

# VW Strain Gauge

VIBRATING WIRE STRAIN GAUGE

## FEATURES

- Choice of mounting blocks for embedment / bonding in concrete arc welding / bonding on steel structures
- Sensor with unique integral magnet design
- Extremely stable for long term operations
- Accurate, highly sensitive and reliable
- Frequency output for transmission over long distances
- Suitable for remote reading, scanning & data logging
- Stainless steel waterproof construction
- Easy to install

## APPLICATIONS

### Embedment Strain Gauges

- Stress & strain monitoring in foundations & concrete structures
- Dams
  - Nuclear plants
  - Bridges
  - Buildings
  - Laboratory applications or where space is a limitation



### Strain Gauges

- Stress and strain monitoring
- Steel structures: girders, struts, piles, pipe lines, pen stocks, pressure vessels
- Concrete structures, bridges, retaining walls, hydraulic structures
- Underground works, supports, linings, piers
- Suitable for laboratory applications

ES&S series of strain gauges have been designed for universal applications. Be it direct embedment in concrete or surface mounting on concrete and steel structures, by using appropriate type of mounting blocks. The same strain gauge can be embedded in concrete, arc welded onto steel structures such as tunnel linings and supports. Alternatively grouted or epoxy bonded on the surface of concrete structures.



**ISO 9001**  
CERTIFIED

## TECHNICAL SPECIFICATIONS

<b>Model</b>	RP-110	RP-120
<b>Embedment</b>	RP-110A	RP-120A
<b>Arc Weldable / Bondable</b>	RP-110B	RP-120B
<b>Groutable</b>	RP-110C	RP-120C
<b>Gauge Length</b>	55 mm	140 mm
<b>Gauge Factor</b>	0.4815 x 10 <sup>-3</sup> μ strain / Hz <sup>2</sup>	3.12 x 10 <sup>-3</sup> μ strain / Hz <sup>2</sup>
<b>Strain Range</b>	3000 μ strain	3000 μ strain
<b>Sensitivity</b>	1 μ strain	1 μ strain
<b>Cable</b>	4 - conductor shielded	
<b>Wiring Code</b>	V/W sensor	Red & Black
	Thermistor	White & Green
<b>Thermistor 3k ohm</b>	Included	Included
<b>Operating Temperature</b>		
<b>Electrical Surge Protection</b>	Optional	Optional

### OPERATING PRINCIPLE

Any change in the stress in the concrete mass or the structural member will cause changes in the tension of the wire. The wire is plucked by energizing the magnet so that it vibrates at its natural resonant frequency. The resonant frequency is proportional to the square root of the tension of the wire. A conventional readout unit can accurately measure the resonant frequency of the wire. A microprocessor based readout unit can display the frequency as well as the value of the measured parameter directly in engineering units. Alternatively, data loggers can be used to record data automatically at predetermined intervals.

Once the strain is known, the stress in the concrete or steel can also be determined if the modulus of elasticity of the material is known provided that the magnitude of the strain other than the magnitude of the strain induced by loading can be evaluated. A thermistor mounted in the gauge enables simultaneous measurement of temperature allowing any corrections to be made in the observed readings due to temperature changes. However, when the strain gauge is mounted on steel, the differential thermal expansion between the wire and the structure is so small that no such correction is needed in practice. Strain gauges with lightning protection area available on request.

The design contributes to the outstanding features and performances over conventional vibrating wire strain gauge. These strain gauges comprise of a high tensile strength, heat treated and tempered steel wire stretched between two end blocks. The wire is sealed in a small diameter stainless steel tube by means of a double 'O' ring fixed on each end block. A miniature magnet coiled assembly is precisely fitted at the center of the wire inside the small diameter stainless steel tube. This greatly enhances the response characteristics of the vibrating wire.

The 'O' ring seal provides complete waterproofing and a high degree of protection to the vibrating wire as well as the miniature magnet coil assembly from humid and corrosive environmental conditions and allows the end blocks to move freely relative to each other. An internal spring holds the wire at an initial tension that can be factory set to any desired value. Prior to dispatch, the range on the gauge can be set mostly in tension or mostly in compression or in both tension and compression, as per customer requirements. Two standard gauge lengths are available -140mm and 55mm in series. Other gauge lengths are available on request. The end blocks are common for all strain gauges, thus reducing inventory costs.

