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DONG-A GEOVAN

Optimized Measurement, Proven Safety

manufacturer providing solutions to measuring sensors for construction safety and unmanned automatic data collection, has accumulated know-how over the years and conducted technology research over and over again through process innovation, measurement, collection and the data analysis of stored information, and immensely contribute to prevent various negligent accidents

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GV-2401	MEMS Tiltmeter	p003
GV-2402	In Placement Inclinator	p004
GV-2403	VW Crackmeter	p006
GV-2403EL	EL Crackmeter	p007
GV-2404	ABS Inclinator Casing	p008
GV-2405	VW Strain Gage	p009
GV-2407	VW Piezometer	p010
GV-2408	EL Piezometer(mV)	p011
GV-2409	VW Load Cell	p012
GV-2410	VW Embedment Strain Gage	p013
GV-2411	VW Spot Weldable Strain Gage	p014
GV-2415	GeoLogger (Data Logger)	p015
GV-2416	VW Indicator	p016
GV-2417	Water level indicator	p017
GV-2418	Magnetic Indicator	p018
GV-2419	Total Pressure Cell	p019
GV-2424	Linear earth settlement cell	p020
GV-2427	Micron Filter	p021

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MEMS TILTMETER

MODEL - GV-2401



APPLICATION

- Slope measurement
- Monitoring tilt of retaining wall
- Inclination of concrete dam monitoring
- Land slide monitoring
- Bridge monitoring
- Leveling of industrial equipment
- Position control

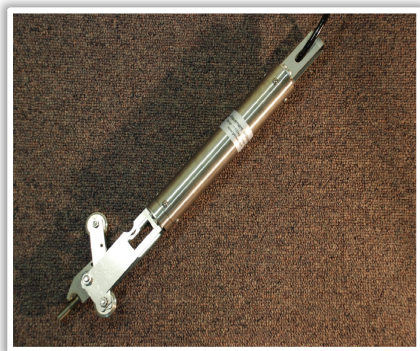
FEATURES

- Biaxial sensor
- Minimized drift signal
- Good repeatability
- Excellent Linear output
- Waterproof coated aluminium case
- Adopted MEMS ceramic tilt sensor with military grade PCB

SPECIFICATION

Items	GV-2401-10D
Range	±10 arc Deg
Accuracy	<F.S ±0.1%
Output	Single ended 0-5Vdc
Power	12Vdc
Non-linearity	< F.S. 1%
Sensor type	MEMS
Response time	< 0.5 second
Housing	IP67 waterproof grade
Operating Temperature	-20°C ~ +80 Celsius

* Specification and design can be changed without prior notice.



APPLICATION

In-Place inclinometer are used for continuous monitoring of horizontal and vertical deformations.

Applications includes :

- Monitoring of slope or embankment performance
- Monitoring of deflection of piles, abutments or retaining walls
- Monitoring of ground movements caused by tunneling
- Monitoring of settlement below storage tanks and structures
- Monitoring of land sliding area

OPERATIONS

- An In-Place inclinometer installation comprises a number of Uniaxial or Biaxial electrical tilt sensors, placed at predetermined intervals inside inclinometer casing
- The inclinometer sensor is mounted in a waterproof housing of fixed gauge length and is terminated with a robust inclinometer wheel assembly
- A system consists out of a number of tilt sensors connected to each other
- Each tilt sensor measures the inclination at its own depth. When movement occurs, a change in inclination of the tilt sensor will result in a displacement by using the same formula as with the mobile inclinometer
- As the base length of wheel to wheel is known(L), the measured tilt angle degree(θ) L will relate to the displacement (D) by using the formula :
 $D = L \times \sin\theta$

INSTALLATION

- The In-Place inclinometers system is installed in standard inclinometer casing of 70 or 85mm size. The signal cables of tilt sensors are guided out of the installation and are connected to a Data Acquisition System or terminal box
- The +/-10Deg is widely used in both horizontal and vertical systems
- The heavy-duty mechanical design is ideally suited for multiple use on many different projects and applications

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IN-PLACE INCLINOMETER

MODEL - GV-2402

FEATURES

- Thermal Sensitivity
- Low signal noise ratio
- High sensitive
- EMF immunity
- The 0~5Vdc transmission allows low power consumption

SPECIFICATION

- Axis : Uniaxial or Biaxial
- Range : +/-10Degrees
- Accuracy : 0.004Degrees. less than 0.002Degrees with filtering
- Material : 304F Stainless Steel
- Resolution : $1 \times 10E-4$ F.S. depend on data logger's resolution
- Output : 0~5Vdc low power Consumption
- Wheel set : Heavy duty wheel assembly is made of stainless steel
- Support assembly: Required to secure inclinometer chain on top of borehole
- Operating temperature : -20°C ~ 80 Celsius
- Power supply : 9~12Vdc

SIGNAL CABLE

- 22AWG 4Core shielded Cable. Attached to sensor at factory
- Specify length in meters with order

INSTALLATION EQUIPMENT

- Requires extension tube for sensor housing in 1 or 2mtr length with one wheel assembly
- The end unit requires an extension tube with two wheel assemblies in case of continuous chain
- Support Assembly requires for continuous chain in order to centralize and secure the system

READOUT EQUIPMENT

Compatible readouts includes the Digital indicator or Data Logger

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VW CRACKMETER

MODEL - GV-2403



FEATURES

- Splash proof
- Robust design
- Stainless steel material used
- High accurate & resolution
- Long term stability
- Stable frequency signal

OPERATION

Vibrating wire crackmeter is designed to measure displacements across cracks in structures. The transducer employs a shaft coupled to a spring which, in turn is coupled to a vibrating wire element. Movement of the shaft changes the tension in the spring and in the wire causing a corresponding change in its frequency of vibration. Transmitted through the cable to the readout location, the frequency signal is conditioned and displayed on a portable readout box. Alternatively, dataloggers can be used to record the data automatically. As VW crackmeter is linear displacement transducer, therefore the end user can use it for sensor head assembly of Rod extensometer which data be collected by datalogger.

SPECIFICATION

Type	Vibrating Wire
Range	100mm
Sensitivity	±0.025%
Accuracy	±0.1%
Nonlinearity	0.5%
Temp. Range	-20°C ~ +80 Celsius

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EL CRACKMETER

MODEL - GV-2403EL



FEATURE

- Heavy duty design
- Low drift against temperature variation
- Transmitting stable signal over long distance
- Providing accurate data near construction noise

DESCRIPTION

Geovan Linear Extensometer consists of linear displacement transducer. This Linear Extensometer is provided with two mounting blocks to install sensor to brick, concrete or rock surface. The sensor outputs a signal proportional to the plunger travel. Two type s are available, Push & Return and Pull & Return. 0–5Vdc signal output can be read out data logger and Digital indicator

SPECIFICATION

Range	30mm
Resolution	0.01mm
Linearity	0.1% F.S.
Input	9 ~ 12Vdc
Output	0 ~ 5Vdc
Working temperature	-20°C ~ +80 Celsius

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ABS INCLINOMETER CASING

MODEL - GV-2404



PURPOSE

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

APPLICATION

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

SPECIFICATION

Unit, mm,kg	60mm			70mm			85mm		
	Casing	Coupling	Cap	Casing	Coupling	Cap	Casing	Coupling	Cap
O.D	60	66	66	70	77	77	85	94	94
Length	3M	160		3M	160		3M	200	
	N/A			400			380		
Weight	2.3	0.18	0.06	2.5	0.2	0.07	3.2	0.3	0.09

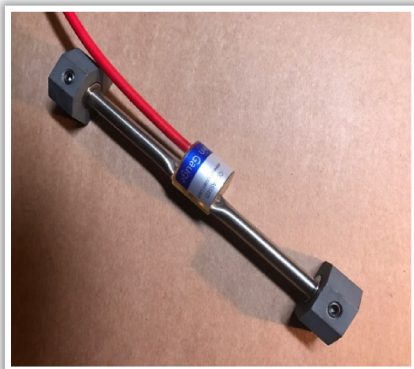
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VIBRATING WIRE STRAIN GAGE

MODEL - GV-2405

Strain and Stress Measurement



APPLICATION

- Steel strain monitoring
- Concrete strain measurement
- Driven and bored piles struts and support systems
- Underground and deep excavations monitoring

FEATURES

- Arc weldable installation
- Waterproof construction
- Removable coil & magnet
- Stable frequency signal output
- Temperature reading together
- Stainless steel construction
- Suitable for long term monitoring project

SPECIFICATION

Type of Transducer	Vibrating Wire
Standard Range	3,000 μs
Sensitivity	1.0 μs
Accuracy	F.S. 0.1 %
Nonlinearity	less than F.S. 0.5 %
Temperature Range	-20°C ~ +80 Celsius
Gage Length	150mm

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VIBRATING WIRE PIEZOMETER

MODEL - GV-2407



EXACT PORE PRESSURE MEASUREMENT

Geovan model GV-2407 piezometers are widely used to Measure ground water elevations and pore water pressures in boreholes, embankments, pipe lines, wells, mines, tunnels, road construction and soft ground monitoring projects

APPLICATION

- Controlling water pressure during consolidation by continuous monitoring
- Prediction of slope failure and remediation
- Design for lateral earth pressures
- Design for uplift pressures and buoyancy
- Monitor seepage, determine phreatic line and verify models of flow
- Monitor surface water run-off
- Monitor rate and direction of flow of contaminated water
- Monitor encroachment of salt water into fresh water aquifers

SPECIFICATION

Standard Ranges	3.5 5, 7, 10, 20, 35, 50 (Higher ranges on request)
Accuracy	less than F.S. 0.5 %
Non-Linearity	less than F.S. 0.5 %
Material (outer body)	Stainless steel
Operating Temperature	-20°C ~ +80 Celsius
Coil Resistance	140 160 Ohm @ 25°C
Thermistor	YSI 44005 or equivalent (3k Ohm @ 25°C)
Filter	High and low air entry Ceramic
Dimension	20mm dia x 145 mm length
Cable	4 core shielded

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EL PIEZOMETER

MODEL - GV-2408



FEATURES

- Slim size design OD22mm, L=120mm
- Stainless steel body material
- Accurate measurement
- Long term stability & low power consumption
- Atmosphere compensation with vent tube cable
- mV output (Red V+, Black GND, White S+)

OPERATION

The pressure sensing element is a semi-conductor which is wired up to give a change in resistance when the pressure in the environment changes. The output can be read using a simple handheld readout unit or can be wired to a datalogger for remote and/or real-time monitoring.

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VIBRATING WIRE LOAD CELL

MODEL - GV-2409



FEATURES

- Proven long term stability and accuracy
- Rugged Waterproof
- Not affected by cable length and resistance
- Compatible with datalogger

DESCRIPTION

The model GV-2409 Vibrating Wire Load Cell consists of a cylinder of high-strength, heat treated steel with 3 or 4 VW strain gages located around the circumference of the cell body.

Geovan Load Cell is ideally designed to measure loads in tiebacks, anchors, struts, rock bolts and strands in structures.

SPECIFICATION

Sensortype	Vibrating Wire Strain Gage
Standard range	50, 100, 150, 200 TON (other ranges on request.)
Over range	1.5 times full scale without damage
Resolution	0.025% F.S.
Accuracy	±0.25% F.S.
Nonlinearity	±0.5% F.S.
Material of cell	SCM Steel
Operating temperature	-20°C ~ +80 Celsius
Thermistor resolution	0.1 deg.C.
Excitation range	1200 ~ 3500Hz
Optional model	GV-2409 Strut Load Cell

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VIBRATING WIRE EMBEDMENT STRAIN GAGE

MODEL - GV-2410

Strain and Stress Measurement



APPLICATION

- Driven and bored piles monitoring
- Suspension bars strain measurement
- Soil nailing strain monitoring
- Strain of H-Beam steel monitoring
- Monitoring of Rebar deformation

FEATURES

- Concrete embedded installation
- Totally water proof construction
- Removable coil & magnet
- Stable frequency signal
- Temperature reading together
- Suitable for harsh environments
- Insensitive to long cable length

SPECIFICATION

Type of Transducer	Vibrating Wire
Standard Range	3,000 μs
Sensitivity	1.0 μs
Accuracy	F.S. 0.1 %
Nonlinearity	less than F.S. 0.5 %
Temperature Range	-20°C ~ +80 Celsius
Gage Length	50 mm

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VIBRATING WIRE SPOT WELDABLE STRAIN GAGE

MODEL - GV-2411



APPLICATION

For the measurement of settlement and heave in foundations

- Relaxation of rock around tunnels
- Embankments vertical displacement monitoring
- Settlement and heave in large excavations
- Pre-consolidation of soft soils
- Landfill sites Spidermagnet
- Subsidence

Long base strain monitoring of concrete piles

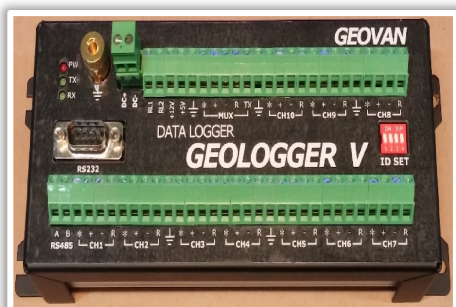
FEATURE

- Spot weldable installation
- Waterproof construction
- Stable frequency signal
- Temperature reading together
- Built in plucking coil with VW Strain Gage
- Insensitive to long cable lengths

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GEOLOGGER (DATA LOGGER)

MODEL - GV-2415



The model GeoLogger IV is free from extra programming work. It does not require additional programming language such as Basic or C⁺

- 10 to 30 Universal Sensor Channels
- Built in 16GB Memory in Hardware
- Easy-to-use, Configurable, Windowsbased Software
- Stand-alone and Real-time Data Acquisition
- Remote Monitoring and Control
- Removable Screw Terminals
- Expandable

Simply say, It is "Key-in Start Logger System" to supports various sensors reading as below ;

- Vibrating Wire Sensors
- 4-20mA Sensors
- 0-5V Sensors
- mV Sensors [Select $\pm 2.5\text{mV}$, $\pm 25\text{mV}$, $\pm 250\text{mV}$, $\pm 2500\text{mV}$]
- Thermistor
- Full Bridge Strain Gage Transducer

SPECIFICATION

Reading Channel No 30nos single-ended or 10nos differential

Input power	Select 12Vdc or 24Vdc
Accuracy	0.15% at 25
Resolution	Single-ended 16bits, Differential 15bits,
Communication	Logger to PC by RS 232 / Logger to Logger by RS485

Direct CDMA Modem connection available

Expand Memory by SD memory Card

Maximum data logger link :

- External Select = 16sets data loggers
- Internal Select = 64sets data loggers

Each Channel can be expanded up to 256 channels by use of multi port function.

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VIBRATING WIRE INDICATOR

MODEL - GV-2416



FEATURE

- Provide stable data read out
- Adopted advance microprocessor
- Simple menu by knob switch
- Support temperature reading
- Harsh weather operation outer case

DESCRIPTION

Geovan vibrating wire indicator is designed for use with all of vibrating wire sensor.

Modes A through F are designed for use with specific vibrating wire gages and the reading is displayed directly in microstrain, frequency squared or period.

A convenient feature of the Geovan Indicator is its ability to read 3K thermistors encapsulated inside most vibrating wire sensors, and to display the temperature reading.

SPECIFICATION

Mode	Calculation	Unit	Frequency Sweep(Hz)
A	Frequency	Hz	450 ~ 6,000
B	$F^2 \times 10^{-3}$	Digits	1,200 ~ 3,500
C	$F^2 \times 10^{-3} \times 4.062$	μS (micro strain)	450 ~ 1,000
D	$F^2 \times 10^{-3} \times 3.304$	μS (micro strain)	450 ~ 1,000
E	$F^2 \times 10^{-3} \times 0.39102$	μS (micro strain)	1,000 ~ 3,500

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WATER LEVEL INDICATOR

MODEL - GV-2417



Geovan water level indicator is supplied on a sturdy winding reel complete with a brake and carrying handle. The moisture resistant electronics and standard 9V battery are housed in the reel hub. This hub can be easily removed to replace the battery or check the electronics without disassembling the entire reel.

FEATURE

- Unit 1mm
- Durable flat cable, Consists of transparent coated steel tape with stainless conductors
- Easy electronics removal / battery replacement, standard 3Vdc
- Small probe diameter 16mm
- Sensitivity adjustment, light, buzzer, test switch
- Tape markings will not fade or wear away

OPERATING PRINCIPLE

A two conductor cable serves to both lower the probe and connect the probe to the output circuit board. An insulating gap in the probe serves as a switch, closing upon contact with the water.

This signaling contact with the water.

Elevation of the water table is then read directly from the tape. Since the water acts as the electrolyte, a sensitivity adjustment is provided to compensate for varying conductivity up to tape length 500meters.

FUNCTION

Measuring the elevation of groundwater in standpipes, boreholes, and wells.

TAPE LENGTH

- 50m
- 100m
- 150m
- 200m

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MAGNETIC INDICATOR

MODEL - GV-2418



- A portable system to monitor either heave or settlement in soil and rock
- Installation may be either as a single purpose device to monitor settlement / heave
- The system is simple, accurate, and has proven long term reliability
- Proven simple and accurate monitoring

APPLICATION

- Monitor settlement or heave
- When used around inclinometer casing, deformation in the third axis can be monitored
- Subsidence monitoring
- Displacement of retaining walls, piers, and abutments

FEATURE

- Sustain influenced magnetic field for long term project

SPECIFICATION

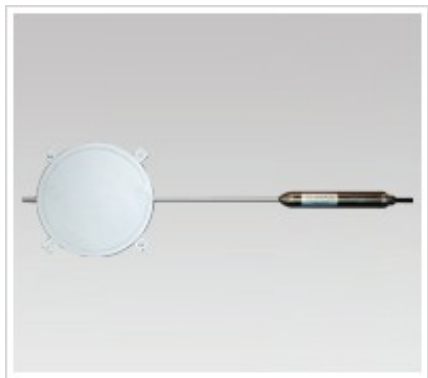
Range	Standard 50m, 100m, 200m (other ranges on request.)
Sensitivity	1mm
Repeatability	± 1mm
Accesstube	ID 30mm ~ ID 70mm heavy duty PVC flush threaded
Borehole Size	Ax(44mm), Bx(60mm), Nx(70mm) 100mm, 125mm

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TOTAL PRESSURE CELL

MODEL - GV-2419



FEATURE

- Accurate and robust structure
- Long term reliability
- All stainless steel construction
- Rugged construction for harsh environmental
- Easy to operate and install
- Thermistor included for Temperature measurement

APPLICATION

The Geovan's Total Pressure Cell is designed to measure total pressure in earth fills and embankments; as well as pressure on the surface of retaining walls, buildings, bridge abutments, tunnel linings and to measure stress in mass concrete.

SPECIFICATION

Standard Ranges	3.5, 7, 20 BAR (other ranges on request.)
Accuracy	Less than $\pm 0.25\%$ F.S.
Output	mA, Hz(V.W)
Operating Temperature	-20°C ~ +80 Celsius
Coil Resistance	140 ~ 160 Ohm @25
Thermistor	NTC 3k Ohm @25
Dimension	200mm dia pad 200mm dia x 145mm length pressure transducer 6mm dia connection tube

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LINEAR-EARTH SETTLEMENT CELLS

MODEL - GV-2424

Korea Patent Nr 10-0792400



APPLICATION

- Monitoring settlement or heave in embankments and embankment foundations
- Monitoring subsidence due to tunneling and mining
- Monitoring consolidation under storage tanks
- Monitoring settlement due to dewatering or preloading
- Monitoring continuous settlement with data logger

FEATURES

- Measurement of linear settlement, Heave small range monitoring available structures, railway and bridge settlement monitoring
- Atmosphere compensation with vent tube cable; free from barometric pressure change
- Tubing lengths of up to 300meter are permissible
- Special designed constant liquid level reservoir consists of liquid spare tank and liquid control valve without external power supply
- The reservoir and readout station should be located away from the monitoring site

SPECIFICATION

Range	2, 10, 35 mH2O (special ranges on request)
Sensitivity	F.S. +/-0.02%
Accuracy	F.S +/-0.1%
Resolution	1/1000 digit
Output	Current loop 2wire4-20mA, 0-5Vdc
Liquid	Ethylene glycol , Distilled water
Operating Temp	-20°C ~ +80 Celsius

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MICRON FILTER

MODEL - GV-2427

Ground water level measurements



APPLICATION

Ground water level measurements

- Simple and economic measurement of groundwater pressures in soil and rock.
- Standpipe piezometers are used to monitor piezometric water levels.
- Observation wells are used to monitor ground water levels.
- Water level readings are typically obtained with a water level indicator.

Typical applications include:

- Monitoring of dams, reservoirs & embankment
- Slope stability Groundwater levels for dewatering & drainage
- Groundwater sampling
- Permeability testing
- Contaminated soil monitoring
- Monitoring water drawdown during pumping tests

ADVANTAGES

- Economical components
- Simple to install
- Well and good filtering
- Free from clogged well and good filtering

FEATURES

Water level measurements are normally taken using a water level meter (dipmeter) or in the case of artesian pressure a Bourdon pressure gauge is attached to the top.

SPECIFICATION

- 50~60 micron porous PE plastic filter
- Available various size of fittings from, 20mm to 70mm
- Filter size : OD38 x ID30 x L400mm

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