

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.soil.co.uk
If you would like to speak with someone directly please call +44 (0)1825 765044 or email sales@soil.co.uk

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 itmsoil VWnote readout.

Alternatively, cells can be wired to a datalogger.

Applications

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

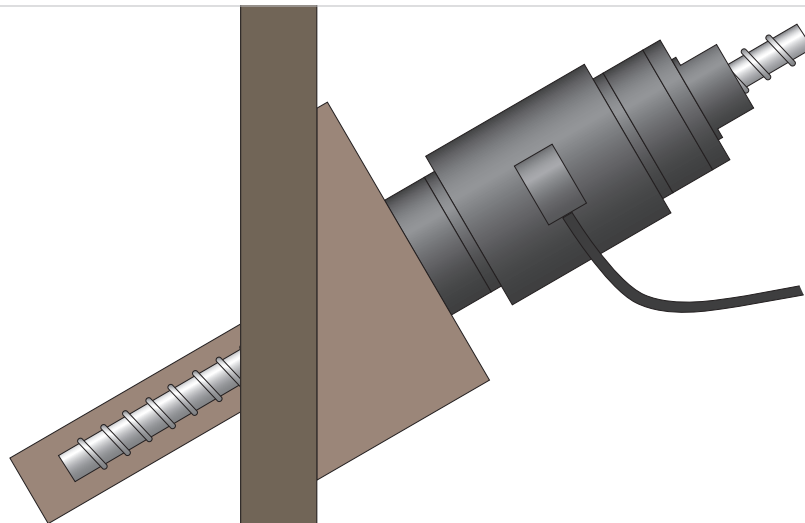
Typical applications include:

- 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 |

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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@soil.co.uk 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 | 750 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 6000 |
|------------------------------------|---------------------------|-----|------|------|------|------|------|------|------|
| Accuracy ¹ | ±0.25% full scale | | | | | | | | |
| Resolution ² | 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 ³ | IP66 | | | | | | | | |
| Material | Plated steel | | | | | | | | |
| Thermistor type | NTC 3k Ω | | | | | | | | |
| Thermistor accuracy | ±0.5% full scale | | | | | | | | |
| Thermistor resolution ² | 0.1°C | | | | | | | | |

Load Cell

| kN Range | 500 | 500 | 750 | 1000 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 6000 |
|-------------------|-------|-------|-------|-------|-------|-------|--------|--------|-------|--------|--------|
| No. strain gauges | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 6 | 6 | 6 | 6 |
| Internal diameter | 50mm | 75mm | 75mm | 75mm | 100mm | 150mm | 150mm | 150mm | 175mm | 200mm | 240mm |
| Outside diameter | 80mm | 100mm | 110mm | 125mm | 135mm | 195mm | 195mm | 225mm | 255mm | 280mm | 325mm |
| Height | 120mm | 120mm | 140mm | 140mm | 140mm | 160mm | 160mm | 180mm | 180mm | 180mm | 180mm |
| Weight | 4.5Kg | 5.2Kg | 6.5Kg | 9Kg | 9.8Kg | 16Kg | 15.3Kg | 28.4Kg | 38Kg | 47.6Kg | 52.9Kg |

Bearing Plate

| kN Range | 500 | 500 | 750 | 1000 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 6000 |
|-------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Internal diameter | 50mm | 75mm | 75mm | 75mm | 100mm | 150mm | 150mm | 150mm | 175mm | 200mm | 240mm |
| Outside diameter | 90mm | 110mm | 120mm | 125mm | 145mm | 190mm | 200mm | 220mm | 255mm | 290mm | 330mm |
| Thickness | 33mm | 33mm | 38mm | 43mm | 43mm | 48mm | 58mm | 63mm | 68mm | 73mm | 78mm |

¹ Dependent on load bearing conditions

² Dependent on readout

³ Waterproof versions available to 0.5MPa or 1.0MPa

Ordering Information

Vibrating Wire Load Cells

Supplied with 1m cable

| | |
|---------|--------------------------------------|
| L2-1.1 | 500kN load cell; 50mm ID – 3 gauge |
| L2-1.2 | 500kN load cell; 75mm ID – 3 gauge |
| L2-1.3 | 750kN load cell; 75mm ID – 3 gauge |
| L2-1.4 | 1000kN load cell; 75mm ID – 3 gauge |
| L2-1.5 | 1000kN load cell; 100mm ID – 3 gauge |
| L2-1.6 | 1500kN load cell; 150mm ID – 4 gauge |
| L2-1.7 | 2000kN load cell; 150mm ID – 4 gauge |
| L2-1.8 | 3000kN load cell; 150mm ID – 6 gauge |
| L2-1.9 | 4000kN load cell; 175mm ID – 6 gauge |
| L2-1.10 | 5000kN load cell; 200mm ID – 6 gauge |
| L2-1.11 | 6000kN load cell; 240mm 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 4 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; 50mm ID |
| L2-2.2 | For 500kN load cell; 75mm ID |
| L2-2.3 | For 750kN load cell; 75mm ID |
| L2-2.4 | For 1000kN load cell; 75mm ID |
| L2-2.5 | For 1000kN load cell; 100mm ID |
| L2-2.6 | For 1500kN load cell; 150mm ID |
| L2-2.7 | For 2000kN load cell; 150mm ID |
| L2-2.8 | For 3000kN load cell; 150mm ID |
| L2-2.9 | For 4000kN load cell; 175mm ID |
| L2-2.10 | For 5000kN load cell; 200mm ID |
| L2-2.11 | For 6000kN load cell; 240mm 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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