RS-WZ3/WZ1-N01-1
Temperature vibration transmitter user 's manual

Document version： V2.2

directory

1. Product Introduction

RS-WZ3/WZ1-N01-1 is a high-performance, low-power, anti-interference, and composite vibration sensor developed and produced using high-performance MEMS chips and embedded technology, temperature sensing technology, and vibration sensing technology.The product is widely used in online temperature and vibration measurement of rotating equipment such as motors, reducers, fans, generators, air compressors, centrifuges, and water pumps in industries such as coal mining, chemical engineering, metallurgy, and power generation.

The overall shell is made of stainless steel material, and threaded installation can be used if conditions permit on site. The standard threads on the metal shell can be quickly connected to the installation site. Magnetic suction installation method can also be chosen, which eliminates the trouble of drilling on site and makes installation more convenient.

2. Product Selection

RS-					Company code
	WZ3-				Temperature+vibration (three axis) collector (Frequency response range 10-1600Hz)
	WZ1-				Temperature+vibration (single axis) collector (Frequency response range 10-1600Hz)
	WZ3A-				Temperature+vibration (three axis) collector (Frequency response range 10-5000Hz)
	WZ1A-				Temperature+vibration (single axis) collector (Frequency response range 10-5000Hz)
		N01-			RS485（Modbus-RTU agreement）
			1-		First generation appearance
				M10	M10 external thread
				M8	M8 external thread
				M5	M5 external thread
				CX	Magnetic suction installation

3. Functional characteristics

- The product adopts high-performance MEMS chips, with high measurement accuracy and strong anti-interference ability.
- The product provides threaded installation and magnetic suction installation methods.
- It can measure parameters such as uniaxial and triaxial vibration velocity, vibration displacement, etc.
- It can measure the surface temperature of the motor.

- 10-30V DC wide voltage power supply.
- Protection level IP67.
- Support remote upgrades.

4.Technical parameter description

power supply	DC10-30V
consumption	0.3W(DC24V)
protection grade	IP67
Frequency range (Hz)	10-1600 or 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	＜1% （@160Hz，10mm/s）
Vibration velocity display resolution (mm/s)	0.1
Vibration displacement measurement range（ μ m）	0-5000
Vibration displacement measurement accuracy	＜1% （@40Hz，400μm）
Vibration displacement display resolution（ μ m）	0.1
Vibration acceleration measurement range*230510	±16g（Default g=9.8m/s2）
Vibration acceleration measurement accuracy*230510	＜1% （@160Hz，10mm/s^2）
Acceleration display resolution (m/s2)*230510	0.1
Surface temperature measurement range (℃)	-40~+80
Temperature display resolution (℃)	0.1

OUTPUT	RS-485
detection period	real time

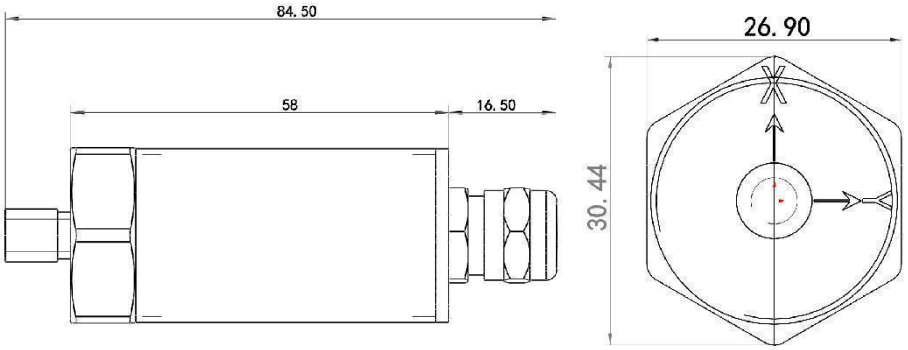
Note: Marked with "* xxxxxx" as a new feature, some old devices do not have this feature.

The performance data stated above is obtained through statistical analysis of the prototype provided by our company under the testing conditions of the testing system and software operated by the testing agency according to the corresponding calibration basis. If you have any questions about the relevant data and testing process, you can contact our staff to obtain relevant information about the prototype for reference. In order to continuously improve the product, our company reserves the right to change the design features and specifications without prior notice

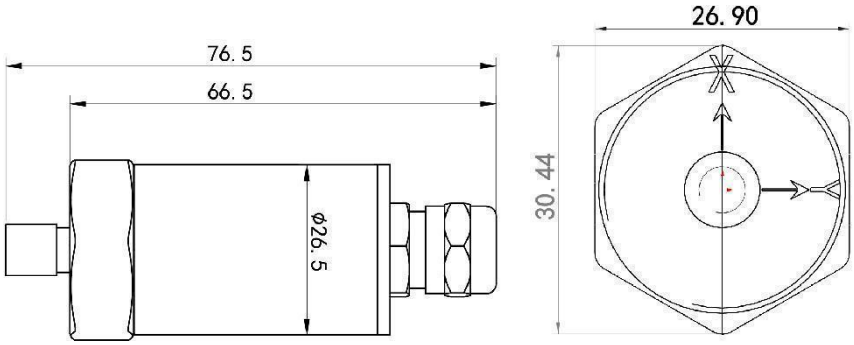
5. Installation instructions

5.1 Dimension

The size of the old temperature vibration transmitter (some selected transmitters still use the old size)



Dimensions of the new temperature vibration transmitter



Magnetic suction model and M5 threaded model: Based on the dimensions shown in the figure, the thread will be shortened by 3mm;

Attention: The above dimensions are theoretical, but there may be a deviation of ± 2mm in actual dimensions

Equipment list:

■1 main device

■ Certificate of conformity, warranty card, etc

5.2 Installation and wiring instructions

1） There are certain standard requirements for 485 field wiring, please refer to the information package "485 Equipment Field Wiring Manual" for details.

2） When connecting devices to the 485 bus, ensure that multiple device addresses are not duplicated.

Installation instructions

This sensor has two types of thread installation: m8 * 1.25 * 10 and m5 * 7 external threads. In addition, there is also a magnetic suction installation method

If there are special requirements for detecting X and Y axis data, it is necessary to pay special attention to the silk screen identification at the bottom of the sensor. If only single axis data is monitored, it is recommended to use the Z axis, which is perpendicular to the bottom of the device after installation.

Power supply and 485 signal

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

Specific wiring

	Linear color	illustrate
power supply	brown	V+（10~30V DC）
	black	V-
communication	Yellow (green)	485-A
	blue	485-B

5.3Configuration software installation and use

Software Selection

Open the data package, select "Debugging Software" - "485 Parameter Configuration Software", and find

Just open it.**Note: Only one device can be connected when changing the address and baud rate using this configuration software.**

Parameter settings

①、 Select the correct COM port (view the COM port in "My Computer - Properties - Device Manager - Port"). The following figure lists the drive names of several different 485 converters.

②、 Connect one device separately and power it on. Click on the software's test baud rate, 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 according to usage needs, while also querying the current functional status of the device.

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

6.485 communication protocol

6.1 Basic communication parameters

code	8-bit binary
Data bits	8-bit
Parity bit	not have
stop bit	1 bit
Error verification	CRC (Redundant Cyclic Code)
BAUD	2400~115200 can be set

6.2 Definition of data frame format

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

Time for 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 transmitter, which is unique in the communication network (factory default 0x01).

Data area: The data area is specific communication data, please note that the high byte of 16bits data comes first!

CRC code: A two byte check code.

Host inquiry frame structure:

Address code	function code	Register Start Address	register length	Check code low bit	Check code high bit

1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

Slave response frame structure：

Address code	function code	Effective Bytes	Data Zone 1	Second data area	Nth data area	Check Code
1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes

6.3 Register Address Description

Note: A new register is marked with "* xxxxxx", and some old devices do not have this register.

RS-WZ1-N01Register Description

Register address	PLC or configuration address	content	Support function codes	illustrate
0000 H	40001	temperature	0x03/0x04	Temperature measurement value (increased by 10 times)
0001 H	40002	speed	0x03/0x04	Speed measurement value (increased by 10 times)
0002 H	40003	displacement	0x03/0x04	Displacement measurement value (increased by 10 times)
0003 H	40004	acceleration	0x03/0x04	Acceleration measurement value (increased by 10 times)*230510
0050 H	40081	Temperature calibration value	0x03/0x04/0x06	Integer (expanded by 10 times)
005C H	40093	Temperature calibration coefficient A	0x03/0x04/0x10	Temperature coefficient A (float)*230510
005D H	40094			
005E H	40095	Temperature calibration coefficient B	0x03/0x04/0x10	Temperature coefficient B (float)*230510
005F H	40096			
0068 H	40105	Speed calibration value A	0x03/0x04/0x10	Speed coefficient A (floating point)
0069 H	40106			
006A H	40107	Speed	0x03/0x04/0x10	Speed coefficient B (floating

006B H	40108	calibration value B		point)
0074 H 0075 H	40117 40118	Displacement calibration value A	0x03/0x04/0x10	Displacement coefficient A (floating point)
0076 H 0077 H	40119 40120	Displacement calibration value B	0x03/0x04/0x10	Displacement coefficient B (floating point)
0080 H 0081 H	40129 40130	Displacement calibration value A	0x03/0x04/0x10	Acceleration coefficient A (float)*230510
0082 H 0083 H	40131 40132	Displacement calibration value B	0x03/0x04/0x10	Acceleration coefficient B (float)*230510
07D0 H	42001	Device Address	0x03/0x04/0x06	1~254（Factory default 1）
07D1 H	42002	BAUD	0x03/0x04/0x06	0 represents 2400 1 represents 4800 2 represents 9600 3 represents 19200 4 represents 38400 5 represents 57600 6 represents 115200 7 represents 1200

RS-WZ3-N01Register Description

Register address	PLC or configuration address	content	Support function codes	illustrate
0000 H	40001	temperature	0x03/0x04	Temperature measurement value (increased by 10 times)
0001 H	40002	X-axis speed	0x03/0x04	X-axis velocity measurement value (increased by 10 times)
0002 H	40003	Y-axis speed	0x03/0x04	Y-axis velocity measurement

				value (increased by 10 times)
0003 H	40004	Z-axis speed	0x03/0x04	Z-axis velocity measurement value (increased by 10 times)
0004 H	40005	X-axis displacement	0x03/0x04	X-axis displacement measurement value (expanded by 10 times)
0005 H	40006	Y-axis displacement	0x03/0x04	Y-axis displacement measurement value (expanded by 10 times)
0006 H	40007	Z-axis displacement	0x03/0x04	Z-axis displacement measurement value (expanded by 10 times)
0009 H	40010	VERSION	0x03/0x04	VERSION
000A H	40011	X-axis acceleration	0x03/0x04	X-axis acceleration measurement value (increased by 10 times)*230510
000B H	40012	Y-axis acceleration	0x03/0x04	Y-axis acceleration measurement value (increased by 10 times)*230510
000C H	40013	Z-axis acceleration	0x03/0x04	Z-axis acceleration measurement value (increased by 10 times)*230510
0050 H	40081	Temperature calibration value	0x03/0x04/0x06	Integer (expanded by 10 times)
005C H	40093	Temperature coefficient A	0x03/0x04/0x10	Temperature coefficient A （float）*230510
005D H	40094			
005E H	40095	Temperature coefficient B	0x03/0x04/0x10	Temperature coefficient B （float）*230510
005F H	40096			
0060 H	40097	X-axis speed calibration value A	0x03/0x04/0x10	X-axis velocity coefficient A （float）
0061 H	40098			
0062 H	40099	X-axis speed calibration	0x03/0x04/0x10	X-axis velocity coefficient B （float）
0063 H	40100			

		value B		
0064 H	40101	Y-axis speed calibration value A	0x03/0x04/0x10	Y-axis velocity coefficient A （float）
0065 H	40102			
0066 H	40103	Y-axis speed calibration value B	0x03/0x04/0x10	Y-axis velocity coefficient B （float）
0067 H	40104			
0068 H	40105	Z-axis speed calibration value A	0x03/0x04/0x10	Z-axis velocity coefficient A （float）
0069 H	40106			
006A H	40107	Z-axis speed calibration value B	0x03/0x04/0x10	Z-axis velocity coefficient B （float）
006B H	40108			
006C H	40109	X-axis displacement calibration value A	0x03/0x04/0x10	X-axis displacement coefficient A（float）
006D H	40110			
006E H	40111	X-axis displacement calibration value B	0x03/0x04/0x10	X-axis displacement coefficient B（float）
006F H	40112			
0070 H	40113	Y-axis displacement calibration value A	0x03/0x04/0x10	Y-axis displacement coefficient A（float）
0071 H	40114			
0072 H	40115	Y-axis displacement calibration value B	0x03/0x04/0x10	Y-axis displacement coefficient B（float）
0073 H	40116			
0074 H	40117	Z-axis displacement calibration value A	0x03/0x04/0x10	Z-axis displacement coefficient A（float）
0075 H	40118			
0076 H	40119	Z-axis	0x03/0x04/0x10	Z-axis displacement coefficient

0077 H	40120	displacement calibration value B		B（float）
0078 H	40121	X-axis displacement calibration value A	0x03/0x04/0x10	X-axis acceleration coefficient A（float）*230510
0079 H	40122			
007A H	40123	X-axis displacement calibration value B	0x03/0x04/0x10	X-axis acceleration coefficient B（float）*230510
007B H	40124			
007C H	40125	Y-axis displacement calibration value A	0x03/0x04/0x10	Y-axis acceleration coefficient A（float）*230510
007D H	40126			
007E H	40127	Y-axis displacement calibration value B	0x03/0x04/0x10	Y-axis acceleration coefficient B（float）*230510
007F H	40128			
0080 H	40129	Z-axis displacement calibration value A	0x03/0x04/0x10	Z-axis acceleration coefficient A（float）*230510
0081 H	40130			
0082 H	40131	Z-axis displacement calibration value B	0x03/0x04/0x10	Z-axis acceleration coefficient B （float）*230510
0083 H	40132			
07D0 H	42001	Device Address	0x03/0x04/0x06	1~254（Factory default 1）
07D1 H	42002	BAUD	0x03/0x04/0x06	0 represents 2400 1 represents 4800 2 represents 9600 3 represents 19200 4 represents 38400

				5 represents 57600 6 represents 115200 7 represents 1200

6.4 Communication protocol examples and explanations

Example 1: Reading the temperature value of device 1

Inquiry frame：

Address code	function code	start address	Length	Check code low bit	Check code high bit
0x01	0x03	0x00 0x00	0x00 0x01	0x84	0x0A

Reply frame： （For example, device 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（hexadecimal）=80（decimalism）=>temperature=8.0 ℃（Our transmitter upload value is ten times the actual value）

6.5 Common problems and solutions

The device cannot be connected to a PLC or computer

Possible reasons:

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 (factory default is all 1)

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

4) The 485 bus is disconnected, or wires A and B are connected in reverse

5) If there are too many devices or the wiring is too long, power should be supplied to the nearby area, with a 485 booster and a 120 Ω terminal resistor added.

6) USB to 485 driver not installed or damaged

7) Equipment damage.

7.contact information

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8. Document History

V1.0 Document establishment.

V2.0 Revise some content descriptions and improve technical parameters.

V2.1 Add - WZ3A selection description.

V2.2 Add new register description.

Appendix 1

ISO2372 equipment vibration standard is applicable to various types of motors, fans, pumps, machine tools, etc.

This product can detect triaxial vibration speeds in the range of 0-50mm/s and 0-5000 μ The triaxial vibration displacement within the range of m is suitable for vibration testing and fault reduction.

Vibration range	ISO2372 Equipment Vibration Standard			
	Equipment category			
unit（mm/s）	Class I	Class II	Class III	Class IV
0.71	A	A	A	A
1.12	B	A	A	A
1.8	B	B	A	A
2.8	C	B	B	A
4.5	C	C	B	B
7.1	D	C	C	B
11.2	D	D	C	C
18	D	D	D	C
28	D	D	D	D

Class I	Small equipment below 15KW	A:	good
Class II	15-75KW medium-sized equipment	B:	Acceptable
Class III	Large equipment installed on a hard foundation	C:	pay attention to
Class IV	High speed equipment with speeds higher than natural frequencies	D:	not allow