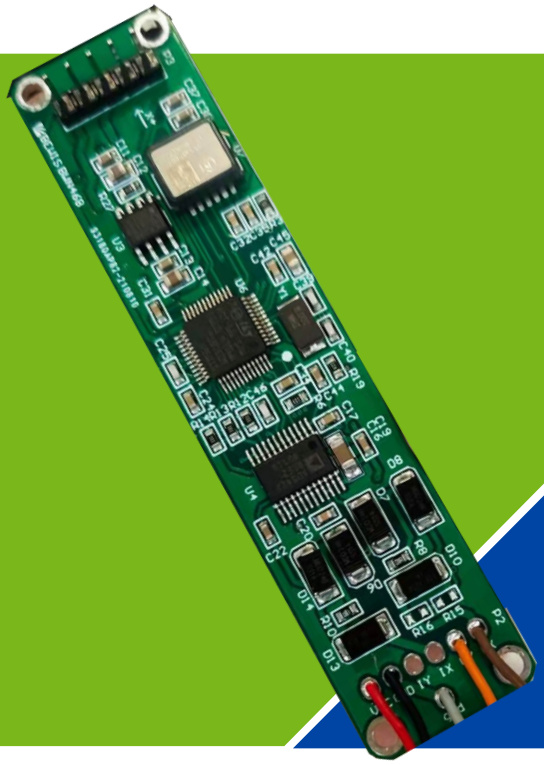


BWN460 Series

Voltage Output Dual Axis Inclinometer

Technical Manual

V3.0

BWM460
Voltage Output Dual Axis Inclinometer




Introduction

BWN460 is a cost-effective dual-axis tilt sensor developed and produced by Bewis Sensing that adopts MEMS technology and voltage output. The measurement range is ±90°, the highest accuracy is 0.01°, and the working temperature is -40°C-+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 largely eliminates errors caused by environmental changes. Convert the change of the static gravity field into the inclination change, and directly output the horizontal inclination value through the voltage 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 used for surveying, industrial automation and other industries.

Main Feature

- Dual axis
- Resolution：0.001°
- Power supply：12～35V
- Bare board volume: L82.5*W20*H15（mm）
- Highest accuracy: 0.01°
- Range: ±90°
- Output：0～5V/0-10V optional, TTL

Application

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

Product Features

Electrical Index

Parameter	Condition	Minimum	Typical	Maximum
Power Voltage(V)		12		35
Working Current(mA)	No load	14	30	30
output load(kΩ)	resistivity	10		
output load(nF)	capacitive			20
Operating Temperature(℃)		-40	25	85
Storage Temperature (℃)		-55	25	100

Performance index

Measurement Range (°)	Condition	±90
Measurement axis		X-Y
Accuracy(°)	Room temperature	0.02
Resolution(°)	Completely still	0.001
Zero temperature drift (°/℃)	-40~85℃	±0.005
Output frequency (Hz)	5-100Hz adjustable	Up to 100
Full range output voltage range(V)	0~5V、0~10V (for optional)	
Mean time between failures MTBF	≥90000 h/times	
Electromagnetic compatibility	According to GBT17626	
Insulation resistance	≥100 MΩ	
Impact resistance	2000g，0.5ms，3 times/axis	

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

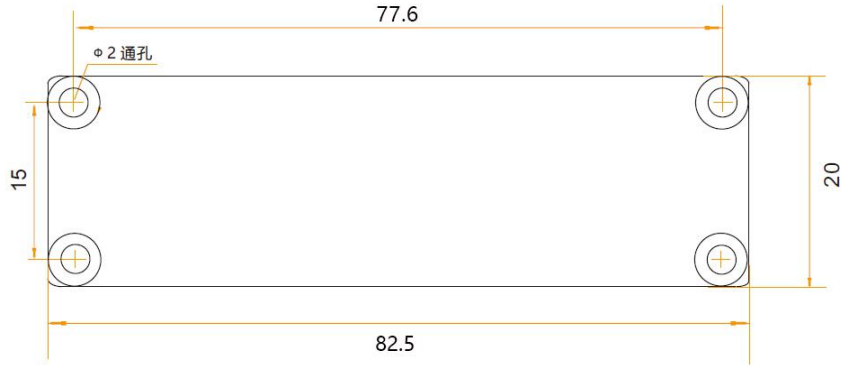
Accuracy: The root mean square error of the actual angle and the sensor measuring angle for multiple (≥16 times) measurements.

Mechanical Index

Connector	Cable hole
Protection level	PCB
Shell material	PCB
Installation	Four M2 screws

Package product size

Product size: L82.5*W20*H15 (mm), the length and width may have ±1mm error, please refer to the actual object



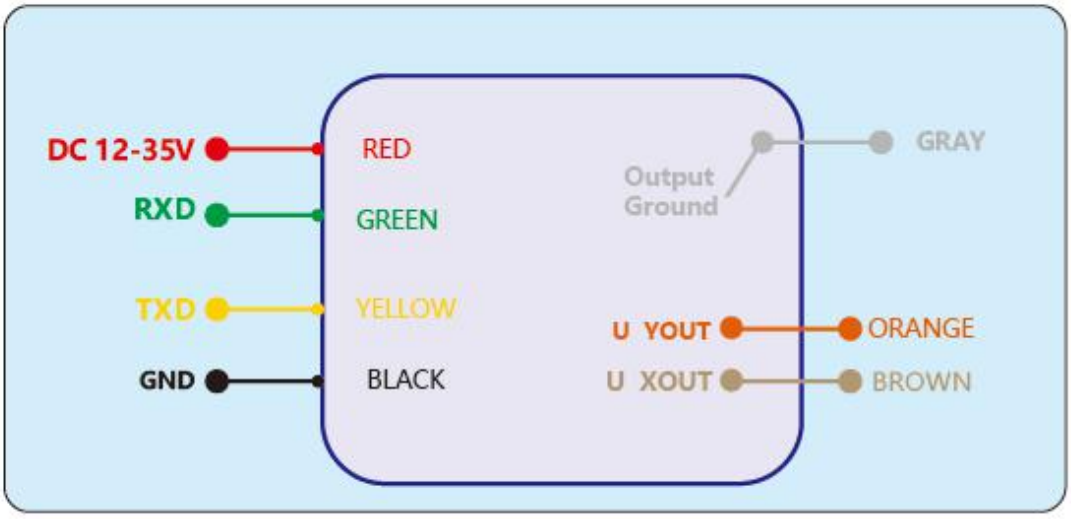
电路板示意图

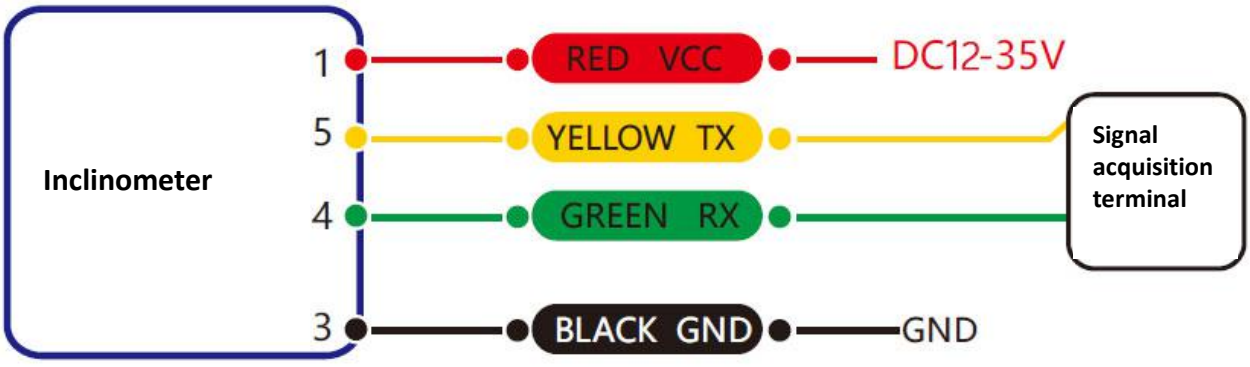
PCBA

Electrical interface

Wiring definition

Wire	RED	BLACK	GREEN	YELLOW	BROWN	Orange	Grey
color	1	3	4	5	8	9	10
function	VCC DC 12-35V	GND ground	Receive RXD	Send TXD	U XOUT	U YOUT	Output Ground





TTL Wiring Diagram

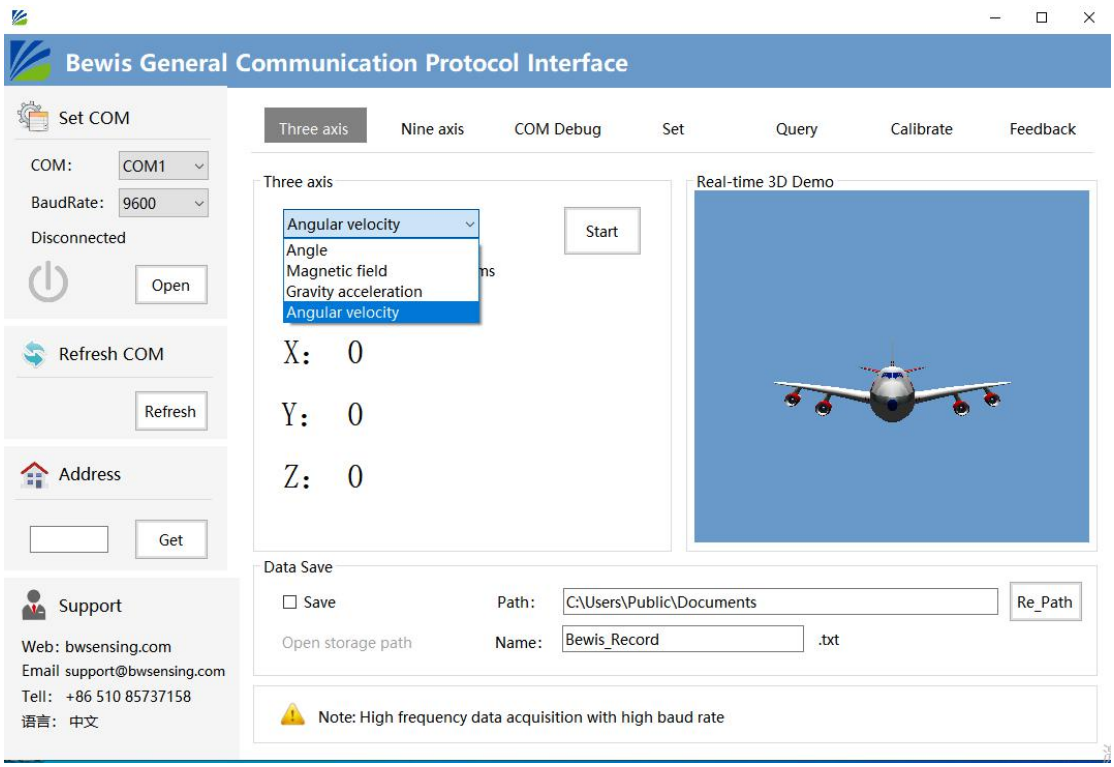
Debugging Software

You can download the serial debugging assistant directly on the official website (technical service -> download area), or you can use the more convenient and intuitive host computer software.

BWM460 supporting serial port debugging software can connect the inclination sensor on the computer to display the angle. The software debugging interface is shown in the figure below. Using the tilt angle to debug the host computer, you can conveniently display the current X direction and Y direction tilt angle, and you can also modify and set other parameters.

Step:

① Connect the serial port hardware of the inclinometer correctly, and connect the power supply.
② Select computer serial port and baud rate and click connect serial port.
③ Click start button and the current inclination Angle of the incliner in X and Y directions will be displayed on the screen.



Order information

Model	Communication code	Package situation
BWM460-90-05	0-5V/TTL	PCBA board
BWM460-90-010	0-10V/TTL	PCBA board

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

BWN460 Series

Voltage Output Dual Axis Inclinometer

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