



FS63 - Temperature Sensors

Optical Temperature Sensors

The **FS63 - Temperature Sensors** are Fiber Bragg Grating (FBG) based sensors, designed to be bonded to surfaces and materials, spot welded to structures and components, attached or directly cast into concrete wet mix.

Temperature sensors are available in the following configurations:

- Weldable
- Composite
- Embedded

Characteristics

- **Robustness**
Long-term reliability ensured by innovative sensor design, careful selection of materials and IP68 packaging.
- **Completely passive**
Inherent immunity to all electromagnetic effects (EMI, RFI, sparks, etc.) and safe operation in hazardous environments.
- **High multiplexing capability**
Connection of a large number of sensors to a single optical fiber, reducing network and installation complexity.
- **Remote sensing**
Large distance between sensors and interrogator (several kilometers).
- **Compatible with most interrogators**
Provided with calibration sheet, allowing easy and accurate configuration.
- **Self-referenced**
Based on the measurement of an absolute parameter - the Bragg wavelength - independent of power fluctuations.

Applications

HBM FiberSensing temperature sensors can be used in several temperature measuring applications. They are particularly suited for temperature mapping in large structures (SHM).

- Industry
- Civil Engineering
- Energy
- R&D

Accessories

The implementation of complex sensing networks in large structures is made simpler with HBM FiberSensing accessories. These include cables especially designed to resist harsh environments as in civil engineering, not only during construction, but also during the lifetime of the structure (humidity, corrosion, etc.).

For the installation of weldable temperature sensors in severe environments, an optional metallic protection cover is available.

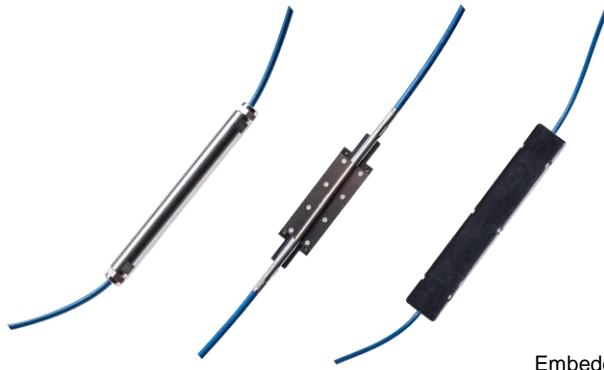
Quality

All HBM FiberSensing's processes are strictly controlled from development to production. Each product is subjected to high standard performance and endurance tests, individually calibrated and checked before shipping.

HBM FiberSensing, S.A. concentrates all optical sensing activity of HBM and is an ISO 9001:2008 certified company.

Fiber optic technology
Immunity to strain
Rugged stainless steel or composite packaging
IP68 for embedded sensors
Long-term reliability





Embedded, Weldable, Composite

Specifications

Sensor

Sensitivity ¹	33 °C/nm
Measurement range	-20 to 80 °C
Resolution ²	0.1 °C
Maximum calib. error ^{3,4}	0.5 °C

Optical

Central wavelength	1500 to 1600 nm
Spectral width (FWHM)	< 0.2 nm
Reflectivity	> 65%
Side lobe suppression	> 10 dB

Inputs/Outputs

Cable type	Ø 3 mm indoor (kevlar) ⁵ Ø 3 mm outdoor (armor)
Bending radius	static: > 10x cable diameter dynamic: > 20x cable diam.
Cable length	2 m each side (±5 cm)
Connectors	FC/APC SC/APC NC (No Connectors)

Environmental

Storage temperature	-20 to 80 °C
IP rating	Embedded: IP68

Mechanical

Bending radius	Flat
Materials	Embedded: stainless steel Weldable: stainless steel Composite: GFRP and polyurethane
Dimensions	Embedded: 100 x Ø 10 mm Weldable: 45 x 15 x 0.6 mm Composite: 130 x 20 x 6 mm
Weight	Embedded: 55 g Weldable: 5 g Composite: 21 g

¹ First order. Typical values.

² For 1 pm resolution in wavelength measurement, as found in FS22SI interrogator.

³ To achieve absolute measurements as presented in this datasheet, an interrogator with an accuracy of at least ±2 pm is required.

⁴ Typical traceability uncertainty of ±0.7°C.

⁵ Only available for weldable and composite sensors.

Ordering Information

FS63 – Temperature Sensors

P/N

K-FS63 aa bb ccc d

WAVELENGTH

N	1503.3 nm
O	1509.7 nm
K	1516.1 nm
L	1522.5 nm
A	1528.9 nm
B	1535.1 nm
C	1541.5 nm
D	1547.9 nm
E	1554.3 nm
F	1560.8 nm
G	1567.2 nm
H	1573.8 nm
I	1580.2 nm
J	1586.6 nm

CABLES

202	Indoor cable 2m ⁵
302	Outdoor cable 2m

CONNECTIONS

10	No connectors
11	Optical Connector FC/APC
13	Optical Connector SC/APC

TYPE

17	Composite
20	Weldable
50	Embedded