

**MULTIPLE POINT BOREHOLE EXTENSOMETER
STAINLESS STEEL OR FIBERGLASS RODS
PRECISE LONGITUDINAL DISPLACEMENT**

The Multiple-Point Borehole Extensometer (MPBX) Model BOR-EX allows for measurements of precise longitudinal displacements in rock, soil and concrete structures.

Description

The **BOR-EX** allows for measurements of precise longitudinal displacements in rock, soil and concrete structures. Typically it is used for monitoring settlement in foundations, subsidence above tunnels, displacements of retaining structures, and deformations in underground openings.

The borehole extensometer includes anchors, extension rods and a reference head. The anchor is connected to the head of the instrument by extension rods typically placed within a protective sleeve. This sleeve ensures that the rods can move freely and translate all movement of the anchor to the tip of the rod. Movement of the rock or soil mass relative to the head can then be calculated by measuring the displacement of the tip of the extension rod to a reference plate located in the head of the extensometer.

Three head types are available: one that allows mechanical reading only (**BOREX-M**), one that allows electrical reading only (**BOREX-E**), and one that allows simultaneous mechanical and electrical readings (**BOREX-E/M**). The mechanical reading is performed with a depth gauge or with a dial indicator, whereas electrical readings are done using vibrating wire or potentiometer sensors.

Key Features

- Rugged construction
- Mechanical, electrical, or both reading
- Stainless steel or fiberglass rods
- Protective sleeve on rods
- Many anchors available

Applications

- Bearing measurements of precise longitudinal displacements in rock, soil and concrete structures
- Deformation of laterally loaded piles and sheet piles
- Monitoring settlement in foundations,
- Displacements of retaining structures
- Deformations in underground openings.

Characteristics

ANCHORS

Groutable Rebar Anchor

Easy to install, this type of anchor is the preferred type for downward boreholes in rock. Can also be installed upward with a special grouting technique. A good contact between the borehole wall and grout is important to ensure that any movement of the surrounding material is transmitted to the anchor. Up to six anchors can be installed in a 3-in (NX) borehole.

Hydraulic Borros-Type Anchor

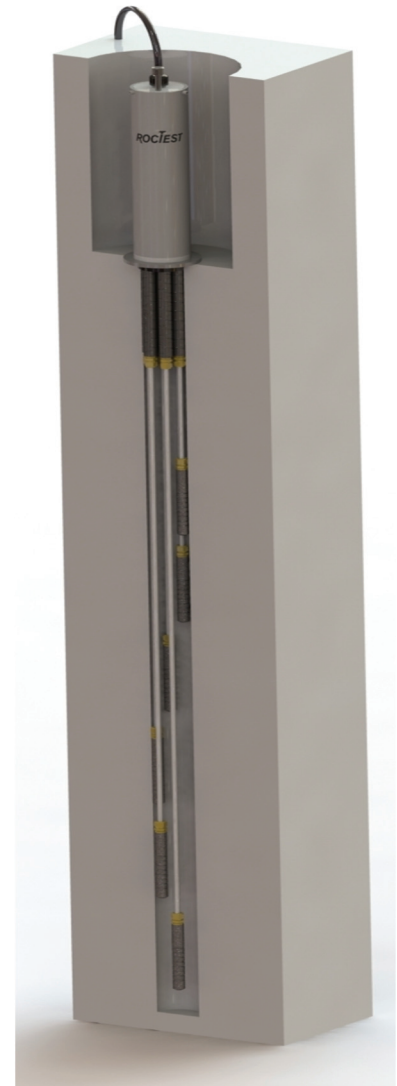
These anchors are typically used in soils where deep penetration of the prongs is required for good anchorage, for instance in cases where hole squeezing is anticipated. A single acting anchor contains 3 prongs, which are extended into the surrounding soil by means of a hydraulic pump. A double acting anchor has extendable prongs at both top and bottom of the anchor. The prongs, once extended, cannot be retracted. The borehole is generally grouted in place following installation. The installation of this type of anchors requires hydraulic tubing and pump.



Groutable Rebar Anchors



Hydraulic Borros-Type Anchors



EXTENSION RODS

Two types of extension rods are available: fiberglass and stainless steel. Ease and speed of installation are the main benefits of the fiberglass rods. Fiberglass rod extensometers are assembled at our factory and shipped to the site, ready to install. Stainless steel rods are preferable for long extensometers. These rods are supplied in sections and are as-assembled on site.

PROTECTIVE TUBE

Rods are typically installed in protective tubes to protect them from the injected grout and other confining material. Tubes are supplied in sections for stainless steel rods or, when not pre-assembled, can be shipped in continuous lengths for fiberglass rods.

ROD CENTRALIZER

Rod centralizers may be used to maintain the extension rods in position. They are highly recommended for non-grouted, deep installations.



Depth Gauge



Dial Indicator

Specifications

	DIAL INDICATOR 1	DEPTH GAGE 1	VIBRATING WIRE 2	POTENTIOMETER 3
Range :	50 mm	150 mm	25, 50, 100,150, 200 mm	25, 50, 100, 150 mm
Accuracy :	-	±0.003 mm	±0.25 % F.S. (±0.1 % in option)	±0.5 % F.S.
Resolution :	0.01 mm	LCD: 0.001 mm Vernier: 0.01 mm	0.02% F.S.	0.01 mm
Readout Instruments :	-	-	MB-3TL, SENSLOG, SL Module	Contact Roctest
Operating Temperature :	-	0 to +40°C (LCD)	-20 to +80°C	-20 to +80°C
Thermistor :	-	-	One 3-kΩ per sensor (see model TH-T)	Available on request
Electrical cable :	Multiconductor with variable numbers of twisted shielded pairs (according to number of sensors per extensometer) grounded, PVC jacket (standard), with thermistor. Or with individual cable for each sensor (IRC-41A)			
Electrical head	Including a PVC protective tube with variable overall dimensions, and a protective cap, all splash proof			
Fiberglass Rods:	6.4 mm with BOREX-E or 9.5 mm with BOREX-E/M and M. Protected in a polyethelene tube.			
Stainless steel Rods	6.4 mm. Protected in 13.7-mm O.D. lengths of PVC tube.			

1 Available for E/M or M models only. Other ranges available.

2 Available for E or E/M models only. Please refer to the JM-T datasheet for more details.

3 Available for E/M model only.

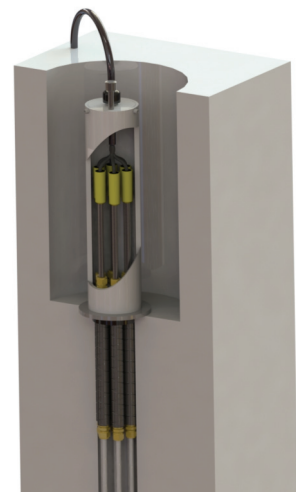
Ordering Information

Please specify:

- Model (BOREX-E, E/M, M)
- Type, number and position of anchors
- Type of rods
- Borehole diameter
- Type and range of sensors
- Cable (length, individual or multiconductor)

Optional Accessories

- Readout instruments
- Non-groutable Spring Leaf Anchors
- Invar rods for limited thermal effects
- Additional thermistors
- Grout tube
- Grout plate
- Tool kit



BOREX-E Reference Head
with Multiconductor Cable