

BWM425E Series

High EMC protection CAN Bus Dual Axis Inclinometer

Technical Manual

BWM425E
High EMC protection CAN Bus Dual Axis Inclinometer



Introduction

BWM425E is a high EMC protection dual-axis inclinometer developed and produced by Bewis Sensing, which adopts MEMS technology and CAN output. It has a measurement range of ±90°, the highest accuracy of 0.01°, and an operating temperature of -40°C to +85°C. The product uses a high-precision MEMS accelerometer and a high-resolution differential digital-to-analog converter, with built-in automatic compensation and filtering algorithms, which eliminates errors caused by environmental changes to the greatest extent. Convert the change of the static gravity field into the change of the inclination angle, and directly output the horizontal inclination value through the digital method. This product has high long-term stability, low temperature drift, simple use, and strong ability to resist external interference. It is a recommended choice to be used for surveying and mapping, industrial automation and other industries.

Main Feature

- Dual axis inclination measurement
- Resolution：0.005°
- Power supply：9-35V
- Dimension：L97*W63*H27.2（mm）
- Highest accuracy：0.01°
- Range：±90°
- Output：CAN
- IP67 Protection level

Application

- Industrial automatic leveling
- Medical instruments
- Photovoltaic automatic tracking
- Tower tilt monitoring
- Structural deformation monitoring
- Surveying and Mapping Instruments
- Equipment automation
- Lifting equipment inclination control

Product Feature

Electrical Index

Power Voltage	9~35V DC
Working current	20~40mA
Operating temperature(mA)	-40~85℃
Storage Temperature (℃)	-55~100℃

Performance Index

Measurement Range (°)	Condition	±90
Measurement axis	Mutually perpendicular	X-Y
Accuracy (°)	Room temperature	0.01
Resolution (°)		0.005
Zero bias (°/℃)	-40~85℃	±0.008
Cross axis error(°)	-40~85℃	0.01
Mean time between failures MTBF	≥90000 h/time	
Electromagnetic compatibility	According to GBT17626	
Impact resistance	2000g，0.5ms，3 times/axis	
Electrostatic discharge (ESD)	IEC 61000-4-2 IV level	Contact discharge 8KV, air discharge 15KV
Fast transient pulse burst immunity	IEC 61000-4-4 IV level	Repetition frequency 5kHz Power supply: ±4kV Signal line: 2kV
Surge (impact) immunity	IEC 61000-4-5 IV level	Power supply positive and negative, signal line;

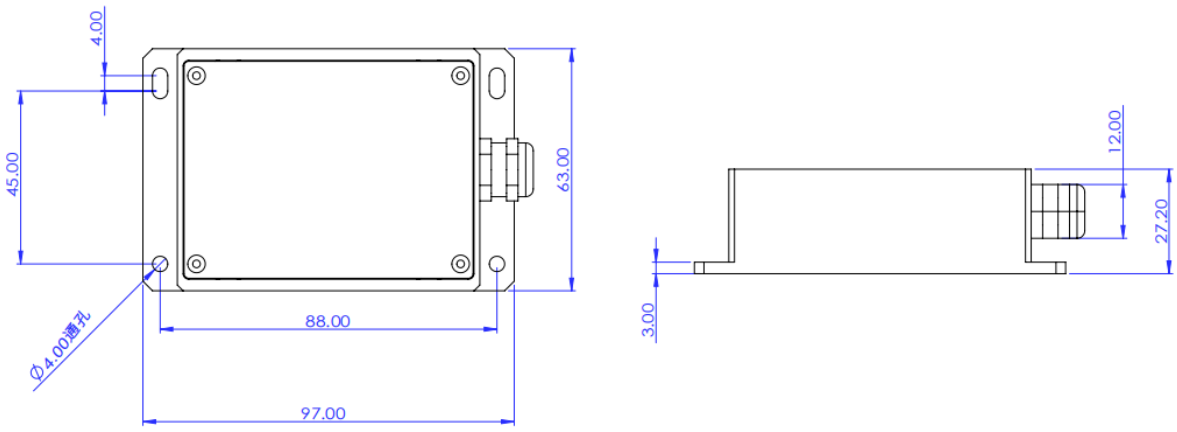
Resolution: The smallest change value of the measured value that the sensor can detect and distinguish within the measurement range.
Accuracy: The root mean square error of the actual angle and the sensor measuring angle for multiple (≥16 times) measurements.

Mechanical Index

Connector	Metal Joint（Cable 1.5m)
Protection level	IP67
Shell material	Magnesium aluminum alloy oxidation
Installation	Four M4 screws

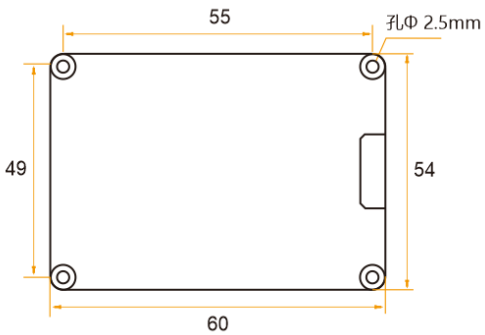
Package product size

Product size：L97*W63*H27.2（mm）



Bara board product size

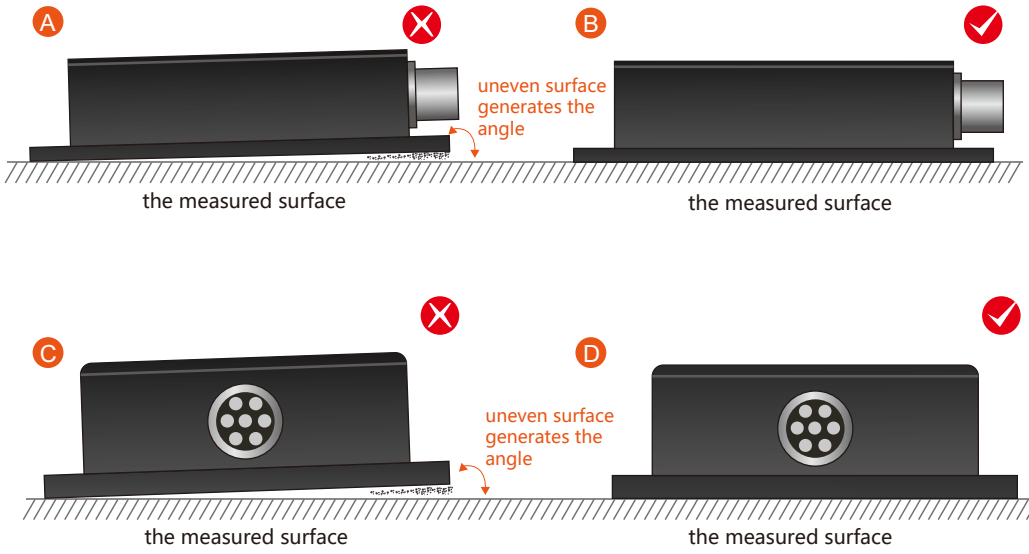
Product size: L60*W54*H6 (mm), the length and width may have an error of ±1mm, please refer to the actual product



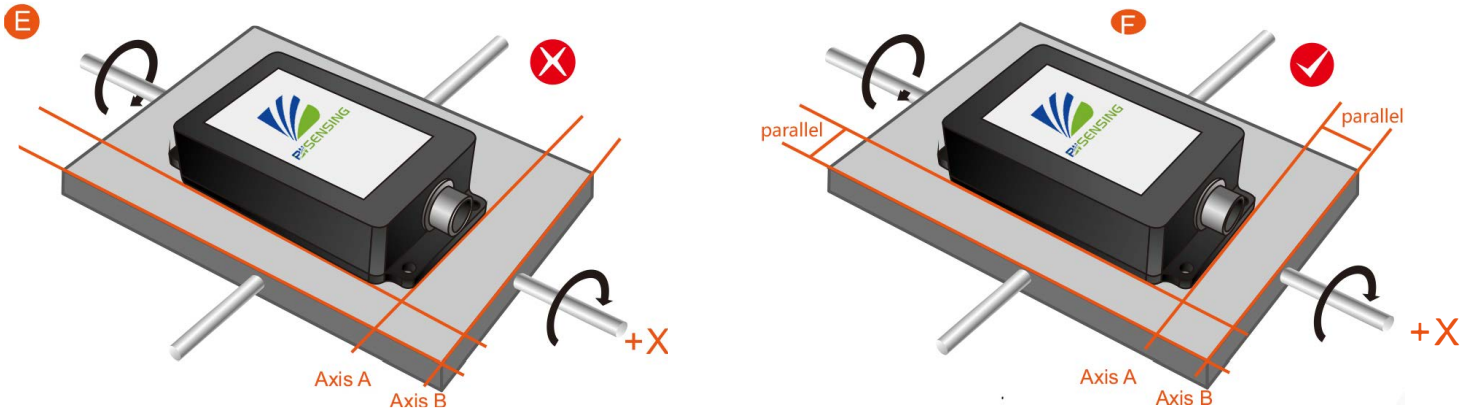
Installation

The correct installation method can avoid measurement errors. When installing the sensor, please do the following:

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.

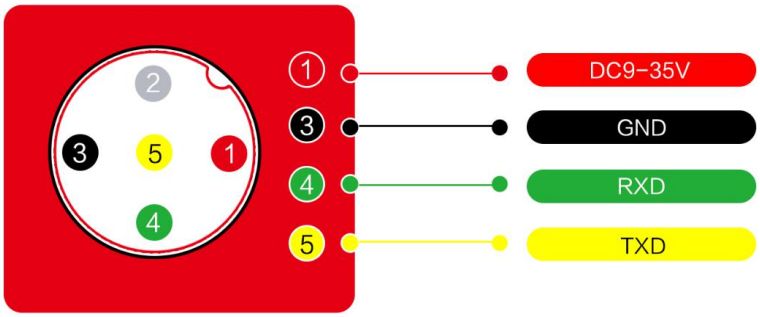


Finally, the mounting surface of the sensor and the surface to be measured must be tightly fixed, smooth in contact, and stable in rotation, and measurement errors due to acceleration and vibration must be avoided.

Electrical Interface

Definition of host aviation patch cord

	RED	BLUE	BLACK	GREEN	YELLOW
Wire color	1	2	3	4	5
function	VCC DC 9-35V	NC	GND ground	CAN L	CAN H



Debugging Software

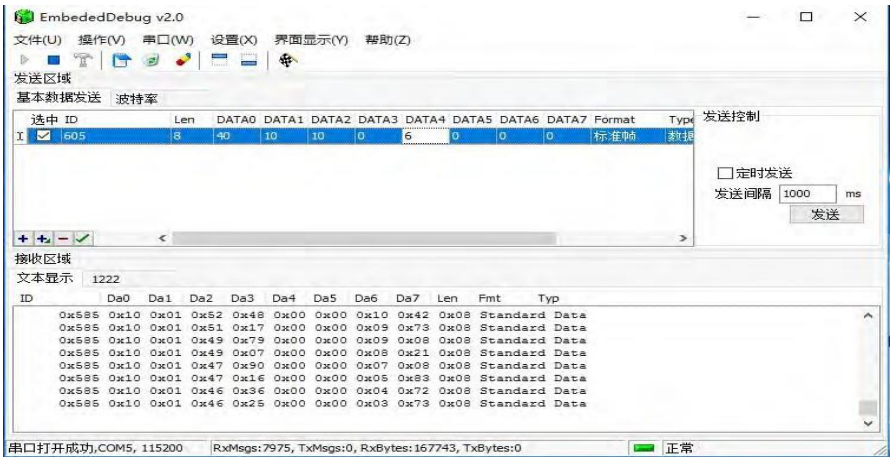
When communicating with CAN interface products, there is generally a dedicated CAN receiving device, so the software comes with the CAN acquisition device, and the usage methods are different, that is why there is no corresponding supporting software. Take the CAN receiver module and product communication used by our company as an example:



Configure CAN baud rate and parameters as follows::



The receiving and sending area is set as follows:



Order information

Model	Communication code	Package situation
BWM425E-90	CAN	IP67 Package/Metal joint

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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