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GEOTECHNICAL & STRUCTURAL MONITORING

# Vibrating Wire Sensor Catalogue

Precision measurement solutions for slopes, dams, tunnels, piles, and infrastructure structures.

*Engineered for long-term reliability in the harshest environments*

## PRODUCTS IN THIS CATALOG

**BEAM-PZ** Piezometer
**BEAM-E150** Embedment Gauge
**BEAM-SG-ST** Strand Meter
**BEAM-LC** Load Cell
**BEAM-SG-W/S** Surface Strain Gauge
**BEAM-SG-R** Rebar Strain Gauge
**BEAM-CR** Crackmeter

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# Vibrating Wire Piezometer
## Model: BEAM-PZ / PZV



**DESCRIPTION**

The Ackcio VW Piezometer series is designed for embedding in hydraulic structures and bedrock, or installing in piezometer tubes, boreholes, dams, pipelines, or pressure vessels to measure pore water pressure or liquid level. The main components are made of special steel, making them suitable for various harsh environments.

The standard filter is made of sintered stainless steel with 50-micron pores, ensuring excellent permeability. The unique stability compensation technology gives the sensor a minimal temperature compensation coefficient. With improved cable protection measures, it can be directly embedded in roller-compacted concrete.

**OPERTAIONS**

Connect the sensor Ackcio VW node via the cable. The readout displays frequency units, or engineering units by inputting the instrument calibration coefficient.

**APPLICATIONS**

Landslides and slope sites | Embankments and tailings lagoons | Aquifers and ground water measurement | Monitoring of up-lift pressure | Dewatering activities | Dams and hydraulic structures

**FEATURES**

Long-term stability | Built-in temperature sensor | Stable data transmission over long cable | Long working life | Good sealing | Customisable ranges | Built-in lightning protection

| Model | BEAM-PZ-XX |
|---|---|
| Standard Range | 350kPa, 500kPa, 700kPa, 1000kPa, 2000kPa, 3000kPa |
| Resolution | ≤ 0.025% F.S. |
| Over Range | 150% F.S. |
| Accuracy | ± 0.1% F.S. |
| Material | Stainless Steel |
| Diamater | 20mm |
| Length | 210mm |
| Temperature Range | -20°C to +80°C |

**ORDERING INFORMATION**

Standard model: BEAM-PZ-XX where XX denotes the pressure range.
Vented model: BEAM-PZV-XX available for applications requiring barometric compensation.
Cable: 4-core screened cable available in custom lengths. Vented cable available for vented models.


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# VW Surface Mount Strain Gauge
## Model: BEAM-SG-W / SG-WX / SG-S / SG-SX



**DESCRIPTION**

The Ackcio VW Arc Weldable Strain Gauge (SG-W) is designed for monitoring strain in pipelines, steel structures, sheet piles, and bridges. The two end blocks can be welded with an arc welder or fixed with bolts on the surface of a structure.

The Ackcio VW Surface Mount Strain Gauge (SG-S) can be used for surface stress and strain monitoring of concrete or steel structures, installed using two groutable anchors through drilling.

**OPERATIONS**

The SG-W is designed for direct installation onto structural steel surfaces. The sensing element consists of a tensioned steel wire mounted between two steel blocks, which are arc welded directly to the steel member being monitored. This ensures rigid mechanical coupling and reliable long-term strain measurement on steel structures.

The SG-S is designed for embedment within solid materials including concrete, rock, and timber. The unit is secured in place via two groutable anchors, allowing the gauge to be cast or grouted directly into the host material for accurate internal strain monitoring.

**APPLICATIONS**

- SG-W: Steel members, struts, pipelines, sheet piles, and bridges
- SG-S: Concrete members, struts, piles, and mass concrete
- Monitoring strain and load during construction and service life
- Monitoring strain in reinforcing bars during construction and pile testing

**FEATURES**

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

| Model | BEAM-SG-W / SG-WX / SG-S / SG-SX |
|---|---|
| Range | 3000 με |
| Accuracy | ± 0.5% F.S. |
| Resolution | 1 με |
| Diameter | 22mm |
| Gauge Length | 150mm |
| Temperature Range | -20°C to +80°C |
| Waterproof | Customised |
| Installation Method | Surface Mounting (weld or bolt) |


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# VW Strain Gauge Embedment
## Model: BEAM-E150 / EX150 / E250



**DESCRIPTION**

The E150 Embedment Strain Gauge can be directly embedded in the concrete or reinforced concrete of hydraulic structures and other structures to monitor the strain of the concrete. The built-in temperature sensor can simultaneously monitor the temperature at the measuring point.
The EX150 has an integrated structure with excellent waterproof performance, suitable for monitoring the stress and strain of concrete or steel structures, and is particularly suitable for concrete piles.
The E250 Heavy Duty Strain Gauge is suitable for monitoring the strain of roller-compacted concrete. With optional supporting equipment, it can form a multi-directional strain gauge and a stress-free gauge.

**OPERATION**

The gauge is installed prior to concrete pour and protected during the pour. It may also be pre-cast into a concrete briquette for subsequent casting, or embedded into holes drilled into an existing structure. The pickup coil is fitted over a flattened section in the centre of the gauge tube and held in place using a securing clamp. Cables from the gauges are run to a readout, terminal box, or data logging point.

**APPLICATIONS**

Concrete members and struts | Bridges and dams | Piles and mass concrete | Strains in reinforcing bars during construction, pile testing and service life

**FEATURES**

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

| Model | BEAM-E150 / EX150 / E250 |
|---|---|
| Range | 3000 με / 2500 με |
| Accuracy | ± 0.5% F.S. (batch); ± 0.1% F.S. (individual cal.) |
| Resolution | 1 με |
| Diameter | 22mm /50mm |
| Gauge Length | 150mm / 250mm |
| Temperature Range | -20°C to +80°C |
| Waterproof | Customised |
| Installation Method | Embedded in concrete |


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# VW Rebar/Sisterbar Strain Gauge
## Model: BEAM-SG-R



**DESCRIPTION**

The BEAM-SG-R Rebar Strain Gauge is designed for monitoring stress changes in rebar or anchor rods within concrete or other structures. The built-in temperature sensor also allows for the measurement of ambient temperature at the installation location. The ends of the rebar strain gauge can be welded in the middle of the rebar to be measured, or processed into threaded joints for easy on-site installation.

Small diameter rebar strain gauges (12mm-16mm) can be used as "sisterbars", allowing them to be directly tied near the large diameter rebar to be measured. This enables stress measurement of the rebar using an equivalent measurement method. Sisterbars are installed alongside existing lengths of rebar within the cage.

**OPERATION**

The Rebar Strain Gauge consists of a sealed element containing the wire, de-bonded from the concrete by a plastic coating, attached to two lengths of rebar (one at each end) which transfer strain from the structure. Rebar extensions are long enough to ensure full transfer of strain. Rebar Strain Gauges and Sisterbars are usually installed in pairs on either side of the neutral axis, so that bending movements can be separated from axial loads. The integrated thermistor records temperature data for evaluating thermally induced strains.

**APPLICATIONS**

Diaphragm and slurry walls | Monitoring of strain due to load | Bridges and dams | Monitoring strain and load during construction and service life | Piles and mass concrete | Monitoring strains in reinforcing bars during construction, pile testing and service life

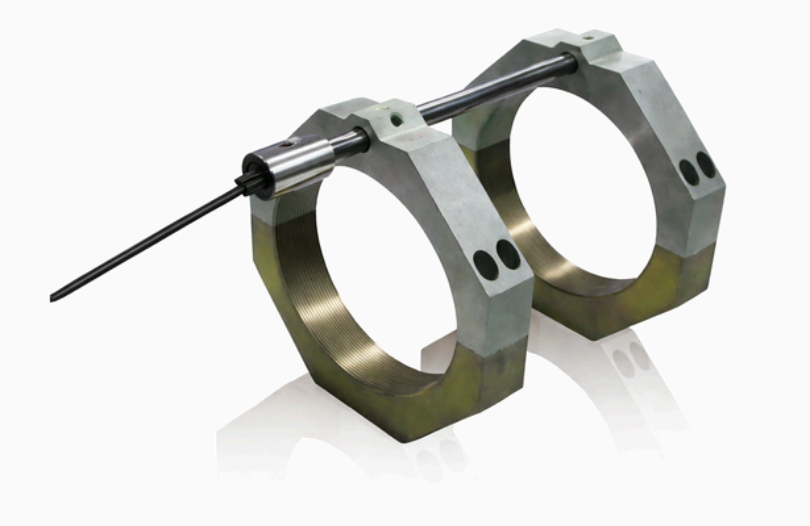
**FEATURES**

Accurate, long-term stability | Robust design and reliable | Available for most rebar sizes (12-40mm) | Fit for manual or remote reading | Range adjustable for compression or tension | Integral thermistor

| Model | BEAM-SG-RXX-300 / SG-RXX-400 |
|---|---|
| Range | 2000 με (300MPa) / 2500 με (400MPa) |
| Accuracy | ± 0.25% F.S. |
| Resolution | 0.4 με |
| Rebar Diameter | 12, 14, 16, 18, 20, 22, 25, 28, 32, 36, 40mm |
| Temperature Range | -20°C to +80°C |
| Waterproof | Customised |


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# VW Strand Meter
## Model: BEAM-SG-ST20 / SG-ST50



**DESCRIPTION**
The BEAM-SG-ST Vibrating Wire Strand Meter is designed for monitoring the stress and strain in cables. The installation bracket at both ends securely grips the cable, allowing precise measurement of deformation and elastic modulus to determine force changes. The installation bracket can be customized according to user requirements.

**OPERATION**
The Strand Meter uses vibrating wire displacement transducers to measure displacements across joints and cracks. The transducer consists of a vibrating wire in series with a tension spring. Displacements are accommodated by stretching of the tension spring, producing a commensurate increase in wire tension. The wire and spring are connected to a free-sliding rod which protrudes from, and is free to slide inside, a protective outer tube. An O-ring seal prevents water from entering. The frequency signal is transmitted through the cable to the readout.

**APPLICATIONS**
Bridges | Highway | Hydroelectric power plants | Railway facilities | Chemical plants | Nuclear power plants

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

| Model | BEAM-SG-ST20 / SG-ST50 |
|---|---|
| Range | 20,000 με / 50,000 με |
| Resolution | 0.01% F.S. |
| Nonlinearity | Linearity: ≤ 0.5% F.S.; Polynomial: ≤ 0.1% F.S. |
| Temperature Range | -20°C to +80°C |
| Length | Based on range |
| Waterproof | Customised |

**ORDERING INFORMATION**
BEAM-SG-BKT-A: Mounting bracket pair for strand ID < 50mm
BEAM-SG-BKT-B: Mounting bracket pair for strand ID 50-100mm


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# VW Crackmeter
## Model: BEAM-CR / CR-W



**DESCRIPTION**

The Ackcio VW Crackmeter is suitable for installation on structural surfaces, providing long-term monitoring of the opening and closing of surface cracks or joints. The universal joints at both ends of the sensor allow for a certain degree of shear deformation. The built-in temperature sensor can simultaneously monitor the ambient temperature. With other mounting accessories, it can be configured as a biaxial, triaxial crack meter, etc.

**OPERATION**

The socket is installed in the first lift of concrete, using an installation plug to prevent concrete entering. Before the second lift, the main body is screwed into the installed socket, extended to allow for expected joint movement, welded or tied to the rebar and the second lift is cast. When both lifts are complete, the crackmeter is firmly anchored into each concrete lift and will measure opening or closing of the joint.

**APPLICATIONS**

Brick and stone buildings | Bridges and dams | Construction joints | Pipelines | Joints and bearing/support interaction | Tunnels and lining cracks | Structures susceptible to earthquake and landslide areas

**FEATURES**

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

| Model | BEAM-SR-XX / CR-W-XXXX |
|---|---|
| Range (VW) | 12.5, 25, 50, 100, 150, 200mm |
| Range (Wire) | 1000, 2000mm (4-20mA output) |
| Resolution | 0.025% F.S. |
| Accuracy | ± 0.1% F.S. |
| Waterproof | Customised |
| Temperature Range | -20°C to +80°C |
| Gauge Length | Determined by range |

**ORDERING INFORMATION**

BEAM-CR-XX: Vibrating wire crackmeter, where XX = range in mm. Supplied with thermistor and two anchors.
BEAM-CR-W-XXXX: Wire crackmeter for extended range (1000/2000mm), output 4-20mA.
Cable: 4-core screened cable available in custom lengths.


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# VW Load Cell
## Model: BEAM-LC



**DESCRIPTION**

The Ackcio VW Load Cell is designed for monitoring the loads on anchor cables, anchor bolts, rock bolts, and arch supports, as well as other heavy loads. The load cell is made of high-strength alloy steel cylinder and is equipped with 3 to 6 vibrating wire sensors that can monitor the total load acting on the load cell. By measuring the data from each sensor, uneven or eccentric loads can be obtained.

**OPERATION**

The load cell is designed primarily for use on tiebacks and rockbolts, and particularly where long-term monitoring is required. They may also be used during pile load tests and for monitoring loads in struts, tunnel supports, etc. In practically all cases, the load cells are used in conjunction with bearing plates positioned on either side of the load cell. A bearing plate is placed beneath the load cell to spread the load and take up any residual non-alignment. Another bearing plate is placed between the cell and the anchor bolt or tensioning device. To minimize eccentric and uneven loading, the use of thick machined-flat bearing plates and centralizer bushings (where necessary) are recommended. The readings from up to six gauges are averaged to produce the total load for the cell. Calibration factors are provided to enable direct reading in engineering units.

**APPLICATIONS**

Rock bolts | Tensions in cable anchors and tendons | Structural beams | Piles | Tunnel supports | Loading and pull-out tests on trial anchors | Loads during pile testing | Loads in arch tunnel supports | Long term loads in concrete dams

**FEATURES**

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

| Model | BEAM-LC-XX |
|---|---|
| Range | 250–999kN \| 1000–2999kN \| >3000kN |
| Resolution | 0.025% F.S. |
| Accuracy | ± 0.25% F.S. |
| Temperature Range | -20°C to +80°C |
| Overload Capacity | 150% |
| Number of Gauges | 3 \| 3-4 \| 6 |

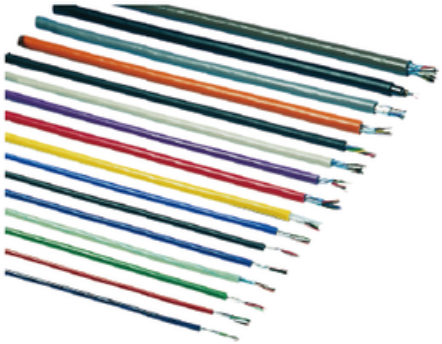
**ORDERING INFORMATION**

BEAM-LC-XXXX: Vibrating wire load cell, where XXXX = range in kN. Supplied with thermistor and bearing plates.
Cable: 10/14-core screened cable available in custom lengths.


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# Screened Cable
## Model: BEAM-CA-XX



**DESCRIPTION**
The Ackcio BEAM-CA Screened Cable series is designed for connecting vibrating wire sensors in geotechnical and structural monitoring installations. The cables can be directly buried in soil or embedded in concrete, offering excellent waterproof and electrical performance for long-term field deployments.

All cable cores are twisted per pair and individually screened with tin foil, providing 100% shielding coverage to protect against electrical noise interference. The BEAM-CA-04 models incorporate high-strength steel strands to improve tensile strength and facilitate cable routing in challenging installations. Vented cable variants (BEAM-CA-04-T) are available for use with sensors requiring automatic atmospheric barometric compensation.

**OPERATION**
Connect the sensor to the Ackcio VW node (BEAM-VW or BEAM-AN) via the screened cable. Route the cable from the sensor location to the node, ensuring adequate protection at entry/exit points in concrete or soil. For long cable runs, junction boxes may be used to consolidate connections. Vented cables must maintain an unobstructed vent path to atmosphere for barometric compensation to function correctly.

**APPLICATIONS**
Vibrating wire sensor connection | Piezometer installations in boreholes and embankments | Strain gauge and crackmeter wiring | Load cell connections | Long cable runs in dams, tunnels, and foundations | Direct burial in soil or embedment in concrete

**FEATURES**
100% screened coverage for electrical noise protection | Multi-core options from 4 to 14 cores | High-strength steel strand reinforcement (BEAM-CA-04 models) | Multiple sheath options for different environments | Vented cable available for barometric compensation | Armoured cable option for high tensile loading

| Model | BEAM-CA-XX | BEAM-CA-04-T | BEAM-CA-04-A |
|---|---|---|---|
| Cores | 4/6/8/10/14 | 4 | 4 |
| Name | Screened Cable | Vented Cable | Armored Cable |
| Core wire material | Copper, or Copper Alloy, Tin Plated | | |
| Area | 0.22mm² or 0.35mm² | 0.35mm² | 0.35mm² |
| OD | 4.75mm-11mm | 8.5mmm | 6.35mm |
| Jacket Material | PVC, PTFE, Polyurethane | | |
| Operating Temperature | -25°C to +80°C | | |


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