



Industrial Vibration Sensor (Analog Type) User Manual



ATO-SN-3001-WZ1



1.1 Product Overview

This product is a high-performance MEMS chip, using embedded technology, temperature sensing technology, vibration sensing technology development and production of a high-performance, low-power, anti-interference and composite vibration sensor. The product is widely used in coal mining, chemical industry, metallurgy, power generation and other industries, motor, reducer fan, generator, air compressor, centrifuges, pumps and other rotating equipment vibration of online measurement.

The whole shell is made of stainless steel, and it can be installed with threads if there are conditions on site, and the standard threads on the metal shell can be connected with the installation parts quickly. You can also choose the magnetic suction mounting method, the site free from the trouble of drilling holes, the installation is more convenient.

1.2 Functional Features

- The product adopts high-performance MEMS chip, with high measurement accuracy and strong anti-interference ability.
- The product provides thread mounting and magnetic suction mounting.
- Measurement of single-axis vibration speed.
- Motor surface temperature can be measured.
- 10-30V DC wide voltage power supply.
- Protection class IP68.

1.3 Main Specifications

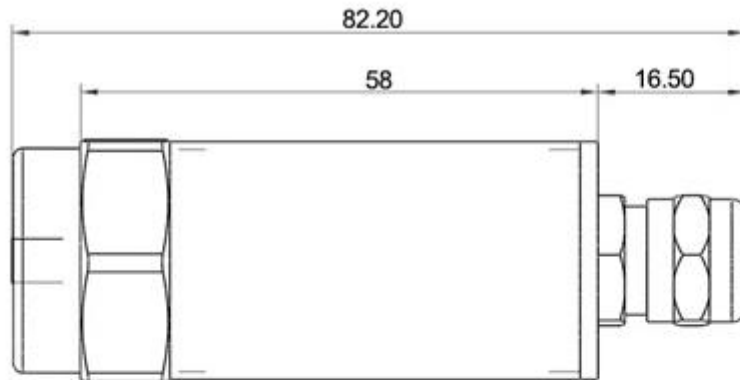
Power Supply	DC10-30V	
Maximum Power Consumption	Current Output	1.2W
	Voltage Output	1.2W
Protection Class	IP68	
Frequency Range	10-1600Hz or 10-5000Hz (optional)	
Vibration Measurement Direction	Single-axis, vertical measurement of the direction of the surface	
Sensor Circuit Operating Temperature	-40°C~+60°C, 0%RH~80%RH	
Vibration Speed Measurement Range (mm/s)	0-50mm/s	
Surface Temperature Measurement Range	-40°C~+80°C	
Vibration Speed Measurement Accuracy (mm/s)	±1.5% FS (@1kHz, 10mm/s)	
Output Signal	Current Output	4-20mA
	Voltage Output	0-5V/0-10V
Load Capacity	Current Output	≤600Ω
	Voltage Output	Output resistance ≤250Ω
Detection Cycle	(in) real time	

Note: This product is not suitable for use in explosive environments.

Dimension (unit: mm)

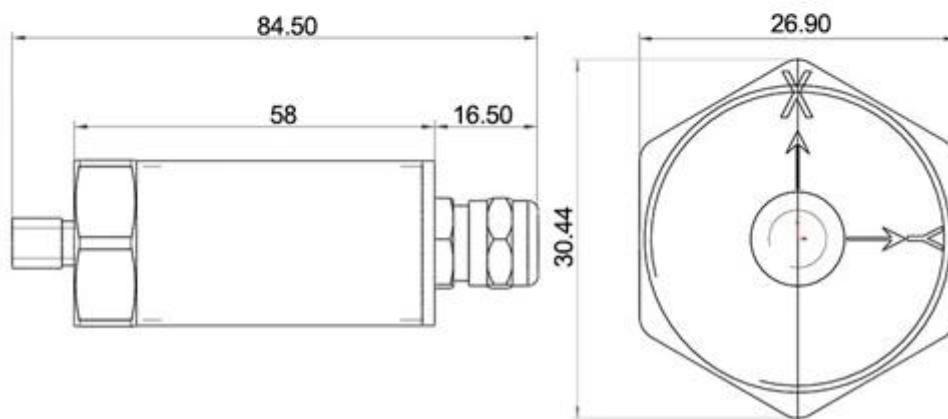
Magnetic mounting dimensions:

(Unit: mm)



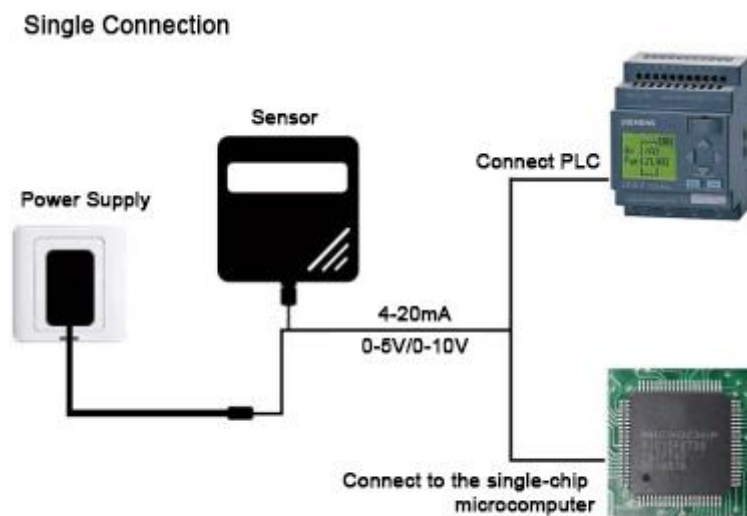
Threaded mounting dimensions:

(Unit: mm)



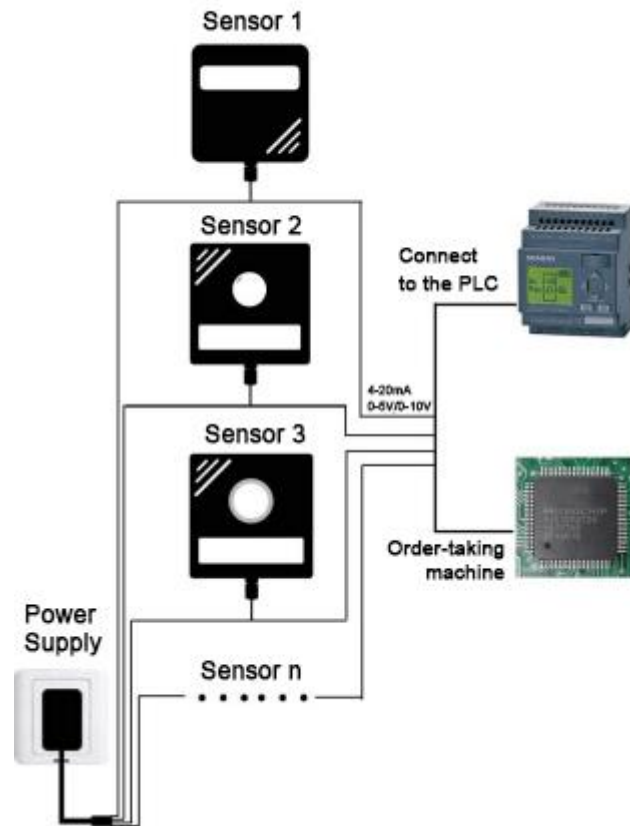
1.4 System Framework Diagram

When the system needs to access an analog version of the sensor, you only need to supply power to the device, and at the same time, connect the analog output line to the DI interface of the microcontroller or PLC, and at the same time, write the corresponding acquisition program according to the conversion relationship in the following.



When the system needs to access more than one analog version of the sensor, you need to access each sensor to each different microcontroller analog acquisition port or PLC's DI interface, and at the same time, according to the later conversion relationship to write the corresponding acquisition program can be.

Multiple Connections



1.5 Product Appearance



2. Hardware Connections

2.1 Pre-installation Inspection of Equipment

Equipment list:

- 1 set of main equipment
- Certificate of conformity, warranty card, etc.

2.2 Interface Description

Wide voltage 10~30V DC power input. For 0-10V output type devices can only be powered by 24V. The device comes standard with 1 independent analog output. At the same time to adapt to the three-wire system and four-wire system.

2.2.1 Sensor Wiring

Specific Wiring

(Please refer to Appendix 2 for products purchased prior to December 15, 2022)

	Thread Color	Description
Power	Brown	Power positive (10~30V DC)
	Black	Power supply negative
Communication	Blue	Temperature signal positive
	Yellow	Vibration speed signal positive

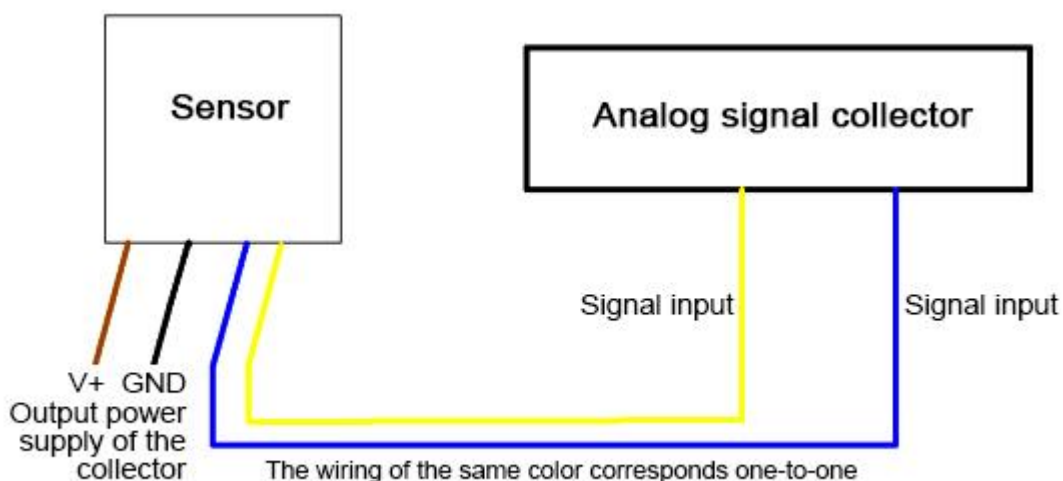
2.3 Installation Instructions

The sensor threaded mounting m8*1.25*10, m5*7 external thread two specifications, in addition to magnetic mounting.

If you need to detect X,Y axis data with special needs, you need to pay attention to the bottom of the sensor silk screen logo, if only monitoring single axis data is recommended to use the Z-axis, that is, after the installation is completed perpendicular to the bottom of the equipment direction.

3. Wiring Instructions

Analog type sensors are easy to wire, just connect the wire to the designated port of the device.



4. Meaning of Analog Parameters

4.1 Current Type Output Signal Conversion Calculation

Example: Range: 0-50mm/s, 4~20mA output. When the output signal is 12mA, the current vibration velocity value is calculated.

The span of this vibration velocity range is 50mm/s, which is expressed by 16mA current signal,

$(50\text{mm/s})/16\text{mA}=3.125\text{mm}/(\text{s}\cdot\text{mA})$, i.e., current 1mA represents a change in vibration speed of 3.125mm/s.

Measured value $12\text{mA}-4\text{mA}=8\text{mA}$, $8\text{mA}\cdot 3.125\text{mm}/(\text{s}\cdot\text{mA})=25\text{mm/s}$
 $25\text{mm/s}+ (0) =25\text{mm/s}$, current vibration speed 25mm/s.

4.2 Voltage Type Output Signal Conversion Calculation

Example: Range: 0-50mm/s, 0-10V output, When the output signal is 5V, the voltage vibration velocity value is calculated.

The span of this vibration velocity range is 50mm/s, expressed as a 10V voltage signal.

$(50\text{mm/s})/10\text{V}=5\text{mm}/(\text{s}\cdot\text{v})$, i.e., voltage 1V represents a change in vibration speed of 5mm/s.

Measured value $5\text{V}-0\text{V}=5\text{V}$, $5\text{V}\cdot 5\text{mm}/(\text{s}\cdot\text{v}) =25\text{mm/s}$
 $25\text{mm/s}+ (0) =25\text{mm/s}$, current vibration speed 25mm/s.

5. FAQs and Solutions

No output or output error

Possible causes:

1. Wrong range correspondence leads to PLC calculation error, for range, please check the technical specifications in the first part.
- 2) Incorrect wiring or wrong wiring sequence.
- 3) Incorrect power supply voltage (24V for 0-10V type).
- 4) The distance between the sensor and the collector is too long, resulting in signal disturbance.
5. PLC acquisition port is damaged.
6. equipment damage.

Appendix 1

ISO2372 equipment vibration standard, applicable to all kinds of motors, fans, pumps, machine tools and equipment.

This product can detect 0-50mm/s range of triaxial vibration speed, applicable to 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 under 15KW	A:	Good
Class II	Medium-sized equipment 15-75KW	B:	Acceptable
Class III	Large equipment mounted on a hard foundation	C:	Attention
Class IV	High-speed machines with speeds higher than the natural frequency	D:	Not allowed

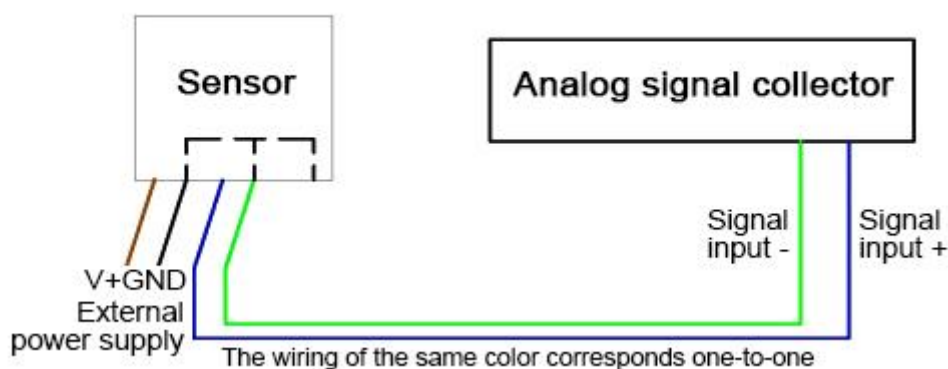
Appendix 2

(Applies to purchases made before December 15, 2022)

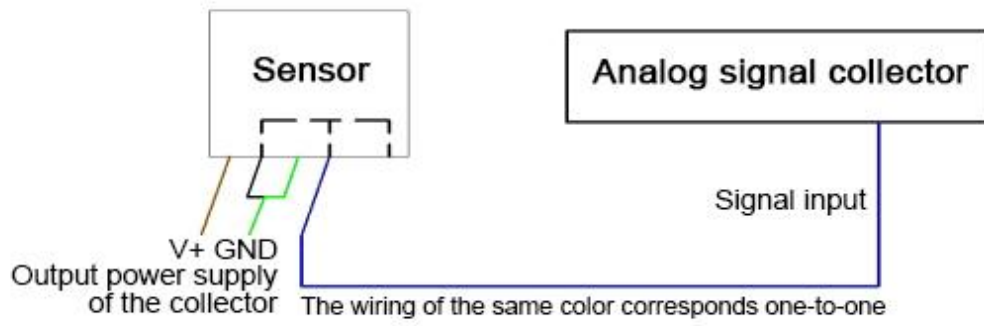
Specific Wiring

	Thread Color	Description
Power	Brown	Power positive (10~30V DC)
	Black	Power supply negative
Communication	Blue	Vibration speed signal positive
	Green	Vibration speed signal negative
	Yellow	Reserved Please use under the guidance of our staff
	White	

Examples of Wiring Methods



4-wire connection diagram



3-wire connection diagram