

## Digital Dual Axis Inclinometer-BWM826

In recent years, with the deterioration of the global environment and climate change, various natural disasters have emerged in China. As a country with frequent geological disasters, China has been affected by geological disasters such as mudslides and landslides. The loss of personnel and property is huge. The monitoring of mountain slopes has become a necessary measure to prevent various related geological disasters. The slope is a necessary infrastructure for many roads on the mountain. Slope rock and soil often exhibit heterogeneity and anisotropy, and it is easy to enter the local transient instability sliding state under external loads such as excavation, loading, rainfall and earthquake. Therefore, for slope engineering, especially large complex slopes, in addition to routine engineering geological survey and stability evaluation, dynamic monitoring of slope engineering should be carried out in a timely and effective manner to predict the possibility of slope instability and the risk of landslides.



In slope monitoring, the instrument observation method is to use precision instruments, such as sensors, to monitor the displacement, inclination (settlement) dynamics of the deep part of the surface of the deformation slope, the relative tension, closure, sedimentation, fault changes, ground sound, stress and strain and other physical parameters and environmental factors. The content of electronic instrument observation can basically realize continuous observation and automatically collect, store, print and display observation data. Long-distance wireless transmission is the most basic feature of this method. Because of its high degree of self-use, it can be continuously observed all the time, so it is time-saving, labor-saving and safe.

It is the development direction of landslide monitoring in the current and future period. Bewis Sensing provides sophisticated tilt sensor products for slope monitoring.



Product real shot

### Product Highlights :

- Accuracy: 0.005°
- Dual-axis inclination measurement
- Resolution: 0.002°
- Using MEMS technology, small size and low power consumption
- High consistency and stability
- RS232/RS485/TTL optional
- Operating temperature: -40°C ~ +85°C
- Strong resistance to external electromagnetic interference
- IP67 protection rating for harsh climate

## Digital Dual Axis Inclinometer-Technical Indicators

## 电气指标：

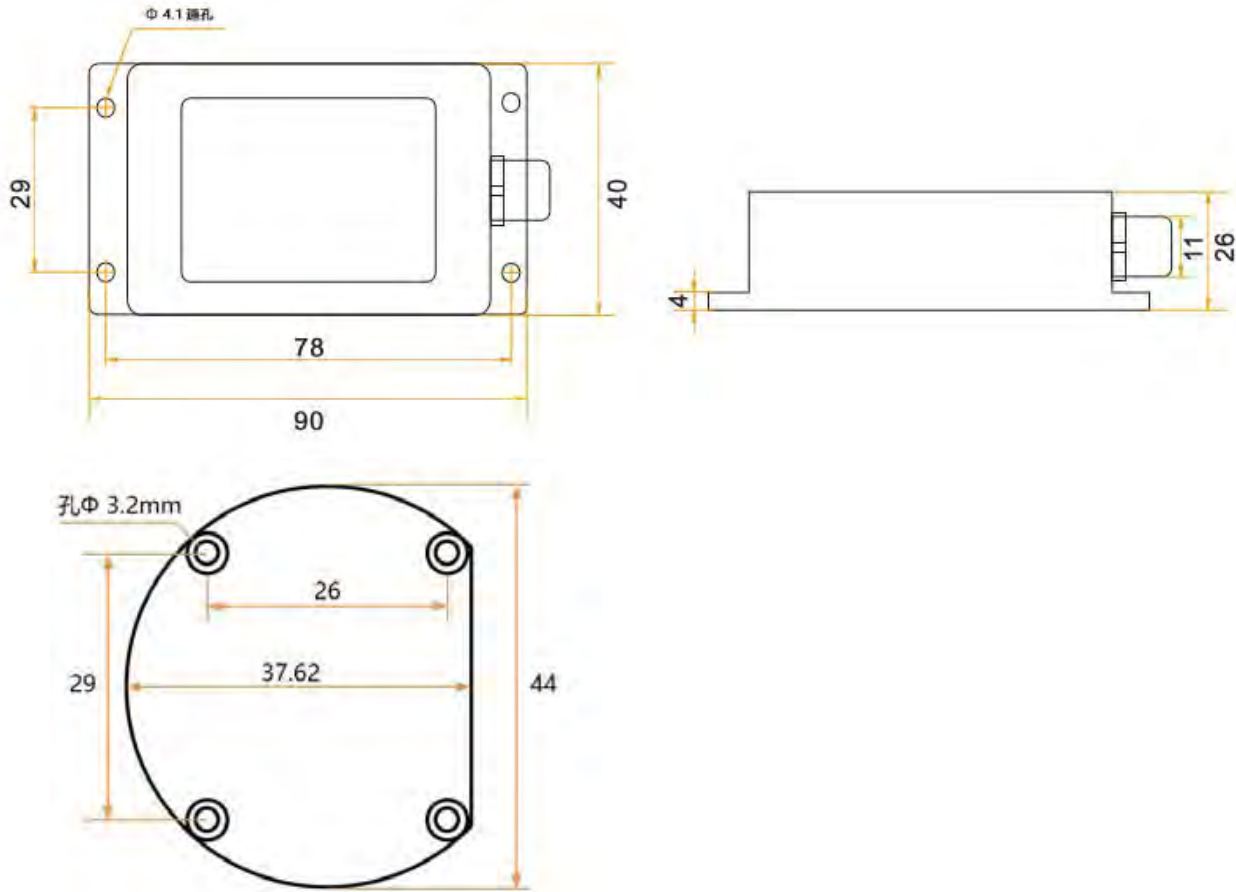
参数	条件	最小值	典型值	最大值	单位
供电电压		10	12	35	V
工作电流	无负载	20	30	40	mA
工作温度		-40	25	+85	°C
存储温度		-55	25	+100	°C

## 性能指标：

参数		BWM826-5	BWM826-15	BWM826-30	单位
测量范围	条件	±5	±15	±30	°
测量轴		X-Y	X-Y	X-Y	
精度	室温	0.005	0.008	0.01	°
分辨力		0.002	0.002	0.002	°
零点温度漂移	-40~85°C	±0.001	±0.001	±0.001	°/°C
灵敏度误差	25°C	±0.5	±0.5	±0.5	%
最高频率输出		100	100	100	Hz
交叉灵敏度		3	3	3	%
平均无故障工作时间MTBF	≥90000 小时/次				
电磁兼容性	依照GB17626				
绝缘电阻	≥100 兆欧				
抗冲击	2000g, 0.5ms, 3次/轴				
重量 (g)	约150 (包含外包装)				

## Digital Dual Axis Inclinometer-Size & Connection

### Product plan:



### Electrical connections:



## Digital Dual Axis Inclinometer-Success Cases

The development of the slope monitoring system by Bewis Sensing and Chengdu Survey and Design Institute (Chengkan Institute) has completed the pilot work and achieved good test results. In order to adapt to the special topographical ecological environment, Chengkan Institute put forward higher requirements for the application equipment for slope monitoring. In response to the actual demand put forward by Chengkan Institute, Bewis Sensor provides a cost-effective tilt sensor and a three-dimensional attitude measurement electronic compass product independently developed and produced. The two parties worked closely together to solve the long-term stability of the system, solar power supply, wireless communication, data cloud storage technology problems. This system has been used in the field, and the operation is in good condition. The technological innovation has promoted the further development of slope geological hazard monitoring.

This slope monitoring system uses Bewis's BWM826 tilt sensor and HEC395 electronic compass, which can automatically detect the abnormal changes of the slope soil in real time in 24 hours. BWM826 is a digital output dual-axis tilt sensor for the health monitoring field. It is equipped with a high-accuracy 16-bit A/D differential converter. The 5th-order filtering algorithm finally outputs a biaxial tilt value with an accuracy of  $0.005^\circ$ . With the built-in high-accuracy digital temperature sensor, the output angle is corrected again within the operating temperature range to ensure high repeatability of the product in high and low temperature environments. The HEC395 is an inertial product designed to provide high-precision roll, pitch and azimuth measurements for magnetic interference and dynamic motion environments. It includes a 9-degree-of-freedom sensor: a 3-axis acceleration sensor, a 3-axis magnetic sensor, and a 3-axis gyroscope. It outputs high-precision attitude information in real time. This system uses GSM data transmission unit, solar power supply, and is equipped with a waterproof box to fully meet the requirements of the most adverse environment.



Disaster monitoring system layout site



System hardware configuration