

L3 STRAIN GAUGE LOAD CELL

Datasheet L3



**Description**

Strain Gauge Load Cells measure compressive and tensile loads in rock bolts, cable anchors and tendons.

They consist of a Stainless Steel cylindrical housing with up to 16 resistance strain gauges in a Wheatstone Bridge configuration. When the cell is subjected to load, the strain gauges change their resistance value; the resulting output signal is directly proportional to the applied load.

The cell is connected to a sheathed cable which is itself connected either directly to a readout unit, or via a switched terminal unit. Load cells can also be wired directly to dataloggers for remote monitoring.

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**

- **Accurate and robust with very good long-term stability**
- **Fast response time**
- **Suitable for measurement, remote reading and datalogging**
- **Connecting cable is strong, screened and flexible**
- **Negligible temperature effects compared to hydraulic load cells**

**Benefits**

- **Option for dynamic monitoring**
- **Effects of uneven and eccentric loads are minimised**
- **Corrosion resistant**



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)

## Operation

A bearing plate is placed beneath the load cell to spread the load and take up any residual non-alignment. A further bearing plate is placed between the cell and the anchor bolt or tensioning device.

Each sensor is connected from the load cell either directly to a readout unit, or via a switched terminal unit. Load cells can also be wired directly to dataloggers for remote monitoring.

Configuration of up to sixteen strain gauges within the load cell produces an average load output signal from the cell.

Readings can be displayed in engineering units.

## Applications

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

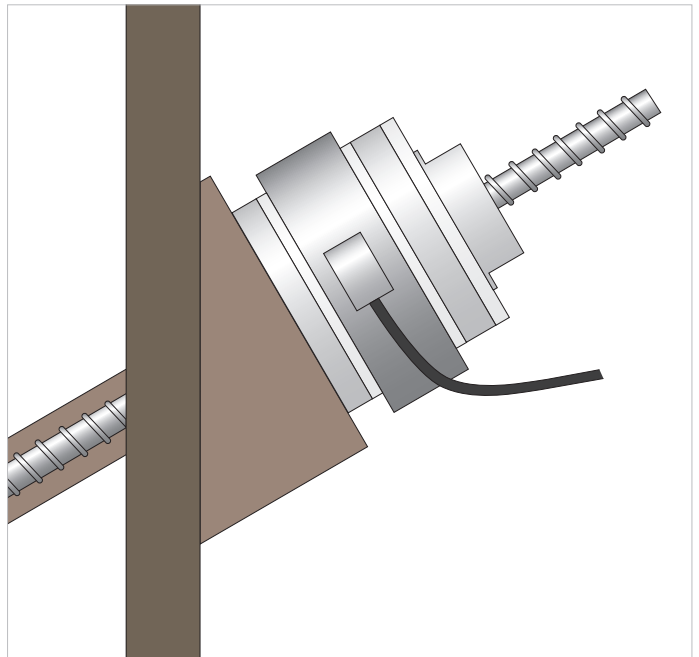
Typical applications include:

- Rock bolts
- Tensions in cable anchors and tendons
- Structural beams
- Piles
- Between tunnel supports
- Proof of loading and pull-out tests on trial anchors
- Measuring loads during pile testing
- Monitoring loads in arch tunnel supports
- Monitoring long-term loads in concrete dams

## Associated products

For details on:	Catalogue code:
Dataloggers	D1
Terminal and Junction Boxes	RO-TB/JB/TJ
Cables	CA
4-20 mA Handheld Readout	L3-1.14
mV/V Handheld Readout	L3-1.15

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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@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

### Strain Gauge Load Cell

Type	mV/V		mA	
kN Range	300   500   750   1000   1250   1500   1800   2500   3000			
Accuracy <sup>1</sup>	±0.5% full scale			
Repeatability	0.02% full scale			
Sensitivity	2mV/V ±0.1%			
Excitation	2-15 V DC		10-30 V DC	
Compensated temperature range	-10 to +50°C			
Over range	150% full scale			
Material	Stainless Steel			
Ingress protection	IP67			
Temperature range	-20 to +70°C		-10 to +40°C	
Input resistance	700 ± 20 Ω			
Output resistance	700 ± 5 Ω			

### Load Cell Dimensions; 300 - 1000 kN Range

kN Range	300	500	750	500	750	750	1000
Internal diameter	50mm	50mm	50mm	75mm	75mm	120mm	120mm
Outside diameter	163mm	163mm	163mm	163mm	163mm	229mm	229mm
Height	45mm	45mm	45mm	45mm	45mm	45mm	45mm
Weight	5kg	5kg	5kg	5kg	5kg	9kg	9kg

### Load Cell Dimensions; 1250 - 3000 kN Range

kN Range	1250	1250	1500	1800	1800	2500	3000
Internal diameter	120mm	165mm	165mm	165mm	225mm	225mm	225mm
Outside diameter	229mm	275mm	275mm	275mm	320mm	320mm	320mm
Height	45mm	45mm	45mm	45mm	55mm	55mm	55mm
Weight	9kg	14kg	14kg	14kg	20kg	20kg	20kg

<sup>1</sup> System accuracy is dependent on load bearing conditions

## Ordering Information

### Strain Gauge Load Cells

**mV output (maximum 40 metres cable connection recommended)**

L3-10-V	300kN load cell, 50mm ID
L3-11-V	500kN load cell, 50mm ID
L3-12-V	750kN load cell, 50mm ID
L3-13-V	500kN load cell, 75mm ID
L3-14-V	750kN load cell, 75mm ID
L3-15-V	750kN load cell, 120mm ID
L3-16-V	1000kN load cell, 120mm ID
L3-17-V	1250kN load cell, 120mm ID
L3-18-V	1250kN load cell, 165mm ID
L3-19-V	1500kN load cell, 165mm ID
L3-20-V	1800kN load cell, 165mm ID
L3-21-V	1800kN load cell, 225mm ID
L3-22-V	2500kN load cell, 225mm ID
L3-23-V	3000kN load cell, 225mm ID

### Strain Gauge Load Cells

**4-20mA output (maximum 1,000 metres cable connection recommended)**

L3-10-A	300kN load cell, 50mm ID
L3-11-A	500kN load cell, 50mm ID
L3-12-A	750kN load cell, 50mm ID
L3-13-A	500kN load cell, 75mm ID
L3-14-A	750kN load cell, 75mm ID
L3-15-A	750kN load cell, 120mm ID
L3-16-A	1000kN load cell, 120mm ID
L3-17-A	1250kN load cell, 120mm ID
L3-18-A	1250kN load cell, 165mm ID
L3-19-A	1500kN load cell, 165mm ID
L3-20-A	1800kN load cell, 165mm ID
L3-21-A	1800kN load cell, 225mm ID
L3-22-A	2500kN load cell, 225mm ID
L3-23-A	3000kN load cell, 225mm ID

## Ordering Information

### Strain Gauge Load Cell Distribution Plates

L3-050-T	Top plate for 50mm ID load cell
L3-075-T	Top plate for 75mm ID load cell
L3-120-T	Top plate for 120mm ID load cell
L3-165-T	Top plate for 165mm ID load cell
L3-225-T	Top plate for 225mm ID load cell
L3-050-B	Bottom plate for 50mm ID load cell
L3-075-B	Bottom plate for 75mm ID load cell
L3-120-B	Bottom plate for 120mm ID load cell
L3-165-B	Bottom plate for 165mm ID load cell
L3-225-B	Bottom plate for 225mm ID load cell

### Strain Gauge Load Cells Accessories

L3-3.1	Signal Cable for mV cells; 6 x 0.35 with shield and PU Jacket
L3-3.3	Signal Cable for 4-20mA cells; 4 x 0.35 with shield and PU Jacket
L3-1.14	Readout for 4-20mA load cells
L3-1.15	Readout for mV load cells

### Terminal Units

RO-TB-S-12	Terminal unit – switching; for up to 12No. 4-20mA load cells only
RO-TJ-S-12	Terminal unit/junction box – switching; for up to 12No. 4-20mA load cells only
RO-TB-S-24	Terminal unit – switching; for up to 24No. 4-20mA load cells only
RO-TJ-S-24	Terminal unit/junction box – switching; for up to 24No. 4-20mA load cells only
RO-TB-S-48	Terminal unit – switching; for up to 48No. 4-20mA load cells only
RO-TJ-S-48	Terminal unit/junction box – switching; for up to 48No. 4-20mA load cells

### Cable Accessories

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.

### Manual

MAN-211	Strain Gauge Load Cell
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