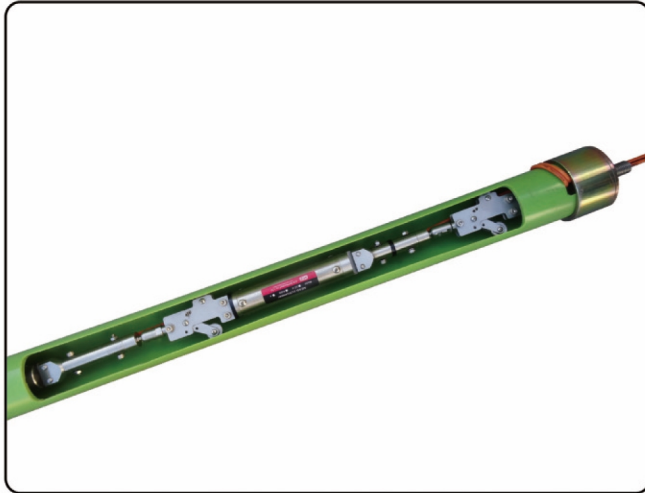


MEMS vertical, horizontal multi-point inclinometers



Description

Model 4490 MEMS type vertical, horizontal multi point inclinometer consists of several MEMS sensor, the guide wheel, the extension tube, and the inclinometer casing.

The casing should be attached on the structure or embedded to the direction that vertical or horizontal displacement is expected. The casing controls the locations and direction of MEMS sensor

As the measuring range of MEMS sensor is max ± 10 degree, it can be installed in vertical or horizontal direction according to the calibration method using MEMS sensor.

Settlement or heave is happened the change of sensor inclination angle with displacement of casing. This change volume is outputted as mV. If multiply the converted $\sin\theta$ by gage length (L), you can easily calculate the displacement value. The displacement volume that is the moved distance is difference of initial measure value and current measure value.

Model 4490, the remote measurement or unmanned operation is possible using data logger.

This product is manufactured with the corrosion resistant stainless steel for waterproof and rustproof.

It is useful to measure slope displacement or horizontal displacement in underground bedrock, and in case of real time measurement dynamic measurement is needed.

Applications

MEMS horizontal multi-point inclinometer is useful to measure vertical displacement like settlement or heave in the basic part of embankment and dam, and at the construction site of highway.

- Measurement of vertical displacement of layer followed by construction of tunnel and excavation
- Measurement of settlement under terrestrial structure like dam and embankment
- When vertical settlement is expected in blasting tunnel facing
- Measurement of stability of retaining wall.

Features

- Included the high precision tilt sensor
- 200m H₂O waterproof
- Included the electric noise protecting circuit
- Dynamic measurement is possible by connecting automated equipment

The readout

It is connected to the system such as the voltage readout units, or data logger as it is the electrical sensor that output mV.

- ACE-1500 (MEMS readout)
- ACE-900 series (MEMS mini logger)
- ADL-200A (Smart logger)

Ancillary equipments

- Universal terminal box (model 7012/7024)
- Material related with casing
- Analysis program for horizontal displacement (SF-01)

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Specification

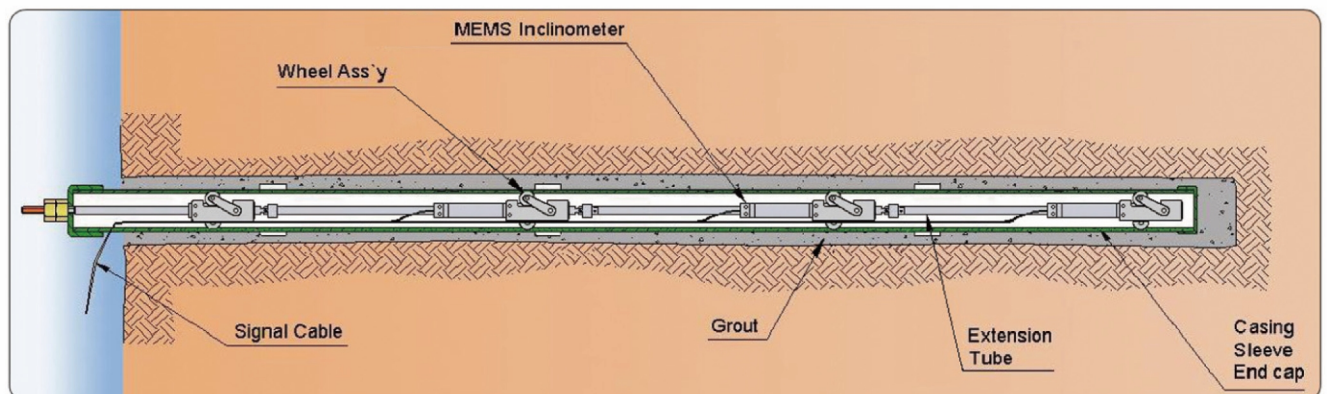
Model	4490 A10	4490 AB10	4490 A30	4490 AB30
Sensor element	MEMS sensor			
Range	$\pm 10^\circ$ 1axis	$\pm 10^\circ$ 2axis	$\pm 30^\circ$ 1axis	$\pm 30^\circ$ 2axis
Resolution	10arc second			
Accuracy	$\pm 0.1\%$ FSR			
Nonlinearity	$\pm 0.5\%$ FSR			
Supply voltage	+12V, -12V DC			
Output voltage	-5V~5V DC			
Insulation resistance	More than 100 M Ω / 500 V			
Operating temperature	-30~80°C			
Gage length	Selection of standard length 1, 2, 3 m			
Maximum sensor volume	Inclinometer sensor 60 ea / ID \varnothing 59mm casing			
Waterproof	200m H ₂ O			
Materials	Stainless steel, fluorinate series O-ring, high grade silicone potting			
Weight	① Sensor 1.0kg ② Guide wheel 0.4kg ③ Extension tube 0.7kg/m ④ Union 0.15kg			
Signal cable	\varnothing 3~ \varnothing 6mm, 0.24mm ² × 4C shielded PVC sheath cable			
Accessories	① Guide wheel ② Extension tube ③ Union part ④ Top cover ⑤ Connection part			

Ordering information

- Place to install
- Component of system
- Specification of system / controlled standard
- Depth of installation and cable length
- Keeping readout unit
- Length of signal cable

Recommendation

- In setting of standard inclinometer casing, if the horizontal / vertical displacement is expected, please use telescopic section for extension so that it make displacement to be absorbed in extension and prevent from damage of casing and sensor.
- When there are too many to set, you can measure easily and quickly by using analysis program for vertical displacement. (SF-01H).
- System has limit in radius curvature in setting casing that it cannot exceed 3m of gauge length. And in case of using standard casing of \varnothing 59mm inside diameter, you cannot set over 60 nos inclinometer.
- In case of setting MEMS vertical, horizontal multi-point Inclinometer, it is possible to set when applying over \varnothing 59mm of inside diameter.



[Installation of MEMS vertical, horizontal multi-point inclinometer]