The Ministry of Housing and Urban-Rural Development defines the “Guidelines for Construction Safety Supervision and Management of Construction Projects High Formwork Support System”: The tall formwork support system refers to the height of the concrete member formwork support construction site on the construction site exceeds 8m, or the span exceeds 18m, or the total construction load A formwork support system with a load greater than 15kN/㎡ or a concentrated line load greater than 20kN/m; a high formwork means a formwork with a height greater than or equal to 4.5m and its supporting system; a high-support form safety accident is mainly caused by excessively large or deformed high-supported formwork. Excessively induced failure of the steel components in the system, local collapse of the high-span form or overall overturning, resulting in casualties.

Cost-effective dual axis inclination sensor: BWM826-30-485

The high-module real-time monitoring and alarm system hardware and equipment developed by Beiwei Sensing Partner Wuhan Zhongyan Technology Co., Ltd. has four parameters: high-module formwork settlement, vertical axis force, member inclination angle, and overall horizontal displacement of the bracket. High-frequency automatic acquisition, real-time wireless transmission, data processing analysis and live sound and light alarm function, using high-frequency sampling to achieve real-time continuous monitoring, live sound and light alarm, second-pole response, automatic trigger mechanism for real-time alarm and on-site alarm, reminder operation Personnel evacuate dangerous areas in an emergency, effectively reducing construction safety risks.

Product Highlights:
- Roll and pitch accuracy up to 0.005°
- Resolution up to 0.0007
- Biaxial inclination measurement with small cross error
- Real-time monitoring of high-module geometry deformation
- High degree of automation, unattended
- More implementation cases and better results
- High data stability and minimal temperature drift
- Easy to install sensors, shorten construction time
- Small size, light weight and long life
- IP67 protection for outdoor installation
- High-frequency sampling for real-time continuous monitoring, live sound and light alarm
# Cost-effective dual axis inclination sensor - Technical indicators

## Mechanical Characteristic

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>lead (standard cable is 1.5m)</td>
</tr>
<tr>
<td>Protection level</td>
<td>IP67</td>
</tr>
<tr>
<td>Shell material</td>
<td>Magnesium alloy anodizing</td>
</tr>
<tr>
<td>Installation</td>
<td>Four M4 screws</td>
</tr>
</tbody>
</table>

## Electrical Specifications

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Conditions</th>
<th>BWM826-5</th>
<th>BWM826-15</th>
<th>BWM826-30</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>Non-loaded</td>
<td>10</td>
<td>12</td>
<td>35</td>
<td>V</td>
</tr>
<tr>
<td>Operating current</td>
<td>Non-loaded</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>mA</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>Non-loaded</td>
<td>-40</td>
<td>25</td>
<td>+85</td>
<td>°C</td>
</tr>
<tr>
<td>Store temperature</td>
<td>Non-loaded</td>
<td>-55</td>
<td>25</td>
<td>+100</td>
<td>°C</td>
</tr>
</tbody>
</table>

## Performance Specifications

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Conditions</th>
<th>BWM826-5</th>
<th>BWM826-15</th>
<th>BWM826-30</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>Indoor</td>
<td>±5</td>
<td>±15</td>
<td>±30</td>
<td>°</td>
</tr>
<tr>
<td>Measuring axis</td>
<td>X-Y</td>
<td>X-Y</td>
<td>X-Y</td>
<td></td>
<td>°</td>
</tr>
<tr>
<td>Accuracy</td>
<td>Indoor</td>
<td>0.005</td>
<td>0.008</td>
<td>0.01</td>
<td>°</td>
</tr>
<tr>
<td>Resolution</td>
<td>Indoor</td>
<td>0.002</td>
<td>0.002</td>
<td>0.002</td>
<td>°</td>
</tr>
<tr>
<td>Zero temperature drift</td>
<td>-40~85°C</td>
<td>±0.001</td>
<td>±0.001</td>
<td>±0.001</td>
<td>°/°C</td>
</tr>
<tr>
<td>Sensitivity error</td>
<td>25°C</td>
<td>±0.5</td>
<td>±0.5</td>
<td>±0.5</td>
<td>%</td>
</tr>
<tr>
<td>Frequency response</td>
<td></td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>Hz</td>
</tr>
<tr>
<td>Cross sensitivity</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>%</td>
</tr>
<tr>
<td>MTBF</td>
<td></td>
<td>≥90000</td>
<td></td>
<td></td>
<td>hours/time</td>
</tr>
<tr>
<td>Electromagnetic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>compatibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance</td>
<td></td>
<td>≥100 MΩ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock resistance</td>
<td></td>
<td>2000g,0.5ms,3times/axis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (g)</td>
<td></td>
<td>150</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
System Overview

Product development is based on the following:
1. Construction Management Safety Regulations;

The names of the supporting products involved in the high-profile instrumentation are shown in the following table:

<table>
<thead>
<tr>
<th>equipment name</th>
<th>Instrument model</th>
<th>Standard quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-module multi-channel wireless acquisition instrument</td>
<td>RSM-WAS</td>
<td>1</td>
</tr>
<tr>
<td>High mode wireless collector</td>
<td>RSM-WAS (L)</td>
<td>34</td>
</tr>
<tr>
<td>Pull line displacement meter</td>
<td>RSM-SLJ(L)</td>
<td>16</td>
</tr>
<tr>
<td>High precision inclinometer</td>
<td>RSM-QJS100</td>
<td>8</td>
</tr>
<tr>
<td>Pressure Sensor</td>
<td>RSM-FHJ</td>
<td>8</td>
</tr>
<tr>
<td>Audible alarm</td>
<td>RSM-SLA</td>
<td>2</td>
</tr>
<tr>
<td>High modulus monitoring system</td>
<td>RSM-MPS (G)</td>
<td>1</td>
</tr>
<tr>
<td>Instrument sensor case</td>
<td>custom made</td>
<td>5</td>
</tr>
</tbody>
</table>

Main characteristics

1) Powerful, stable and durable, friendly interface, easy to carry, easy to connect on site.
2) High degree of automation, unattended operation, automatic recovery of acquisition functions in case of power failure, and real-time manual control.
3) The computer and the collector are connected to communicate to support the wireless and wired mode. The communication mode of the uploading platform of the collector is 3G/4G.
4) The high-mode wireless collector is set up in a wireless ad hoc network to support automatic wireless upload after power off or power off.
5) Realize remote monitoring of cloud platform system.

6) Supporting the use of 433 wireless communication module and PC upper computer operation software, it can carry out wireless parameter setting of data and analysis of data transmitted on site.

7) The instrument has high precision and good reliability.

8) Compatible, compatible with RSM-QJS1000 high-precision inclinometer inclinometer, RSM-SLJ (L) cable displacement meter and RSM-FHJ load pressure sensor wireless data acquisition, RSM-WAS high-module multi-channel wireless acquisition instrument can simultaneously Connect 32 different types of sensors.

9) There is no delay in the on-site alarm response.

10) Multiple power supply modes: built-in lithium battery and external 220V AC power supply, built-in lithium battery can support continuous acquisition for 24 hours; support long-term live use; support solar panel power supply for harsh areas.

11) Data capacity: Built-in 16G memory card, can support 1 million groups. Support data to directly capture and save U disk.

**RSM-WAS High-module multi-channel wireless acquisition instrument**

---

**Product index :**

<table>
<thead>
<tr>
<th></th>
<th>RSM-WAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>RSM-WAS</td>
</tr>
<tr>
<td>Sampling method</td>
<td>Fixed point scan acquisition</td>
</tr>
<tr>
<td>Display mode</td>
<td>External PC display</td>
</tr>
<tr>
<td>Storage mode</td>
<td>External U disk or PC capture storage</td>
</tr>
<tr>
<td>Communication method</td>
<td>Built-in wired and wireless communication, 3G/4G wireless transmission</td>
</tr>
<tr>
<td>Sensor supply voltage</td>
<td>+12V</td>
</tr>
<tr>
<td>External supply voltage</td>
<td>+12V</td>
</tr>
<tr>
<td>Measurable sensor type</td>
<td>High-precision inclinometer, cable displacement meter, load pressure gauge</td>
</tr>
</tbody>
</table>
## Cost-effective dual axis inclination sensor - Success case

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of sensors that can be mounted</td>
<td>32</td>
</tr>
<tr>
<td>Sampling interval</td>
<td>≥1S</td>
</tr>
<tr>
<td>Range</td>
<td>±30° (high-precision inclinometer), 1000mm (wire tension meter), 50KN (load pressure gauge)</td>
</tr>
<tr>
<td>Measurement accuracy</td>
<td>0.005 (inclinometer), 0.1mm (wire tension meter), 0.05% FS (load pressure gauge)</td>
</tr>
<tr>
<td>Temperature error</td>
<td>0.1°C</td>
</tr>
<tr>
<td>Number of channels</td>
<td>32 channel</td>
</tr>
<tr>
<td>Data transmission mode</td>
<td>Wireless transmission</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-20°C ~ 55°C</td>
</tr>
<tr>
<td>Power supply mode</td>
<td>Built-in lithium battery ≥ 24 hours or external power supply for long-term work</td>
</tr>
<tr>
<td>Shell</td>
<td>Full metal casing; matching waterproof box for long-term use</td>
</tr>
<tr>
<td>Interface</td>
<td>USB2.0</td>
</tr>
<tr>
<td>Volume</td>
<td>13.5cm×8.8cm×6cm</td>
</tr>
<tr>
<td>Weight</td>
<td>1.0kg (Lithium-containing battery)</td>
</tr>
</tbody>
</table>

### RSM-WAS (L) High mode wireless collector

**Product index:**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>RSM-WAS (L)</td>
</tr>
<tr>
<td>Transfer method</td>
<td>Free application band wireless transmission</td>
</tr>
<tr>
<td>Transmission distance</td>
<td>The distance from the open space is about 4000 meters.</td>
</tr>
</tbody>
</table>
Cost-effective dual axis inclination sensor-Success case

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>Up to -126dBm</td>
</tr>
<tr>
<td>Error correction coding</td>
<td>Support for maximum error</td>
</tr>
<tr>
<td>Power supply</td>
<td>Lithium battery power supply</td>
</tr>
<tr>
<td>Internal power supply</td>
<td>+12V</td>
</tr>
<tr>
<td>Internal battery working</td>
<td>≥48H</td>
</tr>
<tr>
<td>Sampling interval</td>
<td>≤1Hz</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-10°C to +60°C</td>
</tr>
<tr>
<td>Protection level</td>
<td>IP65</td>
</tr>
</tbody>
</table>

RSM-QJS100 Inclinometer

Product index:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>9-36VDC</td>
</tr>
<tr>
<td>Current consumption</td>
<td>50mA (12V)</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-40°C to +85°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-45°C to +90°C</td>
</tr>
<tr>
<td>Connector</td>
<td>Waterproof air socket or</td>
</tr>
<tr>
<td>Shell material</td>
<td>direct lead (1.5M)</td>
</tr>
<tr>
<td>Impact resistance</td>
<td>20000g, 0.5ms, 3Times/Axis</td>
</tr>
<tr>
<td>Weight</td>
<td>240g</td>
</tr>
</tbody>
</table>
**RSM-SLJ(L) wire-type displacement meter**

**Product index:**

<table>
<thead>
<tr>
<th>Model</th>
<th>RSM-SLJ (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard range (mm)</td>
<td>0 ~ 1000mm</td>
</tr>
<tr>
<td>Minimum reading (mm)</td>
<td>0.1</td>
</tr>
<tr>
<td>System error (mm)</td>
<td>≤0.2</td>
</tr>
<tr>
<td>Steel ruler tension (Kg)</td>
<td>8</td>
</tr>
<tr>
<td>Temperature correction system (mm / °C)</td>
<td>12×10⁻⁶</td>
</tr>
<tr>
<td>Instrument weight (Kg)</td>
<td>1.8</td>
</tr>
</tbody>
</table>

**RSM-FHJ Pressure sensor**
Cost-effective dual axis inclination sensor-Success case

### Product index:

<table>
<thead>
<tr>
<th>Model</th>
<th>RSM-FHJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>alloy steel</td>
</tr>
<tr>
<td>Rated load</td>
<td>50KN</td>
</tr>
<tr>
<td>Standard range</td>
<td>0 ~ 50KN</td>
</tr>
<tr>
<td>Precision</td>
<td>0.05%FS</td>
</tr>
<tr>
<td>Zero output</td>
<td>±1%FS</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP67</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-20 ~ 65°C</td>
</tr>
</tbody>
</table>

#### RSM-SLA Audible alarm

120 high-decibel sound and light alarm (left custom original) and 90 low-decibel multi-color alarm warning light (right optional)

### Product index:

<table>
<thead>
<tr>
<th>Model</th>
<th>RSM-SLA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Alloy steel shell + tempered glass cover</td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>DC24V</td>
</tr>
<tr>
<td>Sound intensity</td>
<td>120 dB</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP65</td>
</tr>
<tr>
<td>type of light source</td>
<td>Red rotatable LED light</td>
</tr>
<tr>
<td>Explosion-proof grade</td>
<td>EXD BT6</td>
</tr>
<tr>
<td>product weight</td>
<td>2.46KG</td>
</tr>
</tbody>
</table>