

## TECHNICAL FEATURES

- ✓ Type of sensor: vibrating wire;
- ✓ Measuring range: +/-1750  $\mu\epsilon$ ;
- ✓ Resolution: 1  $\mu\epsilon$ ;
- ✓ Accuracy: <0.5% F.S;
- ✓ Non linearity: <0.5% F.S;
- ✓ Temperature range: -30°/+80°C;
- ✓ Temperature sensor integrated: NTC 3K $\Omega$ ;
- ✓ Output signal: Hz;
- ✓ Typical frequency: 2500 Hz;
- ✓ Thermal dilation coefficient: 12.2  $\mu\epsilon/^\circ\text{C}$ .



The instrumented bolt is used for measurements of strain changes in rock masses. It consists of a bar in improved bond steel with vibrating wire micro strain gauges. The strain borne by the steel bar is proportional to the axial load applied on it.

These bolts work as passive anchor points and are inserted inside holes filled with cement.

Thank to the ease of installation and their robustness, these instruments are used in particularly rough situations, where standard stain gauges would be damaged.

Each bolt can be provided with one or more strain gauges according to the number of differential deformation points that need to be identified.

Each sensor has a thermistor to check and correct the strain owed to temperature changes.

The sensor's operating principle is as follows: the steel wire is tensioned between two ends fixed onto the support to be monitored. Any tension existing on the support shall affect the tension of the steel wire and the

resulting resonance frequency, thus its tension, therefore it measures the strain on the support.

They are mainly used to measure radial strain at various depths in tunnels under construction or in operation and to test the rock's stress status over time.

When monitored by automatic data acquisition units with a certain frequency, they can provide interesting information on the evolution of the strain-deformation status of the rock mass where they are inserted.

## SENSOR DIMENSIONS

length	51 mm
body diameter	20 mm

**CE** product compliant with European directives