Vibrating wire strain gauges are typically used to measure strain and deformation in metal structures, concrete and reinforced concrete. Depending on the type of installation and use, these instruments have some characteristics which make them particularly well-suited, more functional and easier to install. For strain gauges that measure strain in concrete, we offer instruments with circular heads at both ends which allowing better functioning once cemented in position.

For vibrating wire strain gauges to be welded on armatures of metal piles, diaphragm, walls, tunnel linings, etc., two special removable welding heads are mounted, this speeds installation and consolidate the instrument perfectly with the structure.

Our vibrating wire strain gauges and all variations are extremely robust instruments due to a stainless steel body, and are extremely reliable over time. For these reasons, they are widely used for long-term structural monitoring and wherever reliability, high precision, speed of installation and durability are required. The integration of a thermistor into the sensor allows the measurement of the instrument's operating temperature.

Vibrating wire strain gauges can be read with our portable units (DEC3000 and DECS) or automatic unit (CUM3000).
Applications

Vibrating wire strain gauges are used for the monitoring of deformations in concrete and are either spot welded to metal structures or embedded in concrete.

Particularly used for the control of:
- Load tests on pile
- Piles
- Bridges
- Viaducts
- Tunnel Entrances
- Precast concrete blocks for TBM tunnels
- Tunnel linings
- Dams in conventional concrete or RCC
- Metal structures

Features and benefits

Our vibrating wire strain gauges are particularly robust and therefore suitable for applications in places not reachable after installation.

They have:
- Long duration
- High resistance to corrosive agents
- Negligible thermal drift
- No need for protection against overvoltage
- Easy connection and metering
- Are available in larger sizes for concrete specific applications
- IP68 protection
- Built-in temperature sensor

Measuring principle

Like all vibrating wire sensors, our strain gauge also bases its operation on the principle of the proportionality between the elongation of a wire and the square root of the value of its vibration frequency.

The wire is simply fixed to the two circular heads of the strain gauge and equipped with an electromagnetic unit for excitation of the wire and measurement of frequency.

Appropriate manual or automatic reading units allow interrogation of the instrument and the sampling and storage of data.
Type

The instrument is supplied complete with:
- Tubular sensor body containing the fitted wire, 2 plates to solder,

or:
- Tubular sensor body, containing the wire, 2 fixed circular plates to embed in concrete

Both are supplied with:
- Excitation coil unit to be fixed to the sensor body
- 1 metal clamp for fixing the coil
- 1.5m cable with 3 or 4 conductors

Our strain gauges are generally classified in two basic groups:

Strain gauges for concrete, embedded

Strain gauges for metal structures, spot welded

Our strain gauges are characterized by their small size and short section length.

All strain gauges are equipped with an internal sensor for measuring the temperature.

Strain gauges are available with different sized bases and greater mechanical resistance for use in traditional concrete dams.

Technical assistance

If you have any requests or questions about our instruments or if you have special needs that require different solutions from the standard, please contact us. Our team will provide all the necessary information and will be very happy to work with you to study, develop and customize instruments and solutions suitable for your specific needs.
## Technical specifications

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Base 150 mm to be welded</th>
<th>Base 150 mm to be embedded</th>
<th>Heavy duty model to be embedded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring Base</td>
<td>150mm</td>
<td>150mm</td>
<td>150 – 250 -300</td>
</tr>
<tr>
<td>Range</td>
<td>3.000 µstrain</td>
<td>3.000 µstrain</td>
<td>3.000 µstrain</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>1.0 µstrain</td>
<td>1.0 µstrain</td>
<td>1.0 µstrain</td>
</tr>
<tr>
<td>Linearity</td>
<td>±0.2% f.s.</td>
<td>±0.2% f.s.</td>
<td>±0.2% f.s.</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-30+80 °C</td>
<td>-30+80 °C</td>
<td>-30+80 °C</td>
</tr>
<tr>
<td>Typical Frequency</td>
<td>850-1150Hz</td>
<td>850-1150Hz</td>
<td>500-1200Hz</td>
</tr>
<tr>
<td>Thermistor</td>
<td>NTC 3KOhm</td>
<td>NTC 3KOhm</td>
<td>NTC 3KOhm</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-20 ÷ + 80</td>
<td>-20 ÷ + 80</td>
<td>-20 ÷ + 80</td>
</tr>
</tbody>
</table>

## Accessories and related products

- Plates for vibrating wire strain gauge to be welded
- Coil Group to apply
- DEC5 Portable Readout Unit
- DEC3000 Portable Datalogger
- CUM3000 Multichannel Datalogger
- Special cable 4 x 0.22 mm² or 4 x 0.25 mm²
- Cable for the connection of the strain gauges
- Junction box
- For the junction of the different sensor cables
- Junction and measure box
  - For the junction of the different sensor cables, provided with bushings for taking measures with portable readout unit
Vibrating Wire Strain Gauges

The product information may be subject to variations at any time. Please carefully check the release and contact Pizzi Instruments for further details.