WF-WM400

High-speed WiFi Triaxial Inclinometer

Technical Manual

V3.0

WF-WM400
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Introduction

WF-WM400 high-speed wireless transmission inclination sensor is a compact and intelligent digital inclination sensor designed for structural health monitoring. Using disposable battery. It can meet the demand of high precision and high frequency monitoring. When upload data once an hour, it can be used for more than 3 years, which can meet the long-term monitoring needs.

The sensitive mechanism adopts the latest technology, the inclination unit of micro-electromechanical production technology, small size, low power consumption, high consistency and stability, as a digital inclinometer, the linearity is easier to be corrected. The working temperature reaches the industrial level -40℃ ~ +85℃.

Feature

- Resolution: 0.001°
- Triaxial measurement, range ±60°
- Magnetic Switch
- Data can be transferred to the cloud
- Accuracy: 0.005°
- Power query
- Timed wake up
- Exercise wake

Application

- Dangerous housing monitoring
- Bridge tower inclination measurement
- Dam monitoring
- Slope disaster prevention
- Ancient building protection monitoring
- Tunnel monitoring
- Foundation pit inclinometer
- Tower tilt monitoring

Product Feature

Mechanical index

Connector	Aviation connector
Protection level	IP68(1m water depth, 24h)
Shell material	ABS+30% glass fiber + magnesium aluminum alloy anodized base
Installation	Four M6 screws

Performance index

Measurement range	Condition	±60	°
Measurement axis	Mutually perpendicular	X-Y	
Accuracy	Room temperature	0.005	°
Resolution		0.001	°
Zero temperature drift	-40～85℃	±0.001	°/℃
Cross axis error	25℃	0.001	°
Output frequency		Up to 50	Hz
Mean No Failure Working hours MTBF	100,000 h		
Electromagnetic compatibility	According to GBT17626		
Insulation resistance	≥100 MΩ		
Impact resistance	2000g，0.5ms，3 times/axis		
Dimension	L105.2*W85*H67（mm）(Antenna not included)		
Weight	450（±10）(with battery)		

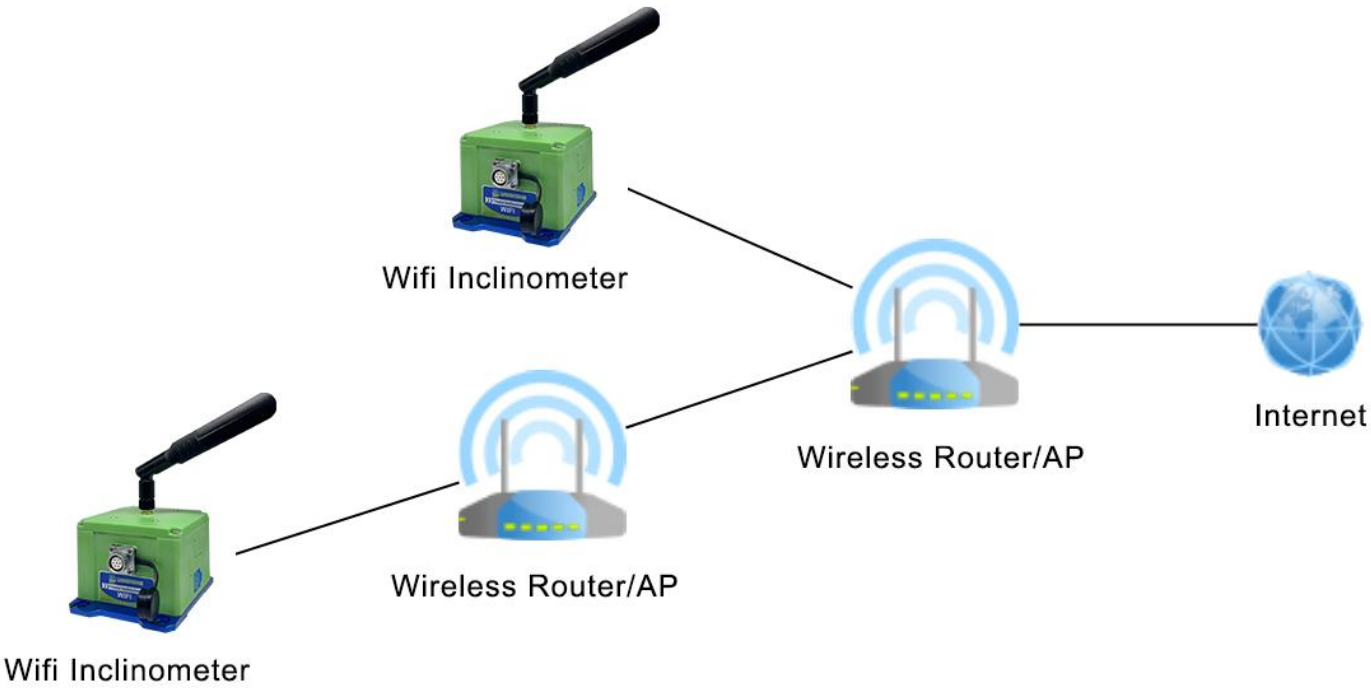
Resolution: The smallest change value of the measured value that the sensor can detect and distinguish within the measurement range.

Accuracy: The root mean square error of the actual angle and the sensor measuring angle for multiple (≥16 times) measurements.

Electrical index

Power connector	Power voltage	3.6VDC~5VDC
	Battery voltage	3.6VDC
	Working current	50mA (Average value)
	Stand-by current	6μA (Typical values)
	Disposable battery capacity	19000mAh
Communication distance	Maximum: 200m	
Data	20 Bytes	
Reliability	The mean time between failures (MTBF) is not less than 100,000 hours	

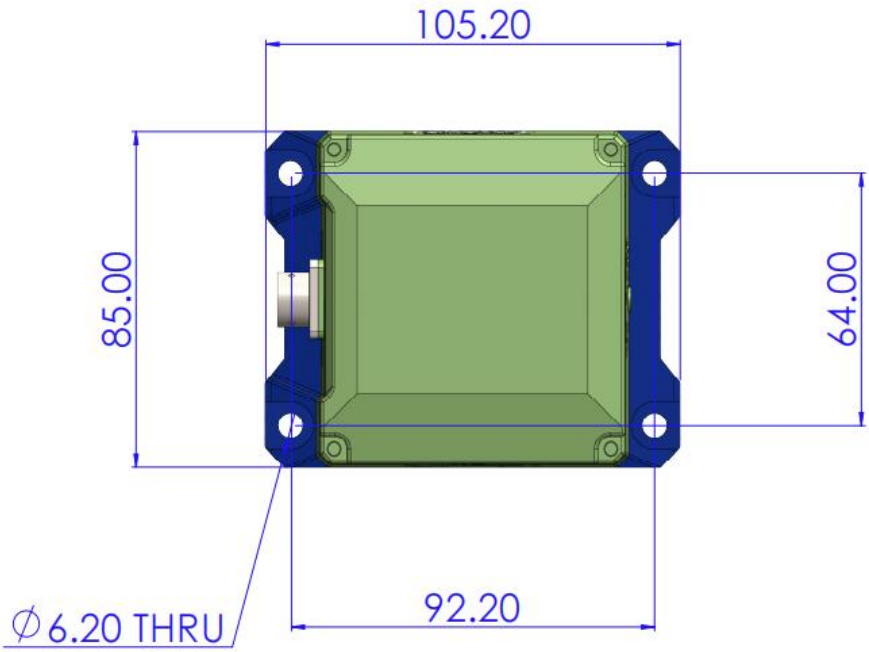
Network topology

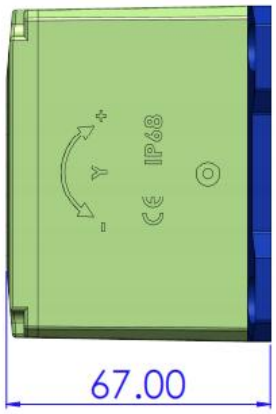


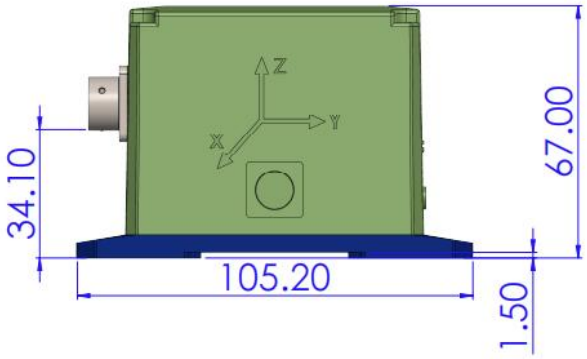
Package product size

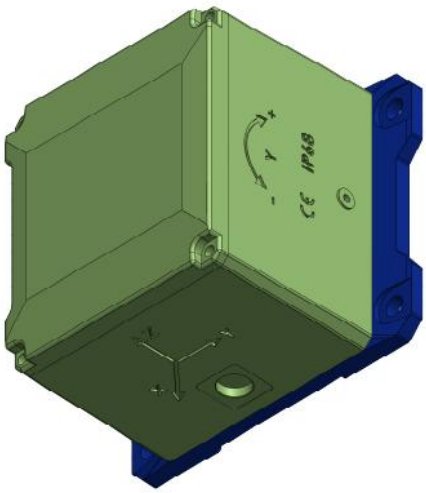
Product size：(Antenna not included) L105.2*W85*H76（mm），the length and width may have 1mm error, please refer to the actual product

Standard antenna height: 159mm (WiFi version without radome)





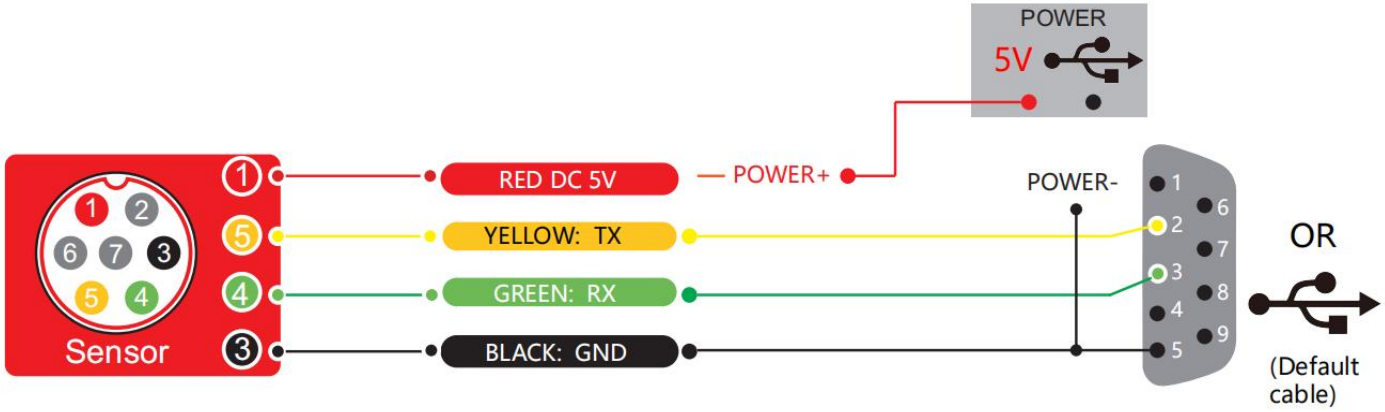




Electrical connections

Aviation plug wiring definition

Wiring color	RED	BLACK	GREEN	YELLOW
function	5VDC	GND	RXD	TXD



Packing list

WF-WM400 *1PC

EVE ER34615 *1PC

EVE SPC1550 *1PC

16cm 4dBi antenna *1PC

19.5cm 6dBi antenna *1PC (Optional)

Aviation plug-USB Power&Data 2in1 cable *1PC

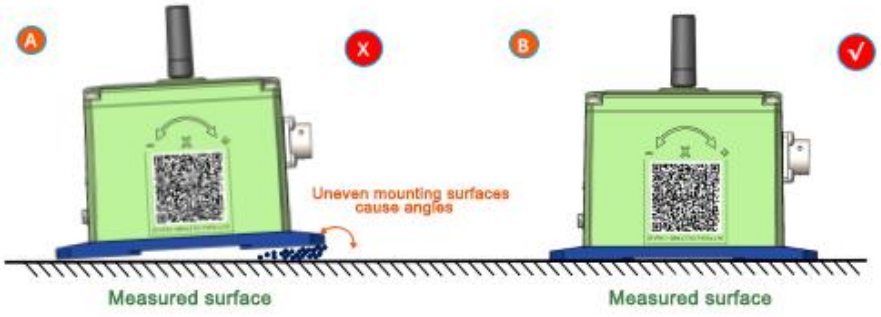
OTG USB Type-A to Type-C *1PC

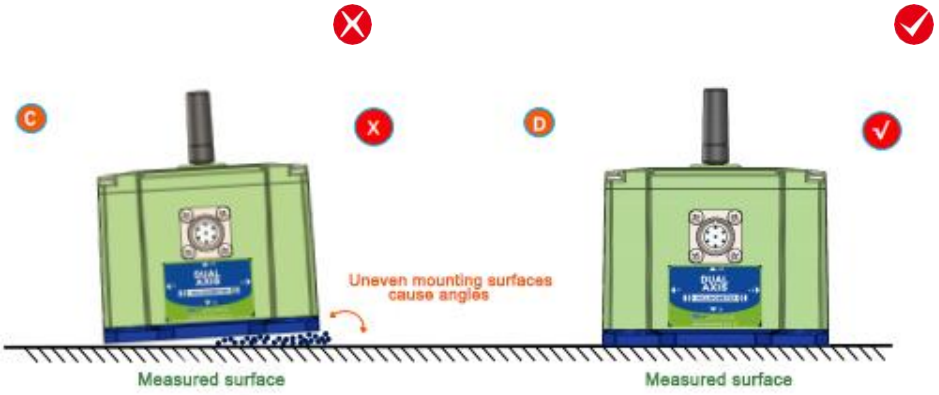
NdFeB strong magnetic screws *4PCS (Optional)

Installation

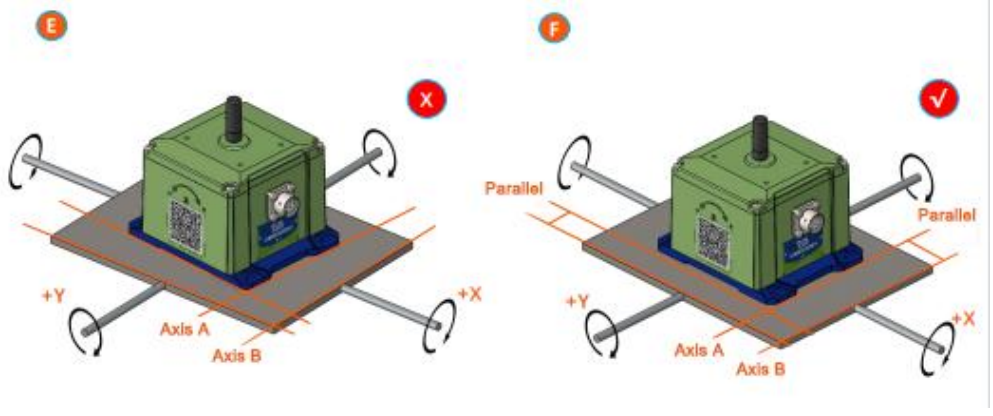
The correct installation method can avoid measurement errors. The following points should be done when installing the sensor:

First of all, make sure that the sensor mounting surface is completely close to the measured surface, and the measured surface should be as level as possible, and there should be no included angles as shown in Figure A and Figure C. The correct installation method is shown in Figure B and Figure D.





Secondly, the bottom line of the sensor and the axis of the measured object cannot have an angle as shown in Figure E, and the bottom line of the sensor should be kept parallel or orthogonal to the axis of rotation of the measured object during installation. This product can be installed horizontally or vertically (vertical installation needs to be customized), and the correct installation method is shown in Figure F.



Finally, the mounting surface of the sensor and the surface to be measured must be tightly fixed, smooth in contact, and stable in rotation, and measurement errors due to acceleration and vibration must be avoided.

Executive standard

- Enterprise Quality System Standard: ISO9001:2015 Standard (Certificate No.064-21-Q-3290-RO-S)
- CE certification (certificate number: M.2019.103. U Y1151)
- ROHS (certificate Number: G 190930099)
- GB/T 191 SJ 20873-2003 General specification for inclinometer and level
- GBT 18459-2001 The calculation method of the main static performance index of the sensor
- JJF 1059.1-2012 Evaluation and expression of measurement uncertainty
- GBT 14412-2005 Mechanical vibration and shock Mechanical installation of accelerometer
- GJB 450A-2004 General requirements for equipment reliability
- GJB 909A Quality control of key parts and important parts
- GJB899 Reliability appraisal and acceptance test
- GJB150-3A High temperature test
- GJB150-4A Low temperature test
- GJB150-8A Rain test
- GJB150-12A Sand and dust experiment
- GJB150-16A Vibration test
- GJB150-18A Impact test
- GJB150-23A Tilt and rock test
- GB/T 17626-3A Radio frequency electromagnetic field radiation immunity test
- GB/T 17626-5A Surge (impact) immunity test
- GB/T 17626-8A Power frequency magnetic field immunity test
- GB/T 17626-11A Immunity to voltage dips, short-term interruptions and voltage changes

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