



## DATASHEET

# TILT METER

## MODEL EAN-90M/EAN-92M



### OVERVIEW

The Encardio-rite model EAN-90M/EAN-92M tilt meter is suitable for monitoring of inclination and vertical rotation in structures. It is a high resolution tilt meter, 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 affect 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.

### FEATURES

- Suitable for severe environment.
- Provides reliable and high resolution readings.
- Rugged & robust construction and excellent temperature stability.
- Easy to install and take readings.
- Readings can be taken by remote datalogger.

### APPLICATION

- Monitoring vertical rotation of retaining walls.
- Monitoring inclination and rotation of dams, piers and piles, etc.
- Monitoring stability of structures in landslide areas.
- Monitoring tunnels for convergence and other movements.
- To evaluate performance of bridges and struts under load. To monitor deformation of embankments, retaining walls etc.



Data from the tilt meter provides early warning of threatening deformations, allowing time for corrective action to be taken or if necessary, for safe evacuation of the area.

## DESCRIPTION

Model EAN-90M tilt meter consists of a basic sensor, mounted inside stainless steel housing. The sensor output is 4 V nominal at  $\pm 15^\circ$ . This output can be carried over long distances without any signal degradation. The sensor provides a relatively low cost system which offers excellent resolution, long term stability and a low thermal sensitivity.

The tilt meter (uniaxial and biaxial) is fixed on to a vertical or horizontal surface by means of an adjustable bracket and expandable anchor.

Movement of the structure causes change in tilt of the tilt meter, which results in change in output of the sensor. Measurements can be made on horizontal or vertical surfaces. Subsequent sets of readings show how the structure is behaving and will give an indication of permanent deformations as time progresses.

Model EAM-92M tilt meter is available with SDI-12 interface such that all sensors can be connected through single bus cable to our compact datalogger. SDI-12 bus cable from different tilt meters can also be connected to same datalogger.

### Mounting variants

Model EAN-90M/92M tilt meter is supplied with standard mounting bracket suitable for wall mounting/vertical surface. However, options are also available on request for mounting the tilt meter on a roof/suspended from ceiling or on the floor.

## READOUT/DATALOGGER

Model EAN-90M tilt meter can be read by our EDI series portable digital read-out unit suitable for MEMS tiltmeters. The readings can also be read or logged at a remote location by an automatic data acquisition system like Encardio-rite model EDAS-10. In the latter case also, it is recommended to take readings with readout unit while installation and for troubleshooting until the tilt meter is connected to EDAS-10.

Model EAN-92M tilt meter data can be monitored through automatic dataloggers suitable for SDI-12 digital interface sensors like Encardio-rite model ESDL-30.

## Breakout box

Breakout box is used to read the EAN-90M tilt meter with our EDI series portable readout unit. It contains a six pin weather proof circular connector that provides fast and easy connection of the 6 core cable of tilt meter to portable readout unit. To read bi-axial tilt meters, a switch is provided for switching and taking readings from both axis. It also is equipped with lightning protection.

Breakout box can later on be used to extend the cable of EAN-90M tilt meter to DAS. Even after connection to DAS, the breakout box has facility to allow readings being taken with EDI series readout unit, if required for troubleshooting.

## SPECIFICATIONS

|                                      |   |
|--------------------------------------|---|
| Sensor                               | Uniaxial, Biaxial   |
| Standard range                       | $\pm 15^\circ$  |
| Output (nominal)<br>(Model EAN-90M)  | 4 V at $15^\circ$<br>Proportional to $\sin \theta$ of angle |
| Output<br>(Model EAN-92M)            | SDI-12 Serial output  |
| Sensitivity                          | $\pm 10$ arc second   |
| Accuracy <sup>1</sup>                | $\pm 0.1\%$ fs  |
| Resolution                           | $\pm 0.05$ mm/m (8 arc seconds)                             |
| Temperature range                    | $-20^\circ\text{C}$ to $80^\circ\text{C}$                   |
| Sensor dimension                     | 32 mm dia x 260 mm length                                   |
| Bracket dimension<br>(wall mounting) | 65 mm x 65 mm x 40 mm, 8 mm thickness                       |
| Weight                               | 0.95 kg (sensor with bracket)                               |

<sup>1</sup>As tested under laboratory conditions

## ORDERING CODE

**EAN-90M/92M-U** Uniaxial tilt meter  
**EAN-90M/92M-B** Biaxial tilt meter