VIBRATING WIRE LOAD CELLS

GEOKON®

MODEL 4900



Model 4900 Vibrating Wire Load Cells (annular and solid).

Closeup of cable insertion showing Kellems® wire mesh grip.

APPLICATIONS

The Model 4900 Load Cells are used for:

- Monitoring loads in tie-backs and rock bolts in the walls of excavations
- Monitoring long-term loads in concrete dam tie-downs
- Monitoring loads in steel arch tunnel supports
- Monitoring loads in cross lot struts



Model GK-406 (Right) utilizing a Model GK-406-MUX (Center) to read a VW Load Cell (Left).



GeoNet Vibrating Wire Data Logger.

OPERATING PRINCIPLE

The Model 4900 Load Cell is designed primarily for use on tiebacks and rockbolts and particularly where long term monitoring is required. They may also be used during pile load tests and for monitoring loads in struts, tunnel supports, etc. In practically all cases, the load cells are used in conjunction with bearing plates positioned on either side of the load cell.

Vibrating Wire load cells provide excellent long-term stability and can be used with long cables without adversely affecting the output. They are water resistant, have a low temperature coefficient and have been used successfully in high radiation environments. Versions that are fully waterproof, for submersion under water, are also available (please contact GEOKON for details).

When used to measure tensile loads in tiebacks or rockbolts, the load cell is trapped between bearing plates positioned between the jack and the structure, either below the anchor head for permanent installations or above the anchor head for proof-testing.

ADVANTAGES & LIMITATIONS

The Model 4900 Load Cell body is constructed in the form of a high strength steel cylinder in which between 3 to 6 vibrating wire strain gauges are embedded to measure the change of strain in the cylinder as it comes under load. Readings from the individual gauges are averaged and used in conjunction with the calibration factor to calculate the applied loads. Multiple gauges are used to account for the effects of eccentric loading.

The Model 4900 Vibrating Wire Load Cell is not suitable to measure dynamic loads. For measurements of this type the Model 3000 Resistance Gauge Load Cell can be used.

Load Cells can be customized to meet your needs. Our staff will work with you throughout the process. Common customizations include size, capacity, connectors, calibrations, etc.

SYSTEM COMPONENTS

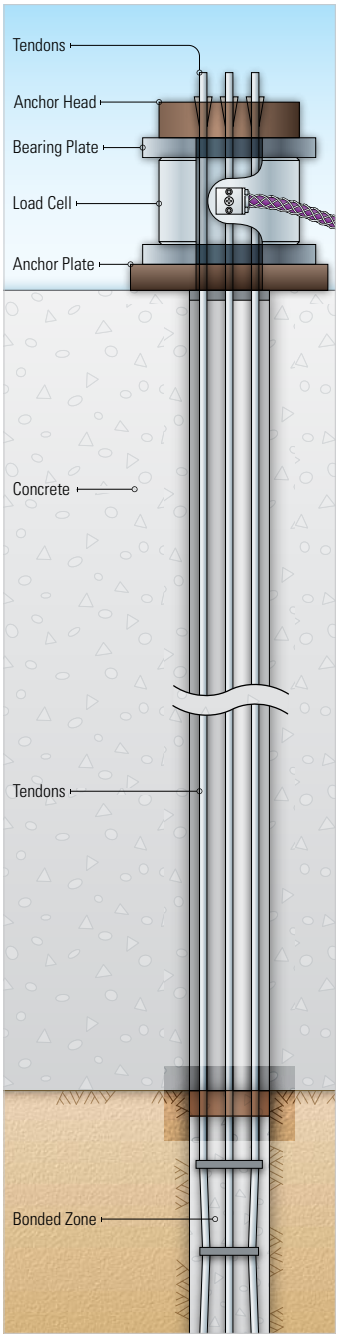
Signals from the load cell are transmitted to the readout location by means of a multi-conductor shielded cable, which may be armored for extra protection. Kellems grips prevent the cable from being pulled from the load cell. Larger size load cells are supplied with lifting lugs.

Compatible readouts include the Model GK-404 and Model GK-406. Readout by the GK-406 requires a Model GK-406-MUX Vibrating Wire Load Cell Multiplexer. Manual readout can be facilitated by connecting the Load Cell to a Model 4999 terminal box. For remote unattended applications, GeoNet or Model 8600 data loggers can be used to provide automatic data collection at predetermined intervals and data transmission via wireless methods.

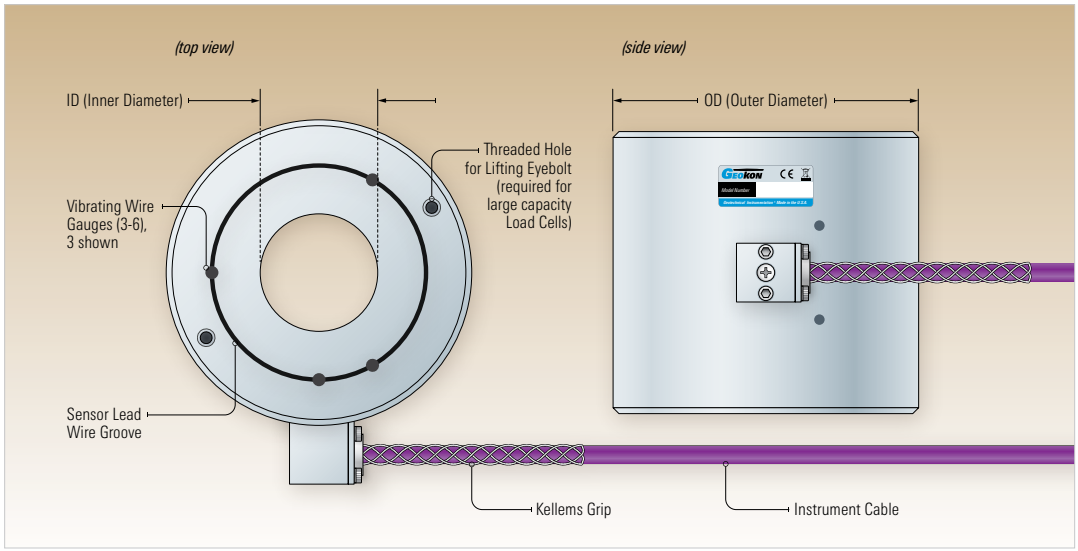
To minimize eccentric and uneven loading, the use of the thick machined-flat bearing plates and centralizer bushings (where necessary) are recommended.

Bearing plates should be machined flat and large enough to totally cover the load bearing surface of the load cell. The thickness is related to the load cell/hydraulic jack size mismatch: the greater the size disparity the thicker the bearing plate. Typical thickness ranges from 25 to 75 mm.

If the size of the tie-back or rock bolt is more than 20 mm smaller than the internal diameter of the load cell, then centralizer bushings are recommended.



Model 4900 used in concrete dam tie-down.



Model 4900 Series Load Cell components.

TECHNICAL SPECIFICATIONS

Rated Capacities[1]	100 to 10,000 kN	Output	1200-2800 Hz
Over Range[2]	150% F.S.	Temperature Range[4]	–20 °C to +70 °C
Resolution	0.025% F.S.	Cables	CE, RoHS
Accuracy[3]	±0.5% F.S.	Internal Diameters[1]	solid, 25, 51, 76, 102, 127, 152, 203, 254 mm

[1]Other capacities and diameters available. Calibrations exceeding Geokon's NIST traceable capacity of approx. 10,675 kN are subcontracted to an accredited testing lab.
[2]With no calibration shift.
[3]Established under laboratory conditions. System accuracy depends on end loading conditions
[4]Other ranges available on request.

ORDERING INFORMATION

4900-#-0: 3 gauge Vibrating Wire Load Cell, solid, 64 mm O.D., 114 mm height. Range (#) in kips: 80, 100, 120, 140.
4901-(75-150)-0: 25 mm thick bearing plate, for the above.
4900-#-0: 3 gauge Vibrating Wire Load Cell, solid, 89 mm O.D., 114 mm height. Range (#) in kips: 150, 200, 250, 300.
4901-(150-300)-0: 38 mm thick bearing plate, for the above.
4900-#-0: 3 gauge Vibrating Wire Load Cell, solid, 127 mm O.D., 114 mm height. Range (#) in kips: 350, 400, 500, 600.
4901-(300-600)-0: 51 mm thick bearing plate, for the above.
4900-#-0: 6 gauge Vibrating Wire Load Cell, solid, 178 mm O.D., 152 mm height. Range (#) in kips: 700, 800, 900, 1000, 1100, 1200.
4901-(600-1200)-0: 76 mm thick bearing plate, for the above.
4900-#-0: 6 gauge Vibrating Wire Load Cell, solid, 254 mm O.D., 152 mm height. Range (#) in kips: 1400, 1600, 1800, 2000, 2200, 2400.
4901-(1200-2400)-0: 76 mm thick bearing plate, for the above.
4900-#-2: 3 gauge Vibrating Wire Load Cell, 51 mm I.D., 76 mm O.D., 114 mm height. Range (#) in kips: 60, 80, 100, 120.
4901-(60-120)-2: 25 mm thick bearing plate, for the above.
4900-#-3: 3 gauge Vibrating Wire Load Cell, 76 mm I.D., 114 mm O.D., 114 mm height. Range (#) in kips: 150, 200, 250.
4901-(150-250)-3: 38 mm thick bearing plate, for the above.
4900-#-4: 3 gauge Vibrating Wire Load Cell, 102 mm I.D., 152 mm O.D., 114 mm height. Range (#) in kips: 250, 300, 350, 400, 450.
4901-(250-450)-4: 51 mm thick bearing plate, for the above.
4900-#-5: 3 gauge Vibrating Wire Load Cell, 127 mm I.D., 190 mm O.D., 114 mm height. Range (#) in kips: 400, 450, 500, 600, 700.
4901-(400-700)-5: 51 mm thick bearing plate, for the above.
4900-#-6: 6 gauge Vibrating Wire Load Cell, 152 mm I.D., 254 mm O.D., 152 mm height. Range (#) in kips: 800, 900, 1000, 1200, 1400.
4901-(800-1400)-6: 76 mm thick bearing plate, for the above.
04-375V9: Violet PVC Cable, 9.50 mm (±0.38 mm) [0.375"] Ø, 4 twisted pairs, for 3 gauge load cells.
06-500V7: Orange PVC Cable, 12.70 mm (±0.38 mm) [0.500"] Ø, 6 twisted pairs, for 6 gauge load cells.
4900-20: 10-Pin Male Connector with Cap (factory installed).
8032-27: Load Cell jumper wiring kit for use with 8032 Multiplexers

COMPATIBLE READOUTS AND DATA LOGGERS

GK-404: Handheld Readout
GK-406: Vibrating Wire Analyzer
8800 and 8900 Series: GeoNet Wireless Mesh Data Acquisition System
8910 Series: GeoNet Wireless LoRa® Data Acquisition System
8920 and 8921 Series: GeoNet Cellular Data Loggers
8930 Series: GeoNet Wi-Fi Data Loggers
8940 Series: GeoNet Local Data Loggers
8600 Series: Data Loggers

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