

GEOTECHNICAL + STRUCTURAL INSTRUMENTATION

Bridges

Foundations

Mines

Tunnels

Dams

Geogrids

Piles

Waste Repositories

Embankments

Groundwater

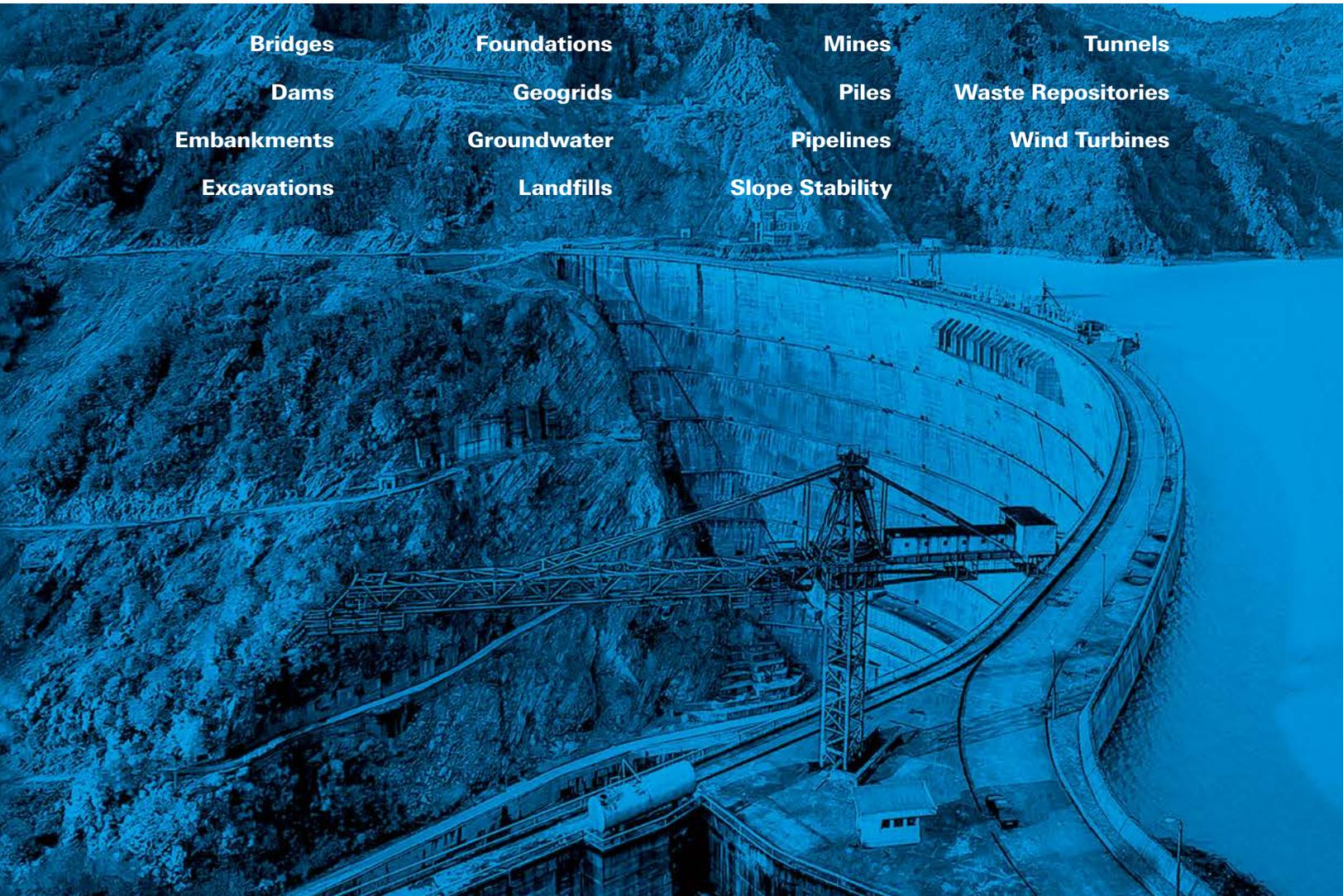
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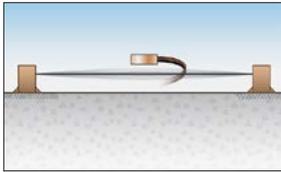
GEOKON is located in Lebanon, New Hampshire, USA and operates on a worldwide basis through a network of agencies. The company was founded in 1979 and currently has over 100 employees.

GEOKON offers a broad range of geotechnical instrumentation, which is manufactured at our factory in the USA, by a staff of trained, qualified and experienced machinists and assemblers.



Products

GEOKON manufactures a complete line of geotechnical instruments including extensometers, piezometers, strain gauges, crackmeters, jointmeters, load cells, settlement sensors, pressure cells, inclinometers, dataloggers and custom designs made to order. GEOKON instruments are used primarily for monitoring the safety and stability of civil and mining structures such as dams, tunnels, mine openings, foundations, piles, embankments, retaining walls, slopes, subway systems, underground powerhouses, bridges, culverts, pipelines, shafts, slurry wall excavations, braced excavations, tiebacks, nuclear waste repositories, ground water remediation schemes and the like.



Vibrating Wire Technology

The resonant frequency of vibration of a tensioned steel wire is dependent on the strain or tension in the wire. This fundamental dependency is utilized in a variety of configurations for the measurement of strain, load, force, pressure, temperature, and tilt.

Vibrating wire sensors are well known for their long-term stability. The advantage of vibrating wire sensors over more conventional types lies mainly in the sensor output, which is a frequency rather than a voltage.



'Caveat Emptor'

Imitation is a form of flattery, so we at GEOKON should feel extremely flattered by the number and variety of companies that have chosen to copy the elegant designs of our products. Our imitators have gone to great lengths to match the appearance of their products to GEOKON's.

So while we marvel at, and applaud the efforts of, our competitors in helping us spread the good word about the use of vibrating wire tech-

nology, we find it necessary to voice a 'Caveat Emptor' that appearances aren't everything and that beauty may be only skin deep.

The pages of this catalog provide a brief description of the standard GEOKON product lines.* Individual data sheets with additional information and complete product details are available online. If these products do not meet your needs, members of our experienced staff are ready to work with you to produce custom instrumentation for special applications. Call or write for more information or visit our website at www.geokon.com and find out why GEOKON has a reputation for high quality, reliability and service unequalled in the industry.

Frequencies can be transmitted over long cables (>2000 m) without appreciable degradation of the signal caused by variations in cable resistance, which can arise from water penetration, temperature fluctuations, contact resistance or leakage to ground. This factor, coupled with the elegance and ruggedness of GEOKON designs results in sensors which exhibit excellent long-term stability and suitability for long-term measurements in adverse environments.

Over 40 years of experience at GEOKON has inevitably honed our products to a high degree of reliability, a reliability which is dependent on subtle improvements and refinements that are not readily visible to the naked eye. This is where quality starts and ends.

Commerce, National Institutes of Standards and Technology (NIST), in Washington, DC, and are calibrated by laboratories with ISO/IEC 17025 accreditation.

GEOKON is a qualified supplier for US Nuclear Facilities in accordance with the American Society of Mechanical Engineers (ASME)/Nuclear Quality Assurance (NQA)-1, Quality Assurance Program Requirements.

The entire GEOKON product line has achieved the Russian GOST certification for product safety and the GOST metrological certification.

In addition, GEOKON offers a comprehensive custom design service to produce custom instrumentation for special applications. For service rates and rental availability, please contact: customer_service@geokon.com.



ANSI-ANAB
Certification
Number: 10643



UKAS
Certification
Number: 11507

Quality

GEOKON policy is to provide its customers with the highest quality products and services, that meet applicable requirements and to make continual improvements in the effectiveness of the Quality Management System to support our objectives and growth of the organization. As a result, GEOKON has been awarded ISO 9001:2015 registration from both ANSI-ANAB, USA and UKAS of Great Britain.

The GEOKON calibration program complies with, and is audited to, the ANSI/NCCL Z540-1 Calibration Laboratory and Measuring and Test Equipment General Requirements. In addition, all primary calibration standards are traceable to the United States Department of

Services

GEOKON offers a variety of services, including presentations and/or office visits regarding instrumentation and/or instrument applications, training (both in-house and on-site), installation assistance at project sites worldwide, and the rental of certain instruments, readouts and dataloggers.

In addition, GEOKON offers a comprehensive custom design service to produce custom instrumentation for special applications. For service rates and rental availability, please contact: customer_service@geokon.com.



*GEOKON maintains an ongoing policy of design review and reserves the right to amend products and specifications without notice.

Bridges



Bridge structures in many countries around the world have used GEOKON sensors for measuring key parameters such as strain, displacement, force, temperature, inclination, alignment and settlement. Sensors are

installed permanently for long-term health monitoring, temporarily for load testing and/or to ensure safe working conditions during repair or strengthening. Internet-accessible data acquisition systems ensure that any significant change in the condition or behavior of the structure is logged, reported and efficiently monitored.

Foundations and Deep Excavations



Excavations in urban environments require extensive monitoring to ensure their stability and to verify that nearby structures are not adversely affected.

Typical excavation/foundation-related projects may require instrumentation for the walls (slurry walls and tiebacks), bracing (cross-lot struts), and/or the underlying ground or adjacent structures and utilities. Many major cities throughout the world including New York, Boston, Kuala Lumpur and Berlin have used GEOKON instruments in these situations.

Dams



GEOKON instruments have been used to monitor and analyze critical elements of numerous dams throughout the world. Dams of any kind can benefit from instrumentation—including concrete, rollcrete, rock-fill and earth. GEOKON instruments

are used in the dams of USA, China, Spain, South Africa, Brazil, Czech Republic, Switzerland, Colombia, New Zealand, Kenya, Pakistan, Algeria, Indonesia, Thailand, Vietnam and Australia.

Geogrids



Geogrid reinforcements can be monitored using displacement transducers attached to the grid with requisite clamps. Networks of such transducers, connected to data acquisition systems, can help identify areas of subsidence and

forewarn of impending failures. Horizontal extensometers, pressure cells and settlement profilers are also commonly used in reinforced embankment constructions.

Embankments



The construction (staged or surcharged) of highway embankments and levees often requires instrumentation to monitor the progress of consolidation and to determine whether the embankment is stable.

Instrumentation can also be utilized to monitor the effectiveness of vertical drains used to accelerate consolidation in embankment construction. GEOKON piezometers, settlement systems, extensometers and inclinometers are among the most common types of instruments used for embankment monitoring.

Groundwater



GEOKON offers a wide variety of options for monitoring groundwater, lake and stream levels. Products range from simple stand-pipe piezometers and water level meters, to downhole water level loggers and

pressure transducers connected to dataloggers for pump tests and real time monitoring. Sensors for measurements in streams and weirs are also available, along with low-power data acquisition systems to wirelessly collect data from many sensors spread over a wide area.

Landfills



Environmental concerns, requiring a knowledge of groundwater conditions and the stability of landfills, have been extensively monitored using GEOKON instrumentation. In these

often highly corrosive regimes, special instruments, capable of withstanding elevated temperatures and aggressive leachates, have been constructed from titanium for added reliability and longevity. The Staten Island Landfill in New Jersey is instrumented with GEOKON sensors.

Mines



Many mines, both underground and open pit, have used GEOKON instruments to monitor the stability of underground openings or pit slopes. Instrumented mines occur in USA, Canada, Mexico, Chile, Australia, New Guinea and Zaire

among others. Of particular note is a full-scale, mine-wide monitoring system installed at J.M. Asbestos, Quebec to warn of possible collapse of the open pit slopes.

Slope Stability



Careful monitoring and examination of slopes for failure warning signs is critical for protecting people and/or facilities down slope. The type of instruments selected for any monitoring program will depend upon the geology of the soil or rock mass and the problems

to be monitored but may include extensometers, piezometers, crackmeters, and inclinometers.

Nuclear Waste Repositories



GEOKON has been involved in the instrumentation of nuclear waste repositories in the USA, Germany, Sweden and Belgium. These applications called for special high temperature

devices capable of withstanding high radiation levels. The willingness and ability of GEOKON to innovate enabled measurements to be made where other commercially available devices were unsuccessful.

Tunnels



Many subway systems in major cities around the world have used GEOKON instruments. GEOKON is a specialist in the supply of instruments for the NATM method of tunnel support. In addition to almost all major cities in the USA, we

have instrumented subway systems in Seoul, Taipei, Guangzhou, Istanbul, Hong Kong, Hanoi, Ho Chi Minh City, Singapore and London. We also have instruments in the Channel Tunnel.

Piles and Pile Testing



GEOKON is a leader in pile instrumentation—both steel and concrete, driven or cast-in-place. Many important projects utilizing coffer dams and sheet piling have been instrumented, plus pilings on foundations of major buildings in cities throughout

the world. The Petronas Twin Towers in Malaysia, among the tallest buildings in the world, uses GEOKON gauges.

Wind Turbines



Newly constructed wind turbines often require instrumentation to verify the design and long-term performance of their foundations. For piled foundations, instrumentation is

often used to measure load distribution and lateral deflections along the pile, and to monitor the effectiveness of any lock off bolts. For raft foundations, instrumentation can be installed to detect tilting and to monitor pressures and any movement between the foundation and the underlying soil or rock.

Pipelines



In situations where pipelines pass over unstable slopes, lateral forces, due to slope movements, may act on the pipe causing it to bend and possibly rupture. To monitor and determine any resulting stresses, vibrating wire strain gauges

can be attached at various points along the pipe. Instruments for slope monitoring and data acquisition systems, which offer near real-time monitoring, are also available.

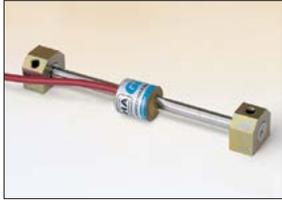
**Model 3900 Embedment Strain Gauge**

The Model 3900 Embedment Strain Gauge is designed for the measurement of dynamic strains in concrete structures, earth fills and soils. It comprises a full bridge strain gauged proving ring coupled, between two flanges, with a spring and shaft. When the flanges move relative to one another, the tension in the spring changes and hence the strain in the proving ring. A PVC tube serves as a protective housing and holds the gauge at the desired initial tension.

Specifications

Range	5000 $\mu\epsilon$
Resolution	0.125 mV/V nominal
Accuracy ¹	$\pm 0.25\%$ F.S.
Nonlinearity	< 0.5% F.S.
Temperature Range ²	-20 °C to +80 °C
Active Gauge Length ²	203 mm

¹Transducer accuracy established under laboratory conditions. | ²Other ranges/lengths available on request.

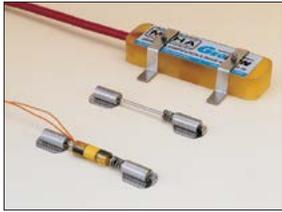
**Model 4000 Arc Weldable Strain Gauge**

The Model 4000 Strain Gauge is designed primarily for arc welding to steel structures such as tunnel linings, excavation bracing, piles and bridges. The gauge has a 150 mm gauge length (longer or shorter versions are also available) a 3000 $\mu\epsilon$ range and a 1 $\mu\epsilon$ sensitivity. The gauge can be adapted for bonding to concrete or for bolting to steel surfaces by modification of the end blocks.

Specifications

Range ¹	3000 $\mu\epsilon$
Resolution	1.0 $\mu\epsilon$
Accuracy ²	$\pm 0.5\%$ F.S.
Nonlinearity	< 0.5% F.S.
Temperature Range ¹	-20 °C to +80 °C
Active Gauge Length ¹	150 mm

¹Other ranges/lengths available on request. | ²Transducer accuracy established under laboratory conditions. Accuracy of $\pm 0.1\%$ F.S. available with optional, individual calibration.

**Model 4100 / 4150 / 4151 Miniature Strain Gauges**

The Model 4100/4150 Strain Gauge has a 51 mm gauge length (3000 $\mu\epsilon$ range, 1 $\mu\epsilon$ sensitivity) and is designed to measure strains in steel structures (4100) and on reinforcement bars (4150) where space may be limited. The gauge is installed quickly and easily by means of a capacitive discharge spot welder or, for short-term use, with special epoxy adhesives. (The 4151 is designed with pins for grouting).

Specifications

	4100	4150	4151
Range ¹	3000 $\mu\epsilon$	3000 $\mu\epsilon$	3000 $\mu\epsilon$
Resolution	0.4 $\mu\epsilon$	0.4 $\mu\epsilon$	0.4 $\mu\epsilon$
Accuracy ²	$\pm 0.5\%$ F.S.	$\pm 0.5\%$ F.S.	$\pm 0.5\%$ F.S.
Nonlinearity	< 0.5% F.S.	< 0.5% F.S.	< 0.5% F.S.
Temperature Range ³	-20 °C to +80 °C	-20 °C to +80 °C	-20 °C to +80 °C
Active Gauge Length	51 mm	51 mm	51 mm

¹Also available with 5,000 $\mu\epsilon$ range (1.0 $\mu\epsilon$ resolution) or with 10,000 $\mu\epsilon$ range (2.0 $\mu\epsilon$ resolution). (Range is dependent on the readout). | ²Transducer accuracy established under laboratory conditions. Accuracy of $\pm 0.1\%$ F.S. available with optional, individual calibration. | ³Other ranges available on request.

**Model 4200 / 4202 / 4210 Concrete Embedment Strain Gauges**

These Strain Gauges are designed for direct embedment in concrete. The 4200 (standard model) has a 153 mm gauge length and 1 $\mu\epsilon$ sensitivity and is commonly used for strain measurements in foundations, piles, bridges, dams, tunnel linings, etc. The 4210 has a 250 mm gauge length making it particularly suitable for use in large aggregate concrete. The 4202 is designed for laboratory use and/or where there are space limitations. Low modulus versions, for measuring concrete curing strains, are also available (please contact GEOKON for details).

Specifications

	4200	4202	4210
Range ¹	3000 $\mu\epsilon$	3000 $\mu\epsilon$	3000 $\mu\epsilon$
Resolution	1.0 $\mu\epsilon$	0.4 $\mu\epsilon$	0.4 $\mu\epsilon$
Accuracy ²	$\pm 0.5\%$ F.S.	$\pm 0.5\%$ F.S.	$\pm 0.5\%$ F.S.
Nonlinearity	< 0.5% F.S.	< 0.5% F.S.	< 0.5% F.S.
Temperature Range ¹	-20 °C to +80 °C	-20 °C to +80 °C	-20 °C to +80 °C
Active Gauge Length	153 mm	51 mm	250 mm ¹

¹Other ranges/lengths available on request. | ²Transducer accuracy established under laboratory conditions. Accuracy of $\pm 0.1\%$ F.S. available with optional, individual calibration.

**Model 4200HT / 4200HT-T High Temperature Embedment Strain Gauges**

The Model 4200HT and 4200HT-T (pictured at left) High Temperature Embedment Strain Gauges are similar to the standard Model 4200. However, the Model 4200HT is designed for short-term use at temperatures up to 200 °C and the Model 4200HT-T is designed for long-term use at temperatures up to 220 °C. They are particularly useful for measurements in autoclaved spun concrete piles.

Specifications

	4200HT	4200HT-T
Range ¹	3000 $\mu\epsilon$	3000 $\mu\epsilon$
Resolution	1.0 $\mu\epsilon$	1.0 $\mu\epsilon$
Accuracy ²	$\pm 0.5\%$ F.S. ³	$\pm 0.5\%$ F.S.
Nonlinearity	< 0.5% F.S.	< 0.5% F.S.
Temperature Range	-20 °C to +200 °C	-20 °C to +220 °C
Active Gauge Length	153 mm	148 mm

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions. ³Accuracy of $\pm 0.1\%$ F.S. available with optional, individual calibration.

**Model 4911 / 4911A Rebar Strainmeters**

The Model 4911 Rebar Strainmeter is designed for measuring strains in foundations, slurry walls, precast piles, caissons, bridge abutments, tunnel liners, etc. The standard Model 4911 (#4 rebar), known as the "Sister Bar", is installed alongside structural rebar. Larger models (4911A) are available for welding directly into structural rebar. Where short-term dynamic measurements are to be made, Model 3911/3911A Rebar Strainmeters, which utilize bonded resistance strain gauges, can be substituted, or added.

Specifications

	4911	4911A
Range	3000 $\mu\epsilon$	3000 $\mu\epsilon$
Resolution	0.4 $\mu\epsilon$	0.4 $\mu\epsilon$
Accuracy ¹	$\pm 0.25\%$ F.S.	$\pm 0.25\%$ F.S.
Nonlinearity	< 0.5% F.S.	< 0.5% F.S.
Temperature Range ²	-20 °C to +80 °C	-20 °C to +80 °C
Rebar Sizes	4 (Sister Bar)	6, 7, 8, 9, 10, 11, 14
Active Gauge Length	914 mm	1105 mm

¹Transducer accuracy established under laboratory conditions. | ²Other ranges available on request.



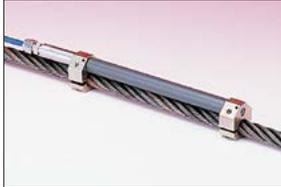
Model 4400 Embedment Jointmeter

The Model 4400 Embedment Jointmeter is designed for use across construction joints such as those between adjacent blocks in a concrete dam. It is normally embedded across the joint to monitor the expansion or contraction of the joint. The use of internal universal joints allows for a degree of shearing motion.

Specifications

Ranges ¹	12.5, 25, 50, 100 mm
Resolution	0.025% F.S.
Accuracy ²	±0.1% F.S.
Nonlinearity	< 0.5% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × Ø)	441, 441, 441, 569 × 51 mm (flange)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4410 Strandmeter

The Model 4410 Strandmeter is designed to measure strains in tendons and steel cables. Two clamps at each end of the strandmeter hold it firmly onto the cable. Various size clamps are available.

Specifications

Ranges ¹	3 mm (15,000 µε)
Resolution	< 5 µε
Accuracy ²	±0.1% F.S.
Nonlinearity	< 0.5% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × W)	203 × 45 mm (clamp width)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4420 Crackmeter

The Model 4420 Crackmeter is intended to measure movement across surface cracks and joints. It is installed by grouting, bolting or bonding two threaded anchors (with ball joints) on opposite sides of the crack and then attaching the ends of the gauge to the anchors.

Specifications

Ranges ¹	12.5, 25, 50, 100, 150 mm
Resolution	0.025% F.S.
Accuracy ²	±0.1% F.S.
Nonlinearity	< 0.5% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × Ø) ³	318, 343, 397, 555, 645 × 8 or 12.7 mm ⁴ (shaft)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.

³Length dimensions are in mid-range position. Coil diameter is 25 mm. | ⁴12.7 mm for 100 and 150 mm ranges.



Model 4422 Micro Crackmeter

The Model 4422 is a miniature crackmeter intended to measure displacements across surface cracks and joints. It has been specially designed for applications where access is limited and/or where monitoring instrumentation is to be as unobtrusive as possible (e.g. on historical structures or buildings).

Specifications

Range	4 mm (±2 mm)
Resolution	0.001 mm
Accuracy ¹	±0.1% F.S.
Nonlinearity	< 0.5% F.S.
Temperature Range ²	-20 °C to +80 °C
Dimensions (L × Ø)	120 × 8 mm

¹Transducer accuracy established under laboratory conditions. | ²Other ranges available on request.



Model 4425 Convergence Meter

The Model 4425 Convergence Meter is used to monitor closures in underground excavations, tunnels, etc. It is comprised of a spring tensioned transducer, turnbuckle, connecting rod (stainless steel, fiber-glass or graphite), rod clamp, and a pair of stainless steel eyebolts.

Specifications

Ranges ¹	12.5, 25, 50, 100, 150 mm
Resolution	0.025% F.S.
Accuracy ²	±0.1% F.S.
Nonlinearity	< 0.5% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × Ø)	varies with application × 25 mm (transducer)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4430 Deformation Meter

The Model 4430 Deformation Meter with flanged ends is designed to measure longitudinal deformation in dams and embankments. It can also be grouted or held in place by hydraulic anchors to measure deformations in boreholes (over the gauge length). Gauge lengths from 0.5 to 100 meters are available.

Specifications

Ranges ¹	25, 50, 100, 150, 300 mm
Resolution	0.025% F.S.
Accuracy ²	±0.1% F.S.
Nonlinearity	< 0.5% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × Ø)	1 m, varies × 27 mm (pipe), 51 mm (flange)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4435 Soil Extensometer

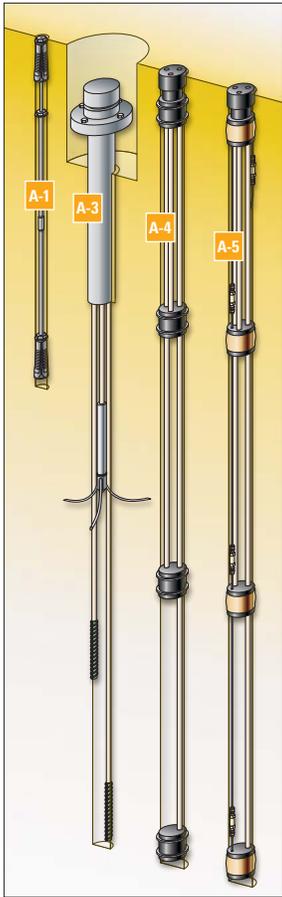
The Model 4435 Soil Extensometer is designed to be installed, in series, to measure horizontal strain in earthfill or rock-fill dams. The 4435 has flanges on either end, which enable a series of extensometers to be bolted together to form long strings of sensors, which allow complete profiles of deformation or settlement to be monitored.

Specifications

Ranges ¹	25, 50, 100, 150, 300 mm
Resolution ²	0.025% F.S.
Accuracy ³	±0.1% F.S.
Nonlinearity	< 0.5% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × Ø)	varies × 27 mm (pipe), 33 mm (slip coupling)

¹Other ranges available on request. | ²Resolution depends on readout equipment.

³Transducer accuracy established under laboratory conditions.



Model 1050 (A-1) Single Point Mechanical Extensometer

The Model A-1 Single Position Rod Extensometer is a very simple, rugged and reliable instrument, easily installed and completely recessed within the borehole for optimum protection. The Model A-1 is a natural first choice for monitoring the safety in and around tunnels and mine openings.

Specifications

Range	up to 100 mm
Least Reading	0.025 mm
Borehole Diameter	35, 44, 51, 64 mm
Dimensions (L)	3 m (maximum)

Model 1150 (A-3) Multiple Point Groutable Anchor Extensometer

The Model A-3 Multiple Point Rod Extensometer is the preferred design for installation in downward directed boreholes which are easily filled with cement grout. Up to six anchors can be installed at various depths in a 76 mm diameter borehole, providing the capability to locate multiple failure plains and zones of movement.

Specifications

Range	up to 300 mm nominal
Least Reading	0.025 mm
Borehole Diameter	76 mm or over
Dimensions (L)	100 m (maximum)

Model 1200 (A-4) Multiple Point Snap-Ring Anchor Extensometer

The Model A-4 Multiple Point Rod Extensometer with Snap-Ring Anchors is quickly and easily installed in boreholes in hard or competent rock. Anchors are pushed to the required depth on the end of setting rods and then a cord is pulled to remove the locking pin which allows two retaining rings on each anchor to snap outward and grip the borehole. Up to six anchors can be installed, at various depths, in a 76 mm diameter borehole. Particularly useful in upward directed boreholes.

Specifications

Range	up to 300 mm nominal
Least Reading	0.025 mm
Borehole Diameter ¹	38 to 76 mm
Dimensions (L)	50 m (maximum)

¹Any borehole diameter up to 76 mm may be specified. Note that the size of the borehole required increases with the addition of more measuring points.

Model 1250 (A-5) Multiple Point Hydraulic Anchor Extensometer

The Model A-5 Multiple Point Rod Extensometer with Hydraulic Anchors is recommended for use in soft ground and soils, or in rock, where the borehole may deteriorate. This anchor is very versatile and can be used in boreholes of varying diameter and roughness oriented in any direction.

Specifications

Range	up to 300 mm nominal
Least Reading	0.025 mm
Borehole Diameter ¹	38 to 102 mm
Dimensions (L)	100 m (maximum)

¹Note that the size of the borehole required increases with the addition of more measuring points.



Model 1280 (A-6) Flexible Rod Extensometer

The Model A-6 Flexible Rod Extensometer uses continuous lengths of fiberglass rods inside protective tubing. The rods are cut to customer-specified lengths, coiled at the factory and shipped ready for installation. The extensometer is lightweight, making it easier to handle for installation and less costly to ship. On-site assembly time is minimal and the installation procedure is simplified.

Specifications

Range	up to 300 mm nominal
Least Reading	0.025 mm
Borehole Diameter ¹	50 mm (minimum for single point)
Dimensions (L)	100 m (maximum)

¹Note that the size of the borehole required increases with the addition of more measuring points.



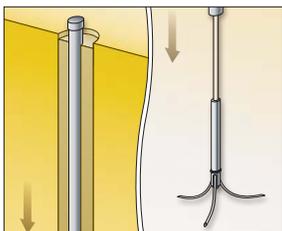
Model 1300 (A-9) Retrievable Extensometer

The Model A-9 Retrievable Extensometer (Patent No. 5,585,555) is designed to measure deformations in boreholes in rock and concrete. The device can be used in pile load test studies, plate jacking tests and virtually any application where a hole can be drilled or a pipe can be cast into the structure being studied. The system features adjustable gauge lengths, rapid and simple installation/removal and high accuracy.

Specifications

Range ¹	12.5, 25, 50 mm
Resolution	0.02% F.S.
Accuracy ²	±0.1% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × ø)	495 mm × 45 mm (anchor); 25 mm (transducer ²)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 1950 Settlement Points (Borros Type)

The purpose of the heave/settlement points is to measure vertical movements in foundation soils during, and subsequent to, construction. The heave/settlement point consists of a three-prong anchor, a ¼" standard inner pipe, and a 1" standard outer pipe. The pipes are assembled in sections and fastened together with standard couplings to the required anchor depths.

Specifications

Range	150 mm (without resetting)
Materials	steel (inner/outer pipes) stainless steel (Borros Anchor)
Dimensions (OD)	33 mm (outer pipe); 14 mm (inner pipe)



Extensometer Anchor Types

1 Borros Type Hydraulic Anchor › For use in soft soils and clays, especially in augered boreholes. Can also be driven directly through soft ground without a borehole being required.

2 Groutable Anchor › The preferred anchor for use in downward-directed boreholes. The pre-assembled extensometer is installed in the borehole, which is then filled with cement grout. These anchors can also be used in upward-directed boreholes with a more complicated grouting procedure.

3 Hydraulic Anchor › For use in rough boreholes in rock and soft ground, especially if dilations and contractions of the borehole are anticipated. Also useful in upward directed boreholes with or without grouting.

4 Snap-Ring Anchor › For use in hard or competent rock where smooth uniform boreholes can be drilled. The simplicity of its design allows for quick and easy installation.



Readout Instruments › Sensors

1 Model 1400-4 Depth Micrometer › Readout of borehole extensometers is made on a digital counter after manual adjustment of the thimble. Accuracy is ± 0.01 mm, Range is 25 mm extensible to 150 mm using the extension rods supplied.

2 Model 1400-1 Dial Indicator › Used for quick and easy readout of borehole extensometers. Accuracy is ± 0.01 mm, Range is 50 mm.

3 Model 1450 DC-DC LVDT › DC-DC LVDT's are for dynamic and/or high-temperature applications. Ranges are 50 mm, 100 mm and 150 mm. Other ranges available on request.

4 Model 1500 Linear Potentiometer › Utilizes a sturdy 6.5 mm diameter rod which protrudes from both ends as the actuating shaft. This facilitates connection of the linear potentiometer to extensometer rods and also permits a mechanical check of the readings.

5 Model 4450 VW Displacement Transducer › Vibrating Wire Displacement Transducers provide remote readout for GEOKON Extensometers. They are particularly useful where other types of VW sensors are used and where long cable runs are required. Ranges are 12.5, 25, 50, 100, 150, 200, 230 and 300 mm. Other ranges available on request.



Model 1610 Tape Extensometer

The Model 1610 Tape Extensometer is designed to measure small changes in the distance between opposite walls or between the roof and floor of excavations, tunnels or mine openings. It can also be used to monitor deformation in structures and supports and to measure movements of unstable slopes. Readout is provided electronically via a front panel LCD.

Specifications

Tape Lengths	20, 30, 50 m
Tape Tension	10 kg
Accuracy	± 0.1 mm
Dimensions (L)	520 mm



Model 1900 Magnetic Extensometer

The Model 1900 Magnetic Extensometer is designed to measure settlement or heave of soft ground under the influence of loading or unloading due to the construction of embankments, fills, buildings, foundations, and structures. A probe is lowered inside a guide tube to detect and measure the position of magnetic anchors located around the guide tube at various depths along the borehole or within the fill. Plate anchors are used in fill and "spider" anchors in boreholes.

Specifications

Cable Lengths	30, 50, 100, 150, 200 m; 100, 125, 200, 300 ft
Resolution	1 mm
Repeatability	± 3 mm
Temperature Range ¹	-30 °C to $+80$ °C
Borehole Size	102 to 152 mm
Dimensions (L x \varnothing)	178 x 19 mm (probe)

¹Other ranges available on request.



Model 4427 Long Range Displacement Meter

The Model 4427 Long Range Displacement Meter is ideally suited for the measurement of the large displacements typically associated with landslides. The Model 4427 can also be used for monitoring the movement of boulders, snow, etc., on unstable slopes.

Specifications

Ranges	1, 2 m (without resetting)
Resolution	0.025% F.S. (0.25 mm for 1 m range)
Accuracy ¹	$\pm 1.0\%$ F.S.
Temperature Range ²	-30 °C to $+60$ °C
Dimensions (L x W x H)	610 x 152 x 152 mm (enclosure)

¹Transducer accuracy established under laboratory conditions. | ²Other ranges available on request.

**Model 4500S/SV > 4500SH > 4500AL/ALV Standard Piezometers***

The Model 4500 Standard Piezometer is designed to measure fluid pressures such as ground water elevations and pore pressures when buried directly in embankments, fills, etc. Can also be installed inside boreholes, observation wells and standard (> 19 mm diameter) piezometer riser pipe. The Model 4500AL is designed for low-pressure ranges. The vented version (ALV) provides automatic compensation for barometric pressure changes. Thermistors are included to measure temperatures.

Specifications	4500S/SV	4500SH	4500AL/ALV
Ranges	-100 to 350, 700 kPa; 1, 2, 3 MPa	-100 kPa to 3, 7.5, 10, 20 MPa	70, 170 kPa
Over Range	1.5 × rated pressure	1.5 × rated pressure	1.5 × rated pressure
Resolution (Minimum)	0.025% F.S.	0.025% F.S.	0.025% F.S.
Accuracy ¹	±0.1% F.S.	±0.1% F.S.	±0.1% F.S.
Linearity ²	< 0.5% F.S.	< 0.5% F.S.	< 0.5% F.S.
Temperature Range ³	-20 °C to +80 °C	-20 °C to +80 °C	-20 °C to +80 °C
Dimensions (L × Ø)	133 × 19.1 mm	194 × 25.4 mm	133 × 25.4 mm

¹Transducer accuracy established under laboratory conditions. | ²±0.1% F.S. option available in some ranges. ³Other ranges available on request.

**Model 4500B/BV > 4500C Small Diameter Piezometers***

These piezometers are uniquely designed to enable the automation of small diameter, non-standard piezometer standpipes. The 4500B will fit inside 19 mm pipe and the 4500C will fit inside 12 mm pipe.

Specifications	4500B/BV	4500C
Ranges	-100 to 350, 700 kPa; 1, 2, 3 MPa	-100 to 350, 700 kPa
Over Range	1.5 × rated pressure	1.5 × rated pressure
Resolution	0.025% F.S. (minimum)	0.05% F.S. (minimum)
Accuracy ¹	±0.1% F.S.	±0.1% F.S.
Linearity	< 0.5% F.S. (±0.1% optional)	< 0.5% F.S.
Temperature Range ²	-20 °C to +80 °C	-20 °C to +80 °C
Dimensions (L × Ø)	133 × 17.5 mm	165 × 11 mm

¹Transducer accuracy established under laboratory conditions. | ²Other ranges available on request.

**Model 4500DP Drive Point Piezometers***

The Model 4500DP Drive Point Piezometer has the transducer located inside a housing with an EW drill rod thread and removable pointed nose cone. This model is ideally suited for use in peat and soft clays. The piezometer may be recovered at the end of the job. Models are also available which use metric threads allowing for installation using conventional cone penetrometer or other drill rods with adapters.

Specifications	
Ranges	-100 to 70, 170, 350, 700 kPa; 1, 2, 3, 5, 7.5 MPa
Over Range	1.5 × rated pressure
Resolution	0.025% F.S. (minimum)
Accuracy ¹	±0.1% F.S.
Linearity	< 0.5% F.S. (±0.1% optional)
Temperature Range ²	-20 °C to +80 °C
Dimensions (L × Ø)	187 × 33.3 mm

¹Transducer accuracy established under laboratory conditions. | ²Other ranges available on request.

**Model 4500HD Heavy Duty Piezometer***

The Model 4500HD Heavy Duty Piezometer is designed for direct burial in fills and dam embankments. The 4500HD is used in conjunction with heavily armored cable to withstand earth movements during construction. Recommended for use in earth dams.

Specifications	
Ranges	-100 to 70, 170, 350, 700 kPa; 1, 2, 3, 5, 7.5 MPa
Over Range	1.5 × rated pressure
Resolution	0.025% F.S. (minimum)
Accuracy ¹	±0.1% F.S.
Linearity	< 0.5% F.S. (±0.1% optional)
Temperature Range ²	-20 °C to +80 °C
Dimensions (L × Ø)	203 × 38.1 mm

¹Transducer accuracy established under laboratory conditions. | ²Other ranges available on request.

**Model 4500HT/HHT High Temp Piezometers/Pressure Transducers***

The 4500HT Series High Temperature Piezometers and 4500HHT Series High Temperature Pressure Transducers are designed for monitoring downhole pressures and temperatures in oil recovery systems and geothermal applications, where the temperature may be as high as 250 °C. These sensors are supplied with either mineral insulated cables or Teflon® cables inside stainless steel tubing.

Specifications	4500HT	4500HHT
Ranges ¹	-100 to 700 kPa; 1, 2, 3, 5, 7.5, 10, 20, 50, 75, 100, 150 MPa	-100 to 700 kPa; 1, 2, 3, 5, 7.5, 10, 20, 50, 75, 100, 150 MPa
Over Range	1.5 × rated pressure	1.5 × rated pressure
Resolution	0.025% F.S. (minimum)	0.025% F.S. (minimum)
Accuracy ²	±0.1% F.S.	±0.1% F.S.
Linearity	< 0.5% F.S. (±0.1% optional)	< 0.5% F.S. (±0.1% optional)
Temperature Range ¹	0 °C to +250 °C	0 °C to +250 °C
Dimensions (L × Ø) ³	191 × 19 mm (-100 to 700 kPa; 1, 2, 3, 5, 7.5, 10 MPa)	191 × 19 mm (-100 to 700 kPa; 1, 2, 3, 5, 7.5, 10 MPa)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.

³Please contact GEOKON for dimensions of ranges above 10 MPa and pressure connection details for 4500HHT.

**Model 4500MLP Multilevel Piezometer***

The Model 4500MLP system overcomes the difficulties associated with the installation of multiple piezometers in a single drill hole. The 4500MLP is lowered into position, then a spring loaded apparatus is actuated, forcing specially configured piezometer filter elements into firm contact with the borehole walls. The borehole is then grouted from the bottom up in one quick and simple operation.

Specifications	
Ranges	-100 to 70, 170, 350, 700 kPa; 1, 2, 3, 5, 7.5 MPa
Over Range	1.5 × rated pressure
Resolution	0.025% F.S. (minimum)
Accuracy ¹	±0.1% F.S.
Linearity	< 0.5% F.S. (±0.1% optional)
Temperature Range ²	-20 °C to +80 °C
Borehole Diameter	100 to 150 mm

¹Transducer accuracy established under laboratory conditions. | ²Other ranges available on request.



Model 4500Ti Titanium Piezometer*

The Model 4500Ti is designed specifically for use in highly corrosive environments, such as landfills and leach fields. It is also used in critical areas where long-term survivability is essential, for example, nuclear waste repositories and aggressive mine tailings. All exposed surfaces are made from titanium.

Specifications

Ranges ¹	-100 to 350, 700 kPa; 1, 2, 3, 5, 7.5 MPa
Over Range	1.5 × rated pressure
Resolution	0.025% F.S. (minimum)
Accuracy ²	±0.1% F.S.
Linearity	< 0.5% F.S. (±0.1% optional)
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × Ø)	125 × 25.4 mm

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4500H > 4500HH Pressure Transducers*

The Model 4500H and 4500HH Pressure Transducers are supplied with a female pipe thread fitting to permit the transducer to be coupled directly into hydraulic or pneumatic pressure lines.†

Specifications

	4500H	4500HH
Ranges ¹	-100 to 70, 170, 350, 700 kPa; 1, 2, 3 MPa;	-100 to 5, 7.5, 10, 20, 35, 75, 100 MPa
Over Range	1.5 × rated pressure	1.5 × rated pressure
Resolution	0.025% F.S. (minimum)	0.025% F.S. (minimum)
Accuracy ²	±0.1% F.S.	±0.1% F.S.
Linearity	< 0.5% F.S. (±0.1% optional)	< 0.5% F.S. (±0.1% optional)
Temperature Range ¹	-20 °C to +80 °C	-20 °C to +80 °C
Dimensions (L × Ø)	140 × 25.4 mm 140 × 32 mm (70, 170 kPa)	143 × 25.4 mm

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4580 Pressure Transducers*

The Model 4580 Pressure Transducers are designed for very low fluid pressure measurements, such as groundwater elevations in wells, water levels in streams, weirs, flumes, etc. Changes in water levels of as little as 0.2 mm can be measured. Sealed types can be used as a barometer to measure atmospheric pressure changes.

Specifications

Ranges ¹	7, 17, 35 kPa; 200 Mbar (Barometer) ¹
Over Range	1.5 × rated pressure
Resolution	0.025% F.S. (depends on readout)
Accuracy ²	±0.1% F.S.
Linearity	< 0.5% F.S. (±0.1% optional)
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × Ø)	165 × 38 mm, 165 × 63.5 mm; 110 × 63.5 mm (Barometer)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4500AR Autoresonant Piezometer

The Model 4500AR Autoresonant Piezometer is designed for use with existing data acquisition systems incapable of reading standard (pluck and read) vibrating wire sensors. It can also be used where low frequency (<20 Hz) dynamic measurements are required. Its high-output offers excellent noise immunity and enhanced signal transmission over long cables (300 m+). (Also see the Model 4500CPR and 8020-42CPR Autoresonant Vibrating Wire Sensors, page 17.)

Specifications

Ranges	7, 17, 35, 70, 170, 350, 700 kPa; 1, 2, 3, 5, 7.5, 10, 20, 25, 35, 50, 75, 100, 150 MPa
Over Range	1.5 × rated pressure
Resolution	0.025% F.S. (minimum; depends on readout system)
Accuracy ¹	±0.1% F.S.
Linearity	< 0.5% F.S. (±0.1% optional)
Temperature Range ²	-20 °C to +80 °C
Dimensions	varies according to pressure range

¹Transducer accuracy established under laboratory conditions. | ²Other ranges available on request.



Model 4675LV Weir Monitor

The Model 4675LV is a water level monitoring system that uses a vibrating wire force transducer to provide a highly stable and sensitive means of monitoring water levels. The main component is a cylindrical weight suspended from the force transducer. The cylinder hangs partially submerged in the water being monitored. As the water level changes the changing buoyancy force on the cylinder acts directly on the transducer, altering the tension of the wire, and thereby its resonant frequency.

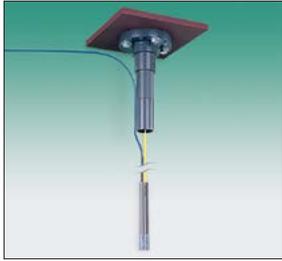
Specifications

Ranges ¹	150, 300, 600, 1500 mm
Resolution	0.025% F.S. (minimum)
Accuracy ²	±0.1% F.S.
Linearity	0.25% to 0.75% F.S.
Stability	±0.05% F.S. per year
Temperature Range	-20 °C to +80 °C (using antifreeze solutions)
Dimensions (L × Ø)	165 × 25 mm (transducer)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.

*All GEOKON vibrating wire piezometers and pressure transducers include tripolar plasma surge arrestors to protect the sensor coils from possible lightning damage. Semiconductor piezometers and pressure transducers are also available (3400 Series). Please see page 22 for further details.

†All high pressure sensors are potentially dangerous and care must be taken not to over-range them beyond their calibrated range. Sensors are tested to 150% of the range to provide a factor of safety.



Model 4600 Settlement System

The Model 4600 Settlement System is designed for the remote measurement of surface or subsurface settlement in fills, surcharges, dams, embankments, etc. A fluid filled tube extends upward, connecting the transducer to a reservoir located in the moving strata or fill. The measurement of fluid pressure indicates the settlement between the sensor and the reservoir. Multiple level systems are also available (please contact GEOKON for details).

Specifications

Ranges ¹	7, 17, 35 m
Resolution	0.025% F.S.
Accuracy ²	±0.1% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × Ø)	305 × 60 mm (reservoir); 191 × 35 mm (sensor)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4660 Settlement System

The Model 4660 Settlement System uses a Pressure Transducer attached to a settlement plate located in the settling ground. The sensor is connected, via two fluid filled tubes extending laterally, to a reservoir located on firm ground away from the area of anticipated movement. Fluid pressure within the tubes is sensed by the transducer, which provides a measure of the elevation difference between the sensor and the reservoir. The tubes are flushable and the closed loop vented transducer/reservoir system is not influenced by barometric pressure.

Specifications

Ranges ¹	7, 17 m
Resolution	0.025% F.S.
Accuracy ²	±0.1% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × Ø)	152 × 51 mm (reservoir); 168 × 25 mm (sensor)
Dimensions (L × W × H)	305 × 305 × 6 mm (plate); 305 × 127 × 45 mm (cover)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 3655 / 4655 Multipoint Settlement Systems

The Model 3655/4655 Multipoint Settlement System comprises a series of sensitive pressure transducers connected by a special Nylon tube, which is connected to a liquid reservoir. The Nylon tube is filled with de-aired water or a de-aired water/antifreeze mixture, if necessary. All sensors share the same liquid line and are referenced to the same liquid elevation in the reservoir, which allows changes in the sensor elevations, relative to one another, to be measured. The Model 4655 utilizes VW sensors, while the Model 3655 utilizes Semiconductors with available outputs of mV/V, 0-5 VDC or 4-20 mA.

Specifications

Ranges	(3655) 7 kPa (0.68 m) H ₂ O; 10 kPa (1.02 m) H ₂ O; 17 kPa (1.73 m) H ₂ O; 35 kPa (3.57 m) H ₂ O (4655) 70 kPa (7.14 m) H ₂ O
Resolution	(3655) depends on readout; (4655) 0.025% F.S.
Accuracy ¹	±0.1% F.S.
Temperature Range ²	-20 °C to +80 °C
Tubing	½" Nylon (liquid); ¼" Polyethylene (vent)

¹Transducer accuracy established under laboratory conditions. | ²Other ranges available on request.



Model 4651 Settlement Profiler

The Model 4651 Settlement Profiler consists of a pressure transducer inside a torpedo that is connected by a long liquid filled tube to a liquid reservoir. The torpedo is pulled through a pipe buried in a fill, surcharge, embankment, etc. The transducer gives a measurement of the elevation profile of the pipe, relative to the reservoir located on stable ground. A lightweight aluminum reel is included for storing the liquid tube.

Specifications

Range ¹	7 m
Resolution	0.025% F.S.
Accuracy ²	±0.1% F.S.
Reel Capacity	up to 130 m (4651-1); up to 330 m (4651-2)
Temperature Range ¹	-20 °C to +80 °C (using antifreeze solutions)
Dimensions (L × Ø)	203 × 35 mm (probe); 178 × 610 mm (reel)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4675 High Sensitivity Settlement System

The Model 4675 High Sensitivity Settlement System consists of a series of vessels containing liquid level sensors interconnected by a liquid filled tube. A reference vessel is positioned at a stable location and observation vessels are positioned at different locations at approximately the same elevation. This system is particularly suitable for critical situations where high resolution is required. Settlements as small as ±0.02 mm can be measured.

Specifications

Ranges ¹	100, 150, 300, 600 mm
Resolution	0.025% F.S.
Accuracy ²	±0.1% F.S.
Temperature Range ¹	-20 °C to +80 °C (using antifreeze solutions)
Dimensions	depends on range

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 46750C Precision Settlement Monitoring System

The Model 46750C Precision Settlement Monitoring System is designed to measure differential settlements with a very high degree of accuracy and resolution, making it suitable for critical applications where expected settlements are small. The system uses a 3" diameter horizontal open channel pipe, half filled with water or antifreeze and fixed to the structure or tunnel under observation. Sensors are situated at required intervals along the pipe and connected to the water via short lengths of tubing.

Specifications

Range ¹	75 mm
Resolution ¹	0.025 mm
Accuracy ²	±0.1% F.S.
Temperature Range	-20 °C to +80 °C (using antifreeze solutions)
Dimensions	depends on range

¹Other ranges and resolutions available on request. | ²Transducer accuracy established under laboratory conditions. Accuracy can be achieved using polynomial calibration constants.



Model 4800 Earth > 4810 "Fat Back" Pressure Cells*

The Model 4800 is designed to measure total pressure in earth fills and embankments and consists of two circular stainless steel plates, welded around their periphery, with a narrow cavity filled with de-aired oil. Changing earth pressure squeezes the plates together causing a corresponding increase of oil pressure, which is measured by a vibrating wire pressure transducer connected via a short length of steel tubing. The Model 4810 is similar, but has an extra-thick backplate to minimize point loading effects when installed on concrete or rock surfaces.

Specifications	4800	4810
Ranges ¹	70, 170, 350, 700 kPa; 1, 2, 3, 5, 7.5, 20 MPa	350, 700 kPa; 1, 2, 3, 5 MPa
Over Range	1.5 × rated pressure	1.5 × rated pressure
Resolution	0.025% F.S.	0.025% F.S.
Accuracy ²	±0.1% F.S.	±0.1% F.S.
Temperature Range ¹	-20 °C to +80 °C	-20 °C to +80 °C
Cell Dimensions (H × ø) ¹	7 × 230 mm	15 × 230 mm

¹Other ranges/sizes available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4820 Jackout Pressure Cell*

The Model 4820 Jackout Pressure Cell is used to measure earth pressures on slurry walls. It is designed to fit inside a plate that is pressed against the side of a slurry wall excavation using a hydraulic jack arrangement. This method of installation ensures that the jackout cell is located with its sensitive face in contact with the adjacent soil.

Specifications	
Ranges ¹	70, 170, 350, 700 kPa; 1, 2, 3, 5, 7.5, 20 MPa
Over Range	1.5 × rated pressure
Resolution	0.025% F.S.
Accuracy ²	±0.1% F.S.
Temperature Range ¹	-20 °C to +80 °C
Cell Dimensions (H × ø) ¹	19 × 150 mm

¹Other ranges/sizes available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4830 Push-In Pressure Cell*

The Model 4830 Push-In Pressure Cell is designed to be pushed in place for the measurement of total pressures in soils and earth fills. Where effective stress is required, the cell is fitted with an integral piezometer. The threaded end allows it to be attached to lengths of pipe or drill rods for installation purposes.

Specifications	
Ranges ¹	70, 170, 350, 700 kPa; 1, 2, 3, 5 MPa
Over Range	1.5 × rated pressure
Resolution	0.025% F.S.
Accuracy ²	±0.1% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × W) ¹	610 × 51 mm

¹Other ranges/sizes available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4850 NATM Style Shotcrete Stress Cells

The Model 4850 NATM Style Shotcrete Stress Cells are designed for the measurement of tangential (4850-1) and radial (4850-2) stresses in shotcrete tunnel linings. The cells consist of two rectangular steel plates welded together around the periphery with a de-aired fluid occupying the space between the plates. A short tube connects the cell to a vibrating wire pressure transducer. A prestressing tube is provided for expanding the cell after the concrete has cured. Cells of this type are also used for measurements of stress in mass concrete.

Specifications	4850-1	4850-2
Ranges ¹	7.5, 20, 35 MPa	2, 3, 5 MPa
Over Range	1.5 × rated pressure	1.5 × rated pressure
Resolution	0.025% F.S.	0.025% F.S.
Accuracy ²	±0.1% F.S.	±0.1% F.S.
Temperature Range ¹	-20 °C to +80 °C	-20 °C to +80 °C
Dimensions (L × W × H) ¹	200 × 100 × 6 mm	250 × 150 × 6 mm

¹Other ranges/sizes available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4855 Pile Tip Pressure Cell*

The Model 4855 is used to measure the pressure in cast-in-place concrete piles (caissons). The cell is roughly the diameter of the pile and has a thick upper plate, which includes hooks or sections of rebar attached to allow connection to the bottom of the reinforcement cage. Two vibrating wire pressure transducers are included for redundancy in case damage occurs during installation, and a remote repressurization mechanism ensures good contact between the cell and the surrounding concrete.

Specifications	
Ranges ¹	2, 3, 5, 7.5, 10, 20 MPa
Over Range	1.5 × rated pressure
Resolution	0.025% F.S.
Accuracy ²	±0.1% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (H × ø) ¹	varies

¹Other ranges/sizes available on request. | ²Transducer accuracy established under laboratory conditions.



Model 3000 > 4900 Load Cells

The Model 4900 Vibrating Wire Load Cell (inset, right) consists of a cylinder of high-strength steel with 3 or 6 vibrating wire strain gauges located around its circumference. Loads applied to the cell are measured by the vibrating wire strain gauges. The effects of uneven and eccentric loading are minimized by averaging the output of all 3 or 6 individual readings. The Model 3000 Load Cell (inset, left) has the same annular design, using high-strength steel or aluminum, but uses electrical resistance strain gauges in a Wheatstone Bridge configuration.

Specifications	3000	4900
Rated Capacities ¹	100 to 10,000 kN	100 to 10,000 kN
Over Range	1.5 × rated pressure	1.5 × rated pressure
Resolution	0.025% F.S.	0.025% F.S.
Accuracy ²	±0.5% F.S.	±0.5% F.S.
Temperature Range ³	-20 °C to +80 °C	-20 °C to +80 °C
Dimensions (ID) ¹	solid, 25, 50, 75, 100, 125, 150, 200, 250 mm	solid, 25, 50, 75, 100, 125, 150, 200, 250 mm

¹Other capacities and diameters available on request. The limit of the GEOKON NIST traceable calibration capability is 12,000 kN (1,200 tons). | ²Transducer accuracy established under laboratory conditions.

³Other ranges available on request.

*Models are also available with semiconductor pressure transducers (please contact GEOKON for details).



Model GK-604D Digital Inclinometer System

The Model GK-604D Digital Inclinometer System includes a Model 6100D Digital Inclinometer Probe, a reel-mounted cable and a Model FPC-2 Field PC. The Digital Inclinometer Probe contains electronics to convert the analog voltage into a digital signal, which is transmitted via the control cable to the cable reel containing the Interface. The Interface communicates via **Bluetooth®** with the Field PC, which is used to take the inclinometer survey and to store and view the survey data. A Digital Compass built into the Inclinometer Probe can be used to correct the inclinometer data sets for any twist (or spiraling) in the inclinometer casings.

Specifications

Range	±30°
Resolution (Probe)	0.0013°
Resolution (System) ¹	±0.025 mm/500 mm; ±0.0001 ft/2 ft
Total System Accuracy ²	±3 mm/30 m; ±0.125 in/100 ft
Temperature Range	-30 °C to +85 °C; -22°F to +185°F
Wheel Base	0.5 m, 1 m, 2 ft
Casing Size ID	48 to 89 mm; 2 to 3.5 in
Dimensions (L × ø)	700 × 25 mm, 1200 × 25 mm; 32 × 1 in (probe)

¹±10 arc seconds. The resolution shown is only true in the range of ±5° from vertical.

²Within 3° of vertical.



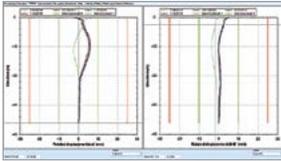
Model 6015 Horizontal Inclinometer Probe

The Model 6015 Horizontal Inclinometer Probe is a modification of the vertical probe, which allows it to be used in horizontal inclinometer casing. The probe, in effect, measures differential settlement along the length of the casing.

Specifications

Range	±53°
Resolution	±0.025 mm/500 mm (±10 arc seconds)
Total System Accuracy ¹	±6 mm/30 m
Temperature Range	0 °C to +50 °C
Casing Size ID	59 to 79 mm
Dimensions (L × ø)	671 × 45 mm (probe)

¹Within 3° of horizontal.



SiteMaster Inclinometer Data Reduction Software

SiteMaster is a powerful inclinometer processing and presentation program that's used to process and present all inclinometers within a project. It can also include plan view displacement graphs related to any excavation history. SiteMaster works with any inclinometer system that produces a text data file. Data are stored systematically in an easy to modify folder, with corresponding displacement graphs organized in a simple and efficient manner. A reporting tool allows reports to be quickly generated and exported in PDF or **Microsoft® Word™** format.

System Requirements

Operating Systems	Windows® 8, 7, Vista, XP Professional
Memory Requirements	512 MB or more (minimum). More RAM will improve application performance.
Hard Disk Requirements	60 MB (minimum)



Model 6150F Series MEMS Addressable In-Place Inclinometer System

The Model 6150F MEMS (Micro-Electro-Mechanical Systems) Digital In-Place Addressable Inclinometer System consists of a string of Biaxial MEMS Tilt Sensors mounted on lengths of stainless steel tubing, which are cut to customer-specified segment lengths, and interconnected with universal joints. Spring-loaded wheel assemblies located at each joint allow the sensor string to engage the grooves of conventional inclinometer casing. The tilt sensors are connected to each other by means of a four-wire bus cable and communicate via the industry standard **Modbus**® Remote Terminal Unit (RTU) protocol. (Quantities of discontinued Model 6150A/B/C/D/E Series versions are available on request. Please contact GEOKON for more information.)

Specifications

Range	±15° (±54000 arc seconds)
Resolution ¹	±0.0001° (±0.2 arcseconds)
Operating Temperature	-40 °C to +80 °C
Minimum Sensor Spacing	0.5 m
Sensor Dimensions (L × ø)	240 × 32 mm

¹All but one in a hundred individual readings would fall within our published tolerance. (Most measuring devices are specified with only a 95% confidence interval, meaning one in twenty readings exceed the stated limit, on average.)



Model 6155 MEMS Horizontal In-Place Inclinometer

The Model 6155 MEMS Horizontal In-Place Inclinometer consists of a string of MEMS (Micro-Electro-Mechanical Systems) tilt sensors (uniaxial or biaxial) mounted on lengths of stainless steel tubing, which are cut to customer-specified segment lengths and linked together by universal joints. The string of sensors is installed inside casing with all the sensor cables passing to the surface where they are connected to Terminal Boxes or Dataloggers. Several models are available, including analog, digital and addressable versions, allowing for optimal configuration based on application and site specifics.

Specifications

Range ¹	±15°
Resolution	±0.02 mm/m (±4 arc seconds)
Accuracy ²	±0.05 mm/m (±10 arc seconds)
Sensor Output	Analog (±4 V @ ±15°); Digital
Shock Survival	2000 g
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × ø)	219 × 32 mm (sensor); 362 × 32 mm (sensor ³)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions. ³Addressable versions.



Model 6300 VW In-Place Inclinometer

The Model 6300 Vibrating Wire In-Place Inclinometer consists of a string of Vibrating Wire Tilt Sensors mounted on lengths of stainless steel tubing, which are cut to customer-specified segment lengths, and linked together by universal joints. The string of sensors is installed inside grooved inclinometer casing with all the sensor cables passing to the surface. The system is designed to be left in place to permit automatic or continuous reading of borehole inclination and lateral deflection.

Specifications

Range ¹	±10°
Resolution ²	±0.05 mm/m (±10 arc seconds)
Accuracy ³	±0.1% F.S.
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × ø)	187 × 32 mm (sensor)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions. ³Depends on readout equipment.



Model 6400 Inclinometer Casing

Model 6400 Glue-Snap ABS Inclinometer Casing is used in conjunction with an inclinometer probe or in-place inclinometer system to monitor the stability of embankments, slopes, foundation and excavation walls, piles, etc. The Model 6400 is flush-coupled for quick and easy assembly.

Specifications

Maximum OD	70 mm, 85 mm
Wall Thickness	5.5 mm
Dimensions (L)	1.5 or 3 m
Telescoping Coupling	609 mm (extended length) 457 mm (compressed length)
Telescoping Coupling OD	77 mm, 91 mm



Model 6500 Inclinometer Casing

The Model 6500 Inclinometer Casing is manufactured from pultruded fiberglass to produce a lightweight, strong, environmentally resistant casing with grooves free from spiraling. The casings and couplings are pop-riveted together and the joints are waterproofed using caulk and tape.

Specifications

Maximum OD	70 mm (casing) 76.5 mm (coupling)
Wall Thickness	3 mm (casing) 2 mm (coupling)
Dimensions (L)	3 m (casing) 300 mm (coupling)
Telescoping Coupling	available up to 3 m (specify)



Model 6101D MEMS Digital Tiltmeter

The Model 6101D MEMS Digital Tiltmeter is a low-cost, portable device designed to measure tilt in structures such as buildings, dams, retaining walls and embankments, as well as measurements related to the stability of slopes, open pits and the walls of excavations (e.g. slurry walls). The sensing element is a highly accurate MEMS (Micro-Electro-Mechanical Systems) tilt sensor, which communicates with the Model FPC-2 Field PC Readout via **Bluetooth®**.

Specifications

Range	±15°
Resolution	±0.02 mm/m (±4 arc seconds)
Accuracy ¹	±0.05 mm/m (±10 arc seconds)
Sensor Output	Digital
Shock Survival	2000 g
Temperature Range	-40 °C to +70 °C
Dimensions (L × W × H)	172 × 102 × 166 mm

¹Transducer accuracy established under laboratory conditions.



Model 6160 MEMS Tilt Sensors

The Model 6160 MEMS Tilt Sensor is designed for attachment to structures, on either a vertical or horizontal surface, and for the subsequent measurement of any tilting that may occur. The sensor comprises one (uniaxial) or two (biaxial) MEMS (Micro-Electro-Mechanical Systems) sensors, with associated signal conditioning, packaged inside a water-proof, stainless steel housing. Four versions are available: analog, analog addressable, digital addressable and RS-485.

Specifications

Range ¹	±15°
Resolution	±0.02 mm/m (±4 arc seconds)
Accuracy ²	±0.05 mm/m (±10 arc seconds)
Sensor Output	Analog (±4 V @ ±15°); Digital
Shock Survival	2000 g
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × ø)	219 × 32 mm (sensor); 362 × 32 mm (sensor ³)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions. ³Addressable versions.



Model 6161 MEMS Tilt Sensors

The Model 6161 MEMS Tilt Sensors are designed for attachment to structures, on either a vertical or horizontal surface, and for the subsequent measurement of any tilting that may occur. The sensor itself is a MEMS (Micro-Electro-Mechanical Systems) sensor, which offers a high range, with high sensitivity and accuracy. The included associated signal conditioning yields an output of ±4 V at ±15° and is designed to drive long cables without degradation. (Also see the Model 8003 (LC-3) Series MEMS Dataloggers, page 17.)

Specifications

Range ¹	±15°
Resolution	±0.02 mm/m (±4 arc seconds)
Accuracy ²	±0.05 mm/m (±10 arc seconds)
Sensor Output	Analog (±4 V @ ±15°); Digital
Shock Survival	2000 g
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × W × H)	140 × 140 × 91 mm (6161A enclosure) 220 × 120 × 91 mm (6161B/C enclosure) to be determined (6161E enclosure)

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 6350 VW Tiltmeter

The Model 6350 VW Tiltmeter is designed to measure tilt in structures such as buildings, dams and embankments and also for measurements related to the stability of slopes, open pits and the walls of excavations (e.g. slurry walls). The tiltmeter is permanently attached to the structure to be monitored and can make measurements on horizontal or vertical surfaces. Readings are taken with the Model GK-404/GK-405 Readout or continuously and remotely with the 8600 Series or 8002 dataloggers.

Specifications

Range	±10°
Resolution	±0.05 mm/m (±8 arc seconds)
Accuracy ¹	±0.1% F.S.
Temperature Range ²	-20 °C to +80 °C
Dimensions (L × ø)	194 × 32 mm (transducer)

¹Transducer accuracy established under laboratory conditions. | ²Other ranges available on request.



Model 6165 MEMS Tilt Beam

The Model 6165 MEMS Tilt Beam is designed for attachment to structures, on either a vertical or horizontal surface, for the measurement of any tilting or differential settlements that may occur. The Tilt Beams can be coupled together in long horizontal strings to measure differential settlement along embankments, railroad tracks, pipelines, tunnels, etc. They can also be used in vertical strings to measure the horizontal deformation of retaining walls, sheet piling, etc.

Specifications

Range ¹	±15°
Resolution	±0.02 mm/m (±4 arc seconds)
Accuracy ²	±0.05 mm/m (±10 arc seconds)
Sensor Output	±4 V @ ±15°
Shock Survival	2000 g
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L) ¹	1029 mm (Beam: standard, aluminum version)

¹Other ranges/lengths available on request. | ²Transducer accuracy established under laboratory conditions.



Model 6850 Pendulum Readout

The Model 6850 is designed to make accurate measurements of the relative movements of normal and inverted pendulums, such as those found in dams, and can be installed as a new system or as an electronic upgrade for an existing system. The electronics package provides both 4-20 mA and EIA RS-485 data outputs. The data can be stored locally, or remotely, with the 8600 Series Dataloggers, or others, and thence by hard-wire or modem to a computer. Manual sighting/reading tables with optical (LED) readout are available where automated systems are not necessary, or where a manual reading back-up is required.

Specifications

Range	X: 0-50 mm, Y: 0-50 mm (2-D) X: 0-50 mm, Y: 0-100 mm (2-D) X: 0-50 mm, Y: 0-100 mm, Z: 0-50 mm (3-D) X: 0-50 mm, Y: 0-50 mm or 0-100 mm (2-D, Manual)
Resolution	0.01 mm
Accuracy	better than 0.1 mm; 0.2 mm (2-D, Manual)
Operating Temperature	-15 °C to +60 °C; n/a (2-D, Manual)
Dimensions (L × W × H)	380 × 330 × 145 mm, 425 × 375 × 190 mm (2-D) 425 × 375 × 190 mm (3-D) 356 × 356 × 100 mm (2-D, Manual)



Model GK-404 Vibrating Wire Readout

The Model GK-404 Vibrating Wire Readout is a portable, low-power, handheld unit that is capable of running (continuously) for more than 20 hours on two AA batteries. It is designed for the readout of all GEOKON vibrating wire gauges and transducers, and is capable of displaying the reading in digits, frequency (Hz), period (μ s) or microstrain (μ ϵ). The GK-404 also displays the temperature of the thermistor embedded in the transducer (if applicable) with a resolution of 0.1 °C.

Specifications

Excitation Range	400 Hz to 6000 Hz, 5 volt Square Wave
Resolution	0.1 digit, 0.1 Hz, 0.1 μ s, 1 μ ϵ , 0.1 °C
Timebase Accuracy	\pm 50 ppm
Temperature Range	-20 °C to +50 °C
Dimensions (L x W x H)	120 x 65 x 22 mm



Model 404 Intrinsically Safe Vibrating Wire Readout

The Model 404, based on the GK-404 (above) and designed in cooperation with GEL Instrumentation, is a portable, low-power, hand-held unit, capable of running (continuously) for more than 6 hours on a single charge. The Model 404 is designed for use in hazardous environments (IECEx ia, approval SIM 13.0014X) and is only approved to read designated GEOKON vibrating wire sensors, identified as Type 1, 2, 3 and 4. Six excitation positions (A-F) are provided, with a display resolution of 0.1 digit. The Model 404 is capable of displaying the reading in either digits, frequency (Hz), period (μ s) or microstrain (μ ϵ). The 404 also displays the temperature of the thermistor embedded in the transducer (if applicable) with a resolution of 0.1 °C.

Specifications

Excitation Range	400 Hz to 6000 Hz, 5 volt Square Wave
Resolution	0.1 digit, 0.1 Hz, 0.1 μ s, 1 μ ϵ , 0.1 °C
Timebase Accuracy	\pm 50 ppm
Temperature Range	-20 °C to +40 °C
Dimensions (L x W x H)	165 x 110 x 45 mm



Model GK-405 Vibrating Wire Readout

The Model GK-405 comprises a battery powered readout unit that communicates via **Bluetooth®** with the Model FPC-2 Field PC running the GK-405 application. It is designed for the readout of all GEOKON Vibrating Wire sensors and is cable of displaying the reading in digits, microstrain (μ ϵ) and microseconds. The GK-405 also displays the temperature of the thermistor embedded in the transducer (if applicable) with a resolution of 0.1° C. Readings can be stored and exported to a number of different file formats, and syncing to a host computer is easily done. The GK-405 Readout is available with or without the FPC-2.

Specifications

Excitation Range	450 Hz to 6000 Hz, 5 Volt Square Wave
Resolution	0.001 Hz
Timebase Accuracy	\pm 50 ppm
Temperature Range	-10 °C to +50 °C
Dimensions (L x W x H)	210 x 165 x 185 mm



Model FPC-2 Field PC

The Model FPC-2 is a rugged, handheld, easy-to-use field PC that is particularly useful in harsh environments, too extreme for a typical laptop PC. It can read Digital Inclinator Probes and Tiltmeters when used in conjunction with Model GK-604D, and Vibrating Wire Sensors when used in conjunction with Model GK-405. The FPC-2 is a stand-alone device for reading Model 3810A Addressable Thermistor Strings and the Model 6101D MEMS Digital Tiltmeter. It can also be used to take compass bearings (with Inclinator Probes) and to program and retrieve data from Model 8002 (LC-2) Series Dataloggers using LogView Mobile software.

Specifications

Processor	Texas Instruments 4470 dual-core @ 1.5 GHz
Operating System	Microsoft® Windows® Embedded Handheld 6.5.3
Memory/Disk	1 GB RAM/4 GB iNAND Flash
Battery	Li-ion, 3.7 V 5200 mAh (19.2 Wh) (Warm-swappable) with smart gauge
Operating Temperature	-30 °C to 60 °C, MIL-STD-810G, 501.5/502.5 Procedure II and III
Dimensions (L x W x H)	191 x 80 x 35 mm



Model GK-406 Vibrating Wire Analyzer

The GK-406 is field ready and used to quickly measure a sensor, save the data, and communicate the results with custom PDF reports and spreadsheet output. The VWA uses spectral-analysis technology (VSPECT™), which can be helpful for reading sensors in electrically noisy environments. The large color display offers an easy-to-view graphical presentation of the sensor output and operation, and a Project File maintains Site/Sensor information for 40 unique sites, with up to 22 sensors per site. Site/Sensor locations are geolocated, allowing the internal GPS to guide a user directly to a sensor location.

Specifications

Resolution	0.001 Hz RMS
Excitation	2 V, 5 V, 12 V (user selectable)
Accuracy	±0.005% of reading
Battery	Five AA (1.5 V)
Temperature Range	-20 °C to +70 °C
Dimensions (L × W × H)	200 × 100 × 58 mm



Model GK-502 Load Cell Readout

The Model GK-502 Load Cell Readout is designed to read 4- and 6-wire GEOKON Model 3000 load cells (see page 11). The readout incorporates a 12 Volt, 1.4 Ahr Sealed Lead Acid battery, 16 × 2 graphic LCD with backlight, membrane keypad, and battery charger circuit. Two side-mounted **Bendix**® connectors are provided for load cell and communications/battery charger connection. The GK-502 displays the output in Digits, mV, mV/V, or in engineering units (lbs, Kg, Kips, etc.) by entering a gauge factor and zero reading.

Specifications

Range	±31250 digits
Resolution	±1 digit
Accuracy	±0.05% F.S. (±30 digits)
Power Requirements	12 VDC @ 22 mA (operating); 12 VDC @ 16 mA (off)
Operating Temperature	-30 °C to +50 °C
Dimensions (L × W × H)	102 × 165 × 232 mm (enclosure)



Model RB-500 MEMS Readout

The Model RB-500 MEMS (Micro-Electro-Mechanical Systems) Readout is designed to read the voltage output from MEMS sensors. The RB-500 incorporates a 12 volt, 1.2 Ahr lead acid battery, a 4½ digit liquid crystal display (LCD), a power on/off switch and an A/B selector switch. The RB-500 supplies +12 V power to the MEMS sensor and displays the sensor output in volts, which is proportional to the angle of inclination.

Specifications

Range	±4.000 volts
Display Range	±1.999 volts
Resolution	1 mV
Accuracy	±0.06% F.S.
Power Requirements	12 VDC @ 50 mA
Operating Temperature	-30 °C to +50 °C
Dimensions (L × W × H)	102 × 165 × 232 mm (enclosure)



Model 4999 Terminal Box

The Model 4999 Terminal Box allows instrument leads to be grouped in one convenient location, thereby saving time when readings have to be made on a number of instruments. Housed in a fiberglass enclosure, the Terminal Box provides a quick and easy means of taking sensor readings. The Terminal Box can handle up to sixteen 4-conductor sensors (e.g. 16 vibrating wire gauges with their thermistors) or thirty-two 2-conductor sensors (e.g. 32 vibrating wire gauges). It's protected from lightning damage by plasma surge arrestors and a suitable earth-ground connection. (4 and 8 channel Terminal Boxes also available.)

Specifications

Switching Current	0.25 A (typical), 4 A (maximum)
Contact Resistance	50 mΩ (maximum)
Insulation Resistance	> 10,000 MΩ
Switch Life	> 25,000 cycles
Enclosure	NEMA 4X fiberglass
Temperature Range	-20 °C to +80 °C
Dimensions (L × W × H) ¹	342 × 301 × 160 mm

¹Does not include mounting feet. Other sizes and configurations available (please contact GEOKON for details).



Model 4999-12L/E LAB3 Surge Module

The Model 4999-12L/E LAB3 Surge Protection Module is designed to protect GEOKON transducers, dataloggers and power supplies from short duration, high voltage surges that may be induced in the transducer or interconnecting cables. Protection is provided by circuitry including tripolar plasma surge arrestors, transient suppression diodes and inductors.

Specifications

Breakdown Voltage	6 V, 16 V or 30 V nominal
Peak Current	10 kA (20 μs) maximum
Temperature Range	-20 °C to +80 °C
Dimensions (L × W × H)	160 × 74 × 76 mm



Model 8020-59 Vibrating Wire Frequency to Analog Converter

The Model 8020-59 Vibrating Wire (VW) Frequency to Analog Converter provides a simple way to connect GEOKON vibrating wire transducers to data acquisition systems that are not capable of reading frequency signals nor able to generate the proper signals required to excite VW transducers. The converter can operate as a stand-alone device for single transducers, or in conjunction with the Model 8032 Multiplexer for multiple transducers. The converter is powered using either a 12 V or 24 V supply.

Specifications

Power Requirements	12 V or 24 V 90 mA @ 12 V (operation), 10 µA (standby) 75 mA @ 24 V (operation), 16.5 mA (standby)
Operation Modes	Single Channel, 16 VW sensors with thermistors, or 32 VW sensors
Output (Analog)	0-5 V, 4-20 mA (non-isolated loop generator)
Resolution	16 bit
Accuracy	±0.1% F.S. (0-5 V), ±0.5% F.S. (4-20 mA)
Temperature Range	-20 °C to +80 °C
Dimensions (L × W × H)	111 × 108 × 36 mm (with cover)



Model 4500CPR & 8020-42CPR Autoresonant Vibrating Wire Sensors

Autoresonant Vibrating Wire Sensors expand the possibilities of dynamic monitoring while retaining the inherent long-term stability of the GEOKON line of vibrating wire instruments. GEOKON offers three types of autoresonant sensor: One uses a custom sensor and an electronic adaptor (Model 4500CPR), another uses the standard vibrating wire sensor and an electronic adaptor (Model 8020-42CPR) and the third type is a custom sensor with internal electronics (see the Model 4500AR Autoresonant Piezometer, page 9).

Specifications

	4500CPR	8020-42CPR
Input	±12 VDC at 50 mA (max)	±12 VDC at 50 mA (max)
Output	4-20 mA; Frequency ¹ (100 Hz dynamic range)	4-20 mA; Frequency (20 Hz dynamic range)
Temperature Range	0 °C to +40 °C	0 °C to +70 °C

¹Open collector output: requires external pull-up termination resistor.



Model 8002 (LC-2) Series Dataloggers

The Model 8002-1 (LC-2) and Model 8002-1A (LC-2A) are stand-alone, single-channel dataloggers, designed to read both the vibrating wire element and the integral thermistor of any GEOKON vibrating wire sensor. The Model 8002-4 (LC-2×4) provides 4 channels of vibrating wire (with thermistor). The Model 8002-16 (LC-2×16) is similar to the LC-2×4, but provides 16 channels of vibrating wire (with thermistor). The dataloggers are housed inside Fiberglass NEMA 4X enclosures, suitable for operation in harsh environments. Power is provided via alkaline D cells or an optional external 12 V source.

Specifications

Measurement Accuracy	±0.05% F.S. (450-4000 Hz)
Measurement Resolution	1 part in 20,000
Program Memory	24K FLASH
Data Memory	320K EEPROM
Temperature Range	-30 °C to +50 °C
Dimensions (L × W × H)	122 × 120 × 91 mm (LC-2(A)) 260 × 160 × 91 mm (LC-2×4) 342 × 301 × 160 mm (LC-2×16) ¹

¹Does not include mounting feet.



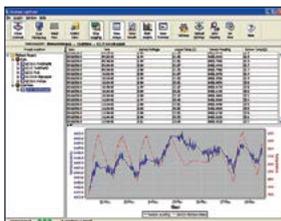
Model 8003 (LC-3) Series MEMS Dataloggers

The Model 8003 Series LC-3 MEMS Dataloggers are designed to read MEMS sensors and their integral thermistors. The 8003A and 8003B are standalone dataloggers to which external MEMS sensors are connected via cables, while the 8003C and 8003D are dataloggers containing integral MEMS sensors. The Model 8003 Series LC-3 MEMS Dataloggers are powered by three, easily accessible, alkaline D cells, or by an optional 12 V source. A solar panel and rechargeable batteries can also be used.

Specifications

Accuracy	±0.05% F.S.
Resolution	18 bit
Storage Capacity (Arrays)	21,000
Temperature Range	-30 °C to +50 °C
Temperature Measurement	1.0% F.S. (accuracy); 0.1 °C (resolution)
Scan Interval	5-86,400 seconds (24 hours)
Dimensions (L × W × H)	122 × 120 × 81 mm (8003A/B) 120 × 220 × 90 mm ¹ (8003C/D)

¹Mounting Panel: 276 × 133 × 6 mm



Model 8001-3 LogView & 8001-10 LogView Mobile Software

LogView Software simplifies the task of configuration, communication, monitoring, data collection and data reduction when using LC-2 and LC-3 Series Dataloggers. The software is an easy-to-use, menu-based application, and includes screens for configuration, connection, measurement and data collection, plus a real-time text-based monitor, graphical monitor and terminal emulator. LogView Mobile performs most of the same functions as LogView but was designed to operate on a ruggedized, handheld PC, such as the Model FPC-2.

System Requirements

Operating Systems	Windows® 7, Vista, XP Pro, XP (LogView) Windows® Mobile 6.1 or greater (LogView Mobile)
.NET Frameworks	Microsoft® Compact Framework 3.5 (LogView Mobile)
System Requirements (Minimum)	Pentium® IV (or equivalent) running at 500 MHz; 64 MB RAM; 20 MB Hard Disk ¹ (LogView)
Storage Memory	10 MB free (minimum), 20 MB free (recommended) (LogView Mobile)
Program Memory	5 MB free (minimum), 10 MB free (recommended) (LogView Mobile)

¹Space required for LogView software installation and log files only. Additional space is required to accommodate data files.





Model 8600 Series Dataloggers

The Model 8600 Series Dataloggers are designed around the Campbell Scientific, Inc. Model CR6 Measurement and Control Module. Manufactured primarily for use with vibrating wire sensors and thermistors, the Model 8600 Series can also be configured to read MEMS, Carlson, voltage, 4-20 ma, and numerous other specialty sensor types. The Model 8600-1 and 8600-2 Dataloggers are housed in a NEMA 4X fiberglass reinforced polyester enclosure. The Model 8600-3 Datalogger is housed in a rugged, water-resistant PVC enclosure together with an integral Spread Spectrum Radio (for wireless data transmission).

Specifications (Excitation Outputs)

Resolution	50 nV (± 200 mV range, differential measurement, input reversal, 5 Hz f_{in}) (analog); 0.001 Hz RMS (frequency)
Accuracy	$\pm(0.04\%$ of reading + 2 microvolts), 0-40 °C (analog); $\pm 0.013\%$ of reading (vibrating wire)
Battery	12 V, 7 Ah Gel Cell (8600-1/2) 4 x D-cell (Li 8.5 Ah) (8600-3)
Temperature Range	-40 °C to +70 °C
Dimensions (L x W x H) ¹	392 x 352 x 161 mm (8600-1); 502 x 461 x 263 mm (8600-2); please consult GEOKON (8600-3)

¹Does not include mounting feet.



Model 8026 Wireless Datalogger

The Model 8026 is designed around the Campbell Scientific, Inc. Model CR800 datalogger to read GEOKON Vibrating Wire sensors. It's housed in a rugged, water-resistant PVC enclosure (optional stainless steel and waterproof enclosures available) together with a battery pack and a RF modem (for wireless data transmission). It's configured to read 6 sensors; either 6 VW or 3 VW plus 3 thermistors, or any combination thereof. A Spread Spectrum Radio Modem and Antenna are typically installed with the 8026.

Specifications (Excitation Outputs)

Range	± 2.5 millivolts to ± 5 volts (analog); DC to 200 kHz (frequency)
Resolution	0.33 microvolts to 1333 microvolts (analog); ± 35 nS/number of cycles measured (frequency)
Accuracy	$\pm 0.12\%$ F.S. of reading, plus offset (analog); $\pm 0.01\%$ of reading, plus resolution (frequency)
Excitation Output	± 2.5 V at 25 mA (maximum)
Battery	4 x D cell Lithium 8.5 Ah
Temperature Range	-25 °C to +50 °C (-55 °C to +80 °C optional)
Dimensions (H x ϕ)	381 x 168 mm



Model 8032 Multiplexer (MUX)

The Model 8032 Multiplexer expands the number of channels that can be read by the 8600 Series Dataloggers or GK-404/GK-405 Vibrating Wire Readout. The channels are protected against voltage surges with tripolar plasma surge arrestors and bipolar surge arrestors. Optional manual switches may be connected to allow manual measurements with a portable readout in tandem with those taken automatically with the datalogger.

Specifications

Switching Current	1 A (maximum)
Contact Resistance	0.1 Ω (maximum)
Insulation Resistance	> 1 G Ω
Switch Life	> 200,000 cycles
Enclosure	NEMA 4X fiberglass
Temperature Range	-40 °C to +60 °C
Dimensions (L x W x H) ¹	342 x 301 x 160 mm

¹Does not include mounting feet.

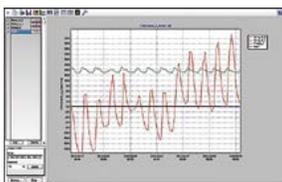


Model 8040 Series Wireless Vibrating Wire Interface

The Model 8040 Series is designed to expand the data collection possibilities of the Model 8600 Series Dataloggers via wireless connectivity, which eliminates the need for running lengthy cables. Available for 2, 4 or 16 sensors (VW plus thermistor), the 8040 Series comprises Campbell Scientific's AVW206 (or AVW216) spectrum analyzer (with built-in 900 Hz or 2.4 GHz radio transmitter), power supply and antenna. It's housed in a rugged NEMA 4X enclosure designed for use in harsh environments.

Specifications

Input Range	100 to 6500 Hz (vibrating wire); ± 2500 mV (thermistor)
Resolution	0.001 Hz RMS (vibrating wire); 0.001 Ω RMS (thermistor)
Accuracy	$\pm 0.013\%$ of reading (vibrating wire); $\pm 0.25\%$ of reading (thermistor)
Wireless Transmission Range	up to 10 miles (when using a higher gain directional antenna, under ideal conditions)
Battery	12 V, 7 Ah Gel Cell
Temperature Range	-25 °C to +50 °C (-55 °C to +80 °C optional)
Dimensions (L x W x H)	varies by model (please contact GEOKON)

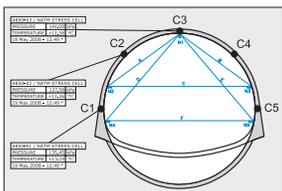


LoggerNet Datalogger Software

LoggerNet Datalogger Software supports programming, communication, and data retrieval between the CSI based GEOKON dataloggers and a PC. It includes tools for network setup, configuration, monitoring, and backup; datalogger programming, maintenance, and data collection; and real-time or historical data display.

System Requirements

Operating Systems	Windows® 10, 8 and 7 (32 and 64 bit versions)
Minimum Requirements	Windows® 7 running on an Intel®-based PC



VDV Vista Data Visualization Software

Vista Data Vision (VDV) is a hosted software package which organizes and displays data collected from almost any datalogger system including GEOKON Model 8600 and 8002 Series Dataloggers for viewing over the Internet via all major web browsers. Users can view and display data from multiple sensors in graphical format, which makes it possible to identify max, min and average for any period of time. Data can also be viewed as a table and downloaded into a .txt file.

Hosting Service Configuration¹

Graph per sensor or per group of sensors
Alarm for low battery voltage and for missing data collection
Scaling of sensor readings
Cumulative displacement graphs for In Place Inclinometers
Real-Time Displays (RTD) showing latest data, per location with background image
Alarm thresholds
3 usernames and passwords for access to the web based data hosting service

¹Please contact GEOKON for further details and hosting packages.



Model 8800 Series GeoNet Wireless Network

GeoNet is a low-power, wireless data acquisition network developed to more efficiently collect data from many points. The system consists of a Network Supervisor (8800-2), which controls the network, and up to 100 Single-Channel Sensor Nodes (8800-1). The system is compatible with all GEOKON Vibrating Wire instruments. GeoNet is built on top of the IEEE 802.15.4 standard. The network is self-healing and will reconfigure itself, if possible, to tolerate disturbances in the physical environment. Up to 12 networks can coexist in the same area by setting each to a different operating frequency (channel). A Cellular Modem (8800-2-4A) and Network Serial Server (8800-2-4B) option are available for the GeoNet Network Supervisor, both of which are housed in a rugged, RFI shielded fiberglass enclosure.

Specifications

Measurement Accuracy	±0.025% F.S. (400-5000 Hz)
Radio Frequency, ISM Band	900 MHz ¹ ; 2.4 GHz ²
Range ³ (Outdoor)	26 km (6500 m × 4 hops) ¹ ; 3 km (750 m × 4 hops) ²
Range ³ (Indoor, Urban)	1220 m (305 m × 4 hops) ¹ ; 240 m (60 m × 4 hops) ²
Data Memory	32 MB
Storage Capacity	>1.04 M Arrays
Power Supply	D Cell Alkaline or Lithium (2×)
Operating Temperature	-40 °C to +85 °C
Dimensions (L × W × H)	122 × 120 × 91 mm

¹North America, Brazil, Singapore, Australia. | ²Other countries. | ³Line-of-sight, maximum 4 hops.

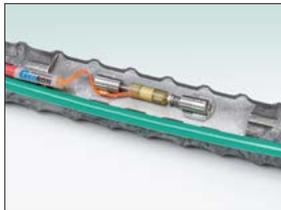


Model 8800 Series GeoNet Multiplexers

GeoNet Multiplexers expand the capacity of each Model 8800-1 Sensor Node to 8 channels, thereby allowing clusters of closely spaced sensors to be added to the system, or to add vibrating wire load cells (which contain between 3-6 sensors), multipoint borehole extensometers (which contain between 3-8 sensors) or multilevel piezometers. Sensor cables are connected to the multiplexer through cable glands (Model 8800-8-1, 8800-8-3) or via 10-pin connectors (Model 8800-8-2). Multiplexers are connected to the nodes via a 3 m interconnect cable (with a 10-pin connector at each end) and are supplied with mounting brackets for attaching to poles or backboards as required.

Specifications

Supply Voltage (Nominal)	2.8 V - 3.6 V (3.3 V)
Quiescent Current (Typical)	50 µA
On-state Current (Typical)	10 mA (varies with temperature)
Switch Resistance (Max)	10 Ω added in series to each VW coil
Datalogger Cable	3 m
Dimensions (L × W × H)	260 × 160 × 91 mm (8800-8-1/3) 360 × 160 × 91 mm (8800-8-2)

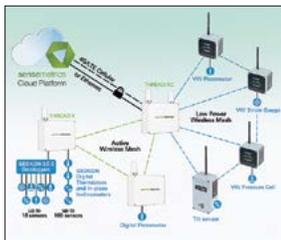


Model 8020-30 Addressable Vibrating Wire Interface

The Model 8020-30 Addressable Interface is designed to “daisy-chain” up to 100 vibrating wire sensors on a single 4-conductor cable. It is particularly useful for reducing cable runs in multipoint systems, incremental extensometers, and for applications where many sensor cables might compromise a grout or cement bond. The system features state of the art signal conditioning and digital addressing. (Please contact GEOKON for more information). Readout is achieved with the FPC-2 Field PC, 8600 Series Dataloggers or via a PC application.

Specifications

Range	400 Hz to 5000 Hz
Accuracy	0.005%
Resolution	better than 0.005 Hz
Sweep/Read Duration	< 500 ms
Communication	Modbus® RTU over RS-485 @ 9600 baud
Temperature Range	-40 °C to +70 °C



sensemetrics Integration

The sensemetrics software platform provides an advanced suite of connectivity and data management tools for distributed sensor networks. The platform is built around THREADS, which are known for their wide range of sensor support and ease of installation. These “smart” devices, integrated with GEOKON 8002 (LC-2) Series Dataloggers, GeoNet Wireless Network, Addressable VW Interfaces, Thermistor Strings and MEMS IPIs, greatly expand the ways in which data can be collected remotely. In addition, they feature “plug and play” connectivity and the ability to display data in real-time, on a user-friendly, cloud-hosted, browser-based data platform.

System Requirements

Minimum Requirements	Internet browser only (Chrome™ or Firefox™)
Operating Systems	Not applicable
Database Requirements	Not applicable



Model 3200 Hydraulic Borehole Pressure Cells

The standard Borehole Pressure Cell (BPC) is used to measure rock stress changes and is designed to be grouted inside a borehole. The BPC is manufactured from two steel plates welded together around their periphery. The plates are deformed into a "dog bone" configuration so that they can be expanded easily without damaging the welds. Hydraulic oil fills the space between the two plates and a high-pressure stainless steel tube connects the plates to a stainless steel pressure gauge and/or a pressure transducer.

Specifications

Ranges ¹	20, 35, 75 MPa
Resolution	0.25% of range (approximately)
Accuracy ²	±0.25% F.S. (gauge); ±0.1% F.S. (transducer)
Borehole Size	57 mm
Temperature Range ¹	-20 °C to +80 °C
Dimensions (L × W × H)	210 × 51 × 6 mm

¹Other ranges available on request. | ²Transducer accuracy established under laboratory conditions.



Model 4300 Borehole Stressmeters

The Model 4300 Vibrating Wire Borehole Stressmeter is designed for long-term measurements of stress changes in rock and can be installed in boreholes up to 100 feet deep. It utilizes a vibrating wire transducer to measure the deformation of a thick-walled steel ring preloaded into the borehole by a wedge and platen assembly. Changes in rock stress cause a related change in the resonant frequency of vibration of the tensioned wire, which is read by the Model GK-404 or GK-405 Readouts.

Specifications

Range in Compression ¹	35 to 100 MPa
Range in Tension	3 MPa
Resolution ¹	2 to 140 kPa
Temperature Range ²	-20 °C to +80 °C
Borehole Diameter	37 to 39 mm (4300EX) 59 to 61 mm (4300BX) 75 to 77.5 mm (4300NX)

¹Depends on rock modulus. | ²High temperature versions (up to 200 °C) available on request.



Model 4350 Biaxial Stressmeter

The Model 4350 Vibrating Wire Biaxial Stressmeter is designed to measure compressive stress changes in rock, salt, concrete or ice. Three or six VW sensors oriented at 60° intervals around a high-strength steel cylinder allow the principal stress changes to be measured in the plane perpendicular to the stressmeter axis. The stressmeter is grouted (or frozen, in the case of ice) into a BX (60 mm) size borehole.

Specifications

Range	70 MPa
Resolution ¹	14 to 70 kPa
Accuracy ²	±0.1% F.S.
Temperature Range ³	-20 °C to +80 °C
Borehole Diameter	60 mm (BX)

¹Depends on rock modulus. | ²Transducer accuracy established under laboratory conditions.
³Other ranges available on request.



Model 4360 Soft Inclusion Stress Cells (SISC)

The Model 4360 Vibrating Wire SISC is a larger version of the Model 4300 Borehole Stressmeters. The SISC is pre-loaded by wedging it into a large size diamond drill hole using an integral screw mechanism or hydraulic piston. The SISC can be set to measure both tensile and/or compression stress changes. It has been used successfully in 152 mm diameter overcoring holes (drilled to measure in situ stresses) to measure Aggregate/Alkali Reactions (AAR) in concrete dams.

Specifications

Range ¹	±35 MPa
Resolution ¹	35 kPa
Accuracy ²	±0.5% F.S.
Temperature Range ³	-20 °C to +80 °C
Borehole Diameter ³	NX, HQ, PQ, 152 mm

¹Proportional to rock modulus; figures given are for $E = 0.03 \times 106 \text{ MPa}$.
²Transducer accuracy established under laboratory conditions.
³Other ranges and diameters available on request.



Model 4370 Concrete Stressmeter

The Model 4370 Vibrating Wire Concrete Stressmeter comprises a short vibrating wire load cell in series with a longer cylinder of concrete, which has the same properties as the surrounding concrete but is de-bonded from it by means of a plastic tube. It's coupled at its ends to the surrounding concrete by means of two flanges. The vibrating wire load cell measures the load imposed on the inner concrete cylinder by stresses in the surrounding concrete.

Specifications

Range	-3 MPa to +25 MPa
Resolution	10 kPa
Accuracy ¹	±0.25% F.S.
Temperature Range ²	-20 °C to +80 °C
Dimensions (L × Ø)	600 × 76 mm; 66 mm (ID)

¹Transducer accuracy established under laboratory conditions. | ²Other ranges available on request.

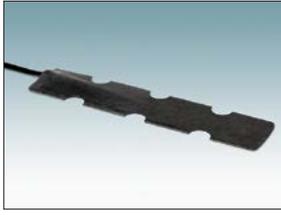


Model 5000 Borehole Deformation Gauge

The Model 5000 Borehole Deformation Gauge is the proven USBM-style gauge used to measure in situ rock stresses using the overcoring technique in rock that is competent and elastic. The measurement of in situ stresses is important in the design of underground openings such as power houses, crushing stations, mines, tunnels and the like. It is also useful for determining the inherent stability of pit slopes, foundation excavations, mine pillars and dam abutments.

Specifications

Borehole Diameter	38 mm EX-size diamond drill hole
Resolution	1.0 µε
Minimum Overcore Depth	203 mm (25 mm with reverse case)
Maximum Overcore Depth	15 m standard (60 m with extra cable)
Temperature Range	-20 °C to +80 °C
Dimensions (L × Ø)	267 × 35 mm



Model FP4000 Fiber Optic Strain Gauge

The Model FP4000 Fiber Optic Strain Gauge is designed for use in environments where it may be difficult to use conventional types of strain gauges because of space considerations, high levels of electrical interference or where intrinsic safety is an issue. Measurements of dynamic events are also possible with these gauges and the requisite dataloggers. The strain gauges have a very low coefficient of thermal expansion and can be used to measure both mechanical and thermo-mechanical strains in a variety of different materials.

Specifications	FP4000-1.0	FP4000-2.5	FP4000-5.0
Ranges	-1000 to +1000 $\mu\epsilon$	-2500 to +2500 $\mu\epsilon$	-5000 to +5000 $\mu\epsilon$
Resolution	0.15 $\mu\epsilon$	0.30 $\mu\epsilon$	0.50 $\mu\epsilon$
Gauge Factor Accuracy ¹	$\pm 3\%$ F.S.	$\pm 3\%$ F.S.	$\pm 10\%$ F.S.
Temperature Sensitivity	0.85 to 1.22 $\mu\epsilon/^\circ\text{C}$	0.85 to 1.22 $\mu\epsilon/^\circ\text{C}$	0.85 to 1.22 $\mu\epsilon/^\circ\text{C}$
Transverse Strain Sensitivity	transverse strain insensitive	transverse strain insensitive	transverse strain insensitive
Temperature Operating Range	-40 $^\circ\text{C}$ to +80 $^\circ\text{C}$	-40 $^\circ\text{C}$ to +80 $^\circ\text{C}$	-40 $^\circ\text{C}$ to +80 $^\circ\text{C}$
Dimensions (L x W x H)	100 x 25 x 1 mm	100 x 25 x 1 mm	100 x 25 x 1 mm

¹The accuracy of the OSP sensors is determined by sample testing of controlled batches at the factory. The manufacturing technique results in the spans shown above and is confirmed by actual strain tests performed on samples from batch lots.



Model FP4700 Fiber Optic Temperature Sensor

The Model FP4700 Fiber Optic Temperature Sensor is designed for use in environments where high levels of electrical interference exist or where intrinsic safety is an issue. The FP4700 uses the temperature-dependent birefringence of a specially selected crystal as the temperature transduction mechanism. This crystal does not show thermal creep or aging as with some other fiber optic sensors.

Specifications	
Temperature Ranges ¹	-40 $^\circ\text{C}$ to +250 $^\circ\text{C}$
Resolution	0.1 $^\circ\text{C}$
Accuracy ²	± 1.0 $^\circ\text{C}$
Response Time	1.5 s typical
Operating Humidity Range	0-100%
Dimensions (L x ϕ)	50 x 4.8 mm (sensor)

¹The available operating range is dependent on cable type (contact GEOKON with temperature parameters).
²Total accuracy over the full range including both signal conditioner and sensor errors. Higher accuracy available on request.



FP4911 Fiber Optic Rebar Strainmeter

The Model FP4911 Fiber Optic Rebar Strainmeter is designed for measuring strains in foundations, slurry walls, precast piles, caissons, bridge abutments, tunnel liners, etc. The standard Model FP4911 (#4 rebar), known as the "Sister Bar," is installed alongside structural rebar. The Fibre Optic element employed in this sensor makes it particularly suitable where dynamic measurements are to be made and/or on projects where other fiber optic sensors are deployed.

Specifications	
Range	-1000 to +1000 $\mu\epsilon$
Resolution	0.15 $\mu\epsilon$
Accuracy	$\pm 0.25\%$ F.S.
Nonlinearity	< 0.5% F.S.
Temperature Sensitivity	0.85 to 1.22 $\mu\epsilon/^\circ\text{C}$
Temperature Operating Range ¹	-40 $^\circ\text{C}$ to +80 $^\circ\text{C}$
Rebar Size	4 (Sister Bar)
Active Gauge Length	914 mm

¹Other ranges available on request.



Model 2100 Nold DeAerator™

De-aired water or antifreeze solutions are an essential ingredient of any hydraulic piezometer or settlement system where the formation of air bubbles in the fluid-filled tubing must be prevented. The Nold DeAerator removes dissolved gases from fluids at a much faster rate than conventional heating/boiling methods. The holding tank of the Model 2100 can be evacuated using either a vacuum pump or a water-powered aspirator. Water (or antifreeze solution) is drawn into the tank and agitated violently by a rotating impeller, causing cavitation, nucleation and rapid expulsion of dissolved gases. The Nold DeAerator can also be used with other fluids to remove dissolved gases.

Specifications

Standard Capacity	8 liter
Power Supply	115 V (60 Hz) or 230 V (50/60 Hz)
Power Consumption	59 watts (115 V) or 64/59 watts (230 V)
Vacuum Requirements	750 mm Hg (12 Torr) or better
Degassing Purity	0.6 ppm
Dimensions (L × W × H)	190 × 190 × 600 mm



Model 3400 Semiconductor Piezometers/Pressure Transducers

The Model 3400 Semiconductor Piezometers and Pressure Transducers are intended for dynamic measurements of fluid and/or pore water pressures in standpipes, boreholes, embankments, pipelines, pressure vessels, reservoirs, etc. They are also used for static pressure movement where the readout system is incompatible with vibrating wire type transducers. Three transducer output options are available: mV/V, 0-5 VDC or 4-20 mA.

Specifications

Ranges	100, 250, 400, 600 kPa; 1, 2.5, 6 MPa
Over Range	2 × rated pressure
Output	10 mV/v, 4-20 mA, 0-5 V
Accuracy	< 0.1% F.S. (dependent on readout)
Linearity	< 0.5% F.S.
Temperature Range	-20 °C to +80 °C
Dimensions (L × ø)	194 × 32 mm



Model 3800 Thermistor Probes

The Model 3800 Thermistor Probe consists of an interchangeable thermistor bead mounted inside a rugged PVC (Model 3800-1) or stainless steel (Model 3800-2, 3800HT) housing. They are used for remote readings, such as measuring hydration and cooling temperatures in placement of mass concrete. The 3800HT is for temperatures of up to 230 °C.

Specifications

	3800-1/2	3800HT
Range ¹	-20 °C to +80 °C	-30 °C to +230 °C
Resolution	0.1 °C	0.1 °C
Accuracy ²	±0.5 °C; ±0.2 °C	±0.5 °C
Dimensions (L × ø)	50 × 12 mm (probe)	75 × 19 mm (probe)

¹Other ranges available on request. | ²Accuracy of ±0.5 °C for Models 3800-1-1 and 3800-2-1; ±0.2 °C for Models 3800-1-2 and 3800-2-2.



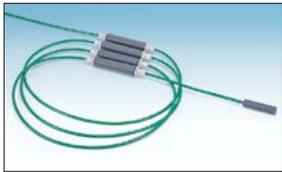
Model 3810 Thermistor Strings

The Model 3810 Thermistor String comprises a number of individual 3800 sensors mounted in a rugged, multi-conductor cable for multiple temperature measurements in a single borehole. Thermistor strings are manufactured according to customer requirements for overall length, number of sensors and accuracy.

Specifications

	3810-1	3810-2
Range ¹	-20 °C to +80 °C	-20 °C to +80 °C
Resolution	0.1 °C	0.1 °C
Accuracy ²	±0.5 °C	±0.2 °C
Dimensions (L × ø)	45 × 16 mm (sensor)	64 × 22 mm (sensor)

¹Other ranges available on request. | ²Stated accuracy is for the thermistor sensor only, between 0 °C and 70 °C. The cable used to connect the thermistor to the readout adds resistance and measurement error.



Model 3810A Addressable Thermistor Strings

The Model 3810A Addressable Thermistor String is a variation of the Model 3810 Thermistor String, which uses addressable thermistor sensors installed on a 2-pair cable. This configuration allows up to 248* sensors to be installed on a single, 6 mm diameter cable up to 2000 m in length. (*The number of sensors that can be supported depends on the overall length of the cable. Please contact GEOKON for details.)

Specifications

Range	-20 °C to +80 °C
Resolution (Non-Linear)	0.002 °C (0° to +50 °C); 0.005 °C (-20° to +80 °C)
Accuracy	±0.35 °C @ -20° to -10 °C; ±0.15 °C @ -10° to 0 °C; ±0.07 °C @ 0° to +50 °C; ±0.12 °C @ +50° to +65 °C; ±0.16 °C @ +65° to +80 °C
Dimensions (L × ø)	140 × 22 mm (sensor)



Model 4700 VW Temperature Gauge

The Model 4700 VW Temperature Gauge consists of a stainless steel transducer body to which a vibrating wire element is attached. As the thermal coefficients of expansion of the body and wire are different, a simple, yet sensitive, temperature measuring device can be constructed. These gauges are ideally suited for use in projects that require datalogging and where other types of VW transducers are in use.

Specifications

Range	100 °C (-20 °C to +80 °C)
Optional Range	200 °C (-200 °C to +50 °C or 0 °C to +200 °C)
Resolution	0.034 °C
Accuracy ¹	±0.5% F.S.
Dimensions (L × ø)	130 × 19 mm

¹Transducer accuracy established under laboratory conditions.



Cables

GEOKON cables are waterproof, have good electrical properties and can be buried in soil or embedded in concrete. Cable construction consists of one or more shielded pairs with individual drain wires for electrical noise protection. Cable jackets include PVC for standard applications, Teflon® for use at high temperatures and Polyurethane, for use where extra abrasion resistance is required. Armored cables, for use in earth dams, and cables with straining wires and integral vent tubes are also available.

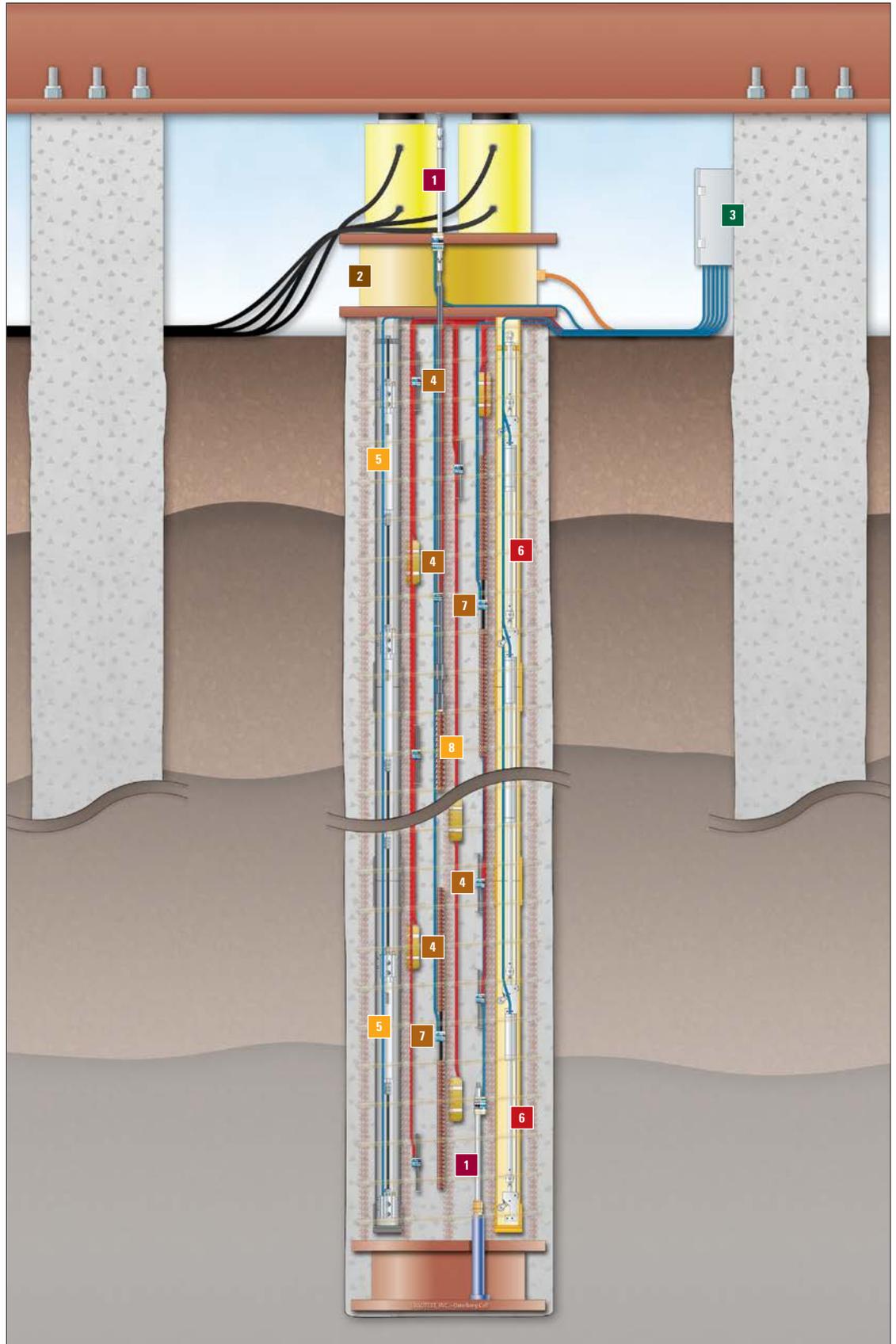
Specifications

Conductors	4, 6, 8, 10, 12 and 24
Conductor Insulation	High Density Polypropylene, 8 and 10 mil; Fluorinated Ethylene Propylene, 10 mil
Shielding	Aluminum polyester with drain wire, 24 AWG tinned copper
Jackets ¹	Extruded PVC standard, Teflon® Polyurethane, Polyethylene and Armored Polyethylene
Temperature Range	-20 °C to +80 °C; -80 °C to +200 °C (Teflon®)

¹Other cable jackets are available for special applications.

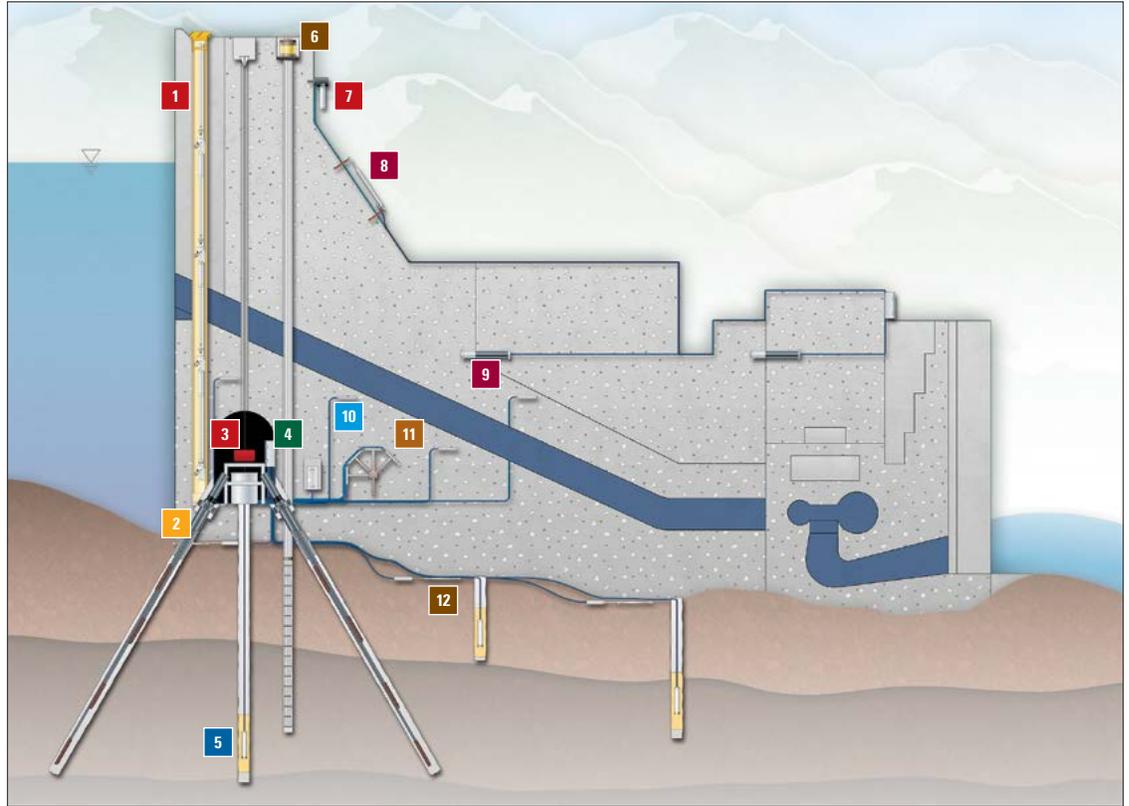
Pile Testing Instrumentation

- 1 Displacement Transducers | 05
- 2 Load Cells | 11
- 3 Multi-Channel Dataloggers | 18
- 4 Strain Gauges | 04
- 5 Retrievable Extensometers | 06
- 6 In-Place Inclinometers | 13
- 7 Sister Bars | 04
- 8 Telltales | 07



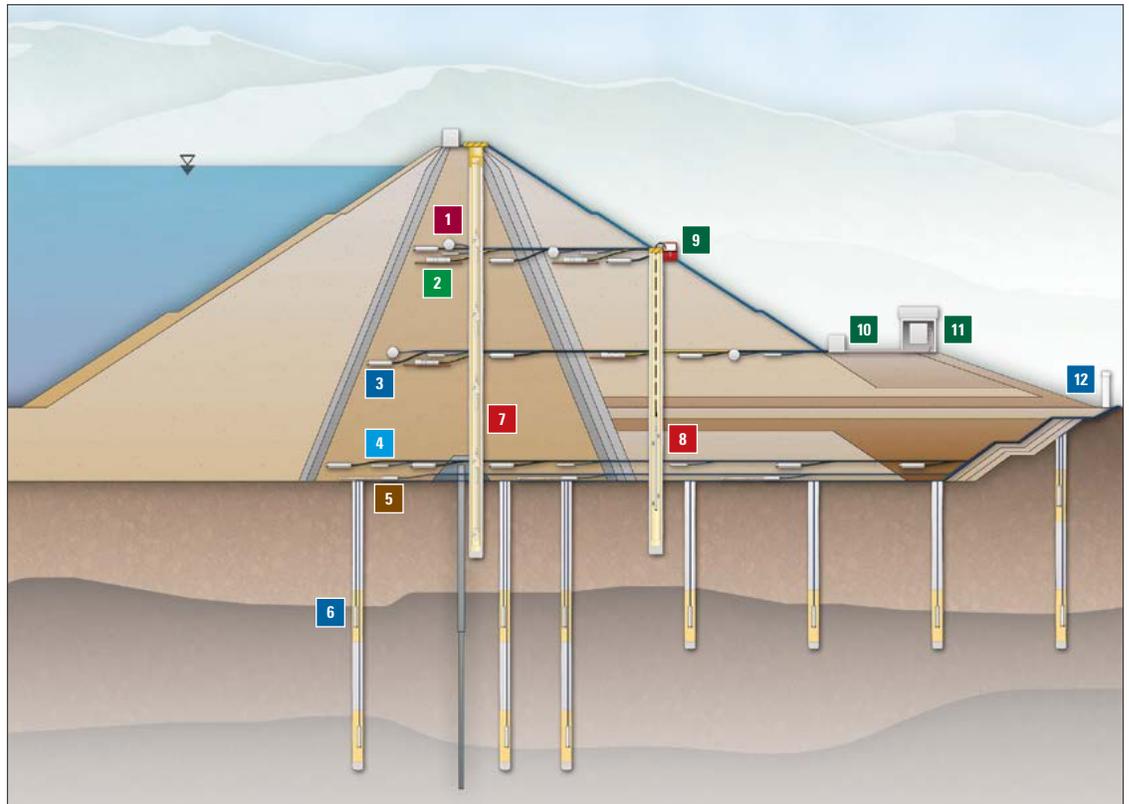
Concrete Dam Instrumentation

- 1 In-Place Inclometers | 13
- 2 Extensometers | 06-07
- 3 Pendulums | 14
- 4 Multi-Channel Dataloggers | 18
- 5 Piezometers | 08-09
- 6 Load Cells | 11
- 7 Tiltmeters | 14
- 8 Crackmeters | 05
- 9 Embedment Jointmeters | 05
- 10 Temperature Gauges | 22
- 11 Embedment Strain Gauges | 04
- 12 Earth Pressure Cells | 11



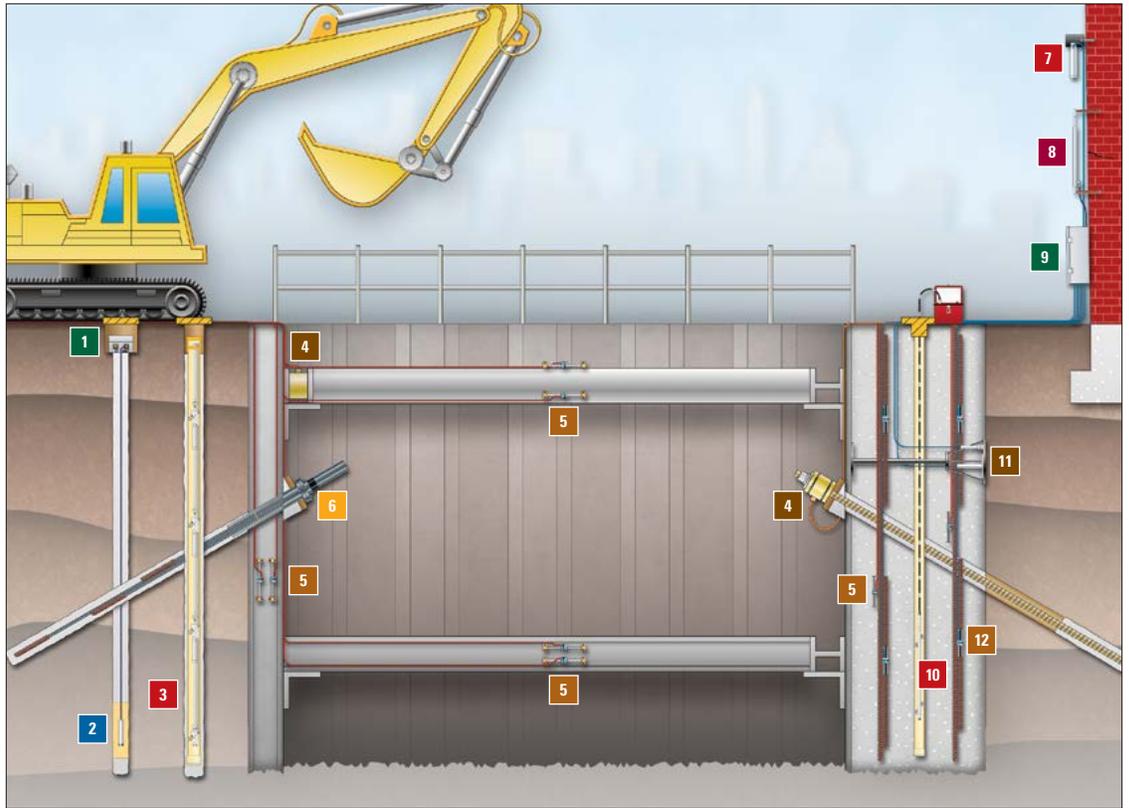
Earth Dam Instrumentation

- 1 Soil Strainmeters | 05
- 2 Settlement Sensors | 10
- 3 Heavy Duty Piezometers | 08
- 4 Temperature Gauges | 22
- 5 Earth Pressure Cells | 11
- 6 Piezometers | 08-09
- 7 In-Place Inclometers | 13
- 8 Inclometer Probes | 12
- 9 Readouts | 15-16
- 10 Multiplexers | 18
- 11 Multi-Channel Dataloggers | 18
- 12 Weir Monitors | 09



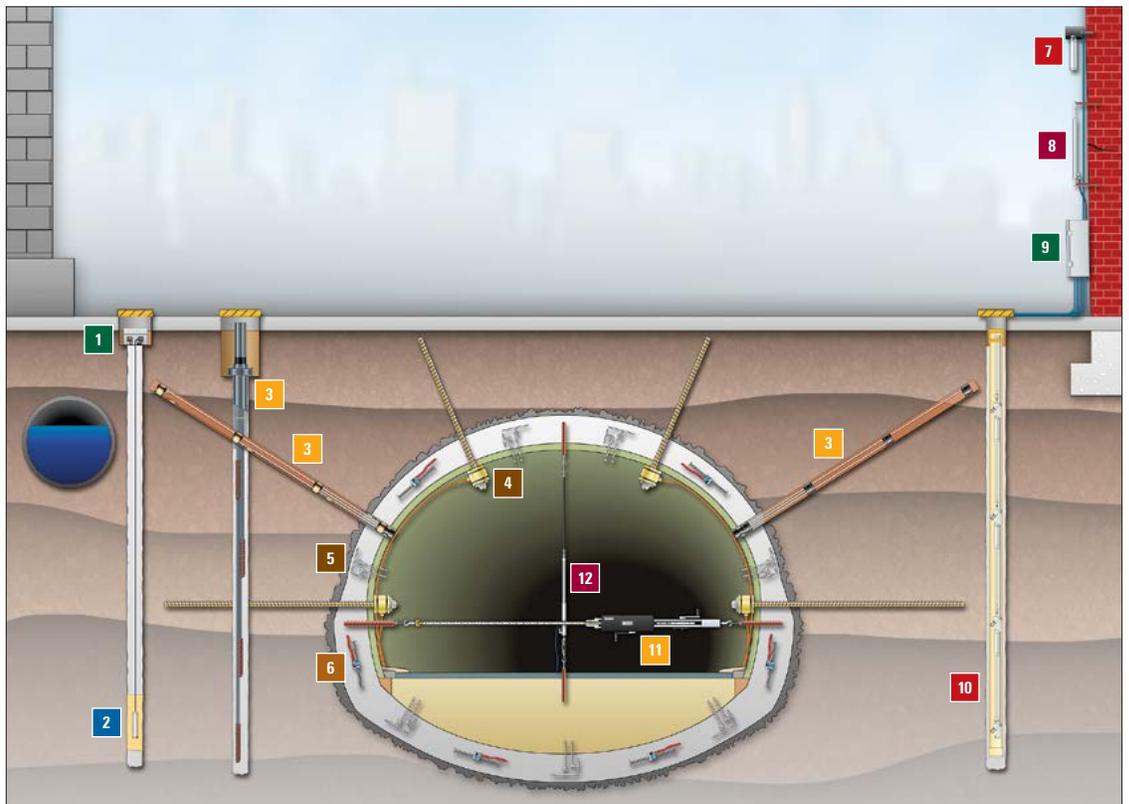
Deep Excavation Instrumentation

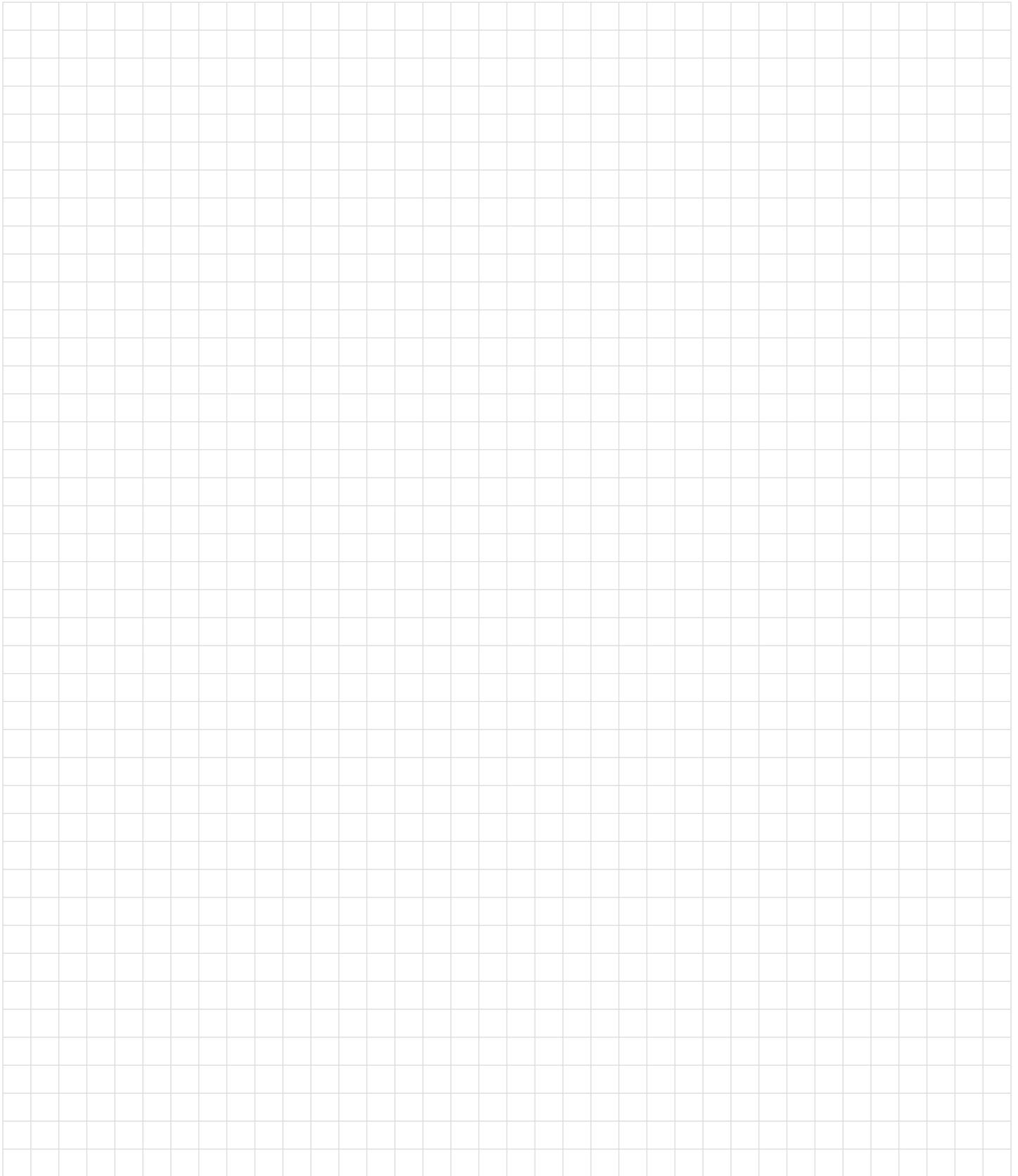
- 1 Single-Channel Dataloggers | 17
- 2 Piezometers | 08-09
- 3 In-Place Inclinometers | 13
- 4 Load Cells | 11
- 5 Strain Gauges | 04
- 6 Extensometers | 06-07
- 7 Tiltmeters | 14
- 8 Crackmeters | 05
- 9 Multi-Channel Dataloggers | 18
- 10 Inclinometer Probes | 12
- 11 Jackout Pressure Cells | 11
- 12 Sister Bars | 04



Tunnelling Instrumentation

- 1 Single-Channel Dataloggers | 17
- 2 Piezometers | 08-09
- 3 Extensometers | 06-07
- 4 Load Cells | 11
- 5 NATM Pressure Cells | 11
- 6 Strain Gauges | 04
- 7 Tiltmeters | 14
- 8 Crackmeters | 05
- 9 Multi-Channel Dataloggers | 18
- 10 In-Place Inclinometers | 13
- 11 Tape Extensometers | 07
- 12 Convergence Meters | 05







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