

DATA SHEET

FS63DTP Dielectric Temperature Probe

SPECIAL FEATURES

- Full dielectric design for safe operation in all environments
- Accurate temperature measurements
- Ø1mm diameter probe
- Small weight
- Fast thermal response
- Bundle configuration for multipoint measurements



DESCRIPTION

The Dielectric Temperature Probe is a miniature Fiber Bragg Grating (FBG) based sensor that provides accurate temperature measurements in all environments, including high voltage or explosive. Several sensors can be combined as a bundle and onto the same optical connector of the measurement equipment by using standard telecommunication splitters. The sensor's small terminal design allows measurements in tight spaces with short response time.

The FS63DTP 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 probe with other strain and temperature sensors from HBK FiberSensing with optical splitters. Please contact HBK FiberSensing for support.

BENEFITS AND APPLICATION

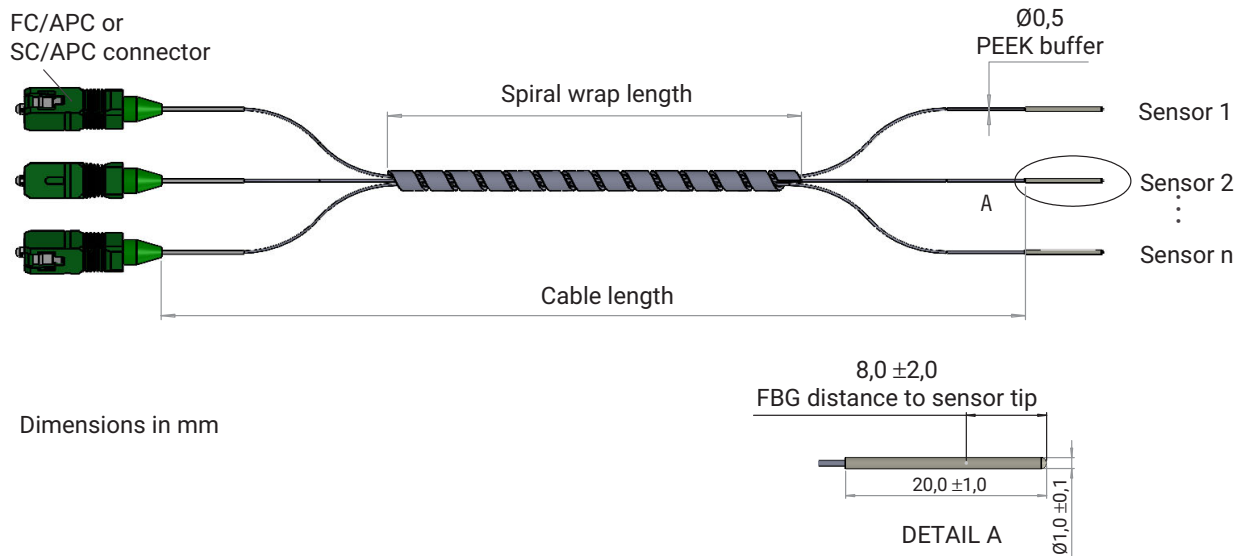
Sensor design

- Small size terminal configuration fitting tight spaces
- Thin and light cabling reducing feed through sizes and sensor influence on the DUT
- Wide measurement range
- Fully dielectric design for safe usage in high voltage or explosive areas in industrial and scientific applications
- General purpose temperature measurements in small spaces like inside batteries or machines
- Insensitive to mechanical loads

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 interrogator

DIMENSIONS



SPECIFICATIONS

		Regular Calibration [-40 °C ... 100 °C]	Extended Calibration [-40 °C ... 200 °C]
Sensor			
Sensitivity ¹⁾	pm/°C	10	
Response time ²⁾	s	1.5	
Resolution ³⁾	°C	0.1	
Maximum calibration error ⁴⁾	°C	±1	±1.5
Measurement range	°C	-40 ... 100	-40 ... 200
Storage temperature ⁵⁾	°C	-20 ... +80	
Operation and storage humidity	%	<95	
Sensor bend radius	n.a.	Cannot be bent	
Maximum cable pull strength ⁶⁾	N	5	
Attachment method	n.a.	Adhesive tape	
Dimensions	mm	20±1 x 1±0.1	
Weight ⁷⁾	g	0.5	
Main materials ⁸⁾	n.a.	Alumina, peek and 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	

- 1) Typical linear sensitivity at room temperature considering an FBG with 1550 nm wavelength. Sensors provided with 3rd order polynomial calibration formula.
- 2) The presented value is calculated as 5T0.63. 5T0.63 is the time needed for the sensor to reach 63.5 % of an imposed temperature change.
- 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) Limited by the connectors area.
- 6) Pull force between cable and sensor capsule.
- 7) With 4m cable and no connectors.
- 8) The full composition of the sensor including cable, complies with RoHS, REACH, Conflict Minerals and fire propagation prevention directives.

Inputs/Outputs		
Cable type	n.a.	Ø 0.5 mm peek
Cable bend radius ⁹⁾	mm	> 16
Cable length ¹⁰⁾	m	1 ... 4
Spiral wrap material	n.a.	PTFE
Spiral wrap outer diameter ¹¹⁾	mm	~ 5
Spiral wrap length ¹²⁾	m	0.5 ... 3
Connectors	n.a.	FC/APC, SC/APC

9) Induced loss due to one complete turn around a mandrel < 0.05 dB.

10) Specified cable length is ensured on delivery. A margin of up to 10 cm can be present. Cable length is measured from connector end to probe start. For different cable lengths please contact HBK FiberSensing.

11) For other spiral wrap diameters please contact HBK FiberSensing.

12) Defined in steps of 0.1 m, with a margin of up to 10 mm. For other spiral wrap lengths please contact HBK FiberSensing.

ORDERING INFORMATION

Configurable Item K-FS73DTP	
Options	
Number of sensors¹³⁾	1 to 16
Sensor wave-lengths¹⁴⁾	1515, 1520, 1525, 1530, 1535, 1540, 1545, 1550, 1555, 1560, 1565, 1570, 1575, 1580, 1585, and 1590 nm. Cannot be repeated
Cable length¹⁵⁾	Cable length must be defined in steps of 0.5 m Cable must be between 1 m and 4 m Same length for all probes
Spiral wrap length¹⁶⁾	Selectable: Yes or No Spiral wrap length must be defined in steps of 0.1 m Spiral wrap length must be between 0.5 m and 3 m
Termination	Single end connector options are: FC - FC/APC; SC - SC/APC. One connector type per bundle of sensors
Calibration range	RE – Regular [-40°C to 100°C] EX – Extended [-40°C to 200°C]

13) Individual sensors (FS63DTP) should be ordered as bundle of one sensor (FS73DTP).

14) For different wavelengths please contact HBK FiberSensing

15) Cable length measured from connector boot to sensor capsule, as per technical drawing. For other cable lengths please contact HBK FiberSensing.

16) For other spiral wrap lengths please contact HBK FiberSensing.

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