

Arc Weldable Strain Gauge

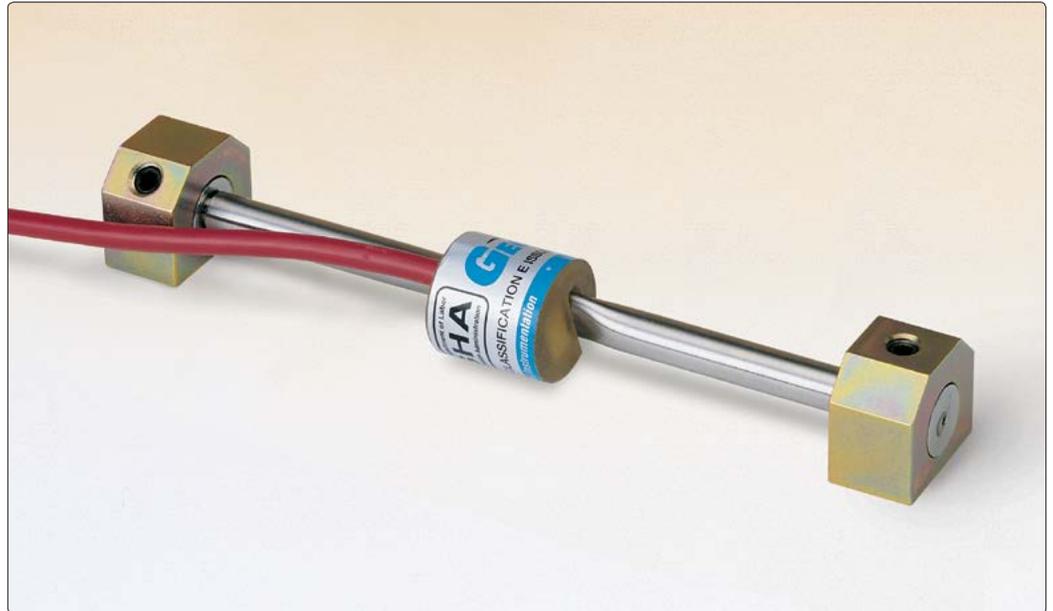
Applications

The Model 4000 Vibrating Wire Strain Gauge 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 gauge length.



• Model 4000 Vibrating Wire Strain Gauge.

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, 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.

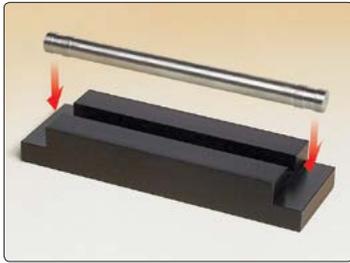
The Model 4050 is a modified version of the Model 4000 designed for measuring strains over a longer base length.

Advantages & Limitations

The Model 4000 is the most popular vibrating wire strain gauge 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 gauge at any time without disturbing the gauge reading. This provides a degree of flexibility in the event of cable damage. Gauges and coils are re-usable.

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



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



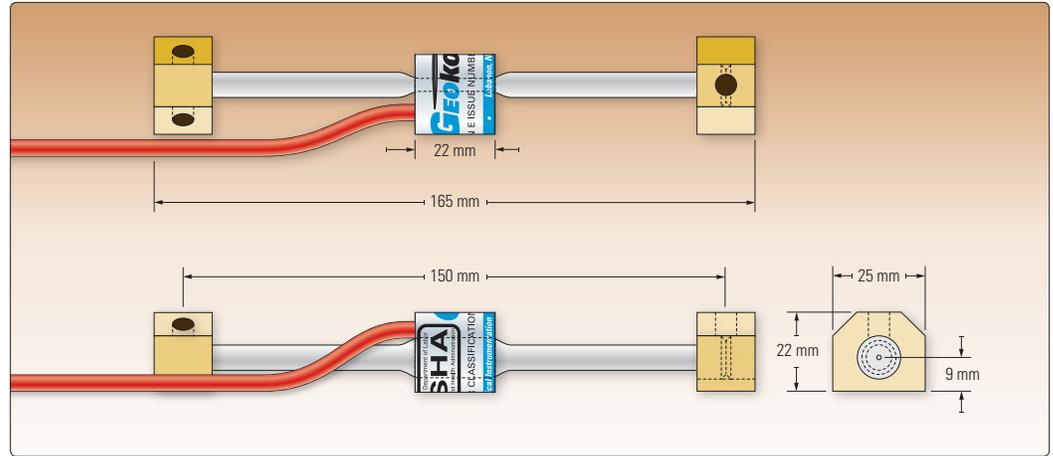
● Concrete mounting blocks (optional).



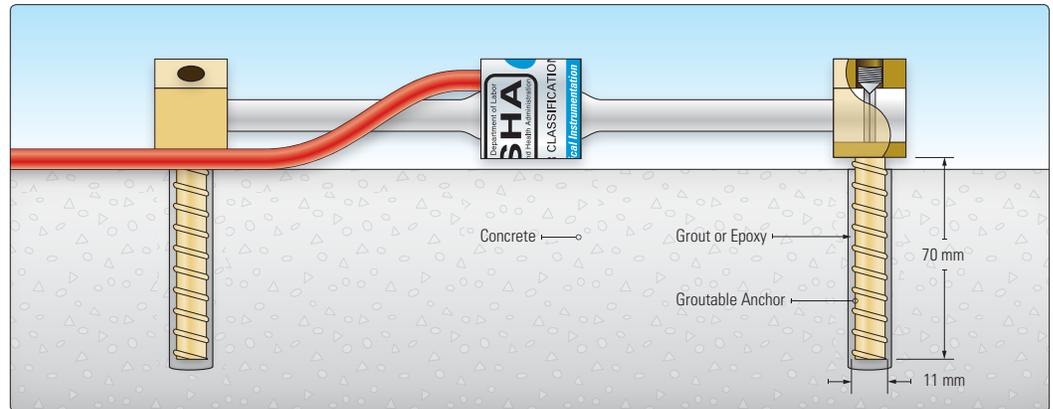
● Cover plate (optional).



● GEOKON Model GK-405 Readout for use with the Model 4000 and 4050 Strain Gauges.



● Dimensions of the Model 4000.



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

System Components

The vibrating wire is protected inside a stainless steel tube with 'O' ring seals at both ends for complete waterproofing. 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 gauge from accidental damage.

Readout is accomplished using the Model GK-404 or GK-405 Readouts or the Micro-1000 Datalogger.

Technical Specifications

| | 4000 | 4050 |
|----------------------------------|--------------------|--------------------|
| Standard Range ¹ | 3000 $\mu\epsilon$ | 3000 $\mu\epsilon$ |
| Resolution | 1.0 $\mu\epsilon$ | 1.0 $\mu\epsilon$ |
| Accuracy ² | $\pm 0.5\%$ F.S. | $\pm 0.5\%$ F.S. |
| Nonlinearity | < 0.5% F.S. | < 0.5% F.S. |
| Temperature Range ³ | -20 °C to +80 °C | -20 °C to +80 °C |
| Active Gauge Length ⁴ | 150 mm (5.875 in.) | 300 mm (12 in.) |

¹ Also available with 5,000 or 10,000 $\mu\epsilon$ range (please contact GEOKON for details).

² $\pm 0.5\%$ F.S. with standard batch calibration. $\pm 0.1\%$ F.S. with individual calibration.

Accuracy established under laboratory conditions.

³ Other ranges available on request.

⁴ Other lengths available on request.