IN-PLACE INCLINOMETER

GEOTECHNICAL MONITORING

Applications

In-Place Inclinometers (IPIs) are designed to detect ground deformation by measuring changes in inclination across solid segment lengths. These measurements are converted into a displacement and then cumulated across the full length of the IPI.

Typical applications include:

- Retaining Walls and Deep excavations
- Slopes, Embankments and Ground Improvement Schemes
- Tunnels and Shafts
- Dam Monitoring

Specifications

Uniaxial or Biaxial options - MEMS output

Accuracy:	0.0125% Full Scale
Resolution:	0.0017% Full Scale
Repeatability:	0.007% Full Scale
Thermal Stability:	0.005% Full Scale

Models: Vertical
Horizontal
Inclined

Installation

The method for installing IPIs is similar for both vertical and horizontal systems. In both situations the IPI segments are installed into specially designed inclinometer casings that feature grooves to guide the wheels of the instrument.

In a Vertical or Inclined installation, a borehole is drilled to the required depth and inclinometer casing is installed into the hole. Optionally, a reservation tube can be installed into the borehole before the casing. Inclinometer casing generally features a quick joint system to allow for fast, simple installation. The grout used to secure the casings must be of a strength similar to, or slightly weaker than the substrate being monitored.

Once the grout has cured and the casing is secure, measurements are taken using a manual inclinometer probe to provide a record for the installation.
The IPI system can then be installed. Serial numbers must be recorded during the installation of each segment. At least 0.5m of space should be left between the bottom sensor and the base of the casing to allow for potential movement of the hole. The IPI string is suspended at the top of the casing using a top hanger.

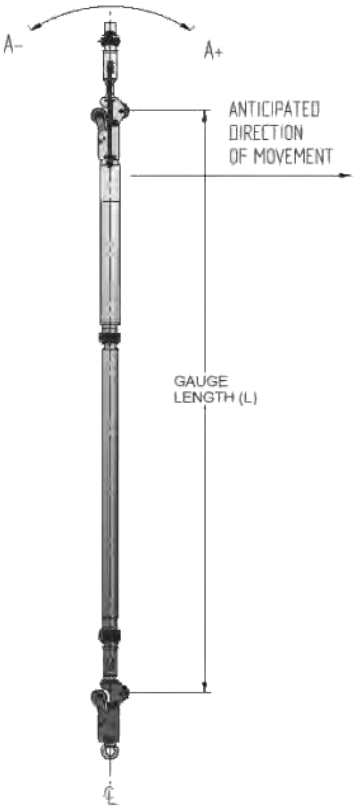
For a horizontal IPI system, a casing is not always required as the sensor can simply be clamped or mounted to the required locations.

All systems can be set up for automated transmission of data or for manual data collection.

Operation

IPI systems can be comprised of custom combinations of steel segments at pre-defined lengths from 0.5 to 3m connected via a BUS system terminating at a cable at top of the borehole. This cable is connected to a digital wireless node.
Segment lengths can be varied across the installation and can be removed and replaced if required.

Recorded changes in inclination are converted into displacement over the length of the segment. Values are then cumulated along the sensor string from an assumed “fixed point”. This point is generally at the base of the borehole on a vertical or inclined system.



Key Advantages

Versatility:
IPIs can be installed in a variety of environments, taking advantage of variable segment lengths to provide cost-efficient monitoring.

Compatibility:
Systems can be installed at any stage of a project and support a wide range of loggers for flexible data acquisition.

Automated and Low Maintenance:
Once installed, IPIs can be left in situ for long time spans with limited need for maintenance or repair.