

Model 4000 Vibrating Wire Strain Gage

(Arc Weldable)

APPLICATIONS

- Bridges and infrastructure monitoring
- Steel arch, strut, and sheet piling monitoring
- Structural component monitoring

FEATURES & ADVANTAGES

- Arc Weldable
- Robust design
- Water resistant



OPERATING PRINCIPLE

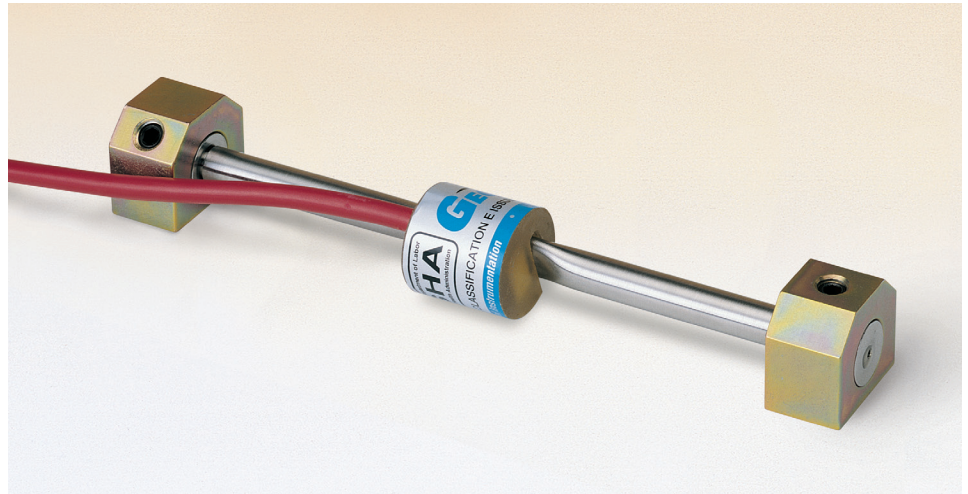
The Model 4000 essentially consists of a length of steel wire tensioned between two mounting blocks that are arc welded to the surface of a structural steel member. As the structure deforms under load, it produces relative movement between the two mounting blocks. This alters the tension of the internal vibrating wire to produce a corresponding change in its resonant frequency. Strain measurements are taken by means of an electromagnetic coil, which “plucks” the wire and transmits a frequency signal to the readout location.

The Model 4000 can be used on other materials such as wood, rock or concrete. When necessary, standard mounting blocks can be epoxy bonded to the surface of interest. Special mounting blocks complete with short grout-able rebar studs can also be ordered for concrete surface mounting.

For projects requiring longer base lengths use the Model 4050.

ADVANTAGES & LIMITATIONS

The Model 4000 is the most popular vibrating wire strain gage in the world on account of its elegant and robust design. These gages enjoy all the usual advantages of vibrating wire technology including long-term stability, high resistance to water intrusion and lightning



damage, and stable signal transmission over long cable lengths.

The electronic coil can be detached from the rest of the gage at any time without disturbing gage readings. This provides a large degree of flexibility in the event of cable damage. Gages and coils are also re-usable.

Temperature effects are automatically compensated for when the gages are welded to steel. A built in thermistor permits thermally induced strains to be distinguished from load strains.

Model 4000 gages are not suitable for dynamic applications, although auto-resonant versions are capable of following low frequency (less than 100 Hz) oscillations.

SYSTEM COMPONENTS

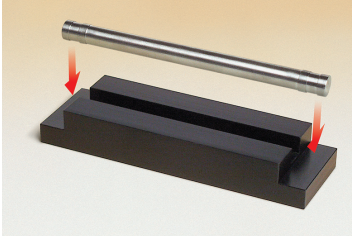
The Model 4000's vibrating wire is housed within a protective stainless steel tube, complete with watertight 'O' ring seals at both ends. The gage's electronic coil clips over the center of tube and includes an encapsulated thermistor to permit the measurement of temperature.

Use the Model 4000-8 spacer-bar and welding jig to correctly space mounting blocks during welding. Available cover plates (Model 4000-6) may also be ordered to protect the gage from accidental damage.

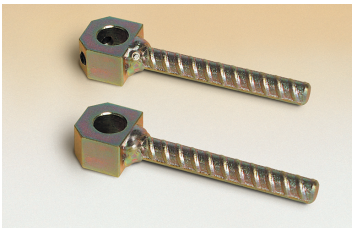
Readout is accomplished with our Advisor Vibrating Wire Readout unit, or appropriate datalogger. Contact Applied Geomechanics for details.



The Model 4050 with a 12 inch active gage length.



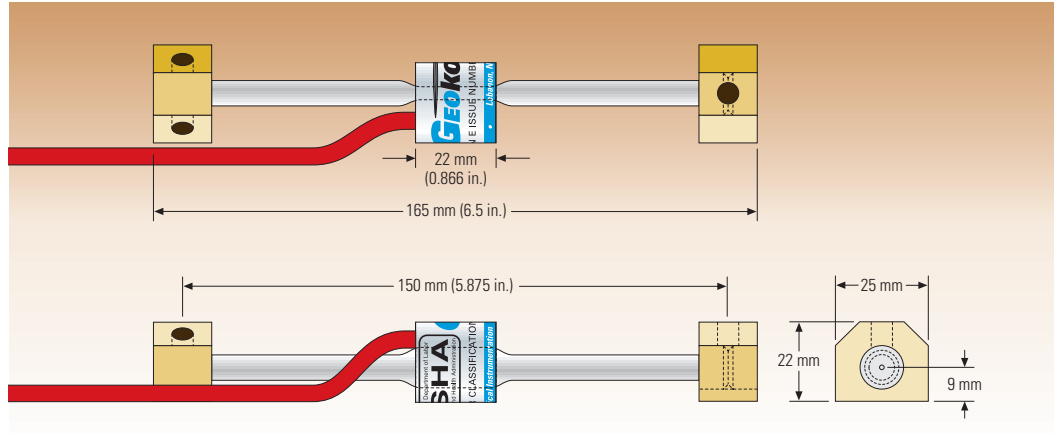
A spacer bar and welding jig (Model 4000-8) can be used during strain gage installation.



Concrete mounting blocks (optional).



Cover plate (optional).



Dimensions of the Model 4000.

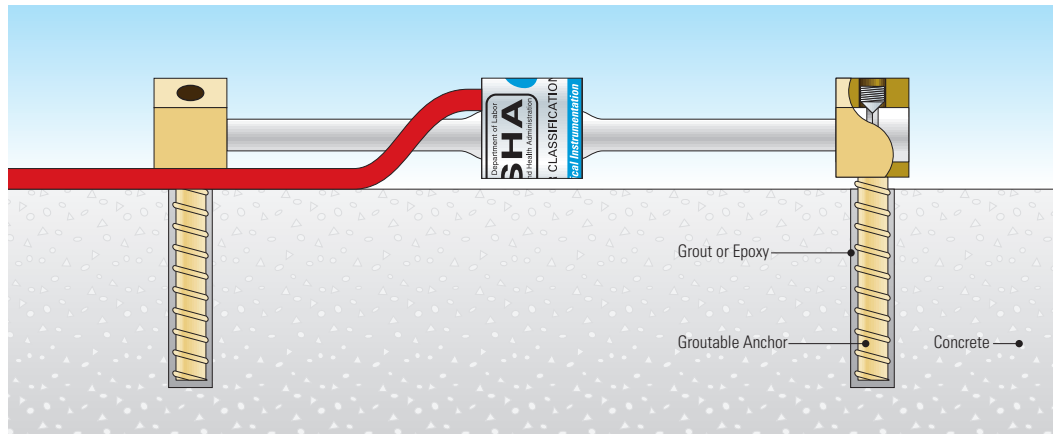


Illustration shows the Model 4000 attached to concrete via grouted concrete mounting blocks.

TECHNICAL SPECIFICATIONS	4000	4050
STANDARD RANGE	3000 $\mu\epsilon$	3000 $\mu\epsilon$
RESOLUTION	1.0 $\mu\epsilon$	1.0 $\mu\epsilon$
ACCURACY ¹	$\pm 0.1\%$ to $\pm 0.5\%$ F.S.	$\pm 0.1\%$ to $\pm 0.5\%$ F.S.
NONLINEARITY	< 0.5% F.S.	< 0.5% F.S.
TEMPERATURE RANGE	-20°C to +80°C 0.15 second	-20°C to +80°C
ACTIVE GAGE LENGTH ²	150 mm (5.875 in.)	300 mm (12 in.)

¹19-pin quarter-turn connector on end of 7.5m (25 ft) tiltmeter cable. Cable lengths to 1000m available. Power and signal connections made on terminal strip in switch box.

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