

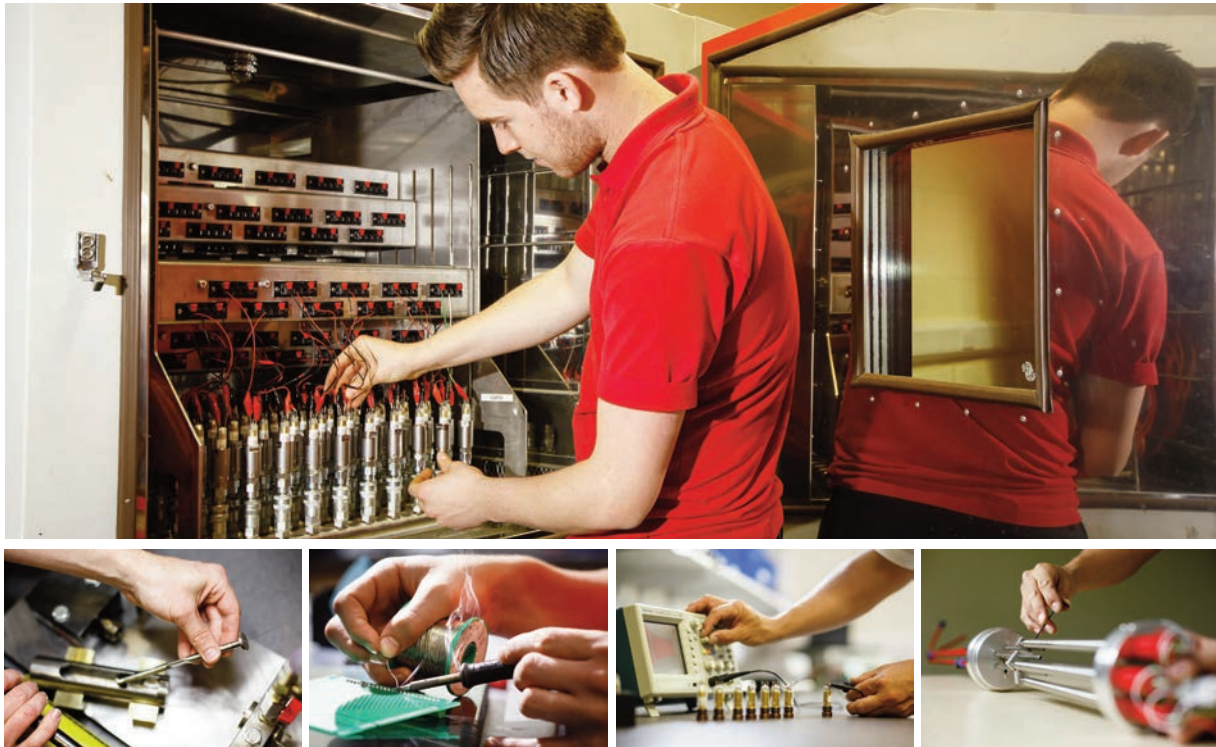


Geotechnical & Structural Instruments

- Inclinometers
- Tilt Sensors
- Piezometers
- Extensometers
- Joint Meters
- Crack Meters
- Settlement Monitors
- Load Cells
- Pressure Cells
- Strain Gauges
- Readouts
- Data Loggers
- Wireless Systems
- Software
- Temperature Sensors
- Flow Sensors
- Cables & Accessories
- Survey Accessories



Product Range Overview



Geosense Ltd is one of Europe's leading manufacturers and suppliers of instruments to the geotechnical, civil engineering, mining and environmental industries.

With a comprehensive in-house design and manufacturing capability we can provide products not only to tight deadlines but also to suit custom-engineered solutions for specific project requirements.

Geosense specialises in the manufacture of vibrating wire and MEMS sensors, which are used to produce a wide range of

instruments. In addition we manufacture automated data acquisition systems to complement our sensors and a range of inherently safe pneumatic pumps for use in the environmental sector.

All components are manufactured using CAD-CAM and CNC techniques and together with rigorous inspection under our ISO 9001 quality management system this ensures products are of the highest quality.

This brochure is designed as a quick, comprehensive overview of our key product ranges. Further information on the individual products is available on our datasheets which are easily accessible from our website at www.geosense.co.uk

| | |
|----------------------|--------------|
| Inclinometers | 7-10 |
| Tilt Sensors | 11-12 |
| Piezometers | 13-14 |
| Extensometers | 15-17 |
| Joint & Crack Meters | 18-19 |
| Settlement Monitors | 20 |
| Load Cells | 21 |
| Pressure Cells | 22 |
| Strain Gauges | 23-24 |
| Readouts | 25-26 |
| Data Loggers | 27-29 |
| Wireless | 30-32 |
| Software | 33 |
| Temperature Sensors | 34 |
| Flow Sensors | 35-36 |
| Cables & Accessories | 37-39 |
| Survey Accessories | 40 |
| Conversion Tables | 41 |
| Index -Products A-Z | 42 |

Portable Inclinometers



VERTICAL PORTABLE INCLINOMETER

mems

For the measurement of lateral displacement of soil, rock and structures.

Applications:

Used for monitoring: Direction of movement and shear-plane identification in natural and cut slopes Lateral displacement of dams &

embankments Deflection of bridge piers and abutments

Deflection of dam membranes, diaphragm and retaining walls

Stability of tunnels, shafts, underground workings and piled foundations

KEY FEATURES & SPECIFICATIONS

- ~ High accuracy
- ~ Fast stability of readings
- ~ MEMS technology
- ~ Wireless communication to readout
- ~ Lightweight
- ~ Rugged construction
- ~ On board calibration in probe
- ~ Probes and reels interchangeable
- ~ Only probe returned for calibration
- ~ Kevlar® reinforced cable with swaged cable marks

| | |
|-------------------|--------------------|
| Probe Diameter | 25.4mm |
| Probe Length | 710mm |
| Wheelbase | 0.5mm |
| Resolution | 0.005mm per 500mm |
| Range | ±30° from vertical |
| Temperature Range | -40°C to +70°C |
| Repeatability | ±0.002° |

Imperial system also available



INCLINED PORTABLE INCLINOMETER

mems

Used for monitoring lateral movements and deformations of soil, rock including retaining structures.

The Inclined Digital Inclinometer System is used to monitor manually lateral deformations within an inclined borehole or surface.

Applications:

Used for monitoring down stream face of concrete faced rock filled dams

KEY FEATURES & SPECIFICATIONS

- ~ High accuracy
- ~ Fast stability of readings
- ~ MEMS technology
- ~ Wireless communication to readout
- ~ Lightweight
- ~ Rugged construction
- ~ On board calibration in probe
- ~ Probes and reels interchangeable
- ~ Only probe returned for calibration
- ~ Kevlar® reinforced cable with swaged cable marks

| | |
|-------------------|-------------------|
| Probe Diameter | 25.4mm |
| Probe Length | 710mm |
| Wheelbase | 0.5mm |
| Resolution | 0.005mm per 500mm |
| Range | ±15° from 45° |
| Temperature Range | -40°C to +70°C |
| Repeatability | ±0.002° |

Imperial system also available



HORIZONTAL PORTABLE INCLINOMETER

mems

For monitoring settlement or heave under structures and observation of ground movement caused by construction excavation.

Applications:

Embankments

Dams

Roadways

Storage Tanks

Landfills

KEY FEATURES & SPECIFICATIONS

- ~ High accuracy
- ~ Fast stability of readings
- ~ MEMS technology
- ~ Wireless communication to readout
- ~ Lightweight
- ~ Rugged construction
- ~ On board calibration in probe
- ~ Probes and reels interchangeable
- ~ Only probe returned for calibration
- ~ Kevlar® reinforced cable with swaged cable marks

| | |
|-------------------|----------------------|
| Probe Diameter | 25.4mm |
| Probe Length | 710mm |
| Wheelbase | 0.5mm |
| Resolution | 0.005mm per 500mm |
| Range | ±30° from horizontal |
| Temperature Range | -40°C to +70°C |
| Repeatability | ±0.002° |

Imperial system also available

In-Place Inclinerometers



VERTICAL IN-PLACE INCLINOMETER

mems

Vertical In-place Inclinerometer Systems (IPI) are designed to measure lateral movement of soil and rock or deflection of man-made structures such as piles or retaining walls, when remote and continuous monitoring is required.

As they have a digital output they can be BUSSED so

that there is only one cable per borehole significantly reducing cost of installation and set-up.

Applications: Used for monitoring: Retaining/diaphragm walls; Dams ; Slope Stability; Tunnelling

KEY FEATURES & SPECIFICATIONS

- ~ Uni-axial and bi-axial options
- ~ MEMS sensors
- ~ In-built temperature compensation
- ~ Single cable digital BUS system
- ~ Stainless steel construction
- ~ IP68 (16 bar) rated
- ~ Removable
- ~ Variable gauge length
- ~ High accuracy and precision

| | |
|----------------|------------------------|
| Range | ±15° from vertical |
| Resolution | ±2 arc sec (±0.01mm/m) |
| Axis | Uniaxial and biaxial |
| Non-linearity | ±0.125% F.S. |
| Output | RS-485 Digital bus |
| Operating Temp | -40°C to +85°C |
| Casing sizes | 70-85 mm |



INCLINED IN-PLACE INCLINOMETER

mems

Inclined In-place inclinometers (IPI) are used primarily for monitoring the downstream concrete face of rock filled dams or other inclined applications.

They are installed within inclinometer casing, which is either placed in a borehole, concreted in or attached to a structure. They consist of a series of

wheeled sensors placed at various depths within the casing which are connected together with extension rods. Each sensor has specially designed connectors which allow them to move independently.

Applications: Used for monitoring: Dams; Slope Stability; Tunnelling

KEY FEATURES & SPECIFICATIONS

- ~ Uni-axial and bi-axial options
- ~ MEMS sensors
- ~ In-built temperature compensation
- ~ Single cable digital BUS system
- ~ Stainless steel construction
- ~ IP68 (16 bar) rated
- ~ Removable
- ~ Variable gauge length
- ~ High accuracy and precision

| | |
|----------------|------------------------|
| Range | ±15° from 45° |
| Resolution | ±2 arc sec (±0.01mm/m) |
| Axis | Uniaxial and biaxial |
| Non-linearity | ±0.125% F.S. |
| Output | RS-485 Digital bus |
| Operating Temp | -40°C to +85°C |
| Casing sizes | 70-85 mm |



HORIZONTAL IN-PLACE INCLINOMETER

mems

Horizontal In-place Inclinerometers (IPI) are designed to remotely monitor, and continuously measure, underground vertical movement as a result of construction and excavation and any settlement that may occur around tunnels, dams, embankments and landfills.

As movement occurs and the inclinometer casing

deforms, each sensor can be automatically monitored and can be read at a remote readout location.

Applications: Used for monitoring settlement or heave in: Embankments; Storage Tanks; Landfills & Tunnels

KEY FEATURES & SPECIFICATIONS

- ~ Uni-axial and bi-axial options
- ~ MEMS sensors
- ~ In-built temperature compensation
- ~ Single cable digital BUS system
- ~ Stainless steel construction
- ~ IP68 (16 bar) rated
- ~ Removable
- ~ Variable gauge length
- ~ High accuracy and precision

| | |
|----------------|------------------------|
| Range | ±15° from horizontal |
| Resolution | ±2 arc sec (±0.01mm/m) |
| Axis | Uniaxial and biaxial |
| Non-linearity | ±0.125% F.S. |
| Output | RS-485 Digital bus |
| Operating Temp | -40°C to +85°C |
| Casing sizes | 70-85 mm |

Inclinometer Casing & Accessories



INCINOMETER SPIRAL SENSOR

mems

The MEMS Inclinometer Spiral Probe is used to determine down-hole helical deformation of installed inclinometer casing.

It can be used with any RST vertical inclinometer system by using the same cable, reel, and hand-held readout. It is only necessary to read one data set;

no 180° second reading set is required. Inclinalysis™ Inclinometer Software processes the resulting spiral data set.

Application: Determining spiral deformation of inclinometer casing

KEY FEATURES & SPECIFICATIONS

- ~ 'Hot swap' capability with Digital Inclinometer System – simply connect the probe to the reel's connector and prepare for spiral readings on the spot
- ~ No additional software required
- ~ Inclinalysis™ Software used for RST's Digital Inclinometer System doubles as the method of processing spiral data
- ~ Compact and lightweight design ensures spiral surveys in all casing orientations

| | |
|----------------|--------------|
| Range | 360° |
| Weight | 1kg |
| Overall length | 570mm |
| Gauge length | 400mm |
| Accuracy | ± 0.25% F.S. |
| Resolution | 0.01° |



INCLINOMETER CASING QJ - QUICK JOINT

Geosense® QJ Inclinometer Casing is a quick connecting casing, precision extruded from ABS, with four precise keyways formed at 90 degrees which allow accurate installation of portable and in-place inclinometers.

The quick connecting joint makes it faster and easier

to install than traditional glue & socket casing with external couplers and does not require special tools or tapes. On deep installations time saved is significant.

Applications: Slopes & landslides; Embankments; Diaphragm walls; Sheet pile walls; Piles; Pre-loads; Deep excavations

KEY FEATURES & SPECIFICATIONS

- ~ Flush coupled with Quick Connect joints and O-ring seal
- ~ Rapid and easy installation
- ~ No need for glue, rivets and tape
- ~ Telescopic sections available
- ~ Fully compatible with all probe types
- ~ 70 and 83mm diameters
- ~ Available in 3 & 1.5 metre lengths
- ~ Colour: Orange

| | |
|-----------------------------------------|-----------------------|
| Material | ABS 100% virgin |
| Groove spiral | <0.3 °/3m |
| Tensile strength | 40 MPa |
| Coefficient of linear thermal expansion | 9 x 10-5 mm/mm °C |
| Flexural modulus @ 23° C | 20 Kg/cm ² |
| Collapse resistance | ~ 2000kPa |



INCLINOMETER CASING XC - EXTERNAL COUPLER

Geosense® XC (External Coupler) Inclinometer Casing is a precision extruded from ABS, with four precise keyways formed at 90 degrees which allow accurate installation of portable and in-place inclinometers.

Standard joints are made by using external couplers which are glued to each end of the casing.

Advantages of the XC Inclinometer casing is that it can be cut and re-joined on site allowing maximum flexibility and makes any damage easily repairable.

Applications: Slopes & landslides; Embankments; Diaphragm walls; Deep foundations; Tunnelling, Piles, Pre-loads; Deep excavations

KEY FEATURES & SPECIFICATIONS

- ~ Low spiral
- ~ Fast installation
- ~ Can be cut & repaired on site
- ~ Available in 3 & 1.5 metre lengths
- ~ Fully compatible with all probe types
- ~ 70 and 85mm diameters
- ~ Telescopic sections available
- ~ Colour: Natural

| | |
|-----------------------------------------|-----------------------|
| Material | ABS 100% virgin |
| Groove spiral | <0.3 °/3m |
| Tensile strength | 40 MPa |
| Coefficient of linear thermal expansion | 9 x 10-5 mm/mm °C |
| Flexural modulus @ 23° C | 20 Kg/cm ² |
| Collapse resistance | ~ 1800kPa |

Inclinometer Casing & Accessories



INCLINOMETER CASING ANCHORS

Inclinometer Casing Anchors are fixed to the bottom of the casing prior to installation to prevent uplift, usually due to buoyancy forces of water or grout. As soon as the anchor exits the bottom opening of the drill rod/borehole, the spring-loaded arms of the anchor are automatically extended to grip the borehole wall.

Anchors available for 70 and 85mm casing in both snap seal and glue and socket coupling styles. Grouting version of the anchor available. Magnetic targets can also be integrated.

ACCESSORIES

- General casing accessories include:
- ~ Repair couplings
 - ~ Caps
 - ~ Grout Caps
 - ~ Suspension Clamps
 - ~ Alignment Tool
 - ~ Anti-Flotation Tool



SLIP INDICATOR SYSTEM

The Geosense® Slip Indicator comprises a flexible pipe with base plate which is inserted into the base of a borehole and surrounded with sand. When a lateral differential movement of the soil occurs, the flexible tube will become deformed in the zone of movement. Indicator probes, attached to a length of

support rope, are used to determine the zone of movement.

Application: The Slip Indicator system is used to determine within a soil mass the location of a zone in which movement is occurring

KEY FEATURES & SPECIFICATIONS

- ~ Can be installed in 70mm boreholes or larger
- ~ Cost-effective way to measure movement in soils
- ~ Simple to install
- ~ No readout required
- ~ Probes can be made to suit individual requirements



PENDULUM SYSTEM

HPS-3500 (Hanging) and IPS-3000 (Inverted) Pendulums are used to measure the tilt or rotation by measuring the relative internal horizontal displacement of points along a true vertical line. Displacements relative to the wire are measured using an optical manual readout or, for remote

reading, the TP-2000 automatic readout is used.

Application: Concrete dams, bridges and high rise buildings

KEY FEATURES & SPECIFICATIONS

- ~ High accuracy and repeatability
- ~ Manual or automatic readouts available
- ~ Direct and inverted options available
- ~ Simple to use
- ~ Long-term reliability
- ~ Movements can be observed at frequent intervals
- ~ Proven technology
- ~ Can read X, Y and Z movement

| AVAILABLE ITEMS |
|----------------------------------------------|
| Direct pendulum c/w tensioning weight & tank |
| Inverted pendulum |
| Stainless steel wire for pendulums |
| Portable optical readout |
| Automatic readout |



PORTABLE TILT METER

mems

Portable Tilt Meters are used to measure tilt in either one or two axial planes perpendicular to the surface of the base plate. The analogue or digital signal is directly proportional to the sine of angle of tilt. They are used in conjunction with a permanent reference plate which is bolted or bonded to the

surface being monitored and the tilt sensor is demountable and moved from plate to plate to take readings.

Applications: Typically used where a large number of measuring points are to be observed.

KEY FEATURES & SPECIFICATIONS

- ~ MEMS technology
- ~ Uniaxial or biaxial sensors available
- ~ Horizontal or vertical applications
- ~ Readout units & portable sensor lightweight & easy to use
- ~ Datalogger compatible; High accuracy & repeatability
- ~ Outputs: 4-20mA, Volts, RS-485

| | |
|--------------------------|--------------------------------|
| Range | ±15° (other ranges on request) |
| Axis | Biaxial |
| Resolution (analogue) | ±5 arc sec. |
| Resolution (digital) | ±2 arc sec. |
| Non-linearity (analogue) | ±0.05% F.S. |
| Non-linearity (digital) | ±0.0125% F.S. |
| Repeatability (analogue) | ±0.025% F.S. |
| Repeatability (digital) | ±0.0125% F.S. |



IN-PLACE TILT METER

mems

In-Place Tilt Meters are designed to measure uniaxial or biaxial tilt, which is measured from the plane(s) perpendicular from the base unit. They are designed to be installed permanently in either the vertical or horizontal position by either bonding or bolting directly to a structure or

mounting plate. Data is read via a cable with either a portable readout or connected into a data logger.

Applications: Monitoring tilt of: Retaining walls; Diaphragm walls; Concrete dams; Party walls; Structures; Bridge piers; Tunnels; Compensation grouting; Slopes; Piles

KEY FEATURES & SPECIFICATIONS

- ~ MEMS technology
- ~ Ultimate accuracy and repeatability
- ~ Uniaxial or biaxial sensors option
- ~ LSHF cable option
- ~ Horizontal or vertical mounting
- ~ Easy to install
- ~ Outputs: 4-20mA, Volts, RS-485 (BUS)
- ~ IP66 enclosure
- ~ Durable powder coating
- ~ Data logger compatible

| | |
|--------------------------|--------------------------------|
| Range | ±15° (other ranges on request) |
| Axis | Uniaxial and biaxial |
| Resolution (analogue) | ±5 arc sec. |
| Resolution (digital) | ±2 arc sec. |
| Non-linearity (analogue) | ±0.05% F.S. |
| Non-linearity (digital) | ±0.0125% F.S. |
| Repeatability (analogue) | ±0.025% F.S. |
| Repeatability (digital) | ±0.0125% F.S. |



SUBMERSIBLE TILT METER

mems

The Submersible Tilt Meter provides precision real-time remote monitoring of tilt of submerged structures. It consists of a tilt sensor and electronics mounted inside a rugged waterproof enclosure. It can be mounted directly on horizontal, vertical or inclined surfaces. In all three situations, no precision

levelling of the instrument is required as the wide measurement range of the MEMS tilt sensor (+/-15°) allows for latitude in installation.

Applications: Monitoring of tilt in submerged structures

KEY FEATURES & SPECIFICATIONS

- ~ MEMS technology
- ~ Robust construction, suitable for long-term, high-pressure underwater situations
- ~ Can be mounted on inclined, vertical or horizontal surface
- ~ Outputs: 4-20mA, Volts, RS-485 (BUS)
- ~ High accuracy and repeatability
- ~ IP68 (16 bar) enclosure

| | |
|--------------------------|--------------------------------|
| Range | ±15° (other ranges on request) |
| Axis | Uniaxial and biaxial |
| Resolution (analogue) | ±5 arc sec. |
| Resolution (digital) | ±2 arc sec. |
| Non-linearity (analogue) | ±0.05% F.S. |
| Non-linearity (digital) | ±0.0125% F.S. |
| Repeatability (analogue) | ±0.025% F.S. |
| Repeatability (digital) | ±0.0125% F.S. |



TILT BEAM

mems

Tilt beams are designed for attachment to structures, on either a vertical or horizontal surface, for the measurement of tilt or differential settlement and can be coupled together in long strings to obtain profile measurements.

They consist of MEMS sensors mounted in a rigid,

aluminium beam which is mounted on anchor bolts set into the structure.

Applications: Retaining walls; Diaphragm walls; Concrete dams; Party walls; Structures; Bridge piers; Tunnels; Compensation grouting

KEY FEATURES & SPECIFICATIONS

- ~ Robust construction
- ~ Convenient to install and easy to use
- ~ Beams can be linked together to provide profile data over long distances
- ~ Outputs: 4-20mA, Volts, RS-485 (BUS)
- ~ Easily adaptable to datalogging
- ~ Integral temperature sensor
- ~ Length 1, 2, 3 m

| | |
|--------------------------|--------------------------------|
| Range | ±15° (other ranges on request) |
| Axis | Uniaxial and biaxial |
| Resolution (analogue) | ±5 arc sec. |
| Resolution (digital) | ±2 arc sec. |
| Non-linearity (analogue) | ±0.05% F.S. |
| Non-linearity (digital) | ±0.0125% F.S. |
| Repeatability (analogue) | ±0.025% F.S. |
| Repeatability (digital) | ±0.0125% F.S. |



TRACK MONITORING SYSTEM

A high accuracy instrument used to measure track geometry. It is ideally suited to monitor areas where instability has been identified and more detailed information is required as the system can be connected into an automated data acquisition system to monitor real data which can also be accessed remotely.

Applications: Track monitoring in construction zones; Railroad track monitoring in geologically unstable areas (prone to washout, landslide, etc)

KEY FEATURES & SPECIFICATIONS

- ~ High accuracy MEMS digital or analogue tilt sensors
- ~ Fully modular construction
- ~ Sensor profile can be designed for individual project
- ~ Meets LUL criteria for cant monitoring
- ~ Available for mounting on all sleeper types
- ~ Data can be viewed in 'real time' via GeoAxiom Vista visualisation software
- ~ Fully CE compliant for EMC to LUL standards

| | |
|--------------------------|--------------------------------|
| Range | ±15° (other ranges on request) |
| Axis | Uniaxial and biaxial |
| Resolution (analogue) | ±5 arc sec. |
| Resolution (digital) | ±2 arc sec. |
| Non-linearity (analogue) | ±0.05% F.S. |
| Non-linearity (digital) | ±0.0125% F.S. |
| Repeatability (analogue) | ±0.025% F.S. |
| Repeatability (digital) | ±0.0125% F.S. |



TUNNEL SEGMENT MONITORING SYSTEM

The system consists of a series of tilt meters, fixed to the tunnel wall on each of the precast concrete segments erected in place as tunnel lining by a Tunnel Boring Machine (TBM).

This Profile Monitoring System using tiltmeters is a simplified version of the Tunnel Profile Monitoring

System and its main advantage is that it can be deployed in the tight space available around the TBM.

Applications: Monitor convergence of precast concrete segments in TBM-driven tunnels during construction; monitor deformation in existing tunnels

KEY FEATURES & SPECIFICATIONS

- ~ Very low profile design, suitable for installation in the tight space available around TBMs
- ~ No tunnel traffic interference
- ~ High system accuracy
- ~ Tilt meters can easily be redeployed periodically to follow tunnel face progression
- ~ Built-in connectors for manual tape extensometer connection
- ~ Immune to the air density related problems inherent in optical systems

| | |
|---------------|---------------|
| Range | ±15° |
| Resolution | ±2 arc sec |
| Non-linearity | ±0.0125% F.S. |
| Repeatability | ±0.0125% F.S. |



VW PIEZOMETER VWP-3000 SERIES



The VWP-3000 Series of Vibrating Wire piezometers use the well-proven method of converting fluid pressures on a sensitive diaphragm into a frequency signal.

Frequency signals are particularly suitable for the demanding environment of Civil Engineering

applications, since the signals are capable of long transmission distances without degradation, tolerant of wet wiring conditions and resistant to external electrical noise.

Applications: Pore pressure measurement in soils and rocks; Fluid pressures in hydro-fracture and pump tests

KEY FEATURES & SPECIFICATIONS

- ~ Reliable long-term performance
- ~ Rugged, suitable for demanding environments
- ~ High accuracy
- ~ Insensitive to long cable lengths
- ~ Threaded adaptors to customer specifications available

| | |
|----------------|--------------------|
| Pressure Range | 345 to 6895kPa |
| Over-range | 2 x rated pressure |
| Resolution | 0.025% F.S. |
| Accuracy | ±0.1% F.S. |
| Non-linearity | <0.5% F.S. |
| Temp range | -20°C to +80°C |



MULTI-POINT VW PIEZOMETER



Allows multiple VW piezometers to be simply and reliably installed in a single borehole and be connected to a single cable. Used primarily where multi-zone monitoring is needed at single locations. No conductors are shared ensuring the independent reliability of each sensor reading.

Applications: Assessing performance and investigating stability of earth fill dams & embankments & slope stability; Monitoring of pressures behind retaining walls and diaphragm walls & pore pressures during fill or excavation; Pore pressure in land reclamation applications

KEY FEATURES & SPECIFICATIONS

- ~ No inter-zone leakage
- ~ Simple installation
- ~ Field proven reliability & accuracy
- ~ Will tolerate wet wiring common in geotechnical applications
- ~ Immune from external electrical noise
- ~ Signal transmission of several kilometers
- ~ Cable lengths can be changed without affecting the calibration

| | |
|----------------|--------------------|
| Pressure Range | 345 to 6895kPa |
| Over-range | 2 x rated pressure |
| Resolution | 0.025% F.S. |
| Accuracy | ±0.1% F.S. |
| Non-linearity | <0.5% F.S. |
| Temp range | -20°C to +80°C |



STRAIN GAUGE PIEZOMETER

The SGP- 3400 Series of strain gauge piezometers are designed for monitoring soil pore pressure or changes in water level.

They are accurate, highly reliable and suitable for use in harsh environments often found within civil engineering including water wells, boreholes, dams,

reservoirs, rivers, tanks or any other body of water.

Applications: Well monitoring; Groundwater & surface water monitoring; Dewatering; Percolation testing; Slug testing; Pore water pressure

KEY FEATURES & SPECIFICATIONS

- ~ Fast response
- ~ Suitable for dynamic measurements
- ~ High accuracy
- ~ Easy to read
- ~ Can be easily automated
- ~ Wide pressure range
- ~ Temperature compensation

| | |
|----------------|-------------------------|
| Pressure Range | 0 to 20 bar |
| Over Range | 1.5, 2 x rated pressure |
| Accuracy | <0.5% F.S. |
| Thermal Effect | <0.04% F.S./°C |
| Temp range | -20°C to +80°C |
| Output | 4 - 20 mA, 0 - 10 VDC |



STANDPIPE PIEZOMETER

A simple and economic measurement of groundwater pressures in soil and rock can be carried out using Casagrande type piezometers which are made up of low air entry porous plastic or ceramic elements connected to standpipe tubing and lowered into a predrilled borehole. Alternative types may be driven or pushed into soft soil.

Applications:

Monitoring of dams, reservoirs & embankments; Slope stability; Groundwater levels for dewatering & drainage; Groundwater sampling; Permeability testing; Contaminated soil monitoring

KEY FEATURES & SPECIFICATIONS

- ~ Economic
- ~ Simple to install
- ~ Simple to use
- ~ Variable filters
- ~ Variable Material

~ Can be used for artesian pressure

| | | |
|------------------------|----------------|-------------------------------|
| POROUS PLASTIC ELEMENT | Material | HDPE |
| | Mean Pore Size | 60 microns |
| | Permeability | $3 \times 10^{-4} \text{m/s}$ |
| CERAMIC ELEMENT | Porosity | 35% |
| | Material | Alumo Silicate |
| | Mean Pore Size | 60 microns |
| | Permeability | $3 \times 10^{-4} \text{m/s}$ |
| | Porosity | 45% |



PNEUMATIC PIEZOMETER

Pneumatic Piezometers are used to assess performance and investigating stability of earth fill dam embankments, in slope stability investigations, monitoring water levels in wells and standpipes and pressures behind retaining walls and diaphragm walls.

Applications: Assessing performance and investigating stability of earth fill dam embankments; Slope stability investigations; Monitoring water levels in wells and standpipes; Monitoring pressures behind retaining walls and diaphragm walls; Monitoring pressures during fill or excavation

KEY FEATURES & SPECIFICATIONS

- ~ Over 25 years of proven, long-term reliability and accuracy
- ~ Lowest displacement pneumatic piezometer available
- ~ Low cost
- ~ No internal metal parts. Flow or

- non-flow methods supported
- ~ Compatible with most brands of readouts
- ~ In-line filtered quick couplers
- ~ Remote readings via flexible direct burial tubing avoids construction obstacles

| | |
|---------------|---------------------------------------------|
| Sensitivity | 0.1% F.S. |
| Displacement | 0.002cc |
| Materials | Nylon 12 with EP diaphragm |
| Accuracy | $\pm 0.25\%$ F.S. |
| Range | 0-2000kPa/ 0-200psi |
| Repeatability | $\pm 0.35 \text{kPa} / \pm 0.05 \text{psi}$ |



WATER LEVEL METER

The Water Level Meter (with temperature option) is used to determine the water level and temperature within a borehole, piezometer pipe or sump.

It consists of a stainless steel shrouded probe with a specially designed conductive probe to minimise displacement errors, providing unparalleled accuracy particularly in small bore piezometers.

Applications: Determines water level (and temperature) within borehole, piezometer, pipe or sump

KEY FEATURES & SPECIFICATIONS

- ~ Slim-line 14 mm probe
- ~ High accuracy
- ~ Simple to use
- ~ Easy to clean
- ~ Robust construction
- ~ Compact design

| | |
|-------------------|-----------------------------------------|
| Probe Diameter | 14mm |
| Probe Length | 150mm |
| Tape Type | Steel mm markings |
| Tape Lengths | 30, 50, 100, 150, 200, 250, 300 metres* |
| Audible Indicator | 88 dB (A) buzzer |

* Special lengths available on request



MAGNETIC EXTENSOMETER GEO-XM

The GEO-XM settlement system is used typically to monitor settlement or heave in foundations, excavations and embankments.

Settlement is identified at the depth/position where the settlement has occurred and as well as measuring the total amount of settlement.

The system comprises a central access tube along which magnetic targets are positioned at various

locations. Settlement is measured by the relative position of the magnetic targets using a Reed Switch Probe lowered down through the central access casing.

Applications: Foundations; Excavations; Dams; Embankments; Sheet piles; Retaining walls; Slurry walls; Tunnels & shafts & reclamation

KEY FEATURES & SPECIFICATIONS

There are several variations to suit individual applications:

GXM-100 Central access tubing and spider magnets for use in boreholes

GXM-100P Central access tubing and settlement plates for use in fill

GXM-100T Central access tubing with telescopic joints for larger movement

GXM-200 Combined settlement/heave and inclination using inclinometer casing as the access tubing with spider magnets

GXM-200P Combined settlement/heave and inclination using inclinometer casing as the access tubing with settlement plates

GXM-200T Combined settlement/heave and inclination using inclinometer casing with telescopic joints for larger movement

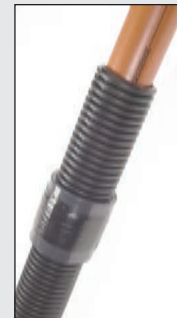
GXM-300 Central access tubing de-bonded by an outer corrugated pipe with magnetic targets

GXM-300i Combined settlement/heave and inclination using inclinometer casing as the access tubing de-bonded by an outer corrugated pipe with magnetic targets

| INCLINOMETER CASING | | |
|---------------------|-----------|-----------|
| Casing OD | 70mm | 85mm |
| Casing ID | 59mm | 73mm |
| Casing Length | 1.5 or 3m | 1.5 or 3m |
| Material | ABS | ABS |
| Groove Spiral | <0.3°/3m | <0.3°/3m |

| INCLINOMETER TELESCOPIC SECTION | | |
|---------------------------------|----------|----------|
| Coupling OD | 83mm | 90mm |
| Compressed Length | 508mm | 508mm |
| Extended Length | 660mm | 660mm |
| Range | 152mm | 152mm |
| Material | ABS | ABS |
| Groove Spiral | <0.3°/3m | <0.3°/3m |

| ACCESS TUBING TELESCOPIC SECTION | |
|----------------------------------|-------|
| Telescopic section OD | 42mm |
| Telescopic section ID | 35mm |
| Length | 500mm |
| Range | 200mm |
| Material | PVC |



| ACCESS TUBING | |
|---------------|-----------|
| Casing OD | 33mm |
| Casing ID | 25mm |
| Casing Length | 1.5 or 3m |
| Material | PVC |

| CORRUGATED PIPE | |
|-----------------|---------------|
| Pipe OD | 42, 80, 100mm |
| Pipe ID | 35, 71, 91mm |
| Length | 3 or 50m coil |
| Material | PP, PVC |

| ACCESSORIES | |
|-------------------|------------------------|
| Coupling | 42, 80, 100mm |
| Magnetic targets | 90, 117mm |
| Reed switch probe | 30, 50, 100, 150, 200m |



REED SWITCH PROBE

The reed switch probe is used to determine the location of magnetic sensors in magnetic settlement systems. When the reed switch passes through a magnetic field it closes, completing a circuit, and a buzzer is activated. The elevation of the magnet target is read directly from the tape.

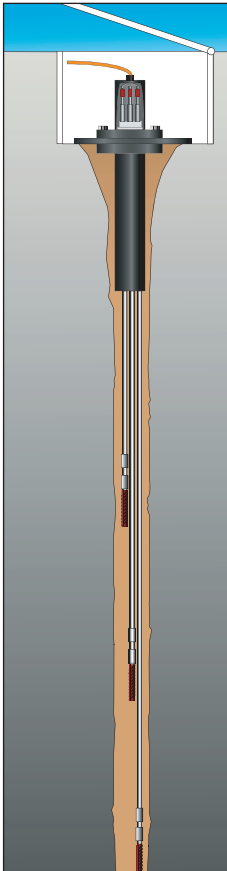
Applications: To measure location of magnetic targets; For use with magnetic extensometer systems

KEY FEATURES & SPECIFICATIONS

- ~ Slimline probe
- ~ High accuracy
- ~ Simple to use
- ~ Easy to clean
- ~ Robust construction
- ~ Compact design

| | |
|----------------|----------------------------|
| Probe Diameter | 14mm |
| Probe Length | 150mm |
| Probe Material | Austenitic Stainless Steel |
| Tape Type | Steel mm markings |
| Tape Width | 9.5mm |
| Tape Coating | Polyethylene |
| Tape Lengths | 30, 50, 100, 150, 200m |

* Special lengths available on request



ROD EXTENSOMETERS - GEO-XB™

The GEO-XB™ rod type extensometer range is used to measure and locate settlement, displacement and deformation in soil and rock.

It consists of a reference head and one or more in-hole anchors each of which is placed at a known depth and connected to the reference head by either a rigid or flexible rods running inside sleeves which keep the rods de-bonded from the grout.

As the soil or rock deforms the anchors' positions change and the relative movement can be measured in the reference head.

The magnitude, distribution, rate and acceleration of deformation can be accurately measured at the reference head.

The GEO-XB™ rod type extensometer range is

available in a wide range of reference heads, anchors, rods and measuring sensors.

Applications:

Deformation of dam abutments & foundations

Ground movement around tunnels & mines

Ground movement behind retaining walls & sheet piles

Fracturing in roofs of underground caverns

Deformation of concrete piles

Settlement & heave in soft soil excavations

KEY FEATURES & SPECIFICATIONS

- ~ Quick & easy to install, even in uphole applications
- ~ Easy access & adjustment to sensors
- ~ Mechanical & electrical combination possible
- ~ Integral grout holes in head make grouting easy
- ~ Accurate & reliable

| | |
|-------------------|-----------------|
| Standard Range | 0 to 300 mm |
| Resolution | 0.025% F.S. |
| Non-linearity | <0.5% |
| Borehole Diameter | 50 mm to 126 mm |
| Maximum Length | 100 m |



REFERENCE HEAD TYPES

- ~ Flanged
- ~ Flangeless

MEASUREMENT OPTIONS

- ~ Mechanical - Reading is carried out using a dial indicator or depth micrometer
- ~ Electrical- Reading is carried out using an electrical sensor
- ~ Combination- Reading can be carried out both mechanically and electrically



SENSORS (DISPLACEMENT GAUGES)

- ~ Vibrating wire
- ~ Linear Potentiometer
- ~ Linear Variable Displacement Transducer (LVDT)
- ~ All of the above can be used in combination with a mechanical system

RODS

- ~ Rigid type - 6mm stainless steel M6 threaded flush coupled joints available in 1,2,3m lengths
- ~ Flexible type - 5mm GRP in lengths up to 400m



SLEEVES

- ~ Available in rigid PVC with flush threaded joints or flexible nylon with external couplers

ANCHORS

- ~ Groutable
- ~ Hydraulic
- ~ Packer
- ~ Snap Ring

| Description | Ranges |
|----------------------|---------------------------------|
| Manual | 0-150mm |
| Vibrating Wire | 25, 50, 75, 100, 150, 200mm |
| Linear Potentiometer | 10, 20, 30, 50, 100, 125, 150mm |
| LVDT | 25, 50, 75, 100, 150mm |

| VW Specification | |
|------------------|--------------------------|
| Excitation | Pluck or swept frequency |
| Thermistor | 3k Ohms at 25°C |
| Over-range | Range +20% |
| Resolution | 0.025% F.S. |
| Accuracy | <0.5% F.S. |
| Operating Range | -20°C to +50°C |
| Typical Range | 3000-1600Hz |





MEASURING ANCHORS

Measuring Anchors are a combination of a rock bolt and an extensometer and are used to determine the load exerted on rock bolts.

They consist of a hollow anchor body, the sectional area and material of which corresponds to that of the rock anchor being monitored.

Changes of length due to extension or compression between each anchor point can be measured using a mechanical dial gauge, VW or potentiometric transducer.

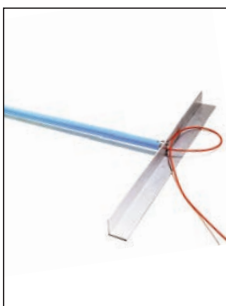
Applications: Tunnels; Mines; Dams; Bridges; Retaining walls; Rock formations; Foundations



KEY FEATURES & SPECIFICATIONS

- ~ Simple & robust construction
- ~ Replaces system anchor
- ~ No extra borehole required
- ~ Automatic data acquisition possible

| | |
|---------------------|----------------------|
| Lengths | 2, 3, 4, 6, 9 metres |
| Anchor points | 4 |
| Capacity | 250 kN |
| Range - manual | ±10mm |
| Range - VW | ±10mm |
| Resolution - manual | 0.01mm |
| Resolution - VW | 0.01mm |
| Accuracy (VW) | <0.5% F.S. |



VW SOIL EXTENSOMETER

The VW Soil Extensometer monitors lateral and longitudinal deformation of soil and different types of embankments and embankment dams.

It consists of a vibrating wire displacement sensor encased in a sealed body. The body contains a telescopic outer PVC pipe fitted with two flanges and an inner

stainless steel rod. One end of the rod is attached to the flange while the other is connected to a displacement sensor attached to the other flange. As deformation occurs, the telescopic pipe moves with the soil causing the rod to operate the displacement sensor.



KEY FEATURES & SPECIFICATIONS

- ~ Easy installation and maintenance
- ~ Suitable for remote reading and datalogging
- ~ VW displacement sensor assures long-term stability
- ~ Robust and accurate
- ~ Wide measuring range

| | |
|---------------|----------------------------------------|
| Gauge Length | 1m, with 0.5, 1, 2 & 3m extension kits |
| Sensor Range | 100, 150, 200, 300, 500mm |
| Accuracy | ±0.1% F.S. |
| Resolution | 0.025% F.S. |
| Non-Linearity | 0.5% F.S. |



TUNNEL PROFILE MONITOR

The system involves a series of linked rods, fixed to a tunnel wall to monitor deformation. A datalogging system and related software is available to provide near real time displacement and generate a graphical representation of tunnel performance.

Applications: Underground openings during construction for control and safety; Tunnel deformation due to nearby construction; Long-term deformation and performance of existing tunnels



KEY FEATURES & SPECIFICATIONS

- ~ Low profile design with multiple arms to fit close to tunnel wall
- ~ Does not interfere with tunnel traffic
- ~ High system accuracy of up to 0.02mm of deformation
- ~ Custom engineered to suit each individual application
- ~ Immune to air density problems inherent in optical systems
- ~ Direct measurement of displacement rather than calculation from tilt measurement

| SYSTEM COMPONENTS |
|-----------------------------------------------|
| Tilt/displacement sensor assembly |
| Extension tube |
| Electrical sensor to logger |
| Reference pin c/w tape extensometer connector |
| Datalogger system |

Joint & Crack Meters



VW CRACK METER

vibrating wire

VWCM-4000 crack meters are used to measure movement across surface cracks and joints in concrete, rock, soil and structures.

They consist of a sensor outer body tube and an inner free-sliding rod which is connected at the internal end to a vibrating wire sensor by a spring.

At the sensor end of the outer body and the external end of the rod anchors are attached which

Applications: Concrete structures; Stone & brick buildings; Dams; Tunnels; Construction joints; Pipelines; Rock formations can be fixed either side of a crack to be monitored

KEY FEATURES & SPECIFICATIONS

- ~ Simple to install and read
- ~ High resolution & accuracy
- ~ Internal thermistor
- ~ Insensitive to long cable runs
- ~ Datalogger compatible
- ~ Ranges from 5 to 500mm
- ~ Waterproof up to 16 bar
- ~ 3D version available

| | |
|-------------------|--------------------------------------------|
| Ranges | 5, 12.5, 25, 50, 100, 150, 200, 300, 500mm |
| Resolution | <0.025% F.S. |
| Accuracy | ±0.1 F.S. |
| Non-linearity | <0.5% F.S. |
| Frequency | 2200 - 3500 Hz |
| Waterproof rating | 16 bar |



VW 3D CRACK METER - VWTCM-4500

Geosense® VWTCM-4500 3D crack meters are used to measure three-way movement across surface cracks and joints in concrete, rock, soil and structures. They consist of a triaxial mounting frame into which three vibrating wire displacement gauges are mounted and connected to individual anchors via a

wireline which allows independent movement in all directions, irrespective of each other.

Applications: Concrete structures; Stone & brick buildings; Dams; Tunnels; Rock formations

KEY FEATURES & SPECIFICATIONS

- ~ Monitors X,Y, Z axes
- ~ Accurate and robust
- ~ Range up to 50mm
- ~ Internal thermistor
- ~ Waterproof to IP68 (18 bar)
- ~ Datalogger compatible

| | |
|-----------------|----------------|
| Range | 12.5, 25, 50mm |
| Resolution | <0.025% FS |
| Accuracy | ± 0.1% FS |
| Non-Linearity | <0.5% FS |
| Frequency Range | 1650 - 2700 Hz |



MANUAL 3D CRACK METER

vibrating wire

Developed to monitor joints of mass concrete structures, the instrument consists of two parts - a socket and the main body with a waterproof vibrating wire sensing gauge.

The socket is secured to the form and embedded into the block to be constructed. After removal of

the form, and prior to concreting of adjacent block, the gauge is screwed into the socket, set at the desired range and then embedded into concrete.

Application: Monitoring of joints of concrete arch, gravity and buttress dams; concrete-faced, rockfill dams; concrete retaining walls

KEY FEATURES & SPECIFICATIONS

- ~ Three way independent movement monitoring
- ~ Reads in X, Y and Z axes
- ~ Easy to install
- ~ Simple manual reading
- ~ Accurate and precise
- ~ Low maintenance
- ~ Long-term stability and reliability
- ~ VW option available

| | |
|-----------------|---------------------|
| Range | ±12, ±35, ±75mm |
| Block Material | Anodised Mild Steel |
| Anchor type | Groutable |
| Anchor Material | BZP Mild Steel |
| Anchor Size | 100 x 160mm |

Joint & Crack Meters



VW JOINT METER

vibrating wire

Developed to monitor joints of mass concrete structures, the instrument consists of two parts - a socket and the main body with a waterproof vibrating wire sensing gauge.

The socket is secured to the form and embedded into the block to be constructed. After removal of

the form, and prior to concreting of adjacent block, the gauge is screwed into the socket, set at the desired range and then embedded into concrete.

Application: Monitoring of joints of concrete arch, gravity and buttress dams; concrete-faced, rockfill dams; concrete retaining walls

KEY FEATURES & SPECIFICATIONS

- ~ Long-term stability in difficult environments
- ~ Suitable for datalogging and remote monitoring
- ~ Integral lighting protection
- ~ High accuracy and resolution
- ~ Accommodates shear movement
- ~ Not affected by cable length

| | |
|----------------|---------------------|
| Ranges | 12.5, 25, 50mm |
| Overrange | 1.25 X range |
| Resolution | 0.025% range F.S. |
| Accuracy | 0.1% F.S. |
| Operating temp | -20°C to +80°C |
| Diameter | 51mm |
| Length x diam | 340mm, 430mm x 51mm |



VW DISPLACEMENT GAUGE

vibrating wire

The VWDT-5000 series of vibrating wire displacement transducers cover displacement ranges up to 500 mm and are fully waterproof to a minimum of IP68 (16 bar external pressure). They can be incorporated into many displacement products such as crack joint meters, rod

extensometers, convergence meters, soil extensometers and displacement meters.

Applications: Rod Extensometers; Crack-meters; Joint-meters; Wire Convergence meters

KEY FEATURES & SPECIFICATIONS

- ~ Reliable long term performance
- ~ Rugged, suitable for demanding environments
- ~ High accuracy
- ~ Insensitive to long cable lengths
- ~ Waterproof to 16 bar

| | |
|-----------------|--------------------------------------------|
| Ranges | 5, 12.5, 25, 50, 100, 150, 200, 300, 500mm |
| Over-range | Range + 20% |
| Resolution | <0.025% F.S. |
| Accuracy | ±0.1 % F.S. |
| Non-linearity | <0.5% F.S. |
| Operating Range | -20 °C +80 °C |



LP DISPLACEMENT GAUGE

The LPDT-5500 series of linear potentiometer displacement transducers cover displacement ranges up to 300mm and are rated to IP68.

They can be incorporated into many displacement products such as crack joint meters, rod extensometers, convergence meters, soil

extensometers and displacement meters.

The data can be monitored by a portable read-out unit or connected to an automatic data acquisition system.

Applications: Rod Extensometers; Crack-meters; Joint-meters; Wire Convergence meters

KEY FEATURES & SPECIFICATIONS

- ~ Reliable long term performance
- ~ Rugged, suitable for demanding environments
- ~ High accuracy
- ~ Low noise output signal
- ~ Ultra slim 13mm
- ~ IP68

| | |
|-----------------|---------------------------------------|
| Ranges | 5, 12.5, 25, 50, 100, 150, 200, 300mm |
| Over-range | Range + 20% |
| Resolution | <0.025% F.S. |
| Accuracy | ±0.1 % F.S. |
| Non-linearity | <±0.5% F.S. |
| Operating Range | -40 °C to +125 °C |

Settlement Monitors



ROD SETTLEMENT SYSTEM

The GEO-XR single point rod settlement system is used to monitor sub-surface settlement or heave of ground.

The system comprises a series of inner steel rods and plastic outer sleeves together with plates when positioned on ground before fill or Borros type

anchors when used in boreholes.

Applications: Measure subsurface settlements or heave in: Embankments; Pre-loads; Deep excavations

KEY FEATURES & SPECIFICATIONS

- ~ Simple to install & use
- ~ Low cost

| | |
|-----------------------|-----------------|
| Steel rod OD | 25, 33mm |
| Steel rod ID | 19, 25mm |
| Steel rod connection | 3/4", 1" BSPF/M |
| Steel rod length | 1 metre |
| PVC sleeve OD | 60, 165mm |
| PVC sleeve ID | 52, 150mm |
| PVC sleeve connection | Flush thread |
| PVC sleeve length | 1 metre |



LIQUID SETTLEMENT SYSTEM

The VWLSS-200 Vibrating Wire Liquid Settlement System is used to monitor settlement or heave in soils and other structures such as embankments, earth and rockfill dams.

The main components are a reservoir (single or multiple), liquid-filled tubing and a vibrating wire pressure transducer cell mounted on a plate or, for



borehole application, attached to an anchor. The vibrating wire sensor is attached to a settlement plate at the point of settlement.

Applications: Measure subsurface point settlements/heave beneath: Embankments; Surcharges; Fills; Dams; Landfills

KEY FEATURES & SPECIFICATIONS

- ~ Vented and sealed options available
- ~ In-situ checks available
- ~ Air can be easily removed
- ~ Manual or automated readout
- ~ Reservoir can be sited away from construction area

| | |
|-------------------|-------------------|
| Standard Range | 7, 17 metres |
| Sensor Accuracy | 0.1% full scale |
| System Accuracy | Site dependent |
| Resolution | 0.025% full scale |
| Temperature Range | -20°C to +80°C |



VW SETTLEMENT PROFILER

Used for the measurement of subsurface settlement. A vibrating wire sensor is located within a probe that can be pulled through a buried pipe or borehole. The sensor is connected via a liquid-filled tube mounted on a reel. The sensor measures the hydraulic head of liquid between the sensor and the reservoir locations.



Applications: For the measurement of subsurface settlement/heave profiles beneath embankments, surcharges, fills, roadways, storage tanks, structures and landfills. It can also be used to measure differential settlements at discrete points on structures or settlement above tunnelling

KEY FEATURES & SPECIFICATIONS

- ~ Not affected by barometric pressure
- ~ Simple & easy to use
- ~ Accurate settlement profile

| | |
|-----------------|----------------|
| Standard Range | 7m |
| Resolution | 0.025% F.S. |
| Sensor Accuracy | 0.1% F.S. |
| Temp Range | -20°C to +80°C |



VW ANCHOR LOAD CELL



The VWLC 5000 series Vibrating Wire Anchor Load Cell consists of a cylinder of high strength steel with 3 to 6 vibrating wire strain sensors (depending on capacity).

The sensors are mounted parallel to the longitudinal axis and arranged equidistant around the

circumference to measure the compression of the cylinder under load.

Applications: Measurement of load acting on: Ground anchors; Rock Bolts; Tie-backs; Struts; Arch Supports; Props

KEY FEATURES & SPECIFICATIONS

- ~ High strength steel construction
- ~ Load distribution plates available
- ~ Proven long term accuracy
- ~ Accommodates eccentric loading
- ~ Multiple gauge system
- ~ Solid version also available (VWLC 5500)
- ~ Available with plug connector or cable

| | |
|--------------------|------------------------------------------------------------|
| Range | 250 to 2500kN |
| Internal Diameters | 60, 80, 108, 142, 174, 197, 222, 227, 264, 271, 284, 301mm |
| Resolution | <0.05% F.S. |
| Accuracy* | 0.5 % F.S. |
| Temperature range | -20°C to +80°C |
| Output | 1200 - 2800 Hz |

* System accuracy depends on loading conditions



HYDRAULIC ANCHOR LOAD CELL



The HLC-6000 series Hydraulic Anchor Load Cells consist of a sensitive pressure pad formed by joining two stiff steel discs at their periphery.

The void inside the cell is filled with de-aired fluid. When load is applied to the cell the pressure of the inside liquid changes. The changes in pressure

correspond directly to the load applied.

Applications: Measurement of load acting on: Ground anchors; Rock Bolts; Tie-backs; Struts; Arch Supports; Props

KEY FEATURES & SPECIFICATIONS

- ~ Robust stainless steel construction
- ~ Load distribution plates available
- ~ Manual or VW transducer readout
- ~ Proven long-term accuracy
- ~ Accommodates eccentric loading
- ~ Data logger compatible
- ~ Available with plug connector or cable

| | |
|---------------------|----------------------------------|
| Range | 250 to 2500kN |
| Internal Diameters | 40, 50, 77, 112, 165, 190, 225mm |
| Over range capacity | 20% F.S. |
| Resolution | <0.2% F.S. |
| Accuracy | ± 1.0 % F.S. |
| Temperature range | -30°C to +85°C |
| Output signal | Manual or VW |



STRAIN GAUGE LOAD CELL

The SGLC 7000 series load cell consists of a cylinder of high strength steel with a series of electrical resistance strain gauges connected around the periphery as a Wheatstone Bridge that compensates for unevenly distributed loads and provides a single mV/V signal output.

They are manufactured with a centre hole to accommodate anchors, rock bolts and tendons.

Applications: Measurement of load acting on: Ground anchors; Rock Bolts; Tie-backs; Struts; Arch Supports; Props

KEY FEATURES & SPECIFICATIONS

- ~ Robust stainless steel construction
- ~ Load distribution plates available
- ~ Dynamic testing possible
- ~ Accommodates eccentric loading
- ~ Multiple gauge system
- ~ Data logger compatible
- ~ Available with plug connector or cable

| | |
|---------------------|----------------------------------------------|
| Range | 250 to 3500kN |
| Internal Diameters | 40, 50, 52, 71, 75, 78, 105, 120, 165, 190mm |
| Over range capacity | 150% F.S.R |
| Bridge Resistance | 700Ω |
| Sensitivity | ± 2.0 mV/V |
| Accuracy | ± 0.5 % F.S. |
| Temperature range | -30°C to +85°C |



VW TOTAL EARTH PRESSURE CELL

vibrating wire

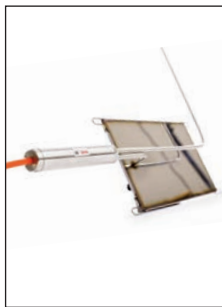
TPC-4000 series Total Earth Pressure cells are designed to measure total pressure (effective stress and pore water pressure) in soils and at the interface between structures and the wall of excavation. They are constructed from two stainless steel plates, welded around their periphery with the narrow gap

between the plates filled with hydraulic fluid. **Applications: Measurement of total pressure in or on: Concrete dams; Diaphragm walls; Retaining wall surfaces; Slurry walls; Sheet piles; Tunnel lining; Fills & embankments; Mine backfilling; Rail track**

KEY FEATURES & SPECIFICATIONS

- ~ High accuracy
- ~ Long-term stability
- ~ Stainless steel construction
- ~ High height to diameter ratio
- ~ Dynamic measurement possible
- ~ VW or strain gauge readout
- ~ Suitable for remote reading and data logging

| | |
|-----------------------|-----------------------------------------------|
| Range | 70, 170, 350, 700kPa, 1, 2, 3, 5, 7.5, 20 MPa |
| Over range | 150% F.S. |
| Resolution | ± 0.025% F.S., Infinite |
| Accuracy | ± 0.1% F.S. |
| Non-linearity | <0.5% F.S. |
| Diameter | 120, 230, 300mm |
| Thickness | 6mm, 12mm |
| Operating temperature | -20°C to +80°C |



VW NATM PRESSURE CELL

vibrating wire

NPC-3000 Series NATM Pressure cells are designed to monitor radial and tangential stresses of shotcrete in the construction of tunnels, particularly those using the New Austrian Tunnel Method and other underground works.

The cells are constructed from two stainless steel

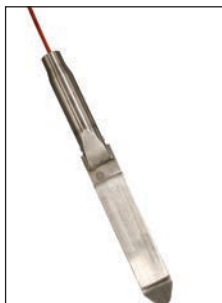
plates welded around their periphery with the narrow gap between the plates filled with hydraulic fluid.

Applications: Measurement of: Radial stress in shotcrete tunnel lining; Tangential stress in shotcrete tunnel lining; Radial stress and Tangential stress in concrete tunnel lining

KEY FEATURES & SPECIFICATIONS

- ~ High rigidity
- ~ High accuracy
- ~ Long-term stability
- ~ Stainless steel construction
- ~ Environmentally friendly internal fluid
- ~ VWT-3000 pressure transducer
- ~ Strain gauge transducer
- ~ Direct reading
- ~ Data logger compatible

| | |
|-----------------------|--------------------------|
| Range | 2, 3, 5, 7, 20, 35 MPa |
| Over range | 150% F.S. |
| Resolution | ± 0.025% F.S., Infinite |
| Accuracy | ± 0.1% F.S. |
| Non-linearity | <0.5% F.S. |
| Cell dimensions | 100 x 200mm, 150 x 250mm |
| Cell Thickness | 5mm |
| Operating temperature | -20°C to +80°C |



PUSH-IN PRESSURE CELL

vibrating wire

A Push-in Pressure Cell, also called a Spade Cell, is designed to be pushed into the ground where it can measure total earth pressure and pore water pressure within the soil. Typical installations are in fine grained cohesive soils, including very soft to stiff clays.

Applications: It can be used as a site investigation tool to determine the in-situ stress state, both

vertical and horizontal, depending on the direction of installation. It can also be used to monitor the change in active and passive pressure around retaining structures (diaphragm walls etc) as well as in tunnelling, and other earthworks

KEY FEATURES & SPECIFICATIONS

- ~ Integrated pore pressure measurement
- ~ Long term stability
- ~ High accuracy and sensitivity
- ~ Constant monitoring capability
- ~ Ease of data logging
- ~ Either vibrating wire or strain gauge transducers

| | |
|-------------------|-----------------------------|
| Capacity | 350, 700 kPa 1, 2, 3, 5 MPa |
| Over range | 150% F.S. |
| Resolution | ± 0.025% F.S. |
| Accuracy | ± 0.1% F.S. |
| Temperature range | -20°C to +80°C |

Strain Gauges



VW EMBEDMENT STRAIN GAUGE



VWS-2100 series vibrating wire embedment strain gauges are designed for direct embedment in concrete.

Two end flanges have a tensioned steel wire between them; As concrete undergoes strain, the end blocks will move and the tension in the wire

changes. A vibrating wire readout generates voltage pulses in the magnet/coil at the centre of the gauge and measures the resonant frequency of vibration.

Applications: Driven and bored piles; Tunnels and deep excavations; Concrete dams; Retaining walls; Building foundations

KEY FEATURES & SPECIFICATIONS

- ~ Reliable long term performance
- ~ Rugged, suitable for demanding environments
- ~ High accuracy
- ~ Insensitive to long cable lengths
- ~ Totally waterproof
- ~ Direct embedment in concrete

| | |
|-------------------|---------------------|
| Gauge length | 150mm |
| Overall length | 156mm |
| Resolution | 1 ε |
| Strain range | 3000 ε |
| Accuracy | ±0.1% to ±0.5% F.S. |
| Non linearity | <0.5% F.S. |
| Temperature range | -20°C to +80°C |
| Frequency range | 850-1550 Hz |



VW SURFACE MOUNT STRAIN GAUGE



VWS-2000 series vibrating wire surface strain mount gauges are designed for the long term monitoring of steel or concrete structures. Gauges may be attached to steel structures by arc welding or, using alternative end blocks, bonded or grouted into concrete. The strain gauge operates on the principle that a

tensioned wire, when plucked, vibrates at its resonant frequency. The square of this frequency is proportional to the strain in the wire.

Applications: Steel struts; Excavation support systems; Driven and bored piles; Tunnel linings Bridges & arches; On-board truck weighing

KEY FEATURES & SPECIFICATIONS

- ~ Reliable long term performance
- ~ Rugged, suitable for demanding environments
- ~ Range of mounting blocks
- ~ Insensitive to long cable lengths.
- ~ High accuracy
- ~ Integral Thermistor
- ~ Suitable for demanding environments

| | |
|-------------------|-----------------------|
| Gauge length | 150, 89mm |
| Overall length | 156, 95mm |
| Resolution | 1 ε |
| Strain range | 3000 ε |
| Accuracy* | ±0.1% to ±0.5% F.S. |
| Non linearity | <0.5% F.S. |
| Temperature range | -20°C to +80°C |
| Frequency range | 850-1550, 900-2000 Hz |

*±0.1% with individual calibration, ±0.5% F.S. with standard batch calibration



VW SPOT WELD STRAIN GAUGE



VWS-2020 vibrating wire strain gauges are designed primarily to measure strains on the surface of steel structures but may also be used on other types of material.

Available in two versions: Gauge with integral coil housing; Gauge only with separate coil housing

Applications include Stress and/or strain determination in or on: Bridges & Dams; Buildings; Struts and support systems; Pipelines; Tunnel linings; Piles & Mass Concrete; Reinforcement bars

KEY FEATURES & SPECIFICATIONS

- ~ Small size - can be used in confined spaces
- ~ Easily tensioned on site
- ~ Reliable long-term performance
- ~ Insensitive to long cable lengths
- ~ Integral Thermistor

| | |
|----------------|---------------------|
| Strain Range | 3000 με |
| Resolution | 0.4 με |
| Accuracy* | ±0.1% to ±0.5% F.S. |
| Non Linearity | <0.5% F.S. |
| Temp range | -20°C to +80°C |
| Gauge Length | 49mm |
| Overall Length | 65mm |



REBAR STRAIN METER & SISTER BARS

vibrating wire

The VWS-4000 series vibrating wire sister bars and rebar strain meters are designed to be embedded in concrete to measure strains due to imposed loads in mass concrete. The location of installation defines whether it is a Rebar Strain Meter or a Sister Bar.

The VWS-4000 Sister Bar is installed by tying it alongside an existing length of rebar within the cage.

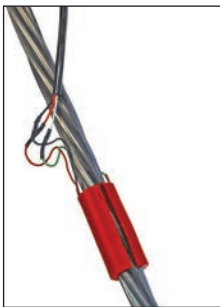
The VWS-4001 Rebar Strain Meter is installed by welding it into the existing rebar cage at a location within the structure where loads can be accurately passed from the concrete into the gauge.

Applications: Concrete Piles; Tunnel Linings; Mass concrete structures; Diaphragm walls & barrettes

KEY FEATURES & SPECIFICATIONS

- ~ Reliable long-term performance
- ~ Suitable for demanding environments
- ~ High accuracy
- ~ Insensitive to long cable lengths
- ~ Direct concrete embedment

| | |
|--------------------|------------------------------|
| Thermistor | 3k Ohms at 25°C |
| Over-range | +20% |
| Resolution | 0.6µε |
| Accuracy | ±0.5% F.S. |
| Non-linearity | <0.75% F.S. |
| Overall Length | 1.39m |
| Standard Diameters | 12, 14, 16, 20, 25, 28, 32mm |



TENSMEG TENSION MEASURING GAUGE

The TENSMEG (Tension Measuring Gauge) for monitoring strand tendons is a spiral strain gauge comprising a Teflon[®] coated resistance wire extending between two hard rubber end anchors.

It is a highly effective, simple to use means to examine load and strain in rock and soil anchors and also in cable bolts used for rock support.

Applications: Used to measure load and strain in rock and solid anchors in the bond or stressing zone and in pre-stressed and post-tensioned concrete; Surcharges; Fills; Dams; Landfills

KEY FEATURES & SPECIFICATIONS

- ~ Exceptional linear response and accuracy in a low-cost system
- ~ Simple to use and implement on site
- ~ Sturdy design provides ultimate reliability and durability
- ~ Performance not compromised when embedded in concrete or surrounded by grout
- ~ Water resistant

| | |
|------------------------|------------------|
| Full Scale Tension | Exceeds 50,000µε |
| Full Scale Compression | 3000µε* |
| Resolution | 1µε |
| Accuracy | 2% F.S. |

* Dependent on level of pre-tension applied during installation



MULTI-PURPOSE READOUT MP12



The MP12 is a multi-purpose manual readout unit which can be used with all types of electrical outputs including vibrating wire. Colour coded connections for the different sensor types makes the MP12 easy to use with any type of sensor cable.

Applications: Manual readout for: Piezometers; Load cells; Tilt Meters & Tilt Beams; Strain gauges; Rod extensometers; Settlement systems; Joint Meters & Crack Meters; Pressure cells & NATM cells; Thermistors & Thermocouples

KEY FEATURES & SPECIFICATIONS

- ~ Multiple sensor inputs
- ~ Small & lightweight
- ~ Easy to use
- ~ Simple keyboard buttons
- ~ Easy to see
- ~ Re-chargeable battery
- ~ Displays battery status

| | |
|------------------------|-------------------------------------------------------------------|
| Signal inputs | 4-20mA 2C, 4-20mA 3C, V, mV, mV/V 3C, mV/V 4C, °C, Hz, PT100, NTC |
| Sensor supply voltage | +20V, +/-12V, +5V |
| Power supply | Internal 12 volt battery (re-chargeable) |
| Measurement resolution | 16 bit |
| Display | LCD 16 x 2 back-light characters |
| Operating temperature | -20°C to +70 °C |



VW READOUT VW-2106



The portable VW-2106 Vibrating Wire Readout reads, displays and logs both vibrating wire sensors and thermistors. Vibrating wire load cells can be read using a special expansion port. Special software allows the VW-2106 to be easily configured on a host PC including selection of data

in engineering units and the program downloaded to the readout. Data can also be uploaded from the readout in csv format..

Applications: Reads, displays, and logs both vibrating wire sensors and thermistors

KEY FEATURES & SPECIFICATIONS

- ~ Durable, compact design
- ~ Large graphics display with a convenient backlight.
- ~ Readings in raw or engineering units
- ~ Built-in multiplexer for load cells

| | |
|----------------------|---------------------------------|
| VW Excitation Range | 400Hz to 6000Hz, 5V Square Wave |
| Resolution | 0.01µs |
| Timebase Accuracy | ±50ppm |
| Temperature Accuracy | ±0.1°C |
| Temperature Range | -50°C to +80°C |
| Memory Capacity | 11,400 labelled points |



ULTRA RUGGED FIELD PC2

The Ultra-Rugged Field PC2 functions as a data collector. It provides a high-level user interface, industry-leading memory, optional Flash data security, on-site data analysis and instant USB synchronization with office computers. It also offers on-board wireless communication options which

provide ease of use and reliability since there is no longer any concern with fragile connectors, cable related failure and reliability problems.

Applications: On-site data collection: Compatible with several systems and data loggers

KEY FEATURES & SPECIFICATIONS

- ~ Rugged design for use in extreme environments
- ~ Wireless options
- ~ Battery easily changed in the field
- ~ 8GB flash storage, user-accessible micro SD/SDHC slot
- ~ Secure Digital (SD or SDIO) can be used with memory cards and other peripherals

| | |
|-----------------------|------------------------------------------------|
| Operating System | Windows® Mobile 2010 |
| Communication | Bluetooth™ Wireless |
| Memory | 8 GB Flash memory |
| Battery | Intelligent Li-Ion 3.7VDC @ 10600mAh, 38.16Whr |
| Operating Temperature | -30°C to +60°C |
| Enclosure | IP68 |
| Screen | 109mm |



PNEUMATIC READOUT C-108

The C108 Digital Pneumatic Readout is the ideal solution for monitoring all pneumatic transducers, including Total Earth Pressure Cells.

The C108 stores up to 170 instrument locations per route, each with a convenient text label and up to 20 time/date stamped data points.

User-specified location names and previous data greatly assist the operator in data collection and analysis.

Applications: Monitor all pneumatic transducers including Total Earth Pressure Cells; Bubbler readout for monitoring standpipe piezometers

KEY FEATURES & SPECIFICATIONS

- ~ Accurate, repeatable readings
- ~ Internal pressure cylinder refilled in-situ
- ~ No additional regulator required to fill the internal cylinder
- ~ Low operating flow of 35 cc/min
- ~ Relief valves protect sensitive parts from over-pressurisation
- ~ Pressure ranges to 2000 psi (14,000 kPa) available

| | |
|-----------------------|-------------------------|
| Accuracy | ± 0.1% F.S. |
| Range | 0 to 14000 kPa/2000 psi |
| Resolution | 1 kPa/ 0.1 psi |
| Operating Temperature | -20°C to +50°C |
| Memory | 128kB |
| Storage Locations | 20 points |
| Storage Per Location | 20 points |



AUTOMATIC PENDULUM READOUT TP-2000 SERIES

The Geosense TP-2000 Series is a readout device specifically designed to automatically measure and record relative movements of normal and inverted pendulums. It can be installed as part of a complete new system or be retro-fitted as part of an upgrade

to an existing manual system.

It is available in three models as follows:

| | |
|------------|-----------------------|
| TP-2D-2001 | Range 50 x 50mm |
| TP-2D-2002 | Range 50 x 100mm |
| TP-3D-2003 | Range 50 x 100 x 50mm |

KEY FEATURES & SPECIFICATIONS

- ~ Can be used with direct & inverted pendulums
- ~ Can be retrofitted to manual pendulums
- ~ Local data storage
- ~ Can be integrated into automatic data acquisition systems
- ~ Analogue or digital output
- ~ 2D & 3D models available
- ~ Weatherproof housing

| | |
|----------------------|----------------------|
| Resolution | 0.01mm |
| Accuracy | ± 0.05mm |
| Repeatability | ± 0.1mm |
| Display | 4-digit LED |
| Communication Method | 4-20mA, RS-485 |
| Power Supply | 85-265 VAC, 50-60 Hz |
| Protection | IP65 |



SINGLE CHANNEL LINX DATA LOGGER



The Geosense single channel LINX data logger is a low cost, battery powered data logger, designed for reliable, unattended monitoring of a single vibrating wire sensor and thermistor. They can be automatically configured using a text file via the USB connection.

It is a purpose-built logger ideal for remote locations or instruments that require frequent reliable data recording.

Applications: Ideal for applications that require reliable, unattended monitoring of a single vibrating wire sensor

KEY FEATURES & SPECIFICATIONS

- ~ Robust construction
- ~ 8MB memory
- ~ Auto fill of calibration data
- ~ Weather resistant IP66 enclosure
- ~ Battery powered for remote sites
- ~ Download via USB
- ~ User friendly LINX host software
- ~ Lithium battery option available
- ~ Compatible with all VW sensors

| | |
|-------------------|---------------------------|
| Frequency Range | 260 to 4800 Hz |
| Resolution | 0.10 Hz |
| Accuracy | 0.01% FS |
| Channels | 1 x VW + 1 x NTC |
| Readings | ~ 279,000 |
| Battery | 4 x Alkaline C |
| Battery Life | > 8 years /8 memory fills |
| Temperature Range | -20°C to +80°C |
| Enclosure | IP66 |



4 CHANNEL LINX DATA LOGGER



The Geosense 4 channel LINX data logger is a low cost, battery-powered multi-channel data logger designed for reliable unattended monitoring of up to 4 vibrating wire sensors and their associated thermistors. They can be automatically configured using a text file via the USB connection.

It is a purpose-built logger ideal for remote locations or instruments that require frequent reliable data recording.

Applications: Can be used with any vibrating wire sensor including piezometers, crack gauges, strain gauges and pressure cells.

KEY FEATURES & SPECIFICATIONS

- ~ Robust construction
- ~ 8MB memory
- ~ Auto fill of calibration data
- ~ Weather resistant IP66 enclosure
- ~ Battery powered for remote sites
- ~ Download via USB
- ~ User friendly LINX host software
- ~ Lithium battery option available
- ~ Compatible with all VW sensors

| | |
|-------------------|---------------------------|
| Frequency Range | 260 to 4800 Hz |
| Resolution | 0.10 Hz |
| Accuracy | 0.01% FS |
| Channels | 4 x VW + 4 x NTC |
| Readings | ~ 135,000 |
| Battery | 4 x Alkaline C |
| Battery Life | > 5 years /4 memory fills |
| Temperature Range | -20°C to +80°C |
| Enclosure | IP66 |



8 CHANNEL LINX DATA LOGGER



The Geosense 8 channel LINX data logger is a low cost, battery-powered multi-channel data logger designed for reliable unattended monitoring of up to 8 vibrating wire sensors and their associated thermistors. They can be automatically configured using a text file via the USB connection.

It is a purpose-built logger ideal for remote locations or instruments that require frequent reliable data recording.

Applications: Can be used with any vibrating wire sensor including piezometers, crack gauges, strain gauges and pressure cells

KEY FEATURES & SPECIFICATIONS

- ~ Robust construction
- ~ 8MB memory
- ~ Auto fill of calibration data
- ~ Weather resistant IP66 enclosure
- ~ Battery powered for remote sites
- ~ Download via USB
- ~ User friendly LINX host software
- ~ Lithium battery option available
- ~ Compatible with all VW sensors

| | |
|-------------------|---------------------------|
| Frequency Range | 260 to 4800 Hz |
| Resolution | 0.10 Hz |
| Accuracy | 0.01% FS |
| Channels | 8 x VW + 8 x NTC |
| Readings | ~ 83,000 |
| Battery | 4 x Alkaline C |
| Battery Life | > 5 years /3 memory fills |
| Temperature Range | -20°C to +80°C |
| Enclosure | IP66 |



GEOLOGGER G8-PLUS

The Geologger 485-SDI is a small, portable, battery powered datalogger system for use with instruments with digital outputs.

Ideal for sensors which use digital BUS and can accommodate up to 30 connected sensors and two SDI-12 sensors.

Applications: For use with any instrument outputting RS-485, SDI-12 such as in-place inclinometers, tilt meters, tilt beams and a range of environmental instruments

KEY FEATURES & SPECIFICATIONS

- ~ Long battery life
- ~ IP67 enclosure
- ~ Waterproof USB plug & play port
- ~ Configuration via 'Smart' android phone or tablet

| | |
|-------------------|--------------------------------------------------------|
| Sensor Inputs | RS-485, SDI-12 |
| Battery | 4 x Lithium C |
| Communication | USB |
| Temperature Range | -20°C to +70°C |
| Memory | 15,000 for 30 sensors; 90,00 readings for 5 sensors |
| Enclosure | IP67 |



GEOLOGGER G8 MODULE



The GeoLogger G8 is a versatile low powered multi-channel data logger which is capable of being used with a wide range of sensors with outputs which include VW, V, mV/V, 4-20mA, Pt100, NTC. It can be used with multiplexers to capable of managing up to 16320 channels. Its low power requirement enables it to be used in remote locations for up to one year

without mains power thus minimising any EMC effects.

Applications: Remote data logging of various types of geotechnical instruments used in dams, tunnels, bridges, deep foundations and slope stability

KEY FEATURES & SPECIFICATIONS

- ~ Ability to read most geotechnical sensors
- ~ Low power for remote sites
- ~ Long life (~1 year) internal battery
- ~ Can be used with mains power
- ~ Internal FTP or FTP client
- ~ Easy to use key pad
- ~ Data can be viewed on site
- ~ Can be used with "Smart" phones or tablets
- ~ Large internal memory

| | |
|-------------|----------------------------------------|
| Inputs | VW, V, mV/V, 4-20mA, Pt100, NTC, pulse |
| Ports | Ethernet, RS-485, RS232 |
| Memory | SD card |
| Acquisition | 1-59min, 1-23 hr, 1-10 days |
| Supply | 12Vdc, 100-220VAC |



SMART-MUX

The Geosense SmartMux is a modular multiplexer that allows the management of multiple sensors as part of a remote or automatic data acquisition system. It is an easy-to-use digital alternative to the traditional vibrating wire rotary switch terminal box.

Sensor connection is simple thanks to plug-in connectors.

Allows multiple sensor types to be connected in a central location and is used typically for: Dams; Tunnels; Roads; Deep Foundations

KEY FEATURES & SPECIFICATIONS

- ~ Manual readings available
- ~ Can be integrated into automatic systems
- ~ Intelligent on-board A2D processing
- ~ Vibrating wire inputs
- ~ Analogue inputs
- ~ Digital inputs & outputs
- ~ Can be connected together

| | |
|---------------------------------------|------------------------------------------|
| Channel numbers | 4+4, 8+8, 16+16 (or any combination) |
| Total multiplexers that can be linked | Up to 256 |
| Total channels | 32 for MUX, max 16320 channels |
| Inputs | VW, V, mV/V, 4-20mA, Pt100, NTC, RS485 |
| Resolution | 24 Bit V, mV/V, 4-20mA, Pt100, NTC 0.1Hz |



GEOLOGGER GL SERIES



The GL Series is built around the Campbell Scientific CR800 and CR1000 control modules and offers reliable remote monitoring under demanding geotechnical conditions. Functions include sensor measurement, timekeeping, data reduction, data storage, control and alarm notification.

Applications: Remote data logging of geotechnical & structural instrumentation in: Dams, Tunnels; Deep excavations; Buildings; Bridges

KEY FEATURES & SPECIFICATIONS

- ~ Tailored to your individual requirements
- ~ Precision measurement capability
- ~ Rugged construction
- ~ Wide operating temperature range
- ~ Low power consumption

| | |
|--------------------|-----------------------------|
| Data logger module | CR800, CR1000 |
| Sensor inputs | VW, Volt, 4-20mA, RS-485 |
| Input expansion | Multiplexers |
| Communication | Radio, GSM, GPRS |
| Dimensions | Variable |
| Power supply | Mains, battery, solar panel |
| Enclosure | IP66 |



GEOLOGGER 485-SDI

The Geologger 485-SDI is a small, portable, battery powered datalogger system for use with instruments with digital outputs. Ideal for sensors which use digital BUS and can accommodate up to 30 connected sensors and two SDI-12 sensors.

Applications: For use with any instrument outputting RS-485, SDI-12 such as in-place inclinometers, tilt meters, tilt beams and a range of environmental instruments

KEY FEATURES & SPECIFICATIONS

- ~ Long battery life
- ~ IP67 enclosure
- ~ Waterproof USB plug & play port
- ~ Configuration via 'Smart' android phone or tablet

| | |
|-------------------|-----------------------------------------------------|
| Sensor Inputs | RS-485, SDI-12 |
| Battery | 4 x Lithium C |
| Communication | USB |
| Temperature Range | -20°C to +70°C |
| Memory | 15,000 for 30 sensors; 90,00 readings for 5 sensors |
| Enclosure | IP67 |



GEOLOGGER GL101A-V

The Geosense® Geologger GL101A-V is a small, portable, battery powered data logger system for use with instruments that output in voltage. Each unit comes with data logger software, with real time graphing and varying sampling times.

We can also offer a wide variety of instruments to connect to the unit, which can be housed within the enclosure itself.

Applications: For use with any instrument outputting in voltage such as: Linear Potentiometers; Linear variable differential transformer (LVDT); Strain Gauge load cell; Tilt meter

KEY FEATURES & SPECIFICATIONS

- ~ CE compliant
- ~ Robust plastic waterproof enclosure
- ~ Fully battery powered
- ~ Light and portable
- ~ Waterproof USB plug & play port
- ~ Interior storage for instruments while not in use
- ~ Easy-to-use, comprehensive data logger software

| | |
|-----------------------------------|------------------------------------------------------------------|
| External power supply requirement | 3.6V (Lithium ion batteries included for the logger and sensors) |
| Voltage range | -8 - +24V |
| Voltage Resolution | 0.5mV |
| Calibrated Accuracy | ± 0.05% FSR at 25° C |
| Reading rate | 4 readings every second to 1 every 24hrs |



Wi-SOS 480 SYSTEM

The Wi-SOS 480 (Wireless Sensor Observation System) collects, data-logs, transmits and receives data from any sensor with a vibrating wire, voltage, 4-20mA, RS-485, resistance or SDI12 output. Utilising a Star topology spread spectrum modulation and sub 1Gz frequencies, it has an extremely long range, up to 15 km in open field



conditions and typically 3.5km in dense urban areas. The system comprises Nodes and a central Gateway. The Gateway collects data from the Nodes, stores it locally then pushes it to the Wi-SOS WebCentre where it can be viewed and/or downloaded.

Applications: Wireless sensor network for a range of sensors

KEY FEATURES & SPECIFICATIONS

- ~ Sub 1GHz frequency range
- ~ Spread spectrum modulation
- ~ Long range up to 15km
- ~ No repeaters needed
- ~ Long battery life
- ~ Signal coverage tests available
- ~ Data storage in Node & Gateway
- ~ Simple configuration via Android device
- ~ Can be configured 'over air'
- ~ Raw data can be viewed via the Internet or pushed to any FTP address

| | |
|------------------------|-----------------------------------------|
| Input Type | VW, analogue, digital |
| Inputs | 1,4,5 |
| Sampling Rate | 5, 10, 15, 30 minutes 1, 4, 24 hours |
| Range Open Field (LOS) | 15km |
| Battery Life | ~ 10 years* |
| Radio Frequency | Sub 1GHz |
| Enclosure | IP67/8 |

* Dependent on sampling rate.



VW NODE

Low powered battery-operated, it can be used with any sensor with a vibrating wire signal output and its associated thermistors and is available with one or five channels. Fitted with a 4MB internal memory, data is stored locally and can be accessed via USB. Individual configuration and signal coverage tests can be

carried out using the G-LOG App on any Android device.

Mounted in a rugged enclosure rated to IP68.

Applications: for any sensor with a vibrating wire output such as piezometer, strain gauge, crack meter, pressure cell, load cell

KEY FEATURES & SPECIFICATIONS

- ~ 1 to 5 sensor inputs
- ~ Sub 1GHz radio frequency
- ~ Long battery life
- ~ 4MB memory
- ~ Configuration via Android device
- ~ Small rugged IP68 enclosure
- ~ USB communication port

| | |
|-------------------|-----------------|
| Sensor input | VW + NTC |
| Battery | 4 x Lithium C |
| Battery life | Up to 10 years |
| Communication | USB |
| Memory | 4MB |
| Temperature range | -20°C to + 70°C |



DIGITAL NODE

Low powered battery operated, it can be used with several types of digital sensor and is fitted with one RS-485 channel (up to 30 sensors in a BUSSED string) plus two channels for SDI-12. Fitted with a 4MB internal memory data is stored locally and can be accessed via USB. Individual

configuration and signal coverage tests can be carried out using the G-LOG App on any Android device. Mounted in a rugged enclosure rated to IP68.

Applications: For use with any sensor with a digital output such as In-Place inclinometer, tilt meter, tilt beam

KEY FEATURES & SPECIFICATIONS

- ~ Up to 30 RS-485 BUSSED sensor inputs
- ~ Sub 1GHz radio frequency
- ~ Long battery life
- ~ 4MB memory
- ~ Configuration via Android device
- ~ Small rugged IP68 enclosure
- ~ USB communication port

| | |
|-------------------|-----------------|
| Sensor input | RS-485, SDI-12 |
| Battery | 4 x Lithium C |
| Battery life | Up to 2.5 years |
| Communication | USB |
| Memory | 4MB |
| Temperature range | -20°C to + 70°C |



ANALOGUE NODE

Low-powered and battery operated, it can be used with any sensor with a Voltage, mV/V, 4-20mA, resistance signal output and is available with one or four channels.

Fitted with a 4MB internal memory, data is stored locally and can be accessed via USB. Individual

configuration and signal coverage tests can be carried out using the G-LOG App on any Android device. Mounted in a rugged enclosure rated to IP68.

Applications: For use with any sensor with an analogue output such as tilt meter, tilt beam, piezometer, strain gauge, crack meter, pressure cell, load cell

KEY FEATURES & SPECIFICATIONS

- ~ 1 to 4 sensor inputs
- ~ Sub 1GHz radio frequency
- ~ Long battery life
- ~ 4MB memory
- ~ Configuration via Android device
- ~ Small rugged IP68 enclosure
- ~ USB communication port

| | |
|-------------------|--------------------------------|
| Sensor Input | Volt, 4-20mA, mV/V, PT100, NTC |
| Battery | 4 x Lithium C |
| Battery life | Up to 5 years |
| Communication | USB |
| Temperature Range | -20°C to +70°C |
| Memory | 4MB |



WIRELESS TILT METER

Low powered battery operated stand-alone Tilt Meter which can be integrated with any other type of Node into the Wi-SOS 480 system.

Fitted with a 4MB internal memory, data is stored locally and can be accessed via USB. Individual configuration and signal coverage tests can be

carried out using the G-LOG App on any Android device.

Mounted in a rugged enclosure rated to IP68.

Applications: Monitoring of tilt for structures, rail tracks, tunnels, slopes

KEY FEATURES & SPECIFICATIONS

- ~ Small footprint
- ~ Sub 1GHz radio frequency
- ~ Long battery life
- ~ 4MB memory
- ~ Configuration via Android device
- ~ Small rugged IP68 enclosure
- ~ USB communication port

| | |
|-------------------|----------------------|
| Range | ±15° |
| Axis | Uniaxial and biaxial |
| Resolution | ±2 arc sec. |
| Battery | 1 x Lithium C |
| Battery life | Up to 5 years |
| Communication | USB |
| Memory | 4MB |
| Temperature range | -20°C to + 70°C |



GATEWAY

Powered by mains, solar panel or PoE the Gateway collects the data from any series of Nodes, stores it internally and then pushes the data to the Wi-SOS WebCentre or any FTP address where it can be viewed and/or downloaded.

Mounted in a robust enclosure rated to IP67

Applications: Part of a wireless sensor network to collect data from Nodes, pushing it to web centre of FTP address where it can be viewed

KEY FEATURES & SPECIFICATIONS

- ~ On-board software
- ~ >500 Node inputs
- ~ Sub 1GHz radio frequency
- ~ Low power – 1.5W
- ~ Mains, solar or PoE
- ~ 8GB memory
- ~ Internal barometer
- ~ Small rugged IP67 enclosure

| | |
|-------------------|-----------------------|
| Sensor input | VW, analogue, digital |
| Communication | GPRS, Ethernet |
| Memory | 8GB |
| Temperature range | -20°C to + 70°C |



SOFTWARE

The free G-LOG software which can be used on any Android Smart device allows configuration, diagnostics and download of all Node types.

Signal coverage tests can also be carried out to confirm connectivity of the Nodes to the Gateway. The on-board software within the Gateway allows

data to be converted into Engineering units. All data can be pushed to the Wi-SOS WebCentre or to any FTP address for visualisation

Ap

KEY FEATURES & SPECIFICATIONS

- ~ Free download
- ~ Allows configuration, diagnostics and download
- ~ Signal coverage tests available
- ~ Smart Android technology
- ~ Engineering units

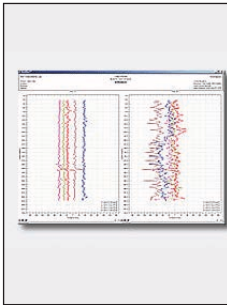


WEBCENTRE

The Wi-SOS WebCentre provides real-time data visualisation and allows the data to be downloaded in csv format. Alarm thresholds can be set and alerts sent via email or SMS. The system health can be viewed and re-configured.

KEY FEATURES & SPECIFICATIONS

- ~ Free access
- ~ System health diagnostics
- ~ Real-time monitoring
- ~ Alarms & alerts
- ~ Available the Internet
- ~ Data can be downloaded



INCLANALYSIS SOFTWARE

Inclanalysis software is a powerful companion to any Inclinometer System.

It allows the user quickly and efficiently to reduce large volumes of inclinometer data into a variety of formats suitable for analysis and presentation. Data is organised in a standard file structure which makes

transferring it between the PDA and Inclanalysis simple.

Applications: Analysis and compilation of inclinometer data into a range of visual formats

KEY FEATURES & SPECIFICATIONS

- ~ Create custom graph, text views, vector or time plots
- ~ Mean deviation
- ~ Incremental displacement
- ~ Absolute position
- ~ Cumulative displacement
- ~ Checksum
- ~ Time plot and vector plot
- ~ User defined settings for X and Y-axis properties such as scale, units, labels, ticks and gridlines



GEOAXIOM VISTA

GeoAxiom Vista is a specialist Geotechnical software which provides data handling, storage, visualisation, alarms, reporting and web based access from any size of automatic data acquisition system.

It comprises three main components: DataStore; DataViewer and Internet Publisher.

Applications: For the visualisation and presentation of data from: Vibrating wire sensors, 4-20 mA sensors, mV sensors, Inclinometers, Robotic Total Stations, Manual readings, GPS stations, Webcam

KEY FEATURES & SPECIFICATIONS

- ~ Data presented as photographs, plans or cross-sections
- ~ Displacement graphs
- ~ Can import Google maps
- ~ Trend lines can be generated
- ~ Wide range of reports
- ~ Highly configurable
- ~ Easy to configure
- ~ Near real time data
- ~ Can be accessed via Internet
- ~ Can be networked
- ~ No limit to sensor number
- ~ Multi-language options



VW TEMPERATURE SENSOR

The VWTS 6000 vibrating wire temperature sensor is used primarily for the measurement of internal temperature in concrete structures, soil, rock or water and ideally suited for use where other types of vibrating wire sensors are used. As the thermal response of the VWTS 6000 is relatively slow it is not suitable for measuring rapid change in temperature.



The VWTS 6000 vibrating wire temperature sensor is fitted with an internal Thermistor and gas-discharge tube for lightning protection.

Applications: Monitoring temperatures in or on: Dams; Concrete structures; Geothermal wells; Soil & rock temperatures; Water temperature

KEY FEATURES & SPECIFICATIONS

- ~ Accurate
- ~ High resolution
- ~ Long-term stability
- ~ Insensitive to long cable lengths.
- ~ Integral Thermistor
- ~ Integral lightening protection
- ~ Suitable for remote reading and data logging

| | |
|-----------------------------|----------------------------|
| Temperature range | 100°C |
| Operating Temperature Range | -20°C to +80°C |
| Operating frequency | 2000 to 3500 Hz |
| Cable | 4 x 22 AWG (shielded) |
| Weight | 210g |
| Dimension | 20mm diameter x 140mm long |



THERMISTOR STRINGS

Thermistors provide accurate and reliable long-term temperature measurements and are used widely in the extremely harsh environments found within Geotechnical monitoring.

They are available in two types: Probe – A single point sensor mounted within a PVC or stainless steel

housing which is attached to a cable length.

String – A series of sensors mounted along a multi-core cable which provide a temperature profile.

Applications: For monitoring temperature in: Concrete (particularly RCC dams); Soil; Rock; Ice caps; Glaciers; Landfill

KEY FEATURES & SPECIFICATIONS

- ~ Fast Response
- ~ High accuracy
- ~ Excellent long term stability
- ~ Operating range -50°C to +150°C

| | |
|-------------------|-----------------|
| Temperature Range | -50°C to +150°C |
| Accuracy | ± 0.2°C |
| Resolution | 0.1°C |



VW WEIR MONITOR



The VWM-2000 vibrating wire precision water level monitor utilises a vented vibrating wire force transducer in combination with a cylindrical weight suspended from it to monitor water levels. The vibrating wire transducer is vented to atmosphere so that any atmospheric changes are

automatically compensated.

Applications: Precise water level measurement of: Weirs; Streams; Reservoirs; Tanks

KEY FEATURES & SPECIFICATIONS

- ~ High sensitivity & stability
- ~ Low maintenance
- ~ Force transducer immune to zero drift & has low response to temperature changes
- ~ Not affected by long signal cables
- ~ Measured by portable readout or datalogger

| | |
|-----------------|----------------------|
| Standard Ranges | 150,300,500, 1500mm |
| Accuracy | ±0.1% F.S. |
| Resolution | 0.025% F.S. (min) |
| Linearity | <0.5% F.S. |
| Stability | ±0.05% F.S. per year |
| Temp Range | -20°C to +80°C |



V-NOTCH WEIRS & TANKS

V-Notch Weirs and Tanks are used to measure seepage water flows in open streams, channels or tanks and are used mainly as part of Dam Safety Monitoring programs.

A V-notch weir system comprises a stainless steel plate with a chosen notch profile to suit expected

flow rates and a means of measuring the head on the weir plate.

Applications: Measuring water flows in: Dams; Rivers & streams; Open Channels

KEY FEATURES & SPECIFICATIONS

- ~ In accordance with BS 3684 Pt 4
- ~ Available in 90, 45, 22.5 degrees
- ~ Flows from 10 to 60 litres/second
- ~ Simple principle
- ~ Very low maintenance
- ~ Made from corrosion resistant materials
- ~ Can be easily automated
- ~ Portable or fixed

| | |
|-----------------|-------------------------|
| Design standard | BS 3684 Pt 4 |
| Material | Stainless steel |
| Geometry | 90, 45, 22.5° |
| Flow | 10 to 60 litres/second* |



ECHO SOUNDER

The EchoSounder acts as a stand-alone altimeter, providing accurate height off the dam bed and other sub-aqua distance measurements.

Applications: Dam reservoir silt level monitoring; Scour monitoring

KEY FEATURES & SPECIFICATIONS

- ~ Ultra compact professional altimeter
- ~ Analogue and digital output
- ~ Millimetric resolution
- ~ Depth rating 750m
- ~ Laptop control
- ~ Low cost

| | |
|---------------------|------------------------|
| Operating Frequency | 500KHz |
| Beamwidth | 6° conical (at 500KHz) |
| Operating Range | 50m (160ft) |
| Power Requirements | 12V to 50VDC @ 3.5 VA |
| Digital Resolution | 1mm |
| Analogueue Output | 0-5V, 1-50m |
| Data Communication | RS-485, RS232 |



ULTRASONIC FLOW MONITOR

The Ultrasonic Flow Monitor is a compact, easy-to-use system for measuring the velocity and depth of water in rivers and streams and open drainage channels often used in dam safety monitoring.

Water velocity is measured by the ultrasonic Doppler principle which relies on suspended particles or

small air bubbles in the water to reflect the ultrasonic detector signal.

Applications: Records flow in streams, open channels and part-filled pipes

KEY FEATURES & SPECIFICATIONS

- ~ Battery Powered for use in remote locations
- ~ Easy to install, no weir or flume required
- ~ Optional Flow Display for on site viewing
- ~ Options for wireless and web data collection
- ~ SDI-12 Compatible
- ~ Rain gauge input
- ~ Low cost

| | |
|--------------------------|------------------------------------|
| Velocity Range | 21 mm/s to 4500mm/s bi-directional |
| Accuracy | Resolution |
| Resolution | 1mm/s |
| Depth Range | 0 to 5m in two ranges |
| Depth Resolution 0-2.5 M | 2.5mm |
| Depth Resolution 2.5 -5M | 5.0mm |
| Depth Accuracy | ± 0.25% |



CABLES

Geosense® supplies a wide range of high quality stranded copper cables manufactured to British, European and American standards which comply with the European Directive RoHS-II.

All cables have excellent strength and flexibility making them suitable for installation within

applications such as dams, tunnels bridges etc .

They are suitable for direct burial within selected graded material such as clay cores, filter sand and concrete.

KEY FEATURES & SPECIFICATIONS

CONSTRUCTION

Twisted pair or Multi-core

OUTER SHEATH MATERIAL

PUR , PVC, PE, PP, Teflon, Flame retardant, LSHF

CONDUCTORS

Multi-stranded copper for flexibility and easy handling during installation. Typical conductor size is 0.2-0.75mm² (24 – 18AWG) with PE or PP insulation. The number of conductors is dependent on the type and quantity of sensors.

COLOUR CODING

DIN 47100, VDE 0293-308, IEC 60757, BS 6360, US Chart 2 & 3

SHIELDING

Shielding is required for protection against the effects of EMI (electromagnetic interference) from sources such as electrical equipment, power lines, generators, transformers etc.

Protection is available by using twisted pair construction, foil drain wires, partial or fully braided cable.

ARMOUR

Armoured cables typically use a series of solid steel helically wound around the cable conductors and is used where large forces are exerted on cables by settlement or earth moving vehicles.

VENTED CABLE

Used for products such as piezometers and liquid level sensors to allow a path for the changes in barometric pressure to act upon both sides of the sensing element and thus negate the need for barometric compensation.

STANDARDS & APPROVALS

Cables are made to a wide range of standards and approvals including:

IEC 60228, IEC 60332, IEC 61034, IEC 60754, BS 6360, BS EN 60228, BS EN 60332, BS 5308, PAS5308, VDE 0812, VDE 0814 , VDE 0295, UL 2464, LU 1-085-A2.



TERMINAL SWITCH BOXES & ACCESSORIES

vibrating wire

Terminal boxes are available to connect up to 12, 24 or 36 instruments

They are equipped with up to three 12-position rotary switch boards with connectors for readout output. Housed in a waterproof IP66 wall mounting plastic or steel lockable enclosure.

Different models of waterproof junction boxes are available for single or multiple cable entry together with a full range of cable ducting, cable end protection, slicing kits, flying and Jumper cables.

Application: Provides central monitoring location for multiple sensor installations

KEY FEATURES & SPECIFICATIONS

- ~ Can be used all types of VW sensors
- ~ Increases efficiency of taking of manual readings
- ~ Eliminates need to visit multiple locations to take readings
- ~ Enables manual readings during installation and commissioning
- ~ Allows manual troubleshooting
- ~ Enables cable lengths to be reduced
- ~ Reduces costs
- ~ IP67 enclosure available
- ~ Auto readings version available



REMOTE SMART-MUX



The Remote Smart-Mux comprises a Smart-Mux housed in a waterproof cabinet which can be placed in any position on site and have multiple sensors attached. They can be linked together by a single four-core cable which can then be connected to a central GeoLogger G8-Plus. Cable lengths up to 1000 metres can be realised, even for 4-20mA signals.

Remote SmartMux-Plus: By connecting a Smart Mux Interface (SMI) local data acquisition can be obtained and stored onto the interface module.

Applications: Allows multiple sensor types to be connected in a central location and is used typically for: Dams; Tunnels; Roads; Deep foundations

KEY FEATURES & SPECIFICATIONS

- ~ Manual readings available
- ~ Can be integrated into automatic systems
- ~ Intelligent on-board A2D processing
- ~ Vibrating wire inputs
- ~ Analogue inputs
- ~ Digital inputs & outputs
- ~ Can be connected together

| | |
|---------------------------------------|------------------------------------------|
| Channel numbers | 4+4, 8+8, 16+16 (or any combination) |
| Total multiplexers that can be linked | Up to 256 |
| Total channels | 32 for MUX, max 16320 channels |
| Inputs | VW, V, mV/V, 4-20mA, Pt100, NTC, RS485 |
| Resolution | 24 Bit V, mV/V, 4-20mA, Pt100, NTC 0.1Hz |



REMOTE-MUX

The Geosense® RemoteMux allows multiple sensor cables to be connected into one central location with subsequent connection to a data logger via one multi-core cable. The cost of cabling and installation is therefore significantly reduced.

typically allows five vibrating wire instruments together with their respective thermistors and ground conductors to be connected.

It comprises of a series of multiplexers, each of which has five sets of five input channels which

Applications: Allows multiple sensor types to be connected in a central location and is used typically for: Dams; Tunnels; Roads; Deep foundations

KEY FEATURES & SPECIFICATIONS

- ~ Unlimited connections to datalogger using cascading method
- ~ Detachable screw terminals
- ~ Simple wiring process
- ~ Built-in transient protection
- ~ Robust steel box
- ~ Waterproof to IP67 rated
- ~ Up to 100 sensors can be connected

| | |
|---------------|--------|
| Multiplexers | 1-10 |
| Chanel Inputs | 5-50 |
| Cable Entries | 7-52 |
| Enclosure | IP67 |
| Power | 12 VDC |



SURGE PROTECTIVE DEVICE

Geosense® Surge Protective Device (SPD) protects all types of sensors from Transient Overvoltage.

Transient protection devices attempt to re-direct the energy in these transients by taking advantage of the differences between the transient waveform and the intended signal or power waveform.

Transient overvoltage affecting sensors is typically due to lightning strikes where long, particularly horizontal wiring can be subject to these leading to destructive voltages at sensors.

Applications: Protecting sensors and cables from overvoltages

KEY FEATURES & SPECIFICATIONS

- ~ Lightweight impact-resistant ABS box
- ~ Corrosion free
- ~ Waterproof to IP67 rated
- ~ Robust 5 pole terminal strips
- ~ Easy & quick to wire
- ~ Up to 10 sensors can be connected
- ~ Conductor sizes from 28-12 AWG
- ~ Spring Pressure Connection Technology
- ~ Vibration-Proof connections
- ~ Maintenance-free connections
- ~ Colour coded glands for IN & OUT

| | |
|---------------------------|-------------|
| Lines Protected | 4+1 shield |
| Maximum Surge Current | 15,000 Amps |
| Minimum Breakdown Voltage | 17.1 Volts |
| Maximum Clamping Voltage | 32.5 Volts |
| Output Clamp Voltage | < 5 Volts |
| Max AC Current | 40 Amps |



JUNCTION BOX

Geosense® Junction Boxes allow multiple sensor cables to be connected into one multi-core cable thus reducing the cost of cabling and installation.

Fitted with a series of five pole spring pressure connectors, they are quick and easy to wire and provide vibration-proof and maintenance-free connections, unlike traditional screw terminals. The

input and output connections are colour-coded for easy identification.

Applications: Joining multiple sensors to a single multicore cable; Providing central location for manual readings; Protecting sensors and cables from overvoltage protection

KEY FEATURES & SPECIFICATIONS

- ~ Lightweight impact resistant ABS box
- ~ Corrosion free
- ~ Waterproof to IP67 rated
- ~ Robust five pole terminal strips
- ~ Easy & quick to wire
- ~ Conductor sizes from 28-12 AWG
- ~ Spring Pressure Connection Technology
- ~ Vibration-Proof connections
- ~ Maintenance-free connections
- ~ Colour coded glands for IN & OUT
- ~ Simple hinged quick-release catch lid
- ~ Up to 10 sensors can be connected



MONITORING PRISM

The GMP104 is a 3-dimensional triple mini prism target primarily used for measuring the deflection of buildings.

It is mounted in an aluminium metal holder and supplied with L-bar for fixed installations with a weight of 0.25kg.

The prism offset is dependant on the mounting position.

Applications: Tunnel Convergence Monitoring; Deflection of Buildings

KEY FEATURES & SPECIFICATIONS

- ~ High precision
- ~ Robust construction
- ~ Range of reflective targets available
- ~ WILD/LEICA compatible
- ~ Range of fixings

| | |
|-------------------------------|--------------------|
| IR range | 2000m (7000ft) |
| Prism Material | BK7, Grade A glass |
| Prism diameter | 25.4mm |
| Prism Chamfer Edges | 0.10-0.25 Max |
| Prism Total Angular Deviation | 5 Arc Seconds |
| Prism Surface Quality | 60/40 |
| Prism Surface Flatness | 1/4 Wave |



REFLECTIVE TARGETS

Model GSRT2 is a 2-dimensional reflective Bireflex target used primarily for tunnel convergence monitoring. It has reflectors on both sides.

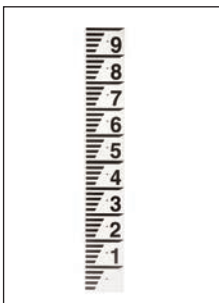
Models GSRT3/4 are 3-dimensional triple mini prism targets primarily used for measuring the deflection of buildings. Both are mounted on universal joints so

they can be orientated in any direction required and are made from high impact and resistant plastic with a bottom fitting which allows them to be mounted on a wide range of fixings such as convergence and reference bolts and prism poles.

KEY FEATURES & SPECIFICATIONS

- ~ High precision
- ~ Range of retro reflective targets available
- ~ Robust construction
- ~ Range of reflective targets available
- ~ Range of prism diameters
- ~ WILD/LEICA compatible

| Description | GSRT2 | GSRT3 | GSRT4 |
|--------------------------|-----------|-----------|-----------|
| Prism Diam | 60mm | 25mm | 38mm |
| Cut Accuracy | NA | <0.5" | <0.5" |
| Off Set (prism constant) | 2mm | -17.5mm | -34mm |
| Range | 10-150m | ~1000m | ~1000m |
| Materials | Polyamide | Polyamide | Polyamide |
| Weight | 0.2kg | 0.2kg | 0.2kg |



STAFF GAUGES

Staff Gauges are used mainly to measure the water levels in dam reservoirs or in combination with V-notch weirs to monitor seepage or entry flows as part of Dam Safety Monitoring programs.

They are provided with red datum numerals for easy surveying and the numerals can either be on separate

boards or printed directly onto the board itself.

Special ranges or sizes can be produced to meet specific project requirements.

Applications: Measuring water levels in or on: Dams, Rivers & streams, Lagoons, Harbours, V-Notch weirs

KEY FEATURES & SPECIFICATIONS

- ~ Made from GRP
- ~ Lightweight
- ~ Corrosion resistant
- ~ Clear markings
- ~ Low moisture absorption
- ~ In accordance with BS 3680 Part 7
- ~ High impact resistance
- ~ Red datum numerals
- ~ Chemically resistant
- ~ Long life

| | |
|-----------|--------------------------------|
| Standard | BS 3680 Part 7 |
| Material | Glass reinforced plastic (GRP) |
| Width | 145mm |
| Length | 1 metre |
| Thickness | 4mm |
| Fixing | 8 x M10 SS screws |

| DENSITY | | | | | |
|------------------------------------------------------------------------|-------------------------|--------------------------|------------------------------|------------------------------|--------------------------|
| Tonne/m³ Mg/m³ g/cm³ | kg/m³ | lb/in³ | UK ton/yd³ | US ton/yd³ | lb/ft³ |
| 1 | 1000 | 0.03613 | 0.75247 | 0.8428 | 62.423 |
| 10 ⁻³ | 1 | 3.613x10 ⁻⁵ | 7.525x10 ⁻⁴ | 8.428x10 ⁻⁴ | 6.243x10 ⁻² |
| 27.680 | 27680 | 1 | 20.828 | 23.238 | 1.728x10 ³ |
| 1.3289 | 1.328x10 ³ | 4.801x10 ⁻² | 1 | 1.12 | 82.955 |
| 1.1865 | 1.186x10 ³ | 4.287x10 ⁻² | 0.8929 | 1 | 74.074 |
| 1.602x10 ⁻² | 16.019 | 5.787x10 ⁻⁴ | 1.205x10 ⁻² | 1.35x10 ⁻² | 1 |

| FORCE & WEIGHT | | | | | |
|---------------------------|------------------------|-----------------|------------------------|------------------------|-----------------------|
| MN | kN | N | kgf | tonf | lbf |
| 1 | 1000 | 10 ⁶ | 1.0196x10 ⁵ | 100.4 | 2.248x10 ⁵ |
| 10 ⁻³ | 1 | 10 ³ | 101.96 | 0.1004 | 224.82 |
| 10 ⁻⁶ | 10 ⁻³ | 1 | 0.10196 | 1.004x10 ⁻⁴ | 0.2248 |
| 9.807x10 ⁻⁶ | 9.807x10 ⁻³ | 9.807 | 1 | 9.842x10 ⁻⁴ | 2.2048 |
| 9.964x10 ⁻³ | 9.964 | 9964 | 1016 | 1 | 2240 |
| 4.448x10 ⁻⁶ | 4.448x10 ⁻³ | 4.448 | 0.45355 | 4.464x10 ⁻⁴ | 1 |

| PERMEABILITY | | | | | |
|------------------------|------------------------|-----------------------|----------------------|-----------------------|------------------------|
| m/s | cm/s | m/year | Darcy | ft/yr | ft/day |
| 1 | 100 | 3.156x10 ⁷ | 1.04x10 ⁵ | 1.035x10 ⁶ | 2.835x10 ⁵ |
| 0.01 | 1 | 3.156x10 ⁵ | 1.04x10 ³ | 1.035x10 ⁴ | 2.834x10 ³ |
| 3.169x10 ⁻⁸ | 3.169x10 ⁻⁶ | 1 | 3.28x10 ³ | 3.281 | 8.982x10 ⁻³ |
| 9.66x10 ⁻⁶ | 9.66x10 ⁻⁴ | 304 | 1 | 1000 | 2.74 |
| 9.658x10 ⁻⁹ | 9.659x10 ⁻⁷ | 0.3048 | 10 ⁻³ | 1 | 2.378x10 ⁻³ |
| 3.527x10 ⁻⁶ | 3.527x10 ⁻⁴ | 111.33 | 0.365 | 365.25 | 1 |

| PRESSURE, STRESS & MODULUS OF ELASTICITY | | | | | | | | | | |
|-----------------------------------------------------|---------------------------------------|----------------------------------------|------------------------|------------------------|-------------------------|--------------------------|--------------|----------------------------|-----------------------------------------|---------------------------|
| MN/m² MPa | kN/m² kPa | kp kpf/cm² | bar | atm | m H₂O | ft H₂O | mm Hg | Tonf/ft² | psi lbf/in² | lbf/ft² |
| 1 | 1000 | 10.197 | 10.000 | 9.869 | 102.2 | 335.2 | 7500.6 | 9.320 | 145.04 | 20886 |
| 0.001 | 1 | 1.019x10 ⁻² | 0.0100 | 9.87x10 ⁻³ | 0.1022 | 0.3352 | 7.5006 | 0.0093 | 0.14504 | 20.886 |
| 9.807x10 ⁻² | 98.07 | 1 | 0.9807 | 0.9678 | 10.017 | 32.866 | 735.56 | 0.9139 | 14.223 | 2048.1 |
| 0.100 | 100.0 | 1.0197 | 1 | 0.9869 | 10.215 | 33.515 | 750.06 | 0.9320 | 14.504 | 2088.6 |
| 0.1013 | 101.33 | 1.0332 | 1.0132 | 1 | 10.351 | 33.959 | 760.02 | 0.9444 | 14.696 | 2116.2 |
| 9.788x10 ⁻³ | 9.7885 | 9.983x10 ⁻² | 9.789x10 ⁻² | 9.661x10 ⁻² | 1 | 3.2808 | 73.424 | 9.124x10 ⁻² | 1.4198 | 204.45 |
| 2.983x10 ⁻³ | 2.9835 | 3.043x10 ⁻² | 2.984x10 ⁻² | 2.945x10 ⁻² | 0.3048 | 1 | 22.377 | 2.781x10 ⁻² | 0.43275 | 62.316 |
| 1.333x10 ⁻⁴ | 0.1333 | 1.3595x10 ⁻³ | 1.333x10 ⁻³ | 1.315x10 ⁻³ | 1.362x10 ⁻² | 4.469x10 ⁻² | 1 | 1.243x10 ⁻³ | 1.934x10 ⁻² | 2.7846 |
| 0.1073 | 107.3 | 1.0942 | 1.0730 | 1.0589 | 10.960 | 35.960 | 804.78 | 1 | 15.562 | 2240.0 |
| 6.895x10 ⁻³ | 6.895 | 7.031x10 ⁻² | 6.895x10 ⁻² | 6.805x10 ⁻² | 0.7043 | 2.3108 | 51.714 | 6.426x10 ⁻² | 1 | 144.00 |
| 4.788x10 ⁻⁵ | 4.788x10 ⁻² | 4.883x10 ⁻⁴ | 4.788x10 ⁻⁴ | 4.725x10 ⁻⁴ | 4.891x10 ⁻³ | 1.605x10 ⁻² | 0.3591 | 4.464x10 ⁻⁴ | 6.944x10 ⁻³ | 1 |

| PRODUCT | PAGE | PRODUCT | PAGE |
|-------------------------------------------|------|-----------------------------------|------|
| Cables | 37 | Pressure Cell - Total | 22 |
| Crack Meter - VW | 18 | Readout - Multi-purpose MP12 | 25 |
| Crack Meter - 3D | 18 | Readout- Pendulum | 26 |
| Crack Meter - 3D Manual | 18 | Readout - Pneumatic C108 | 26 |
| Datalogger 4 Channel LINX | 27 | Readout - Single Channel VW-2106 | 25 |
| Datalogger - GeoLogger 8 Channel LINX | 27 | Rebar Strain Meter & Sister Bar | 24 |
| Datalogger - GeoLogger 485-SDI | 29 | Reed Switch Probe | 15 |
| Datalogger - GeoLogger G8 Module | 28 | Reflective Target | 40 |
| Datalogger - GeoLogger G8-Plus | 28 | Remote-Mux | 38 |
| Datalogger - GeoLogger GL101A-V | 29 | Remote Smart-Mux | 38 |
| Datalogger - Geologger GL Series | 29 | Rod Extensometer | 16 |
| Datalogger - Single Channel LINX | 27 | Rod Settlement System | 20 |
| Displacement Gauge - LP | 19 | Settlement Profiler | 20 |
| Displacement Gauge - VW | 19 | Slip Indicator System | 10 |
| Echo Sounder | 35 | SmartMux | 28 |
| Extensometer - Magnetic | 15 | Software - GeoAxiom Vista | 33 |
| Extensometer - Rod | 16 | Software - Inclinalysis | 33 |
| Extensometer - Soil | 17 | Soil Extensometer | 17 |
| Inclinometer Software | 32 | Staff Gauge | 40 |
| Inclinometer Casing Anchors | 10 | Strain Gauge - Embedment | 23 |
| Inclinometer Casing XC - External Coupler | 9 | Strain Gauge - Spot Weld | 23 |
| Inclinometer Casing QJ - Quick Connection | 9 | Strain Gauge - Surface Mount | 23 |
| Inclinometer - Horizontal In-Place | 8 | Surge Protective Device | 38 |
| Inclinometer - Horizontal Portable | 7 | Temperature Sensor | 34 |
| Inclinometer - Inclined In-Place | 8 | Tensmeg Tension Measuring Gauge | 24 |
| Inclinometer - Inclined Portable | 7 | Terminal Switch Box & Accessories | 37 |
| Inclinometer - Spiral Sensor | 9 | Thermistor String | 34 |
| Inclinometer - Vertical In-Place | 8 | Tilt Beam | 12 |
| Inclinometer - Vertical Portable | 7 | Tilt Meter - In-Place | 11 |
| Joint Meter | 19 | Tilt Meter - Portable | 11 |
| Junction Box | 39 | Tilt Meter - Submersible | 11 |
| Liquid Settlement System | 20 | Track Monitoring System | 12 |
| Load Cell - Hydraulic Anchor | 21 | Tunnel Profile Monitor | 17 |
| Load Cell - Strain Gauge | 21 | Tunnel Segment Monitoring System | 12 |
| Load Cell - Anchor VW | 21 | Ultra Rugged Field PC | 25 |
| Measuring Anchor | 17 | Ultrasonic Flow Monitor | 36 |
| Monitoring Prism | 40 | V-Notch Weir & Tanks | 35 |
| Pendulum Readout | 26 | Water Level Meter | 14 |
| Pendulum System | 10 | Weir Monitor | 35 |
| Piezometer - Multi-Point | 13 | Wi-SOS 480 System | 30 |
| Piezometer - Pneumatic | 14 | Wireless Digital Node | 30 |
| Piezometer - Standpipe | 14 | Wireless Gateway | 31 |
| Piezometer - Strain Gauge | 13 | Wireless Software | 32 |
| Piezometer - VW | 13 | Wireless Tilt Meter | 31 |
| Pressure Cell - NATM | 22 | Wireless VW Node | 30 |
| Pressure Cell - Push-In | 22 | Wireless WebCentre | 32 |



Geosense Ltd, Nova House, Rougham Industrial Estate, Rougham, Bury St Edmunds, Suffolk IP30 9ND, England
www.geosense.co.uk e info@geosense.co.uk t +44(0)1359 270457 f +44(0)1359 272860