

## DATA SHEET

# FS63CTS

## Composite Temperature Sensor

### SPECIAL FEATURES

---

- Easy and straightforward installation
- Robust design
- Configurable wavelengths, cable lengths and connector types



### DESCRIPTION

---

The Composite Temperature Sensor is a Fiber Bragg Grating (FBG) based sensor designed to fit the most demanding applications. It can be used as a temperature sensor for accurate and reliable temperature measurements, as well as an element for temperature compensation of Composite Strain Sensors.

The FS63CTS is based on the newLight® technology developed by HBK FiberSensing. newLight sensors employ high strength fiber coatings ensuring robustness, increased sensitivity, and higher measurement accuracy. HBK FiberSensing offers innovative sensor designs compatible with standard telecommunication

fibers. This eases network design and significantly reduces installation time and cost, even when a large number of sensors are multiplexed on the same fiber, sometimes kilometers apart. The technology is completely passive - fitting explosive environments -, self-referenced - providing measurement long term stability -, and compatible with most interrogators in the market.

Combine this with other strain and temperature sensors from HBK FiberSensing with aramid or armor cables by using the configurator K-FS76ARD and K-FS76ARM, respectively.

### BENEFITS AND APPLICATIONS

---

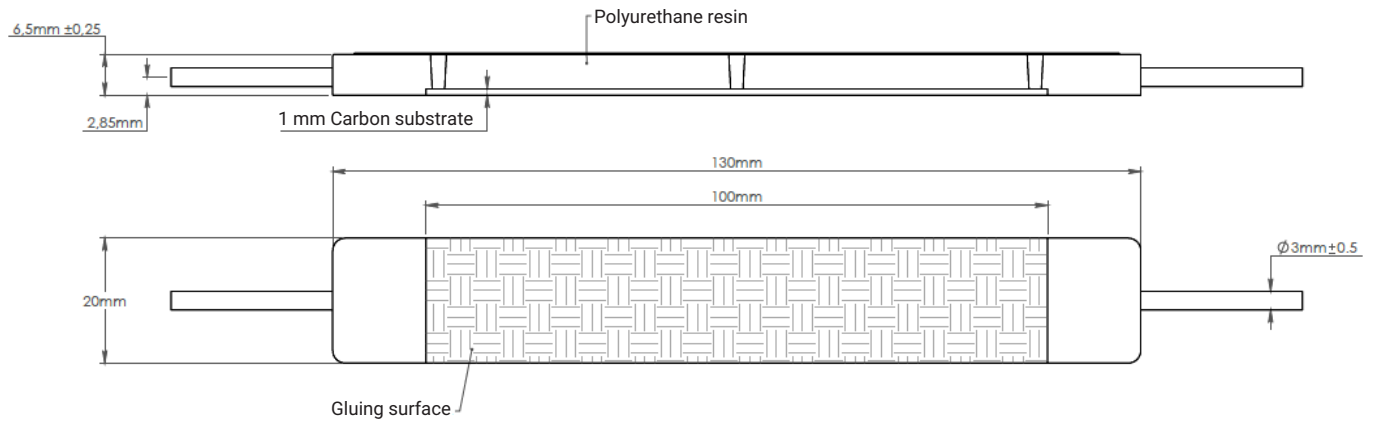
#### Sensor design

- To be used as temperature sensor or for temperature compensation
- Suited for outdoor applications
- Fitting applications like structural health monitoring of large structures across several industries (civil engineering, wind...)

#### Fiber Bragg grating technology

- No drift, absolute referenced measurements
- Immune to electro-magnetic and radio frequency interferences
- Passive technology fitting applications in explosive areas
- Reduced cable requirements with intrinsic multiplexing capability
- Long distances between sensors and the interrogators attainable
- Combinable with other FBG sensor types on the same fiber and same interrogator

## DIMENSIONS



## SPECIFICATIONS

Sensor		
Sensitivity <sup>1)</sup>	pm/°C	30
Temperature compensation factor <sup>2)</sup>	( $\mu\text{m}/\text{m}$ )/°C	20
Resolution <sup>3)</sup>	°C	0.02
Maximum calibration error <sup>4)</sup>	°C	$\pm 0.5$
Measurement range <sup>5)</sup>	°C	-20 ... +80
Storage temperature	°C	-20 ... +80
Operation and storage humidity	%	< 95
Sensor bend radius	n.a.	Cannot be bent
Attachment method	n.a.	Glue <sup>6)</sup>
Dimensions	mm	130 $\pm$ 0.5 x 20 $\pm$ 0.5 x 6.5 $\pm$ 0.5
Weight <sup>7)</sup>	g	$\varnothing$ 3 mm aramid: 47 $\varnothing$ 3 mm armor: 97
Main materials <sup>8)</sup>	n.a.	Stainless steel, CFRP, polyurethane, ormocer®
Bragg wavelengths	nm	1500 ... 1600 ( $\pm 0.5$ )
Fiber type	n.a.	SMF-28 compatible
Fiber cladding and coating diameter	$\mu\text{m}$	125/195
FWHM, reflectivity and side lobe suppression	n.a.	$\leq 0.3$ nm, 21 $\pm$ 4%, > 10 dB
Inputs / Outputs		
Cable type	n.a.	$\varnothing$ 3 mm aramid (Hyrel, Kevlar® and LSZH) or $\varnothing$ 3 mm armor (Hyrel, stainless steel spiral, Kevlar®, stainless steel mesh and LDPE)
Cable bend radius <sup>9)</sup>	mm	> 30
Cable length <sup>10)</sup>	m	0.5 ... 20
Connectors	n.a.	FC/APC, SC/APC or NC (No Connectors)

1) Considering an FBG with 1550 nm wavelength. Typical first order.

2) Temperature Compensation Factor (TCF) is the apparent induced strain on the temperature caused by a 1 °C change. This value can be used for compensation of strain sensors.

3) For 0.5 pm resolution in wavelength measurement, as found in FS22SI interrogator.

4) To achieve absolute measurements as presented in this datasheet, an interrogator with an accuracy of at least  $\pm 2$  pm is required. Typical traceability uncertainty of  $\pm 0.7$  °C.

5) Aramid cables start changing their mechanical characteristics above 70°C. Sensor behavior and measurement is not affected by this change.

6) HBK FiberSensing suggests the use of bi-component epoxies, as for example 3M DP490 cold curing adhesive.

7) With 2 m cable each side and no connectors.

8) The full composition of the sensor including cable, complies with RoHS, REACH, Conflict Minerals and fire propagation prevention directives.

9) Induced loss due to one complete turn around a mandrel lower than 0.05 dB

10) For cables longer than 2 m, a splice with polyimide protection is included at 2 m from the sensor ( $\varnothing 8 \times 150$  mm). Specified cable length is ensured on delivery. A margin of up to 10 cm can be present. Extension cables are delivered with acrylate coated fiber. For different cable lengths or splice position please contact HBK FiberSensing.

## ORDERING INFORMATION

Configurable Item		Standard item <sup>11)</sup>
<b>K-FS63CTS – 1 2 – 3 4 – 5 – 6 7</b>		
<b>Options</b>		
<b>1</b>	<b>0</b> - No calibrator; <b>1</b> - Standard Calibration	1-FS63CTS-ARM/1515
<b>2</b>	<b>ARD</b> - Aramid cable; <b>ARM</b> – Armor cable	1-FS63CTS-ARM/1525
<b>3</b>	<b>NC</b> - No connector; <b>FC</b> - FC/APC; <b>SC</b> - SC/APC	1-FS63CTS-ARM/1535
<b>4</b>	0.5 m ≤ <b>Cable length</b> ≤ 20 m @0.5 m steps	1-FS63CTS-ARM/1545
<b>5</b>	1515 nm ≤ <b>Wavelength</b> <sup>12)</sup> ≤ 1595 nm @10 nm steps	1-FS63CTS-ARM/1555
<b>6</b>	0.5 m ≤ <b>Cable Length</b> ≤ 20 m @0.5 m steps	1-FS63CTS-ARM/1565
<b>7</b>	<b>NC</b> - No connector; <b>FC</b> - FC/APC; <b>SC</b> - SC/APC	1-FS63CTS-ARM/1575
		1-FS63CTS-ARM/1585
		1-FS63CTS-ARM/1595

<sup>11)</sup> Standard Items correspond to a configuration: Standard calibration, armor cable with 2m length to each side terminated with FC/APC connectors. Wavelengths from 1515 nm to 1595 nm spaced at 10 nm.

<sup>12)</sup> For different wavelengths please contact HBK FiberSensing.

### HBK FiberSensing S.A.

Rua Vasconcelos Costa, 277 · 4470-640 Maia · Portugal  
 Phone: +351 229 613 010 · Fax: +351 229 613 020  
[www.hbkworld.com](http://www.hbkworld.com) · [info.fs@hbkworld.com](mailto:info.fs@hbkworld.com)

Subject to modifications. All product descriptions are for general information only.  
 They are not to be understood as a guarantee of quality or durability.