pizzi instruments

MEMS Inplace Inclinometer

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Instruments and Systems for Geotechnical and Structural

MEMS Inplace Inclinometer

Description

The IPI inclinometers we offer are composed of an integrated system, where power supply electronics, transmission signal electronics and MEMS sensors, are housed together in one probe casing. The instrument is fully waterproof and is suitable for use in conventional inclinometer columns.

It is normally used with an inclinometer tube in drilled holes for the monitoring of horizontal movement in soil, landslides and deformations of structure.

Generally this type of sensor is used to form chains inserted into the same tube, thereby providing automatic measurement of the deformation of an inclinometer column (as an alternative to systems with manual probe inclinometer).

Applications

The IPI system is used to monitor movements in soil or movement of structures.

It can be used inside inclinometer tubes for many applications:

- **Landslides**
- **Identification of shear zones**
- **Diaphragms**
- **Piles**
- **Dams**
- **Tunnels**
- **Bridges**
- **Road and railway embankments**
- **Various**

The IPI system has also been designed for monitoring in horizontal applications.

Features and benefits

- **Accuracy of measurements**
- **Precision of manufacture**
- **Versatility**
- **Low cost**
- **Built-in electronics**
- **Removable instrument**

The IPI system has also been designed for monitoring in horizontal applications and for vertical applications (or inclinated).

Measurement principle

The IPI we offer is made of a cylindrical stainless steel body, complete with tilting wheels for maintaining orientation in the guide tubes where it is generally installed.

Accuracy of calibration ensures low dependence on temperature, high resolution and low influence from disturbances. The control system is generally composed of multiple IPI sensors, connected to each other via a single cable for the version with output signal, or with independent cables for the version with anaologue output, inserted into an inclinometer column which forms the reference element and guide for the entire system.

Thanks to the pairs of guide wheels on the body of each instrument, the chain is lowered into the column, bringing the various sensors in the chain to the preestablished level.

The inclinometer column follows the ground's movements, consequently causing a change in inclination of the individual IPI sensors which automatically provide data revealing the deformation of the column.

The first instrument in the chain is connected to an acquisition unit (our CUM3000), where all automatically acquired data is sent to processing and analysis software, which allows, amongst other things, alarm messages to be sent when control parameters are exceeded.

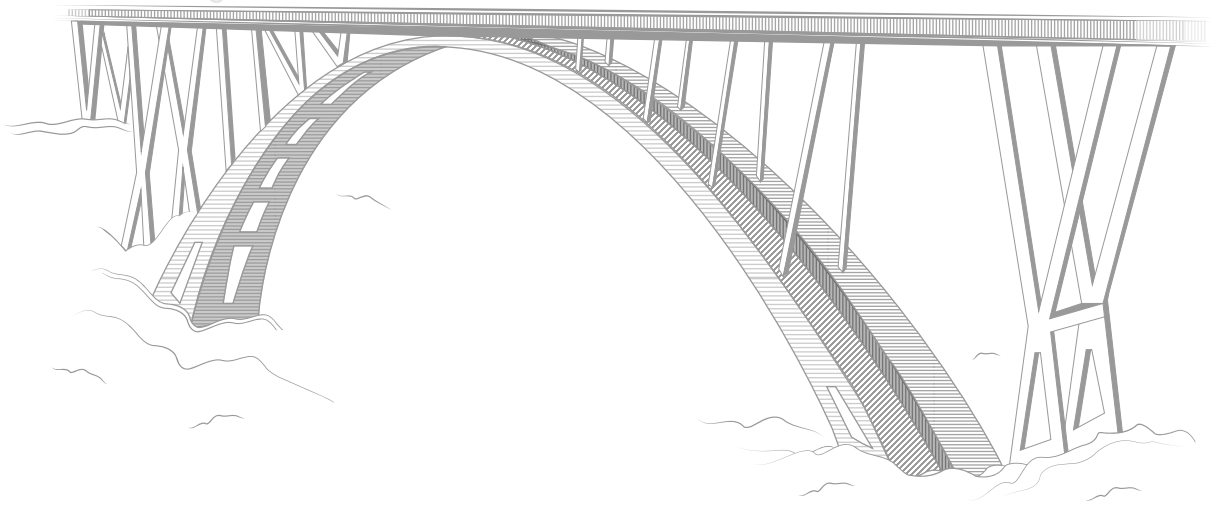
Characteristics

Sensor	
Type	Monoaxial or biaxial
Digitizer	
Type	2 Channel 24 bit – Sigma Delta ADC
Sampling rate	100 SPS per channel
General Specifications	
Range	± 15°, (upon request)
Linearity	±0,1% f.s.
Resolution	0,001°
Thermal Drift	0.01%/°C
Thermal Drift Offset -25…85°C (typical)	±0.002 °/°C
Thermal Drift Offset -40…125°C (max)	-2.5...+1
Long term stability	<0.004°
Output	Angle in 0,001° Temperature in 0,1°
Mechanical	
Material	Acciaio inox
Length	Da 0,5m a 1m
Diameter	Pipe Ø = 31 mm
Protection degree	IP 68 a 200m di H2O
Weight	500g about
Working Temperature	- 40 to 85 °C
Power supply	
Power Supply	10 to 25 VDC
Absorption	15mA @15VDC
Connector	On board
OVP	All contacts are protected
Communication	
Power Supply	RS-485 port
Sampling	2400, 4800, 9600, 19200, 38400, 57600
Protocol Communication	MODBUS RTU
Security Protocol	Checksum
Sensor Connection	Up to 128 sensors with a single cable type 2x2x0.5 mm2

The Company

For over 40 years we have been producing precision and large facility monitoring instruments sold throughout the world.

Accuracy in design, efficiency in construction, reliability in management; these are the prerogatives that every major work must have and that Structural Monitoring Systems must guarantee.



Technical assitance

If you have any requests or questions about our instruments or if you have special needs that require different solutions from the standard, please contact us. Our team will provide all the necessary information and will be very happy to work with you to study, develop and customize instruments and solutions suitable for your specific needs.

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