

## DATA SHEET

# FS66HDL

## Heavy Duty Force Sensor

### SPECIAL FEATURES

- Intrinsically immune to EMI
- Electrically passive
- Compact design and low weight
- Designed for application on pantographs
- EN45545 certified



### DESCRIPTION

The FS66HDL Heavy Duty Force Sensor is a Fiber Bragg Grating (FBG) based single axis force sensor, designed to be directly fixed with screws. It is suited for high voltage and harsh environments commonly found in railway applications, namely in vehicle pantographs. It operates with two FBG for effective temperature compensation and can be inserted in series with other sensors as it is provided with two lead fibers.

The FS66HDL is based on the newLight® technology developed by HBK FiberSensing. newLight sensors em-

ploy 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.

### BENEFITS AND APPLICATION

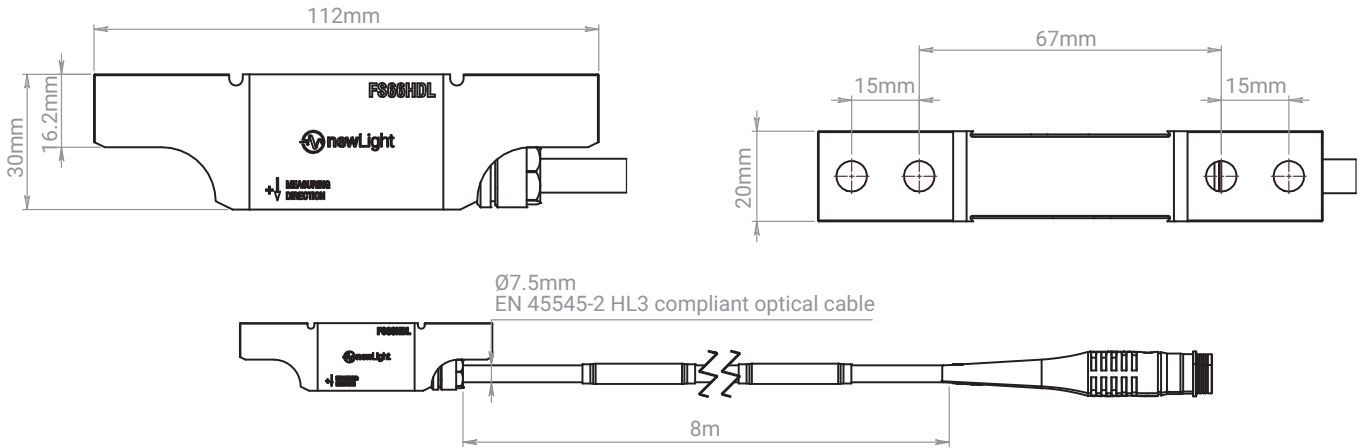
#### Sensor design

- High robustness and reliability ensured by innovative sensor design, careful selection of materials and compact packaging
- No need for temperature compensation with external elements
- Possibility to connect in series with other FBG sensors on a single optical fiber
- Specifications compatible with railway applications

#### 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 per FBG <sup>1)</sup>	pm/N	1.1
Calibration factor <sup>2)</sup>	N/nm	435
Resolution <sup>3)</sup>	N	< 1
Measurement range <sup>4)</sup>	N	0 ... 500
Limit load	N	1000
Breaking load	N	1250
Temperature effect on zero signal <sup>5)</sup>	% of Cn/10°C	0.1
Temperature effect on calibration factor <sup>5)</sup>	% of Cn/10°C	1
Linearity deviation <sup>5)</sup>	% of Cn	1
Acceptable interfering moment: around y axis / around x axis	N.m	40/25
Operation temperature range	°C	-20 ... 75
Storage temperature range	°C	-40 ... 75
Dimensions	mm	112 x 20 x 30
Weight		
Sensor, not considering cable	g	99
Sensor with cable and connectors		720
Main Materials <sup>6)</sup>	n.a.	Aluminum
Bragg wavelengths	nm	1580 and 1590
Fiber type	n.a.	SMF-28 compatible
Fiber cladding and coating diameter	µm	125/155
FWHM, reflectivity and side lobe suppression	n.a.	≤ 0.3 nm, 21 ± 4 %, > 10 dB

Inputs / Outputs		
Cable	n.a.	Dual fiber, EN45545 compliant outer coating, Ø 7.5 mm, metal free
Cable length <sup>7)</sup>	m	8
Cable bend radius	mm	> 40
Connector	n.a.	Huber+Suhner Q-ODC-2

- 1) Typical wavelength variation of each FBG caused by a 1 N force.
- 2) Typical value. Sensitivity defined as wavelength difference  $(\lambda_2 - \lambda_1) / \text{force}$ .
- 3) For 1 pm resolution in wavelength measurement, as found on MXFS Interrogator.
- 4) Sensor is suited for operating between  $\pm 500$  N. Calibration for  $\pm 500$  N is available upon request.
- 5) Referred to measurement range (Cn = nominal load).
- 6) The full composition of the sensor including cable, complies with RoHS, REACH, Conflict Minerals.
- 7) With a tolerance of  $\pm 20$  cm. For different cable lengths please contact HBK FiberSensing.

## ORDER INFORMATION

Standard Item
1-FSOEM-1701-01-01

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