

Model RT-1010 Array Displacement Meter

Real-Time, Accurate, Integrated Design Soil Structure Health Monitoring System

Significantly Improves Efficiency by Integrating Data Acquisition Modules and Direct Output Capabilities



Description

The RT - 1010 array displacement meter is generally used for the automated monitoring of the deformation of structures such as landslides (slopes), dams, embankments, foundation pits, and tunnels, as well as groundwater levels, water temperatures, and layered settlements. It can replace manual inclinometers for automated measurements and can also replace In-Place Inclinometers to achieve more accurate continuous measurements.

Applications

■ Vertical installation:

When the RT-1010 is used to monitor the deep - horizontal displacement of structures such as landslides, foundation pits, dams, and embankments, it generally needs to be installed by drilling. The sensor is installed in an inclinometer tube to automatically measure the deep - horizontal displacement, groundwater level, and water temperature. By cooperating with settlement magnetic rings, the layered settlement of the soil can be automatically measured in the same hole, realizing a comprehensive solution for soil safety monitoring.

■ Horizontal installation:

When the RT - 1010 is horizontally installed in structures such as dams and roadbeds to measure settlement, one end of the sensor must be fixed to a reference point, and the settlement of each position along the sensor direction relative to the reference point can be measured.

■ Arc - shaped installation:

When the RT - 1010 is arc - shaped installed in structures such as tunnels and pipelines to measure convergence, one end of the sensor must be selected as the reference point, and the convergence of each point in the section can be measured.

Key Features

■ Multi - parameter measurement:

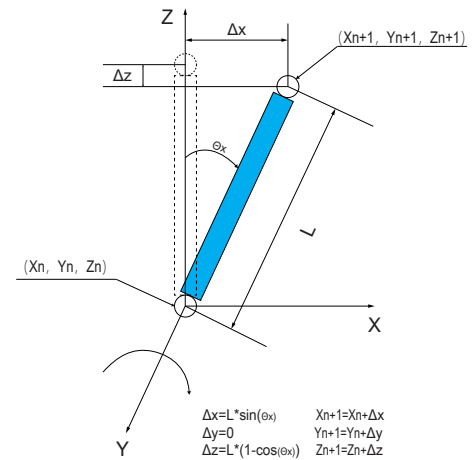
- It can accurately measure displacement, inclination angle, groundwater level + water temperature (optional), and layered settlement (optional).

■ High reliability:

- IP68 - level dust - proof and waterproof
- Withstands water pressure of 2MPa, and a 4MPa version can be customized
- Excellent lightning - protection and anti - static performance ($\pm 60\text{kV}/600\text{W}$)
- Strong interface protection with reverse - polarity protection for the power supply
- Verified by over 100,000 sensors in the field

Working Principle

The array displacement meter is a static application of MEMS accelerometers. It uses the components of gravitational acceleration in the three axes of the MEMS sensor to calculate the angles between each sensor section and the vertical and horizontal directions. By combining the length of the sensor, the vertical and horizontal displacements are calculated, that is, the coordinates (X, Y, Z) of each node relative to the reference point (coordinate origin). The calculation principle and connection structure of the sensor are shown in the following figure:



Specifications

Parameter	Specification	
Monitoring Elements	Displacement, angle, groundwater level + water temperature, layered settlement	
Single Segment Length	50cm/100cm/Customizable lengths	
Maximum Segment Num	400	
Angle Measure	Resolution	0.001°
	Accuracy	0.05°
Displacement Measure	Resolution	0.01mm
	Stability	Less than ±1mm@50m
Temperature Drift	Less than 1mm@50m, Temperature Range: -20 ~ 55°C	
Node Temperature	Resolution	0.1°C
	Accuracy	0.5°C
Groundwater Measure	Groundwater Level	Resolution: 1mm, Accuracy: 0.25%FS
	Water Temperature	Resolution: 0.1°C, Accuracy: 0.5°C
Operating Voltage	DC 5 - 30V, recommended DC 12V	
Current Consumption	≤1.8mA@12V/section (average)	
	< 5mA@12V/section (instantaneous maximum)	
Communication Interface	RS485	
Dimensions	Maximum φ22mm, minimum φ18mm	
Material	304 stainless steel tube and high - strength waterproof sealing tube	
Weight	0.6Kg/segment	
Operating Temperature	-40°C ~ +85°C	
Waterproof Rating	2MPa or 4 MPa customization available	

Note: To ensure the best installation effect, it is recommended to use a circular inclinometer tube with an outer diameter of φ70mm.

