VW Borehole Stressmeter

Model 5830-RT-VBS-2

FEATURES

- ***Direct measurement of stress change in solids***
- ***Wedge-platen assembly for hard and soft materials***
- ***High stress and load sensitivity***
- ***Virtually insensitive to temperature changes***
- ***High temperature model (optional)***
- ***Electroplated body to prevent corrosion***
- ***Frequency signal easy to process and transmit over long distances***

APPLICATIONS

*The **VBS-2** has been developed at first for the purpose of monitoring stress changes in underground coal mining operations. Its use has then been extended to hard rock and concrete structures. It also serves as a load cell when incorporated between steel members. The **VBS-2** measures change of stress or load in:*

- *Mines (roof, wall and pillar)*
- *Tunnels (around and within their lining)*
- *Underground storage chambers*
- *Concrete structures*

VBS-2 (SR) with Wedge and Platen

Description

*The **VBS-2** stressmeter is quite small, with a length of 40.6 mm and a diameter to fit in an E size hole (38 mm). It is composed of a hollow cylindrical body sustaining a piano wire across the diameter. Both ends are vacuum-sealed with small cans that are electron beam welded. The body is electroplated to resist corrosion. For excitation and reading purposes, a coil/magnet assembly and a thermistor are encapsulated in one of the cans and are connected to an electrical cable.*

*A two-part wedge/platen assembly completes the **VBS-2** stressmeter. Setting on a flat made onto the cylindrical body of the stressmeter, this assembly is used to pre-stress the **VBS-2** against the borehole wall at the moment of installation. The wedge/platen assembly can take two configurations depending on the installation being made either in hard or soft rock. In softer materials such as coal, special wide platens are used to lower the contact stresses on the borehole wall.*

Stress variations in the host medium will deform the stressmeter changing the wire tension and consequently its resonant frequency.

*When a reading of the **VBS-2** stressmeter is taken, the MB-6T(L) or PALMETO VW readout unit generates plucking voltages at variable frequency in the coil/magnet assembly, forcing the wire to vibrate. In turn, this vibration generates AC voltages in the coil registered by the same coil/magnet assembly. After having recorded 100 cycles the readout unit then selects the frequency corresponding to the peak voltage, which is the resonant frequency of the wire and displays the period. Changes in the frequency or period of vibration are correlated to stress changes.*

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FOR FURTHER INFORMATION
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Installation

The VBS-2 stressmeter is set in an "E" size hole (38 mm) preferably diamond drilled, to provide proper seating of the gauge against the rock. When percussion drilling is done, it is of utmost importance to incorporate a reaming shell behind the bit to obtain a smooth surface against which the gauge will be wedged.

The wedge/platen assembly can be activated from the borehole collar either with a percussion or screw or hydraulic setting tool depending on the depth of installation. In the first case, depths of 16 metres can be reached. The screw system permits deeper installations reaching 30 metres.

The stressmeter being a uniaxial device, several units may be installed in series to resolve the change in the biaxial stress field (minimum of 3 measurements) at a particular location. Under good conditions, it is possible to recover the stressmeter from the borehole.

Although the VBS-2 stressmeter is mostly installed in boreholes, it can be used advantageously as a load cell for load monitoring within a metallic structure.

Accessories

- *Vibrating wire portable readout unit (MB-6T(L) or PALMETO VW)*
  - see separate brochure
- *Data acquisition system (SENSLOG)*
  - see separate brochure
- *Installation tools: manual (screw or percussion)*

Ordering Information

Please specify:

- *Platen type (hard or soft rock)*
- *Installation depth or cable length*
- *Percussion or screw setting tool*
- *Accessories required*

Specifications

Model:	**VBS-2 (HR) (HARD ROCK)**	**VBS-2 (SR) (SOFT ROCK)**
Range:	70 MPa	40 MPa
Sensitivity: (depending on rock modulus)	14 – 70 kPa	7 – 60 kPa
Borehole diameter:	37 – 40 mm	37 – 39 mm
Operating Temperature:	-40°C to +65°C	
Dimensions: (length x diameter)	41 x 29 mm	
Weight:	0.45 kg	
Thermistor: - Type: - Accuracy:	3 kΩ (2 kΩ optional) ± 0.5% F.S.	
Cable:	IRC-31: 3-conductor, shielded	

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