

## DATA SHEET

# FS62WSS

## Weldable Strain Sensor

### Aramid or Armor cable

## SPECIAL FEATURES

- Spot welding installation
- Robust design
- Proven chock resistance



## DESCRIPTION

The Weldable Strain Sensor is a Fiber Bragg Grating (FBG) based sensor designed to be easily spot welded to metallic surfaces using a low power welding machine. Prepared with a robust and resistant layout, this sensor on its rugged version can be used in demanding environments as seen in many field applications.

The FS62WSS 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 corresponding cable types using the configurators K-FS76ARD and K-FS76ARM.

## BENEFITS AND APPLICATIONS

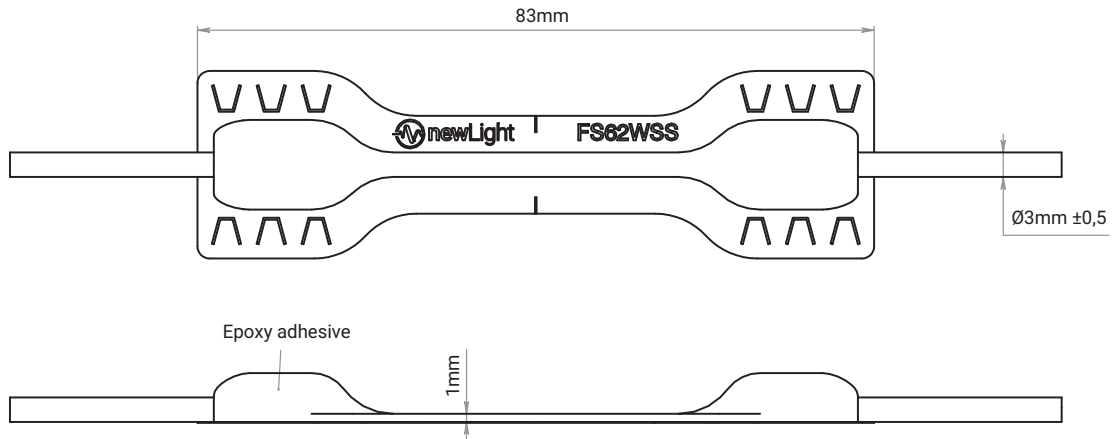
**Sensor design**

- Easy installation by spot-welding with immediate measurements after installation
- Suited for measuring on curved surfaces
- Validated resistance to shock
- Proven usage on outdoor and offshore applications
- Fitting applications like structural health monitoring of large structures like bridges, pipelines, ship hulls, monopiles

**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.	0.76±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	40
Operation and storage temperature	°C	-20 ... +80 <sup>3)</sup>
Operation humidity <sup>4)</sup>	%	≤ 100
Storage humidity	%	< 95
Temperature cross sensitivity <sup>5)</sup>	(µm/m)/°C	7.6±1
Transverse sensitivity	%	< 2
Shock resistance (at 50 g SRS)	cycles	> 10 <sup>4</sup>
Sensor bend radius <sup>6)</sup>	mm	> 400
Attachment method	n.a.	Spot weld <sup>7)</sup>
Substrate thickness	mm	0.1
Dimensions <sup>8)</sup>	mm	83±1 x 23±1 x 6±0.5
Weight <sup>9)</sup>	g	Ø 3 mm aramid: 19; Ø 3 mm armor: 63
Main materials <sup>10)</sup>	n.a.	Stainless steel, epoxy, ormocer®
Bragg wavelengths	nm	1500 ... 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 <sup>11)</sup>	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>12)</sup>	mm	> 30
Cable length <sup>13)</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 µm resolution in wavelength measurement, as found in FS22SI interrogator.  
3) Above 60 °C creep values above 0.5% may be observed. Technical Note is available for further details.  
4) For long term operation extra protection is recommended.  
5) Temperature Cross Sensitivity (TCS) is the thermal strain induced by a 1 °C change in temperature.  
6) Bragg wavelength change up to ±1 nm at maximum allowed sensor curvature.  
7) Required spot welding machine with low power, 20 to 70 V, 26 to 80 Ws.  
8) Welding plate thickness of 100 µm.  
9) With 2 m cable each side and no connectors.  
10) The full composition of the sensor including cable, complies with RoHS, REACH, Conflict Minerals and fire propagation prevention directives.  
11) Aramid cables start changing their mechanical characteristics above 70°C. Sensor behavior and measurement is not affected by this change.  
12) Induced loss due to one complete turn around a mandrel lower than 0.05d B  
13) For cables longer than 2 m, a splice with is included at 2 m from the sensor protected with polyimide (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 HBM FiberSensing.

## ORDERING INFORMATION

Configurable Item		Standard item <sup>14)</sup>
K-FS62WSS – 1 – 2 3 – 4 – 5 6		
<b>Options</b>		
<b>1</b>	<b>ARD</b> - Aramid cable; <b>ARM</b> - Armor cable	1-FS62WSS-ARM/1510
<b>2</b>	<b>NC</b> - No connector; <b>FC</b> - FC/APC; <b>SC</b> - SC/APC	1-FS62WSS-ARM/1520
<b>3</b>	0.5 m ≤ <b>Cable length</b> ≤ 20 m @0.5 m steps	1-FS62WSS-ARM/1530
<b>4</b>	1510 nm ≤ <b>Wavelength</b> <sup>15)</sup> ≤ 1590 nm @10 nm steps	1-FS62WSS-ARM/1540
<b>5</b>	0.5 m ≤ <b>Cable Length</b> ≤ 20 m @0.5 m steps	1-FS62WSS-ARM/1550
<b>6</b>	<b>NC</b> - No connector; <b>FC</b> - FC/APC; <b>SC</b> - SC/APC	1-FS62WSS-ARM/1560
		1-FS62WSS-ARM/1570
		1-FS62WSS-ARM/1580
		1-FS62WSS-ARM/1590

- 14) Standard Items correspond to a configuration: Armor cable, with 2 m length to each side terminated with FC/APC connectors. Wavelengths from 1510 nm to 1590 nm spaced at 10 nm.  
15) For different wavelengths please contact HBK FiberSensing.

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