

V3.0



FG-WM400 Series

High-speed wireless transmission Inclinometer

Technical Manual



Introduction

FG-WH400 4G wireless transmission inclination sensor is a compact and intelligent digital inclination sensor designed for structural health monitoring. It can output three-axis inclination angle and three-axis acceleration, using high-capacity lithium sub-battery (optional rechargeable lithium battery), uploading data once an hour can be used continuously for 3 years. Support 4G full network can transfer data to the cloud.

Sensitive mechanism using the latest technology, microelectromechanical production process of the tilt unit, small size, low power consumption, consistency and stability is very high, because it is a digital tilt sensing module, linearity is more easily corrected. The working temperature reaches industrial level $-40^{\circ}C \sim +85^{\circ}C$.

Feature

- Resolution: 0.001°
- Biaxial inclination measurement, range ±60°
- Magnetic Switch
- 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

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Product Feature

Mechanical index

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

🕺 Performance index

Measurement range	Condition	±60	٥	
Measurement axis	Mutually perpendicular	X-Y		
Accuracy	Room temperature	0.005	٥	
Resolution		0.001	0	
Zero temperature drift	-40 ~ 85℃	±0.001	°/°C	
Cross axis error	25℃	0.001	٥	
Output frequency		Up to 50	Hz	
Mean No Failure Working hours MTBF	≥90000 h			
Electromagnetic compatibility	According to GBT17626			
Insulation resistance	≥100 MΩ			
Impact resistance	2000g, 0.5ms, 3times/axis			
Dimensions	L105.2*W85*H76 (mm) (Antenna not included)			
Weight	/			

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	4.2VDC
	Disposable dry cell voltage	3.6VDC
	Working current	50mA (Average value)
	Stand-by current	6µA(Typical values)
	Rechargeable battery capacity	6000mAH
	Disposable dry cell battery capacity	19000mAH
Transmit power	13~16dBm	
Receiving sensitivity	-90~-67dBm	





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Package product size

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

Standard antenna height: 159mm (this product without antenna cap)



Electrical connections

Aviation plug wi	ring definition			
	RED	BLACK	GREEN	YELLOW
Wiring color function	1	3	4	5
	4.2V	GND	RXD	TXD



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Installation

This series of products can only be installed vertically (pendulum type measurement), not horizontally. 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

- National Standard for Static Calibration Specifications for Dual-Axis Inclination Sensors (Draft)
- GB/T 191 SJ 20873-2003 General Specification for Inclinometers and Levels

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