

L2 VIBRATING WIRE LOAD CELL

Datasheet L2



**Description**

The Vibrating Wire Load Cell is designed to directly measure load in piles, rock bolts and between tunnel supports, as well as tension in cable anchors.

The load cell comprises a set of up to six Vibrating Wire gauges mounted parallel to the cell axis and spaced equidistant radially in a cylindrical housing.

The load cell can be wired directly to a data logger, or connected via sheathed cable and a switched terminal unit to a readout unit.

Load cells are manufactured with a centre hole to accommodate rockbolts, tendons or anchor cables, but can be supplied with top and bottom load plates for use as a solid centre cell.

**Features**

- Uses proven Vibrating Wire technology
- Accurate readings over long cable lengths
- Robust and with long-term stability
- Fast response time
- Negligible temperature effects compared to oil-filled load cells

**Benefits**

- Connecting cable is strong, screened and flexible and can be used in lengths over 1000m
- Suitable for remote reading and datalogging



Comprehensive information about this product and our full range is available at [www.soilinstruments.com](http://www.soilinstruments.com)  
If you would like to speak with someone directly please call +44 (0)1825 765044 or email [sales@soilinstruments.com](mailto:sales@soilinstruments.com)

## VIBRATING WIRE PRINCIPLE



A high carbon steel wire is held in tension between a fixed point and a movable point within the sensor.

The physical changes measured by the sensor result in small changes to the position of the movable point which results in a change to the tension of the wire.

The wire may be excited by either plucking or sweeping via a coil adjacent to the wire. The resulting resonant frequency (which is relative to the tension of the wire) is then recorded by the same coil. The reading can be displayed by instrument readout or recorded by data logging equipment.

### Operation

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.

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 when using Soil Instruments VWnote readout.

Alternatively, cells can be wired to a datalogger.

### Applications

Vibrating Wire Load Cells can be used to measure general or specific loads.

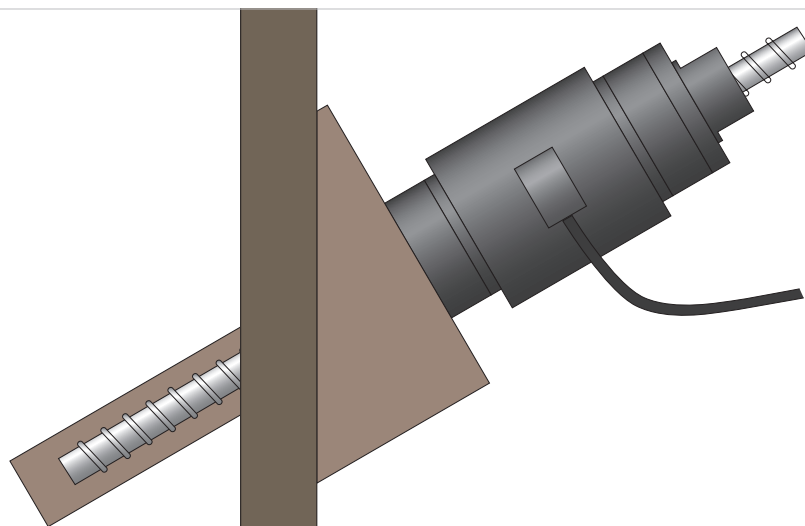
Typical applications include:

- 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

### Associated products

For details on:	Catalogue code:
Terminal and Junction Boxes	RO TB-JB-TJ
VWnote	RO-1-VW-NOTE
Cables	CA

View our full product range on [www.soilinstruments.com](http://www.soilinstruments.com)



### THE TECHNICAL RATING FOR THIS PRODUCT:

**INTERMEDIATE** 

As the correct installation of any monitoring sensor or system is vital to maximise performance and accuracy, Soil Instruments makes the following recommendations, for the skill level of the installation contractor.

#### ADDITIONAL SUPPORT

We offer installation and monitoring services to support this system. For more information please email : [sales@soilinstruments.com](mailto:sales@soilinstruments.com) or call : **+44 (0) 1825 765044**

**ADVANCED** 

The installer is trained and experienced in the installation of this type of instrument or systems, and is ideally a specialist Instrumentation and Monitoring contractor.

**INTERMEDIATE** 

The installer already has previous experience and/or training in the installation of this instrument or system.

**BASIC** 

As a minimum the installer has read and fully comprehends the manual, and if possible has observed these instruments or systems being installed by others.

## Specifications

### Vibrating Wire Load Cell

kN Range	500	1000	1500	1800	2500	5000	10000
Accuracy <sup>1</sup>	±0.5% full scale						
Resolution <sup>2</sup>	0.025% full scale minimum						
Over range	150% full scale						
Temperature range	-20 to +80°C						
Excitation method	Pluck or sweep						
Frequency range	2200Hz to 2800Hz						
Ingress protection	IP68 (to 1000kPa)						
Material	Plated steel						
Thermistor type	NTC 3k Ω						
Thermistor accuracy	±0.5% full scale						
Thermistor resolution <sup>2</sup>	0.1°C						

### Load Cell

kN Range	500	1000	1000	1500	1800	2500	5000	10000
No. strain gauges	3	3	3	3	3	3	6	6
Internal diameter	50.8mm	76.2mm	101.6mm	76.2mm	101.6mm	101.6mm	152.4mm	203.2mm
Outside diameter	76.2mm	111.1mm	130.2mm	123.8mm	149.2mm	162.6mm	240.0mm	328.9mm
Height	76.2mm	101.6mm	101.6mm	101.6mm	101.6mm	101.6mm	149.9mm	200.7mm
Weight	1.6Kg	4.1Kg	4.2Kg	6.0Kg	7.5Kg	10.1Kg	31.8Kg	82.9Kg

### Bearing Plate

kN Range	500	1000	1000	1500	1800	2500	5000	10000
Internal diameter	50.8mm	76.2mm	101.6mm	76.2mm	101.6mm	101.6mm	152.4mm	203.2mm
Outside diameter	95mm	130mm	150mm	145mm	170mm	185mm	265mm	355mm
Thickness	33mm	43mm	43mm	43mm	43mm	43mm	58mm	73mm

<sup>1</sup> Dependent on load bearing conditions

<sup>2</sup> Dependent on readout

## Ordering Information

### Vibrating Wire Load Cells

Supplied with 1m cable

L2-1.1	500kN load cell; 50.8mm ID – 3 gauge
L2-1.4	1000kN load cell; 76.2mm ID – 3 gauge
L2-1.5	1000kN load cell; 101.6mm ID – 3 gauge
L2-1.6	1500kN load cell; 76.2mm ID – 3 gauge
L2-1.7	1800kN load cell; 101.6mm ID – 3 gauge
L2-1.8	2500kN load cell; 101.6mm ID – 3 gauge
L2-1.10	5000kN load cell; 152.4mm ID – 6 gauge
L2-1.11	10000kN load cell; 203.2mm ID – 6 gauge

### Connecting Cable and Fittings

CA-2.3-10-SC	10 core, multicore cable, 16/0.20, screened; priced per metre, PVC jacket, for up to 3 gauge load cells
CA-2.2-18-SC	18 core, multicore cable, 7/0.20, screened; priced per metre, PVC jacket, for up to 6 gauge load cells
CA-2.3-25-SC	25 core, multicore cable, 16/0.20, screened; priced per metre, PVC jacket
CA-2.3-50-SC	50 core, multicore cable, 16/0.20, screened; priced per metre, PVC jacket
CA-4.1	Joint sealing kit
CA-4.2	Coloured adhesive tapes; set of 10No.
CA-4.3	Crimping tool
CA-4.4	Crimping sleeves; set of 100No.
W6-6.1	Nylon ties, 150mm x 3.5mm, pack of 100No.
ST1-3.5	Nylon ties, 370mm x 4.7mm, pack of 100No.

### Centre Hole Bearing Plates

For use with rock bolts or cable anchors, two per cell

L2-2.1	For 500kN load cell; 50.8mm ID
L2-2.4	For 1000kN load cell; 76.2mm ID
L2-2.5	For 1000kN load cell; 101.6mm ID
L2-2.6	For 1500kN load cell; 76.2mm ID
L2-2.7	For 1800kN load cell; 101.6mm ID
L2-2.8	For 2500kN load cell; 101.6mm ID
L2-2.10	For 5000kN load cell; 152.4mm ID
L2-2.11	For 10000kN load cell; 203.2mm ID

### Terminal Units

L2-4.3	Cable end plug
L2-5.2	Selector box; from readout unit to cable end plug L2-4.3
L2-5.3	Selector box; from readout unit to cable ends
RO-TB-S-12	Terminal unit – switching; for 4No. 3 - gauge load cells or 2No. 6 - gauge load cells to readout unit
RO-TJ-S-12	Terminal unit/junction box – switching; for 4No. 3 - gauge load cells or 2No. 6 - gauge load cells to readout unit
RO-TB-S-24	Terminal unit – switching; for 8No. 3 - gauge load cells or 4No. 6 - gauge load cells to readout unit
RO-TJ-S-24	Terminal unit/junction box – switching; for 8No. 3 - gauge load cells or 4No. 6 - gauge load cells to readout unit
RO-TB-S-48	Terminal unit – switching; for 16No. 3 - gauge load cells or 8No. 6 - gauge load cells to readout unit
RO-TJ-S-48	Terminal unit/junction box – switching; for 16No. 3 - gauge load cells or 8No. 6 - gauge load cells to readout unit

### Manual

MAN-188	Vibrating Wire Load Cell
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