

THE IDEAL MEASUREMENT DEVICE

Overview of our 4 Product Series

Next to time, temperature is the most frequently measured physical property. Non-contact temperature measurement through infrared radiation is therefore a favoured and established method for many of our customers.

If you have decided to use non-contact temperature sensors for your applications, the question is what would be the ideal device for you. The following three pages will offer you a good overview of the **most important decision criterias** of all our products for an easy device choice.

The following pages covering the **4 product series** will present the uniqueness of each series according to the decision criterias. The indexes on the right site of each page give you an orientation within which product group you are.

1. Compact Series

Small, compact infrared thermometers for the ideal use in cramped and hot surroundings



2. High Performance Series

Infrared thermometers with highest optical performance and double laser



4. Portable Thermometers

High quality infrared thermometers with integrated USB interface



3. Infrared Cameras

Compact thermal imagers for fast stationary applications, including linescanner functionality



Compact Series

High Performance Series

Infrared Cameras

Portable Thermometers

Spot Measurement or Thermal Image?

First of all, it is important to define the measurement problem and decide between the two following measurement methods:



A selective measuring infrared thermometer

should be used if you know where the critical point or the area to be measured is placed within your application. The size of the measuring object is important to define which lens is necessary. Therefore it is possible to monitor the accurate temperature and optimize processes - if necessary - before quality problems arise.



Infrared cameras, such as the optris PI, should be used in cases where not only one critical area exists or the area can not be clearly defined.

Critical areas can be localized by the camera through the demonstration of thermal images. The areas can then be permanently monitored by one or multiple fixed infrared thermometers.



8 - 14 μm for non-metal surfaces (Type of device: LT)



7.9; 4.64; 4.24; 3.9 μm for special applications (Type of device: P7; F6; F2; MT)

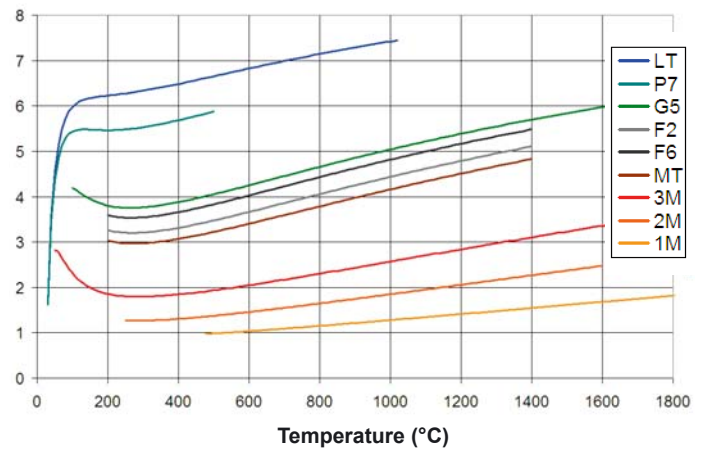


5.0 μm for glass surfaces (Type of device: G5)



2.3; 1.6; 1.0 μm mainly for metal surfaces (Type of device: 3M; 2M; 1M)

dT mistake (%)



Short wavelength reduce measurement mistakes on surfaces with low, unknown or changing emissivity. This appears mostly with metals. The diagram above shows the measurement mistakes across different wavelength if the emissivity is adjusted wrong by only 10 percent.

Which Temperature Range?



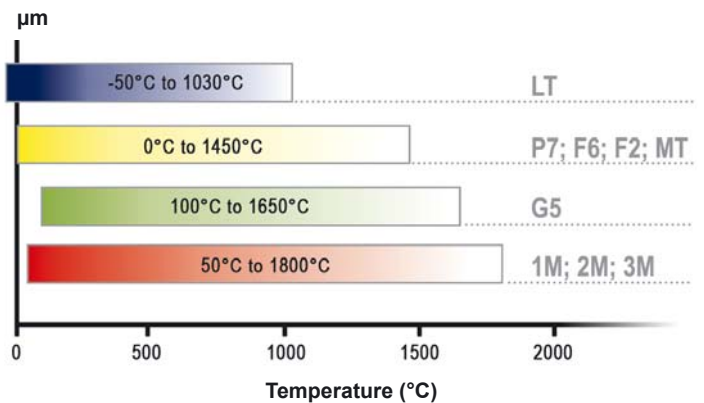
The temperature is an additional factor to decide on. The range should cover all relevant temperatures of the application. Optris offers devices with a measurement range between **-50°C and 1800°C**.

Which Object Surface?



The condition of the object surface defines the measurement device and wavelength to be used for the application. The **emissivity ε** has a central meaning. The choice of the right device is of great importance especially for metals, where the emissivity depends on the temperature and wave length.

Optris offers fitting measurement devices for most applications throughout a wide product range. The following explanation helps to find the right **wavelength** for your application:



Temperature range of the Optris devices across the wavelength.

Object Size / Distance to Sensor?



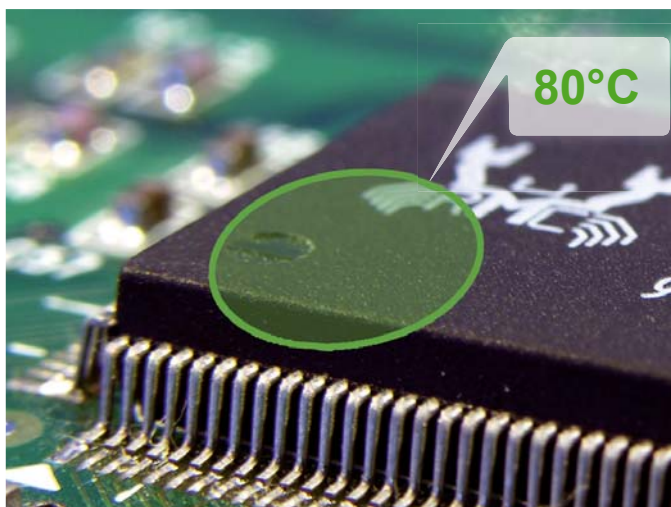
The optical resolution of the checking device is chosen regarding to the **size of the object under test** and the **distance** between the object under test and the sensor. Similar to the emissivity the choice of the wrong lens will lead to extensive temperature differences (ΔT). The spot size of the checking device (d_{meas}) is not allowed to be bigger than the size of the checked object (d_{real}). Otherwise the following applies:

$$\Delta T_{real} (d_{real} / d_{meas})^2 = \Delta T_{meas} \quad (\text{for } d_{real} \leq d_{meas})$$

An example: Measurement of a SMD component
 $80^\circ\text{C} (5 \text{ mm} / 10 \text{ mm})^2 = 20^\circ\text{C}$
 $80^\circ\text{C} (5 \text{ mm} / 5 \text{ mm})^2 = 80^\circ\text{C}$



Spot size chosen too big which results in a measurement mistake

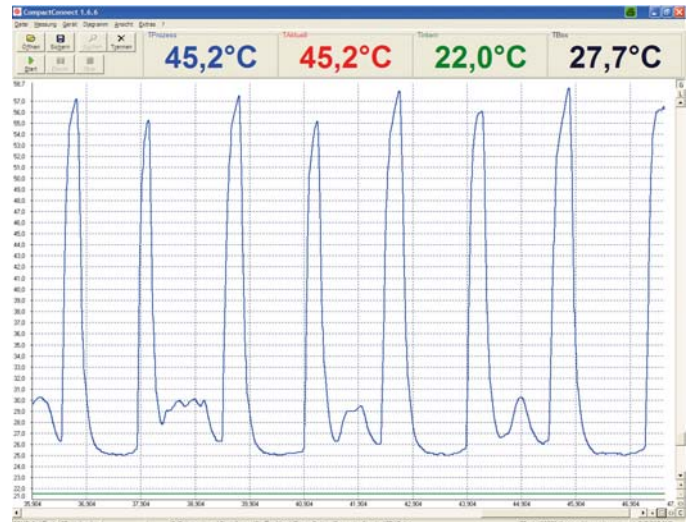


Fitting spot size and correct temperature definition

Which Process Velocity?

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To achieve accurate temperature measurement it is important to know how fast objects under test move in front of the sensor or how fast they change the temperature. The fastest infrared thermometer of Optris captures changes within **1 ms**.



Display of fast temperature changes over a period of time.

Which Environmental Conditions?



Most sensing heads of Optris consist of an **extremely high temperature resistance**.

The highest acceptable ambient temperature for the optris CThat is **250°C without cooling**.



Stainless steel cooling housing for protection and cooling of the device.

The sensor can be combined with a **cooling jacket** and **air purge collars** for the use in harsh surroundings. The robustness of the devices can therefore be increased.

Integration of Sensors?



The temperature sensors of Optris can be installed into the process with **mounting brackets** or **flanges**.

Depending on the device, we offer different analog and digital interfaces for **data evaluation** such as triggering, alerting or saving of data.

Analog Interfaces:

0 - 20 mA, 4 - 20 mA, 0 - 5 mV, 0 - 10 mV,
Thermocouple (type J, type K)

Digital Interfaces:

USB, RS232, RS485, Relay, Profibus DP, CAN Bus, Ethernet

