

**ST3 VIBRATING WIRE CONCRETE SURFACE MOUNT STRAIN GAUGE**

Datasheet ST3


**Description**

The Concrete Surface Mount Strain Gauge measures strain in concrete members. It consists of a coil assembly, Vibrating Wire element and two groutable anchors to embed the unit in the concrete structure to be monitored.

'O' ring seals between the protective tube and the gauge end blocks provide waterproofing and allow the tube to remain unstressed.

A factory fitted, four core screened cable connects the coil to the readout unit.

Once installed, changes in strain are monitored by the coil assembly mounted on the gauge. The gauges can be read individually and locally, or remotely and automatically as part of a data collection system.

**Features**

- Adjustable strain gauge for the most effective use of the instrument range
- Individually calibrated
- Integral thermistor
- Waterproof
- Gauge and coils are reuseable

**Benefits**

- Accurate, repeatable readings over long cable lengths
- Long working life, long-term stability and reliability
- Can be used with long cable lengths with no degradation of signal
- Suitable for remote reading and data logging



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

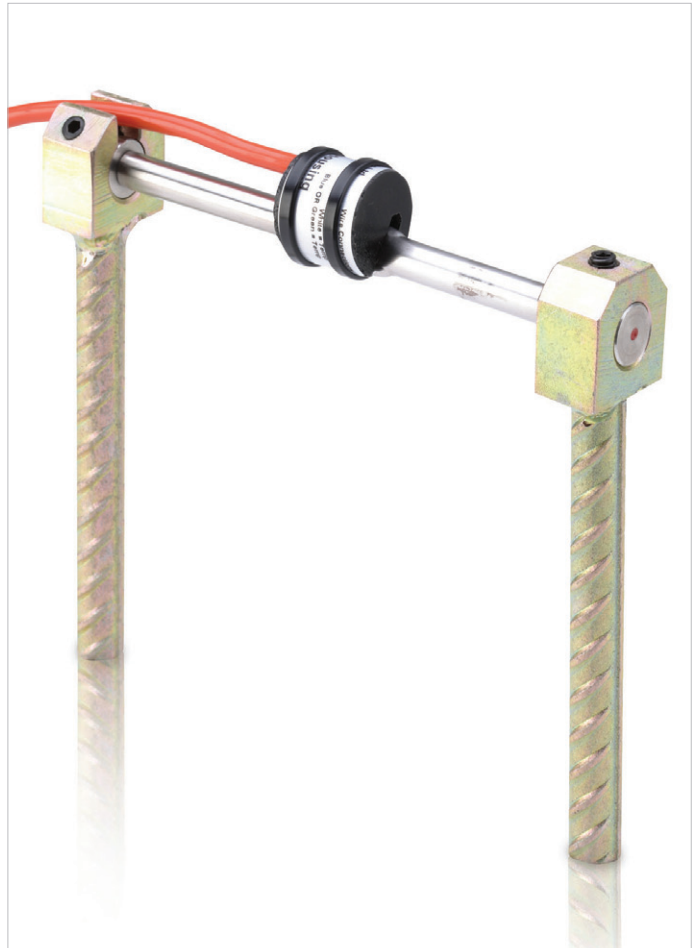
### Operation

The Concrete Surface Mount Strain Gauge consists of a sealed tube containing the wire that is attached via allen bolts to a removable anchor at either end.

The pickup coil is designed to slip easily over a flattened section in the centre of the gauge tube, so it can also be fitted after installing the gauge. As the gauge and the coil are easily removable, they can be reused if desired.

The anchor bolts are grouted using the setting bar as a template to drill holes into the structure to be monitored. The gauge must be removed from the anchor bolts during grouting to prevent damage. The two anchor bolts are grouted (using the gauge setting bar as a template) on to the structure to be monitored. Once the anchors have been grouted into the holes, the gauge is refitted into the anchors and tensioned as necessary. If not already fitted, the pickup coil needs to be slid into place and secured with cable ties.

The sensor can be read using any commercially available Vibrating Wire readout, and temperature data can also be read from the integral thermistor. The use of a frequency based signal (as with all VW measurements) means long cable runs are achievable (in excess of 1,000m) between the instrument and the readout point or datalogger.



### Applications

The Concrete Surface Mount Strain Gauge measures strain on concrete members on buildings, bridges, dams, pipelines or any other concrete structure.

Typical applications include:

- Concrete members and struts
- Monitoring of strain due to load
- Bridges and dams
- Monitoring strain and load during construction and service life
- Piles and mass concrete

### Associated products

For details on:

Catalogue code:

VWnote

RO-1-VW-NOTE

Dataloggers

D1

Terminal and Junction Boxes

RO-TB/JB/TJ

View our full product range on [www.itmsoil.com](http://www.itmsoil.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, itmsoil makes the following recommendations, for the skill level of the installation contractor.

**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.

### ADDITIONAL SUPPORT

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

**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

### Sensor

Range	3000 microstrain
Resolution <sup>1</sup>	1 microstrain
Accuracy <sup>2</sup>	±0.1% full scale
Temperature range	-20 to 80°C
Active gauge length	141.4mm
Excitation method	Pluck or sweep
Material	Stainless Steel
Weight	50g
Dimensions	L 157mm x Ø 12.7mm

### Coil Housing

Type	Encapsulated, detachable with thermistor
Standard cable lengths <sup>3</sup>	3m, 10m & 25m
Thermistor type	NTC 3k Ω
Thermistor accuracy	±0.5°C
Thermistor resolution <sup>1</sup>	±0.1°C
Weight (coil only)	12g
Cable weight /m	30g
Cable type	4 core PUR sheath, foil screen & drain wire

### Mounting Anchors

Material	Steel
Finish	Zinc plated
Dimensions	L 25mm x H 25mm x W 16mm, Rebar 110mm x Ø 12mm

### Optional Protective Cover

Material	Powder coated steel / Polystyrene lining
Dimensions	L 280mm x W 100mm x H 60mm
Weight	670g

<sup>1</sup>Dependent on readout

<sup>2</sup>±0.1% full scale with individual calibration, ± 0.5% full scale with standard batch calibration

<sup>3</sup>Other lengths available

## Ordering Information

### Concrete Surface Mounted Vibrating Wire Strain Gauge

3000 $\mu$  strain range. Includes sensor with thermistor, 2No Mounting Blocks. Installation tool ST3-2.1 required for installation

ST3-1.1	Sensor with specified cable length
ST3-1.2	Sensor with 3 metre cable length
ST3-1.3	Sensor with 10 metre cable length
ST3-1.4	Sensor with 25 metre cable length
ST2-1.5	Protective thermal cover

### Installation Tools

One tool required for multiple installations

ST3-2.1	Installation kit. Includes setting jig & spacer. Only one required.
---------	---

### Connecting Cable and Fittings

CA-3.1-4-IC	Instrument cable, 4 core, 7/0.20, screened
CA-4.1	Joint sealing kit
CA-4.2	Coloured adhesive tapes
CA-4.3	Crimping tool
CA-4.4	Crimping sleeves
W6-6.1	Nylon ties. Price each, 150mm x 3.5mm. Pack of 100No
ST1-3.5	Nylon ties. Price each, 370mm x 4.7mm. Pack of 100No

### Installation Accessories

ST3-3.1	Spare groutable anchors set
---------	-----------------------------

### Manual

MAN-221	Vibrating Wire Concrete Surface Mount Strain Gauge
---------	--



Bell Lane, Uckfield, East Sussex  
TN22 1QL United Kingdom

t: +44 (0) 1825 765044  
f: +44 (0) 1825 744398

e: [info@itmsoil.com](mailto:info@itmsoil.com)  
w: [www.itmsoil.com](http://www.itmsoil.com)

Soil Instruments Ltd. Registered in England. Number: 07960087. Registered Office: 5th Floor, 24 Old Bond Street, London, W1S 4AW

**soil**  
INSTRUMENTS