



FT-400

All Fiber Optic High Temperature Sensor

(Outdoor Type)



INTRODUCTION

The main advantage of fiber optic sensor technology is that it is immune to electromagnetic interference which is critical in many environmentally sensitive and harsh industrial and medical applications. Despite decades of intensive research, field deployable successful fiber optic sensor products remain very technically challenging due in part to its high cost in detection schemes or difficulties in manufacturing high precision requirements. Existing fiber temperature sensing technologies, for example, based on F-P cavity or FBG, require that expensive spectrum analysis components be utilized which resulted in both high cost, lack of scalability and low reliability.

LAMBDA SCOPE's Highly Reliable FT-400 All Fiber Optic High Temperature Sensor is designed based on the intrinsic properties of fiber optic glass thermal expansion. Its operating principle is very simple. We have developed a novel high precision algorithm to detect and analyze the optical cable length as a function of thermal expansion. The operation of the device can be stand-alone, via USB and/or RS-485 MODBUS (over 1000 sensing points) networked to a central computer for data logging and reporting. We provide a simple GUI interface for demonstration purpose. Measurement data can be saved

to an Excel table for further processing and reporting. The graph showing on the front page is an outdoor type demonstration device.

KEY FEATURES:

- The product shown is designed for outdoor operation (-40 to 85 °C) and is capable of measuring temperature from -50 to 350 °C;
- Displays both ambient and probe temperatures;
- Powered by 9V DC with 10 minutes warming up time;
- 1310nm F-P laser diode;
- USB or RS485 connection to PC through user-friendly GUI;
- Can be configured to multiple probes for multi-location measurements to over 1000 points.

APPLICATIONS

- Multi-point temperature measurement in transformer or other industrial equipment;
- EMI immune medical equipment applications.

GENERAL CHARACTERISTICS

Dimensions (D x W x H)	224 mm x 200 mm x 80 mm*
Warm-up Time	10 min.
Communication Interfaces	USB or RS-485
Power Consumption	<5W
Operating Temperature	-40 to 85 °C
Storage Temperature	-40 to 85 °C

Note: *The size can be made smaller to fit into an existing system.

KEY SPECIFICATIONS

Model Type	FT-400
Default Fiber Type	SM
Wavelength	1310nm
Probe Temperature Range	-50 to 350(°C)
Probe Temperature Accuracy	+/-5 °C
Temperature Variation Limit	< 1°C/min.
Ambient Temperature Accuracy	0.5 °C
Sensor Probe Size	100mm (Dia.)*
Fiber Pigtail Length	2m
Sampling Time	<2min.

Note: *Fiber probe is pre-fabricated and calibrated for specific temperature range and may be customized.

DESIGN OF FIBER PROBE:

The fiber probe consists of 50m length of optical fiber. The probe can be customized to meet the demand of a specific application. For example, the photo shown below is a 50m length of polyimide coated fiber. It is designed to withstand the high temperature (up to 350 °C) for power industry applications. Other types of fiber probes can be designed to meet the requirements for various considerations. The lowest cost of all designs is the regular single mode fiber (e.g. SMF-28) which costs nearly negligible.



MULTIPLE SENSOR NETWORK:

In the case of multiple sensors networked applications, our device is designed to communicate via RS-485 MODBUS protocol to enable a network of 1,000 sensor heads. Please send an email to discuss your applications if you are interested.

ORDERING INFORMATION

The part numbering designation for LAMBDASCOPE products is as follows.

FT-400-EVAL: Fiber Optic Temperature Sensor evaluation device for outdoor applications is available for order. It includes a unit of FT-400, a reference thermometer (Omega HH127 with thermal couple probe) and GUI.