

## GENERAL DESCRIPTION

The EM Series of vibrating wire strain gauges are designed for concrete embedment and to measure strains caused by stress variations. The stress can also be evaluated when the concrete's modulus of elasticity is known, following compensation for temperature, creeping and concrete reaction effects. The EM is embedded in structures such as:

- Dams
- Nuclear power plants
- Bridges and overpasses
- Tall buildings
- Tunnels
- Harbors
- Foundations, walls, linings, footings, and piles



Model EM-5

## TECHNICAL DESCRIPTION

The EM is composed of two end pieces joined by a tube that protects a length of steel wire. The wire is sealed in the tube by a set of O-rings on each end piece. Both end pieces have a flat circular flange to allow transfer of concrete deformation to the wire. An electromagnet is fitted at the center of the gauge. Strain developing in the concrete modifies the tension in the wire, therefore changing its resonant frequency, which is read by the electromagnet.

The **EM-5** is the standard model and is used in different types of structures, as mentioned above. The **EM-10** consists of a rugged version to be embedded in concrete with coarse aggregates. The shorter **EM-2** model is designed for laboratory use or for limited spaces.

Unless specified otherwise, the gauge tension is factory-adjusted at mid-range.

The gauge is very compliant. It does not induce stresses in the host media and can therefore be embedded in young curing concrete as well as in hard, synthetic materials such as resins, fiberglass and urethane.

A thermistor inside the EM supplies information on the effects of temperature on the materials.

## FEATURES

- Long-term reliability
- High resolution and accuracy
- 3000 microstrain range
- Very high compliance
- Rugged construction
- Temperature reading
- Flange fitted with mounting holes
- Frequency signal easy to process and transmit over long distances

## SPECIFICATIONS

MODEL	EM-2	EM-5	EM-10
Range	3000 $\mu\epsilon$	3000 $\mu\epsilon$	3000 $\mu\epsilon$
Accuracy	$\pm 0.5\%$ F.S. $\pm 0.1\%$ F.S. optional	$\pm 0.5\%$ F.S. $\pm 0.1\%$ F.S. optional	$\pm 0.5\%$ F.S. $\pm 0.1\%$ F.S. optional
Resolution with MB-3TL	0.4 $\mu\epsilon$	1 $\mu\epsilon$ (min.)	0.4 $\mu\epsilon$
Operating temperature	-20 to +80°C	-20 to +80°C	-20 to +80°C
Thermistor	3 k $\Omega$ (see model TH-T)	3 k $\Omega$ (see model TH-T)	3 k $\Omega$ (see model TH-T)
Coil resistance	45 $\Omega$	144 $\Omega$	144 $\Omega$
Thermal coefficient of expansion	11.5 $\mu\epsilon / ^\circ\text{C}$	11.5 $\mu\epsilon / ^\circ\text{C}$	11.5 $\mu\epsilon / ^\circ\text{C}$
Electrical cable	IRC-41A IRC-41AP (optional)	IRC-41A IRC-41AP (optional)	IRC-41A IRC-41AP (optional)

## INSTALLATION

There are several ways to install the gauge:

- Attaching it to a rebar with tie wire
- Inserting it directly into wet concrete or grout
- Precasting it in briquette with the same mix for subsequent embedment

A mounting rosette that allows gauges to be precisely oriented is offered as an accessory. Also offered is a "no-stress" strain gauge that consists of a compressible cylinder filled with the concrete mix from the mass being poured. This unit, containing an EM, is placed adjacent to the gauge installation and is used as a reference to measure any internal variation of strain in the concrete due to aging, temperature, humidity and factors independent of external loads.

## ACCESSORIES

- Rosette mounting block
- "No-stress" strain gauge
- Readout instruments: MB-3TL, SENSLOG

## ORDERING INFORMATION

Please specify:

- Model
- Cable length
- Accessories

