



## DATASHEET

# BEAM SENSOR (HORIZONTAL & VERTICAL)

MODEL EAN-41M/EAN-42M



## OVERVIEW

The Encardio-rite model EAN-41M/EAN-42M beam sensor is attached to the structures for monitoring any differential movement and tilting of structures. It can be mounted, both vertically and horizontally and has a long term reliability. These beam sensors consist of MEMS sensor housed inside the beam. Model EAN-42M comes with SDI-12 digital interface such that all sensors can be connected through single bus cable to datalogger.

## FEATURES

- Provides reliable and high resolution readings.
- Rugged & robust construction.
- Easy to install and take readings.
- Can be removed and reused.
- Readings can be taken by remote datalogger.

## APPLICATION

- Monitoring vertical rotation, deflection and deformation of retaining walls.
- Monitoring structures for effects of tunneling and excavation.
- Monitoring differential settlement along railway tracks.
- Monitoring stability of structures in landslide areas.
- Monitoring tunnels for convergence and other movements.
- To evaluate performance of bridges and struts under load.



For monitoring deflection and deformation of retaining walls, sheet piling, etc., the beam sensors are mounted in vertical strings. The beam sensor can also be installed in long horizontal strings to measure differential settlement along railway tracks, tunnels, pipelines, embankments, etc.

Tilt changes in structures may be caused due to construction activities such as excavation, tunneling and de-watering, which 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. Data from beam sensor provides early warning of threatening deformations, allowing time for corrective action to be taken or if necessary, for safe evacuation of the area.

### DESCRIPTION

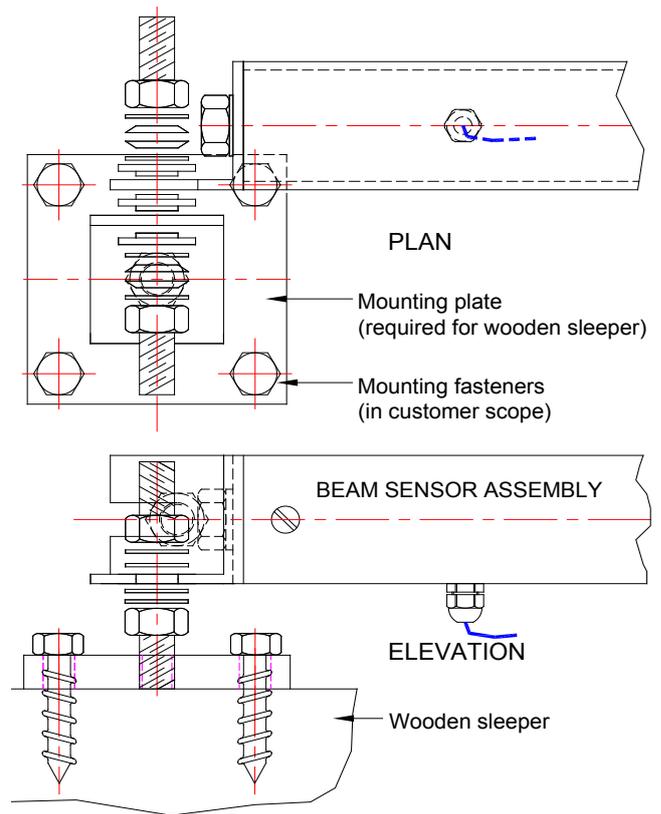
Model EAN-41M/EAN-42M beam sensor consists of a basic MEMS sensor housed inside a metal beam, which can be 1 m, 2 m, or 3 m long.

Model EAN-41M beam sensor output is 4 V nominal at  $\pm 15^\circ$ . This output can be carried over long distances without any signal degradation. Model EAN-42M comes with SDI-12 digital interface such that all sensors can be connected through single bus cable to datalogger. The sensor provides a relatively low cost system which offers excellent resolution and long term stability.

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

The beam sensor is provided with special mounting fasteners for horizontal and vertical installations on concrete structures.

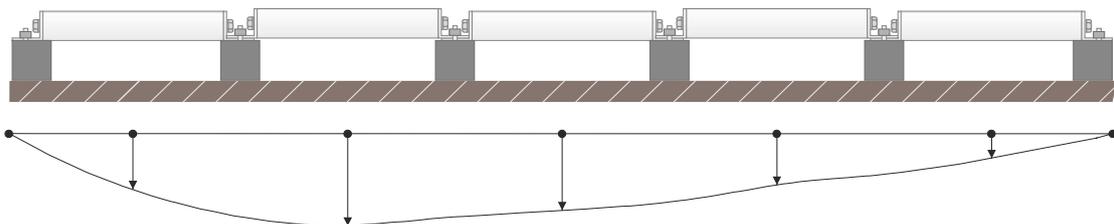
For monitoring differential settlement along railway tracks, installation may be required on wooden railway track sleepers. For such installation, mounting plates are available (at extra cost). Please refer to the adjacent figure. The wood mounting fasteners can be sourced locally.



### SPECIFICATION

Sensor	Uniaxial, mounted inside beam
Standard range	$\pm 15^\circ$
Output (nominal) (Model EAN-41M)	4 V at $15^\circ$ proportional to $\sin \theta$ of angle
Output (Model EAN-42M)	SDI-12 Serial output
Sensitivity	$\pm 10$ arc second
Accuracy <sup>1</sup>	$\pm 0.1$ % fs
Temperature range	-20°C to 80°C
Beam	38 mm x 38 mm, aluminium
Beam length	1, 2, 3 m, or specify

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



Linked horizontal beams monitor vertical settlement or heave



## READOUT/DATALOGGER

Model EAN-41M tilt meter can be read by our EDI series portable digital read-out unit suitable for MEMS beam sensors. 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-42M beam sensor 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-41M/EAN-42M 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 is also equipped with lightning protection.

Breakout box can later on be used to extend the cable of EAN-41M/EAN-42M tilt meter to DAS. Even after connection to DAS, the breakout box has the facility to allow readings being taken with EDI series readout unit, if required for troubleshooting.

## ORDERING CODE

**EAN-41M-X**—Length of beam

**EAN-42M-X**—Length of beam (with SDI-12 digital interface)



Model ESDL-30 automatic datalogger for SDI-12 digital interface sensors