

## FSG borehole rod extensometer(MPBX)

### Description

Model 4380 **FSG borehole rod extensometer** consists of anchors, rods, protective tubes, and foil strain gage type displacement sensors.

The FSG displacement sensor measures settlement or heaves and changes electrical output as movement in layers change. The anchors connected to rods are installed in borehole.

In anchor fixed with grouting or hydraulic anchor in ground and anchor rod, as displacement happens, the position of anchor changes and it transferred to FSG displacement sensor, in this moment, the resistance value of attached foil strain gage changes minutely, and this resistance value is delivered to output device and displayed in suitable mechanical unit. You can confirm the speed of displacement, rate, volume, and displacement section.

The FSG borehole rod extensometer can be installed up to six anchors in  $\varnothing 100\text{mm}$  one borehole. Quantity of anchors installed depends on the drilling diameter in borehole and anchor type.

The anchors are available cement grouting anchors for rock and hydraulic anchors for fill and soft ground.

The rods for anchors are assembled with diameter  $\varnothing 6\text{mm}$  fiberglass rod in field. The FSG borehole rod extensometer is useful for borehole that heave is expected and the depth is deep. The PE protective tube is installed with rods to prevent injection to rods.

The FSG displacement sensor is available 50mm and 100mm range. If the FSG displacement sensor of 50mm range is used, it is turned its sleeve to set to 25mm long. It is distance between extension and compression.

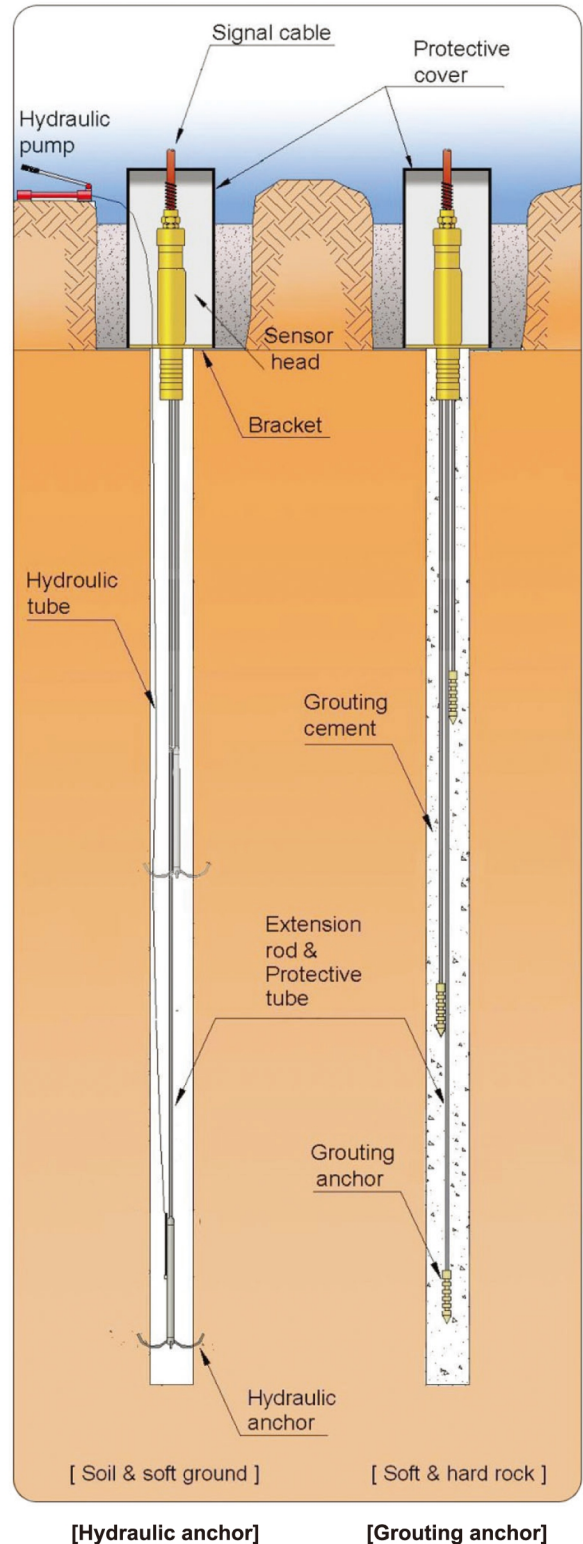
The FSG borehole rod extensometer is calibrated of displacement versus mV by the exclusive device. The calibration sheet is supplied with each sensor.

Foil strain gage type displacement sensor is waterproof and rustproof that permanent measurement is possible.

### Applications

FSG borehole rod extensometer is designed to measure settlement or heaving in borehole that is installed one to six measuring anchors in each layer.

- Measurement of settlement or heaving in foundations
- Monitoring the stability in tunnels, mines, fills and excavations
- Monitoring the stability in adjacent ground during long term structure construction
- Measurement of the deformation in abutments and retaining walls.
- Application to the high-intensity and low coefficient of linear expansion and light fiberglass rod.



### Features

- High precision and reliability
- Stability and reliability in extreme environment
- Possible to automatic measurement
- Permanent anti-corrosive, rustproof materials

## FSG borehole rod extensometer(MPBX)

### Specification

Model		4380
Sensor element		FSG sensor (foil strain gage type)
Range		50mm 100mm
Accuracy		±0.5% FSR
Nonlinearity		±1.0% FSR
Rating output		2 mV/V (2,000 × 10 <sup>-6</sup> )
Exciting voltage recommended		Less than 5 VDC
Exciting voltage allowable		Less than 10 VDC
Resistance		350 Ω
Insulation resistance		More than 100 MΩ / 500 V
Operating temperature		-30~80°C
Waterproof		50m H <sub>2</sub> O
Measuring points		1~6 point (selection by customer)
Length of anchor rod		Order by customer (optional)
Weight		① Sensor head 4~5kg ② Extension tube 0.15kg/m ③ Hydraulic anchor 2.5kg
Material	Sensor part	Stainless steel / alloyed steel (galvanized)
	Anchor rod	Fiberglass rod (Ø6mm) or stainless steel tube (Ø4 × Ø7mm)
	Protective cover of anchor rod	PE tube (Ø8 × Ø10mm)
Signal cable		Ø13mm, 0.3mm <sup>2</sup> × 16C shielded PVC cable

### The readout

It is electric resistance sensor that generates mV and can be used by connecting with strain meter or data logger that can read strain

- ACE-600A (FSG readout)
- ADL-200A (Smart logger)

### Ordering information

- Application field
- Type and quantity of anchors
- Keeping readout unit
- The depth of each anchor rods
- Cable length

### Ancillary equipments

- Universal terminal box (model 7012/7024)
- Protective case (PC-60)
- Nylon tube for grout
- Portable water pressure pump (model 7050)
- Hose kit for hydraulic anchor

### Recommendation

The settlement of surface can be larger than excavated anchor part. Apart from set place of sensor, by setting surface pin for level near save zone, and adjusting surface settlement, you can measure more accurately.

### Maxium install depth

Orient of drilling	Specification
Fiberglass anchor rod	Ø6mm
Vertical lower 45° degree upper slope	About 60m
Vertical upper 45° degree lower slope	About 40m

