

Inclined to Perfection





A Technological Revolution in Inclinometers' Reliability





About Us

The knowledge-based company "Namayagaran Jahat Masir", under the brand of "NAJM", started its activity in 2016 with the aim of developing technological products in the field of "precise instrumentation and navigation".

Our expertise is the design, manufacture and calibration of measuring devices based on microelectromechanical sensors (MEMS).

By simultaneously developing "calibration technology" and "calibration equipment", our team has been able to take an important step in localizing high-tech measurement equipment in Iran.

In addition to the development of products in the field of precision instruments and navigation, NAJM's technical team has good experience in consulting and implementing related projects in instrumentation systems.





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ETC-PRO Inclinometer

Dual-Axis with Digital Output

Features

- MEMS-based
- Full range in two axes (X,Y).
- Accuracy maintaining throughout the range with

3D acceleration data processing.

- Accuracy of 0.015°.
- \blacksquare Compensated temperature 30 \sim +75°C or 40 \sim +85°C .
- Utilization of multi-factor temperature calibration technology.
- Maximum temperature error of 0.030°.
- Long-term stability of 0.02° per year.
- IP67 Standard.







Description

The ETC-PRO sensor, designed based on a micro-electromechanical linear accelerometer (MEMS), is a two-axis static inclinometer that measures the angle with the local horizon within $\pm 90^{\circ} | \pm 30^{\circ} | \pm 5^{\circ}$ with an accuracy of better than 0.015°. These sensors have been specially developed for operational environments and thanks to the use of "3D Acceleration Data Processing" they have been able to maintain their accuracy in the entire measuring range of $\pm 180^{\circ}$. ETC-PRO provides output information with high accuracy.

This sensor is usually used in construction, mining, power plants, oil and gas industries, telecommunication network infrastructure, power transmission lines and geology to monitor the slope and orientation of surfaces and structures correctly. ETC-PRO has features like being resistance to shocks and vibrations, it can be connected to data monitoring systems and also has the ability to measure different angles and slopes, which has made it a useful tool in technical applications.

By using the "multi-factor temperature calibration" technology and temperature compensation based on the internal temperature sensor, ETC-PRO sensors have been able to achieve the highest accuracy temperature stability among all commercial inclinometers in the world and keep their temperature error below 0.030° in the entire temperature range.

Resistance to electromagnetic interference and high long-term stability (Long Term Stability = 0.02° /year) have made these sensors perform well in noisy industrial environments. The ETC-PRO sensor is suitable for non-accelerated platforms and does not perform well in accelerated systems.



Product Specifications

Measuring Axis	Dual Axis (X, Y)
Measuring Range	$\pm 90^{\circ}$ $\pm 30^{\circ}$ $\pm 15^{\circ}$ (Based on Customer's Order)
Resolution	0.001°
Limits Of Error	0.015°
Maximum Temperature Drift	<0.030°
Operating Temperature Range	-40~+85°C
Compensated Temperature Range	-30~+75°C
Long Term Stability	0.02°/year

Size Description









Temperature Profile



Temperature (°C)

Some Applications

- Setting axes in CNC machines and industrial robots
- Deflection measurement of huge pipelines
- Dimensional quality control of parts in steel industry
- Accurate alignment in the installation of rail structures
- Calibrating linacs and other sensitive medical equipment
- Local terrain adjustment of radars
- Testing and control of tables with several degrees of freedom



UTC-PRO INCLINOMETER SENSOR

Dual-Axis with Digital Output

Features

- MEMS-based
- Full range in two axes (X,Y).
- Accuracy maintaining throughout the range with 3D acceleration data processing.
- Error limit of 10 arc seconds.
- \blacksquare The compensated temperature is -30 \sim +75°C $\,$ or -40 \sim +85°C .
- Using "multi-factor temperature calibration" technology
- Maximum temperature error of one arc minute by combining data from multiple accelerometers.
- Long-term stability of 30 seconds of arc in 6 months
- IP67 Standard





Description

The UTC-PRO sensor, designed based on the micro-electromechanical linear accelerometer (MEMS), is a two-axis static inclinometer that measures an angle to the local horizon at a range of $\pm 5^{\circ}$ with an accuracy better than 10 arc seconds.

The sensor is specially developed for operating environments and has been able to maintain its accuracy over the entire measurement range thanks to the use of "three-dimensional processing of accelerated data".

With the use of "Multi-Factor Temperature Calibration" Technology and temperature compensation based on the internal temperature sensor, UTC-PRO sensors have been able to achieve the highest temperature stability among all commercial inclinometers in the world and maintain the temperature error in the entire temperature range less than 1 arc minute.

Resistance to electromagnetic interference and high long-term stability have made these sensors perform acceptable in industrial environments.

The UTC-PRO sensor is suitable for stationary platforms and does not perform well in accelerated systems.





Product Specifications

Measuring Axis	Dual Axis (X, Y)
Measuring Range	±5°
Resolution	1 arcsec
Limits of Error	10 arcsec
Maximum Temperature Drift	< 1 arcmin
Operating Temperature Range	- 40 ~ +85°C
Compensated Temperature Range	$(-30 \sim +75^{\circ}\text{C})$ or $(-40 \sim +85^{\circ}\text{C})$ (Based on Customer's Order)
Long Term Stability	< 30 arcsec / 6 months

Size Description



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Temperature Profile



Temperature (°C)

Some Applications

- Highly accurate alignment for various machining equipment
- Elimination of long-standing errors in inertial measurement units
- Behavior of large-scale building structures
- Alignment and calibration of radar and satellite ground stations
- Vertical angle monitoring for wind turbines and telecommunications docks
- Solar panel angles
- Alignment and monitoring of deviation in large-scale pipelines
- Measuring slope in structures
- Altimetry for construction equipment
- Monitoring changes in vehicle orientation



HDI-NANO DIGITAL INCLINOMETER

High-Accuracy with Digital Display

Features

- Full-range measurement in two axes.
- Quick calibration capability by the user. (User Quick Calibration).
- 2.4" Touch screen.
- The measurement accuracy is 0.030° and the resolution is 0.001°.
- Accuracy throughout the range with "3D Acceleration Data Processing".
- Temperature compensation in the entire operating range (0~40°).
- More than ten hours of continuous work with a single charge.





Description

The HDI-NANO inclinometer is a two-axis hand-held inclinometer designed to measure the slope of the surface in the range of \pounds 180¢ with an accuracy of better than 0.030¢. To use this device, the user usually connects it to the surface where he wants to measure its slope or angle, then the device shows the information related to the slope or angle through a digital screen.

Absolute and relative measurement, temperature compensation and fast calibration capability have made it a reliable product for operational environments and industrial applications.

HDI-NANO is used in various industries with its impressive technical capabilities and reasonable price compared to competitors. For example, this digital inclinometer is used in the construction industry to measure the slope of roofs or horizontal surfaces, in geological sciences to measure the slope of mountains and land surfaces, and even in mechanical engineering to control the slope of various parts.

Thanks to the low consumption design, intelligent energy storage and the use of 1500 mAh lithium-ion battery, you can use HDI-NANO for more than 10 hours with each charge. The 2.4" touch screen and graphical user interface, measurement in units of degrees and seconds of arc, and the ability to change the resolution and quick response are among the features that make measurement with HDI-NANO easier.

By using microelectromechanical sensors (MEMS) and "3D processing of acceleration data", HDI-NANO inclinometers have been able to keep their accuracy constant throughout the measurement range of $\pm 180^{\circ}$. Also, thanks to temperature compensation and the use of "multi-factor temperature calibration" technology, the temperature drift of the device is less than 0.030° in the entire temperature range (0-40°C).



Product Specifications

Measuring Axis	Dual Axis (X, Y)				
Measuring Range	±180°				
Resolution	0.001°				
Limits of Error	0.030°				
Maximum Temperature Drift	< 0.030° over 0+40°C				
Compensated Temperature Range	0~+40°C				
Battery	1500mAh Rechargeable Lithium Ion Battery 10 Working Hours				
Display	2.4" Touch & Resistive TFT LCD 240*320 Pixels Full-color				
Features	Small Size, Auto-sleep, Auto-Power Off, Smart Filter, Plane mode, 12 Neodymium magnets in 5 Reference Side				

Size Description





Some Applications

- Setting axes in CNC machines and industrial robots
- Deflection measurement of huge pipelines
- Dimensional quality control of parts in steel industry
- Accurate alignment in the installation of rail structures
- Calibrating linacs and other sensitive medical equipment
- Local terrain adjustment of radars
- Testing and control of tables with several degrees of freedom





HDI-PRO DIGITAL INCLINOMETER

Dual-Axis with Digital Output

Features

- Quick calibration capability by the user (User Quick Calibration).
- 2.8" Touch screen.
- The measurement accuracy is 0.030° and the resolution is 0.001°.
- Accuracy maintaining throughout the range with "3D Acceleration Data Processing".
- Temperature compensation in the operating range (0~50°).
- Ability to connect with ETC-PRO and UTC-PRO sensors.





Description

The HDI-PRO digital inclinometer is a two-axis hand-held inclinometer designed to measure the slope with an accuracy of 10 seconds of arc in the range of $\pm 5^{\circ}$ and an accuracy of 1 arcmin in the range of $\pm 180^{\circ}$. Temperature compensation, fast calibration capability and the ability to being connected with ETC and UTC series have made HDI-PRO digital inclinometer a reliable product for operational environments.

Thanks to the low-power design, intelligent energy storage and the use of a 3600 mAh lithium-ion battery, you can use the device for more than 36 hours with each charge. Taking advantage of 2.8" touch screen, graphical user interface and measurement in degree and arcsecond units is some of the features that make measuring with HDI-PRO easier.

Using micro-electromechanical sensors (MEMS) and "3D Acceleration Data Processing", HDI-PRO inclinometers have been able to maintain their basic accuracy throughout the measurement range. Also, thanks to temperature compensation and the use of "multi-factor temperature calibration" technology, the temperature drift of the device in the entire temperature range (0~50°C) is less than one arc minute.





Product Specifications

Measuring Axis	Dual Axis (X, Y)					
Measuring Range	±180°					
Resolution	0.001°					
Error Limit	10 arcsec in $\pm 5^{\circ}$ (S-mode) 1 arcmin in $\pm 180^{\circ}$ (Full range-mode)					
Maximum Temperature Drift	< 0.030° over 0~+50°C					
Compensated Temperature Range	0~+50°C					
Battery	3600mAh Rechargeable Lithium Ion Battery 36 Working Hours					
Display	2.8" Touch & Resistive TFT LCD 240*320 Pixels Full-color					

Size Description











Some Applications

- Setting axes in CNC machines and industrial robots
- Measuring deflection of large pipelines
- Quality control of parts in the steel industry
- Precise alignment in the installation of rail structures
- Calibrating linacs and other sensitive medical equipment
- Adjusting local terrain for radars
- Testing and controlling tables with multiple degrees of freedom





GPS-RTK NORTH FINDER

With Tilt Measurement

Features

- Support for all types of GNSS, including Galileo, GLONASS, Bido, etc.
- The possibility of receiving data from different satellites and their optimal combination.
- Measurement of slope and location.
- The possibility of increasing the accuracy by increasing the length of the arm of the antennas.
- Data storage capability.



Description

GPS-RTK North Finder is a satellite system used to accurately determine geographical location and orientation. This product is a precision tool that uses GPS satellite technology along with radio communications with a base station to determine the direction of the North.

GPS-RTK stands for GPS Real-Time Kinematic, where a base station in a fixed location monitors atmospheric and tidal changes, then transmits instant information to devices for calculating their position with centimeter accuracy.

The North Finder GPS-RTK can accurately determine the north direction without requiring manual calibration, making it suitable for applications such as mapping, construction, mining, and the oil and gas industry.



Product Specifications

Azimuth Accuracy (RMS)	0.1 in 2 Min GPS Integration & 2.5 Meter GPS-Antenna Distance			
Tilt Accuracy	0.1° Single Axis Tilt With Two Antenna Dual Axis Tilt With Three Antenna			
GPS Coordinate Accuracy	2.5 Meter			
Data Logging	up to 1000 Data			
Supporting GNSS	BeiDu, Galileo, Glo NASS, IRNSS, QZSS			
Communication	RS485 (optional)			
Power Supply	7-30 V			
Weight (without Antenna)	310 gr ±5			

Some Applications

- Highly precise mapping
- Accurate positioning measurement
- Tracking of agricultural machinery
- Precise location in mining
- Accurate orientation in the oil and gas industry





Calibration Certificate From Reference Laboratory UTC - PRO





Calibration Certificate From Reference Laboratory ETC - PRO

Page No.		Certificate Of Calibration			Certificate Of Calibration					
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			Vertical(Y)	45.000	44.990	-0.010	44.993	-0.0		



Calibration Certificate From Reference Laboratory HDI - NANO





Calibration Certificate From Reference Laboratory HDI - PRO



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