

## DATA SHEET

# FS63WTS Weldable Temperature Sensor

## SPECIAL FEATURES

- Easy and straightforward installation
- For multi-purpose usage
- Configurable wavelengths, cable lengths and connector types



## DESCRIPTION

The Weldable Temperature Sensor is a Fiber Bragg Grating (FBG) based sensor designed to be spot welded to metallic materials. It can be used as a temperature sensor for accurate and reliable temperature measurements, as well as an element for temperature compensation of Weldable Strain Sensors.

The FS63WTS 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

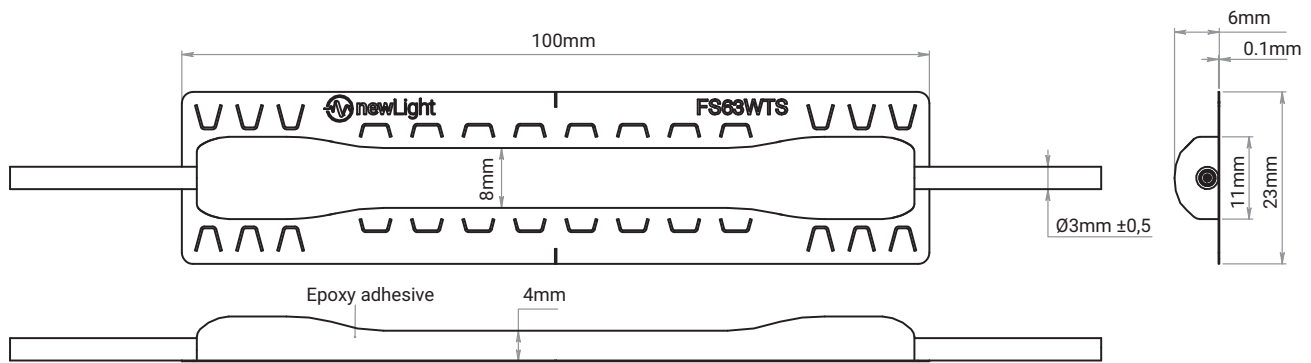
### Sensor design

- Easy installation by spot-welding
- 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		
Sensitivity <sup>1)</sup>	pm/°C	30
Temperature compensation factor <sup>2)</sup>	(µm/m)/°C	20
Resolution <sup>3)</sup>	°C	0.02
Maximum calibration error <sup>4)</sup>	°C	±0.5
Measurement range	°C	-20 ... +80
Storage temperature <sup>5)</sup>	°C	-20 ... +80
Operation <sup>6)</sup> humidity	%	≤ 100
Storage humidity	%	< 95
Sensor bend radius	n.a.	> 300
Attachment method	n.a.	Spot weld <sup>7)</sup>
Substrate thickness	mm	0.1
Dimensions	mm	100±1 x 23±1 x 6±0.5
Weight <sup>8)</sup>	g	Ø 3 mm aramid: 21; Ø 3 mm armor: 65
Main materials <sup>9)</sup>	n.a.	Stainless steel, epoxy, ormocer®
Bragg wavelengths	nm	1500 ... 1600 (±0.5)
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>10)</sup>	mm	> 30
Cable length <sup>11)</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) 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 data sheet, an interrogator with an accuracy of at least ±2 pm is required. Typical traceability uncertainty of ±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) For long term operation extra protection is recommended.

7) Required spot welding machine with low power, 20 to 70 V, 26 to 80 Ws.

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

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

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

11) For cables longer than 2 m, a splice with polyimide protection is included at 2 m from the sensor (Ø 8x150 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 K-FS63WTS – 1 2 – 3 4 – 5 – 6 7		Standard item <sup>12)</sup>
<b>Options</b>		1-FS63WTS-1515
<b>1</b>	<b>0</b> - No calibration; <b>1</b> - Standard Calibration	1-FS63WTS-1525
<b>2</b>	<b>ARD</b> - Aramid; <b>ARM</b> - Armor	1-FS63WTS-1535
<b>3</b>	<b>NC</b> - No connector; <b>FC</b> - FC/APC; <b>SC</b> - SC/APC	1-FS63WTS-1545
<b>4</b>	0.5 m ≤ <b>Cable length</b> ≤ 20 m @0.5 m steps	1-FS63WTS-1555
<b>5</b>	1515 nm ≤ <b>Wavelength</b> <sup>13)</sup> ≤ 1595 nm @10 nm steps	1-FS63WTS-1565
<b>6</b>	0.5 m ≤ <b>Cable Length</b> ≤ 20 m @0.5 m steps	1-FS63WTS-1575
<b>7</b>	<b>NC</b> - No connector; <b>FC</b> - FC/APC; <b>SC</b> - SC/APC	1-FS63WTS-1585
		1-FS63WTS-1595

<sup>12)</sup> Standard Items correspond to a configuration: Standard Calibration, armor cable with 2 m length to each side terminated with FC/APC connectors. Wavelengths from 1515 to 1595 spaced at 10 nm.

<sup>13)</sup> For different wavelengths please contact HBK FiberSensing.

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