CGEO INSTRUMENTS

International Manufacturer of Geotechnical & Structural Instruments

About Us

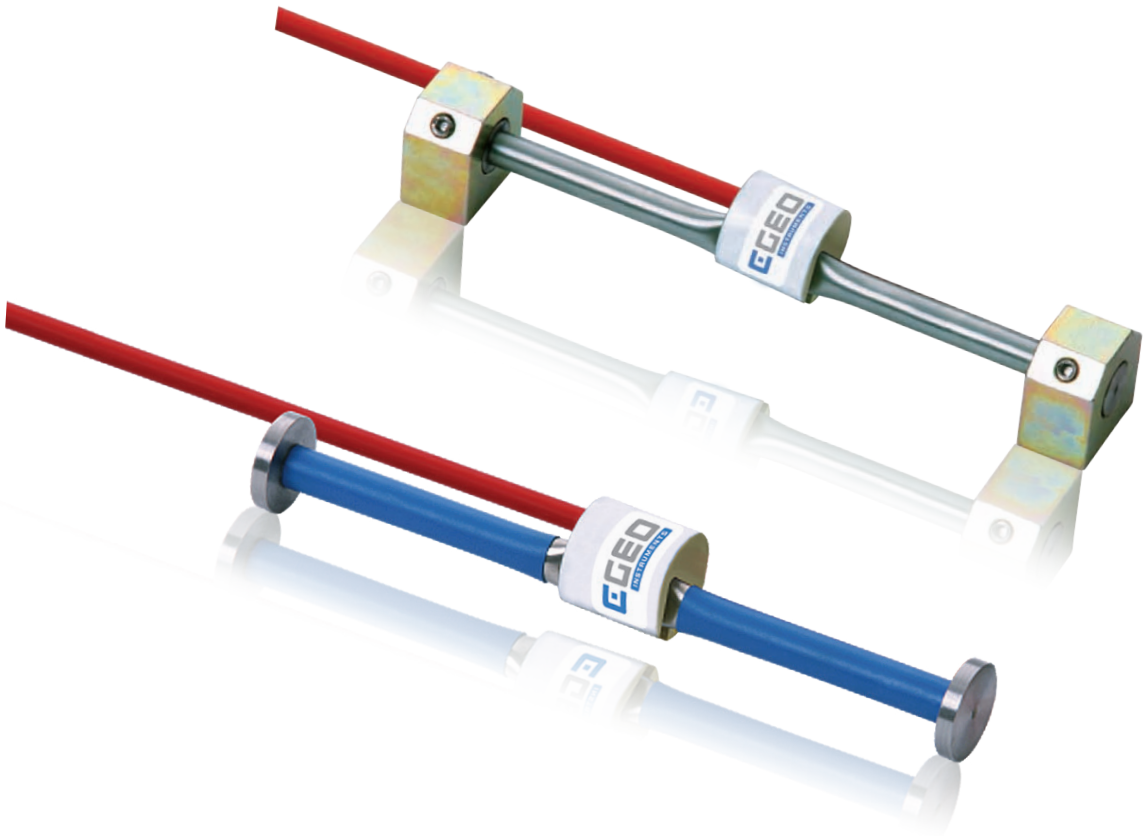
CGEO INTERNATIONAL LIMITED (CGEO Hong Kong)

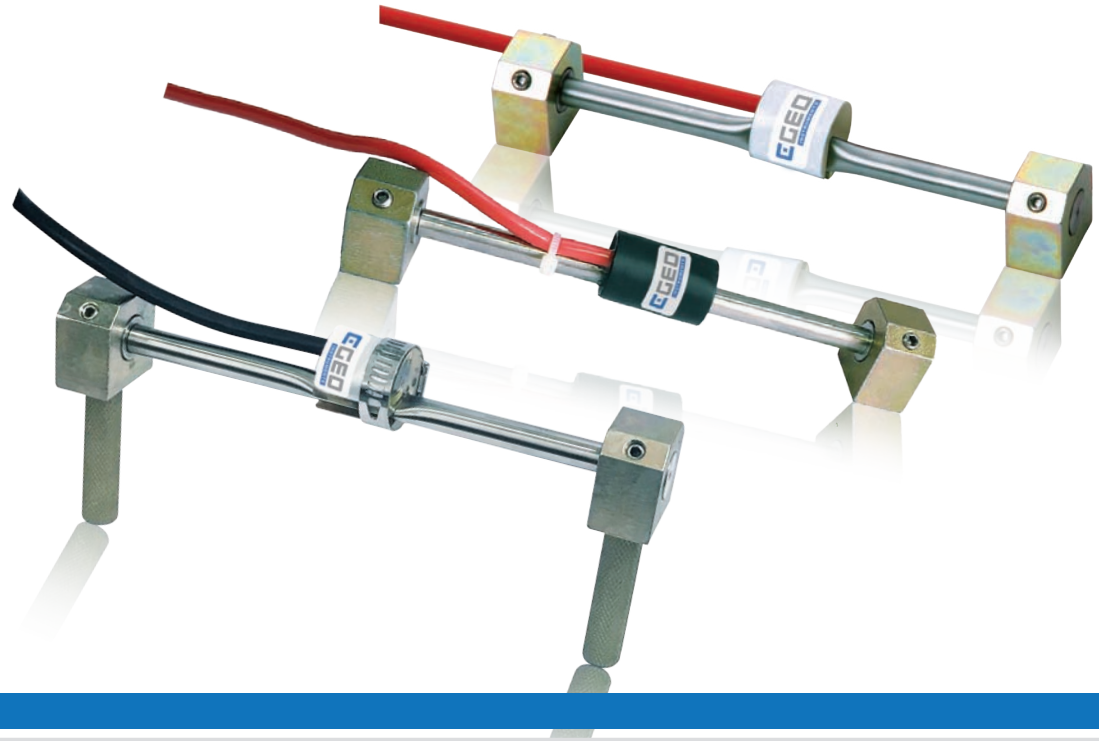
CGEO Hong Kong is a company registered in Hong Kong, specialized in the research and development and manufacture of geotechnical engineering instruments. It is the headquarters and global R & D center of CGEO family. CGEO Hong Kong is the heart of our business and our family of companies is organized to provide expert solutions, geotechnical instrumentation, and operational support to optimize your structural monitoring and operations.

CGEO International (Beijing) Limited (CGEO Beijing)
CGEO Beijing is a subsidiary of CGEO Hong Kong in China and is the manufacturing center of CGEO family.
CGEO Beijing is manufacturing of geotechnical instrumentation for structural monitoring of dams, tunnels, bridges, piles, foundation, landslide.

Contents

Strain





Applications

The Vibrating Wire Strain Gauge is designed for long-term strain measurements of steel structures including buildings, bridges, tunnel linings, arches, struts, sheet piling, piles, dams pipelines, etc.

Description

The Vibrating Wire Strain Gauge measures strain in steel members. The gauge consists of a coil assembly, Vibrating Wire element and two weldable anchors.
The strain gauge incorporates O-ring seals to provide waterproofing, and allows the tube to remain unstressed. A factory fitted, four core screened cable connects the coil to the readout unit.

Key Features

- Accurate, long-term stability
- Robust design and reliable
- O-ring seals provide waterproofing
- Fit for manual or remote reading
- Range is adjustable to suit compression or tension
- Integral thermistor
- Gauges and coils are re-usable

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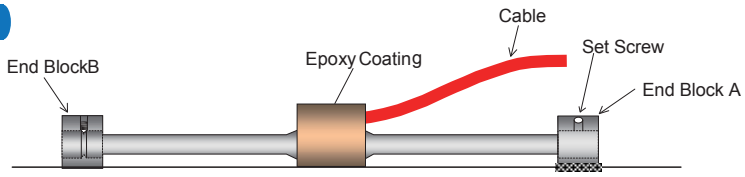
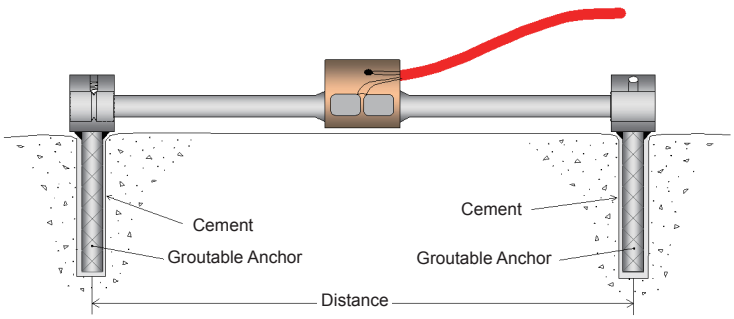
Main Specifications

Model	CGEO-SG2	CGEO-SG2X	CGEO-SG3
Range	3000με		
Accuracy	±0.1% F.S.		
Resolution	1με		
Temperature Range	-20 to + 80 ℃		
Waterproof	Customized	0.5MPa	Customized
Gauge Length	150mm		



Model CGEO-SG2 Installation



Model CGEO-SG3 Installation

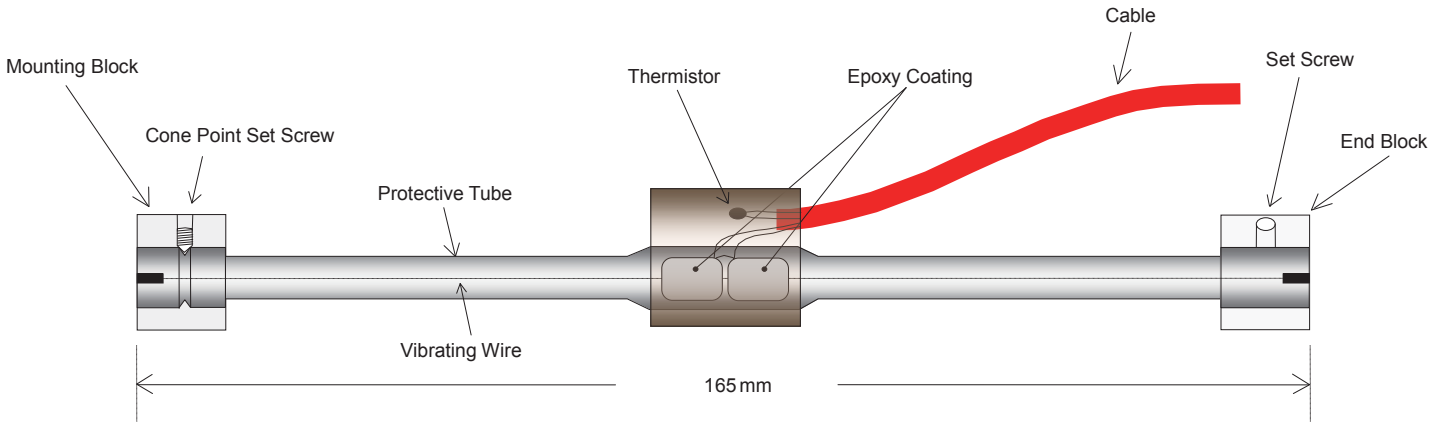
Operation

Deformation of the structure under load produces relative movement between the two mounting blocks causing a change in the wire tension and a corresponding change in its frequency of vibration. Once installed, changes in strain are monitored by the coil assembly mounted on the gauge. The gauges can be read individually or remotely/automatically as part of a data collection system.

CGEO-SG2 Vibrating Wire Arc Weldable Strain Gauge basically consists of a length of steel wire tensioned between two mounting blocks that are arc welded to the surface of a structural steel member.

CGEO-SG2X Vibrating Wire Arc Weldable Strain Gauge is designed as a one-piece structure for measuring strains in steel members and incorporate the excellent waterproof performance (can be customized) and techniques to allow these gauges to work in hostile conditions.

CGEO-SG3 Vibrating Wire Strain Gauge contains two groutable anchors to be embed the unit in the materials such as wood, rock or concrete.



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Applications

The Vibrating Wire Embedment Strain Gauge is designed to measure internal strains in mass concrete placed in foundations, bridges, dams, tunnel linings or any concrete structure.

Description

The gauge is composed of two end stainless steel pads joined by a tube that protects a length of steel wire. The steel wire is sealed in the tube by a set of O-rings on each end pad. Both end pads have a flat circular flange to allow transfer of concrete deformation to the wire.

The changes in strain are monitored by the coil assembly mounted on the center of the gauge. It may be pre-attached to rebar or by attachment to a 2, 3, 4 or more directional rosette, thereby measuring strain in several directions.

The gauges can also read temperature if required.

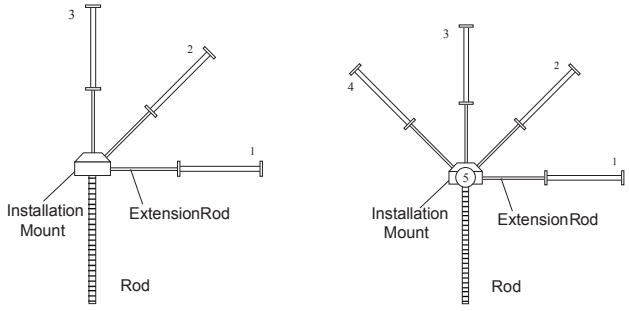
The Model CGEO-SG4-150/SG4X has a 150mm Gauge length and commonly for strain measurement of foundations, piles, bridges and tunnel linings.

The Model CGEO-SG4X is designed as a one-piece structure for measuring strains in steel members and incorporate the excellent waterproof performance (can be customized) and techniques to make these gauges suitable for use in hostile conditions.

And the Model CGEO-SG4-250 has a 250 mm Gauge length and suitable for massive concrete's strain measurement which can be embed into the Roller Compacted Concrete (RCC).

Key Features

- Accurate, long-term stability
- Robust design and reliable
- O-ring seals provide waterproofing
- Fit for manual or remote reading
- Range is adjustable to suit compression or tension
- Integral thermistor



Model CGEO-SG4 Axial Mounting

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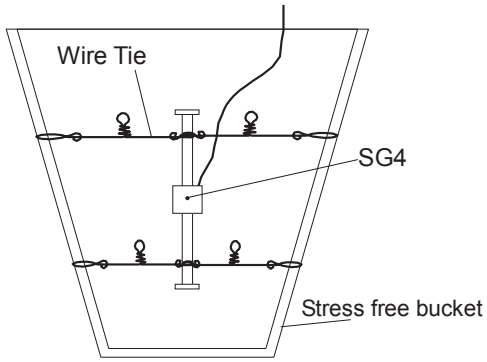
Main Specifications

Model	CGEO-SG4-150	CGEO-SG4-250	CGEO-SG4X
Range	3000με	2500με	3000με
Resolution	1με	0.5με	1με
Accuracy	0.1% F.S.		
Temperature Range	-20 to + 80 ℃		
Waterproof	Customized	Customized	Customized (Standard 0.5MPa)
Gauge Length	150mm	250mm	150mm

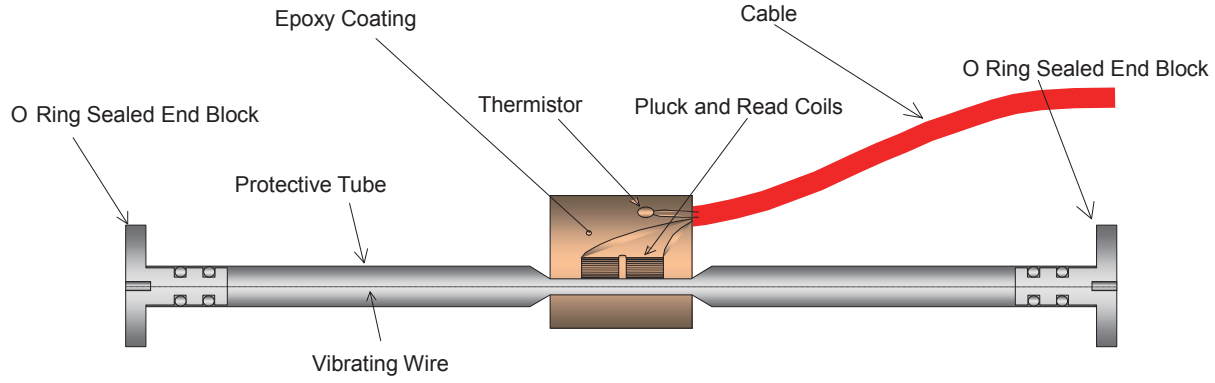


Model CGEO-SG4 Axial Mounting

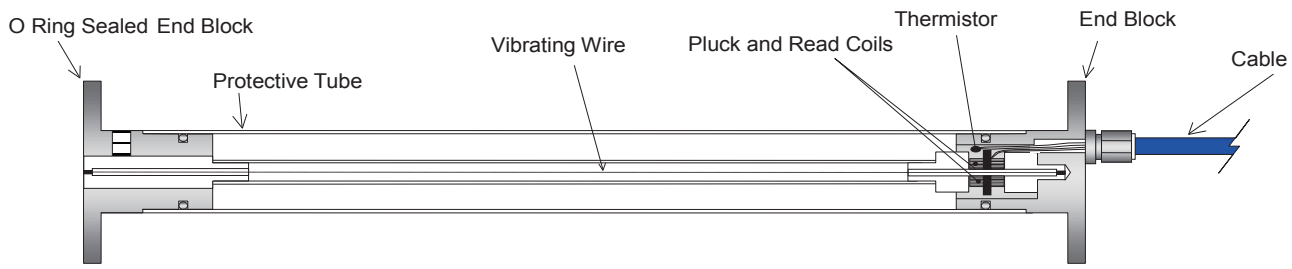
Operation

The Model CGEO-SG4 Embedment Strain Gauge is installed prior to concrete pour and protected during the pour to prevent damage.

The gauge may also be pre-cast into a concrete briquette for subsequent casting into the structure, or embedded into holes drilled into an existing structure. The pickup coil is fitted over a flattened section in the centre of the gauge tube and held in place using a securing clamp; this can be installed on site immediately prior to installation. The sensor is then installed by placing the gauge at a location in the structure suitable for accurately passing microdeformation from the surrounding cured concrete to the gauge. Cables from the gauges are run to a readout, a terminal box, or a data logging point.



Model CGEO-SG4 Vibrating Wire Embedment Strain Gage



Model CGEO-SG4-250 Vibrating Wire Embedment Strain Gage

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Applications

The Vibrating Wire Rebar Strain Gauges are commonly used for measuring strains in concrete piles, mass concrete structures, diaphragm, slurry walls, caissons and for casting in place concrete piles.

Description

The Vibrating Wire Rebar and Sisterbar Strain Gauge is fixed axially inside a short, central length of round steel bar. This central section is de-bonded from the surrounding concrete by means of a plastic coating, and is extended by welding a length of rebar to each end.

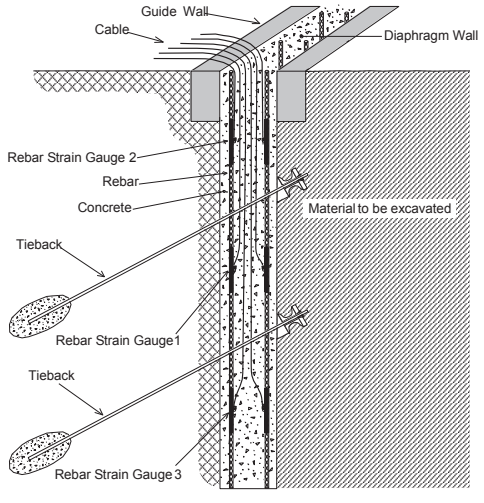
Rebar Strain Gauges are welded into the reinforcing cage and must be matched to the size and grade of the rebar forming the cage.

Sister Bars are installed alongside existing lengths of rebar within the cage. Both types of strain gauge are extremely robust, reliable and waterproof.

The gauges can be read individually or remotely as part of a data collection system. A factory fitted, four core screened cable connects the coil to the readout unit. A thermistor to measure temperature changes can be included in the Rebar and Sisterbar Strain Gauge sensors.

Key Features

- Accurate, long-term stability
- Robust design and reliable
- Available for most rebar sizes
- Fit for manual or remote reading
- Range is adjustable to suit compression or tension
- Integral thermistor



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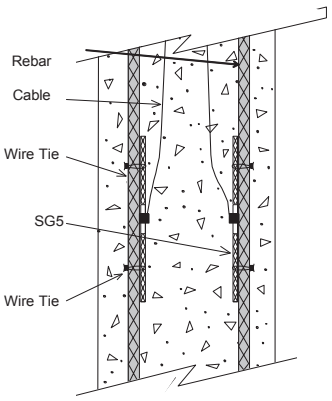
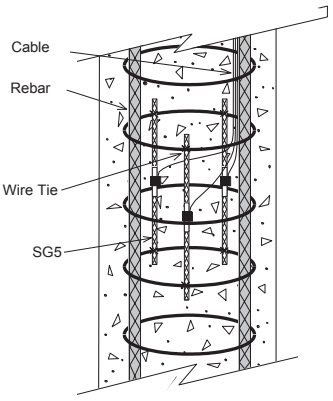
Main Specifications

Model	CGEO-SG5 Sisterbar	CGEO-SG5 Rebar	
Range	1500με	2000με	3000με
Diameter	12mm	14, 16, 18, 20, 22, 25, 28, 32, 36, 40mm	14, 16, 18, 20, 22, 25, 28, 32, 36, 40mm
Resolution	0.4με		
Accuracy	0.25% F.S.		
Temperature Range	-20 to + 80 ℃		
Waterproof	Customized 1, 2, 3MPa		



Sister Bar Installation



Sister Bar Installation in Circle

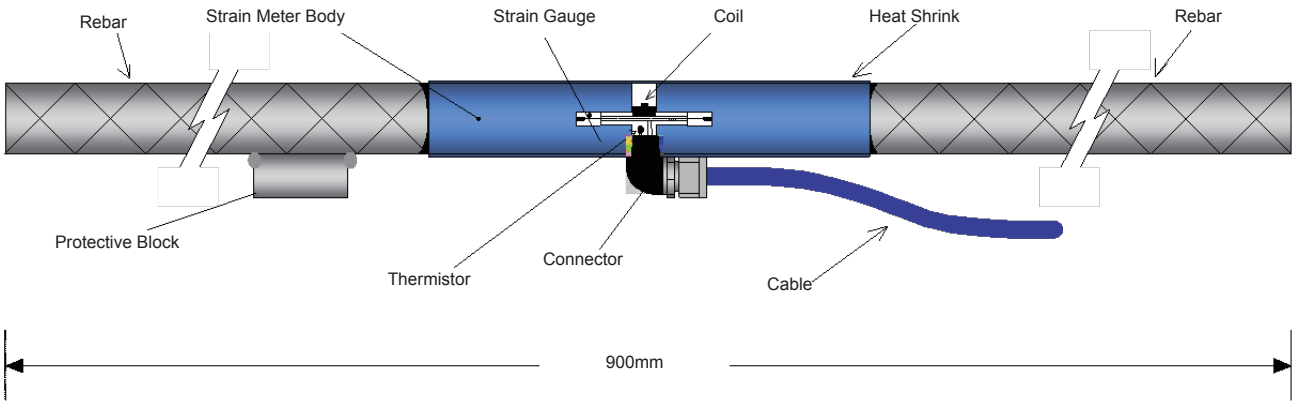
Operation

Rebar Strainmeters and "Sister Bars" are designed to be embedded in concrete for the purpose of measuring concrete strains due to imposed loads. It consists of a sealed element containing the wire, which is de-bonded from the concrete by a plastic coating. This is attached to two lengths of rebar, one at either end, which in turn are used to transfer strain from the structure to be monitored to the gauge.

The Rebar Strain Gauge is installed by welding the gauge into the rebar cage at a location within the structure suitable to accurately pass loads from the cured concrete into the gauge. Sisterbars (of 12mm diameter) are installed alongside existing lengths of rebar within the cage.

Rebar Strain Gauges and Sisterbars are usually installed in pairs within the structure on either side of the neutral axis, so that bending movements can be separated from axial loads.

The gauges can be read individually or remotely/automatically as part of a data collection system.
The integrated thermistor allows for temperature data to be recorded, aiding the evaluation of thermally induced strains.



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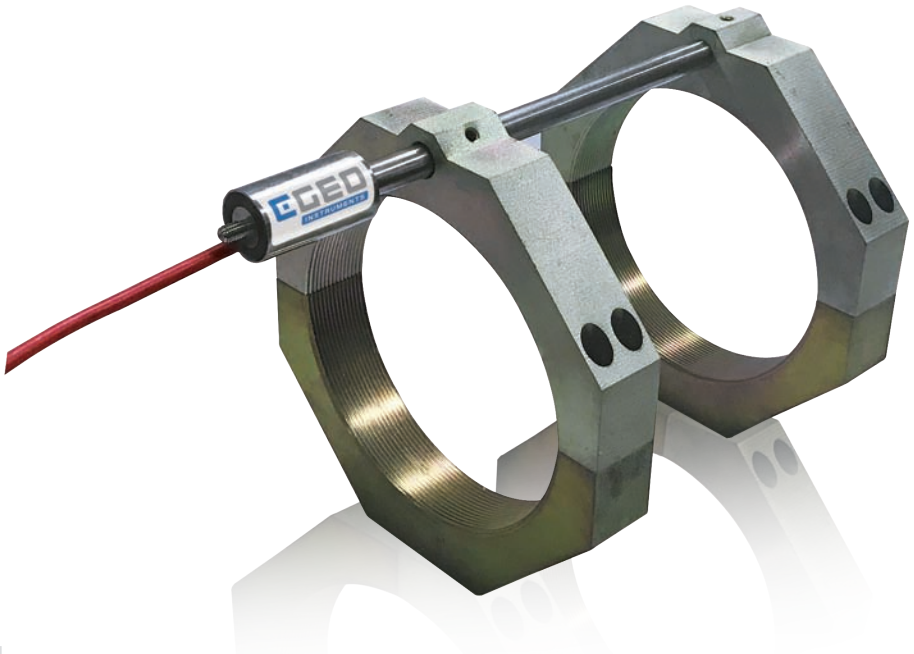


Applications

The Model CGEO-SG6 Strandmeter is designed to measure strains in tendons and steel cables, including bridge tendons, cable stays, ground anchors, tiebacks, etc. Two clamps at each end of the strandmeter hold it firmly onto the cable. Various size clamps are available.

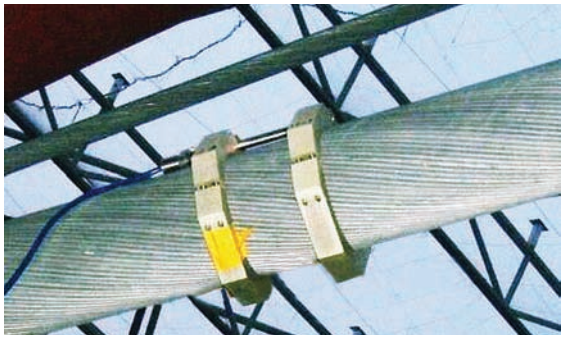
Description

The Model CGEO-SG6 Strandmeter is designed to measure change in deformation in wire strands such as those that are commonly used in tiebacks and earth anchors.
The instrument consists of a vibrating wire sensing element and a stress relieved spring which is connected to the wire at one end and a connecting rod at the other.

As the connecting rod is pulled out from the gage body, the spring is elongated causing an increase in tension, which is sensed by the vibrating wire element. The tension in the wire is directly proportional to the extension; hence, the change in deformation can be determined very accurately by measuring the strain change with the vibrating wire readout box.

Key Features

- Accurate, long-term stability
- Robust design and reliable
- Waterproofing
- Fit for manual or remote reading
- integral thermistor
- Gages and coils are re-usable



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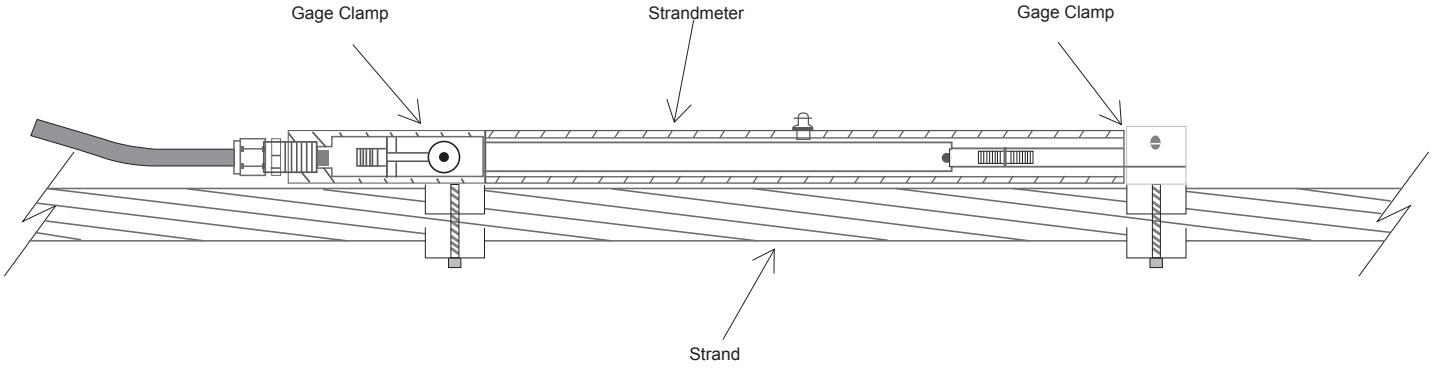
Main Specifications

Model	CGEO-SG6
Range	20000με / 50000με
Resolution	0.01% F.S.
Accuracy	±0.1% F.S.
Temperature Range	-20 to ~ + 80 °C
Waterproof	Customized

Operation

The Model CGEO-SG6 Strandmeters are using vibrating wire displacement transducers to measure displacements across joints and cracks, in essence, the transducer consists of a vibrating wire in series with a tension spring. Displacements are accommodated by a stretching of the tension spring, which produces a commensurate increase in wire tension.
The wire and spring are connected to a free-sliding rod which protrudes from, and is free to slide inside, a protective outer tube. An O-ring seal prevents water from entering.

The frequency signal is transmitted through the cable to the readout location, conditioned, and displayed on portable readouts or dataloggers.



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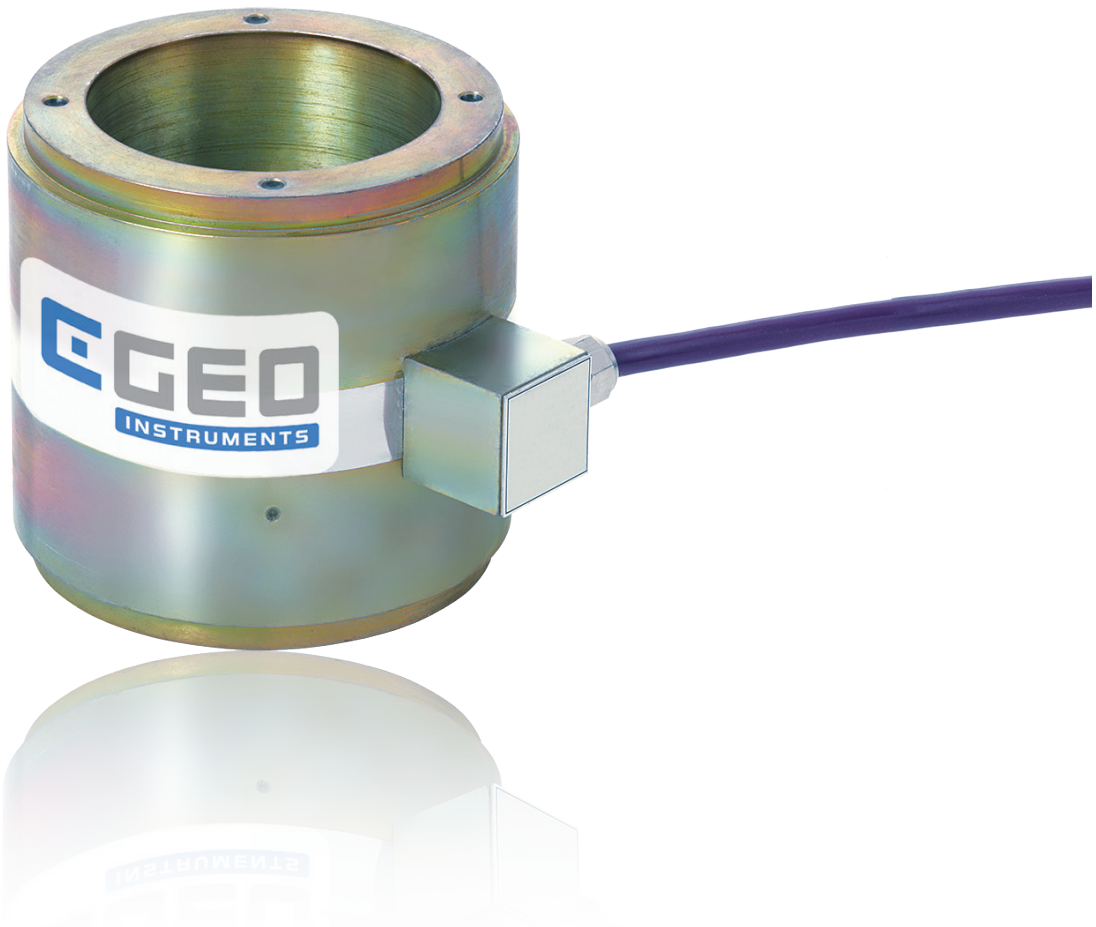
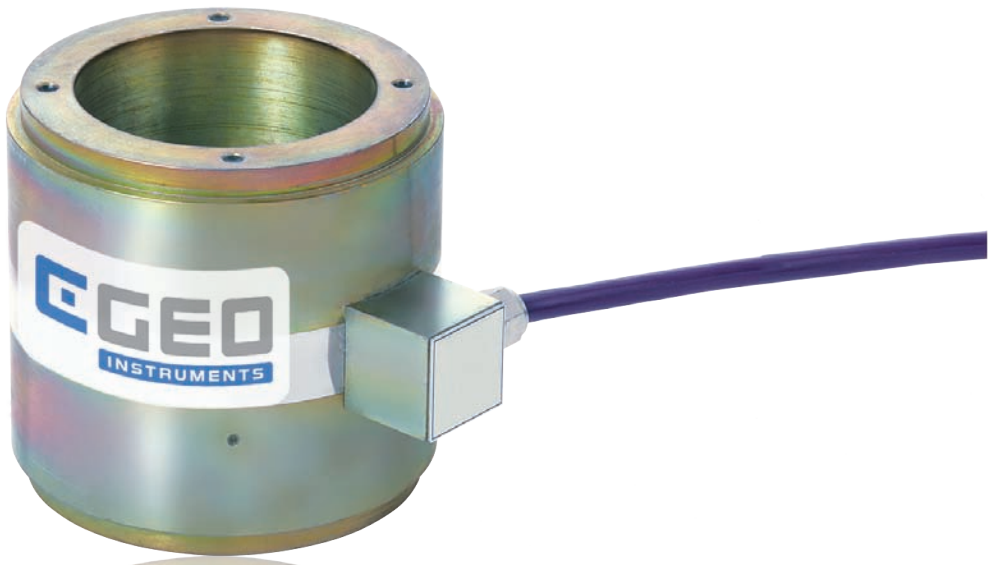
Load & Pressure





Applications

CGEO-LC Vibrating Wire Load Cell is used for monitoring loads in tie-backs and rock bolts in the walls of excavations, rock bolts, tensions in cable anchors and tendons, piles, tunnel supports, loads in arch tunnel supports and concrete dam tie-downs.

Description

The Vibrating Wire Load Cell is designed to directly measure load in piles, rock bolts and between tunnel supports, as well as tension in cable anchors.
The load cell comprises a set of up to six Vibrating Wire Gauges mounted parallel to the cell axis and spaced equidistant radially in a cylindrical housing.

The load cell can be wired directly to a data logger, or connected via sheathed cable and a switched terminal unit to a readout unit. Load cells are manufactured with a centre hole to accommodate rockbolts, tendons or anchor cables, but can be supplied with top and bottom load plates for use as a solid centre cell.

Key Features

- Accurate, long-term stability
- Robust design and reliable
- Waterproofing can be customized
- Fit for manual or remote reading
- Integral thermistor

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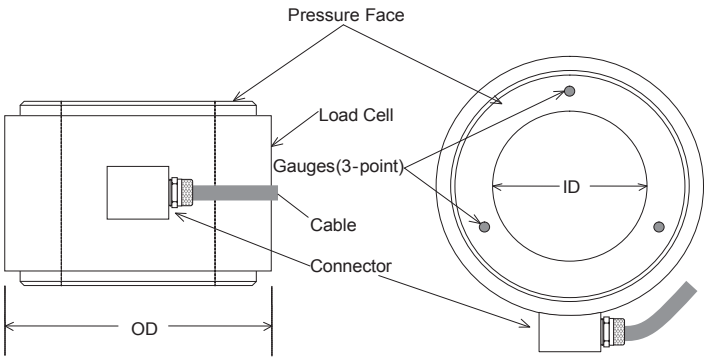
Main Specifications

Model	CGEO-LC
Range	250 to 10,000 kN (Other ranges are available)
Over Range	25% F.S.
Resolution	0.025% F.S.
Accuracy	±0.25% F.S.
Temperature Range	-20 to + 80°C

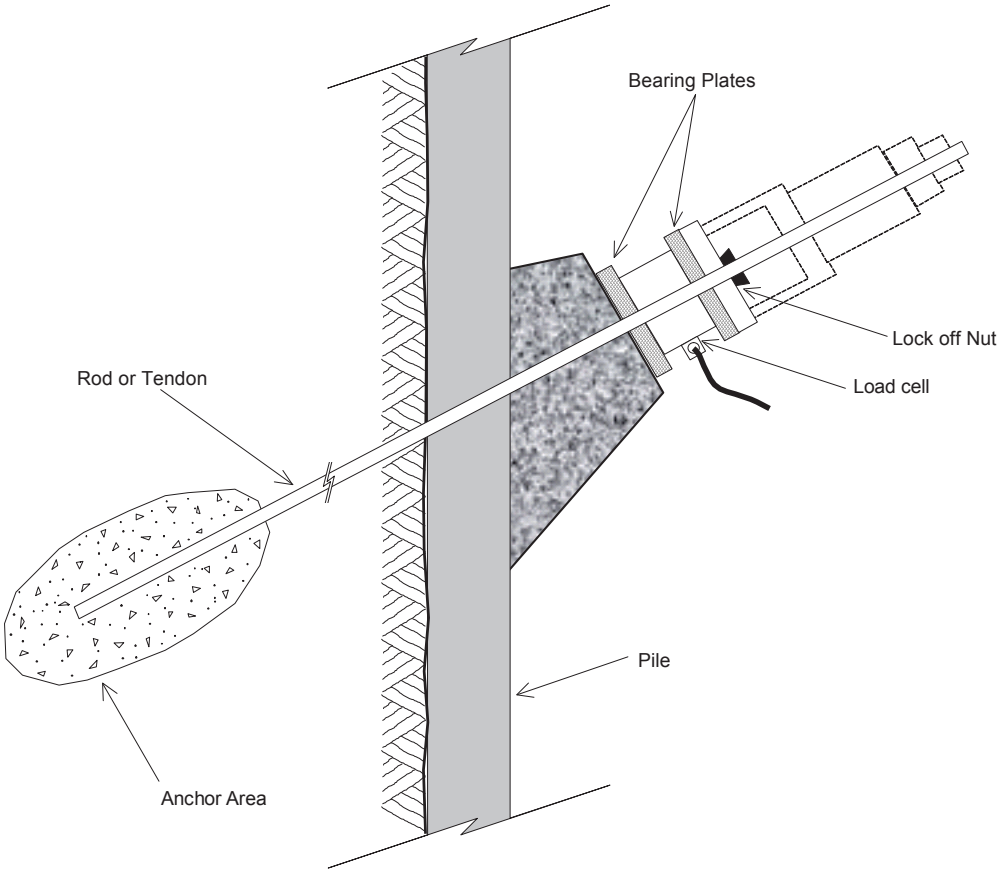


Operation

The Model CGEO-LC Load Cell is designed primarily for use on tiebacks and rockbolts and particularly where long term monitoring is required. They may also be used during pile load tests and for monitoring loads in struts, tunnel supports, etc. In practically all cases, the load cells are used in conjunction with bearing plates positioned on either side of the load cell.

A bearing plate is placed beneath the Load Cell to spread the load and take up any residual non alignment. Another bearing plate is placed between the cell and the anchor bolt or tensioning device. To minimize eccentric and uneven loading, the use of the thick machined-flat bearing plates and centralizer bushings (where necessary) are recommended.

The readings from up to six gauges are averaged to produce the total load for the cell. Calibration factors are provided to enable direct reading in engineering units when using CGEO-PR-LC readout. Alternatively, cells can be wired to a datalogger.



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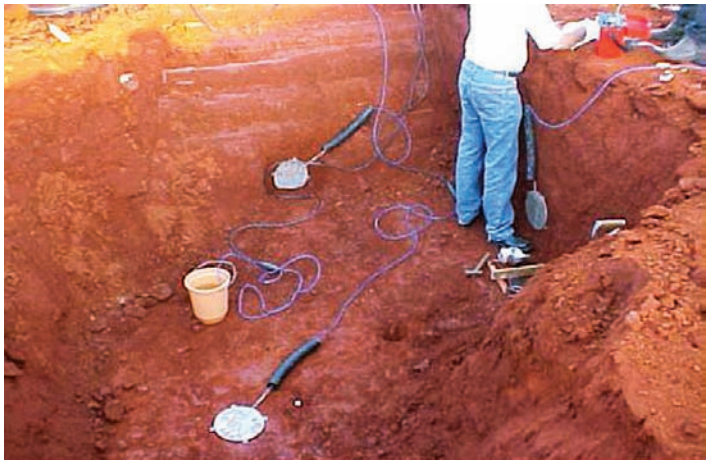
Applications

The Model CGEO-PC1/PC2 is designed to measure total pressure in earth fills and embankments, it provides a direct means of measuring total pressures, i.e. the combination of effective soil stress and pore water pressure, such as bridge abutments, diaphragm walls, fills and embankments, retaining walls surfaces, sheet piling, slurry walls and tunnel linings.

Description

The Model CGEO-PC1 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 CGEO-PC2 has an extra-thick back plate to minimize point loading effects when installed on concrete or rock surfaces.



Key Features

- Accurate, long-term stability
- Robust design and reliable
- Fit for manual or remote reading
- Integral thermistor
- Over-voltage surge arrestor protects against electrical damage

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Main Specifications

Model	CGEO-PC1	CGEO-PC2
Range (MPa)	0.35/0.5/0.7/1.0/2.0/3.0/5.0	
Resolution	0.025% F.S.	
Accuracy	±0.1% F.S.	
Temperature range	-20 to + 80°C	
Over-range capacity	50% F.S.	
Dimensions	Dia. 230mm	

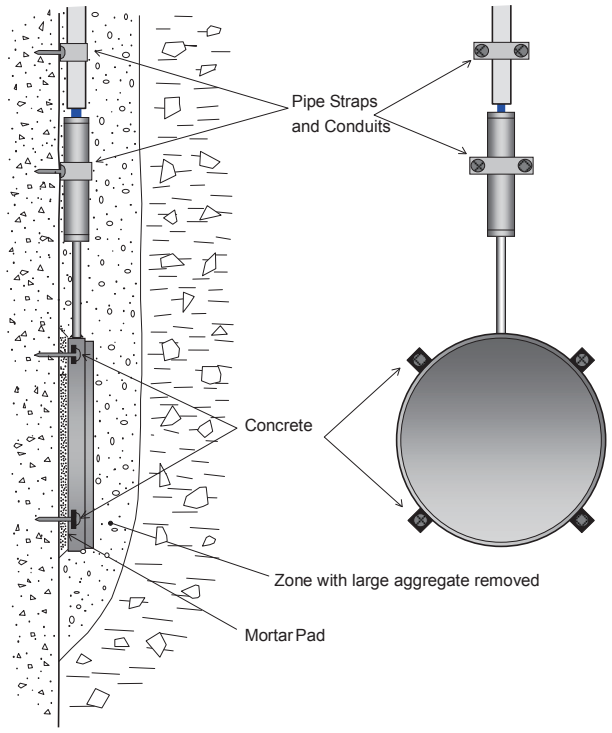
Operation

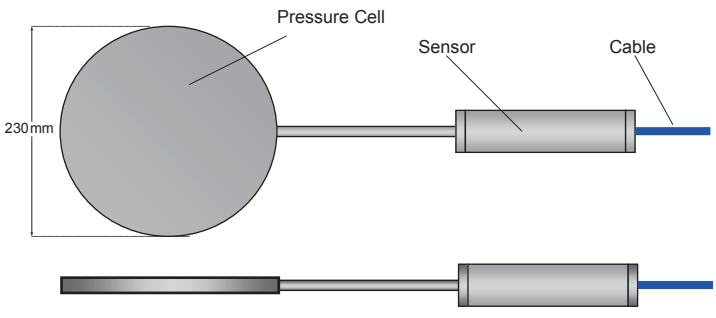
The Vibrating Wire Pressure Cell is used to measure total pressure, particularly in earth or rockfill structures.

The Model CGEO-PC1 Pressure Cell is constructed from two thin pressure sensitive plates. They can be positioned in the fill at different orientations so that soil pressures can be measured in two or three directions. Special armored cables are recommended in earth dam applications.

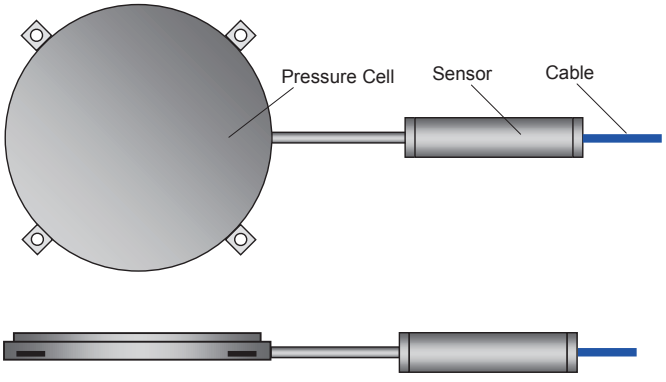
The Model CGEO-PC2 Pressure Cell is designed to measure soil pressures on structures. The back plate of the cell which bears against the external surface of the structure is thick enough to prevent the cell from warping. The other plate is thin and is welded to the back plate in a manner which creates a flexible hinge to provide maximum sensitivity of changing soil pressures.

The change in pressure is converted by the VW transducer into an electrical signal and may be remotely read using a VW readout or datalogger.





Model CGEO-PC1 Pressure Cell



Model CGEO-PC2 Pressure Cell

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Applications

The Model CGEO-NATM1 Style Shotcrete Stress Cell is designed for the measurement of tangential and radial stresses in shotcrete tunnel linings. Cells of this type are also used for measurements of stress in mass concrete.

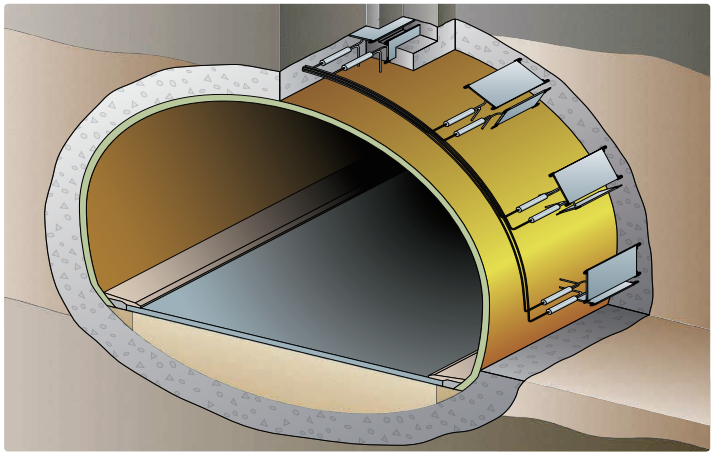
Description

The Vibrating Wire Concrete Stress Cell measures radial and tangential stresses in shotcrete, concrete and rock, usually in 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. The narrow gap between the plates is filled with hydraulic oil. A prestressing tube is provided for expanding the cell after the concrete has cured.

A Vibrating Wire Pressure Transducer is connected to the cell by a short length of steel tubing, forming a closed hydraulic system.

Key Features

- Accurate, long-term stability
- Robust design and reliable
- Fit for manual or remote reading
- Integral thermistor
- Over-voltage surge arrestor protects against electrical damage
- Measures stress on and within linings of underground excavations
- Compensation tube offsets the effects of concrete hydration shrinkage, restoring cell contact pressure



Main Specifications

Model	CGEO-NATM1
Range (MPa)	0.35/0.5/0.7/1.0/2.0/3.0/5.0
Resolution	0.025% F.S.
Accuracy	±0.1% F.S.
Temperature Range	-20 to +80°C
Over-range Capacity	150% F.S.
Dimensions (L × W × H)	250 x150 x 6 mm

Operation

Both cell and transducer are embedded in the medium to be monitored. As the concrete or shotcrete cures, the cell expands due to the rise in temperature. Each cell consists of two rectangular stainless steel plates welded together around the periphery, with a de-aired fluid occupying the space between the plates. Increasing concrete stresses cause a corresponding rise in the de-aired fluid pressure as the steel plates are squeezed together.

Stress cells installed in concrete or shotcrete will expand if the temperature rises as the concrete cures. On cooling, the cell will contract and leave a gap between it and the surrounding concrete, preventing the concrete stresses from reaching the cell.

To correct this situation, a repressurizing tube (pinch tube) is provided to fully expand the cell after the concrete has cured. This ensures an immediate and accurate response to the onset of increasing concrete stresses.

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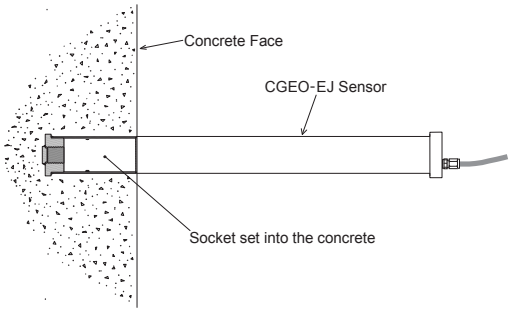
Joint & Crack

CGEO-EJ Vibrating Wire Embedment Jointmeter



Key Features

- Accurate, long-term stability
- Long working life, long-term stability and reliability
- Suitable for manual or remote monitoring
- Waterproof
- Integral thermistor

Applications

The Model CGEO-EJ Vibrating Wire Embedment Jointmeter is designed primarily for the measurement of joint openings between lifts or sections in mass concrete or across fracture zones in fully grouted boreholes. Typical monitoring applications include monitoring construction joints such as abutments, slabs, foundations and retaining walls, tunnels or shaft linings; arch, gravity and buttress dams.

Main Specifications

Model	CGEO - EJ
Range	12.5, 25, 50, 100mm (Other ranges are available)
Resolution	0.025% F.S.
Accuracy	±0.1% F.S.
Temperature Range	-20 to +80°C
Dimensions	Dia.50mm (sensor)/ Gauge length depends on the range

Description

The Vibrating Wire Embedment Jointmeter comprises two parts; a socket and a main body. The socket is a detachable end that is cast into the first concrete lift. The main body is a protective outer case which houses a Vibrating Wire displacement transducer and screws into the socket. Once screwed into the socket, it is cast into the second lift of concrete.

The transducer has a Vibrating Wire sensing element which is anchored at one end and connected to a spring loaded push rod at the other end.
Any movement applied to the push rod causes the spring to contract or elongate, causing an increase or decrease in the Vibrating Wire tension.
This tension is directly proportional to the movement applied and therefore the opening or closing of the joint.

Operation

The socket is installed in the first lift of concrete, using an installation plug to prevent concrete entering the socket.

Before the second lift of concrete is cast, the main body is screwed into the installed socket, extended sufficiently (most commonly to its mid-point) to allow for expected joint movement, welded or tied to the rebar and then the second lift of concrete is cast.
When both lifts of concrete are complete, the jointmeter is now firmly anchored into each concrete lift and will measure opening or closing of the joint.

The sensing transducer is smaller than the protective body of the jointmeter, therefore a degree of shearing motion is accommodated by universal joint connections within the unit.

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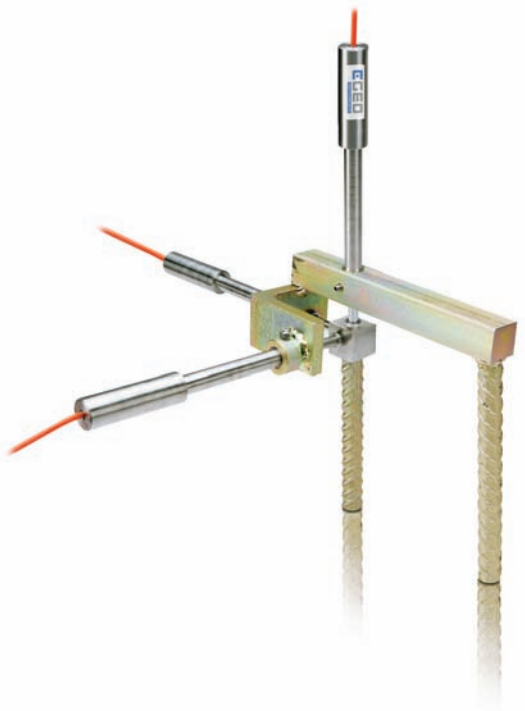
Applications

The Model CGEO-CR Vibrating Wire Crackmeter measures across surface cracks and joints in buildings, bridges, dams, pipelines and similar structures. The inner thermometer can also measure the temperature of the setting space, and the inner global universal joint allows some displacement. It can measure both the opening and closing of cracks or joints.

Description

The Model CGEO-CR Vibrating Wire Crackmeter consists of a vibrating wire in series with a tension spring, which is made from high quality Stainless Steel and designed for long-term, reliable monitoring.
The frequency and thermo-resistance are spread by special 4-core Shielded Cable without the influence of the length of the cable. It's suit to embed the instrument in the atrocious environment to measure the crack for a long time.

A change in distance between the anchors, by the crack opening or closing, will cause the connecting rod to move within the transducer body, changing the tension on the spring and thus altering the resonant frequency of the wire.



Key Features

- Accurate, long-term stability
- Long working life, long-term stability and reliability
- Suitable for manual or remote monitoring
- Waterproof
- Integral thermistor

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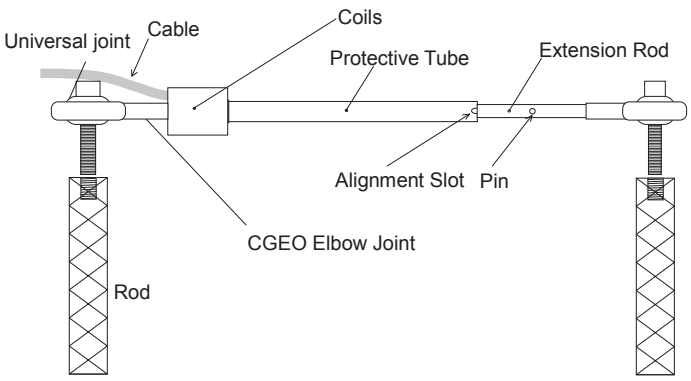
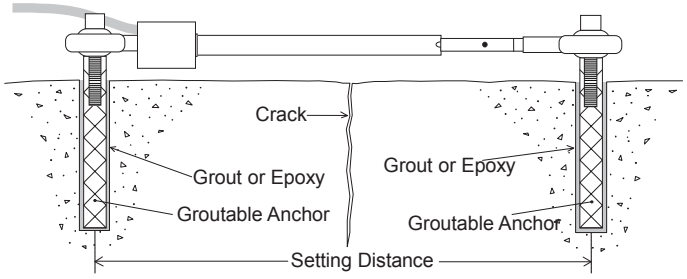
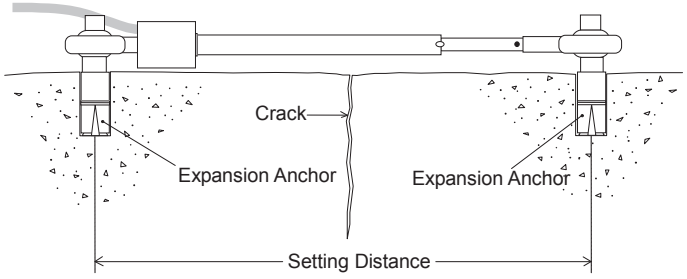
Main Specifications

Model	CGEO-CR
Range	12.5, 25, 50, 100, 150, 200, 250, 300mm
Resolution	0.025% F.S.
Accuracy	±0.1% F.S.
Temperature Range	-20 to + 80℃
Dimensions	Dia.12mm (sensor)/ Dia. 25mm(coil)





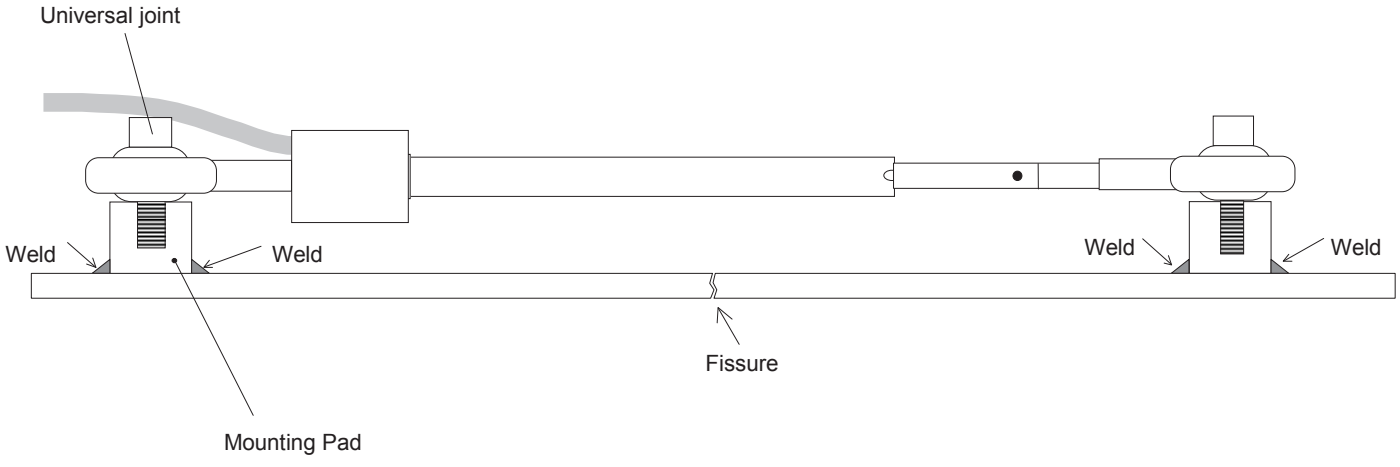


Operation

The Model CGEO-CR Vibrating Wire Crackmeters are designed to measure movement across joints such as construction joints in buildings, bridges, pipelines, dams, etc.; tension cracks and joints in rock and concrete.

The ends of the sensor are attached to anchors (with ball joints) that have been grouted, bolted, welded or bonded on opposite sides of the crack or fissure to be monitored. 3-D mounting brackets, which allow measurement of displacements in three orthogonal directions, and special clamps for attachment to a variety of earth reinforcements and geogrids, are also available.

The frequency signal is transmitted through the cable to the readout location, conditioned, and displayed on portable readouts or dataloggers.



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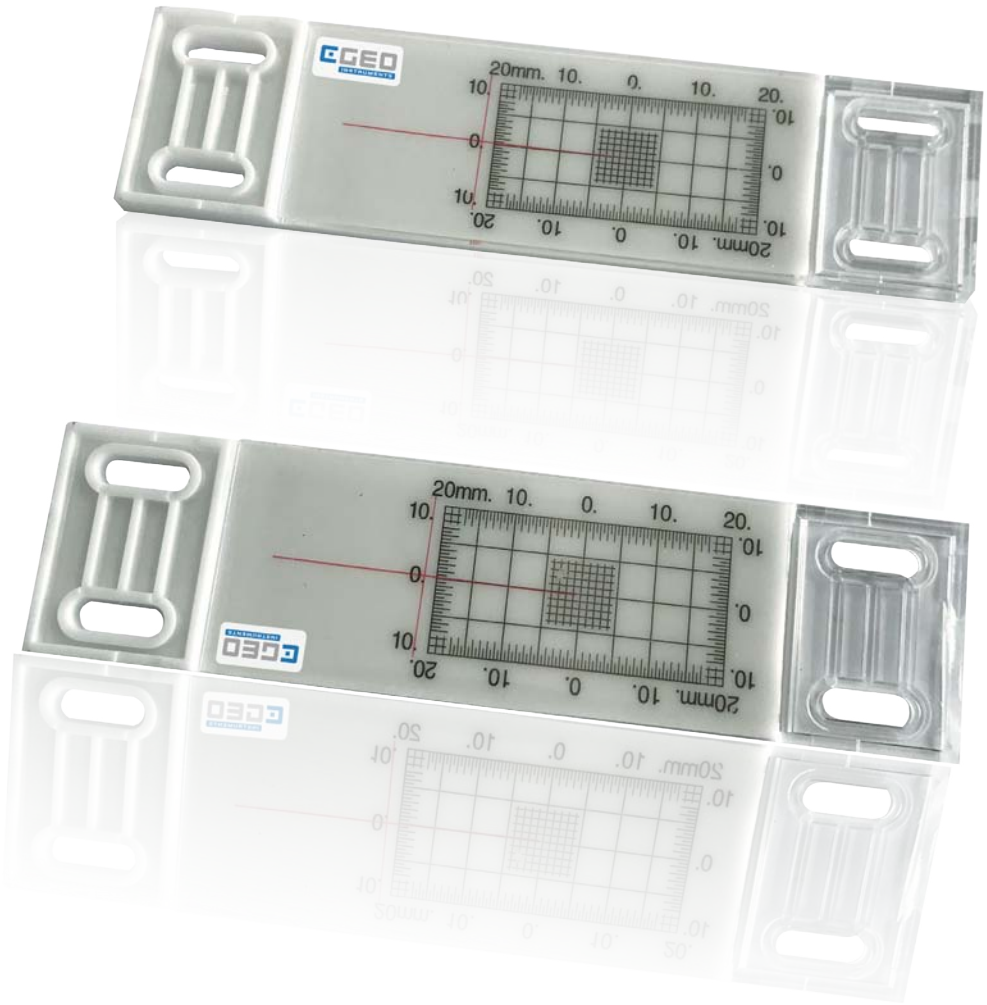

Typical Application

- Plastic Crackmeter is used in the field that needs continuous crack measurement such as crack of old building, road, fence.

Main Specifications

- Material: Polycarbonate (PC)
- Range: ± 20mm (left and right), ± 10mm (up and down)
- Resolution: 1 mm (grid)

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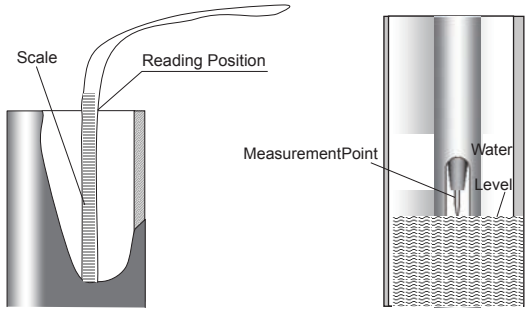
Water



Key Features

- Simple, reliable and easy to operate
- Lightweight and easily portable
- One instrument reads at many locations
- Contoured tape for accurate readings
- Audible (buzzer) and visual (light) water level alert signals
- Sensitivity adjustment for variations in water conductivity

Applications

Water Level Meters are used to measure the depth of water in standpipes, wells and boreholes. The meter is simple to use and being portable, can be used at many locations such as: water levels in open boreholes, construction control and stability monitoring of dams, reservoirs and embankments, hydrological and hydrogeological investigations of water resources, stability investigations of natural and cut slopes, etc.

Main Specifications

Model	CGEO-WL
Range	30, 50, 100, 150, 200 m
Resolution	±1mm
Repeatability	±3mm
Probe Diameter	16mm
Working Temperature	-10 to + 60℃
Consumption	9V/5mA (operation), 9V/5μA (standby)
Power Supply	6F22, 9V battery

Description

CGEO-WL Water Level Meter is used to measure the water level in well logging, boreholes or pressure tubes. The instrument consists of a steel ruler with built-in wires, probe, sound and light indicating circuit and ruler reel etc. The probe on the ruler front end has a needle water level sensor, triggers the sound-light alarm within the reel once the probe touches the water surface and indicates the depth of the liquid level from the orifice basing on the ruler scale. The ruler section adopts a dog bone-shaped design and prevent effectively adhering to well logging or borehole moisture affection. The high qualified reel adopts aluminum alloy manufacture and stoving varnish coating surface features a good anti-moisture and anti-corrosion ability.

Operation

The Water Level Meters use corrosion proof stainless steel probes attached to permanently marked flat tape, fitted on a well-balanced reel. They are powered by a standard 9 volt battery.

The probes incorporate an insulating gap between electrodes. When contact is made with water, the circuit is completed, activating a loud buzzer and a light.
The water level is then determined by taking a reading directly from the tape at the top of the well casing or borehole. A sensitivity control allows the buzzer to be turned off while in cascading water, and ensures a clear signal in both high and low conductivity conditions.

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Applications

CGEO-WP Vibrating Wire Series Vibrating Wire Piezometers provide accurate measurement of pore water pressures in fully or partially saturated soil. The transducer is made from Stainless Steel and designed to handle pressure ranges up to 5000 kPa. It incorporates an over voltage surge arrestor that offers protection from a lightning strike.

CGEO-WP Vibrating Wire Series Vibrating Wire Piezometers is mainly used for the measurement of ground water elevations, pore water pressures, tailings lagoons, pressures in dam foundations and water pressures behind tunnel linings.

Description

The Model CGEO-WP Standard Vibrating Wire Piezometer ranges (0.35~5MPa) is fitted with either a low air entry sintered steel or high air entry ceramic filters. An integral thermistor for temperature monitoring is included.

The Model CGEO-WP Small Range Vibrating Wire Piezometer is designed for low-pressure ranges (70/170kPa). Thermistors are also included to measure temperatures.

The transducers have outstanding long-term stability and reliability, and low thermal zero shift. Cable lengths of several kilometers are no problem and the frequency output signal is not affected by changing cable resistances (caused by splicing, changes of length, terminal contact resistances, etc.), nor by penetration of moisture into the electronic circuitry.

Key Features

- Accurate, long-term stability
- Small diameter
- Robust design and reliable
- Fit for manual or remote reading
- Integral thermistor
- Over-voltage surge arrestor protects against electrical damage

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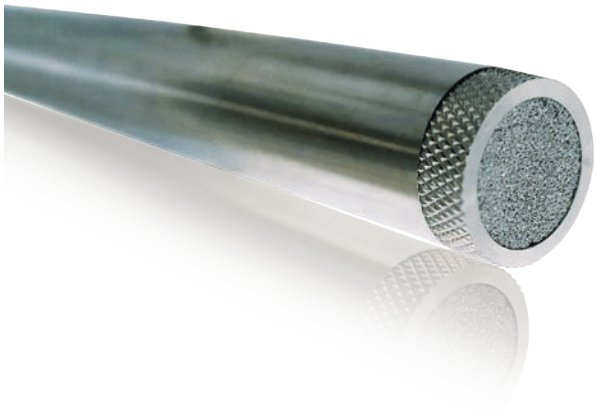
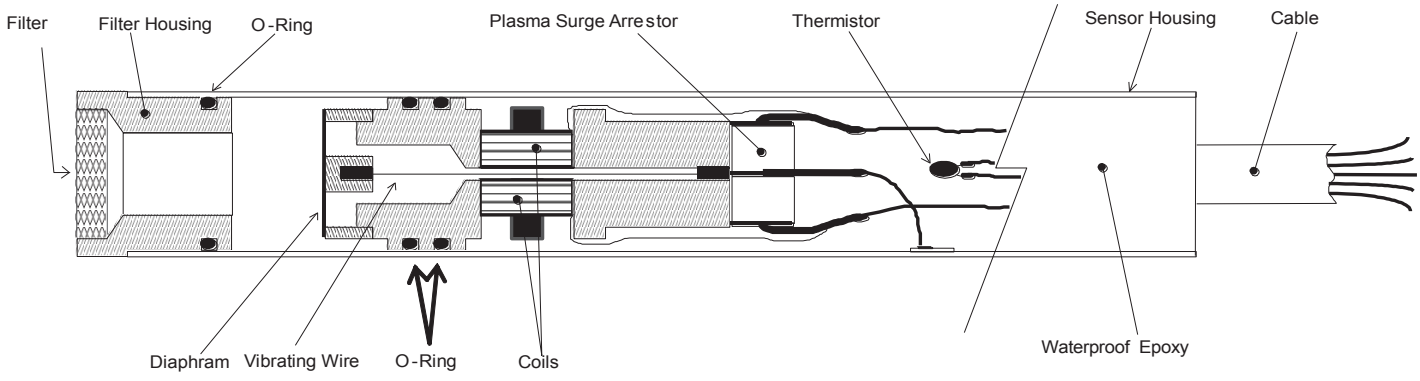
Main Specifications

Model	CGEO-WP-XX-SS-T	CGEO-WP-XX-SS-T	CGEO-WP-XX-HT-T
Range (MPa)	0.07/0.17	0.35/0.5/0.7/1.0 /2.0/3.0/5.0	0.35/0.5/0.7/1.0 /2.0/3.0/5.0
Resolution	0.025% F.S.		
Accuracy	±0.1% F.S.		
Temperature range	-20 to + 80°C		
Over-range capacity	150% F.S.		
Dimensions	Dia. 25mm	Dia. 19mm	Dia. 19mm



Operation

The Vibrating Wire Piezometer is designed for the accurate measurement of pore water pressures in fully or partially saturated soil. The transducer uses a pressure sensitive diaphragm with a vibrating wire element attached to it. The diaphragm is welded to a capsule which is evacuated and hermetically sealed. Fluid pressures acting upon the outer face of the diaphragm cause deflections of the diaphragm and changes in tension and frequency of the vibrating wire. A cable connects the transducer to a read-out, terminal unit or data logger.



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Applications

The Model CGEO-VN Vibrating Wire V-Notch Weir Monitor 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.

Vibrating Wire V-Notch Weir Monitor is used predominately in dams, open channels such as streams and in tunnels. The system comprises a Stainless Steel plate with a notch profile chosen to suit predicted flow rates.

Description

The main component is a cylindrical weight suspended from the force transducer. The cylinder hangs partially submerged in the water whose level is to be monitored. As the water level changes the changing buoyancy force on the cylinder acts directly on the vibrating wire transducer and alters its tension and hence its resonant frequency.

Flow of water over the weir head can be measured optically with a manual steel scale, or by using a Vibrating Wire transducer.

Readings can be taken manually with a Vibrating Wire readout or remotely by means of a data acquisition system.

Key Features

- Accurate and sensitive water level monitoring
- Rectangular or triangular notched plate
- Robust design and reliable
- Fit for manual or remote reading
- Integral thermistor

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Main Specifications

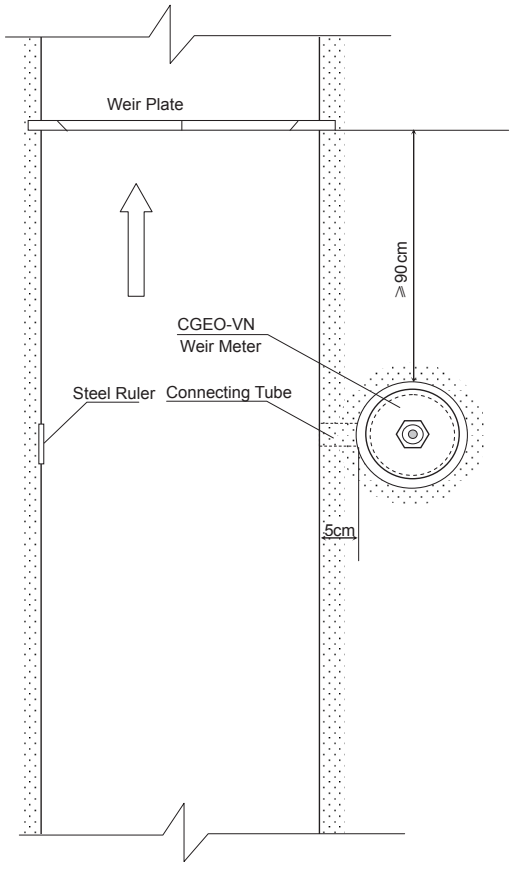
Model	CGEO-VN
Range	150, 300, 600mm
Resolution	0.025% F.S.
Accuracy	±0.1% F.S.
Temperature range	-20 to + 80°C

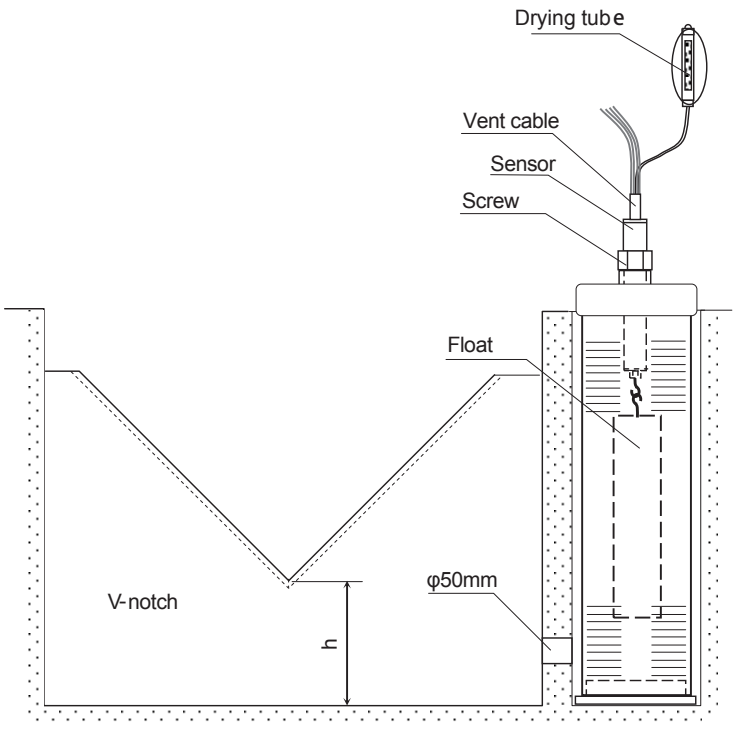
Operation

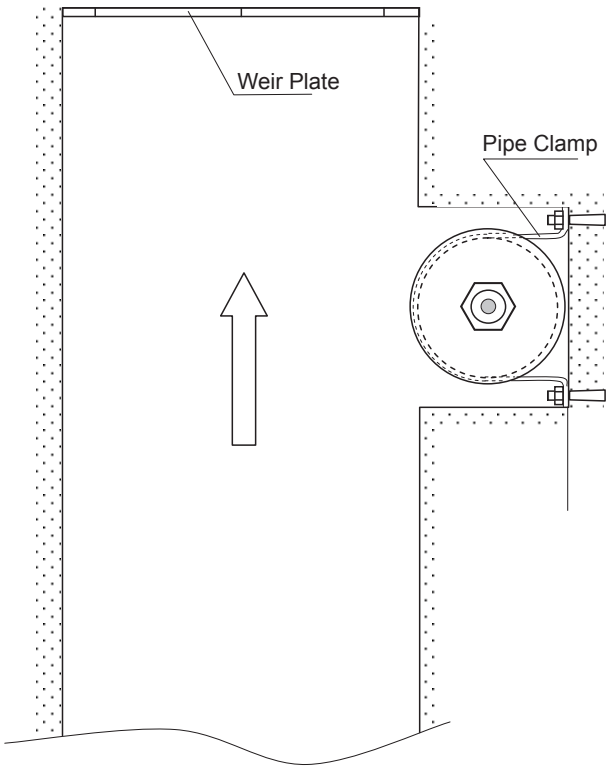
The measuring point for the head of water is located upstream of the weir plate and comprises either an optical Stainless Steel scale fixed to the basin wall for manual readings by eye, or a Vibrating Wire transducer suspended in the head of water.

The cylinder and force transducer of CGEO-W10 Vibrating Wire V-Notch Weir Monitor system are contained within a housing made from slotted PVC pipe. This pipe can be positioned within the weir or tank or it can be installed in a Stilling Well connected hydraulically to the tank or weir.

The vibrating wire transducer is vented to the atmosphere so that barometric fluctuations are compensated for automatically. The vent line terminates in a moisture trap which requires periodic maintenance to replace the desiccant.







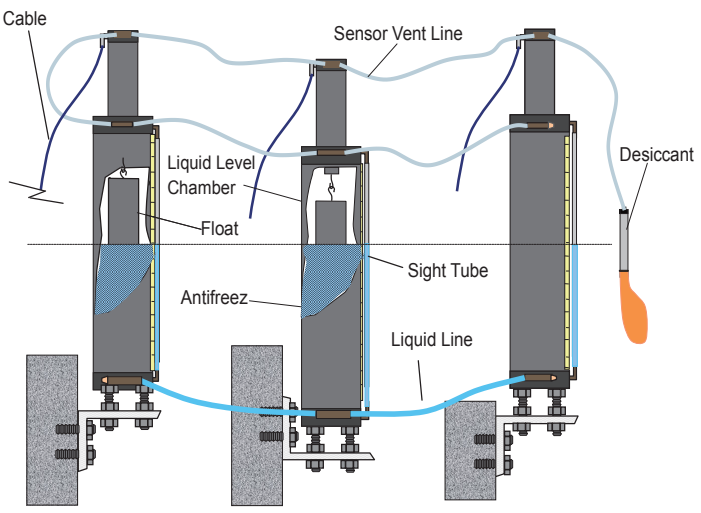
Settlement

Applications

The Model CGEO-LL1 Liquid Level 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 with observation vessels positioned at different locations at approximately the same elevation. It is suitable for settlement monitoring, including road/railway subgrades, bridges, tunnels, dams, foundation pits, building foundations.

Description

The CGEO-LL1 Liquid Level Sensor is based on Vibrating Wire Sensor which is particularly suitable for critical situations where high resolution is required. Settlements as small as 0.01 mm are detectable.



Key Features

- Accurate and precise measurements using Vibrating Wire sensors
- Very high resolution
- Robust design and reliable
- In-built temperature compensation

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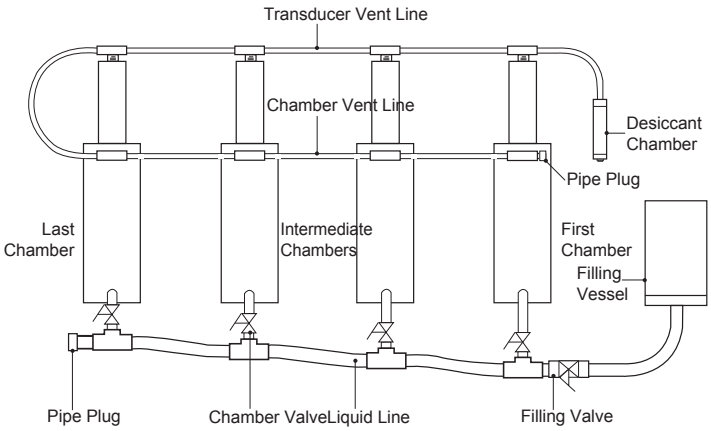
Main Specifications

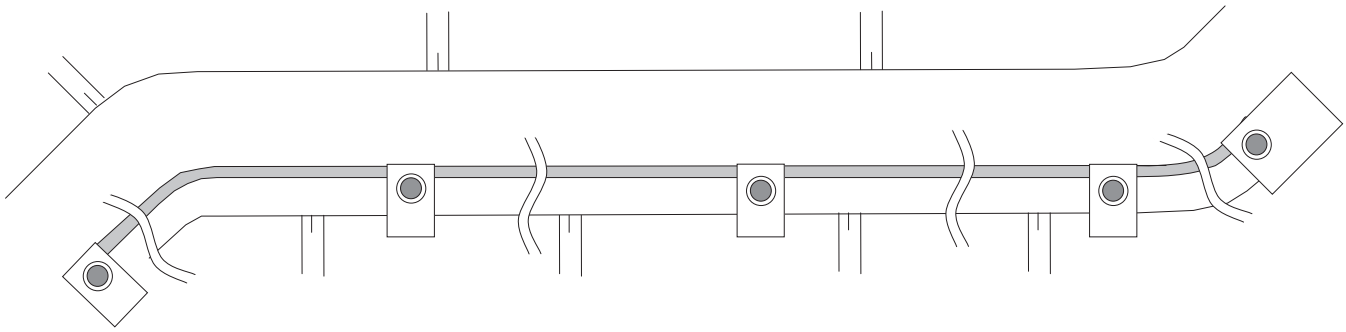
Model	CGEO-LL1				
Range	50mm	100mm	150mm	300mm	600mm
Resolution	0.025% F.S.				
Accuracy	±0.1% F.S.				
Temperature Range	-20 to + 80°C				

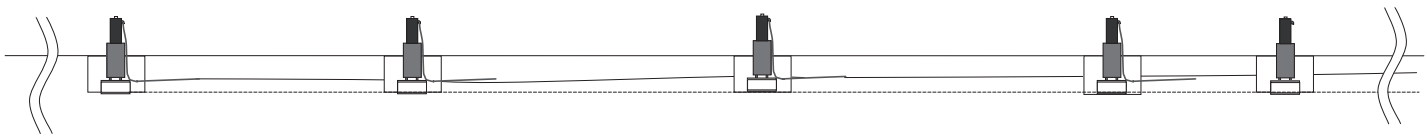
Operation

This system is particularly suitable for critical situations where high resolution is required.

A series of vessels are interconnected by a liquid-filled tube. One reference vessel is located on stable ground and the other vessels are located at the points of settlement. Each vessel contains a cylindrical weight suspended from a vibrating wire transducer. The common liquid level inside each vessel partially submerges the hanging weights; settlement of a vessel causes an apparent rise of the water level in that vessel leading to a greater buoyancy force on the weight and a reduction in the tension and frequency of the vibrating wire.







Applications

The Model CGEO-LL2 Liquid Level 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 with observation vessels positioned at different locations at approximately the same elevation. It is suitable for settlement monitoring, including road/railway subgrades, bridges, tunnels, dams, foundation pits and building foundations.

Description

The output of CGEO-LL2 Liquid Level Sensor is RS485 (MODBUS) digital signal, so each sensor is connected to each other by means of a four-wire bus cable.. The same cable (customer specified length) connects the uppermost sensor to the chosen readout (PC or datalogger, system, etc.)

Key Features

- Accurate and precise measurements using Magnetostrictive sensors
- Robust design and reliable
- In-built temperature compensation
- One single four-wire bus cable to connect each sensor to the dataloggers

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Main Specifications

Model	CGEO-LL2			
Range	100mm	200mm	300mm	500mm
Resolution	0.01% F.S.			
Accuracy	±0.1% F.S.			
Temperature range	-20 to + 60°C			
Dia.	112mm (sensor)			
Height	350mm	450mm	550mm	750mm

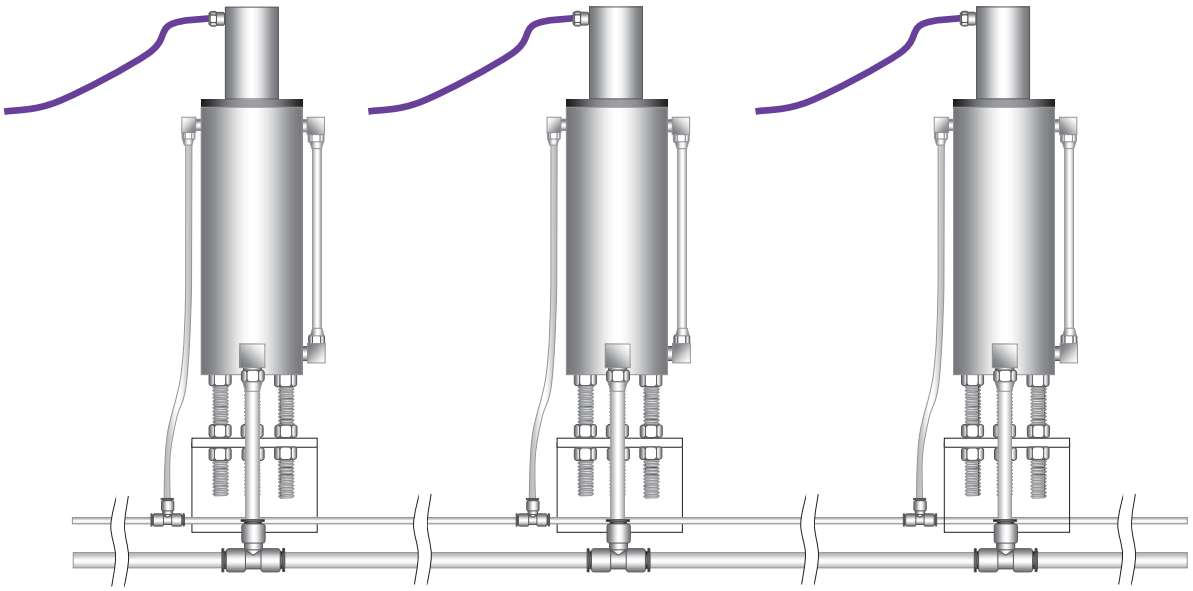
Operation

This system is particularly suitable for critical situations where need high resolution and big measuring range are required.

A series of vessels are interconnected by a liquid-filled tube. One reference vessel is located on reference point (such as stable ground) and the other vessels are located at the points of settlement. The settlement or elevation of monitored points is reflected by measuring the change of the liquid level of the points of settlement relative to the reference point.

The sensor has high sensitivity and good stability, and is not affected by changes in ambient temperature. The system uses a fully sealed internal pressure self-balancing system that is not affected by changes in atmospheric pressure. It is suitable for use in harsh environments with antifreeze.

The vent line and liquid line are all equipped with quick joints to facilitate the user to assemble and debug on site. The supporting mounting brackets allow the user to fix on the wall or the ground. The output of the system is RS485 (MODBUS) signal.



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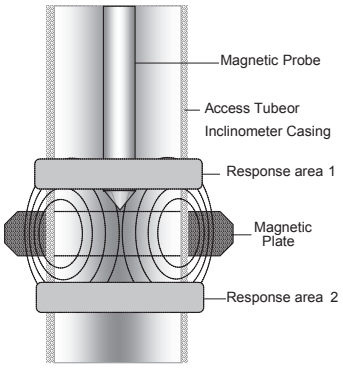
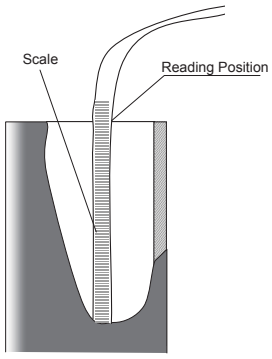
Extension





Applications

The Model CGEO-EX1 Magnetic Extensometer is designed for the measurement of settlement or heave of soils and rock within foundations and embankments, such as excavations, Dams, Embankments, sheet piles and slurry walls, foundations, tunnels, etc.

Description

The Magnetic Extensometer System mainly comprises a probe, a graduated tape on a reel and an access pipe along which magnetic targets are positioned at different depths along the length of a borehole or the height of an embankment or fill.

The probe, lowered down the access tube and detects the magnetic field of the settlement targets. The probe incorporates a precision reed switch which is closed by the presence of a magnetic field. Once the probe detects the position of the target magnet in the borehole, the audio indicator will sound and the visual indicator will be illuminated.

Key Features

- Simple, reliable and easy to operate
- Lightweight and easily portable
- One instrument reads at many locations
- Contoured tape for accurate readings
- Audible (buzzer) and visual (light) alert signals

Main Specifications

Model	CGEO-EX1
Range	30, 50, 100, 150, 200 m
Resolution	1mm
Repeatability	±1mm
Probe diameter	16mm
Working temperature	-10 to + 60°C
Consumption	0.05W
Power supply	6F22, 9V battery

Operation

The Magnetic Extensometer System is installed at locations where monitoring of settlement or heave is required. This System comprises a probe, a graduated tape on a reel and an access pipe along which magnetic targets are positioned at pre-determined intervals. The reed switches within the probe detect the magnets as it moves along the length access pipe.

When a magnet is detected, the switch circuit closes causing a light to display and a buzzer to sound at the reel.

There are various types of magnetic targets available; three-legged and six-legged spider magnets, retained by leaf springs for use in boreholes, and plate magnets for placing in soil or fill when adding further sections of access tube during construction.

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Applications

The Model CGEO-EX2 Vibrating Wire Soil Extensometer is designed to be installed to measure horizontal strain in earthfill or rockfill dams. Versions are also available for the measurement of strains in boreholes and RCC dams. A chain of successive displacement transducers and anchor beams may be employed to provide a continuous profile of movement.

The Soil Extensometer is designed to be installed in trenches, excavated in the surface of the fill of an embankment dam, to measure lateral deformation as the dam is constructed, and to monitor continued deformations during operation of the dam.

Description

The Vibrating Wire Soil Extensometer measures lateral deformation of soil and rock, particularly in embankment dams and quarry or mining excavations.

A chain of successive displacement transducers and anchor beams may be employed to provide a continuous profile of movement.

Key Features

- Accurate, long-term stability
- Long working life, long-term stability and reliability
- Suitable for manual or remote monitoring
- Waterproof
- Integral thermistor

Operation

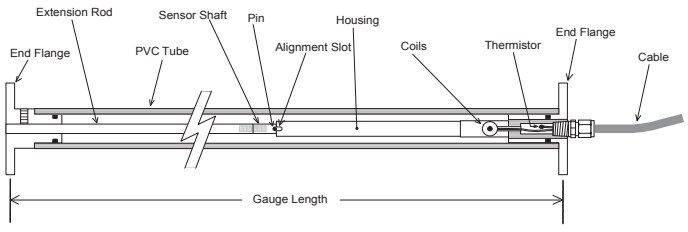
The Model CGEO-EX2 Vibrating Wire Soil Extensometer has flanges on either end which enable a series of extensometers to be bolted together forming long strings of sensors so that complete profiles of deformation can be monitored.

Each extensometer contains a Vibrating Wire Displacement Transducer which converts extensions between flanges into an electrical signal.

As lateral movement occurs, the distance between the VW transducer and the anchor is changed. This causes a change of frequency in the VW transducer; the change is measured and can be converted to give the displacement in millimetres.

Main Specifications

Model	CGEO-EX2
Range	12.5, 25, 50, 100, 150, 200mm
Resolution	0.025% F.S.
Accuracy	±0.1% F.S.
Temperature Range	-20 to + 80°C
Standard Gauge Length	1 meter



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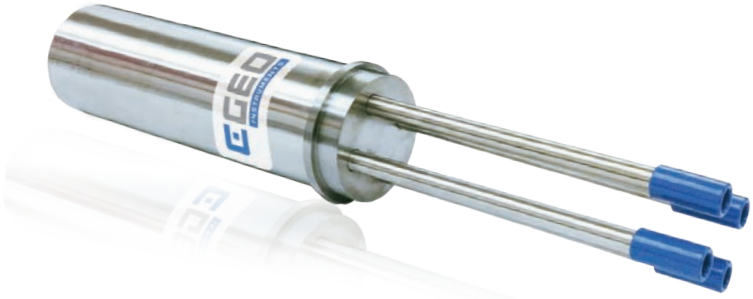

Applications

CGEO-EX3 Single/Multiple Point Rod Extensometer can be used to measure displacement or deformation in soil, rock and concrete structures. Typical applications include the measurement of ground movements around tunnels, deformation of dam abutments and foundations, ground movement behind retaining walls, sheet piling, slurry walls, etc.

Description

CGEO-EX3 rod extensometer can install in downward directed boreholes which are easily filled with cement grout. Up to six anchors can be installed at various depths in a 76mm diameter borehole to monitor the locate multiple failure plains and zones movement. Stainless steel transferring bar and fiberglass bar can be selected.

Key Features

- Accurate, long-term stability
- Long working life, long-term stability and reliability
- Suitable for manual or remote monitoring
- Waterproof
- Integral thermistor

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Main Specifications

Model	CGEO-EX3
Range	12.5, 25, 50, 100, 150, 200, 250, 300mm
Resolution	0.025% F.S.
Accuracy	±0.1% F.S.
Temperature Range	-20 to + 80℃
Rod	Fiberglass/ Stainless Steel
Max. Points	≤12

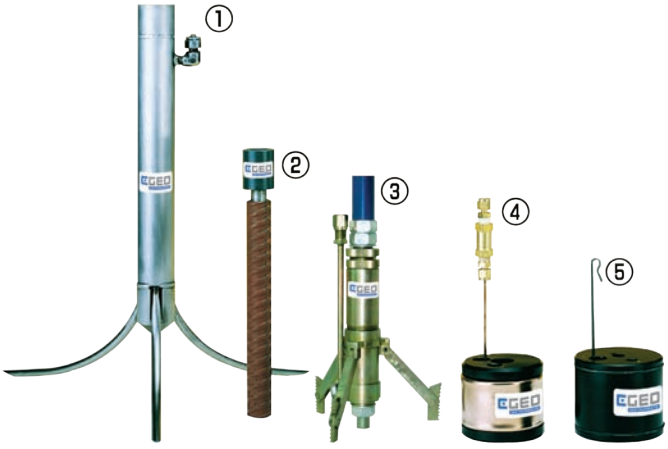
Operation

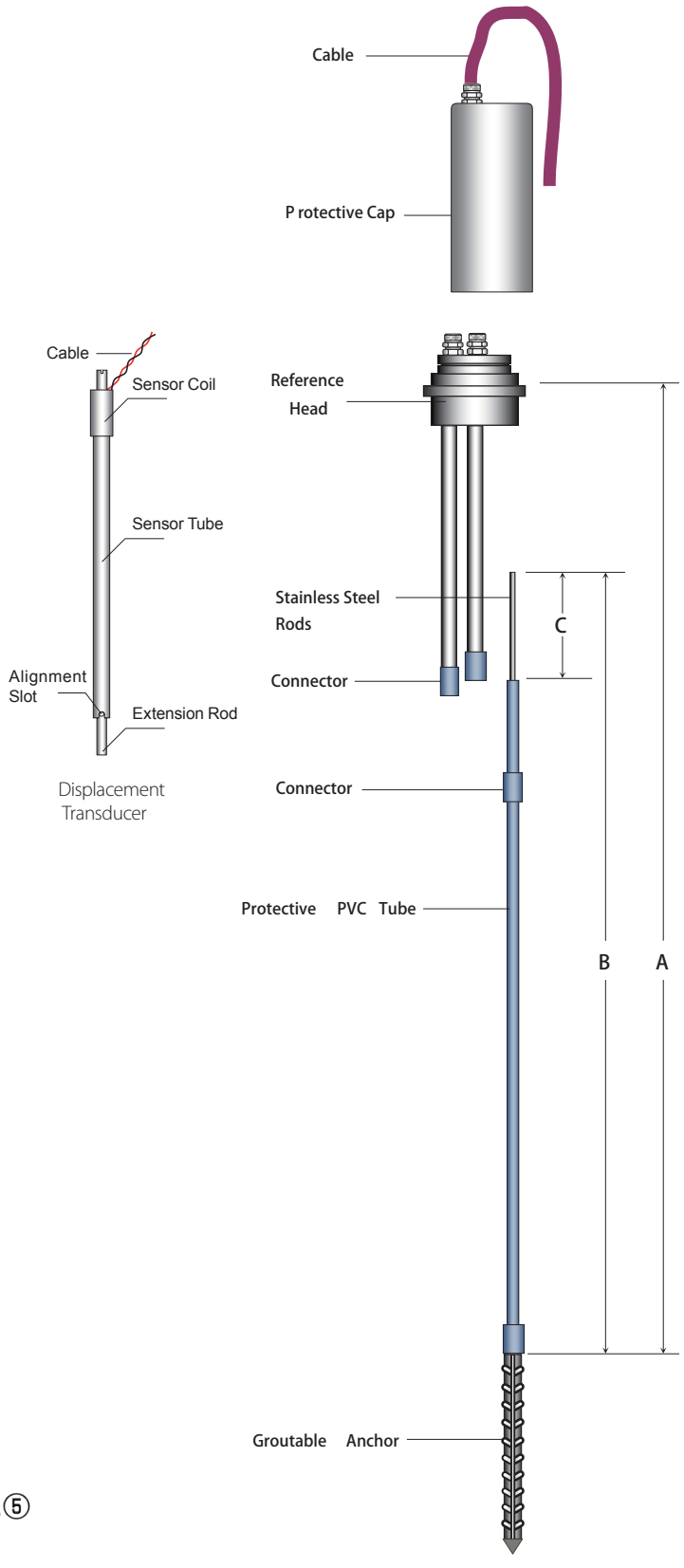
Together with the CGEO-EX3-6 Vibrating Wire Displacement Transducer, the CGEO-EX3 Single/Multiple Point Extensometers can realize remote monitoring with simple structure and easy installation.

The simple structure makes the instruments easy to install. The inner thermometer can also measure the temperature of the borehole. The VW Extensometer has high accuracy and sensitivity, outstanding water-proof capability, out of causticity, and long time stability.

The borehole rods are made from stainless steel or fiberglass, which are connected to the measurement sensors. The rods are protected from the plastic pipes to ensure their free travel.

Up to 12 rod extensometers of these rod / pipe / anchor combinations of differing lengths can be installed in one borehole. This not only enables the measurement of the magnitude of any movements but also the location of any failure planes and zones of movements.





Multiple Point Rod Extensometer

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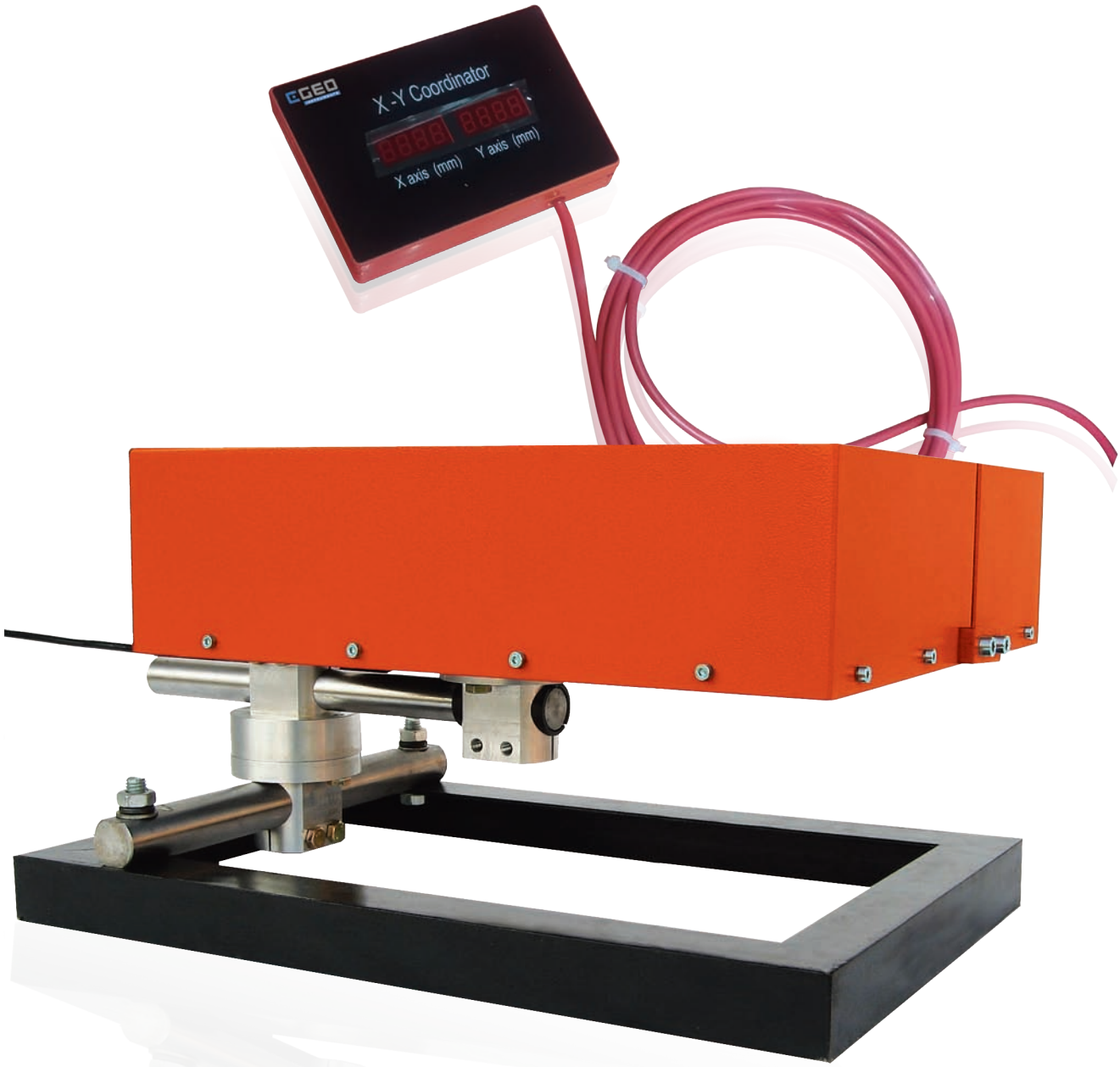
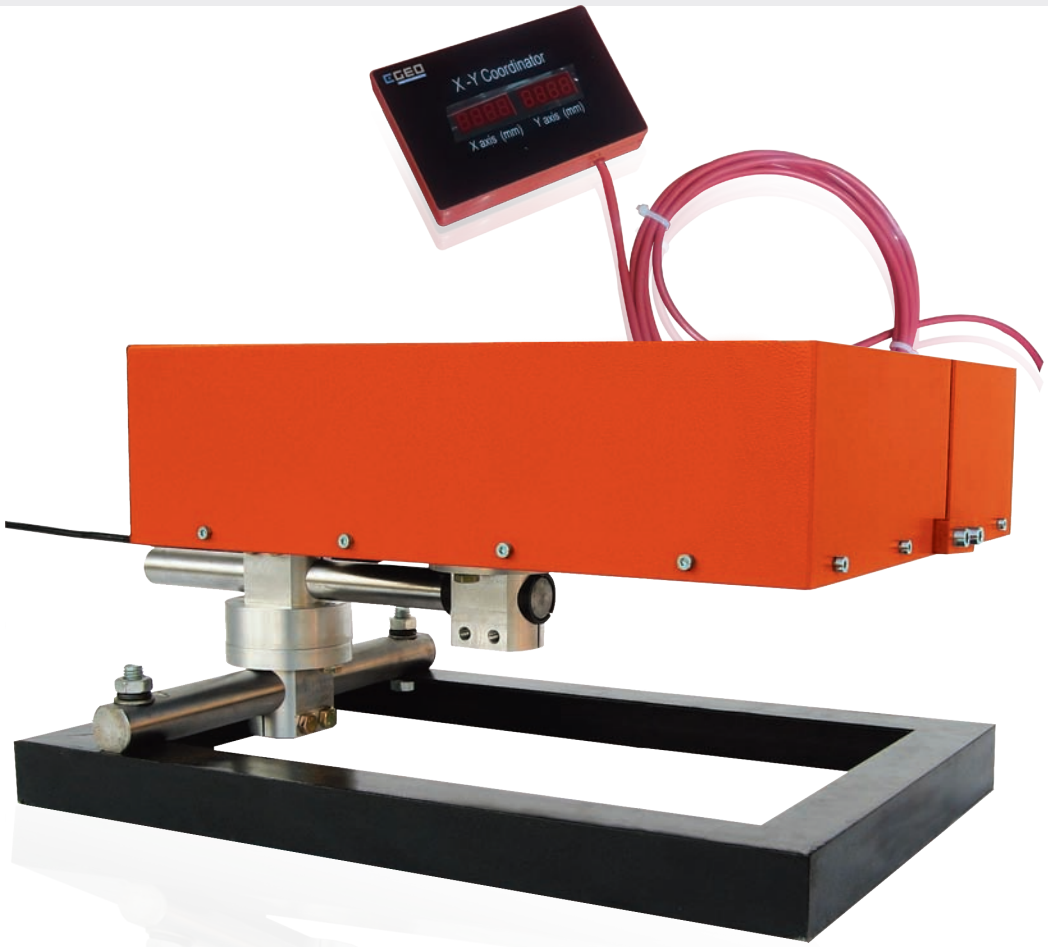
Inclination





Applications

CGEO-APR Automatic Pendulum Readout is designed to make accurate measurements of the horizontal/ vertical movements of dams and dam foundations, abutments, bridges and piers, towers, nuclear power stations, tall buildings, etc.

Description

The model CGEO-APR Automatic Pendulum Readout consists the functions of program-driving, signal-disposal, data-logging, communication, etc., which makes the system real non-contact planar measurement.

The model CGEO-APR Automatic Pendulum Readout has a high accuracy, non-excursion, high stability, easy installation and profound moisture-proof capability.

A LED display makes the user get the X/Y/Z readout from the system.
The output of the system is 4~20mA /RS 485.

Key Features

- Robust design and reliable
- Manual or automatic readouts available
- Simple to use
- Long-term reliability
- Can read X, Y and Z movement

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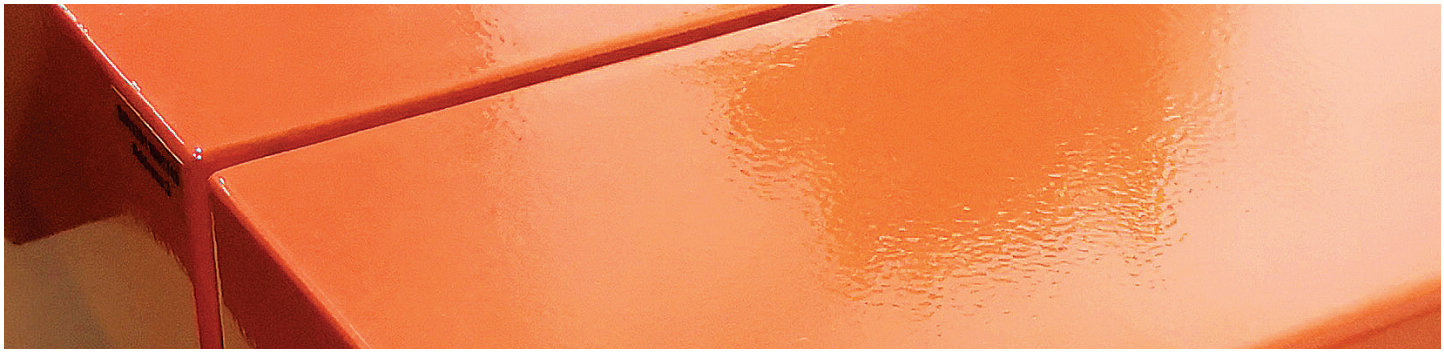
Main Specifications

Model	CGEO-APR-1	CGEO-APR-2	CGEO-APR-3
Range	(X,Y): 50×50mm	(X,Y): 50×100mm	(X,Y,Z): 50×100×50mm
Resolution	0.02% F.S.		
Accuracy	±0.1mm		
Display	LED		
Operating Temperature	-15 to + 60 °C		
Output	RS-485 /4~20mA		
Power Supply	AC85~265V, 50/60Hz		
L×W×H	380×330×145mm	425×375×220mm	425×375×220mm

Operation

The Pendulum Readout uses two high-resolution linear array CCDs (charge coupled device) as the basic sensors. Two collimated light sources at 90° to each other are directed onto two photo-sensitive CCD screens. The shadow of the pendulum wire falls on the CCD sensors and an automatically generated scan of the CCD pixel map records and digitally stores the coordinates of the shadow in the built-in computer.

This information is then converted to an analog signal that enables the position of the pendulum wire to be displayed locally in tenths of millimeter units on two LED panels mounted in the console.
The signal can also be transmitted via 4-20 mA output or RS-485 output to a remote readout site.



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Applications

CGEO-IPI series IPI systems are used to measure lateral movement in the ground or in a structure. They are useful for determining the depth, direction, magnitude, and also rate of movement and can be used to ascertain the stability of retaining walls by measuring bending and rotation. Inclinometer systems can also be used to detect movement in the downstream and upstream side of dams and to define shear zones in the foundations of concrete faced dams.

Typical applications include: detecting slopes and landslides, determining shear and slip zones, monitoring diaphragm or sheet pile walls, monitoring bending in piles, verifying design assumptions and finite element analysis, horizontal IPI systems to measure settlement and deformation of concrete slabs and tank bases.

Description

The Model CGEO-IPIA MEMS Vertical In-Place Inclinometers consist of a string of MEMS (Micro-Electro-Mechanical Systems) tilt sensors (uniaxial or biaxial) mounted on lengths of stainless steel tubing which are linked together by universal joints. The string of sensors is inserted inside a pipe, or a casing installed in a borehole in the ground, with the sensor cable(s) passing to the surface where they are connected to readout or dataloggers.

The Model CGEO-IPIB MEMS Horizontal In-Place Inclinometer consists of a string of MEMS tilt sensors (uniaxial) mounted on lengths of stainless steel tubing which are linked together by universal joints.

The Model CGEO-IPID Smart In-Place Inclinometer system(uniaxial or biaxial) is used to remotely monitor lateral displacement within a vertical borehole. The Smart IPI system comprises a data acquisition system, a Sensor Interface Module, one single cable can be connected with up to 40 Smart IPI nodes.

Key Features

- Accurate and precise measurements using MEMS sensors
- Robust design and reliable
- Fit for manual or remote reading
- Available in uniaxial and biaxial versions
- In-built temperature compensation

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Main Specifications

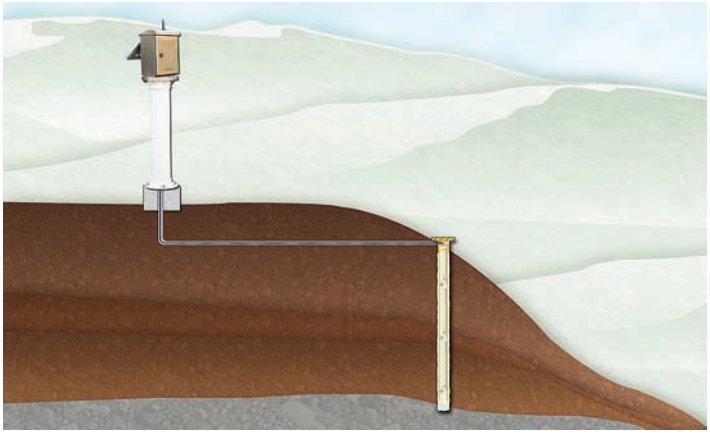
Model	CGEO-IPIA	CGEO-IPIB	CGEO-IPID
Range	±15°(Vertical)	±15°(Horizontal)	±15°(Vertical)
Resolution	<10 arc seconds		
Accuracy	±0.1% F.S.		
Operating Temperature	-20 to + 80℃		
Sensor Output	±4V@±15°		RS485
Input Voltage	12 VDC		
Minimum casing internal diameter	56mm		
Dimensions	Φ32mm x215mm		

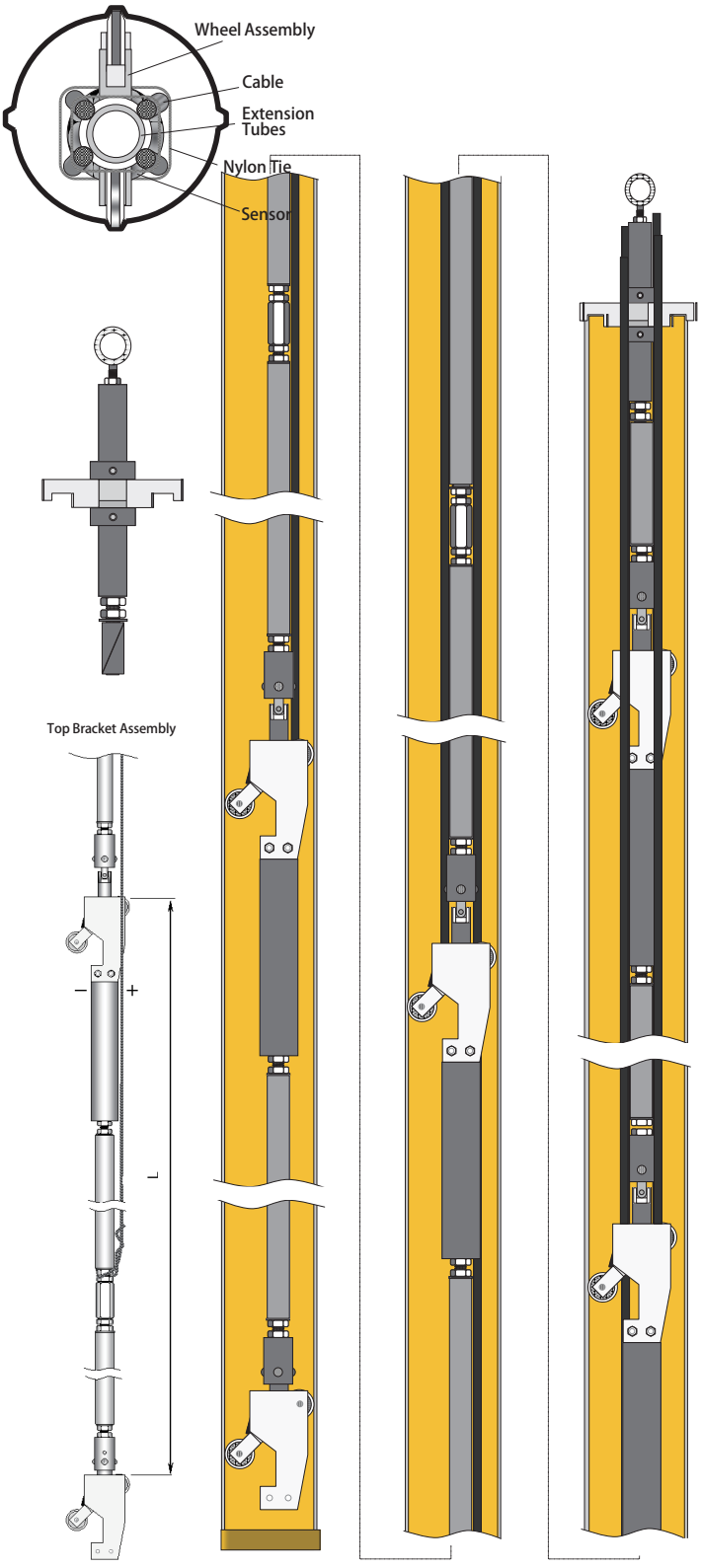
Operation

The tilt sensors are installed in inclinometer casing within a borehole, a sprung wheel assembly on the IPI engages into the keyways of the inclinometer casing to ensure alignment. Multiple IPIs are installed at varying depths and secured using gauge rods connected to the next and previous IPI.

The final gauge rod is secured at the top of the borehole using a top support assembly. Each IPI is connected to a datalogger which powers the sensors, initiates readings and retrieves the data.
Each tilt sensor also contains a thermistor to permit temperatures to be recorded.

The smart IPI sensors are connected to each other by means of a four-wire bus cable. Each sensor has a length of this cable exiting from the top and bottom of the sensor housing. The same cable (customer specified length) connects the uppermost sensor to the chosen readout (PC or datalogger, system, etc.).





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Main Specifications

- Material : AL alloy
- Outer Diameter : 142mm
- Inner Diameter : 62mm
- Height : 24mm
- Weight : 0.22kgs
- Thermal expansion coefficient : 17~19ppm℃

Key Features

- New material AL alloy
- light weight
- Robust
- Excellent thermal expansion coefficient properties
- Easy to install with devcon epoxy or screws.

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Applications

CGEO-TILT1/ TILTG Tiltsensors are designed to measure tilt in structures, including buildings, dams, embankments, slopes, retaining walls, open pits, etc.

Description

The Model CGEO-TILT1 MEMS Tiltsensor 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 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 designed to drive long cables without degradation.

The Model CGEO-TILTG Tiltsensor is also designed for attachment to structures, on either a vertical or horizontal surface to measure any tilting that may occur, but is packaged in a rugged steel enclosure with a mounting plate. TILTG is a small-range tiltsensor which offers high sensitivity and accuracy (Resolution to 0.2″), designed for precision measurement of the structure.

Key Features

- Accurate and precise measurements
- Robust design and reliable
- Fit for manual or remote reading
- Available in uniaxial and biaxial versions
- Inbuilt temperature compensation

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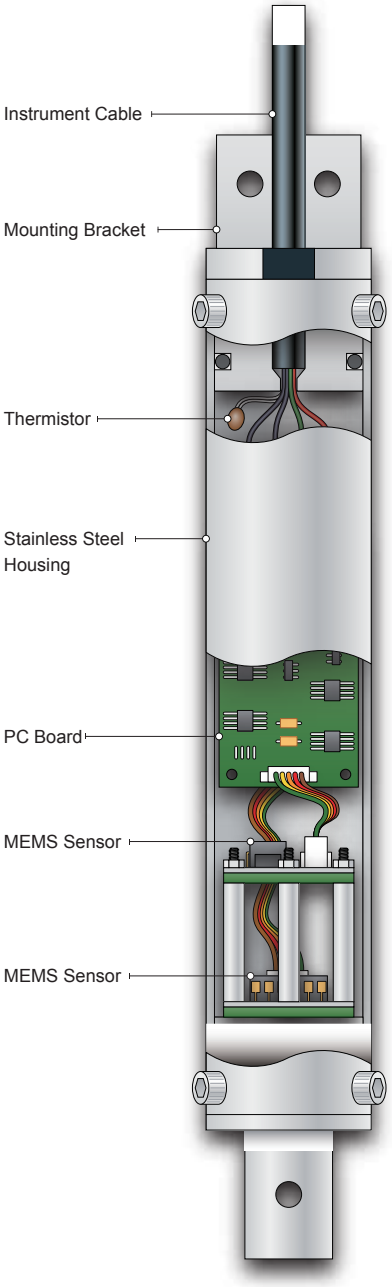
Main Specifications

Model	CGEO-TILT1		CGEO-TILTG
Range	±15° (Vertical)	±15° (Horizontal)	±0.25°/±0.5° (Vertical)
Resolution	<10 arc seconds		<0.5"(0.0001°)
Accuracy	±0.1% F.S.		<1" (0.0002°)
Operating Temperature	-20 to + 80°C		-20 to + 80°C
Sensor Output	±4V@±15°		0.25~4.75V
Input Voltage	12 VDC		12VDC, 15mA
Dimensions	Φ34mm x215mm		(L)70mm x (W)70mm x (H) 40mm

Operation

The Model CGEO-TILT1 MEMS Tiltsensor is designed for attachment to structures, once the location for the MEMS Tiltsensor has been established the position is marked out, ensuring that the sensor is correctly orientated towards the direction of movement. The marked locations are drilled to depth and the 8mm shell anchors supplied with the Tiltsensor are installed. Studding is screwed into the shell anchors, leaving a sufficient length to incorporate the bracket and the Tiltsensor. A spirit level is used to check that the Tiltsensor is level in both directions, and then the nuts are securely tightened before the Tiltsensor is finally wired into a datalogger.

CGEO-TILTG is a small-range tiltsensor with high-precision (Resolution is up to 0.2") which is itself placed in an adjustable mount. The sensor is fixed to the structure. Once installed, thumbwheels at one end allow the sensor to be adjusted to the zero position using a handheld readout.



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Applications

The Electrolevel Beam Sensor is designed to monitor differential settlements or heaves.

Typical monitoring applications include:

- Dams
- Tunneling
- Brick and stone buildings
- Heave and settlement due to adjacent construction activities
- Impounding and loading effects in the short or long term
- Pipelines
- Deep excavations
- Unstable slopes

Main Specifications

Model	CGEO-TILT-EB	CGEO-TILT-EBD
Type	MEMS	
Range	±10°	
Resolution	<10 arc seconds	
Accuracy	±0.1%F.S.	
Sensor output	Analogue version±4V@15V	R485 Digital version
Operating Temperature	-20 to +60℃	
Input Voltage	12V	
Beam Length	0.5, 1,2,3m	
Installation direction	Horizontally, Vertically	

Description

The Electrolevel Beam Sensor consists of a MEMS tiltmeter mounted on a rigid aluminium beam with a defined gauge length.

The sensor mounting incorporates an adjustment for zeroing and protects the sensor against thermal gradients.
The Electrolevel Beam Sensor can be also installed horizontally, vertically or inclined, in chains or in stand alone installations.

When multiple beams are placed end to end, a differential displacement profile of the structure from anchor point to anchor point can be derived.

Key Features

- Simple and fast installation, ideal for measuring tilt in structures
- Accurate and precise
- Digital and analogue version
- Multiple beams in a chain give a complete displacement profile
- Measures tilt along the whole length of a beam
- Measures vertical rotation

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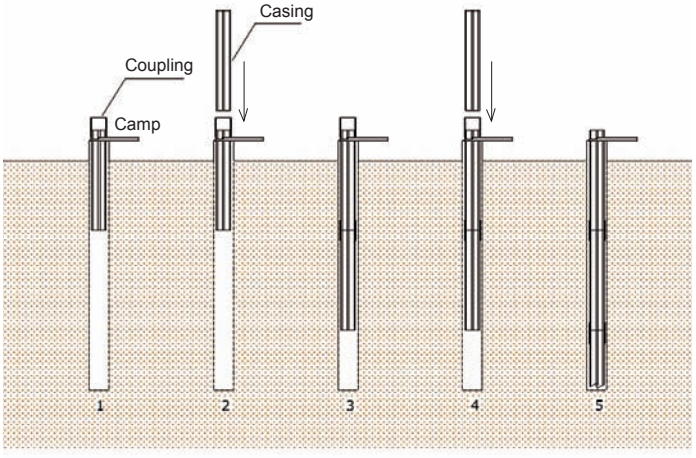
Applications

Inclinometer casing is used in boreholes, embedded in fill material, cast into concrete or attached to structures for the following typical applications:

- Monitoring lateral ground movement in land slide areas
- Measuring stability during site excavation
- Detecting the shear planes in earth fill dams
- Deflection of retaining walls and piles under heavy loads
- Measuring sub-soil movements in reclamation and sub-soil improvement Sites

Description

CGEO manufactured ABS inclinometer casing is a special grooved tubing, generally installed in a borehole, used along with digital inclinometer probe system to monitor lateral ground movement and measure Borehole verticality.



Key Features

- Deep, tight groove profile ensures accurate data
- Available in 70mm and 85mm outer diameters
- Manufactured from virgin ABS

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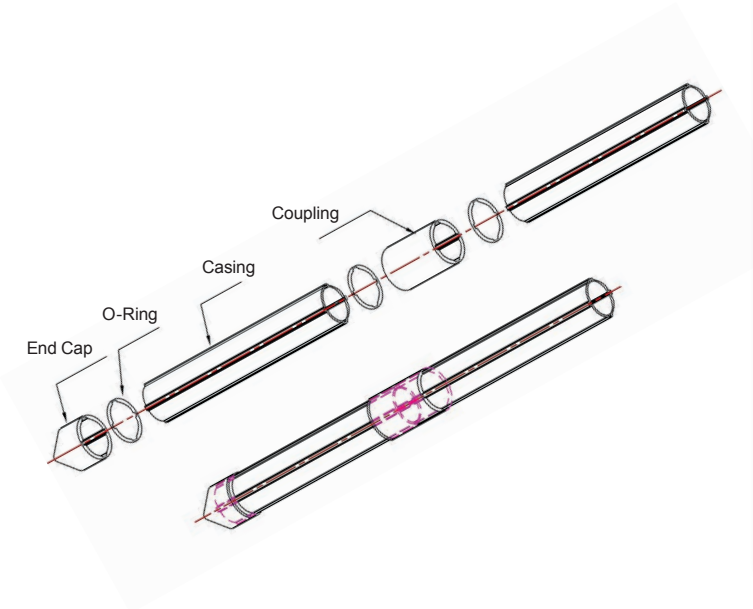
Main Specifications

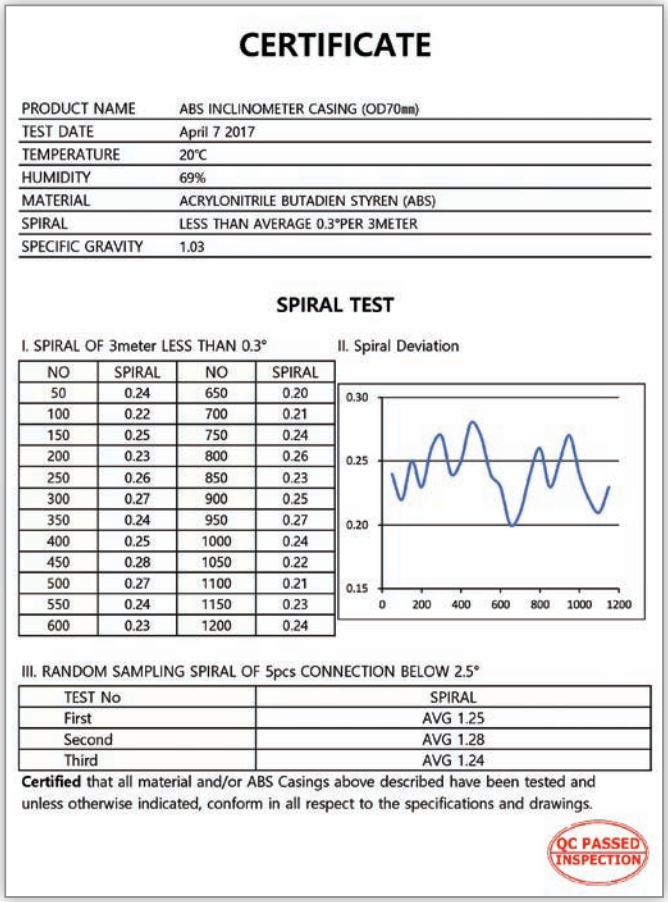
Type	CGEO-IC-60.1	CGEO-IC-70.1	CGEO-IC-85.1
Casing Specification	OD60mm	OD70mm	OD85mm
Material	ABS	ABS	ABS
Groove Spiral	< 0.3° / 3M	< 0.3° / 3M	< 0.3° / 3M
Collapse Rating	2040kPa	1960kPa	1770kPa
Bend Rating	3.15kN	3.07kN	2.65kN
Maximum Temperature	80°C	80°C	80°C
Tensile Strength	708kgF	705kgF	700kgF
Torque	538Nm	520Nm	481Nm
Length	3000mm (+1mm)	3000mm (+1mm)	3000mm (+1mm)
Outer Diameter	60mm	70mm	85mm
Inner Diameter	53mm	62mm	77mm
Length(STD/TLS) of Coupling	200mm	160mm / 400mm	200mm / 380mm
Outer Diameter of Coupling	67mm	75.5mm	91mm
Inner Diameter of Coupling	57.5mm	68mm	83mm

Operation

Inclinometer Casing can be installed in boreholes, embeded into fill material, cast it into concrete or attached to structures. The casing moves with the ground, material or structure and provides inclination over an extended period of time.

Inclinometer Casing is available in 70mm and 85mm outside diameters and is suitable for most construction and civil engineering projects.





CERTIFICATE

PRODUCT NAME	ABS INCLINOMETER CASING (OD70mm)
TEST DATE	April 7 2017
TEMPERATURE	20°C
HUMIDITY	69%
MATERIAL	ACRYLONITRILE BUTADIEN STYREN (ABS)
SPIRAL	LESS THAN AVERAGE 0.3°PER 3METER
SPECIFIC GRAVITY	1.03

SPIRAL TEST

I. SPIRAL OF 3meter LESS THAN 0.3°

NO	SPIRAL	NO	SPIRAL
50	0.24	650	0.20
100	0.22	700	0.21
150	0.25	750	0.24
200	0.23	800	0.26
250	0.26	850	0.23
300	0.27	900	0.25
350	0.24	950	0.27
400	0.25	1000	0.24
450	0.28	1050	0.22
500	0.27	1100	0.21
550	0.24	1150	0.23
600	0.23	1200	0.24

II. Spiral Deviation

III. RANDOM SAMPLING SPIRAL OF 5pcs CONNECTION BELOW 2.5°

TEST No	SPIRAL
First	AVG 1.25
Second	AVG 1.28
Third	AVG 1.24

Certified that all material and/or ABS Casings above described have been tested and unless otherwise indicated, conform in all respect to the specifications and drawings.

QC PASSED INSPECTION

CGEO INSTRUMENTS

International Manufacturer of Geotechnical & Structural Instruments

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Readouts


VIBRATING WIRE READOUT
CHARGE
SET
AUTO
POS
MEAS
TRANSDUCER
ON
OFF

CGEO-PR-VW Vibrating Wire Portable Readout

Applications

CGEO-PR-VW Vibrating Wire Portable Readout is used to read the vibrating wire transducers and built-in thermistor temperature sensors. Entirely airproof construction allows the readout box to work in atrocious environment.

Description

CGEO-PR-VW adopts deft aluminum metal crust with good quality, advantage lithium battery to recharge and also has an electrifiable interface. With the small volume and light weight the box is easy to take.

The big screen LCD has high apheliotropism, which can reveal the readers clearly even at night. The readout box can reveal the vibrating signal and temperature of all kinds of CGEO instruments directly, The stored data can be transferred to the computer and be input in the electric form and the data-base by the communication cables.

It can measure VW instruments which connected to CGEO-RO-TB Junction Box automatically and store data.

Key Features

- Portable and rugged
- Compatible with nearly all VW sensors
- Real time display of VW sensor readings in Hz/ Digital
- Display backlight
- Readings are accurate, repeatable

Main Specifications

Model	CGEO-PR-VW
Frequency Range	400Hz~6000Hz
Frequency Resolution	0.01Hz
Frequency Accuracy	0.05Hz
Time Accuracy	0.0025%
Temperature Measurement Range	-50 to +150℃
Temperature Measurement Resolution	0.01℃
Temperature Measurement Accuracy	0.1℃
Storage	2000 nos.
Communication Interface	RS232 / RS485
Working Temperature	-10 to + 50℃
Battery	7.2V/4Ah lithium battery
Dimension (L×W×H)	166×126×136mm
Weight	1.5kg

Comprehensive information about this product and our full range is available at www.cgeo-instruments.com

If you would prefer to speak with someone directly, please call +86-10-63799136 or email info@cgeo-instruments.com

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CGEO-PR-MEMS Portable Readout

Applications

The Model CGEO-PR-MEMS Portable Readout is designed to read CGEO Model IPI/TILT Series IPI MEMS sensors including Model IPID Smart IPI.

Description

The Model CGEO-PR-MEMS Portable Readout is a battery powered portable readout for reading the voltage output of CGEO Model IPI Series MEMS sensors.

Main Specifications

Model	CGEO-PR-MEMS
Voltage Range	±5V
Voltage Resolution	0.1mV
Frequency Accuracy	±0.05% F.S.
Temperature Measurement Range	-50 to +150℃
Temperature Measurement Resolution	0.01℃
Temperature Measurement Accuracy	0.1℃
Communication Interface	RS232 / RS485
Working Temperature	-10 to + 50℃
Battery	7.2V/4Ah lithium battery
Dimension (L×W×H)	170×128×142mm
Weight	1.5kg

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CGEO-PR-VW-LC Vibrating Wire Load Cell Readout

Applications

The model CGEO-PR-LC Vibrating Wire Load Cell Readout is used to read the vibrating wire load cells and built-in thermistor temperature sensors. Entirely airproof construction allows the readout box to work in atrocious environment.

Description

The model CGEO-PR-LC Readout can connect up to 6 vibrating wire sensors and 1 thermistor temperature sensor, which is especially suitable for data acquisition for load cell installation on site. The data can be read from the display directly and storage automatically.

The model CGEO-PR-LC Readout can preset the engineering units, so it can display not only the frequency, digital, average value, temperature but also the current load value.

Key Features

- Portable and rugged
- Real time display of VW Load Cell readings in Hz/ Digital/ KN
- Display backlight
- Readings are accurate, repeatable

Main Specifications

Frequency Range	400Hz~6000Hz
Frequency Resolution	0.01Hz
Frequency Accuracy	0.1Hz
Temperature Measurement Range	-20 to + 80℃
Temperature Measurement Resolution	0.01℃
Temperature Measurement Accuracy	0.2℃
Communication Interface	RS232 / RS485
Working Temperature	-10 to + 50℃
Battery	7.4V/4Ah lithium battery
Dimension (L×W×H)	276×227×98mm
Weight	1.5kg

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Applications

The Model CGEO-JB/TB Series Terminal Boxes are used for multiple instruments to be grouped in one convenient location, offering an easy and quick means of taking sensor readings, typical applications including Dams, cuttings, structural instrumentation, slope stability etc.

Description

The Model CGEO-JB Non-switching Terminal Box is suitable for rapid manual reading or centralized observation of multiple sensors in various environments by matching corresponding reading devices. It is used to take a reading of up to 20 nos. of Vibrating Wire instruments (including their integral thermistor) using one of VW Readouts.

The Model CGEO-TB Switching Terminal Box is suitable for rapid automatic reading of the sensors which connected. They are used to automatically take manual readings of multiple instruments using a single readout connection point and a rotary switch. There is a standard allowance of 24, 32, 48, 64 instruments.

Key Features

- deal solution for terminating multiple cables
- Easy and quick access for readings
- Waterproof and corrosion resistance
- Integral UPS power supply (option)

Main Specifications

Model	CGEO-JB	CGEO-TB	
Number of instruments	20	24, 32	40, 48, 56, 64
Power Supply	AC220V, UPS(optional)	AC220V, UPS(optional)	
Controlling	Manual	Manually or automatically	
Power Exhaustion	< 3W	< 3W	
Enclosure	IP65	IP65	
Enclosure Dimensions (L × W × H)	400×300×160mm	300×210×400mm	400×210×600mm

Operation

The Model CGEO-JB Non-switching Terminal Box makes it easy to manually connect a Readout (Model CGEO-PR-VW), to a multiplicity of vibrating wire sensors by means of color coded terminal posts, mounted below the rotary switches on the face panel of the Terminal Box, to which the flying leads (patch cord) of the readout can be clipped. The rotary switch is used to select which "channel" or sensor is being read by the Readout.

The Model CGEO-TB Switching Terminal Box is suitable for rapid automatic reading of the sensors which connected. They are used to automatically take manual readings of multiple instruments using a single readout connection point and a rotary switch. There is a standard allowance of 24, 32, 48, 64 instruments.

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Applications

CGEO-CM Signal Converter can resolve the data acquisition problems when the data collection system can not read the vibrating wire sensor output signal directly. It often occurs when the old monitoring system updating or there just exits several vibrating wire sensors in data acquisition system.

Description

CGEO-CM Signal converter can provide continuous incentive to vibrating wire sensor and convert the output signal frequency of vibrating wire sensor to 4-20mA. The converter outputs current signal, which is proportional to the pressure, strain and so on physical parameter from sensors.

Connect the vibrating wire sensor to the converter wiring terminal when using. Provide converter 12-16V DC power supply. Use PC-HyperTerminal software via RS232 serial interface to set the sensor parameters. Then the system can work properly.

Key Features

- Accurate, long-term stability
- Robust design and reliable
- Waterproofing can be customized

Main Specifications

Model	CGEO-CM
Input Sensor Type	Vibrating wire sensor
Output Signal Type	4-20mA
Frequency Range of Input Sensor	400~6000Hz
D / A Convert Resolution	16 digital
Resolution	0.01 Hz
Measuring Accuracy	0.1Hz
Maximum Output Error	< 0.2% F.S.
Sampling	10 seconds
Operating Temperature	-10 to + 60℃
Environmental Humidity	0-99%RH （incondensable）
Power Supply	VDC.12~16V, 50~80mA
Dimension (L×W×H)	156×84×68mm
Weight	400g

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Applications

The Dataloggers can monitor a wide variety of geotechnical datalogging applications. They are ideally suited for structural and geotechnical monitoring and are used extensively in harsh environments on projects around the world.

Typical applications include:

- Concrete curing
- Earthquake early detection
- Dams and bridges
- Land slide
- Mining exploration
- Pipelines monitoring
- Railways
- Rock falls
- Tunnels

Key Features

- Universal–compatible with majority of the commercially available sensors
- Programmable–customised software deployment for changing and challenging requirements
- High input Impedance–ensure accurate sensor readings
- Expandable–expandable to 300(DT80G)/960(DT85G) analogue inputs with expansion module
- Programmable analogue output – for connection to SCADA or control application
- Additional support for vibrating-wires
- Carlson, electro level & LVDT support
- Capable to test sensor integrity through audible frequency

Description

The datalogger is a bespoke, site specific logger with various modules and communication options, combined with a power supply, contained within a steel or reinforced ABS enclosure.

We configure all the datalogging equipment to suit your individual needs and our technical expertise ensures a tailored solution to read an extensive range of sensors, in a vast range of environments. The datalogging system mainly includes the dataTaker DT80G/D85G GeoLogger and CEM20 models. A wide variety of communication options are available for the datalogger, including:

- Direct link to PC or laptop
- Fibre optic link
- Extended RS485 link (up to 13Km)
- Satellite up link
- Cellular (GSM/GPRS) modem
- Telephone modem
- IP via GPRS modem, i.e. direct to internet
- Dedicated radio communication

Operation

The system can be setup to generate alarms remotely, via email or SMS, or locally using a siren and/or beacon if user defined parameters are exceeded.

The datalogger consumes minimal power from either a 12 VDC or mains power source. Power supply options are flexible depending on the site and can include mains, solar cell, and wind generation.

Increasing the channel capacity of the dataTaker DT80 range is made very easy by adding dataTaker Channel Expansion Modules (CEM20). Each CEM20 connects 20 universal data logging channels to the dataTaker data logger. A dataTaker CEM20 connects to one analogue channel of the dataTaker data logger. This effectively expands the total channel capacity of the DT80 to up to 100 sensors (with temperature compensation) or 300 analog inputsor and the DT85 to an incredible up to 320 sensors (with temperature compensation) or 960 inputs.

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Main Specifications

Model	DT85G	DT80G
Max Sampling rate (Hz)	40	40
Analog Inputs	48 (2-wire common reference)	15 (2-wire common reference)
	32 (2-wire isolated)	10 (2-wire isolated)
	16 (3 and 4-wire isolated)	5 (3 and 4 wire isolated)
Analog Input Range	Voltage: ±30m,300m,3000m,50000mVDC	Voltage: ±30m,300m,3000m,50000mVDC
	Current: ±30mA	Current: ±30mA
	Resistance: 1MΩ	Resistance: 1MΩ
	Frequency: 450kHz	Frequency: 450kHz
Analog Voltage Accuracy:	±0.15 of Reading + (Full Scale Reading * 0.01%)	±0.15 of Reading + (Full Scale Reading * 0.01%)
Effective Resolution:	18 bits	18 bits
Analog Outputs	1	1
Analog Out Range	Voltage: 10m-10000mVDC	Voltage: 10m-10000mVDC
	Current: 0-24mA	Current: 0-24mA
Excitation	Analog Channel: selectable 2µA, 250µA or 2.5mA precision current source, 4.5V voltage source or switched external supply	Analog Channel: selectable 2µA, 250µA or 2.5mA precision current source, 4.5V voltage source or switched external supply
	Switchable 12V/5 regulated power output (max 300mA)	Switchable 12V/5 regulated power output (max 300mA)
Digital IO	8 bi-directional channels	8 bi-directional channels
Counter	Low speed counters: 8 counters shared with digital inputs	Low speed counters: 8 counters shared with digital inputs
	Dedicated counters: 4 high speed or 2 phase encoder	Dedicated counters: 4 high speed or 2 phase encoder
RS232/RS422/RS485 serial sensor port	1	1
RS232 host port	1	1
USB Port	1	1
Ethernet Port	1	1
Data Storage	128MB (upgradeable to 2GB)	128MB (upgradeable to 2GB)
Vibrating Wire supported	Yes	Yes
Protocols Supported	Modbus, FTP, HTTP, XML, SMTP, NTP and SDI-12	Modbus, FTP, HTTP, XML, SMTP, NTP and SDI-12
CEM20 Expansion Module supported	Yes	Yes
Power Requirements	10-30 VDC	10-30 VDC
Internal Battery	6Vdc 4 Ah Lead Acid	None
Real Time Clock Accuracy	± 1 min/year (0°C to 40°C)	± 1 min/year (0°C to 40°C)
	± 4 min/year (–40°C to 70°C)	± 4 min/year (–40°C to 70°C)
Dimensions(mm)	300x137x65	180x137x65
Weight	2.5kg	1.5kg
Temperature Range	–45°C to 70°C	–45°C to 70°C

Applications

Typical applications include:

- Bridges monitoring
- Dams monitoring
- Mining projects
- Metro/underground systems
- Pipelines monitoring
- Railway track monitoring
- Tunnels monitoring

Description

Logger.net is a powerful software tool that will improve the efficiency and effectiveness of your geotechnical or structural monitoring projects.

Readings can either be imported automatically from almost any data acquisition system, or alternatively uploaded manually to Logger.net from a variety of data sources.

The data is then calculated and displayed in user selectable engineering units, which can be compared to site specific thresholds. The user can receive over-threshold alerts via email.

Features

- Accessible from anywhere that has an internet connection
- Available 24 hours a day
- Allows the input of manual data
- Can send automated alarms on pre-set trigger levels
- Data can be protected using different user permission levels
- Fully configurable, to suit specific project requirements
- No limit to the number of sensors that can be processed

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Applications

Ackcio Beam is an end-to-end solution that automates the process of monitoring geotechnical and structural sensors in challenging environments like construction sites and mines.

The Ackcio Wireless Mesh network allows all Ackcio Nodes to talk to each other, thus allowing them to relay other Nodes' data to the gateway.

Key Features

- Plug and play style setup and easy to use system.
- Compatible with most geotechnical and structural sensors from all major instrument manufacturers.
- Battery life of over 10 years.
- Low-power, long-range wireless radios that provide a range of up to 15 km in each hop of the mesh network.
- On-gateway and cloud hosted data management software.
- Ability to integrate with third-party servers via FTP or Web APIs.

Up to	Up to	Up to
15km	**3km**	**4km**
in line-of-sight environments	in tunnels and underground settings	in cities and urban environments

Main Specifications

Type	Digital Nodes
Model	BEAM-DG
Power supply options	5V / 12V / 24V DC @ 100mA
External power supply:	7-36V DC
Protocols supported:	RS232 / RS485 / SDI-12
Operating temperature:	-40℃ to +80℃
Weight	0.7KG

Main Specifications

Type	Analogue Nodes	
Model	BEAM-AN-S1	BEAM-AN-S4
Power supply options	5V / 12V / 24V DC @ 100mA	
Voltage (DC)	Measurement range: ±10V Resolution: 0.0001V Accuracy: ±0.05% FS	
Current Loop	Measurement range: 0-20mA Resolution: 0.005mA Accuracy: ±0.05% FS	
Full Wheatstone Bridge	Resolution: 0.001mV/V Accuracy: 0.25% FS	
Thermistor	Measurement range: -50℃ to +100℃ Resolution: 0.1℃ Accuracy: 0.2℃	
Operating temperature:	-40℃ to +80℃	
Weight	0.7KG	1.7KG

Main Specifications

Type	Vibrating Wire Nodes	
Model	BEAM-VW-S1	BEAM-VW-S8
Vibrating Wire	Excitation wave: 8V Measurement range: 450 - 6000Hz Resolution: 0.001Hz Accuracy: ±0.033%FS	
Thermistor	Measurement range: -50℃ to +100℃ Resolution: 0.1℃ Accuracy: 0.2℃	
Operating temperature:	-40 ℃ to +80 ℃	
Weight	0.7KG	1.7KG

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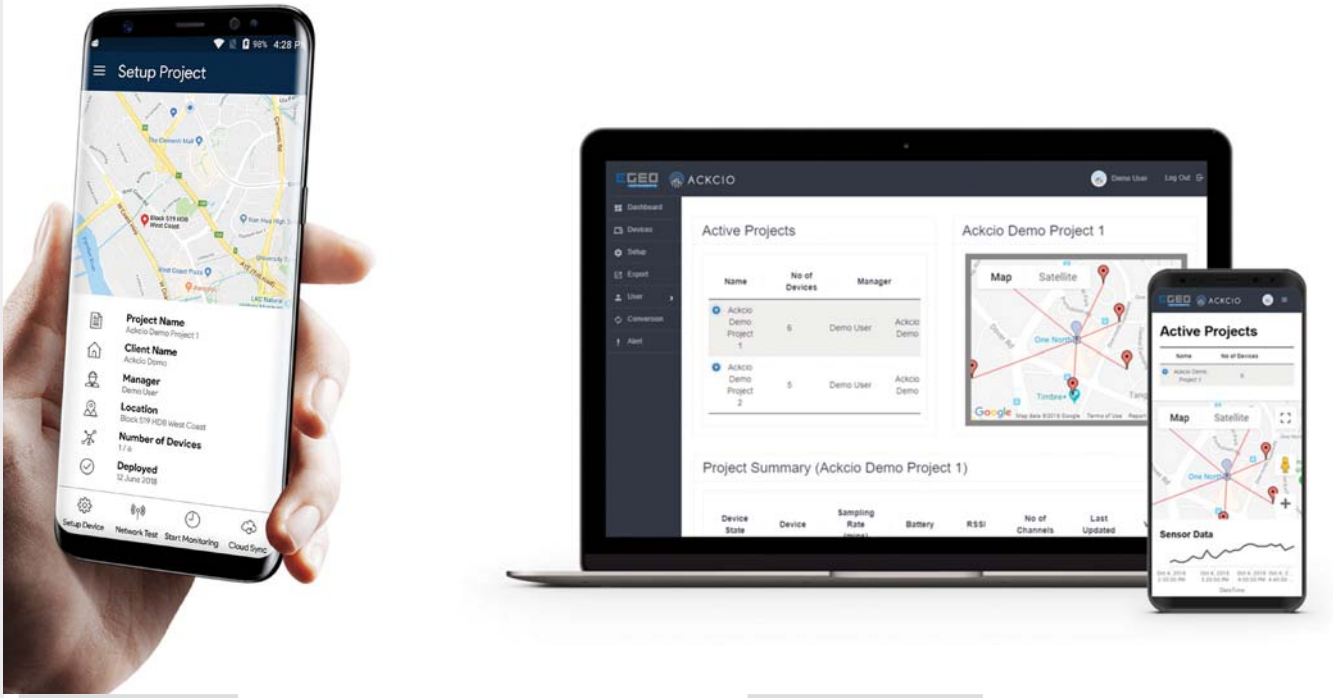
Main Specifications

Type	Relay Nodes
Model	RELAY NODE
Operation modes	Always ON / Duty Cycled
Operating temperature:	-40°C to +80°C
Weight	0.7KG

Main Specifications

Type	Gateway
Power supply	10-24V DC
Power consumption:	250mA Typical / 1.5A Peak
Internet connectivity	In-built 3G/4G modem, LAN
Internal disk storage	13 GB
Weight	1.6KG



Applications

Ackcio Software running on Ackcio Gateways and Ackcio or CGEO Cloud help you to both configure your deployments as well as to manage the sensor data collected by the system.

Description

Ackcio Software provides 24x7 access to all stakeholders of your projects for real-time decision making. Since you have real-time access to every single data point collected from your projects, you can take informed and timely decisions. This increases productivity, reduces delays, and increases safety.

Key Features

- Built on top of trusted Microsoft Azure infrastructure to ensure super-high reliability and availability.
- Automatic conversion of raw sensor data to engineering units like degrees, kN, etc.
- Automatic email alerts when readings exceed pre-set thresholds.
- Collect and visualize health metrics of the Gateways and Nodes.
- Automatic generation of data reports.
- Add any number of users and control their access levels.
- Change deployment settings like sensor sampling intervals and network parameters remotely.
- Web-based platform that works on any device.

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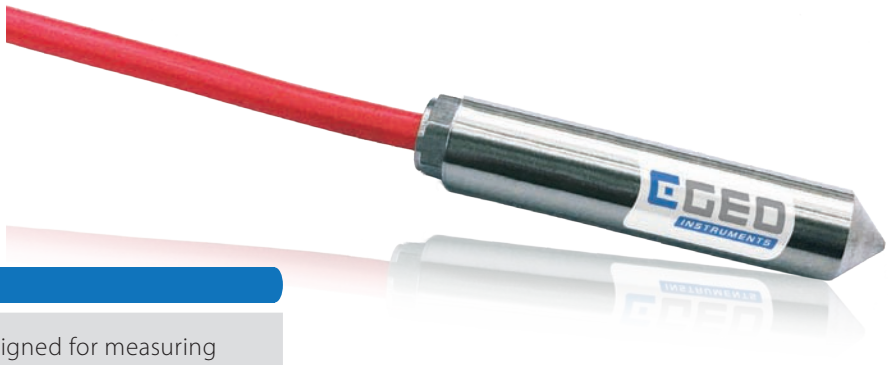

Applications

CGEO-TEM2 Temperature Sensor is designed for measuring temperatures.

Description

CGEO-TEM2 temperature sensor is based on the thermo-resistance and supplied inside a housing at the end of a cable ready to be attached to a structure, or buried in concrete or in the ground.

The temperature can be read directly by CGEO-RO-VW Readout.

Key Features

- Accurate and robust with good long-term stability
- Suitable for manual or remote reading and data logging
- Strong, screened and flexible cable

Operation

Thermistor Probes are particularly well suited for measuring the heat of hydration in concrete and RCC dams.

Thermistors have a negative temperature coefficient (NTC) where their resistance decreases with increasing temperature. The NTC can be as large as several percent per degree C, which allows the thermistor to detect minute changes in temperature. Thermistors are very small, which means they will respond quickly to temperature changes.
Thermistors have a non-linear output that can be represented by the Steinhart-Hart Equation.

Main Specifications

Model	CGEO-TEM2
Range	-30 to + 80℃
Resolution	0.1℃
Accuracy	±0.2℃, ±0.5℃ can be selected
Resistance	3KΩ@25℃
Yearly Stability	≤0.1%
Insulated Resistance	≥100MΩ
Voltage Resistance	1500V
Dimension	Φ12mm×60mm

Applications

The CGEO-TEM2-1.3 magnet temperature sensor is suitable for temperature measurement on ferrous surfaces. There is a magnetic ring on the bottom of the sensor, which can magnetically attract the sensor to the surface of the steel structure.

Description

Thermistors have a negative temperature coefficient (NTC) where their resistance decreases with increasing temperature. The NTC can be as large as several percent per degree C, which allows the thermistor to detect minute changes in temperature. Thermistors are very small, which means they will respond quickly to temperature changes.

Thermistors have a non-linear output that can be represented by the Steinhart-Hart Equation.

Main Specifications

Model	CGEO-TEM2-1.3
Sensor Type	YSI 44005
Standard Range	-30 ~ +70℃
Sensitivity	0.1℃
Accuracy	±0.2℃
Dimension	35mm dia. X 10mm thick
Cable	2 core screened cable Cable length can be customized
Enclosure	IP67

Key Features

- Accurate and robust with good long-term stability
- Suitable for manual or remote reading and data logging
- Strong, screened and flexible cable

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Cables

Applications

CGEO cables are designed to be matched with the appropriate instrument for a variety of geotechnical and hydrological applications.

Key Features

- Armoured cable resists high tensile loading
- Multicore cable is available from 2 to 50 cores
- Sheathing for waterproofing
- Shielded pairs protect against electrical noise

Description

CGEO cables are made from individual stranded copper conductors encased in an insulation material. Individual, insulated conductors are twisted into pairs, bundled inside a conductive Mylar-type shielding material and then covered by an outer jacket made from the most suitable material. In addition, cables may be water blocked, armored, or may contain steel or Kevlar® cables for additional strength. Cables with 2 to 50 conductors are available.

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