

# ISR 12-LO · IGAR 12-LO

Highly accurate, fully digital, extremely fast

Digital 2-color pyrometer with fibre optic for non-contact temperature measurement on metals, ceramics, graphite etc. between 300 and 3300°C

- ◆ Temperature ranges between 300 and 3300°C
- ◆ Highest accuracy, min. 0.4% of reading + 1°C
- ◆ Extremely fast, response time  $\leq 2$  ms
- ◆ Very small spot sizes, min 0.45 mm
- ◆ 2-color- / mono- / metal mode (switchable)
- ◆ Built-in laser targeting light
- ◆ All parameters adjustable at the instrument
- ◆ Output 0 ... 20 mA or 4 ... 20 mA (switchable)
- ◆ Interface RS232 / RS485 (switchable)
- ◆ Diagnostics function
- ◆ Fibre optic and optical head withstand up to 250 °C



The pyrometers **ISR 12-LO** and **IGAR 12-LO** are digital, highly accurate 2-color pyrometers with fibre optic for non-contact temperature measurement.

The pyrometers measure in the 2-color principle (ratio principle) in which two adjacent wavelengths are used to calculate the temperature.

This technique offers the following advantages compared with the standard one-color pyrometers:

The temperature measurement is independent of the emissivity of the object in wide ranges, it is unaffected by dust and other contaminants in the field of view, it is unaffected by dirty viewing windows, the measuring object can be smaller than the spot size.

Additionally the pyrometer can be switched to 1-color mode and used like a conventional pyrometer.

The metal mode allows measurements of metals and alloys with unknown k-factor (emissivity slope).

The instrument is equipped with an optical fibre (length up to 30 m), which can be used in very high ambient temperatures up to 250°C without cooling and it is unaffected by electromagnetic interferences.

Two different optical heads for different measuring distances and very small spot sizes are available.

The very short response time of only 2 ms facilitates the measurement of fastest heating processes.

All settings can be done directly at the instrument. The parametrizing can also be done with the PC and the standard operating software *InfraWin*. Additionally the software offers online temperature display and data storage.

The diagnostics function allows to check pyrometer and wiring.

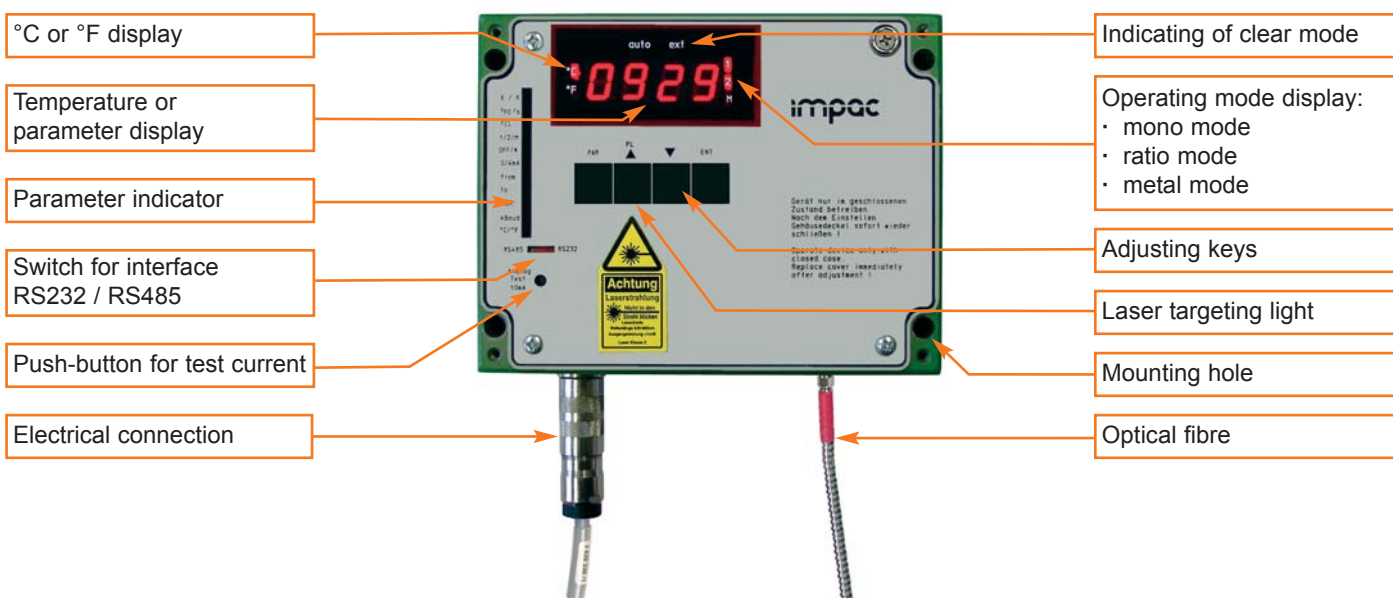
#### Typical applications:

- Induction heating
- Welding
- Casting
- Forging
- Annealing
- Sintering
- Rolling mill
- Rotary kilns
- Pouring stream
- Research and development
- Laser application

## Technical data



	ISR 12-LO	IGAR 12-LO
Temperature ranges:	MB 13: 600 ... 1300°C MB 18: 750 ... 1800°C MB 25: 900 ... 2500°C MB 33: 1000 ... 3300°C	MB 10: 300 ... 1000°C MB 13: 350 ... 1300°C MB 22: 500 ... 2200°C
Sub range:	Any range adjustable within the temperature range, minimum span 51°C	
Spectral range:	0.8 µm / 1.05 µm	1.52 µm / 1.64 µm (MB 22: 1,28 / 1,65 µm)
Signal processing:	Foto current, digitized immediately	
Accuracy:	0.4% of reading in °C + 1°C (< 1500 °C) (ε = 1, t <sub>90</sub> = 1 s) 0.6% of reading in °C + 1°C (> 1500 °C)	0.5% of reading in °C + 1°C (< 1500 °C) 0.7% of reading in °C + 1°C (> 1500 °C)
Repeatability:	0.2% of reading in °C + 1°C	0.3% of reading in °C + 1°C
Response time t <sub>90</sub> :	2 ms (with dynamical adaption at low signal levels), adjustable up to 10 s	
Emissivity slope K:	ε1/ε2: 0.800 ... 1.200 adjustable in steps of 0.001	
Emissivity ε:	0.1 ... 1 adjustable in steps of 0.001	
Switch-off limit:	2% ... 50% in 1% steps	
Analog output:	0 ... 20 or 4 ... 20 mA switchable, load 0 ... 500 Ohm, ratio- (2-color-) / mono- / metal mode, switchable, test current 10 mA	
Power supply:	24 V DC (15 ... 40 V DC) or 24 V AC (12 ... 30 V AC), 48 ... 62 Hz	
Current consumption:	Max. 600 mA	
Maximum value storage:	Built-in single or double storage. cleared by preselected time interval t <sub>clear</sub> (off; 0.01 s; 0.05 s; 0.25 s; 1 s; 5 s; 25 s) or extern or automatically with the next measuring object	
Interfaces:	Switchable: RS232 or RS485 adressable, half duplex; baud rate 2.4 up to 115.2 kBd	
Parameters:	Adjustable at the instrument or via serial interface: Emissivity ε, Emissivity slope K, response time t <sub>90</sub> , clear times for maximum value storage t <sub>CL</sub> , automatic or external deletion of the maximum value storage, setting of ratio- / mono- / metal mode, switch-off limit, 0 ... 20 or 4 ... 20 mA, sub range, address, baud rate, °C / °F.	
Resolution:	Display: 1°C Interface: 0.1°C Analog output: < 0.025% of adjusted temperature range	
Sighting system:	Laser targeting light, laser class II; power < 1 mW, λ = 655 nm	
Control panel:	4 keys, switch for interface, key for test current	
Display:	Built-in 4-digit 7-segment-LED, height 13 mm; LED for °C / °F, clear mode „auto“, „ext“, ratio- (2-color-) / mono- / metal mode	
Isolation:	Power supply, analog output and digital interface are galvanically isolated against each other	
Protection system:	IP 65 (according to DIN 40 050)	
Operating temperature:	At the converter housing: 0 ... 60°C (ISR 12-LO); 0 ... 50°C (IGAR 12-LO)	
Storage temperature:	-20 ... +70°C	
Weight:	2.2 kg	
CE-label:	According to EU directives about electromagnetic immunity	

## Details



## Optical head

Depending on the application the instrument will be delivered with a small (type I) or a big (type II) optical head. The optics are adjusted to one of the measuring distances mentioned in the table. The distance is measured from the front of the window to the target surface. The mentioned spot size will be achieved in exactly this distance (other distances on request).

Optical head	Measuring distance a [mm]	Spot size		Aperture D [mm]
		ISR 12-LO: MB 13 IGAR 12-LO: MB 10 M [mm]	ISR 12-LO: MB 18, 25, 33 IGAR 12-LO: MB 13, 22 M [mm]	
<b>Type I</b> 	120	2,2	1,2	7
	260	5	2,6	7
	700	14	7,2	7
<b>Type II</b> 	87	0,75	0,45	17
	200	1,5	0,8	17
	600	5,3	2,7	15
	4500	42	22	15

## Fibre optic

The radiation, coming in through the optical head, is transported via the lens system into the mono glass fibre with flexible stainless steel protection tube where it is transmitted along to the converter. As the optical head contains only the lens system and the sensor and the electronics are located in the converter box, fibre and optical head can withstand ambient temperatures up to 250°C without cooling. Depending on the measuring range 2 different fibres are used. They are marked red or blue.

Monofibre in stainless steel, flexible protection tube with standardised FSMA-plugs.

Length: 2.5 m in scope of delivery, 5 m, 7.5 m, 10 m, 15 m, 30 m on request

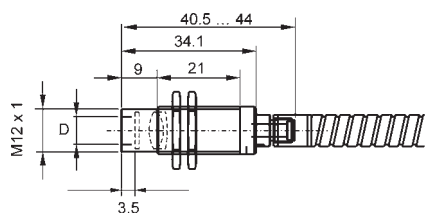
Color mark at the fibre:  
 blue: ISR 12-LO, MB 13; IGAR 12-LO, MB 10  
 red: ISR 12-LO, MB 18, 25, 33; IGAR 12-LO MB 13, 22

Max ambient temperature max. 250°C (instrument's side with color mark max 125°C)

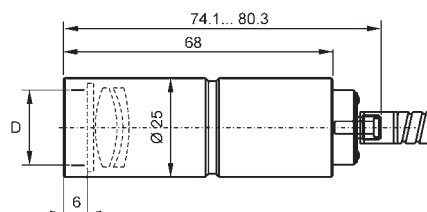
Minimum bending radius:  
 blue: 100 mm for short time, 300 mm permanently  
 red: 50 mm for short time, 120 mm permanently

## Dimensions

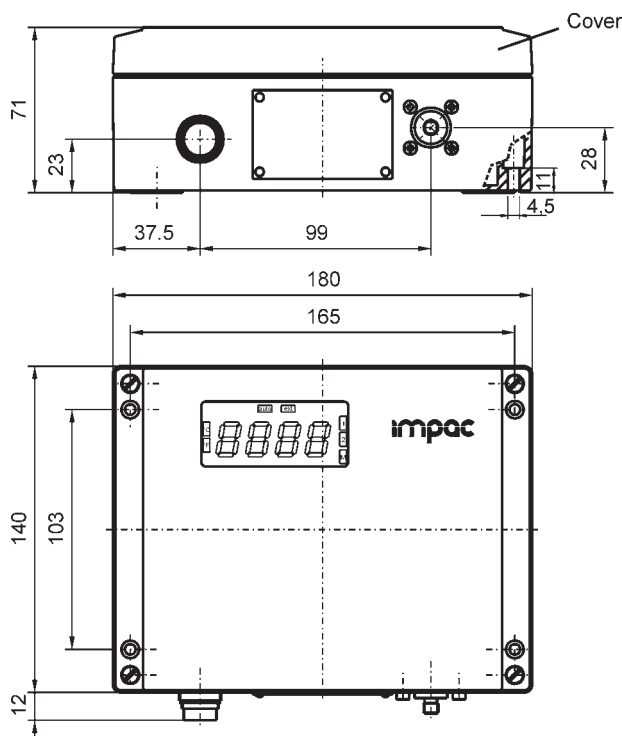
Optical head type I:



Optical head type II:



Converter:



## Reference numbers

### Pyrometers:

3 855 100	ISR 12-LO MB 13:	600 ... 1300°C	3 855 200	IGAR 12-LO MB 10:	300 ... 1000°C
3 855 110	ISR 12-LO MB 18:	750 ... 1800°C	3 855 210	IGAR 12-LO MB 13:	350 ... 1300°C
3 855 120	ISR 12-LO MB 25:	900 ... 2500°C	3 855 220	IGAR 12-LO MB 22:	500 ... 2200°C
3 855 130	ISR 12-LO MB 33:	1000 ... 3300°C			

**Scope of delivery:** Converter, Optical fibre, length 2.5 m, optical head I or II, PC software *InfraWin*, work certificate, user manual  
**A connection cable is not included in scope of delivery, it has to be ordered separately!**

### Ordering details:

To process your order as fast as possible, please give us the following data:

- Instrument with reference number (e.g. ISR 12-LO; 3 855 100)
- Optical head's design (I or II) and the desired measuring distance (e.g. optical head I, a = 120 mm)
- Length of optical fibre (except standard length 2.5 m)
- Connecting cable (e.g. 5 m length 3 820 330)



### Accessories:

3 820 330	connection cable, length 5 m, straight connector	3 852 190	Power supply NG AC; 230 V AC ⇒ 24 V AC, 750 mA
3 820 500	connection cable, length 10 m, straight connector	3 852 550	Power supply NG 2D; 85...265 V AC ⇒ 24 V DC, 600 mA, with 2 limit switches
3 820 510	connection cable, length 15 m, straight connector	3 890 640	LED-digital display DA 4000-N
3 820 810	connection cable, length 20 m, straight connector	3 890 650	LED-digital display DA 4000: with two limit switches
3 820 820	connection cable, length 25 m, straight connector	3 890 560	LED digital display DA 6000-N: with possibility for pyrometer parameter settings for digital <i>INFRATHERM</i> pyrometers; RS232 interface
3 820 520	connection cable, length 30 m, straight connector	3 890 570	LED digital display DA 6000-N, RS485 interface
3 820 740	connection cable, length 5 m, straight connector, temperature resistant up to 200°C	3 890 660	Front cover (IP65) for LED-displays
3 834 370	Mounting support for optical head I (fixed)	3 890 630	ILD24-UTP, digital display, big, height of digits 57 mm
3 834 380	Mounting support for optical head I (adjustable)	3 826 430	Optics monitoring box
3 834 050	Ball and socket mounting with clamp for optical head I or II		
3 834 230	Adjustable mounting support for optical head II		
3 835 170	Air purge unit, stainless steel, for optical head I		
3 835 180	Air purge unit, stainless steel, for optical head II		
3 835 240	Air purge unit with 90°-mirror for optical head II		

## Overview accessories



LED digital display



Power supply NG AC



Air purge unit for optical head II

Adjustable mounting support for optical head II



Optics monitoring



Power supply NG 2D



Air purge unit for optical head I

Fixed and adjustable mounting support for optical head I



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