

# PRODUCT DATASHEET

## EFO Strain Sensor



The EFO is a fiber optic strain sensor especially designed to be embedded in concrete, ideal for composite material engineering research and civil-engineering applications such as monitoring stresses in structural members of buildings, bridges, tunnel linings and supports during and after construction.

Smart structures are now possible thanks to FISO's EFO fiber optic strain sensor. The deployment of sensors within the structure, whether it is a bridge or a dam, provides accurate information on changes in load and strains in reinforced concrete and mass concrete. Measuring strain in tunnel linings and supports is also possible with the EFO fiber optic strain sensor.

The EFO is a 70 mm long sensor designed to be embedded in concrete. The sensor is based on a unique fiber optic strain sensor which constitutes a breakthrough in fiber optic sensing. It consists of a stainless steel body, with two flanges for better adherence to concrete. The intrinsic Fabry-Perot strain sensor is bonded in a very small diameter longitudinal hole located in the center of the steel body. Intrinsically safe, it is immune to EMI, RFI, and lightning. It allows static/dynamic measurement and can deliver signal transmitted over long distances with no interference due to fiber bending.

The sensor can be used with different types of concrete, including conventional, high performance and powder reactive concrete.

The EFO embedded strain sensor is usually set into concrete structures in one of two ways: it can be cast directly into the wet mixture or encapsulated into a concrete briquette which is then cast into the wet mixture. It is also possible to set the sensor into hardened concrete by grouting it – or the briquette containing it – into a pre-drilled hole. The EFO strain sensor will not affect concrete properties and performance.

The EFO fiber optic strain sensor withstands harsh chemical environments and offers ruggedness and flexibility for today's concrete characteristics monitoring requirements.

### Key Features

- Immune to EMI/RFI/Lightning
- Intrinsically safe
- Static/dynamic response
- High sensitivity and resolution of 0.01% of full scale
- Signal transmitted over long distances
- No interference due to fiber bending
- Absolute measurements in engineering units

### Applications

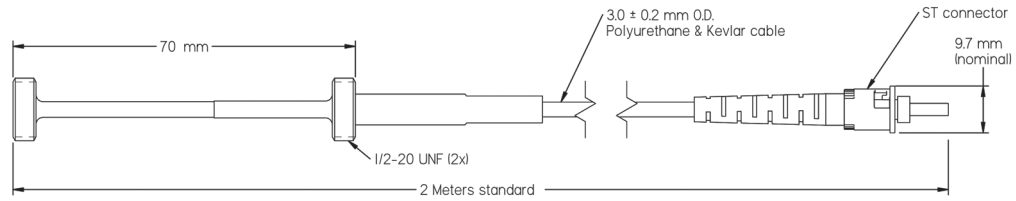
- Dams
- Bridges
- Tunnel linings
- Nuclear power plants
- Buildings
- High performance and reactive powder concrete
- Corrosive environments
- High EMI/RFI environments

## Specifications

Strain range	$\pm 1000\mu\epsilon$ , $\pm 1500\mu\epsilon$ , $\pm 2000\mu\epsilon$ , $\pm 3000\mu\epsilon$
Resolution <sup>1</sup>	0.01% of full scale
Transverse sensitivity	<0.1% of full scale
Connector type	ST connector
Operating temperature	-40°C to 85°C (-40°F to 185°F)

1. Signal conditioner dependent.

## EFO Dimensions



Drawing Number SCH-00505