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## VW Anchor Load Cells



### Introduction

Geosense® VWLC 5000 series Vibrating Wire Anchor Load Cells consist of a cylinder of high strength steel with 3 to 6 vibrating wire strain sensors (depending on capacity) mounted parallel to the longitudinal axis arranged equidistant around the circumference to measure the compression of the cylinder under load.

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

With the multi sensor configuration it is possible to obtain accurate readings under mildly eccentric loading conditions as the sensors are read individually.

The readings from the individual sensors are averaged and when used in conjunction with a calibration factor, supplied with each cell, allow the applied load to be calculated.

In multi strand anchors it is therefore possible to tension the strands uniformly by monitoring the load in each sensor as appropriate.

The abutment plate (to be sourced locally) is normally made to suit specific site requirements and load distribution plate pairs (supplied by PCTE) should be used to minimise eccentric loading and provide a smooth parallel bearing surface and evenly spread the load to the cell. These should be inserted between the load cell and the anchor head.

### Working principle

A vibrating wire 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.

Around the wire is a magnetic coil which when pulsed by a vibrating readout or data logger interface plucks the wire and measures the resultant resonant frequency of vibration.

Deformation within the steel cylinder will cause the wire ends to move relative to each other. The tension in the wire will change accordingly thus altering the resonant frequency of the wire.

Temperature information can be used if logging regularly to determine swift temperature changes during which strain readings may be exaggerated

### Features

- High strength steel construction
- Load distribution plates available
- Proven long term accuracy
- Accommodates eccentric loading
- Multiple gauge system
- Data logger compatible
- Available with plug connector or cable

### Applications

Measurement of load acting on:

- Ground anchors
- Rock Bolts
- Tie-backs
- Struts
- Arch Supports
- Props

### Specifications

VWLC-5000 vibrating wire Anchor Load Cells may be read by the VW-2106 or any vibrating wire readout device and may be readily connected using any datalogger with vibrating wire interface modules.

Cable may be readily and simply extended on site without special precautions. Gauges may be read up to 1000 metres away from their installed location without change in calibration.



PAPWORTHS CONSTRUCTION TESTING EQUIPMENT

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VW Load Cell	
Description	Specification
Thermistor	3k Ohms at 25 oC
Over range capacity	150% F.S.
Accuracy <sup>1</sup>	0.5% F.S.*
Resolution	0.05% F.S.
Output	1200 - 2800 Hz
Temperature range	-20°C to +80°C
Material	High tensile, stress relieved steel

<sup>1</sup>System accuracy depends on loading conditions \*0.25% F.S. available on request

Vibrating wire strain gauges output a frequency signal and are therefore insensitive to resistance changes in connecting cables caused by contact resistance or leakage to ground.

When ordering the following information is require:

- Capacity
- Cable Length
- Load Distribution Plate
- Connectors

### Accessories

- Load distribution plates
- Centraliser Bushings
- Fly Connector
- Cable End protector
- Jump Cables



### Readout Systems



#### Single Channel VW Readout

This unit allows a user to collect readings from a VW Sensor and Thermistor during installation or for short term jobs where a operator can check manually. With a switching box multiple VW system can be read one after the other.



#### Single Channel VW Datalogger

A low cost battery powered system for unattended monitoring of a single VW Sensor and thermistor.



#### Ten Channel VW Datalogger

Each channel records data from a VW sensors or thermistor. Typically will record data for 5 VW sensors and integral thermistors.

Custom datalogger systems for any number of sensors in any configuration are also available.

Load Distribution Plates			
Capacity(kN)	ID(mm)	OD(mm)	Height(mm)
300	30	64	30
500	50	86	30
750	75	113	40
1000	112	148	40
1500	150	190	50
2000	150	200	50
2500	150	210	50

Standard Dimension				
Capacity(kN)	Sensors	ID(mm)	OD(mm)	Height(mm)
300	3*	30	58	100
500	3*	50	80	100
750	3*	75	107	100
1000	3*	112	142	100
1500	6	150	184	100
2000	6	150	194	100
2500	6	150	204	100

\*6 sensor strain elements available

Please see our other data sheets for details of readout equipment, terminal boxes and data loggers specific to vibrating wire devices.

### PCTE

PCTE have over 30 years' experience in the measurement and testing of concrete. With experience in research, consulting and construction they are able to assist you in reviewing the issues and developing solutions. PCTE can provide more than just the equipment. They can provide leading technical support for your business.

### Other Equipment

GeoSense offer a complete range of structural health monitoring equipment, including VW strain gauges, extensometers, load cells and tilt meters.

The Olson Instrument range includes the NDE360, CTG, Freedom Data PC and DAS as well as the resonance tester.

The full Proceq range of equipment is available for insitu non-destructive concrete measurement, including Schmidt Hammers, Covermeters, Half Potentials, Resistivity, Ultrasonics and Permeability.

We also supply Engius maturity, temp and humidity logging systems, corrosion rate monitoring equipment and GPR.