SINTEK

Temperature and Humidity Sensor

THTS2N

Product Manual

(V1.1)

● 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.

● Product overview

The temperature, humidity and atmospheric pressure sensor can be widely used in environmental detection, integrating temperature and humidity, the device adopts standard MODBUS-RTU communication protocol, and RS485 signal output. The transmitter is widely used in occasions that need to measure ambient temperature and humidity.

● Features

◇ 10-30V wide DC voltage power supply

◇ Standard MODBUS-RTU communication protocol

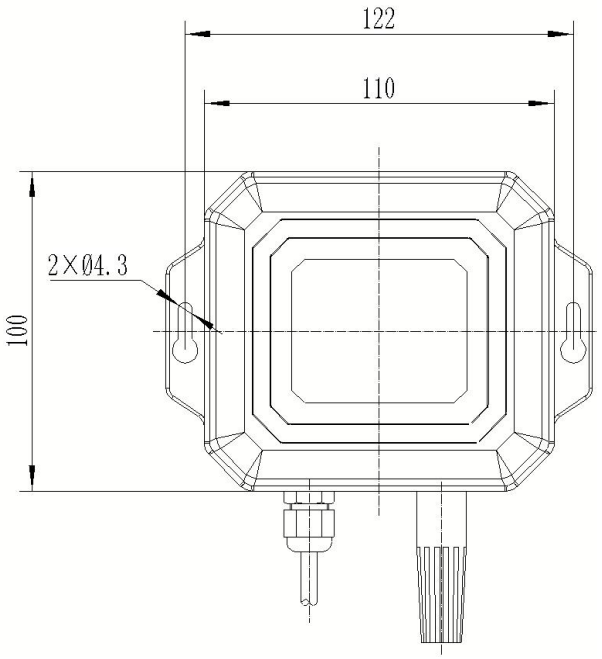
◇ Wide range of air pressure range, applicable to various altitudes

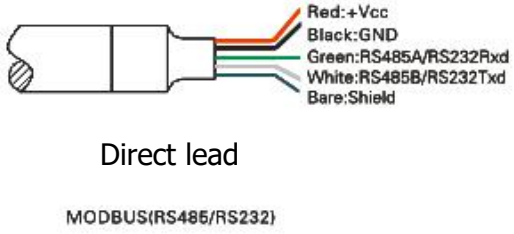
● Technical indicators

Supply voltage	10~30VDC	
Precision	Temperature	±0.5℃（25℃）
	Relative humidity	±3%RH（5%RH~95%RH，25℃）
Measuring range	Temperature	-40℃~80℃
	Relative humidity	0%RH~100%RH
Display resolution	Temperature	0.1℃
	Relative humidity	0.1%rh
Long-term stability	Temperature	0.1℃/y
	Relative humidity	0.1%rh/y
Output signal	(0-5)V, (0-10)V, (4-20)MA, RS485 (MODBUS RTU communication protocol)	

Operating temperature	-40~80℃
Storage temperature	-40~100℃

● Electrical interface and wiring method





Digital RS485 output wiring mode

	Thread color	Lead definition
Power supply	Red	Positive power supply (10~30V DC)
	Black	Power negative
Communication	Green	RS485-A
	White	RS485-B

Analog output wiring

	Thread color	Lead definition
Power supply	Red	Positive power supply (10~30V DC)
	Black	Power negative
Communication	Green	The temperature signal output is positive
	White	Temperature signal output negative

	Blue	Humidity signal output positive
	Yellow	Humidity signal output negative

● Common problems and solutions

The device cannot connect to the PLC or computer Possible reasons:

1. The computer has multiple COM ports, and the selected port is incorrect;
2. The device address is wrong, or there are devices with duplicate addresses (factory defaults are all 1);
3. Baud rate, check mode, data bit, stop bit error;
4. The host polling interval and waiting time for response are too short, both need to be set above 200ms;
5. The 485 bus is disconnected, or the A and B lines are reversed;
6. If there are too many devices or the wiring is too long, the nearby power supply should be added, and a 485 booster should be added, and a 120Ω terminal resistance should be added at the same time;
7. The USB to 485 driver is not installed or damaged;
8. The equipment is damaged.

● Precautions

1. After opening the product package, please check whether the appearance of the product is intact, check whether the relevant content of the product instruction manual is consistent with the product, and keep the product instruction manual for more than one year;
2. Wiring strictly according to the wiring diagram of the product, and work under the permissible excitation voltage of the product, and do not use it with overvoltage;
3. Do not knock the product, so as not to damage the appearance and internal structure of the ring;
4. The product has no customer-repairable parts, please contact our company in case of failure;
5. If the company's products fail under normal conditions, the warranty period is one year (13 months from the date of delivery by our company to the date of return). Whether the failure occurs under normal conditions can be tested by our company's quality inspector as the basis. For maintenance beyond the time limit, the company will charge a cost fee, and all products of the company will be maintained for life;
6. For the unfinished parts, please refer to our company website or call us for inquiries.

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(RS485) MODBUS communication protocol

● Basic settings of communication protocol

Transmission mode: 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 (optional odd parity , even parity), 1 stop bit, after changing the communication parameters, the sensor needs to be powered on again.

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

● Holding register list

Parameter	MODBUS holding register address (16 bits)
Temperature	Address: 0000H The temperature data is uploaded in the form of complement code, and the measured value of the temperature can be obtained by dividing the read value by 10. For example, the read value is 0xFF9B, converted to decimal is -101, and the measured value of the temperature is -10.1°C.
Relative humidity	Address: 0001H The measured value of relative humidity can be obtained by dividing the read value by 10. For example, the read value is 0x0149, converted to 329 in decimal, and the measured value of relative humidity is 32.9%RH.
Baud rate	Address: 0014H The setting value is 48, 96, 192, 384, 576, 1152, corresponding to the baud rate 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 to other addresses is prohibited.

● Modbus RTU command

Supported MODBUS function codes: 0x03, 0x06

03H function code example: read the temperature 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	The high 8 bits of the start register address
Starting Address Lo	00H	The lower 8 bits of the start register address

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 lower 8 bits
CRC Check Hi	0AH	CRC check code high 8 bits

★Slave response：

Slave Address	01H	Slave address
Function	03H	Function code
Byte Count	02H	length is 2 bytes
Data Hi	00H	At this point the temperature is: 24.7°C
Data Lo	F7H	At this point the temperature is: 24.7°C
CRC Check Lo	F9H	CRC check code lower 8 bits
CRC Check Hi	C2H	CRC check code high 8 bits

06H function code example: modify the baud rate (in this case, modify it 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 lower 8 bits
CRC Check Hi	5EH	CRC check code high 8 bits

★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 lower 8 bits
CRC Check Hi	5EH	CRC check code high 8 bits