



# IR-02

## Compact Infrared Thermometer with Current Output



## Features

- / -32...+900°C
- / 2-wire technology
- / Configurable with PC or hand-held device
- / High degree of accuracy
- / Digital signal processing
- / Short response times
- / Solid stainless steel housing

## Description:

The IR-02 infrared thermometer is a pyrometer with a thermopile detector which is equipped with a robust Germanium lens. It utilizes the spectral region of 8 to 14 micrometers so as to measure temperatures in the range of -32...+900°C at a distance ratio of 50:1 without contacting. The radiation of the object of measurement in this wavelength is constantly compared with the radiation of the sensor's surroundings and the current value of the object's surface temperature is delivered to the output of the IR-02 within at least 100 milliseconds. A 4...20 mA signal proportional to the temperature is available in 2-wire system. Decisive for the quality and the accuracy of measurement is the knowledge about the emissivity of the surface being measured. The value indicates the ratio of the intensity of radiation of the surface of a black emitter to that of the actual surface. A list of common surfaces and the relevant emissivities is included in the delivery package of the IR-02. The setting of the programmable parameters such as emissivity, subrange and response time can be adjusted either with the portable hand-held device or via USB adapter and the setting software. On request all necessary values can be set ex works. Also, a maximum value memory can be switched or reset and the measured value of an already installed IR-02 can be displayed. The parameters once transmitted continue to be present even during an outage.

## Application:

Non-contacting infrared thermometers are used in the industry whenever it is not possible to attach a conventional temperature sensor due to high temperature of the object being measured or due to its geometrical characteristics. Pyrometers recognize only surface temperatures; they are free from repercussions and can measure even objects of small specific heat capacity or less thermal conduction such as plastic or various types of glass. The dynamics are solely determined by the evaluation electronics, with the result that fast changing conditions of temperature can be captured. The IR-02 is a genuine 2-wire transmitter and its operating range within -32...+900°C can be freely selected by the



user by means of a hand-held programming device. Its various electronics are situated in a robust stainless steel housing. A wide range of accessories like cooler housing, Laser pilot light or blower attachments and convenient assembling brackets enable permanent installation in the most difficult processes even at high ambient temperatures, in dusty atmosphere or in vacuum chambers. Typical applications are found, for example in the glass, paper and plastic industries as well as in Research & Development activities.

## Version:

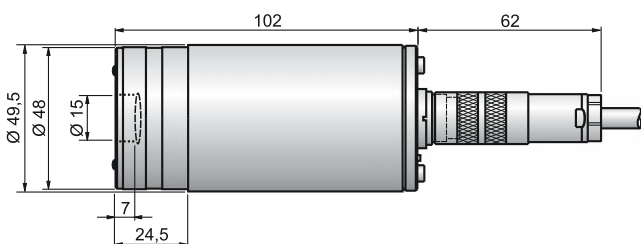
### IR-02 Compact Infrared-Thermometer

**Temperature range:** The entire coverage of IR-02 is from -32...+900°C. Within these limits the 4...20 mA 2-wire output can be freely assigned. This is done in the factory before dispatching the IR-02 or by means of an optionally available hand-held parameterizing device, respectively via an hardware-adaptor with software, which is also used for setting the parameters such as emissivity and response time as well as for configuring the maximum value memory. The minimum span of the adjustable operating range is 50K.

**Optics:** The IR-02 infrared thermometer is supplied with one of the three available optics that can be removed or exchanged only at the factory. Optics VII offers a large measuring spot even from small distances to the point of measurement, Optics VIII has a measuring spot that becomes smaller and Optics IX has a relatively smaller diameter at large distances. The object to be measured should be always larger than the measuring spot found at the relevant distance between the pyrometer and the point of measurement.

**Cable length:** The standard cable length of IR-02 is 2 meters. Optionally, the device can be provided with a longer cable.

## Dimensions in mm:



## Optics:

### Optic VII

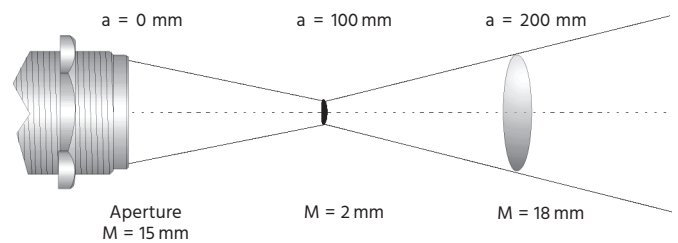
Distance a [mm]	a = 0 (Aperture)	100	200	300
Measuring spot diameter M [mm]	15	2	18	35

### Optic VIII

Distance a [mm]	a = 0 (Aperture)	300	600	1000
Measuring spot diameter M [mm]	15	6	22	45

### Optic IX

Distance a [mm]	a = 0 (Aperture)	800	1500	2500
Measuring spot diameter M [mm]	15	16	36	68



## Ordering Codes:

<b>Order-no.</b>	<b>IR-02.</b>	<b>□□□□-□□□□</b>	<b>1.</b>	<b>1.</b>	<b>0</b>
<b>IR-02 Infrared-Therm.</b>					
<b>Temperature range as per 4...20 mA /</b> □□□□-□□□□ (initial to end temperature in °C)					
<b>Optic /</b>					
1 = Optics VII (Measuring spot 2 mm for a distance of 100 mm)					
2 = Optics VIII (Measuring spot 6 mm for a distance of 300 mm)					
3 = Optics IX (Measuring spot 16 mm for a distance of 800 mm)					
<b>Cable length /</b>					
1 = 2 m Cable (standard)					
2 = 5 m Cable					
3 = 10 m Cable					
4 = 15 m Cable					
4a = 20 m Cable					
4b = 25 m Cable					
5 = 30 m Cable					
<b>Accessories /</b>					
0 = no accessories					
1 = assembling bracket, single part					
2 = assembling bracket, two-part					
3 = blower attachment					
4 = cooling hood with blower attachment (air or water cooling) including holder					
5 = vacuum adapter with window made of Zn Se including sealing and screwing					
6 = pilot light attachment					
7 = plastic carry case					
8 = hand-held parameterizing device without interfacing cable					
9 = hand-held parameterizing device with interfacing cable					
10 = interfacing cable for hand-held parameterizing device					
11 = USB adapter + adjustment software					



## Attachments:

**Assembling bracket:** Using the assembling bracket the pyrometer can be easily adjusted and fixed at one (single part bracket) or two levels (two-part bracket) by  $\pm 45^\circ$  independent of each other. The IR-02 is fixed by means of two counter nuts on the pyrometer.



**Stainless steel blower attachment:**

The blower attachment protects the pyrometer lens in rough industrial conditions against soiling due to dust, humidity or flying particles and ensures trouble-free functioning of the device. The required air passage is in approximately at 25...30 l/min pressurized air under 0.2 to 0.5 bar.



**Cooler housing with stainless steel blower attachment:**

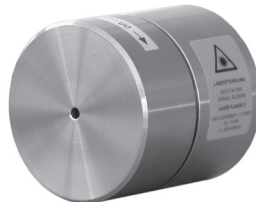
The cooler housing acts as protection for the pyrometer in environments where the permissible ambient temperature of  $70^\circ\text{C}$  exceeds. By using this cooler housing the pyrometer can be operated in ambient temperatures of up to  $170^\circ\text{C}$ . The cooling water flow should be 4 l/min at  $20^\circ\text{C}$  water temperature.

**Vacuum adapter with Zinc-Selenide window:**

Installation of the pyrometer to a vacuum chamber can be performed with the vacuum adapter.

**Laser stainless steel pilot attachment:**

The Laser pilot attachment enables the user to view even small objects of measurement easily and safely by means of a Laser point. It is provided with a counter thread and screwed on to the front side.



**Plastic carry case:** Especially in the field of research the IR-02 needs to be transported from one point of measurement to another. A plastic carry case protects the pyrometer, sensitive optics and accessories from damaged during transportation.

**Hand-held parameterizing device:** Using a hand-held parameterizing device temperature range, emissivity and response time can be transmitted through the service interface of IR-02 to the Pyrometer for storing in its electronics. The maximum value memory of IR-02 is switched off or reset with the hand-held device. If the temperature of an already installed Pyrometer has to be recorded, this is also possible with the practical operating device.

## Technical Specifications:

<b>Operating range /</b>	-32°C...+900°C
<b>Spectral range /</b>	8...14 $\mu\text{m}$
<b>Distance ratio /</b>	50:1
<b>Accuracy /</b>	1% of measured value in $^\circ\text{C}$ or + 0.6°C ( $\epsilon = 1, T_U = 25^\circ\text{C}, t_{90} = 1\text{s}$ )
<b>Repeatability /</b>	0.3% of measuring in $^\circ\text{C}$ or + 0.6°C ( $\epsilon = 1, T_U = 25^\circ\text{C}, t_{90} = 1\text{s}$ )
<b>Resolution /</b>	0.1 $^\circ\text{C}$
<b>Parameters /</b>	subrange, emissivity, response time
<b>Response time /</b>	0,08s (adjustable via interf. 0.5/1/2/5s)
<b>Emissivity <math>\epsilon</math> /</b>	adjustable via service interface
<b>Operating temperature /</b>	0...70°C
<b>Storage temp. /</b>	-20°C...70°C
<b>Thread /</b>	M40 x 1.5-male
<b>Length /</b>	approx. 164 mm
<b>Weight /</b>	approx. 450 g

## Electrical Specifications:

<b>Supply voltage /</b>	24 VDC (10...30 V) ripple $\leq 0.5\text{V}$ , max. 20 mA
<b>Power consumption /</b>	max. 0.6 W
<b>Aperture /</b>	15 mm
<b>Measuring output /</b>	4...20 mA, linear
<b>Load /</b>	max. 700 Ohm bei 24 VDC
<b>Protection class /</b>	IP65 as per DIN 40050
<b>CE-sign /</b>	Corresponds to EU directive on electromagnetic compatibility, for operation with open cap the CE approval becomes void

