

ST5 VIBRATING WIRE SISTERBAR/REBAR STRAIN GAUGE

Datasheet ST5



**Description**

The Vibrating Wire Rebar and Sisterbar Strain Gauge measures strain in concrete and consists of a coil assembly and a Vibrating Wire element with rebar extensions at each end.

Rebar Strain Gauges are welded into the reinforcing cage and must be matched to the size and grade of the rebar forming the cage.

Sister Bars are installed alongside existing lengths of rebar within the cage. Both types of strain gauge are extremely robust, reliable and waterproof. The gauges can be read individually or remotely as part of a data collection system. A factory fitted, four core screened cable connects the coil to the readout unit.

The Rebar Strain Gauge operates on the established Vibrating Wire principle.

**Features**

- Located within rebar cage
- Individually calibrated
- Integral thermistor
- Waterproof

**Benefits**

- Accurate, repeatable readings over long cable lengths
- Long working life, long-term stability and reliability
- Suitable for remote reading and data logging
- Unaffected by bending



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 Rebar and Sister Bar Strain Gauge consists of a sealed element containing the wire, which is de-bonded from the concrete by a plastic coating. This is attached to two lengths of rebar, one at either end, which in turn are used to transfer strain from the structure to be monitored to the gauge.

These rebar extensions are long enough to ensure full transfer of the strain within the concrete to the strain gauge.

The Rebar Strain Gauge is installed by welding the gauge into the rebar cage at a location within the structure suitable to accurately pass loads from the cured concrete into the gauge. Sisterbars (of 12mm diameter) are installed alongside existing lengths of rebar within the cage.

Rebar Strain Gauges and Sisterbars are usually installed in pairs within the structure on either side of the neutral axis, so that bending movements can be separated from axial loads.

The sensor can be read with any commercially available Vibrating Wire readout or remotely via a datalogger.

The integrated thermistor allows for temperature data to be recorded, aiding the evaluation of thermally induced strains.

As with all Vibrating Wire instruments, the use of a frequency based signal allows for long cable runs (in excess of 1,000m) between the instrument and the readout point or datalogger.

### Applications

The Rebar Strain Gauge is used to measure strain in concrete piles, mass concrete structures, diaphragm and slurry walls, caissons and for casting in place concrete piles.

Typical applications include:

- Diaphragm and slurry walls
- Monitoring of strain due to load
- Bridges and dams
- Monitoring strain and load during construction and service life
- Piles and mass concrete
- Monitoring strains in reinforcing bars during construction, pile testing and service life

### Associated products

For details on:	Catalogue code:
VWnote	RO-1-VW-NOTE
Dataloggers	D1
Terminal and Junction Boxes	RO-TB/JB/TJ

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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, itmsoil makes the following recommendations, for the skill level of the installation 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**

**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

### Sensor

Range	2500 microstrain
Resolution <sup>1</sup>	<0.4 microstrain
Accuracy	±0.25% full scale
Temperature range	-20 to +80°C
Length	900mm
Excitation method	Pluck or sweep
Rebar strain gauge diameters	16mm, 18mm, 20mm, 22mm, 25mm, 28mm, 32mm, 36mm and 40mm
Sister bar diameter	12mm
Frequency range <sup>2</sup>	1800 - 2800Hz

### Coil Housing

Type	Integral, 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
Water proof rating <sup>4</sup>	Up to 2000kPa
Cable weight per metre	30g
Cable type	4 core PVC sheath, foil screen & drain wire

<sup>1</sup>Dependent on readout

<sup>2</sup>Approximate

<sup>3</sup>Other lengths available

<sup>4</sup>Standard rating 175kPa

## Ordering Information

### Rebar Vibrating Wire Sister Bar

ST5-12-0	Sister bar with specified cable length
ST5-12-3	Sister bar with 3 metre cable length
ST5-12-10	Sister bar with 10 metre cable length
ST5-12-25	Sister bar with 25 metre cable length

### Rebar Vibrating Wire Strain Gauge

ST5-16-0	16mm outer diameter gauge with specified cable length
ST5-16-3	16mm outer diameter gauge with 3 metre cable length
ST5-16-10	16mm outer diameter gauge with 10 metre cable length
ST5-16-25	16mm outer diameter gauge with 25 metre cable length
ST5-18-0	18mm outer diameter gauge with specified cable length
ST5-18-25	18mm outer diameter gauge with 25 metre cable length
ST5-20-0	20mm outer diameter gauge with specified cable length
ST5-20-25	20mm outer diameter gauge with 25 metre cable length
ST5-22-0	22mm outer diameter gauge with specified cable length
ST5-22-25	22mm outer diameter gauge with 25 metre cable length
ST5-25-0	25mm outer diameter gauge with specified cable length
ST5-25-25	25mm outer diameter gauge with 25 metre cable length
ST5-28-0	28mm outer diameter gauge with specified cable length
ST5-28-25	28mm outer diameter gauge with 25 metre cable length
ST5-32-0	32mm outer diameter gauge with specified cable length
ST5-32-25	32mm outer diameter gauge with 25 metre cable length
ST5-36-25	36mm outer diameter gauge with 25 metre cable length
ST5-40-0	40mm outer diameter gauge with specified cable length
ST5-40-25	40mm outer diameter gauge with 25 metre cable length

### 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
ST1-3.5	Nylon ties

### Manuals

MAN-154	Reinforcement Bar Vibrating Wire Strain Gauge
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