

## VW Liquid Settlement System



### Introduction

The Geosense® 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.

### Working principle

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 estimated settlement. The sensor is connected via two liquid-filled tubes which are connected to a reservoir located on stable ground. As the transducer settles with the surrounding ground the height of the column is increased and the corresponding higher pressure is measured by the transducer.

Settlements are calculated by converting the pressure to millimetres of liquid head.

The pressure sensor transducer uses a pressure sensitive diaphragm with a vibrating wire element attached to it which is mounted inside an evacuated and hermetically sealed housing. Various housings are available to suit application.

The transducer 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.

Fluid pressures acting on the diaphragm causes a deflection of the diaphragm which then changes the tension in the vibrating wire thus altering the resonant frequency of the wire.

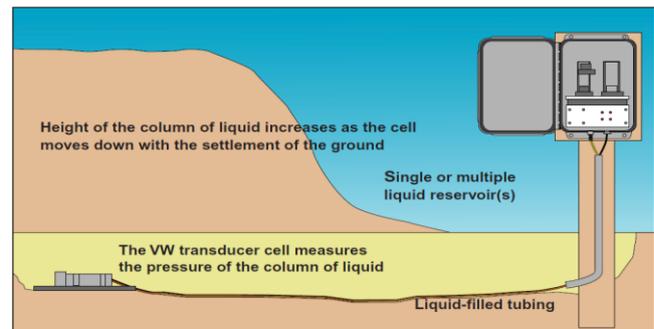
**Vented System:** The pressure sensor is vented so that it is automatically compensated for changes in atmospheric pressure.

**Sealed System:** The pressure sensor is sealed and therefore independent atmospheric readings should be taken and compensations made accordingly.

VWLSS-200 vibrating wire settlement sensors may be read by the VW2106 or any vibrating wire readout device and may be readily data logged using Campbell Scientific or any other data loggers with vibrating wire interface modules.

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

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.



### Features

- Not affected by barometric pressure
- In-situ checks available
- Air can be easily removed
- Manual or automated readout
- Reservoir can be sited away from construction area

### Applications

Subsurface point settlements/heave beneath:

- Embankments
- Surcharges
- Fills
- Dams
- Landfills





PAPWORTHS CONSTRUCTION TESTING EQUIPMENT

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**Melbourne**  
Niddrie  
0428 315 502

**Sydney**  
Belrose  
0418 381 709

## Specifications

DESCRIPTION	
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
MODEL DESCRIPTION	
VWPS-201V	VW vented pressure sensor 70 kPa
VWPS-202V	VW vented pressure sensor 140 kPa
VWPS-203V	VW vented pressure sensor 175 kPa
VWPS-204V	VW vented pressure sensor 345 kPa
VWPS-201S	VW sealed pressure sensor 70 kPa
VWPS-202S	VW sealed pressure sensor 140 kPa
VWPS-203S	VW sealed pressure sensor 175 kPa
VWPS-204S	VW sealed pressure sensor 345 kPa
VWSR211R	1 cell reservoir
VWSR212R	2 cell reservoir
VWSR213R	3 cell reservoir
VWSR214R	4 cell reservoir
VWSR215R	5 cell reservoir
VWSR216R	6 cell reservoir
VWSR217R	7 cell reservoir
VWSR218R	8 cell reservoir
VWSR219R	9 cell reservoir
VWSR220R	10 cell reservoir
VWSP230	450 x 450mm plate
VWSP231	500 x 500mm plate
K10-045	6mm OD x 4mm ID twin nylon tubing with PVC outer sheath - per metre
Q10-020	Type 900-1 cable - per metre

\*other ranges available on request

## Ordering Information

~ Sensor type	~ Number of resevoirs
~ Sensor range	~ Tube length
~ Plate size	~ Cable length

## 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 and can be designed on request.

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.