DATA DIGGER EQUIPMENT

DATA SHEET

PORTABLE MEMS TILTMETER

INTRODUCTION

The Data Digger Equipment's model DDE-70M portable tilt meter is suitable for monitoring change in inclination of a structure. It is a high resolution tilt meter using the same proven technology as used in our inclinometer probe. It is rugged in construction and has excellent temperature stability. Tilt changes in structures may be caused due to construction activities such as excavation, tunneling and de-watering that affects the ground that supports the structure. Changes in tilt may also result from loading of a structure, such as loading of a dam during impoundment, loading of a diaphragm wall during excavation or loading of a bridge deck due to wind and traffic. Data from model DDE-70M tilt meter provides early warning of threatening deformation, allowing time for corrective action to be taken or if necessary for safe evacuation of the area..

FEATURES

- Rugged & robust construction with excellent temperature stability.
- Provides reliable, high resolution readings.
- Economical to use, as one tilt meter can be used to monitor any number of inexpensive tilt plates. Ease in installation as tilt plate can be anchored to structure or even bonded in case of a smooth surface.
- Ease in monitoring tilt by a single operator.

APPLICATION

- Monitoring critical buildings, structures, utilities etc. located in the zone of influence of cut and cover excavation/tunneling activities.
- Monitoring vertical rotation of retaining walls.
- Monitoring inclination and rotation of dams, piers and piles, etc.
- Monitoring stability of structures in landslide areas.
- To evaluate performance of bridges and struts ruts under load.

Overview

The portable tilt meter system includes a portable tilt meter model DDE- 70M, tilt plates, and a readout unit. Die-cast aluminium tilt plates, available are dimensionally stable and weather resistant. Protective covers are available for the tilt plates if specifically ordered. The DDE-70M portable tilt meter incorporates a sensor based on precision MEMS accelerometer technology. It is housed in a rugged frame with machined surfaces that facilitate accurate positioning on the tilt plate

Description

A series of inclinometer access tubes, attached to each other, are installed in a borehole or embedded in earth/rock fill or concrete structure during construction or fixed to the vertical face of a completed structure.
In-place inclinometer system, consisting of a string of inclination sensors with MEMS tilts sensors and SDI-12 digital interface, is positioned inside the inclinometer casing to span the movement zone. Each in-place inclination sensor is fitted with a pair of pivoted sprung wheels. The extension rod lengths, connecting the sensors, can be varied to suit individual gage length requirements. The sensors can also be concentrated in areas where movement is expected. A suspension stainless steel wire rope is available to position a single or group of sensors where profile of entire borehole is not of interest but only a specific portion needs monitoring. A single 3 conductor bus cable is threaded in a daisy chain fashion connecting each sensor to its next immediate neighbor and finally to the top of the borehole and directly to the wireless communication network through a Node. The design allows each sensor to move independently to each other without influence from the sensors above or below. This provides a profile of displacement over the complete length of the installation.

Operation

Tilt plates are mounted on the structure at specified locations. Tilt plates are typically anchored to the structure, but may also be bonded to a smooth clean surface i.e. granite, stone, tiles. The bottom surface of the portable tilt meter is used to take readings from horizontally-mounted tilt plates and the side surfaces are used to take readings from vertically-mounted tilt plates. The DDE-70M monitors change of tilt of structures over a period of time. Tilt measurement is done by taking two readings for each tilt plate - one reading in plus direction and another in minus direction as per the + and – orientation provided in the base plate of tilt meter. Initial tilt reading for each tilt plate is recorded after it is mounted on the structure and stored in the readout logger. Change in tilt with time is obtained by comparing the initial tilt reading with the subsequent tilt reading.

Readout/Datalogger

Compatible portable digital readout unit model DDE-103 series is available for storing and monitoring tilt from DDE-70M portable tilt meter with date and time.

TECHINCAL SPECIFICATIONS:

PORTABLE TILTMETER DDE-70M	
Sensor	Uni-axial
Measuring Range	± 15° from vertical Sensitivity 10 arc second
Accuracy	± 0.1% F.S Output ± 4.1 V nominal at 15°
Sensor Outer Body Material	Stainless Steel Frame, anodized aluminium housing
Operating Temperature	-20°C to +80°C
Dimension	162L x 90B x 145H mm
Net weight	3.6 kg
Mounting Method	Hilti anchor HPS 1-6/15x40 # 260350 or equivalent