

WISTCryo

FBG Temperature Sensor Arrays for Cryogenic Applications

Distributed temperature sensing based on fiber Bragg grating (FBG) technology is widely adopted due to its high speed and accuracy, dense multiplexing, small form factor, immunity to EMI and safety within explosive environments.

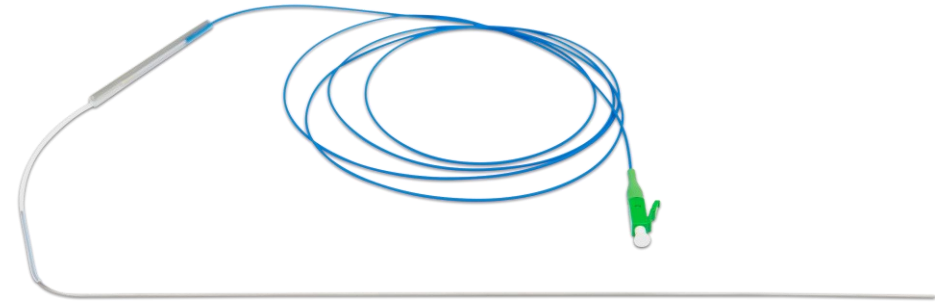
Historically, FBG technology has been of limited use for cryogenic applications, since temperature measurement sensitivity falls significantly at low temperatures. Proximion has addressed this unmet need with the WISTCryo array sensor which provides high accuracy, repeatable measurements down to 10K.

Low Temperature Operation

The high sensitivity and stability down to 20K can be guaranteed using a unique grating writing process and probe mechanical design.

High Spatial Resolution

Each sensor can handle numerous FBGs. The number and placement of FBGs along the WISTCryo sensor is fully configurable. Despite the high FBG count and customizable FBG spacing the WISTCryo sensor is produced without any splices between the FBGs.



Example WISTCryo construction

EM Immunity

WISTCryo sensors are immune to the effect of magnetic fields used in some cryogenic processes.

Intrinsically safe

WISTCryo uses no electrical power and is part of an inherently safe system when used with a Proximion ATEX certified interrogator.

Small Form Factor

WISTCryo offers multiple temperature measurements in a single, low-profile probe, enabling measurement in previously inaccessible locations.

WISTCryo

FBG Temperature Sensor Arrays for Cryogenic Applications

WISTCryo is a customised sensor, manufactured to suit the application needs. For guidance, some typical specifications are set out below.

Physical Properties	Typ.	Min.	Max.
Number of FBGs per fiber	10	1	50 ¹
FBG length	5 mm	1 mm	10 m
Temperature Range ² For high temperature, see our WISTHeat sensor	N/A	-263 °C (10 K)	+50 °C
Typical thermal response at -173 °C (100K) -253 °C (20K)	32 pm/°C 25 pm/°C		
Temperature accuracy ³	0.15K @100K, 0.2K @20K		
Temperature resolution ³	3mK @100K, 4mK @20K		
Magnetic measurement error	0		
Response time ⁴	<1 s		

WISTCryo Package	Typ.	Min.	Max.
Probe Material – metal	Stainless Steel, Inconel or Aluminium		
– polymer	Silica, Teflon or PEEK		
Probe Diameter	-	3 mm	-
Fiber pigtail length	1 m	0.1 m	10 m
Fiber pigtail type	SMF28e compatible		
Fiber pigtail coating	Acrylate or polyimide		
Fiber pigtail buffer	900 µm	None	2 mm
Fiber pigtail bend radius ⁶	17 mm	7.5 mm	-
Connector type	LC/APC, SC/APC, FC/APC E2000/MU/ST/LSA/ARINC on request		

1. Max sensor value set by interrogator bandwidth specification
2. WISTCryo remains sensitive below 20K but its performance is untested
3. Preliminary, based on prototype testing using Proximion WISTSense Ultra interrogator
4. Varies with package option