Temperature vibration sensor

(Type 485)

PR-3001-*-N01-*

Ver 2.0

Chapter 1 Product Introduction

1.1 Product overview

PR-3001 * - N01 * is a high-performance, low-power, anti-jamming and composite vibration sensor developed and produced by using high-performance MEMS chips and embedded technology, temperature sensing technology and vibration sensing technology. The products are widely used in online measurement of temperature and vibration of rotating equipment such as motors, reducer fans, generators, air compressors, centrifuges, water pumps, etc. in coal mining, chemical, metallurgy, power generation and other industries.

The shell is made of stainless steel as a whole, and can be installed with thread if conditions permit on site. The standard thread on the metal shell can be quickly connected with the

installation position. The magnetic suction installation method can also be selected to avoid the trouble of drilling on site and make the installation more convenient.

1.2 Functional characteristics

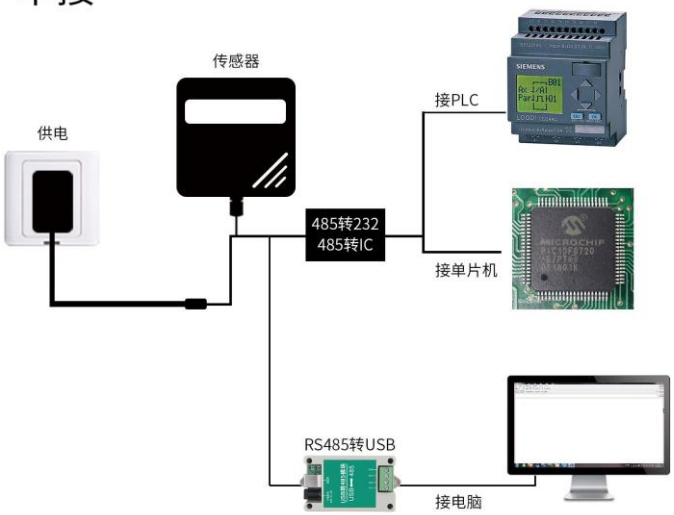
- The product adopts high-performance MEMS chips with high measurement accuracy and strong anti-interference ability.
- The product provides thread installation and magnetic suction installation.
- It can measure parameters such as single-axis and three-axis vibration velocity and vibration displacement.
- It can measure the surface temperature of the motor.
- 10-30V DC wide voltage power supply.
- Protection grade IP67.
- Support remote upgrade.

1.3 Main parameters

power supply	DC10-30V
power waste	0.1W(DC24V)
Protection grade	IP67
frequency range（HZ）	10-1600/10-5000
Vibration measurement direction	Single or three-axis
Transmitter circuit operating temperature	-40℃~+80℃，0%RH~80%RH
Vibration speed measurement range（mm/s）	0-50
Vibration velocity measurement accuracy（mm/s）	±1.5% FS（@1KHZ，10mm/s）
Vibration speed display resolution（mm/s）	0.1
Vibration displacement measurement range（μm）	0-5000
Vibration displacement display resolution（μ m）	0.1
Surface temperature measurement range（℃）	-40~+80
Temperature display resolution（℃）	0.1
signal output	RS-485
Test cycle	real time

1.4 System framework diagram

单接



This product can also be used by combining multiple sensors in a 485 bus. In theory, one bus can have 254 485 sensors, and the other end is connected to a PLC with 485 interface, connected to a single chip through a 485 interface chip, or connected to a computer by using USB to 485. The sensor configuration tool provided by our company is used for configuration and testing (only one device can be connected when using this configuration software).

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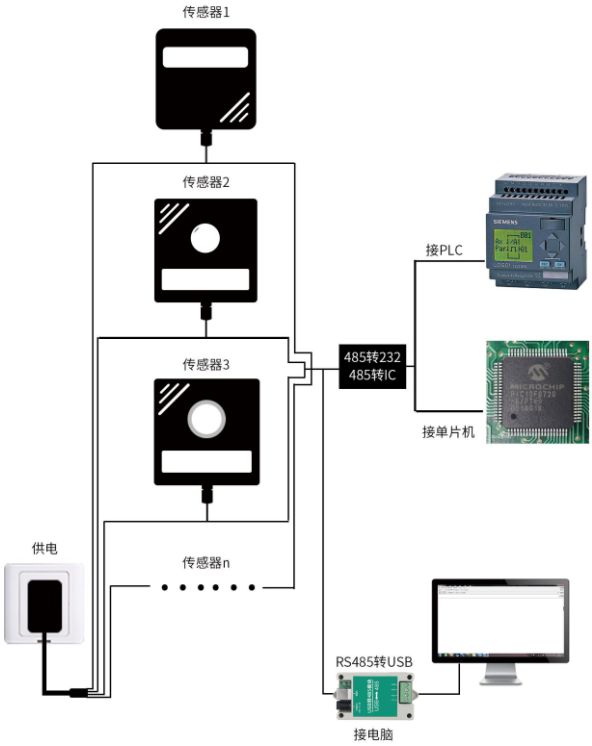


1.6 Product appearance

Chapter 2 Hardware connection

2.2 Interface description

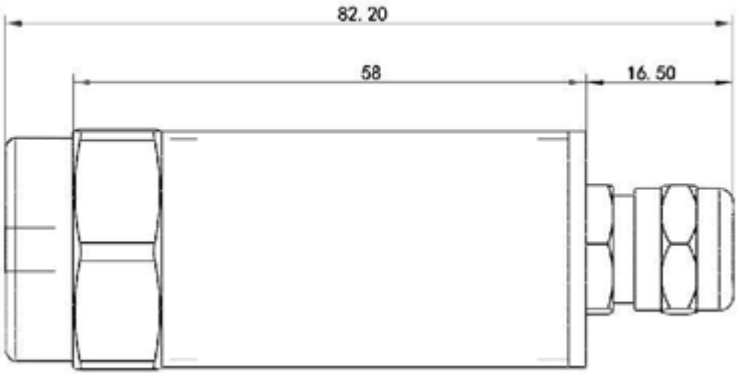
Wide voltage power input can be 10~30V. When wiring the 485 signal line, pay attention to that the two lines A　B cannot be connected reversely, and the addresses of multiple devices on the bus cannot conflict.

2.2.1 Sensor wiring

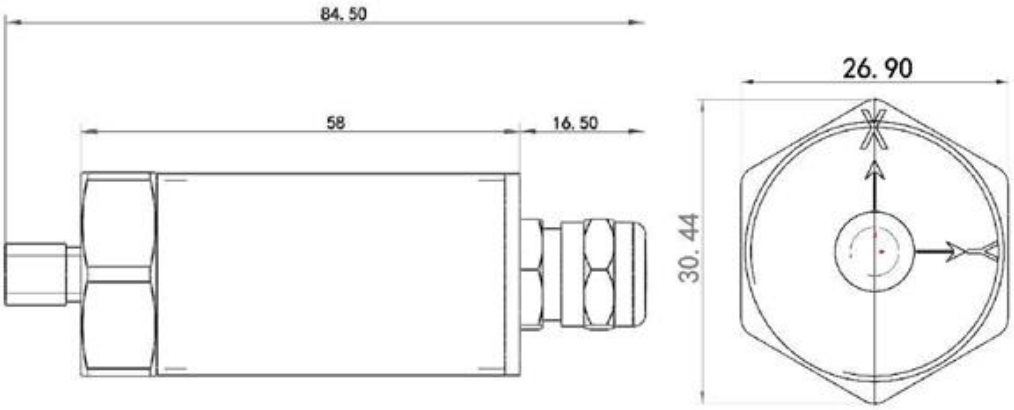
	Linear color	explain
Power Supply	brown	Power supply positive（10~30V DC）
	black	Power supply negative
signal communication	Yellow (green)	485-A
	blue	485-B

2.3 Installation instructions

Installation dimension of magnetic suction



Thread installation size



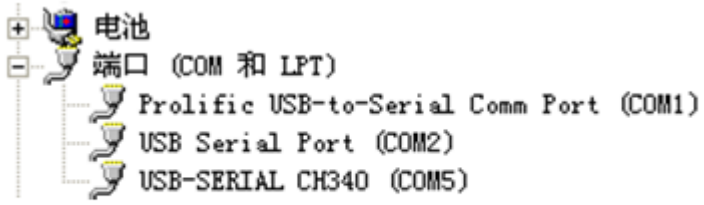
Chapter 3 Installation and Use of Configuration Software

Our company provides the supporting "485 parameter configuration software", which can easily read the parameters of the sensor using the computer, and flexibly modify the device ID and address of the sensor.

Note that there is only one sensor on the 485 bus when using software for automatic acquisition.

3.1 Sensor access to computer

After connecting the sensor to the computer through USB 485 and providing power, you can see the correct COM port in the computer (see the COM port in "My Computer - Properties - Device Manager - Port").



Open the data package, select "Debugging software" - "485 parameter configuration software",

find and open it. 

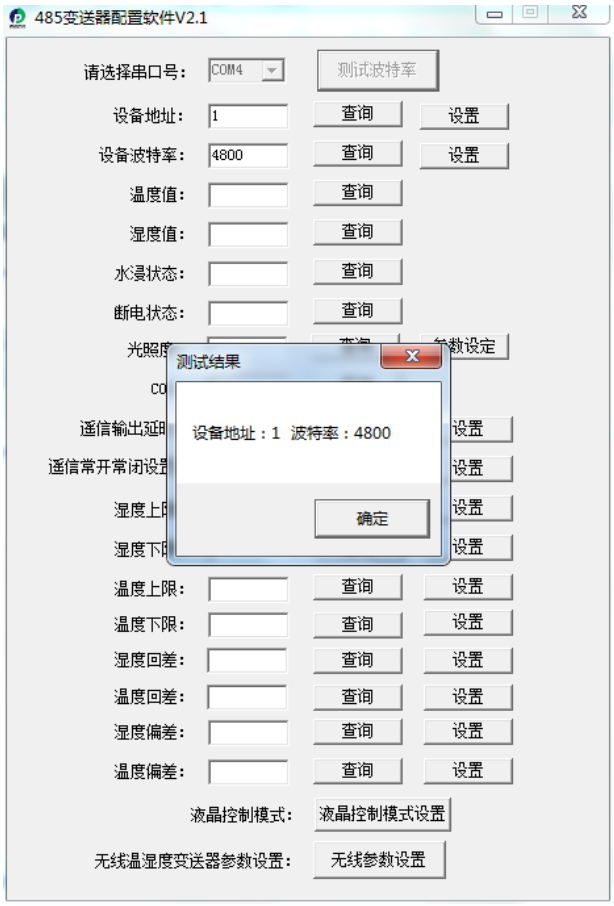
3.2 Use of sensor monitoring software

① The configuration interface is as shown in the figure. First, get the serial port number according to the method in Section 3.1 and select the correct serial port.

② Click the test baud rate of the software, and the software will test the baud rate and address of the current device. The default baud rate is 4800bit/s, and the default address is 0x01.

③ . Modify the address and baud rate as needed, and query the current function status of the device.

④ . If the test is not successful, please recheck the equipment wiring and 485 drive installation.



Chapter 4 Communication Protocol

4.1 Basic communication parameters

code	8-bit binary
Data bits	8 bits
Parity bit	no
Stop bit	1 bit
Error check	CRC (redundant cyclic code)

Baud rate	2400~115200 can be set

4.2 Definition of data frame format

Modbus-RTU communication protocol is adopted, and the format is as follows:

Time of initial structure ≥ 4 bytes

Address code=1 byte

Function code=1 byte

Data area=N bytes

Error check=16-bit CRC code

Time to end structure ≥ 4 bytes

Address code: the address of the sensor, which is unique in the communication network (factory default 0x01).

Function code: the instruction function indication sent by the host.

Data area: The data area is specific communication data. Note that the high byte of 16bits data comes first!

CRC code: two-byte check code.

Host query frame structure:

Address code	Function code	Register start address	Register length	Check code low bit	Check code high bit
1 byte	1 byte	2 byte	2 byte	1 byte	1 byte

Slave response frame structure:

Address code	Function code	Number of valid bytes	Data Zone 1	Second data area	Nth data area	Check code
1 byte	1 byte	1 byte	2 byte	2 byte	2 byte	2 byte

4.3 Register address

RS-WZ1-N01 register description

Register address	PLC or configuration address	content	Support function code	explain
0000 H	40001	temperature	0x03/0x04	Real-time temperature value (expanded by 10 times)
0001 H	40002	speed	0x03/0x04	Real-time value of speed (increase by 10 times)
0002H	40003	displacement	0x03/0x04	Real-time displacement value (expanded by 10 times)
0050H	40081	Temperature calibration	0x03/0x04/0x06	Integer (10 times larger)

		value		
0068H 0069H	40105 40106	Speed calibration value A	0x03/0x04/0x10	Speed coefficient A (floating point)
006AH 006BH	40107 40108	Speed calibration value B	0x03/0x04/0x10	Speed coefficient B (floating point)
0074H 0075H	40117 40118	Displacement calibration value A	0x03/0x04/0x10	Displacement coefficient A (floating point type)
0076H 0077H	40119 40120	Displacement calibration value B	0x03/0x04/0x10	Displacement coefficient B (floating point type)
07D0 H	42001	Device address	0x03/0x04/0x06	1~254 (factory default 1)
07D1 H	42002	Baud rate	0x03/0x04/0x06	0 representative 2400 1 representative 4800 2 representative 9600 3 representative 19200 4 representative 38400 5 representative 57600 6 representative 115200 7 representative 1200

RS-WZ3-N01 register description

Register address	PLC or configuration address	content	Support function code	explain
0000 H	40001	temperature	0x03/0x04	Real-time temperature value (expanded by 10 times)
0001 H	40002	X-axis speed	0x03/0x04	Real-time value of X-axis speed (expanded by 10 times)
0002H	40003	Y-axis speed	0x03/0x04	Real-time value of Y-axis speed (expanded by 10 times)
0003H	40004	Z-axis speed	0x03/0x04	Real-time value of Z-axis speed

				(increased by 10 times)
0004H	40005	X-axis displacement	0x03/0x04	Real-time value of X-axis displacement (expanded by 10 times)
0005H	40006	Y-axis displacement	0x03/0x04	Real-time value of Y-axis displacement (expanded by 10 times)
0006H	40007	Z-axis displacement	0x03/0x04	Real-time value of Z-axis displacement (expanded by 10 times)
0050H	40081	Temperature calibration value	0x03/0x04/0x06	Integer (10 times larger)
0060H	40097	X-axis speed calibration value A	0x03/0x04/0x10	X-axis speed coefficient A (floating point type)
0061H	40098			
0062H	40099	X-axis speed calibration value B	0x03/0x04/0x10	X-axis speed coefficient B (floating point type)
0063H	40100			
0064H	40101	Y-axis speed calibration value A	0x03/0x04/0x10	Y-axis speed coefficient A (floating point type)
0065H	40102			
0066H	40103	Y-axis speed calibration value B	0x03/0x04/0x10	Y-axis speed coefficient B (floating point type)
0067H	40104			
0068H	40105	Z-axis speed calibration value A	0x03/0x04/0x10	Z-axis speed coefficient A (floating point type)
0069H	40106			
006AH	40107	Z-axis speed	0x03/0x04/0x10	Z-axis speed coefficient B

		calibration value B		(floating point type)
006BH	40108			
006CH	40109	X axis displacement calibration value A	0x03/0x04/0x10	X-axis displacement coefficient A (floating point type)
006DH	40110			
006EH	40111	X axis displacement calibration value B	0x03/0x04/0x10	X-axis displacement coefficient B (floating point type)
006FH	40112			
0070H	40113	Y-axis displacement calibration value A	0x03/0x04/0x10	Y-axis displacement coefficient A (floating point type)
0071H	40114			
0072H	40115	Y-axis displacement calibration value B	0x03/0x04/0x10	Y-axis displacement coefficient B (floating point type)
0073H	40116			
0074H	40117	Z-axis displacement calibration value A	0x03/0x04/0x10	Z-axis displacement coefficient A (floating point type)
0075H	40118			
0076H	40119	Z-axis displacement calibration value B	0x03/0x04/0x10	Z-axis displacement coefficient B (floating point type)
0077H	40120			
07D0 H	42001	Device	0x03/0x04/0x06	1~254 (factory default 1)

		address		
07D1 H	42002	Baud rate	0x03/0x04/0x06	0 representative 2400 1 representative 4800 2 representative 9600 3 representative 19200 4 representative 38400 5 representative 57600 6 representative 115200 7 representative 1200

4.4 Communication protocol example and explanation

Example 1: Read the temperature value of device 1

Query frame:

Address code	Function code	Start address	Data length	Check code low bit	Check code high bit
0x01	0x03	0x00 0x00	0x00 0x01	0x84	0x0A

Response frame: (for example, equipment 1 is temperature, and the real-time value is 8.6 ℃)

Address code	Function code	Returns the number of valid bytes	Device 1 real-time data	Check code low bit	Check code high bit
0x01	0x03	0x02	0x00 0x50	0xB8	0x78

Temperature calculation:

Temperature: 0050H (hex)=80 (decimal)=>Temperature=8.0 ℃ (our transmitter upload value is ten times the actual value)

Chapter 5 Common Problems and Solutions

The device cannot connect to the computer

Possible causes:

1) The computer has multiple COM ports, and the selected port is incorrect

2) The device address is incorrect, or there are devices with duplicate addresses (all are 1 by default)

3) Baud rate, check method, data bit, stop bit error

4) The 485 bus is disconnected, or the A and B lines are connected reversely

5) If the number of equipment is too large or the wiring is too long, power supply shall be provided nearby, and 485 intensifier shall be added, and 120 Ω terminal resistance shall be added at the same time.

6) USB to 485 drive not installed or damaged

7) Equipment damage.