ST4 VIBRATING WIRE EMBEDMENT STRAIN GAUGE

Datasheet ST4

Description

The Vibrating Wire Embedment Strain Gauge is used for measuring strain in mass concrete.

The 150mm long gauge, which is made from Stainless Steel, may be pre-attached to rebar or by attachment to a 2, 3 or 4 directional rosette, thereby measuring strain in several directions.

The gauge comprises a sealed tube containing a wire held in tension between two circular stainless steel pads, one at each end. Deformation to these pads alters the tension of the wire and the resulting readings are used to measure strain. The changes in strain are monitored by the coil assembly mounted on the gauge. The gauges can also read temperature if required.

The gauges can be read individually or remotely/automatically as part of a data collection system.

Features

- **Located within concrete**
- **Uses proven Vibrating Wire technology**
- **Suitable for manual or remote monitoring**
- **Fully waterproof**
- **Fitted with thermistor for temperature monitoring**

Benefits

- **Accurate, repeatable readings over long cable lengths**
- **Long working life, long-term stability and reliability**
- **Over-voltage surge arrestor protects against electrical damage**
- **Connecting cable is screened and flexible**

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

VIBRATING WIRE PRINCIPLE

VW

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 gauge is installed prior to concrete pour and protected during the pour to prevent damage. The gauge may also be pre-cast into a concrete briquette for subsequent casting into the structure, or embedded into holes drilled into an existing structure.

The pickup coil is fitted over a flattened section in the centre of the gauge tube and held in place using a securing clamp; this can be installed on site immediately prior to installation. The sensor is then installed by placing the gauge at a location in the structure suitable for accurately passing microdeformation from the surrounding cured concrete to the gauge.

Cables from the gauges are run to a readout, a terminal box, or a data logging point.

The sensor can be read with any commercially available Vibrating Wire readout (or a data logger) and the incorporated thermistor allows for temperature data to be recorded.

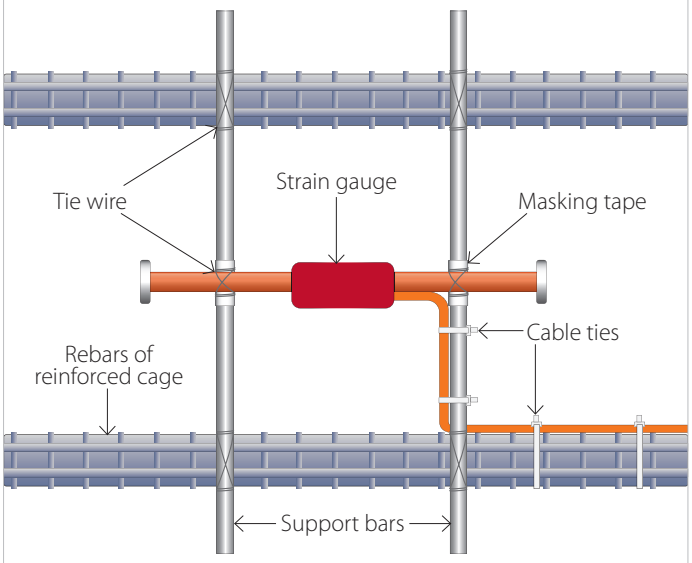
Applications

The Vibrating Wire Embedment Strain Gauge is designed to measure strain in concrete members on buildings, bridges, dams, pipelines, or any concrete structure.

Typical applications include:

- Concrete members and struts
- Bridges and dams
- Piles and mass concrete
- Strains in reinforcing bars during construction, pile testing and service life

Strain Gauge to Adjacent Rebars



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.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** 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	3000 microstrain
Resolution[1]	1 microstrain
Accuracy[2]	±0.1% full scale
Temperature range	-20 to +80°C
Active gauge length	150mm
Excitation method	Pluck or sweep
Material	Stainless Steel
Weight	58g
Dimensions	157mm x Ø19mm

Cable

Type	Standard
Construction	4 core, PUR sheath, foil screen & drain wire
Diameter	4mm
Weight/m	30g

Coil Housing

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

[1] Dependent on readout
[2] ±0.1% full scale with individual calibration; ±0.5% full scale with standard batch calibration
[3] Other lengths available

Ordering Information

Vibrating Wire Embedment Strain Gauge

3000µ strain range. Includes sensor with thermistor

ST4-1.1	Set for mid-range. Sensor with specified cable length CA-3.1-4-IC fitted
ST4-1.3	Set for mid-range. Sensor with 3m cable length
ST4-1.4	Set for mid-range. Sensor with 10m cable length
ST4-1.5	Set for mid-range. Sensor with 25m cable length
ST4-1.2	Set for compression. Sensor with specified cable length CA-3.1-4-IC fitted
ST4-1.6	Set for compression. Sensor with 3m cable length
ST4-1.7	Set for compression. Sensor with 10m cable length
ST4-1.8	Set for compression. Sensor with 25m cable length

Connecting Cable and Fittings

CA-3.1-4-IC	Instrument cable 4 core, 7/0.20; screened, priced per metre
CA-4.1	Joint sealing kit
CA-4.2	Coloured adhesive tapes; pack of 10
CA-4.3	Crimping tool
CA-4.4	Crimping sleeves; pack of 100
W6-6.1	Nylon ties; 150mm x 3.5mm, pack of 100
ST1-3.5	Nylon ties; 370mm x 4.7mm, pack of 100

Manual

MAN-142	Vibrating Wire Embedment Strain Gauge

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