

FOTEMP FTH

Handheld Device



USER MANUAL

date 2018-MAR-06

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1 General

the fiber optical thermometer described in the operating instructions has been designed and manufactured using state-of-the-art technology.

all components are subject to stringent quality and environmental criteria during production. these operating instructions contain important information on handling the instrument. working safely requires that all safety instructions and work instructions are observed.

observe the relevant local accident prevention regulations and general safety regulations for the instrument's range of use. the operating instructions are part of the product and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time. skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.

the manufacturer's liability is void in the case of any damage caused by using the product contrary to its intended use, non-compliance with these operating instructions, assignment of insufficiently qualified skilled personnel or unauthorised modifications to the instrument. the general terms and conditions contained in the sales documentation shall apply. subject to technical modifications.

Further information: internet-adress: www.optocon.de

2 Safety

this manual contains important information to ensure personal safety and to prevent damage.

explanation of symbols:

(<I>) information: points out useful tips, recommendations and information for efficient and trouble-free operation.

(<C>)caution: indicates a potentially dangerous situation that can result in light injuries or damage to equipment or the environment, if not avoided.

(<W>) warning: indicates a potentially dangerous situation that can result in injury or death, if not avoided.

skilled personnel

skilled personnel are understood to be personnel who, based on their technical training, knowledge of measurement and control technology and their experience and knowledge of country-specific regulations, current standards and directives, are capable of carrying out the work described and independently recognizing potential hazards.

intended use

the instrument has been designed and built solely for the intended use described here, and may only be used accordingly. the technical specifications contained in these operating instructions must be observed.

3 Unpacking, Inspection, Service

when unpacking and inspecting your system components, you need to do the following:

1. check all materials against the enclosed packing list.
2. carefully unpack and inspect all components for visible damage.
3. save all packing materials, until you have inspected all components and find that there is no obvious or hidden damage.
4. before shipment, each instrument is assembled, calibrated, and tested. if you note any damage or suspect damage, immediately contact us.

in case of a malfunction or service request please use our technical support which can be contacted by telephone monday-Friday between 8:30 to 17:00 o'clock MET:

+49 (351) 8435990 or email: info@optocon.de

send RMA shipments to:

Weidmann Technologies Deutschland GmbH, Washingtonstrasse 16/16A17, 01139 Dresden,
Germany

using the prior by phone or mail gatherd RMA or QSV number.

disposal

inoperable instruments must be disposed of in compliance with local regulations for electronic materials.

4 Introduction

is a mobile 1 channel-optical fiber thermometer used for measuring temperature in an environment with high electromagnetic interference, or with the presence of high power microwave fields. It can also be used in places where measurement with an electric temperature probe is not possible.

With the FOTEMP1 Handheld you are able to operate a comfortable and safe temperature measurement, even in difficult situations, with an overwhelming aggregated system accuracy of $\pm 0.2^{\circ}\text{C}$.

Via the serial connector type of the instrument, by using the delivered software, is it possible to do a great monitoring about the results.

FOTEMP1 Handheld is a compact, user-friendly, and easy to operate instrument for many fields of application, e.g.:

- Medical engineering such as nuclear spin tomography
- High Frequency heating processes
- Microwave power heating processes
- Electric motors
- Generators and transformers
- Aeronautical engineering
- Chemistry and petro chemistry

the outer jacket of the fiber optic temperature sensors is made out of teflon, at the sensor tip a gaascrystal (gallium arsenide) is attached. The probe sensor is completely non-conductive. optocon's fiber optic sensors offer complete immunity to rF and microwave radiation with high temperature operating capability, intrinsic safety, and non-invasive use. the probes are also designed to withstand harsh and corrosive environments.

starting at a light wave length of 850nm gaas becomes optical translucent. since the position of the band gap is temperature dependent, it shifts about 0.4nm/kelvin. the measurement device contains a light source and a device for the spectral detection of the band gap. this guaranties fast, repeatabe and reproducible measurements. via the analog outputs and thanks to its accompanying software "Fotemp-assistant", measurement results can be easily controlled and monitored. over the entire life of the system calibration is not required to remain within the specifications.

5 Product specifications

Instrument:

Number of channels: 4
Power Requirements: 9 VDC, power pack included
Current: 1,5 A
Display range: 0 to 300°C
Accuracy: up to $\pm 0.2^\circ\text{C}$
Resolution: $0,1^\circ\text{C}$
Communication: RS-232
Display: LCD display 1x8 digits, background lighting
Storage temperature: -20°C to $+50^\circ\text{C}$
Operating temperature: 0°C to $+40^\circ\text{C}$

Probe:

Accuracy: $\pm 0.2^\circ\text{C}$
Length: 2m, 5m or 10 m, different probe lengths and configurations on request
Diameter: 1,3 mm (probe tip 2cm, OD 1,7mm), totally made of nonmetallic material
Time constant: $< 1^\circ\text{C}$ in case auf temperature-fluctuations
Temperature range (probe): 0°C to 300°C
Connector: ST-Connector
System-accuracy (Instrument and probe): $\pm 2^\circ\text{C}$ in the temperature range 0°C - 300°C
Calibration: One-point temperature calibration by the user possible
Accuracy close to the calibration point is $\pm 0,1^\circ\text{C}$

6 Calibration

To ensure an accurate temperature measurement in critical areas, we offer a comprehensive calibration service for our fiber optic temperature measurement instruments. through our modern labs and our qualified staff we can guarantee you a very accurate and fast calibration. within a few days you get your unit back and can start your fiber optic measurement projects. For each calibrated measurement instrument by us, a full certificate of test results is supplied. your fiber optical thermometer icomes factory calibrated. an annual re-calibration is not necessary, except for internal company regulations. all calibrations are performed at our factory. For each calibrated measurement instrument by us, a full certificate of test results is supplied. your account manager is available monday to Friday 8:30 to 17:00 clock personally by phone +49 (351) 8435990. in addition, you are welcome to send an email message to tell us your concern. we will get in touch with you as soon as possible.

7 Getting started

1. plug the provided optical fiber temperature sensors to the st-socket on the upper of the instrument, where the ON/OFF switch is located.
2. connect the provided rs-232 interface cable to the thermometer and a free serial port of the pc or notebook.
3. to power the thermometer please use the provided power supply.
4. after powering and switching the thermometer on, temperature values will be displayed if sensor's level is above 20% signal strength
5. now the thermometer is ready for measurement.

(<C>) caution! the fiber optical thermometer only function with optocon fiber optic temperature sensors. please do not use temperature sensors of other brands.

general installation guidelines

please read the instructions for installing the fiber optic instrument carefully. please note especially the order of the instructions exactly.

sensor handling

the sensor consists of a st-plug at the end and a gallium arsenide crystal at the tip of the sensor. the crystal is sensitive and should not be exposed to excessive mechanical stress. please note the information about the bending radius of the sensor on page 16. a forcible bending of the sensor leads to breakage of the fiber. in this case the sensor is damaged and needs to be repaired / replaced.

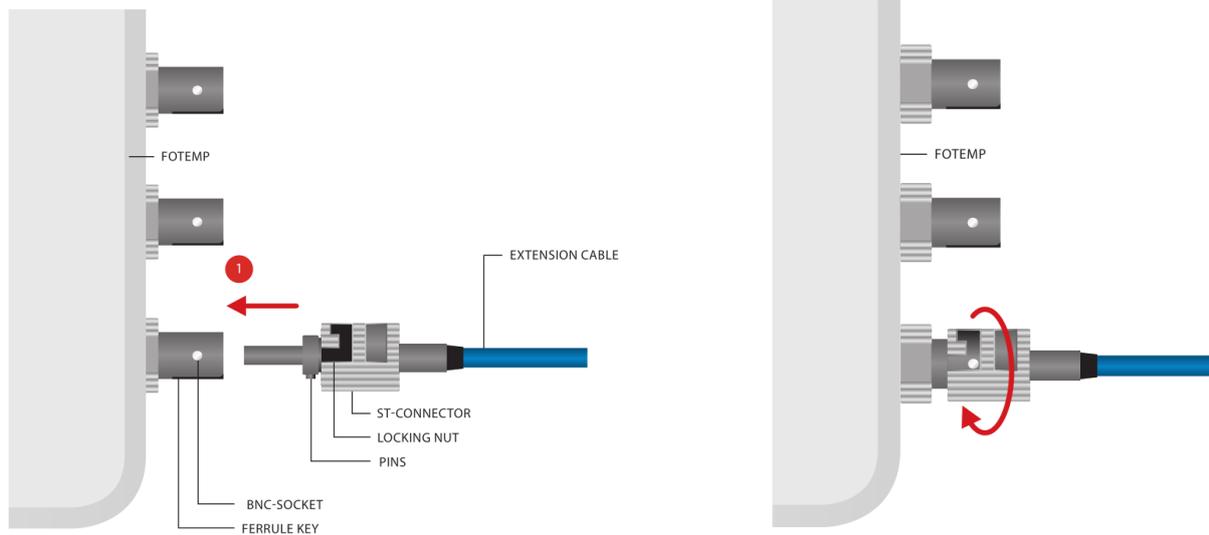
connection with pc:

before establishing the first connection, please check whether the Fotemp device is connected to the power supply and the pc via the rs-232 cable respectively.

connection with sensors:

the temperature sensors are connected via the st-plugs to the bnc sockets at the back panel. please note to insert the plugs pushing slightly against the spring pressure and to turn with a clockwise rotation. all fiber optical temperature sensors of optocon ag can be connected.

(<I>) any channels not in use must be protected with supplied dust caps.



to ensure accurate measurements and long life of the fiber optic sensors and instruments, it is necessary to clean them regularly. More information about cleaning can be found in a later chapter.

Test of sensor functionality

To test the functionality of the sensor, you can place the sensor into a test liquid, of which the temperature is known (eg boiling water). The sensor will respond with the given temperature within a few seconds. If no temperature is displayed please re-install the software and check if the sensor has contact to the measuring object

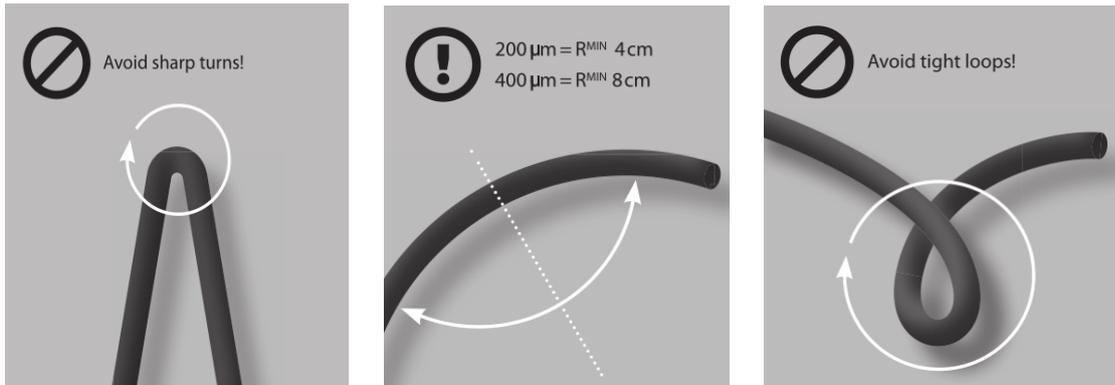
8 Sensor handling

1 General advise

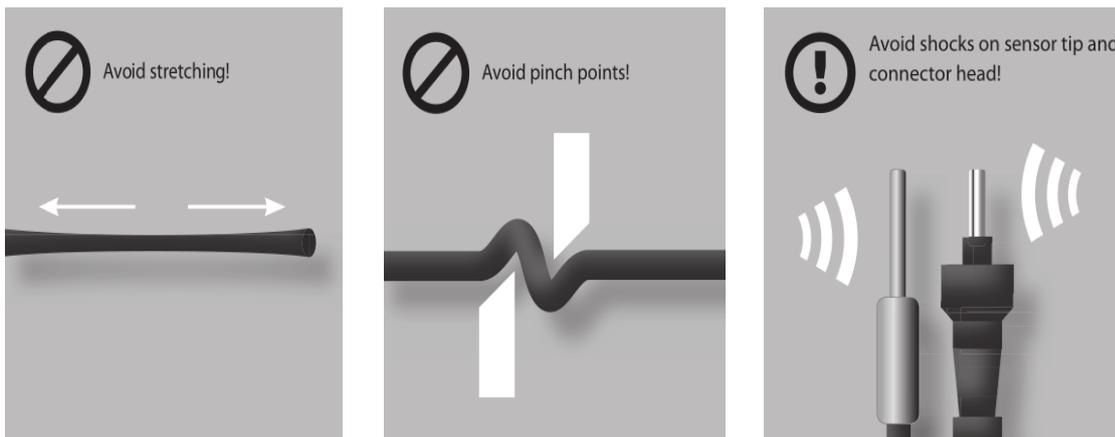
bending radius:

For fibers with a core diameter of 200 μm have a maximum short time bending radius of 4cm applies; long term usage of 8cm. Fibers with a core diameter of 400 μm have a maximum short term bending radius of 8cm; long term of 16cm.

bending radius



mechanical load



2 *Cleaning of sensor connectors and plugs*

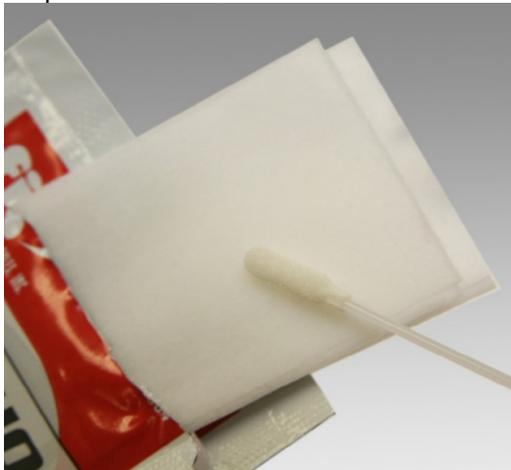
Step 1



Step 3



Step 2



Step 4

3 *Instructions*

clean the st connector of the sensor with the connector cleaner. softly press the connector on the cloth tape and rotate across the tape while rotating the connector. you can clean up to 6 connectors before advancing the tape. tear off excess tape as required. take a swab and wet it with the isopropanol wipes. in rotating motion smoothly insert swab into the internal connector of the conditioner. avoid using cotton swabs.

9 Software

For a description of usable software please be referred to the following documents:

- optocon_Manual_FOTEMP_Assistent_EN_Rev01.pdf
- optocon_Manual_FOTEMP_Assistent_DE_rev01.pdf

10 Device Usage

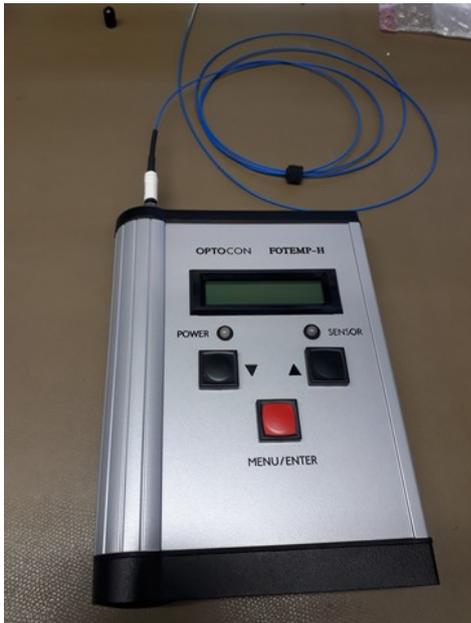


Figure xxx Handheld device FTH is switched off, sensor connected



Figure xxx Sensor connected, enable switch to turn on the device



Figure xxx device switched on and measuring (see display and blinking LED)
 LED's blinking speed is the measurement speed at a fixed rate. Whatever sensor signal level is detected a temperature is calculated as long as the signal level is above or equal 20%.



Figure xxx press „MENU/ENTER“ key longer than a second to enter menu and show first menu option „Offset“. Use the UP and DOWN keys to enter your offset. Save and exit menu with the „MENU/ENTER“ key



Figure xxx Press key „UP“ to to see second menu option „Light“ (press UP or DOWN key to switch backlight on or off, execute with „MENU/ENTER“ key)

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