Rod Extensometer

Applications
Rod extensometers monitor settlements in foundations, subsidence above tunnels, displacements of retaining structures, and deformations in underground openings.

Operation
Components of a rod extensometer include anchors, rods, protective pipe, and a reference head. The anchors are attached to rods and installed in the borehole. The rods span the distance from the anchors to the reference head at the surface. The protective plastic pipe prevents bonding between rods and grout backfill.

Readings are obtained at the reference head by measuring the distance between the top (near end) of the rod and a reference surface. A change in this distance indicates that movement has occurred.

Movements are referenced to a stable elevation, typically a downhole anchor. The resulting data can be used to determine the zone, rate, and acceleration of movements, and to calculate strain.

Anchors
Groutable anchors are suitable for most applications. The hydraulic anchor is used in soft soil.

Rods
Rods are fiberglass or stainless steel. Fiberglass rod extensometers are assembled at the factory and shipped to the site, ready to install. The flexibility of these extensometers also makes them easier to install in confined areas, such as tunnels. Stainless steel rod extensometers are assembled on site. However, their stiffer rods can be used for deeper anchor depths.

Reference Heads
Mechanical reference heads can be used when there is easy access to the extensometer. Measurements are obtained with a depth micrometer. Electric reference heads are used when access to the reference head is difficult or where continuous monitoring is required. Measurements are obtained with displacement sensors and a readout or data logger.
FIBERGLASS RODS
Fiberglass Rod . . . . . . . . . . . . . . . . 51815855
Protective Tubing . . . . . . . . . . . . . . . 51815860
Rod Completion Kit . . . . . . . . . . . . . . 51836240
Fiberglass rod has a diameter of 5 mm (3/16”) and is supplied in continuous lengths. Protective polyethylene tubing is supplied in continuous lengths. Rod completion kit includes components for top and bottom of rod. Order 1 kit per anchor.

STAINLESS STEEL RODS
Stainless Steel Rod . . . . . . . . . . . . . . . . 51704310
Protective Pipe . . . . . . . . . . . . . . . . . . 51704321
Rod Completion Kit . . . . . . . . . . . . . . . 51836210
Stainless steel rod has a diameter of 6.4 mm (0.25”) and is supplied in 10’ lengths, each threaded and tapped for assembly. Protective pipe is supplied in 10’ lengths and includes couplings. Requires PVC solvent cement, which can be obtained locally. Rod completion kit includes components for top and bottom of rod. Order 1 kit per anchor.

MECHANICAL REFERENCE HEAD
Single-Point Head . . . . . . . . . . . . . . . . . 51836110
Multi-Point Head . . . . . . . . . . . . . . . . . . 51836120
Digital Depth Micrometer . . . . . . . . . . . . . . 51809620
Single-point head works with 1 rod and anchor. Multi-point head works with up to 6 rods and anchors. Readings are obtained with depth micrometer. Digital depth micrometer displays readings in inches and millimeters. 150 mm (6”) range, 0.01 mm (0.001”) resolution.

ELECTRIC REFERENCE HEAD
Single-Point Head . . . . . . . . . . . . . . . . . 51836130
Multi-Point Head . . . . . . . . . . . . . . . . . . 51836140
VW Sensor, 60 mm range . . . . . . . . . . . . . . . 52636305
VW Sensor, 100 mm range . . . . . . . . . . . . . . . 52636325
Potentiometer, 60 mm range . . . . . . . . . . . . . . . 51836152
Potentiometer, 100 mm range . . . . . . . . . . . . . . . 51836154
Single-point head works with 1 rod and anchor. Multi-point head works with up to 6 rods and anchors. Displacement sensors are supplied with 0.6 m (2’) of signal cable.

VW sensor provides resolution of 0.01% FS. Potentiometer provides resolution of 0.1% FS. Repeatability is better than ±0.5% FS.

Special ranges and waterproof ratings can be quoted on request.

VW sensors are read with a VW readout or a data logger: VW minilogger for single points, Quattro logger for four points, or Campbell Scientific logger for multiple points.

Potentiometers are read with the Extensometer Indicator, a or a Campbell Scientific data logger.