DGSI
DURHAM GEO SLOPE INDICATOR

Vertical GeoFlex - 1 meter gauge length



System Overview

The GeoFlex system is a string of MEMS sensors, 1 meter apart, ideal for geotechnical monitoring applications including:

- Monitoring deformation of the diaphragm walls that support deep excavations.
- Monitoring ground movements induced by tunnel construction.
- Monitoring deformations of embankments and retaining walls.
- Monitoring landslide areas above dams, highways, and railroads to provide early warning of slope failure.



A single GeoFlex segment folded for shipment

Operation

The system can contain up to 150 sensor nodes in a vertical string installed in 85 mm or up to 50 nodes in a 70 mm inclinometer casing.

The casing provides access for subsurface measurements. The joints between each sensor are robust, allowing the system to maintain a consistent orientation of all the nodes.

The casing is typically installed in a vertical borehole that passes through a suspected zone of movement. The nodes are spaced at 1 meter to provide cost effective monitoring.

The system spans the zone of movement and when the ground moves, the casing moves with it, changing the inclination of the nodes inside.

Cumulating the deflections along the string produces a graph of the casing profile. Changes indicate displacement (movement).

The GeoFlex system uses a data acquisition system, and can transmit readings to cloud-based processing software that can trigger alarms based on displacements or rate of change.

Advantages

Real Time Monitoring: The GeoFlex system is ideal for continuous, unattended monitoring and can deliver readings in near real-time.

Single-Cable Installation: Each sensor conects to the sensor above, requiring only one signal cable for each borehole and making datalogger wiring easy.

Mix and Match Sensor Spacing: 1 m node spacing strings may be integrated with traditional 0.5 m node spacing strings for greater data resolution at targeted depths.

GeoFlex systems are made easy to ship. The sections connect with quick release clevis pins and separate for shipping, so the segments can ship in a 1.2 meter long box. We include spare clevis pins with each segment.

This makes the logistics of a GeoFlex installation easy. You can send the packages to a job site through overnight mail, carry a GeoFlex array in the trunk of your car, or even strap it to the cargo rack on an ATV and haul it to a remote job location.

DGSI also offers sensor-less nodes to install at the top of the system, letting you save money by only monitoring the zone of interest and bypassing the upper layers.

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Durable Components: Nodes, cables, connectors and gage rods are exceptionally durable, making it practical to remove the systems at the end of the project and redeploy them on other projects.

Data Reduction: The GeoFlex system outputs the displacement as engineering units, requiring less computing power and a lighter load on your data acquisition system. No need to keep track of what node has what calibration coefficients or what order you installed the segments in - the datalogger detects and configures this automatically.

Complete Solutions: DGSI offers complete monitoring solutions that include dataloggers and web-based monitoring software that can check for alarm conditions in near-real time and can plot data immediately after retrieving the readings.

GeoFlex System Configuration

A GeoFlex system requires casing, GeoFlex segments, a suspension kit, a bottom plug and a jumper cable.

Casing: Choose 70 mm or 85 mm diameter inclinometer casing.

GeoFlex Segments: Choose the number of GeoFlex segments required, and casing diameter. If mixing 1M and 0.5M length strings, order one additional adapter cable 57802201, for each transition where 0.5 m strings are attached below 1 m strings.

Suspension Kit: Order one suspension kit for each installation. The kit includes the suspension gate and hardware for securing the system.

Signal Cable: Each borehole requires a bottom plug to seal the end of the signal cable and a jumper cable to connect to the datalogger.

DataLogger:

Campbell Scientific: The GeoFlex system works with many Campbell Scientific dataloggers. The CR6 or CR1000Xe can log two GeoFlex systems per logger directly. The CR350 can log one GeoFlex system.

DGSI GTecLink Wireless Dataloggers: Use the GTecLink dataloggers for easy wireless data monitoring. The Digital Node works with up to 10 nodes, while the GeoFlex Node works with up to 50.

Data Reduction Software: Process the GeoFlex data with a spreadsheet or the Sensly web-based monitoring system.

1 meter GeoFlex System

70 mm Inclinometer Casing

GeoFlex Segment, 5 m.....57802700
GeoFlex Segment, 4 m.....57802704
GeoFlex Segment, 3m.....57802703
GeoFlex Segment, 2 m.....57802702
GeoFlex Segment, 1 m.....57802701
Dummy Segment, 1.5 m.....57801993
Dummy Segment, 0.5 m.....57801990
Suspension Kit for 70 mm.....57801755

85mm Inclinometer Casing

GeoFlex Segment, 5 m.....57802760
GeoFlex Segment, 4 m.....57802764
GeoFlex Segment, 3 m.....57802763
GeoFlex Segment, 2 m.....57802762
GeoFlex Segment, 1 m.....57802761
Dummy Segment, 1.5 m.....57801995
Dummy Segment, 0.5 m.....57801992
Suspension Kit for 85 mm.....57801758
Bottom Plug.....57802210
Jumper Cable, 25 m.....57802225
Jumper Cable, 50 m.....57802250
Adapter Cable (1 m to 0.5 m).....57802201

GeoFlex Node Specifications

Sensor Type: MEMS (Micro Electro-Mechanical Systems) tilt sensor for inclination readings.

Requirements: Minimum supply voltage of 10 Vdc. Maximum supply voltage of 30 Vdc. Digital RS485 signal requires Campbell Scientific or GTecLink datalogger.

Weight: 650 g per 1 meter segment. Calibrated Range: ±30 degrees from vertical over a temperature range of -10°C to +40°C.

Resolution: 9 arc seconds or 0.04 mm/m.

Repeatability: ±82 arc seconds or ±0.4 mm/m. Required Casing: Fits 70 mm or 85 mm diameter inclinometer casing.

Waterproof: Waterproof to 2 MPa. Signal

Cable: Jumper Cable for connecting the system to the datalogger. Sensors per Chain: The tables below show nominal limits for chains of nodes.

Number of Nodes	Jumper Length, m (12V Supply)	Jumper Length, m (24V Supply)
10	315	
25	118	434
50	45	212
75	24	132
100		85
125		51
150		22

DataLoggers

The GeoFlex system requires a Campbell or GTecLink data logger. These loggers connect to the GeoFlex over RS485.

CR350 DataLogger.....56700350
CR1000Xe Data Logger.....56700001
CR6 Data Logger.....56700006
GTecLink Digital Node.....57801705
GTecLink GeoFlex Node.....57801700

Buy/Request a Quote

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