

VIBRATING WIRE STRAIN GAGE

MODEL EDS-20V/21V
Series

DATASHEET



OVERVIEW

The Encardio Rite strain gages are designed for precise strain monitoring in steel or concrete structures and determine structural loads or stresses and their variations over time. These gages are extensively used in structural applications, such as monitoring stress distribution in underground cavities and tunnels, strain in bridges and concrete structures during and after construction, stress distribution in concrete and masonry dams, pile testing, loads on struts and diaphragm walls, and more.

The strain gages are available in models: EDS-20V-AW arc weldable; EDS-20V-E embedment; and EDS-21V-SW spot weldable, to suit different applications for either mounted on or embedded in steel or concrete structures.

Each gage comprises two main components: a basic gage and a sensor assembly. The basic gage features a high tensile strength magnetic wire stretched between two end blocks and sealed in a tube. This tube is flattened in the middle to accommodate the sensor assembly, which houses a permanent magnet and a plucking coil. The sensor assembly is an integral part of the strain gage. The stainless steel construction and sealing with double "O" rings and heat shrinkable tube make the sensor rugged and waterproof, suitable for hostile environments.

When the magnet coil assembly plucks the wire, it vibrates at its natural frequency, which is proportional to the tension in the wire. Structural strain causes the end blocks to move relative to each other, altering the wire's tension and its resonant frequency. The strain is proportional to the square of the frequency.

The readout or datalogger generates voltage pulses in the magnet/coil assembly to pluck the wire and measure its resonant frequency, displaying the strain in microstrain. The strain gages include a built-in thermistor for temperature data, aiding in the analysis of thermal effects.

FEATURES

- **High-tensile strength wire:** Ensures durability and accuracy in strain measurement.
- **Durable and waterproof:** High-tensile strength wire and stainless steel encasement makes the sensor suitable for harsh environmental conditions, enhancing durability and reliability.
- **Long-term stability:** Delivers reliable performance over extended periods, crucial for long-term structural health monitoring.
- **Versatile models:** Available for embedment, arc welding, and spot welding applications, meeting diverse structural monitoring needs.
- **Long-distance signal transmission:** Maintains signal integrity over long distances, ensuring accurate data collection.
- **Integrated temperature monitoring:** Enhances measurement accuracy by accounting for temperature variations.
- **Versatile datalogging:** Compatible with various readout units for manual data collection. For continuous monitoring, it 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.
- **Infrastructure data intelligence platform:** Transmit data to a local or cloud server hosting the Proqio platform for 24/7 insights. Proqio enables efficient data processing, analysis and real-time visualization. Benefit from instant alerts for critical events and automated reports, supporting informed decision-making.
- **Cross-compatibility:** The sensor can work with any manufacturer's Dataloggers and Data Management Systems.

PRODUCT OFFERINGS

The EDS-20V/21V Series Vibrating Wire Strain Gage includes three models designed for different application needs in structural monitoring:

EDS-20V-AW ARC WELDABLE STRAIN GAGE

The arc weldable strain gage is designed for surface mounting on steel structures using weldable end-blocks and on concrete surfaces using groutable reinforced bar mounting blocks.

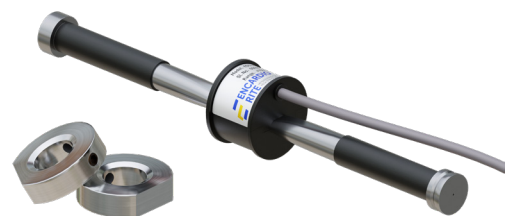
Installation involves accurately positioning and aligning the two mounting blocks with a mounting jig and dummy gage, then welding or grouting them to the structure. The dummy gage is replaced by the actual strain gage, clamped in position by a pair of grub screws on each block.

- Accessories for EDS-20V-AW
- Mounting blocks - weldable or groutable

Installation kit consisting of mounting jig, dummy gage, Allen keys and grub screws (ordered separately).

EDS-20V-E EMBEDMENT STRAIN GAGE

The embedment strain gage are suitable for direct embedment in concrete. Similar to the arc weldable strain gage, it replaces the mounting blocks with stainless steel flanges, providing precise strain measurement for embedded applications.



EDS-20V-AW



EDS-20V-E

EDS-21V-SW SPOT WELDABLE STRAIN GAGE

The EDS-21V-SW strain gage features a versatile installation method with a stainless steel foil tab for spot welding or epoxy bonding, making it ideal for applications with space constraints. This compact sensor excels in harsh environments due to its waterproof construction and stable frequency signal.

It offers pre-tensioning for customizable tension or compression measurement and is designed for flat surfaces. For applications where welding is prohibited, the sensor can be readily attached to rebars, rock bolts, and pipelines using suitable epoxy adhesive.

The sensor assembly is encapsulated in a molded protective cover, providing a watertight enclosure.

The protective housing, supplied only on request, is secured to the substrate using a pair of clamps, spot welded in place.



SPECIFICATIONS

	EDS-20V-AW	EDS-20V-E	EDS-21V-SW
Range	±1500 µstrain	±1500 µstrain	3500 ±100 µstrain
Accuracy ¹	± 0.1% fs	± 0.1% fs	< ±0.25%
Nonlinearity	< 0.5% fs	< 0.5% fs	< ±0.25%
Resolution	1 µstrain	1 µstrain	1 µstrain
Active gage length	150 mm	150 mm	50 mm
Effective gage factor ²	~ 4.051 x 10 ⁻³ µstrain/Hz ²	~ 4.051 x 10 ⁻³ µstrain/Hz ²	~ 3.896 x 10 ⁻⁴ µstrain/Hz ²
Output	vw, frequency	vw, frequency	vw, frequency
Thermistor type	YSI 44005 or equivalent (3,000 Ohm at 25°C)	YSI 44005 or equivalent (3,000 Ohm at 25°C)	YSI 44005 or equivalent (3,000 Ohm at 25°C)
Operating temp.	-20°C to 80°C	-20°C to 80°C	-20°C to 80°C
Storage temp.	-20°C to 80°C	-20°C to 80°C	-20°C to 80°C
Humidity	0-100%	0-100%	0-100%
Protection	IP67	IP67	IP67
Fatigue life	105 cycles at 2500 µstrain	105 cycles at 2500 µstrain	105 cycles at 2500 µstrain
Cable	4-core shielded 1 m long; specify	4-core shielded 1 m long; specify	4-core shielded 1 m long; specify
Size l x b x h (mm):	174 x 28.5 x 30	170 X 28.5 X 30	64.5 x 8 dia

¹As established under laboratory conditions

²For actual value check test certificate

*All specifications are subject to change without prior notice

DATASHEET | 1216-15 R02



Dams



Mining



Tunnels



Transportation



Construction



Bridges



Landslides



Energy



Environmental Monitoring



Pipelines



Structural Health Monitoring



Smart Cities