

# GEOKON

# TRUSTED MEASUREMENTS®

## Geotechnical + Structural **Monitoring**

GEOKON offers a full complement of instrumentation for a wide range of industries:

- **Bridges**
- **Dams**
- **Embankments**
- **Foundations + Excavations**
- **Geogrids + Geotextiles**
- **Groundwater**
- **Landfills**
- **Mines + Tailings Dams**
- **Nuclear Waste Repositories**
- **Piles + Caissons**
- **Pipelines**
- **Slope Stability**
- **Tunnels**
- **Wind Turbines**



## About **GEOKON**

**Measurements You Can Trust**

GEOKON, now an employee owned company, is a recognized world leader in the manufacture of geotechnical + structural instrumentation.

Since 1979, GEOKON sensors have provided excellent long-term stability and proven reliability for protracted measurements in adverse environments.

GEOKON has been awarded ISO 9001:2015 registration from both ANSI•ANAB, USA and UKAS of Great Britain.

GEOKON products are supported by an experienced team of factory-trained associates ready to assist with instrument design, selection and installation.

GEOKON is committed to providing exceptional customer service to meet the needs of our clients.

# GEOKON

**TRUSTED MEASUREMENTS®**

48 Spencer Street, Lebanon, NH 03766, USA

**p:** +1•603•448•1562    **f:** +1•603•448•3216

**w:** [www.geokon.com](http://www.geokon.com)    **e:** [teamsales@geokon.com](mailto:teamsales@geokon.com)

[www.linkedin.com/company/geokon-usa](http://www.linkedin.com/company/geokon-usa)



# STRAIN GAUGES

geokon.com/  
Strain-Gauges



A strain gauge is a sensor that measures strain, typically on a structural element. The sensor's output varies with applied force. The change in gauge output can be used to determine changes in applied force on the structural element. In geotechnical applications, there are two main types of strain gauges, externally mounted on a structure and embedded in the concrete of a structure.

## CONCRETE EMBEDMENT

**Standard** 4200  
VW



- Standard Embedment type
- Length: 153 mm (6")
- Ranges: 3,000, 5,000, 10,000  $\mu$

**Miniature** 4204  
VW



- For laboratory use
- Length: 102 mm (4")
- Range: 3,000  $\mu$

**Miniature** 4202  
VW



- For laboratory use
- Length: 51 mm (2")
- Ranges: 3,000, 5,000, 10,000  $\mu$

**Long Base Length** 4210–4224  
VW



- For large aggregate concrete
- Lengths: 250, 300, 350, 600 mm (10, 12, 14, 24")
- Range: 3,000  $\mu$

**Standard Low Modulus** 4200L  
VW



- For measuring curing strains
- Length: 153 mm (6")
- Range: 3,000  $\mu$

**Miniature Low Modulus** 4202L  
VW



- For measuring curing strains
- Length: 51 mm (2")
- Range: 3,000  $\mu$

**Dynamic** 3900  
ER



- Full strain gauged bridge type
- Length: 203 mm (8")
- Range: 5,000  $\mu$

**High Temperature** 4200HT  
VW



- For short-term exposure
- Length: 153 mm (6")
- Range: 3,000  $\mu$

**High Temperature** 4200HT-T  
VW



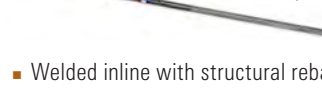
- For long-term exposure
- Length: 148 mm (1.9")
- Range: 3,000  $\mu$

**Sister Bar** 4911 | 3911 | FP4911  
VW | ER | FO



- Installed alongside structural rebar
- Length: 914 mm (36")
- Range: 3,000  $\mu$  (VW, ER)  
 $\pm 1,000$   $\mu$  (FO)

**Rebar Strainmeter** 4911A | 3911A  
VW | ER



- Welded inline with structural rebar
- Length: 1105 mm (44")
- Range: 3,000  $\mu$

**Deformation Meter** 4430  
VW



- For use in RCC dams
- Tied to rebar cage
- Length: 335–1210 mm (13.2–47.6")
- Ranges: 25, 50, 100, 150, 300 mm (1, 2, 4, 6, 12")

## CONCRETE + MASONRY

**Standard** 4000B  
VW



- With groutable mounting blocks
- Length: 150 mm (6")
- Ranges: 3,000, 5,000, 10,000  $\mu$

**Long Base Length** 4050B  
VW



- With groutable mounting blocks
- Length: 300 mm (12")
- Range: 3,000  $\mu$

**Strain Transducer** ST-350  
ER



- Bolted to structure
- Length: 76 mm (3")
- Range:  $\pm 4,000$   $\mu$   
( $\pm 2,000$   $\mu$  calibrated)

**Fiber Optic** FP4000  
FO



- Bonded to structure
- Length: 100 mm (4")
- Ranges:  $\pm 1,000$ ,  $\pm 2,500$ ,  $\pm 5,000$   $\mu$

### TECH KEY

#### Vibrating Wire | VW

- Long-term monitoring
- Long cable requirements
- Adverse environments

#### Electronic Resistance | ER

- Dynamic response
- For Data Acquisition Systems unable to read VW sensors

#### Fiber Optic | FO

- Dynamic response
- Long cable (fiber) requirements
- EMI/RFI/Lightening immunity



## STEEL STRUCTURES

### Standard 4000A

VW



- Arc weldable
- Length: 150 mm (6")
- Ranges: 3,000, 5,000, 10,000  $\mu$

### Miniature 4150A

VW



- Arc weldable
- Length: 51 mm (2")
- Ranges: 3,000, 5,000, 10,000  $\mu$

### Long Base Length 4050

VW



- Arc weldable
- Length: 300 mm (12")
- Range: 3,000  $\mu$

### Spot Weldable 4100

VW



- Standard
- Length: 51 mm (2")
- Ranges: 3,000, 5,000, 10,000  $\mu$

### Spot Weldable 4150

VW



- Low profile version
- Length: 51 mm (2")
- Ranges: 3,000, 5,000, 10,000  $\mu$

### Strain Transducer ST-350

ER



- Bolted to structure
- Length: 76 mm (3")
- Range:  $\pm 4,000 \mu$   
( $\pm 2,000 \mu$  calibrated)

### Fiber Optic FP4000

FO



- Bonded to structure
- Length: 100 mm (4")
- Ranges:  $\pm 1,000, \pm 2,500, \pm 5,000 \mu$

## SOIL

### Soil Extensometer 4435

VW



- With flanges at each end, enabling assembly in series
- Length: 335–1210 mm (13.2–47.6")
- Ranges: 25, 50, 100, 150, 300 mm (1, 2, 4, 6, 12")

### Soil Strain Gauge 3900

ER



- Full strain gauged bridge type
- For measuring dynamic strains
- Length: 203 mm (8")
- Range: 5,000  $\mu$

### Deformation Meter 4430

VW | ER



- For embedment in soil embankments
- Tied to rebar cage
- Length: 335–1210 mm (13.2–47.6")
- Ranges: 25, 50, 100, 150, 300 mm (1, 2, 4, 6, 12")

## STEEL STRANDS (TENDONS)

### Strandmeter 4410

VW



- With clamps to suit tendon diameter
- Length: 203 mm (8")
- Range: 15,000  $\mu$

## PLASTICS AND FIBERGLASS

### Surface Mount 4151

VW



- With groutable mounting pins
- Length: 51 mm (2")
- Ranges: 3,000, 5,000, 10,000  $\mu$

# DISPLACEMENT TRANSDUCERS

geokon.com/  
Displacement-Transducers



Displacement transducers are designed to measure linear movement between two points. These sensors play a crucial role in tracking positional changes within an object, structure, or over a certain area. They come in various measurement ranges tailored to the type and magnitude of displacement being measured.

## GENERAL USE

**Embedment Jointmeter** 4400  
VW



- Expansion or contraction of a joint
- Strains in tendons and steel cables
- Movement across surface cracks and joints
- Closures in underground excavations, tunnels, etc.
- Displacements associated with landslides
- Movement of boulders, snow, etc. on unstable slopes
- Length: 441–569 mm (17.4–22.4")
- Ranges: 12.5–250 mm (0.5–10")

**Deformation Meter** 4430  
VW



- Expansion or contraction of joints
- Borehole elongation or shortening
- Closures in underground excavations, tunnels, etc.
- Displacements associated with landslides
- Movement of boulders, snow, etc. on unstable slopes
- Length: 335–1210 mm (13.2–47.6")
- Ranges: 25–300 mm (1–12")

## CONSTRUCTION JOINTS

**Crackmeter** 4420  
VW



- For measuring movement across the joint
- Anchors are bolted, welded, or bonded in place
- Midrange length: 318–645 mm (12.5–25.4")
- Ranges: 12.5–500 mm (0.5–20")

**Micro Crackmeter** 4422  
VW



- For limited access and/or unobtrusive installation
- With mounting studs and groutable anchors
- Length: 122 mm (4.8")
- Range: 4 mm [±2 mm] (0.15" [±0.08"])

**Mechanical 3D Crack Meter** 4415



- Manually measure displacement/expansion across cracks in three directions
- Anchor (L × Ø): 150 × 12 mm (6 × 0.5")
- Ranges: ±12.5, ±25, ±50 mm (±0.5, 1, 2")

## DAMS + EMBANKMENTS

**Soil Extensometer** 4435  
VW



- For measuring horizontal strain in earthfill or rockfill dams
- With flanged ends enabling assembly in series
- Length: 335–1210 mm (13.2–47.6")
- Ranges: 25–300 mm (1–12")

## GEOGRIDS

**Crackmeter** 4420  
VW



- With clamps to match geogrid
- Midrange length: 318–645 mm (12.5–25.4")
- Ranges: 12.5–500 mm (0.5–20")

## STEEL STRANDS (TENDONS)

**Strandmeter** 4410  
VW



- With clamps to suit tendon diameter
- Length: 203 mm (8")
- Range: 15,000 μ

## TUNNELS

**Convergence Meter** 4425  
VW



- For monitoring closures in tunnels, underground excavations, etc.
- With groutable or rockbolt expansion anchors
- Length: 710–1615 mm (28–63.6") (including eyehook assembly)
- Ranges: 12.5–150 mm (0.5–6")

## LARGE DISPLACEMENTS

**Long Range Displacement Meter** 4427  
VW



- For measuring landslides, or the movement of boulders, snow, etc. on unstable slopes
- Enclosure dimensions (L × W × H): 610 × 152 × 152 mm (24 × 6 × 6")
- Ranges: 1, 2 m (3.3, 6.5') without resetting

### TECH KEY

- Vibrating Wire | VW
- Long-term monitoring
  - Long cable requirements
  - Adverse environments



Extensometers are high-precision instruments designed to monitor displacement, deformation, or strain. The extensometer is a critical performance device and a key monitoring instrument to measure soil and rock masses' behavior, stability, and movement.

## GENERAL USE

### Rod Type Borehole Extensometer (MPBX)

1100

VW



- For measuring ground movements in and around tunnels, open pit mines, retaining walls, etc.
- Also for deformation of dam abutments and foundations, fracturing in underground caverns, subsidence in tunnels and mines, and foundation elevation changes
- Suitable for grouted or ungrouted boreholes oriented in any direction
- Anchor options for soil, rock, or concrete

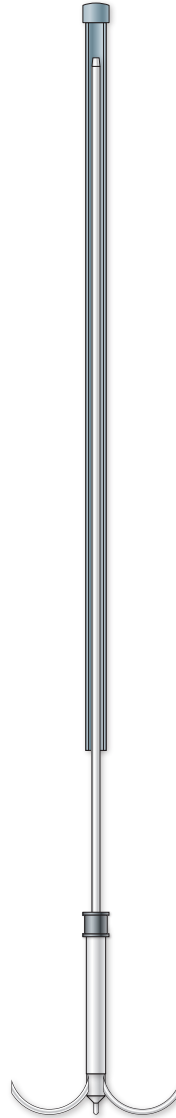
## SETTLEMENT AND HEAVE

### Magnetic Extensometer 1900



- For measuring settlement or heave of soft ground
- Typically used in or around excavations, foundations, dams, embankments, tunnels, sheet piles, and slurry walls
- Borehole Ø: 102–216 mm (4–8.5")
- Length: 30–200 m (100–300')

### Settlement Points 1950



- For measuring vertical movements in foundation soils during and subsequent to construction
- Designed for fills and embankments, foundations, roadways, surcharges, etc.
- Anchor type: Hydraulic Borros
- Outer Pipe Ø: 25 mm (1")
- Inner Pipe Ø: 6 mm (0.25")

### Settlement Plate System 4625



- For monitoring areas where significant settlement or substantial material displacement is expected
- Plate dimensions: (L × W): 610 × 610 mm (24 × 24")
- Sleeve Ø: 89 mm (3.5")
- Riser pipe Ø: 38 mm (1.5")

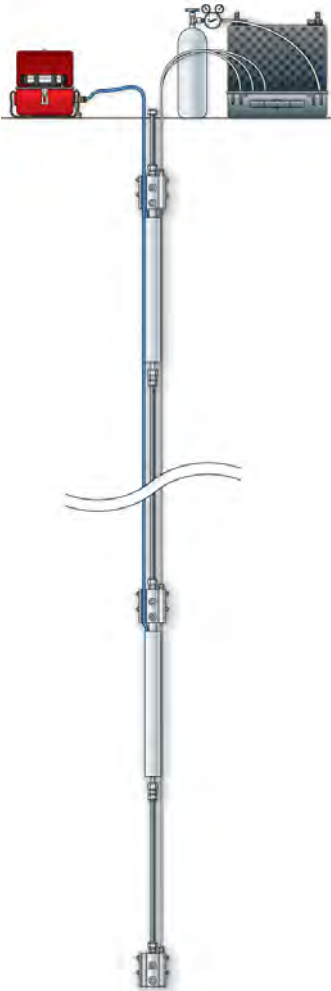
#### TECH KEY

- Vibrating Wire | VW
- Long-term monitoring
  - Long cable requirements
  - Adverse environments



## BOREHOLES

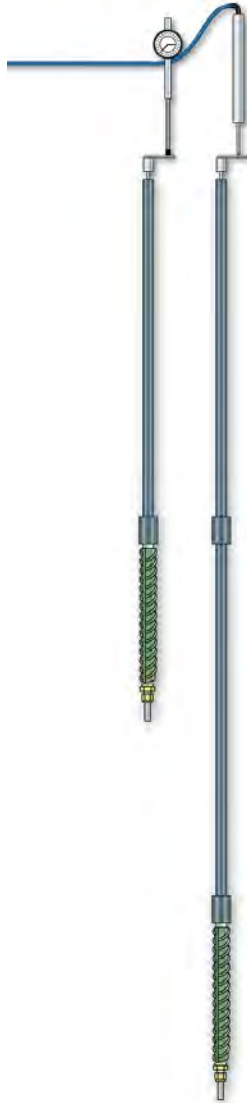
### Retrievable Extensometer 1300



- For measuring borehole deformation in piles, concrete, rock, or other materials
- Particularly suited to load testing of concrete piles
- Retrievable and reusable
- Range: 12.5–200 mm (0.5–8")

## LOAD TRANSFER

### Telltales 1800



- For measuring the pattern of load transfer in piles, drilled shafts, tieback anchors
- Commonly used in piles subjected to static load tests
- System consists of a protective tube, internal rod, and anchor
- Dial indicator or displacement transducer is used for readout

## CONVERGENCE

### Tape Extensometer 1610



- For measuring small changes in distance between two points
- Typically used in tunnels, mine openings, structures, unstable slopes, etc.
- Accuracy:  $\pm 0.1$  mm
- Tape lengths: 20, 30, 50 m (66, 100, 165')

### Convergence Meter 4425

4425

VW



- For monitoring closures in underground excavations, tunnels, etc.
- Groutable or rockbolt expansion anchors
- Length: 710–1615 mm (28–63.6") (including eyehook assembly)
- Range: 12.5–150 mm (0.5–6")

# PIEZOMETERS

geokon.com/  
Piezometers



Piezometers are intended primarily for long-term measurements of fluid depths and pore pressures in standpipes, boreholes, embankments, and pressure vessels. Applications typically fall under one of two categories, monitoring the patterns of water flow or providing an index of soil or rock mass strength. Monitoring pore water pressure is essential in differentiating a soil's total stress from its effective stress.

## GENERAL USE



- Dimensions (L × Ø): 133 × 19 mm (5.2 × 0.75")
- Ranges: 350 kPa–3 MPa



- Dimensions (L × Ø): 133 × 25 mm (5.2 × 1")
- Ranges: 70, 170 kPa



- Dimensions (L × Ø): 194 × 32 mm (7.6 × 1.3")
- Ranges: 100 kPa–6 MPa



- Dimensions (L × Ø): 146 × 19 mm (5.75 × 0.75")
- Ranges: 350, 700 kPa



- Dimensions (L × Ø): 133 × 25 mm (5.2 × 1")
- Ranges: 70, 170 kPa



- Dimensions (L × Ø): 194 × 33 mm (7.6 × 1.3")
- Ranges: 100 kPa–6 MPa

## EMBANKMENT DAMS



- Dimensions (L × Ø): 203 × 38 mm (8 × 1.5")
- Ranges: 70 kPa–7.5 MPa

## RCC DAMS



- Dimensions (L × Ø): 194 × 25 mm (7.6 × 1")
- Ranges: 350 kPa–20 MPa

## PUSH-IN



- For EW drill rods
- Dimensions (L × Ø): 187 × 33 mm (7.4 × 1.3")
- Ranges: 70 kPa–3 MPa



- For CPT drill rods
- Dimensions (L × Ø): 218 × 51 mm (8.6 × 2")
- Ranges: 350 kPa–2 MPa

## UPLIFT AND HYDRAULIC LINES



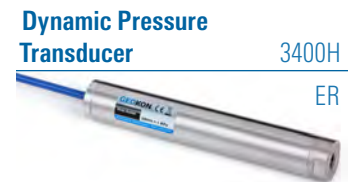
- With 1/4-18 NPT female thread
- Dimensions (L × Ø): 140 × 25 mm or 32 mm (5.5 × 1" or 1.3")
- Ranges: 70 kPa–3 MPa



- With 1/4-18 NPT female thread
- Dimensions (L × Ø): 140 × 25 mm or 32 mm (5.5 × 1" or 1.3")
- Ranges: 70 kPa–3 MPa



- With 7/16-20 medium pressure 60° cone female thread
- Dimensions (L × Ø): 143 × 25 mm (5.6 × 1")
- Ranges: 5–100 MPa



- Full strain gauged bridge type
- Dimensions (L × Ø): 194 × 32 mm (7.6 × 1.3")
- Ranges: 100 kPa–6 MPa

## CORROSIVE ENVIRONMENT



- With dual O-ring seal
- Dimensions vary with range
- Range: 70 kPa–20 MPa



- All-welded construction
- Dimensions (L × Ø): 125 mm or 168 mm × 25 mm (5 or 6.6 × 1")
- Range: 350 kPa–10 MPa

## MULTILEVEL



- Borehole Ø: 100–150 mm (4–6")
- Nominal borehole oversize capacity: +30 mm (1.2")
- Ranges: 70 kPa–7.5 MPa

## ATMOSPHERIC CORRECTION



- Dimensions (L × Ø): 110 × 63 mm (4.3 × 2.5")
- Range: 200 mbar

### TECH KEY

#### Vibrating Wire | VW

- Long-term monitoring
- Long cable requirements
- Adverse environments

#### Electronic Resistance | ER

- Dynamic response
- For Data Acquisition Systems unable to read VW sensors



## STREAMS, FLUMES, WEIRS

### Pressure Transducer 4580-2 VW



- Low pressure, with 1/4-18 NPT female thread
- Dimensions (L × Ø): 165 × 38 mm (6.5 × 1.5")
- Range: 35 kPa

### Weir Monitor System 4675LV VW



- Precision water level measurement
- Dimensions vary with range
- Ranges: 150–1500 mm (6–60")

### Vented Pressure Transducer 4580-2V VW



- Low pressure, with 1/4-18 NPT female thread
- Dimensions (L × Ø): 165 × 38 mm (6.5 × 1.5")
- Ranges: 17, 35 kPa

### Vented Pressure Transducer 4580-3V VW



- Low pressure, vented, with 1/4-18 NPT female thread
- Dimensions (L × Ø): 165 × 64 mm (6.5 × 2.5")
- Range: 7 kPa

## ELEVATED TEMPERATURES

### High Temperature 4500HT VW



- For use in oil recovery systems and geothermal applications
- Dimensions vary with range
- Ranges: 350 kPa–100 MPa

### High Temperature Pressure Transducer 4500HHT VW



- With 7/16-20 medium pressure 60° cone female thread
- Dimensions vary with range
- Ranges: 350 kPa–100 MPa

## STANDPIPES

### Small Diameter 4500B VW



- For automating standpipes
- Dimensions (L × Ø): 133 × 18 mm (5.2 × 0.7")
- Standpipe Ø: 19 mm (0.75")
- Ranges: 350 kPa–3 MPa

### Small Diameter 4500C VW



- For automating standpipes
- Dimensions (L × Ø): Length: 165 × 11 mm (6.5 × 0.4")
- Standpipe Ø: 12 mm (0.5")
- Ranges: 350, 700 kPa

### Vented Small Diameter 4500BV VW



- For automating standpipes
- Dimensions (L × Ø): Length: 133 × 18 mm (5.2 × 0.7")
- Standpipe Ø: 19 mm (0.75")
- Ranges: 350 kPa–2 MPa

### Casagrande Piezometer Tip 4590



- Riser pipe Ø: 127 mm (0.5"), 191 mm (0.75"), 254 mm (1")
- Lengths: 349 mm (13.7"), 501 mm (19.7"), 654 mm (25.7")
- Effective filter area: 30.8 in<sup>2</sup> (198.7 cm<sup>2</sup>), 49.5 in<sup>2</sup> (319.4 cm<sup>2</sup>), or 68.1 in<sup>2</sup> (439.4 cm<sup>2</sup>)

### Water Level Meter 101



- 10 mm (3/8") tape, markings every 1 mm or 1/100'
- Probe Dimensions (L × Ø): 190 × 14 mm (7.5 × 0.6")
- Length: 30–600 m (100–2000')



# SETTLEMENT SYSTEMS

geokon.com/  
Settlement-Sensors



Liquid settlement systems are designed to measure settlement from one point relative to another at a stable location. A liquid-filled line (tube or pipe) is connected to a pressure sensitive gauge. Relative elevation changes increase or decrease the pressure of the liquid in the lines, this change in pressure is measured by the pressure gauge.

## BOREHOLES

### Borehole Settlement System

4600  
VW



- For measuring surface settlement
- Must be located above bedrock or stable ground
- Sensor dimensions (L × Ø): 280 × 60 mm (11 × 2.4")
- Reservoir dimensions (L × Ø): 305 × 60 mm (12 × 2.4")
- Plate dimensions (L × W × H): 305 × 305 × 6 mm (12 × 12 × 0.25")
- Ranges: 7, 17, 35 m

### Borehole Multilevel Settlement System

4600M  
VW



- For measuring subsurface settlement
- Must be located above bedrock or stable ground
- Sensors held in place with hydraulic borros anchors
- Sensor dimensions (L × Ø): 280 × 60 mm (11 × 2.4")
- Reservoir dimensions (L × Ø): 305 × 60 mm (12 × 2.4")
- Plate dimensions (L × W × H): 305 × 305 × 6 mm (12 × 12 × 0.25")
- Ranges: 7, 17, 35 m

## TUNNELS, BRIDGES, EXCAVATIONS, ETC.

### Multipoint Hydraulic Leveling System

4655 | 3655  
VW | ER



- For measuring differential settlements
- Sensor dimensions (L × Ø): 182 × 35 mm (7.2 × 1.4")
- Ranges: 70 kPa (7.14 m) H<sub>2</sub>O (VW)  
7–35 kPa (0.68–3.57 m) H<sub>2</sub>O (ER)

### Multilevel Vibrating Wire Settlement System

4675  
VW



- For detecting and measuring very small changes of elevation at discrete locations
- Dimensions vary with range
- Ranges: 100–600 mm (4–24")

### Precision Settlement Monitoring System

46750C  
VW



- For measuring differential settlements with a very high degree of accuracy and resolution
- Mounting bracket (L × W): 279 × 152 mm (11 × 6")
- Range: 75 mm (3")

#### TECH KEY

##### Vibrating Wire | VW

- Long-term monitoring
- Long cable requirements
- Adverse environments

##### Electronic Resistance | ER

- Dynamic response
- For Data Acquisition Systems unable to read VW sensors



## EMBANKMENTS AND FILLS

### Vibrating Wire Settlement System 4660 VW



- For remote measurement of settlement in or below fills, surcharges, embankments, etc.
- Plate with sensor cover (L x W x H): 305 x 305 x 51 mm (12 x 12 x 2")
- Ranges: 7, 17 m

### Settlement Profiler 4651 VW



- For measuring profiles of heave and settlement beneath fills, embankments, roadways, storage tanks, structures, etc.
- Optional dead end pulley available
- Probe dimensions (L x Ø): 203 x 35 mm (8 x 1.4")
- Max tubing length: 100 m (330')
- Range: 7 m

### Hydraulic Overflow Settlement System 4615



- For measuring settlement where settlement cell and readout location are at the same elevation
- Cell dimensions (H x Ø): 450 x 200 mm (17.7 x 8")
- Readout dimensions (L x W x D): 1650 x 250 x 125 mm (65 x 10 x 5")
- Range: 1 m (3.3')

## SETTLEMENT AND HEAVE

### Settlement Plate System 4625



- For monitoring areas where significant settlement or substantial material displacement is expected
- Plate dimensions (L x W): 610 x 610 mm (24 x 24")
- Sleeve Ø: 89 mm (3.5")
- Riser pipe Ø: 38 mm (1.5")

# PRESSURE CELLS

geokon.com/  
Pressure-Cells



Earth pressure cells provide a direct means of measuring total pressure (soil stress + pore water pressure). Cells are constructed from stainless steel plates welded together around their periphery and filled with hydraulic fluid. A length of stainless-steel tube connects a pressure transducer to the fluid-filled cavity. When external pressures squeeze the plates together, the transducer converts the change in the fluid pressure to an electrical signal.

## EARTH FILLS, EMBANKMENTS, AND SOIL

**Earth** 4800 | 3500  
VW | ER



- For measuring soil pressure
- Multiple cells can be used to measure pressure in two or three directions
- Cell dimensions (H × Ø): 7 × 230 mm (0.3 × 9.1")
- Ranges: 70 kPa–20 MPa (VW) 100 kPa–6 MPa (ER)

**Push-In** 4830-1 | 3530-1  
VW | ER



- For measurement of total pressures in soils and earth fills
- Threaded end for installation using lengths of pipe or drill rods
- Dimensions (L × W × H): 610 × 51 × 10 mm (24 × 2 × 0.4")
- Ranges: 70 kPa–5 MPa (VW) 100 kPa–5 MPa (ER)

**Granular Soil** 4815 | 3515  
VW | ER



- For measuring soil pressure in granular materials
- Effectively reduces the severity of point loading
- Cell dimensions (H × Ø): 26 × 230 mm (1 × 9.1")
- Ranges: 70 kPa–20 MPa (VW) 100 kPa–6 MPa (ER)

**Push-In** 4830-2 | 3530-2  
VW | ER



- With integral piezometer for measurement of effective stress in soils and earth fills
- Threaded end for installation using lengths of pipe or drill rods
- Dimensions (L × W × H): 610 × 51 × 10 mm (24 × 2 × 0.4")
- Ranges: 70 kPa–5 MPa (VW) 100 kPa–5 MPa (ER)

**Contact** 4810 | 3510  
VW | ER



- For measuring soil pressure on structures
- Mounted to concrete forms, or to steel/concrete surfaces
- Cell dimensions (H × Ø): 15 × 230 mm (0.6 × 9.1")
- Ranges: 70 kPa–20 MPa (VW) 100 kPa–6 MPa (ER)

## EXCAVATIONS

**Jackout** 4820 | 3520  
VW | ER



- For monitoring soil pressures on diaphragms (slurry) walls
- Dimensions (H × Ø): 152 × 150 mm (6 × 5.9")
- Ranges: 70 kPa–20 MPa (VW) 100 kPa–6 MPa (ER)

**Hydraulic Jack** 4820-6  
VW



- For use with Model 4820 or 3520 Jackout pressure cells
- Available with piezometer for measuring pore water pressures
- Ranges: 350 kPa–5 MPa

## DAMS + EMBANKMENTS

**NATM Style Shotcrete Stress Cell** 4850-1 | 3550-1  
VW | ER



- For measuring tangential stresses in shotcrete tunnel linings
- Cell dimensions (W × L): 100 × 200 mm (4 × 8")
- Ranges: 7.5, 20, 35 MPa

**NATM Style Shotcrete Stress Cell** 4850-2 | 3550-2  
VW | ER



- For measuring radial stresses in shotcrete tunnel linings
- Cell dimensions (W × L): 150 × 250 mm (6 × 10")
- Ranges: 2, 3, 5 MPa (VW) 1, 2.5, 6 MPa (ER)

## PILES

**Pile Tip** 4855 | 3555  
VW | ER



- For measuring pile-tip loads in cast-in-place concrete piles (caissons)
- Thickness: ~50 mm (2")
- Diameter to suit the pile
- Ranges: 2–20 MPa

## BOREHOLES

**Borehole** 3200  
VW



- For measuring rock stress changes
- With integral pressure gauge, pressure transducer, or both
- Cell dimensions (L × W × H): 203 × 48 × 13 mm (8 × 1.9 × 0.5")
- Ranges: 20, 35, 75 MPa

### TECH KEY

- Vibrating Wire | VW
- Long-term monitoring
  - Long cable requirements
  - Adverse environments

- Electronic Resistance | ER
- Dynamic response
  - For Data Acquisition Systems unable to read VW sensors

**GEOKON** | TRUSTED MEASUREMENTS.

GEOKON  
48 Spencer Street  
Lebanon, NH 03766 · USA

www.geokon.com  
e: info@geokon.com  
p: +1-603-448-1562

GEOKON is an  
ISO 9001:2015  
registered company



Load cells are designed around the transference between applied force and material deformation. They are primarily used to monitor compressive or tensile loads, often in conjunction with a hydraulic jack, which applies the load. Load cells can also be utilized to monitor load throughout the life of tiebacks, rockbolts, struts, or other supports.

## TIEBACKS AND ROCK BOLTS

### Solid Core Load Cell

4900 | 3000

VW | ER



- Particularly suited for long term monitoring
- Typically used in conjunction with bearing plates
- Outer Ø: 64–254 mm (2.5–10")
- Height: 115–153 mm (4.5–6")
- Rated capacities: 100–10,000 kN

### Hollow Core Load Cell

4900 | 3000

VW | ER



- Particularly suited for long term monitoring
- Typically used in conjunction with bearing plates
- Outer Ø: 76–254 mm (3–10")
- Inner Ø: 50–153 mm (2–6")
- Height: 76–153 mm (3–6")
- Rated capacities: 100–10,000 kN

### Bearing Plate

4901 | 3001



- For use with Models 4900 (VW) and 3000 (ER) Load Cells
- Thickness: 25–75 mm (1–3")
- Inner Ø: 50–150 mm (2–6")

### Tension Load Cell

4915

VW



- For monitoring tensile loads in in-line weighing systems
- Transducer (L × Ø): 94 × 19 mm (3.7 × 0.75")
- Rated capacity: 15 kg

### Instrumented Rockbolt

4910

VW



- With integral strain gauge
- Bolt size: 25 mm, #8 rebar, and larger
- Length: 300 mm (12")
- Range: 2,500 µ (equivalent to ~27,215 kg in a 25 mm (1") diameter bolt)

### Reading Probe

4910-1



- Probe for reading Model 4910 Rockbolt
- Length: 183 cm (6")

#### TECH KEY

##### Vibrating Wire | VW

- Long-term monitoring
- Long cable requirements
- Adverse environments

##### Electronic Resistance | ER

- Dynamic response
- For Data Acquisition Systems unable to read VW sensors



Inclinometers monitor inclination relative to casing axes, as well as with respect to gravity. Inclination measured over the length of the instrument shows the deviation of one end relative to the other, creating a profile of the casing. Changes in the casing profile over time provide a deformation measurement of the casing, which can assist in defining subsurface horizontal deformation.

## TUNNELS + UNDERGROUND

### Vertical In-Place Inclinometer String 6140



MEMS

- For remote, continuous, automatic monitoring of lateral movements
- Traditional wheeled design for consistent azimuth direction
- Site adjustable string lengths
- Up to 500 sensors per string
- Casing groove Ø: 58–90 mm (2.3–3.5")
- Range: ±90° (±30° calibrated)

### Vertical In-Place Inclinometer System 6180



MEMS

- For remote, continuous, automatic monitoring of lateral movements
- Lengths: 0.5, 1, 2, 3 m (2, 5, or 10')
- Casing groove Ø: 58–90 mm (2.3–3.5")
- Range: ±90° (±30° calibrated)

### Horizontal In-Place Inclinometer System 6185



MEMS

- For remote, continuous, automatic monitoring of ground movements and differential settlements
- Lengths: 0.5, 1, 2, 3 m (2, 5, or 10')
- Casing groove Ø: 58–90 mm (2.3–3.5")
- Range: ±90° (±30° calibrated)

## DAMS, TAILINGS, SLOPES, LANDSLIDES

### Digital Inclinometer System GK-604D



MEMS

- For measuring lateral movements
- Maximum cable length: 500 m (1640')
- Casing groove Ø: 48–89 mm (2–3.5")
- Range: ±90° (±30° calibrated)

### Vertical In-Place Inclinometer String 6140



MEMS

- For remote, continuous, automatic monitoring of stability and lateral deformations
- Traditional wheeled design for consistent azimuth direction
- Site adjustable string lengths
- Up to 500 sensors per string
- Casing groove Ø: 58–90 mm (2.3–3.5")
- Range: ±90° (±30° calibrated)

### Vertical In-Place Inclinometer System 6180



MEMS

- For remote, continuous, automatic monitoring of stability and lateral deformation
- Lengths: 0.5, 1, 2, 3 m (2, 5, or 10')
- Casing groove Ø: 58–90 mm (2.3–3.5")
- Range: ±90° (±30° calibrated)

### Vibrating Wire In-Place Inclinometer 6300



VW

- For remote, continuous, automatic monitoring of stability and lateral deformation
- Sensor dimensions (L × Ø): 187 × 32 mm (7.4 × 1.25")
- For use with Model 6500 Inclinometer casing
- Range: ±10°

## CASING

### ABS Casing 6600



- Dimensions (ID × OD): 58 × 70 mm (2.3 × 2.75")
- Lengths: 1.5, 3 m (5, 10')

### Glue-Snap ABS Casing 6400



- Dimensions (ID × OD): 59 × 70 mm (2.3 × 2.75") or 73 × 85 (2.9 × 3.3")
- Lengths: 1.5, 3 m (5, 10')

### Fiberglass Casing 6500



- Dimensions (ID × OD): 67 × 70 mm (2.6 × 2.75")
- Lengths: 1, 1.5, 3 m (3.3, 5, 10')

## TECH KEY

### Vibrating Wire | VW

- Long-term monitoring
- Long cable requirements
- Adverse environments

### Micro-Electro-Mechanical Systems | MEMS

- High sensitivity
- Long-term stability
- High resistance to shock loads

# TILTMETERS + PENDULUMS

geokon.com/  
Tiltmeters-Pendulums



Tiltmeters are used to monitor the change in inclination (or rotation) at different points on a structure. These instruments consist of a gravity-sensing element contained within various styles of housing, depending on the application.

## BUILDINGS, DAMS, SLOPES + EMBANKMENTS, RETAINING WALLS, RAILROAD TRACKS, OPEN PITS

### Tilt Sensor 6190

MEMS



- For measuring vertical or horizontal tilt
- Sensors can be combined into a string
- Sensor dimensions (L x Ø): 180 x 25 mm (7.1 x 1")
- Range: ±90° (±30° calibrated)

### Tilt Beam 6195

MEMS



- For measuring vertical or horizontal tilt
- Sensors can be combined into a string
- Beam Ø: 25 mm
- Beam lengths: 0.5, 1, 2, 3 m, 2, 5, 10'
- Range: ±90° (±30° calibrated)

### Vibrating Wire Tiltmeter 6350

VW



- For measuring vertical or horizontal tilt
- Adjustable mounting bracket
- Sensor dimensions (L x Ø): 194 x 32 mm (7.6 x 1.25")
- Range: ±10° uniaxial

### GeoNet Series Tilt Loggers Multiple Models

MEMES



- For measuring vertical or horizontal tilt
- Secure cloud integration for remote data collection and viewing (On-site also available)
- Enclosure dimensions (L x W x H): 120 x 122 x 91 mm (4.7 x 4.8 x 3.6")
- Range: ±90° (±30° calibrated)

### Tilt Sensor in Enclosure 6161

MEMS



- For measuring vertical or horizontal tilt
- Uniaxial and biaxial versions available
- Enclosure dimensions vary with model
- Range: ±15°

## HIGH-RISE BUILDINGS, DAMS, BRIDGES

### Pendulum System 6850



- For measuring vertical or horizontal tilt of large structures
- High-resolution linear array CCDs (charge coupled devices)
- 2D and 3D models available
- X axis range: 50 mm (2")
- Y axis ranges: 50 mm (2"), 100 mm (4")
- Z axis range: 50 mm (2")

## TUNNELS + UNDERGROUND OPENINGS, PIPELINES

### Tilt Beam 6195

MEMS



- For measuring vertical or horizontal tilt
- Sensors can be combined into a string
- Beam Ø: 25 mm (1")
- Beam lengths: 0.5, 1, 2, 3 m, 2, 5, 10'
- Range: ±90° (±30° calibrated)

#### TECH KEY

##### Vibrating Wire | VW

- Long-term monitoring
- Long cable requirements
- Adverse environments

##### Micro-Electro-Mechanical Systems | MEMS

- High sensitivity
- Long-term stability
- High resistance to shock loads

**GEOKON** | TRUSTED MEASUREMENTS.

GEOKON  
48 Spencer Street  
Lebanon, NH 03766 · USA

www.geokon.com  
e: info@geokon.com  
p: +1-603-448-1562

GEOKON is an  
ISO 9001:2015  
registered company



Portable readouts are compact units tailored to work with specific types of external sensors. They are versatile devices that can be used for primary data collection or as diagnostic tools. Capabilities range from basic to advanced and vary with model.

## VIBRATING WIRE

### Handheld GK-404



- Compatible with GEOKON vibrating wire (VW) gauges and transducers
- Displays the reading in digits, frequency (Hz), period ( $\mu$ s), and microstrain ( $\mu\epsilon$ )
- Displays temperature of sensors with integral thermistors
- Accuracy: 0.025% F.S. (VW sensor)
- Dimensions (L x W x H): 120 x 65 x 22 mm (4.7 x 2.6 x 0.9")

### Vibrating Wire Analyzer GK-406



- Compatible with GEOKON vibrating wire (VW) gauges and transducers
- Measures the resonant frequency of the wire using VSPECT (VW spectral analysis technology)
- Very fine measurement resolution
- Limits the influence of external noise
- Accuracy:  $\pm 0.005\%$  of reading
- Dimensions (L x W x H): 200 x 100 x 58 mm (7.9 x 3.9 x 2.3")

## LOAD CELL

### Load Cell Readout GK-502



- For reading Model 3000 electrical resistance strain gauge load cells
- Accuracy:  $\pm 0.05\%$  F.S. ( $\pm 30$  digits)
- Dimensions (L x W x H): 165 x 102 x 216 mm (6.5 x 4 x 8.5")
- Range:  $\pm 16$  mV ( $\pm 31,250$  digits)

### Load Cell Multiplexer GK-406-MUX



- Can be used in conjunction with the GK-406 to read GEOKON 3, 4, and 6 gauge load cells
- Allows the GK-406 to calculate the average reading change, apply the gauge factor, and display the load in engineering units
- Dimensions (L x W x H): 135 x 76 x 35 mm (5.3 x 3 x 1.4")

## INCLINOMETER

### Field PC FPC-3



- For reading GK-604D digital inclinometer probes
- 4 GB memory, 64 GB data storage
- Android 11 (GMS) operating system
- Dimensions (L x W x H): 194 x 92 x 15 mm (7.6 x 3.6 x 0.6")

## ANALOG MEMS

### MEMS Readout RB-500



- For reading the voltage output from GEOKON Model 616 Tilt Sensors
- Accuracy: 0.06% F.S.
- Dimensions (L x W x H): 102 x 165 x 232 mm (4 x 6.5 x 9.1")
- Range:  $\pm 4$  Volts, ( $\pm 1.999$  Volts displayed)

## SURGE PROTECTION

### Surge Protection Circuit Board 4999-12



- Protects GEOKON transducers, dataloggers, and power supplies from short duration, high voltage surges
- Available with or without a protective enclosure
- Break down voltage: 7.5 V, 16 V, or 30 V (nominal)
- Peak current: 5 kA (20  $\mu$ s) max.

## TERMINALS + MULTIPLEXERS

### Manual Switch Terminal Box 4999



- Facilitates reading multiple vibrating wire sensors with a single readout
- Includes built in surge protection
- Capacity of 4, 8, 16, or 32 sensors
- Dimensions vary by model



A datalogger is a device specifically engineered to monitor and record data, at specified time intervals, of either internal or external sensors. Dataloggers are designed to operate autonomously for extended durations with minimal human intervention, making them ideal for deployment in remote environments. Dataloggers can function as standalone units, or serve as integral components of larger systems.

## GEONET

### Networked Loggers 8920 | 8930 | 8950



- Seamless and secure cloud integration for remote data collection and viewing
- Data collected and transmitted directly to the cloud by each unit
- Multiple telemetry options
- Single, multi-channel, addressable, and tilt loggers available
- Compatible with most manufactures' VW sensors and with GEOKON addressable sensor strings

### Mesh Loggers 8800 | 8901 | 8903



- Cloud integration for remote data collection and viewing (on-site data collection also available)
- Mesh network can relay data around obstacles
- Single, multi-channel, addressable, and tilt loggers available
- Compatible with most manufactures' VW sensors and with GEOKON addressable sensor strings

### Dataloggers 8940



- Sensor data is collected on-site via a direct connection to the datalogger
- Single, multi-channel, addressable, and tilt loggers available
- Compatible with most manufactures' VW sensors and with GEOKON addressable sensor strings

### Digital Vibrating Wire Interfaces 8960



- Expands the capacity of multi-channel and addressable loggers
- Single and multi-channel available
- Multiple load cells and VW sensors can be connected to a single interface (total number of VW gauges cannot exceed interface channel capacity)
- Compatible with most manufactures' VW sensors and with GEOKON addressable sensor strings

## MODEL 8600

### Datalogger 8600



- Utilizes the Campbell Scientific, Inc. Model CR6 Measurement and Control System
- Primarily for use with vibrating wire sensors (can be special ordered to read MEMS, voltage sensors, Carlson type sensors, etc.)
- Can read up to 96 VW sensors and thermistors or 256 two-wire sensors (requires multiplexers)
- Standard memory capacity of 128 MB (can be expanded using a Micro SD card)

### Multiplexer 8032



- Enables automatic switching between connected gauges
- Two configurations available: 16 channels of 4-conductors, or 32-channels 2-conductors
- Dimensions (L x W x H): 342 x 301 x 160 mm (13.5 x 11.9 x 6.3")

### Wireless Vibrating Wire Interface 8040



- Wireless data transmission to the model 8600 Series Dataloggers
- Can be used in situations where a flush mounted system is required
- Available for 2, 4, 16 or 32-sensors
- Dimensions (L x W x H): 216 x 112 x 32 mm (8.5 x 4.4 x 1.3")





## SOFTWARE + HOSTING

### Agent Software 8800-GNA



- For configuring GeoNet hardware and performing subsequent data acquisition
- Facilitates hardware configuration, sensor monitoring, data collection, file management, etc.
- Free download on [www.GEOKON.com](http://www.GEOKON.com)

### GeoNet Wireless Data Hosting

- Provides a high-value, networked data collection option for GeoNet devices
- Sensor data is stored in a secure cloud-based storage platform where it can be accessed through the GEOKON OpenAPI
- Agent software or any compatible 3rd party data visualization software can be used with the GEOKON OpenAPI

## CONVERTERS

### Addressable Bus Converter 8032-38



- Allows GEOKON RS-485 enabled sensor strings to be read by USB or TTL capable devices (PCs, dataloggers, programmable logic controllers, etc.)
- Communication: USB version 1.0 and higher, 5-volt TTL, or inverted 5-volt TTL
- Baud rates: 9600 bps–115.2 kbps (user-resettable)
- Dimensions (L × W × H): 89 × 65 × 40 mm (3.5 × 2.5 × 1.6")

### VW Frequency to Analog Converter 8020-59



- Allows GEOKON VW sensors to be read by data acquisition systems unable to read VW sensors or frequency signals
- Provides the necessary signal conditioning
- Accuracy: ±0.1% F.S. (0–5 V), ±0.5% F.S. (4–20 mA)
- Dimensions (L × W × H): 111 × 108 × 36 mm (4.4 × 4.25 × 1.4")

### PLC Interface 8020-59-PLC



- Allows GEOKON Models 8020-59 and 8032 to be used with Programmable Logic Controller (PLC) modules
- VALID Relay Closure Output Type: PhotoMos Solid-State Relay sensors (50 W max. on resistance)
- Power requirements: 20 μA @ +12 V (standby) 30 mA @ +12 V (operation)
- Dimensions (L × W × H): 111 × 109 × 37 mm (4.4 × 4.3 × 1.5")



Stressmeters are typically utilized to measure in-situ stress in rock formations through direct measurement of strain or pressure on borehole walls. These measurements can assist in evaluating the performance of the surrounding formation and may help inform predictions about how the formation will respond to various forces.

## ROCK

### Borehole Stressmeter 4300 VW



- For measuring rock stress changes in boreholes  $\leq 30.5$  m (100')
- Borehole  $\varnothing$ : 38, 60, or 76 mm (1.5", 2.4", 3")  $\pm 1$  mm (0.04")
- Tension range: 3 MPa
- Compression range: 35–100 MPa (Depends on rock modulus)

### Borehole Pressure Cell 3200 VW



- For measuring rock stress changes in boreholes
- With integral pressure gauge, pressure transducer, or both
- Cell dimensions (L  $\times$  W  $\times$  H): 203  $\times$  48  $\times$  13 mm (8  $\times$  1.9  $\times$  0.5")
- Ranges: 20, 35, 75 MPa

### Biaxial Stressmeter 4350 VW



- For measuring compressive stress changes in rock, salt, or ice
- Available with 3 or 6 radial gauges (6 gauge model includes 2 VW temperature gauges and optional 2 longitudinal gauges)
- Borehole  $\varnothing$ : 60 mm (2.4")
- Dimensions (L  $\times$   $\varnothing$ ): 318  $\times$  29 mm (12.5  $\times$  1.1")
- Range: 70 MPa

### Borehole Deformation Gauge 5000 VW



- For measuring in situ rock stresses
- For 38 mm (1.5") EX-size diamond drill boreholes
- Overcore depth: 203 mm–15 m (8"–49.2') standard, 25 mm–60 m (1"–196.9') with reverse case and extra cable
- Dimensions (L  $\times$   $\varnothing$ ): 267  $\times$  35 mm (10.5  $\times$  1.4")

### Soft Inclusion Stress Cell 4360 VW



- For measuring stress changes in elastic rocks
- Diameter: 76 mm (3"), 150 mm (6"), NX, HQ, PQ
- Range:  $\pm 35$  MPa

## CONCRETE

### Concrete Stressmeter 4370 VW



- For measuring tensile and compression stresses in mass concrete
- Length: 600 mm (23.6")
- Diameter (OD  $\times$  ID): 76  $\times$  66 mm (3  $\times$  2.6")
- Range: –3–25 MPa

### Biaxial Stressmeter 4350 VW



- For measuring compressive stress changes in rock, salt, or ice
- Available with 3 or 6 radial gauges (6 gauge model includes 2 VW temperature gauges and optional 2 longitudinal gauges)
- Borehole  $\varnothing$ : 60 mm (2.4")
- Dimensions (L  $\times$   $\varnothing$ ): 318  $\times$  29 mm (12.5  $\times$  1.1")
- Range: 70 MPa

## TECH KEY

- Vibrating Wire | VW
- Long-term monitoring
  - Long cable requirements
  - Adverse environments



Temperature sensors are designed to measure the temperature of an object or environment. Sensor output varies in accordance with the temperature, and is converted into standard engineering units by a portable readout or datalogger. Temperature data plays a critical role in monitoring programs, as significant fluctuations can impact the integrity of the sensors or structures under observation.

## ROCK, SOIL, CONCRETE, ETC.

### Thermistor Probe 3800



- For measuring temperature
- Dimensions (L × Ø):  
50 × 12 mm (2 × 0.5")
- Range: -20 to +80 °C
- Accuracy: ±0.2 °C or ±0.5 °C depending on model

### High Temperature Thermistor Probe 3800HT



- For measuring temperature
- Dimensions (L × Ø):  
75 × 19 mm (3 × 0.75")
- Range: -30 to +230 °C
- Accuracy: ±0.5 °C

## BOREHOLES

### Thermistor String 3810



- For profiling borehole temperatures
- Dimensions ≤16 sensors (L × Ø):  
45 × 16 mm (1.8 × 0.6")
- Dimensions 17–32 sensors (L × Ø):  
64 × 22 mm (2.5 × 0.9")
- Range: -20 to +80 °C
- Accuracy: ±0.2 °C or ±0.5 °C depending on model

### Addressable Thermistor String 3810A



- For profiling borehole temperatures
- Dimensions (L × Ø):  
146 × 22 mm (5.7 × 0.9")
- Terminal sensor (L × Ø):  
158 × 22 mm (6.2 × 0.9")
- Range: -20 to +80 °C
- Accuracy: Varies with temperature

## DAMS, CONCRETE, LANDFILLS, ETC.

### Vibrating Wire Temperature Sensor 4700 VW



- For measuring temperature
- Dimensions (L × Ø):  
130 × 19 mm (5.1 × 0.75")
- Range: -20 to +80 °C
- Accuracy: ±0.5 °C

### High Temperature VW Temperature Sensor 4700HT VW



- For measuring temperature
- Dimensions (L × Ø):  
157 × 19 mm (6.2 × 0.75")
- Ranges: -40 to +200 °C,  
-40 to +250 °C
- Accuracy: ±0.5 °C

### Fiber Optic Temperature Sensor FP4700 FO



- For measuring temperatures where high accuracy is required, high levels of electrical interference exist, or intrinsic safety is an issue
- Dimensions (L × Ø):  
50 × 5 mm (2 × 0.2")
- Range: -40 to +250 °C
- Accuracy: ±1.0 °C

### Thermistor String 3810



- For profiling temperatures in dam embankments, levees, landfills, glaciers, etc.
- Dimensions ≤16 sensors (L × Ø):  
45 × 16 mm (1.8 × 0.6")
- Dimensions 17–32 sensors (L × Ø):  
64 × 22 mm (2.5 × 0.9")
- Range: -20 to +80 °C
- Accuracy: ±0.2 °C or ±0.5 °C depending on model

### Addressable Thermistor String 3810A



- For profiling temperatures in dam embankments, levees, landfills, glaciers, etc.
- Dimensions (L × Ø):  
146 × 22 mm (5.7 × 0.9")
- Terminal sensor (L × Ø):  
158 × 22 mm (6.2 × 0.9")
- Range: -20 to +80 °C
- Accuracy: Varies with temperature

#### TECH KEY

##### Vibrating Wire | VW

- Long-term monitoring
- Long cable requirements
- Adverse environments

##### Fiber Optic | FO

- Dynamic response
- Long cable (fiber) requirements
- EMI/RFI/Lightning immunity



## APPLICATIONS

GEOKON cables are of the highest quality materials and construction. They are designed to be matched with the appropriate instrument for a variety of geotechnical and hydrological applications.

Standard and specialized cables are available for:

- Typical applications
- High temperature environments
- Extra abrasion resistance
- Heavy duty use

## CABLE DESIGN

GEOKON cables are made from individual stranded copper conductors encased in an insulation material. Individual, insulated conductors are twisted into pairs, bundled inside a conductive Mylar-type shielding material and then covered by an outer

jacket made from the most suitable material. In addition, cables may be water blocked, armored, or may contain steel or Kevlar® cables for additional strength, or plastic tubes for circulation fluids, or for venting to atmosphere.

## CABLE SHIELDING AND INSULATION

Shielding provides protection from electromagnetic radiation coming from nearby electrical equipment, lightning strikes and fields surrounding power lines, transformers, etc. GEOKON multi-conductor cables are individually shielded and twisted in pairs, which helps minimize common mode interference. Drain wires connected electrically to Mylar-type shields provide a simple means

of connecting all the shields to a common ground. For applications with very high levels of EMI, such as in pumping wells, a special cable with a braided shield can be provided.

Plastic insulation is typically used on the individual copper conductors. Polyethylene or polypropylene insulation is used at normal temperatures and Teflon is most often used for high temperature.

## CABLE CONDUCTORS

In general, the number of conductors in a cable is determined by the number of sensors to be connected to the cable, and the number of conductors required by each sensor.

The type of conductor normally used is stranded, 22 AWG tinned copper. Stranded conductors are more flexible than solid conductors, which makes the cable easier to handle during installation.

## OUTER JACKETS

GEOKON cable jackets are thicker than regular commercial types, and pressure extruded, which produces cables that are rounder, firmer and easier to grip and seal at the point of entry on the sensor. A wide variety of outer jacket materials is available depending on the end use:

**Neoprene:** A synthetic rubber compound commonly used for outdoor applications, with good resistance to gasoline, oils etc. Ordinary rubber should never be used.

**PVC:** A common choice for its good electrical properties and for being waterproof. It should not be used at low temperatures where it becomes brittle.

**Polyurethane:** This material is very resistant to cuts and abrasions making it useful for cables that are subject to repeated rough handling. It is not as

water resistant as PVC but has better low temperature capabilities.

### High Density Polyethylene:

An excellent material that is highly resistant to environmental attack and exhibits excellent low temperature characteristics. Unfortunately, like Teflon, the material is so slippery that splicing and potting compounds will not stick to it.

**Teflon:** This material is essential wherever sensors and cables are subject to high temperature. It has outstanding resistance to environmental attack and has excellent low temperature properties. However, splicing and potting compounds will not adhere to it.

**Other:** Compounds such as Kevlar or Kapton®, etc. may be required where there is a need for low smoke emissions, flame retardant, or resistance to nuclear radiation.

## ARMOR

Armored cables are most often needed for sensors installed in earth embankments or landfills where large forces are exerted on the cable by compaction equipment and earth moving vehicles, and by settlement, “weaving,” and sideways spreading of the embankment as it is built. Armored cables should not be con-

nected directly to strain gauges or crackmeters because the stiffness of the cable would pull on the gauge and alter the readings. Armored cable is not necessary in concrete. The armor usually takes the form of a helically laid layer of steel wire. In very severe situations, regular cable may be put inside stainless steel tubing.



## VENTED CABLES

Special cables are available which contain plastic tubes inside of them as well as the usual conductors. These tubes can be used to transport air or other fluids. This type is required for

vented piezometers, where a single vent tube allows the inside of the pressure sensor to be connected to the ambient atmosphere to provide automatic barometric compensation.

## CABLE SPLICES

A wide range of splices are available to provide waterproof and mechanically strong cable connections.

The splice kits include the requisite electrical connectors and epoxy potting compounds along with detailed instructions for correct implementation.

## TECHNICAL SPECIFICATIONS

Model	Conductors	Conductor Insulation	Drain Wire	Cable Jacket <sup>1</sup>	Nominal O.D.	Temperature Range
01-250P0	2-conductor, 1 twisted pair, 22 AWG 7/30	10 mil HDPP	24 AWG	Black PU	6.35 mm (±0.25 mm)	-40 °C to +80 °C
02-156T	4-conductor, 24 AWG, 7/34	10 mil PFA	N/A	316L	4 mm	-40 °C to +300 °C
02-187P6	4-conductor, 2 twisted pairs, 22 AWG 7/30	8 mil HDPP	24 AWG	Blue PU	4.75 mm (±0.25 mm)	-20 °C to +80 °C
02-187V3	4-conductor, 2 twisted pairs, 22 AWG 7/30	8 mil HDPP	24 AWG	Red PVC	4.75 mm (±0.25 mm)	-20 °C to +80 °C
02-250P4	4-conductor, 2 twisted pairs, 22 AWG 7/30	8 mil HDPP	24 AWG	Green PU	6.35 mm (±0.25 mm)	-20 °C to +80 °C
02-250P9LT	4-conductor, 2 twisted pairs, 22 AWG 7/30	8 mil HDPP	24 AWG	Violet PU	6 mm (±0.25 mm)	-40 °C to +80 °C
02-250PEP-2205	4-conductor, 24 AWG Solid	8 mil PTFE	N/A	Duplex 2205	6.35 mm (±0.13mm)	-150 °C to +300 °C
02-250PEP-316	4-conductor, 24 AWG Solid	8 mil PTFE	N/A	316 SS	6.35 mm (±0.13 mm)	-150 °C to +300 °C
02-250T	4-conductor, 2 twisted pairs, 22 AWG 19/34	10 mil FEP	24 AWG	White Teflon with aluminum polyester foil shielding	5.20 mm (±0.25 mm)	-80 °C to +200 °C
02-250V4	4-conductor, 2 twisted pairs, 22 AWG 7/30	10 mil PP	24 AWG	Green PVC	6.35 mm	-20 °C to +80 °C
02-250V6	4-conductor, 2 twisted pairs, 22 AWG 7/30	10 mil HDPP	24 AWG	Blue PVC	6.35 mm (±0.25 mm)	-20 °C to +80 °C
02-250V6-LSZH	4-conductor, 2 twisted pairs, 22 AWG 7/30	10 mil PP	24 AWG	Blue LSZH	6.35 mm	-40 °C to +80 °C
02-312PS4	4-conductor, 2 twisted pairs, 22 AWG 7/30	10 mil HDPP	24 AWG	Green PU with Braided Shield	8 mm (±0.38 mm)	-20 °C to +80 °C
02-313P9LTD	4-conductor, 2 twisted pairs, 1st pair 24 AWG 7/32, 2nd pair 22 AWG 7/30	1st pair 20 mil FPE, 2nd pair 10 mil SRPVC	24 AWG	Violet PU	8 mm	-40 °C to +80 °C
02-313PI	4-conductor, 2 twisted pairs, 22 AWG 7/30	10 mil HDPP	24 AWG	Black PU with integral SS straining wire	7.95 mm (±0.38 mm)	-20 °C to +80 °C
02-313V6	4-conductor, 2 twisted pairs, 22 AWG 7/30	10 mil HDPP	24 AWG	Blue PVC with Kevlar strain relief	8 mm (±0.38 mm)	-20 °C to +80 °C
02-335VT8	4-conductor, 2 twisted pairs, 22 AWG 7/30	10 mil HDPP	24 AWG	Yellow PU with integral 0.125" Ø PE vent tube	8.50 mm (±0.38 mm)	-20 °C to +80 °C
02-500PE1A	4-conductor, 2 twisted pairs, 22 AWG 7/30	10 mil HDPP	24 AWG	Black PVC Inner; Black MDPE outer, with served armor	12.70 mm (±0.38 mm)	-20 °C to +80 °C
03-250V0	6-conductor, 3 twisted pairs, 24 AWG 7/32	10 mil HDPP	24 AWG	Black PVC	6.35 mm (±0.38 mm)	-20 °C to +80 °C
04-375V9	8-conductor, 4 twisted pairs, 22 AWG 7/30	10 mil HDPP	22 AWG	Violet PVC	9.50 mm (±0.38 mm)	-20 °C to +80 °C
04-375VT1	8-conductor, 4 twisted pairs, 22 AWG	10 mil HDPP	24 AWG	Black PVC with integral PE vent tube	9.50 mm	-20 °C to +60 °C
05-375V12	10-conductor, 5 twisted pairs, 22 AWG 7/30	10 mil HDPP	22 AWG	Tan PVC	9.50 mm (±0.38 mm)	-20 °C to +80 °C
06-312V0	12-conductor, 6 twisted pairs, 24 AWG 7/32	10 mil HDPP	24 AWG	Black PVC	7.95 mm (±0.38 mm)	-20 °C to +80 °C
06-500V7	12-conductor, 6 twisted pairs, 22 AWG 7/30	10 mil HDPP	22 AWG	Orange PVC	12.70 mm (±0.38 mm)	-20 °C to +80 °C
CAB-541	12-conductor, 6 twisted pairs, 20 AWG 7/28	16 mil TPR	22 AWG	Black TPR	11.68 mm	-30 °C to +105 °C
12-625V5	24-conductor, 12 twisted pairs, 22 AWG 7/30	10 mil HDPP	22 AWG	Brown PVC	15.90 mm (±0.38 mm)	-20 °C to +80 °C
17-375P13	17-conductor, 22 AWG 7/30	9 mil PP	N/A	Beige PU	9.53 mm	-40 °C to +80 °C
17-375P7	17-conductor, 22 AWG 7/30	9 mil PP	N/A	Orange PU	9.53 mm	-20 °C to +80 °C
17-375V7	17-conductor, 22 AWG 7/30	9 mil PP	N/A	Orange PVC	9.53 mm	-20 °C to +80 °C
33-500P6	33-conductor, 22 AWG 7/30	9 mil PP	N/A	Blue PU	12.70 mm	-20 °C to +80 °C
33-500V4	33-conductor, 22 AWG 7/30	9 mil PP	N/A	Green PVC	12.70 mm	-20 °C to +80 °C

<sup>1</sup>All outer cable jackets are pressure extruded. In addition, other cable jackets are available for special applications.

FEP = Fluorinated Ethylene Propylene (Teflon) | FPE = Foamed Polyethylene | HDPP = High Density Polypropylene | LSZH = Low Smoke Zero Halogen | MDPE = Medium Density Polyethylene | PE = Polyethylene  
PFA = Perfluoroalkoxy | PTFE = Polytetrafluoroethylene | PP = Polypropylene | PU = Polyurethane | PVC = Polyvinylchloride | SRPVC = Semi-Rigid PVC | TPR = Thermoplastic Rubber