

# IMPAC IGA 320/23

Small, short wavelength digital infrared thermometer for non-contact temperature measurement of metallic surfaces, graphite, or ceramics between 75 and 1800°C (167 to 3272°F).



The Impac® IGA 320/23 is a short wavelength infrared measuring pyrometer with internal digital signal processing capabilities used for measurements of metallic surfaces, graphite, and ceramics, etc. The very small housing dimensions allow easy integration of the pyrometer into compact production machines, while the solid and robust design guarantees reliability even in harsh industrial environments.

## PRODUCT HIGHLIGHTS

- Small housing dimensions for easy installation in confined spaces
- RS485 interface for connection to a PC in long transmission networks
- Analog output adjustable to 0 or 4 to 20 mA for connection to standard analyzing instruments
- Internal digital signal processing for high accuracy and long temperature ranges
- High quality optics for detection of small measuring objects
- Built-in LED targeting light for easy alignment to the measuring object

## TYPICAL APPLICATIONS

- Preheating
- Annealing
- Tempering
- Welding
- Forging
- Hardening
- Sintering
- Melting
- Soldering
- Brazing
- Rolling

## AT A GLANCE

### Temperature Ranges

75 to 550°C (MB 5.5)  
100 to 700°C (MB 7)  
150 to 1200°C (MB 12)  
200 to 1800°C (MB 18)

### Spectral Range

2 to 2.6  $\mu\text{m}$   
(main wavelength 2.3  $\mu\text{m}$ )

### Measurement Uncertainty

< 400°C: 2°C  
> 400°C: 0.3% oR in °C + 1°C  
> 1500°C: 0.5% oR in °C

### Repeatability

0.1% oR in °C + 1°C

### Optics

2 fixed optics:  
a = 250 mm and a = 800 mm

### Sighting

LED targeting light

TECHNICAL DATA

Measurement Specifications	
Temperature Ranges	75 to 550°C (167 to 1022°F) (MB 5.5)
	100 to 700°C (212 to 1292°F) (MB 7)
	150 to 1200°C (302 to 2192°F) (MB 12)
	200 to 1800°C (392 to 3272°F) (MB 18)
Sub Range	Any range adjustable within the temperature range, minimum span 51°C
Spectral Range	2 to 2.6 μm (main wavelength 2.3 μm)
	Extended InGaAs
Resolution	0.1°C on interface
	< 0.025% of the adjusted temperature sub range at the analog output
Emissivity ε	10.0 to 100.0% adjustable via interface in steps of 0.1%
Transmittance τ	10.0 to 100.0% adjustable via interface in steps of 0.1%
Measurement Uncertainty <sup>1</sup> (ε = 1, t <sub>90</sub> = 1 s, T <sub>amb</sub> = 23°C)	Up to 400°C: 2°C
	Above 400°C: 0.3% of measured value in °C + 1°C
	Above 1500°C: 0.5% of measured value in °C
Repeatability (ε = 1, t <sub>90</sub> = 1 s, T <sub>amb</sub> = 23°C)	0.1% of measured value in °C + 1°C
Sighting	Built-in LED targeting light

Electrical Specifications	
Power Supply	24 VDC (10 to 30 VDC), ripple must be less than 0.5 V
Power Consumption	Max 1 W
Load (Analog Output)	0 to 500 Ω
Switch Contact	Opto relays; max 50 VDC, 0.2 A; P <sub>max</sub> = 500 mW
Hysteresis	2 to 20°C, adjustable
Isolation	Power supply, analog output, and digital interface are galvanically isolated from each other

Communication and Interface Specifications	
Analog Output	0 to 20 mA or 4 to 20 mA (linear); switchable
Digital Interface	RS485 addressable (half duplex), baud rate 1200 up to 38400 Bd or RS232, baud rate 1200 up to 115200 Bd
Exposure Time t <sub>90</sub>	2 ms (with dynamical adaptation at low signal levels); adjustable to 0.01 s, 0.05 s, 0.25 s, 1 s, 3 s, 10 s
Maximum Value Storage	Built-in single or double storage. Clearing with adjusted time t <sub>clear</sub> (off, 0.01 s, 0.05 s, 0.25 s, 1 s, 5 s, 25 s), via interface, automatically with the next measuring object
Connection	8-pin connector
Parameters	Adjustable via interface: Emissivity, transmittance τ, exposure time t <sub>90</sub> , max./min. value storage, analog output, sub temperature range, ambient temperature compensation, pyrometer address, switch contact, hysteresis, baud rate, wait time t <sub>w</sub>

<sup>1</sup> The pyrometer must operate at least 30 min before these values are valid

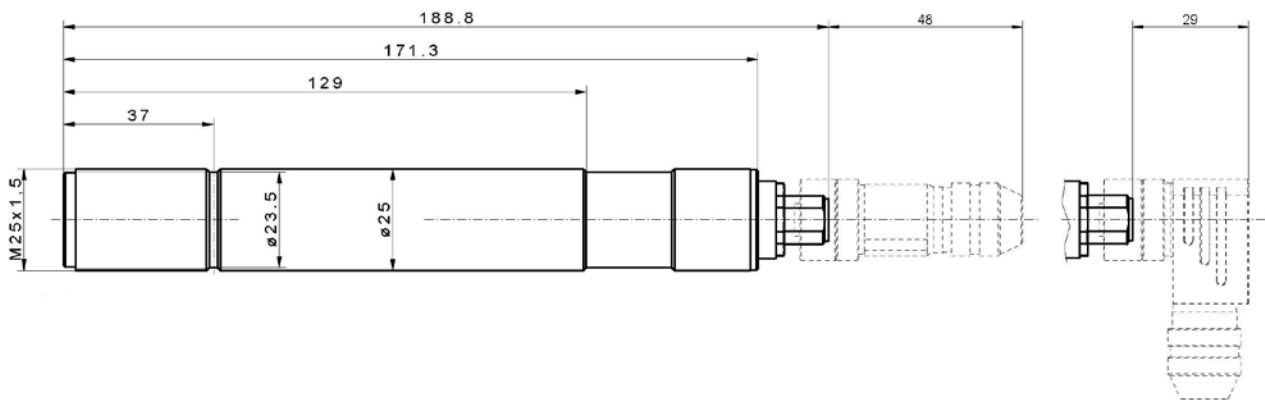
<sup>2</sup> MB is a shortcut used for temperature range (in German: Messbereich).

The determination of the technical data of this pyrometer is carried out in accordance with VDI/VDE IEC TS 62942-2, the calibration / adjustment in accordance with VDI/VDE 3511, Part 4.4.

## TECHNICAL DATA

Environmental Specifications	
Protection Class	IP 65 (DIN 60 529)
Mounting Position	Any
Ambient Temperature	0 to 70°C (32 to 158°F) at housing
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	Non-condensing conditions
Housing	Stainless steel
Weight	0.3 kg (~0.661 lbs)
CE Label	According to EU directives about electromagnetic immunity

## DIMENSIONS



Dimensions in mm

OPTICS

Depending on the selected type the pyrometers are equipped ex works with optics 250 or 800 mm. At these distances the optics are focused, i.e. where they achieve the smallest spot size in relation to the measuring distance. At any other distances (shorter or longer) the spot size will change, normally it will increase. With the optional close-up lens, the distances can be decreased and smaller spot sizes achieved. Please note that the measuring object must be at least as big as the spot size.

The following table shows the size of the spots (M in mm) at a given measuring distance a [mm]. Values between the stated data can be calculated by interpolation. The aperture D indicates the diameter of the optics (at measuring distance 0), this value is used to calculate measuring distances in intermediate distances, e.g. with the spot size calculator in the InfraWin software.

IGA 320/23											
Optics	Temperature Range	Lens Type	a:M <sup>1</sup>	a [mm]	M [mm]	a <sub>1</sub> [mm]	M <sub>1</sub> [mm]	a <sub>2</sub> [mm]	M <sub>2</sub> [mm]	D [mm]	
250 mm	75 to 550°C (MB 5.5)	without close-up lens	50:1	250	5	500	24	1000	62	14	
		without close-up lens 1	50:1	50	1	100	16	200	46		
		without close-up lens 2	50:1	120	2.4	300	27	500	55		
	100 to 700°C (MB 7)	without close-up lens	100:1	250	2.5	500	19	1000	52		
		without close-up lens 1	100:1	50	0.5	100	15	200	44		
		without close-up lens 2	100:1	120	1.2	300	24	500	50		
	150 to 1200°C (MB 12)	without close-up lens	160:1	250	1.6	500	17	1000	48		10
		without close-up lens 1	160:1	50	0.3	100	15	200	43		
		without close-up lens 2	160:1	120	0.8	300	23	500	48		
	200 to 1800°C (MB 18)	without close-up lens	200:1	250	1.25	500	12	1000	35		
		without close-up lens 1	200:1	50	0.25	100	10	200	31		
		without close-up lens 2	200:1	120	0.6	300	16	500	34		
800 mm	75 to 550°C (MB 5.5)	without close-up lens	50:1	800	16	1500	42	3000	98	14	
	100 to 700°C (MB 7)		100:1	800	8	1500	27	3000	68		
	150 to 1200°C (MB 12)		160:1	800	5	1500	22	3000	57		
	200 to 1800°C (MB 18)		200:1	800	4	1500	16	3000	42	10	

<sup>1</sup> a :M; distance ratio (90% intensity); M: spot size; a: measuring distance; D: aperture (effective lens diameter).

FEATURE OVERVIEW



REFERENCE NUMBERS

IGA 320/23				
Temperature Range	RS485		RS232	
	a = 250 mm	a = 800 mm	a = 250 mm	a = 800 mm
75 to 550°C (MB 5.5)	3 913 010	3 913 020	3 913 110	3 913 120
100 to 700°C (MB 7)	3 913 030	3 913 040	3 913 130	3 913 140
150 to 1200°C (MB 12)	3 913 050	3 913 060	3 913 150	3 913 160
200 to 1800°C (MB 18)	3 913 070	3 913 080	3 913 170	3 913 180

Scope of Delivery

Instrument with selected optics, inspection sheet, and manual.

Ordering Note

A connection cable is not included in scope of delivery and needs to be ordered separately.

## ACCESSORIES

PN	Description
3 920 030	Connection cable (RS485 versions), 2 m (straight connector)
3 920 040	Connection cable (RS485 versions), 5 m (straight connector)
3 920 050	Connection cable (RS485 versions), 10 m (straight connector)
3 920 060	Connection cable (RS485 versions), 15 m (straight connector)
3 920 070	Connection cable (RS485 versions), 20 m (straight connector)
3 920 080	Connection cable (RS485 versions), 25 m (straight connector)
3 920 090	Connection cable (RS485 versions), 30 m (straight connector)
3 920 130	Connection cable (RS485 versions), 2 m (90° connector)
3 920 140	Connection cable (RS485 versions), 5 m (90° connector)
3 920 150	Connection cable (RS485 versions), 10 m (90° connector)
3 920 160	Connection cable (RS485 versions), 15 m (90° connector)
3 920 170	Connection cable (RS485 versions), 20 m (90° connector)
3 920 180	Connection cable (RS485 versions), 25 m (90° connector)
3 920 190	Connection cable (RS485 versions), 30 m (90° connector)
3 920 100	Adapter cable (0.2 m) 8 pin onto 12-pin Impac standard connector (RS485 versions only)
3 921 030	Connection cable (RS232 versions), 2 m (straight connector)
3 921 040	Connection cable (RS232 versions), 5 m (straight connector)
3 852 290	Power supply NG DC for DIN rail mounting; 100 to 240 VAC $\Rightarrow$ 24 VDC, 1 A
3 852 550	Power supply NG 2D for DIN rail mounting; 85 to 265 VAC $\Rightarrow$ 24 VDC, 600 mA with 2 settable limit switches
3 852 610	USB LabKit, adapter RS485 to USB with targeting light push-button and analog output clamp, pyrometer cable, power supply 100 to 240 VAC
3 852 600	USB nano: Converter RS485 to USB
3 826 750	USB to RS485 adapter cable, HS-version, 1.8 m long
3 852 580	Converter USB 2.0 $\leftrightarrow$ RS232
3 890 650	DA 4000: LED-display, 2-wire power supply, 2 limit switches (relay contacts), 230 VAC
3 890 530	DA 6000: like the DA 6000-N, but with analog input and 2 limit switches for the RS485 interface
3 826 510	PI 6000: PID programmable controller, extremely fast, for digital Impac pyrometers
3 826 520	PI 6000-N: PID programmable controller, extremely fast, for pyrometers with analog output
3 890 150	DA 6000-T, digital display, for measurement of the cool down time $t_{8-5}$ from 800 to 500°C (for welding processes)
3 834 230	Adjustable mounting support, stainless steel
3 846 170	Mounting tube
3 835 180	Air purge unit, stainless steel
3 835 240	Air purge unit with 90° mirror
3 843 460	SCA 300, scanning attachment with quartz glass window; 24 VAC/DC
3 835 290	Air purge for scanning attachment
3 837 570	Cooling jacket with integrated air purge
3 837 580	Cooling jacket with fused silica window and integrated air purge
3 848 770	Close-up lens (for a = 50 mm @ optics a = 250 mm)
3 848 780	Close-up lens (for a = 120 mm @ optics a = 250 mm)

## INFRAWIN 5 OVERVIEW

InfraWin is easy-to-use measurement and evaluation software for remote configuration of stationary, digital Impac brand pyrometers.

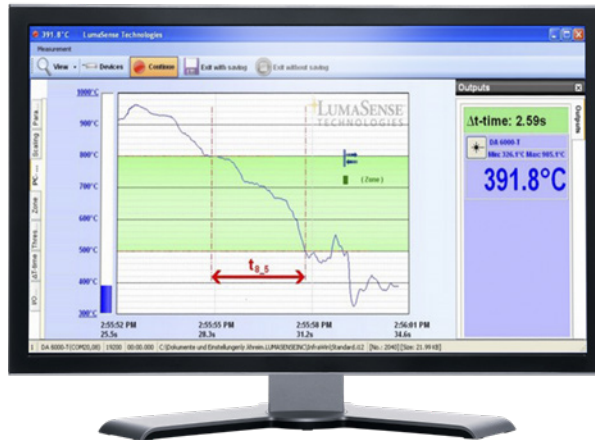
This software allows the user to remotely adjust and control settings for one or two pyrometers from a single computer. InfraWin also allows the user to simultaneously monitor and control temperatures.

- Display temperature data as color bars and online graphics
- Capture downstream evaluations as tables, graphics or text files
- Calculate the spot size for different measuring distances
- Features UPP standard (Universal Pyrometer Protocol)

### Pyrometer Settings

An Impac digital pyrometer connected to a PC will be automatically detected by the software. All available parameters are adjustable, including emissivity, response time, maximum value storage, output signal and sub range.

Further special functions are adjustable for example controllers or TV parameters on instruments available with these functions. Changes are transmitted directly to the pyrometer.

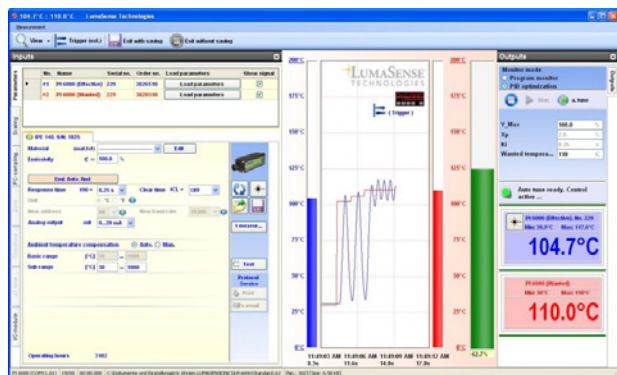


### Measurement with Color Bar

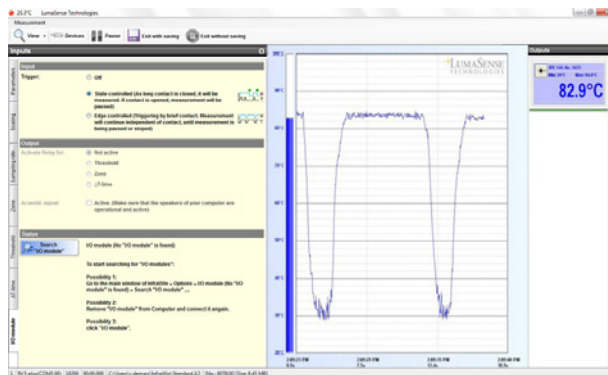
In this window a temperature value for the upper or lower limit can be adjusted numerically or with the mouse. The acquired minimum and maximum value is indicated as well as the inner temperature of the pyrometer. The emissivity is changeable during the measurement at any time.

### Infrared Calculator

After input of the aperture and the focused spot size per datasheet, the calculation of spot sizes at non-focused distances is possible.



Measurement with Internal Temperature of radiation temperature and internal instrument temperature. Parameters can be changed during the measurement.



I/O Module allows users to trigger measurement externally and gives a potential free output contact.



For international contact information,  
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## ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

AE's power solutions enable customer innovation in complex semiconductor and industrial thin film plasma manufacturing processes, demanding high and low voltage applications, and temperature-critical thermal processes.

With deep applications know-how and responsive service and support across the globe, AE builds collaborative partnerships to meet rapid technological developments, propel growth for its customers and power the future of technology.

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