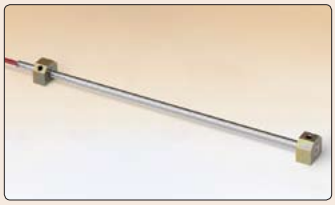
Arc Weldable Strain Gage

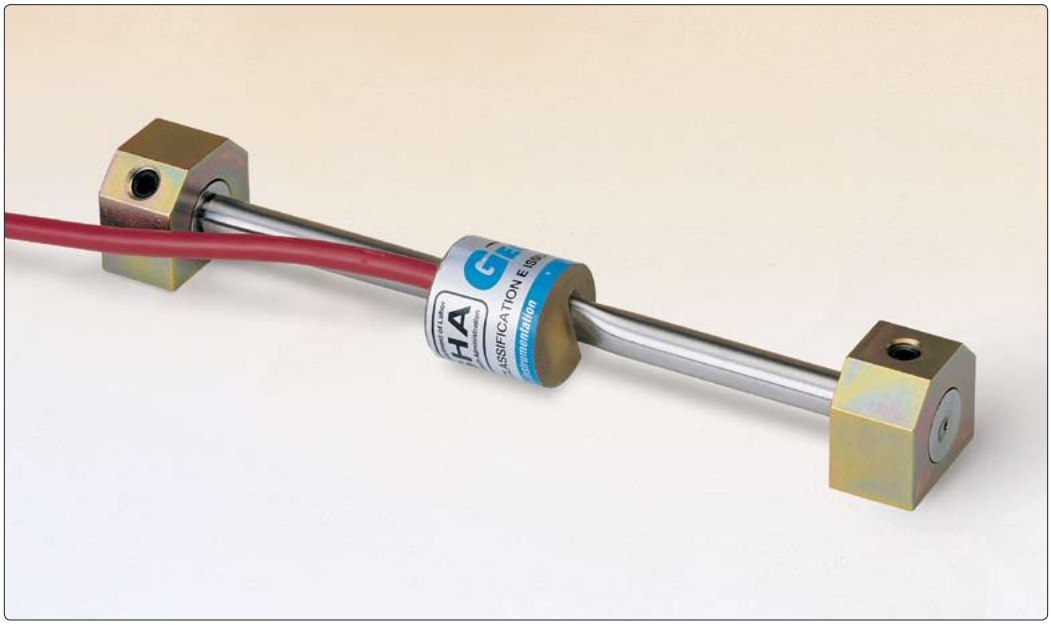
Applications

The Model 4000 Vibrating Wire Strain Gage is designed primarily for long-term strain measurements of steel structures including…

- **Tunnel linings**
- **Excavation bracing**
- **Arches**
- **Struts**
- **Sheet piling**
- **Piles**
- **Bridges**



The Model 4050 with a 12 inch active gage length.



Model 4000 Vibrating Wire Strain Gage.

Operating Principle

The Model 4000 basically consists of a length of steel wire tensioned between two mounting blocks that are arc welded to the surface of a structural steel member. Deformation of the structure under load produces relative movement between the two mounting blocks causing a change in the wire tension and a corresponding change in its frequency of vibration.

The resonant frequency is measured by plucking the wire using an electromagnetic coil connected through a signal cable to a readout box, which also measures the frequency and displays the strain in the wire directly in microstrain.

The Model 4000 can also be used on other materials such as wood, rock or concrete. Standard mounting blocks can be epoxy bonded to the surface or special concrete mounting blocks can be used in which short rebar studs are grouted into boreholes.

The Model 4050 is a modified version of the Model 4000 designed for measuring strains over a longer base length.

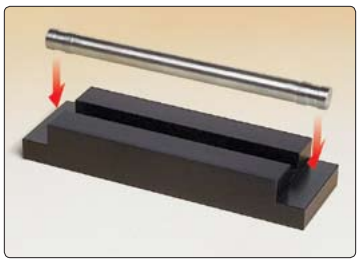
Advantages & Limitations

The Model 4000 is the most popular vibrating wire strain gage in the world on account of its elegant, robust design combined with all the usual advantages of vibrating wire technology, i.e. long-term stability, high resistance to water intrusion and lightning damage and the ability to be used with long signal cables.

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

Temperature effects are automatically compensated for when the gages are welded to steel. The thermistor permits real thermal induced strain to be distinguished from load induced strains.

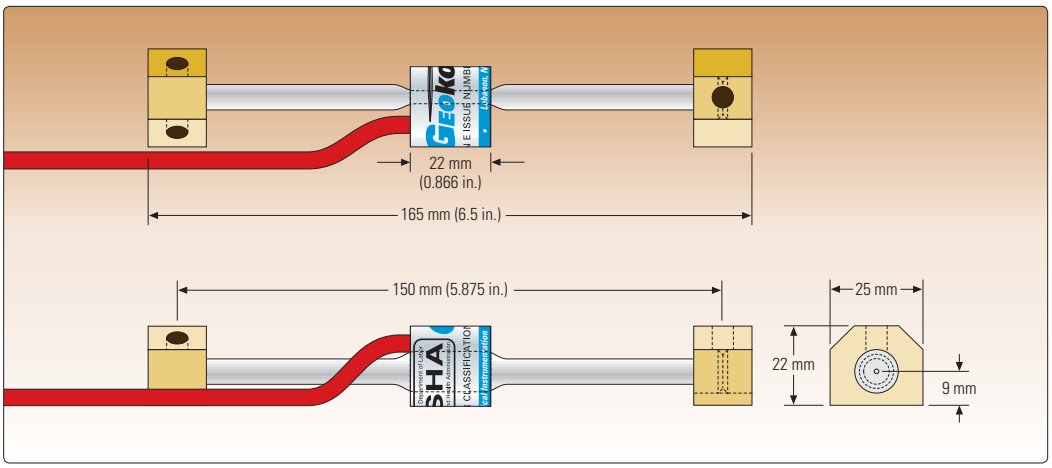
The gage is not suitable for dynamic applications, although auto-resonant versions can follow low frequency (less than 100 Hz) oscillations.



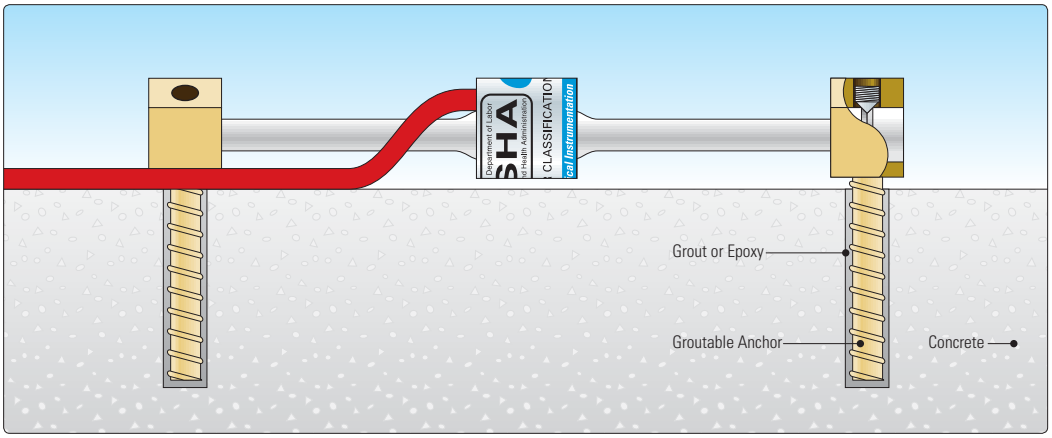
● *A spacer bar and welding jig (Model 4000-8) can be used during strain gage installation.*

● *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.*

● *Geokon Model GK-403 Readout Box for use with the Model 4000 and 4050 Strain Gages.*

System Components

The vibrating wire is protected inside a stainless steel tube with 'O' ring seals at both ends for complete water-proofing. The electronic coil clips over the center of the tube and a thermistor is encapsulated with the coil to permit the measurement of temperature.

The Model 4000-8 spacer bar and welding jig is used to correctly space the mounting blocks during welding. Cover plates (Model 4000-6) can be used to protect the gage from accidental damage.

Readout is accomplished using the Geokon Model GK-401, GK-403 or GK-404 Readout Boxes or the Micro-10 Datalogger.

Technical Specifications

	4000	4050
Standard Range	3000 με	3000 με
Resolution	1.0 με	1.0 με
Accuracy[1]	±0.1% to ±0.5% F.S.	±0.1% to ±0.5% F.S.
Nonlinearity	< 0.5% F.S.	< 0.5% F.S.
Temperature Range	–20°C to +80°C	–20°C to +80°C
Active Gage Length[2]	150 mm (5.875 in.)	300 mm (12 in.)

[1]±0.1% F.S. with individual calibration, ±0.5% F.S. with standard batch calibration.
[2]Other lengths available on request.

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