

## DATA SHEET

# FS62CSS

## Composite Strain Sensor

### SPECIAL FEATURES

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- High strain and high fatigue resistance
- Robust design
- Configurable wavelengths, cable lengths and connector types



### DESCRIPTION

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The Composite Strain Sensor is a Fiber Bragg Grating (FBG) based sensor designed to be easily glued to surfaces of different materials (concrete, steel, fiber composites...). Designed as a robust solution with different levels of cable protection, it is a straightforward solution for deploying large measurement systems.

The FS62CSS is based on the newLight® technology developed by HBK FiberSensing. newLight sensors employ high strength fiber coatings ensuring increased strain ranges, enhanced fatigue resistance 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

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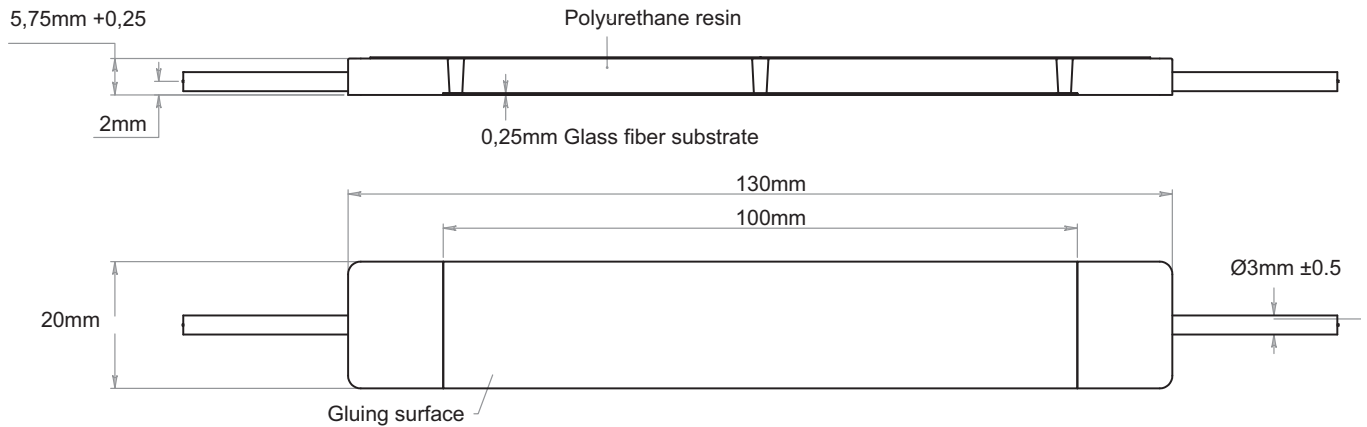
#### Sensor design

- Fitting many materials with high strain measurement range
- Long integration area for measurements even in non-homogeneous materials
- 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		
k-factor	n.a.	0.79±0.03
Sensitivity <sup>1)</sup>	pm/(µm/m)	1.2
Resolution <sup>2)</sup>	µm/m	0.5
Measurement range	µm/m [%]	±5000 [0.5]
Gauge length	mm	10 ... 92
Transverse sensitivity	%	0
Operation and storage temperature <sup>3)</sup>	°C	-20 ... +80
Operation and storage humidity	%	< 95
Temperature cross sensitivity <sup>4)</sup>	(µm/m)/°C	7.3±1
Sensor bend radius	mm	> 1000
Attachment method	n.a.	Glue <sup>5)</sup>
Dimensions	mm	130±0.5 x 20±0.5 x 6±0.5
Weight <sup>6)</sup>	g	Ø 3 mm aramid: 53 Ø 3 mm armor: 97
Main materials <sup>7)</sup>	n.a.	GFRP, polyurethane, ormocer®
Bragg wavelengths	nm	1500 to 1600 (±0.75)
Fiber type	n.a.	SMF-28 compatible
Fiber cladding and coating diameter	µm	125/195
FWHM, reflectivity and side lobe suppression	n.a.	≤ 0.3 nm, 21±4%, > 10 dB
Inputs / Outputs		
Cable type	n.a.	Ø 3 mm aramid (Hytrel, Kevlar® and LSZH) or Ø 3 mm armor (Hytrel, stainless steel spiral, Kevlar®, stainless steel mesh and LDPE)
Cable bend radius <sup>8)</sup>	mm	> 30
Cable length <sup>9)</sup>	m	0.5 ... 20
Connectors	n.a.	FC/APC, SC/APC or NC (No Connectors)

1) Typical. Considering an FBG with 1550 nm wavelength

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

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

4) Temperature Cross Sensitivity (TCS) is the thermal strain induced by a 1 °C change in temperature.

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

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

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

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

9) For cables longer than 2 m, a splice with polyimide protection is included at 2 m from the sensor (Ø8x150 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>10)</sup>
<b>K-FS62CSS – 1 – 2 3 – 4 – 5 6</b>		
<b>Options</b>		
<b>1</b>	<b>ARD</b> – Aramid cable; <b>ARM</b> – Armor cable	1-FS62CSS-ARM/1510
<b>2</b>	<b>NC</b> - No connector; <b>FC</b> - FC/APC; <b>SC</b> - SC/APC	1-FS62CSS-ARM/1520
<b>3</b>	0.5 m ≤ <b>Cable length</b> ≤ 20 m @0.5 m steps	1-FS62CSS-ARM/1530
<b>4</b>	1510 nm ≤ <b>Wavelength</b> <sup>11)</sup> ≤ 1590 nm @10 nm steps	1-FS62CSS-ARM/1540
<b>5</b>	0.5 m ≤ <b>Cable Length</b> ≤ 20 m @0.5 m steps	1-FS62CSS-ARM/1550
<b>6</b>	<b>NC</b> - No connector; <b>FC</b> - FC/APC; <b>SC</b> - SC/APC	1-FS62CSS-ARM/1560
		1-FS62CSS-ARM/1570
		1-FS62CSS-ARM/1580
		1-FS62CSS-ARM/1590

<sup>10)</sup> Standard Items correspond to a configuration: Armor cable, with 2m length to each side terminated with FC/APC connectors. Wavelengths from 1510 to 1590 nm spaced at 10 nm.

<sup>11)</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)

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