ENCARDIO RITE
METASENSING FOR MEGA STRUCTURES

ELECTRONIC PLUMB LINE NORMAL & INVERTED

MODEL EDS-50/51 WITH MODEL EPR-01S READOUT

DATASHEET

OVERVIEW

The Encardio-rite models EDS-50 (Normal) and EDS-51 (Inverted) electronic plumb lines are advanced, reliable systems designed to deliver precise long-base rotation, tilt, and relative displacement measurements in critical civil engineering projects. These systems are commonly used in high-rise buildings, concrete and masonry dams, nuclear plants, and other key infrastructure. They are essential for monitoring structural stability and deformation, offering invaluable data for projects impacted by excavation, tunneling, and dewatering activities.

These plumb lines are particularly beneficial for tracking the vertical rotation of retaining walls, the inclination and rotation of dams, piers, and piles, as well as assessing the stability of structures in landslide-prone areas. Their ability to provide real-time, continuous measurements makes them an ideal choice for monitoring critical buildings and utilities.

The **Normal plumb line (EDS-50)** features a wire fixed through a collet arrangement at the top of the structure. A heavy weight at the lower end is submerged in an oil-filled tank, effectively damping any oscillations caused by vibration or shock. The **Inverted plumb line (EDS-51)** monitors displacement between the structure base and the rock foundation. The plumb wire is anchored between the rock foundation and a float submerged in a water tank, where the water acts as a damping medium.

Both systems detect tilt or displacement, with measurements provided by the **EPR-01S Digital readout unit**. The system offers remote, real-time monitoring, providing accurate and timely data, making it ideal for frequent, precise monitoring where traditional methods, such as theodolite surveys, fall short.

FEATURES

- **Accurate measurements:** Provides precise data on tilt and displacement with better accuracy than theodolite surveys.
- **Robust and easy installation:** Designed for quick and straightforward installation in various environments.
- **Versatile datalogging:** Continuous monitoring can be connected to a suitable datalogger, allowing for data acquisition at desired frequencies. Encardio Rite offers a range of NexaWave dataloggers equipped with GSM/GPRS or RF communication capabilities, ensuring reliable and efficient data transmission.
- **Frequent monitoring:** Suitable for regular and frequent monitoring tasks.
- **High accuracy:** The EPR-01S readout unit ensures a measurement accuracy of 0.01 mm.
- **Infrastructure data intelligence platform:** It integrates with Proqio software to facilitate data processing, analysis, andreal-time visualization and generate instant alarms for critical events to keep all stakeholders informed. The instrument can work with any manufacturer's Dataloggers and Data Management Systems.

PRODUCT OFFERINGS

Normal Plumb Line - Model EDS-50

The EDS-50 Normal Plumb Line features a wire fixed through a collet arrangement, centered on a rectangular collet bar located at the top of the structure or dam. A heavy weight is secured at the lower end of the wire and is submerged in a tank filled with oil, which effectively dampens any oscillatory motion caused by vibrations or shocks. When a tilt occurs in the structure—whether in a building, dam, or nuclear plant—it causes a shift in the weight, which is then measured by the EPR-01 Automatic Readout Unit.

Inverted Plumb Line - Model EDS-51

The EDS-51 Inverted Plumb Line monitors displacement between the structure or dam base and the rock foundation. The plumb wire is anchored between the rock foundation (at the bottom of a drilled hole) and a float submerged in a water tank in the observation area. Tension is maintained in the plumb wire, with the float free to move. The water in the tank serves as a damping medium. Any tilt or displacement in the foundation causes a shift in the float, which is then measured using the EPR-01 Automatic Readout Unit.

Digital Readout Unit - Model EPR-01S

The EPR-01S Automatic Readout Unit provides highly accurate measurements with an impressive precision of 0.01 mm. It operates using two contactless inductive sensors that track the position of the pendulum wire in both directions.

This unit can measure pendulums that are already in place, with no additional modifications required, simply by adding a target to the pendulum wire. The transducer output is a twin-wire 4-20 mA signal, allowing for long-distance signal transmission without signal degradation.

The EPR-01S is equipped with an integrated temperature gauge to provide a reliable reference for temperature compensation when needed. An additional transducer for automatic compensation of wire rotation is mounted on one of the two axes

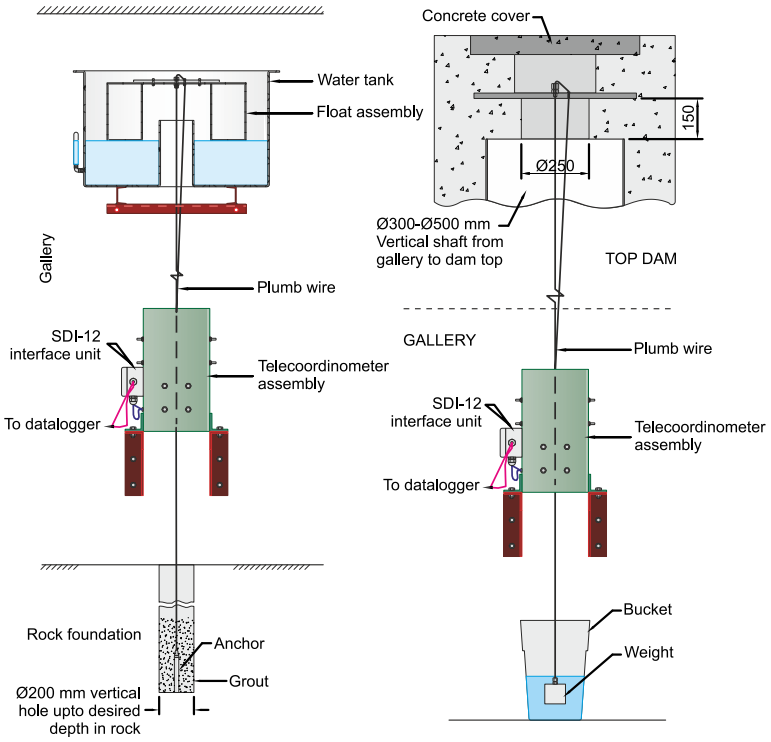
Constructed from durable stainless steel, the unit is maintenance-free and designed to operate in harsh environments. Installation is straightforward and quick, making the EPR-01S a highly efficient and reliable choice for plumb line monitoring systems.

SPECIFICATIONS

Normal plumb line	
Table size	625 mm x 625 mm
Stainless steel wire	1 mm dia x 60 m long (other lengths available)
Wire suspension	Collet on a rectangular bar grouted at the top
Suspension wt.	10 kg
Tank (PVC)	40 litre capacity
Damping oil	S.A.E. 40

Inverted plumb line	
Table size	625 mm x 625 mm
Stainless steel wire	1 mm dia x 60 m long (other lengths available)
Wire suspension	Collet on a rectangular bar grouted at the top
Suspension wt.	8 kgf
Tank (Fiber glass)	800 mm Ø x 500 mm long
Float material	PVC

Model EPR-01S Automatic readout system	
Measuring range	± 25 mm (direct or inverted)
Accuracy	0.01 mm
Repeatability	0.05% fs
Supply	24 VDC
Output	4-20 mA
Operating temperature	-25 to+70°C
Protection	IP67
Installation	Wall or floor



Normal plumb line. Inverted plumb line.

Typical mounting arrangement of normal and inverted plumb lines with model EPR-01S automatic readout unit.

*All specifications are subject to change without prior notice

DATASHEET | 2001-20 R2

Dams | Mining | Tunnels | Transportation | Construction | Bridges | Landslides | Energy | Environmental Monitoring | Pipelines | Structural Health Monitoring | Smart Cities

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