

Small, short wavelength digital infrared thermometer for non-contact temperature measurement of metallic surfaces, graphite or ceramics between 75 and 1800°C

impac® IGA 320/23
Infrared thermometry

CE

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



The **IGA 320/23** is a short wavelength infrared measuring instrument with internal digital signal processing. It is used for measurements of metallic surfaces, graphite and ceramics, etc.

The very small housing dimensions enable the integration of the pyrometer into compact production machines and the solid and robust design guarantees reliability even in rough industrial environments.

The instruments are equipped with a choice of optics for small spot sizes. Using an additional close-up lens these spot sizes can be re-

duced even more, with a measuring distance 50 or 120 mm.

The LED targeting light enables precise alignment on the measurement object. It is automatically active and can be used during measurement.

Additional to the analog output the pyrometer is equipped with a digital RS485 interface. This enables secure data transmission to a PC or a PLC, over long distances. The provided InfraWin software enables the graphical display and storage of measurement values; plus the setting of all instrument parameters.

Typical applications:

- preheating
- annealing
- tempering
- welding
- forging
- hardening
- sintering
- melting
- soldering
- brazing
- rolling
- tempering

Technical Data

Temperature ranges:	75 ... 550°C (MB 5.5) 150 ... 1200°C (MB 12) 100 ... 700°C (MB 7) 200 ... 1800°C (MB 18)
Sub range:	Any range adjustable within the temperature range, minimum span 51°C
Spectral range:	2 ... 2.6 µm (main wavelength 2.3 µm)
IR detector:	Extended InGaAs
Power supply:	24 V DC (10 to 30 V DC), ripple must be less than 0.5 V
Power consumption:	Max. 1 W
Analog output:	0 to 20 mA or 4 to 20 mA (linear), switchable
Load:	0 to 500 Ω
Switch contact:	Opto relays; max. 50 V DC, 0.2 A; $P_{max} = 500$ mW
Hysteresis:	2 ... 20°C, adjustable
Digital Interface:	RS485 addressable (half duplex), baud rate 1200 up to 38400 Bd
Resolution:	0.1°C on interface; < 0.025% of the adjusted temperature sub range at the analog output
Isolation:	Power supply, analog output and digital interface are galvanically isolated from each other
Parameters:	Adjustable via interface: Emissivity ϵ , transmittance τ , exposure time t_{90} , max. / min. value storage, analog output, sub temperature range, ambient temperature compensation, pyrometer address, switch contact, hysteresis, baud rate, wait time t_w
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%
Exposure time t_{90} :	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 / minimum value storage:	Built-in single or double storage. Clearing with adjusted time t_{clear} (off; 0.01 s; 0.05 s; 0.25 s; 1 s; 5 s; 25 s), via interface or automatically with the next measuring object
Uncertainty:	Up to 400°C: 2°C above 400°C: 0.3% of measured value in °C + 1°C ($\epsilon=1, t_{90}=1$ s, $T_{amb}=23$ °C; the pyrometer must be operate at least 30 min before these values are valid) above 1500°C: 0.5% of measured value in °C
Repeatability:	0.1% of measured value in °C + 1°C ($\epsilon = 1, t_{90} = 1$ s, $T_{amb} = 23$ °C)
Protection class:	IP65 (IEC 60529)
Mounting position:	any
Ambient temperature:	0 to 70°C
Storage temperature:	-20 to 70°C
Rel. humidity:	None condensing conditions
Weight:	0.3 kg
Housing:	Stainless steel
Dimensions:	<p style="text-align: right;">All dimensions in mm</p>
Connector:	8 pin connector
Sighting:	Built-in LED targeting light
CE-label:	According to EU directives about electromagnetic immunity

Equipment Features

Stainless steel housing with small dimensions

Mounting thread incl. screw nuts

Optics

LED targeting light shows middle of spot size

Connection cable with connector and cables for:

- Power supply
- LED targeting light switch on / off
- RS485 interface
- Analog output
- Switch contact

RS485 interface for connection to a PC, also for long transmission distances.

Software *InfraWin* for:

- instrument settings
- display of temperature curves
- subsequent graphic or tabular analysis, e.g. for printing out or export.
- spot size calculation

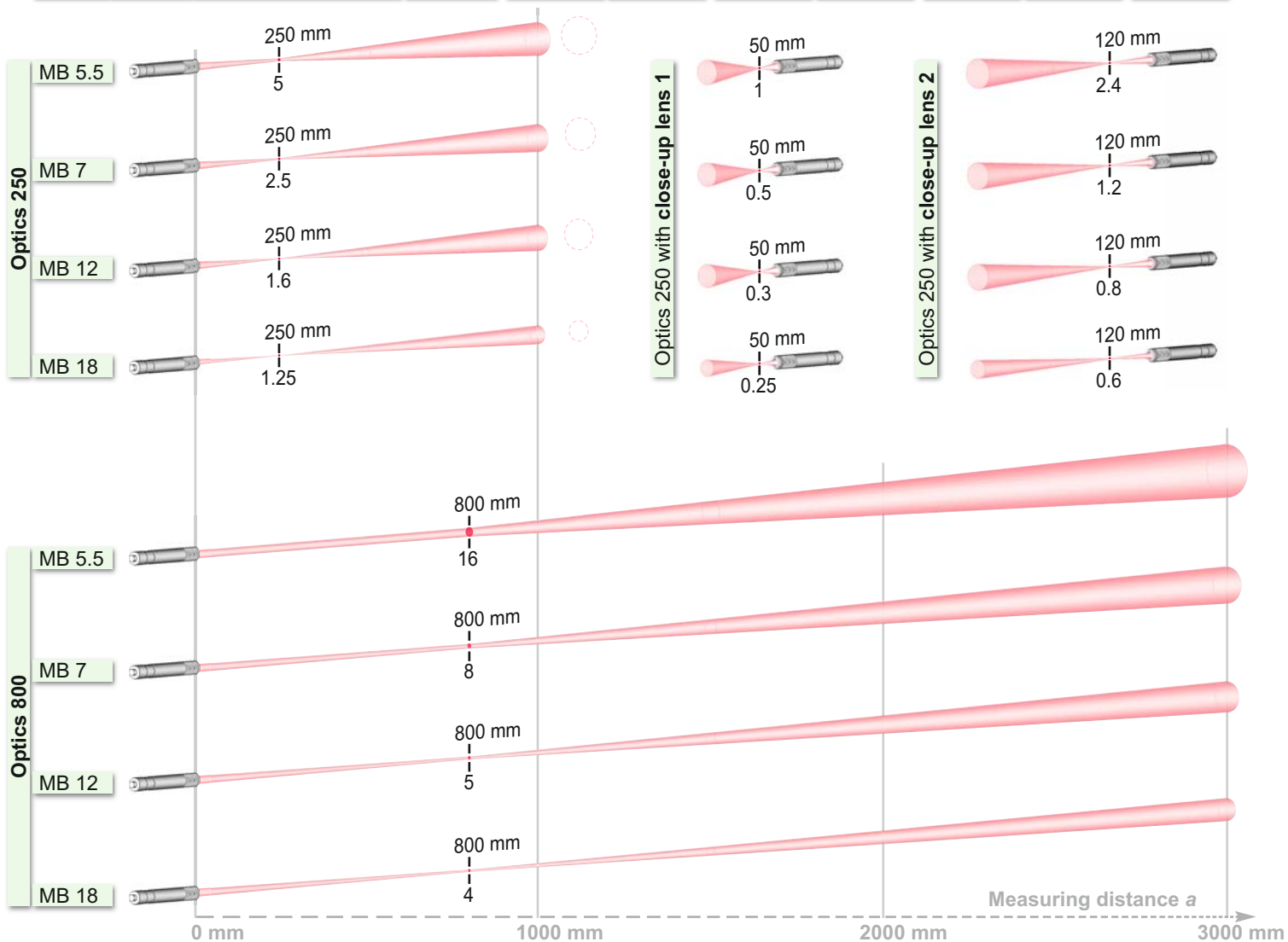
Optics

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 a close-up lens (optional) 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]; the drawings show an impression of the proportions. 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.

Optics		$a : M^*)$	a [mm]	M [mm]	a_1 [mm]	M_1 [mm]	a_2 [mm]	M_2 [mm]	D [mm]	
250	MB 5.5	without close-up lens	250	5	500	24	1000	62	14	
		with close-up lens 1	50 : 1	50	1	100	16	200		46
		with close-up lens 2	120	2.4	300	27	500	55		
	MB 7	without close-up lens	250	2.5	500	19	1000	52	14	
		with close-up lens 1	100 : 1	50	0.5	100	15	200		44
		with close-up lens 2	120	1.2	300	24	500	50		
	MB 12	without close-up lens	250	1.6	500	17	1000	48	14	
		with close-up lens 1	160 : 1	50	0.3	100	15	200		43
		with close-up lens 2	120	0.8	300	23	500	48		
	MB 18	without close-up lens	250	1.25	500	12	1000	35	10	
		with close-up lens 1	200 : 1	50	0.25	100	10	200		31
		with close-up lens 2	120	0.6	300	16	500	34		
800	MB 5.5	without close-up lens	50 : 1	800	16	1500	42	98	14	
	MB 7	100 : 1	800	8	27		68			
	MB 12	160 : 1	800	5	22		57			
	MB 18	200 : 1	800	4	16		42			



*) $a : M$: distance ratio (90% intensity), M : spot size, a : measuring distance, D : aperture (effective lens diameter)

Reference numbers

Temperature range	a = 250 mm	a = 800 mm
75 ... 550°C	3 903 010	3 903 020
100 ... 700°C	3 903 030	3 903 040
150 ... 1200°C	3 903 050	3 903 060
200 ... 1800°C	3 903 070	3 903 080

Scope of delivery: Instrument with selectable optics, inspection sheet, manual

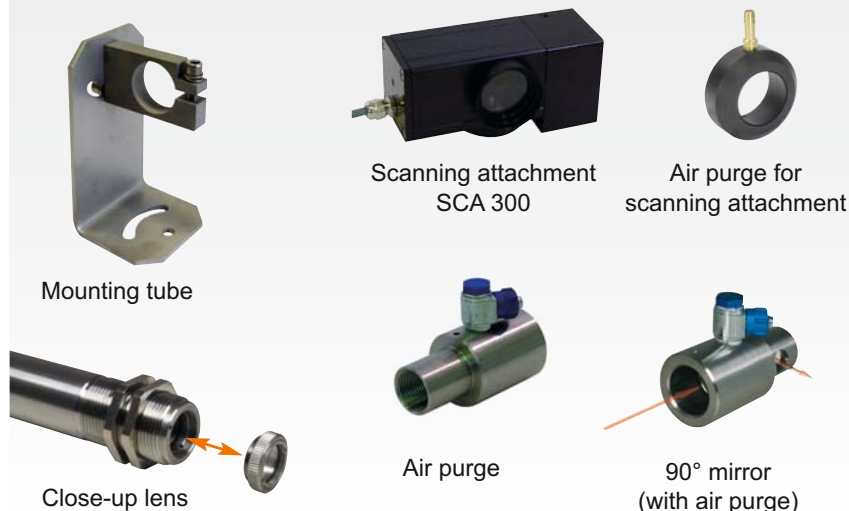
Ordering note: A connection cable is not included in scope of delivery and has to be ordered separately

Accessories

3 920 030	Connection cable, 2 m (straight connector)		
3 920 040	Connection cable, 5 m (straight connector)	3 890 640	pyrometer cable, power supply 100...240 V AC
3 920 050	Connection cable, 10 m (straight connector)		DA 4000-N, LED-display, 2-wire power supply (specify 230 or 115 V AC)
3 920 060	Connection cable, 15 m (straight connector)	3 890 650	DA 4000, LED-display, 2-wire power supply, 2 limit switches (relay contacts) (specify 230 or 115 V AC)
3 920 070	Connection cable, 20 m (straight connector)		DA 6000, LED-display, RS485, max. value storage, analog output
3 920 080	Connection cable, 25 m (straight connector)	3 890 530	PI 6000: PID programmable controller, extremely fast, for digital IMPAC pyrometers
3 920 090	Connection cable, 30 m (straight connector)	3 826 510	PI 6000-N: PID programmable controller, extremely fast, for pyrometers with analog output
3 920 130	Connection cable, 2 m (90° connector)		DA 6000-T, digital display for measurement of the cooling-off time from 800°C to 500°C (for welding processes), RS232 interface
3 920 140	Connection cable, 5 m (90° connector)	3 826 520	RS232 ↔ USB converter (matched to DA 6000-T)
3 920 150	Connection cable, 10 m (90° connector)		
3 920 160	Connection cable, 15 m (90° connector)	3 890 150	Close-up lens (for a = 50 mm at optics a = 250 mm)
3 920 170	Connection cable, 20 m (90° connector)	3 848 770	Close-up lens (for a = 120 mm at optics a = 250 mm)
3 920 180	Connection cable, 25 m (90° connector)	3 848 780	Adjustable mounting support, stainless steel
3 920 190	Connection cable, 30 m (90° connector)	3 834 230	Mounting tube (L 600 x Ø 70 mm)
3 920 100	Adapter cable (0.2 m) 8 pin onto 12-pin IMPAC standard connector	3 846 170	Air purge unit, stainless steel
3 852 290	Power supply NG DC, 100 ... 240 V AC, 50 ... 60 Hz ⇒ 24 V DC, 1 A	3 835 180	90° mirror (with air purge)
3 852 550	Power supply NG 2D, 85 ... 265 V AC, 48 ... 62 Hz ⇒ 24 V DC, 600 mA, with 2 limit switches	3 835 240	SCA 300, scanning attachment with quartz glass window; 24 V AC/DC
3 852 600	USB nano: Converter RS485 ↔ USB	3 843 460	Air purge for scanner
3 852 610	USB LabKIT, adapter RS485 ↔ USB with targeting light push-button and analog output clamp,	3 835 290	

Accessory Overview

Mechanical overview:



Electrical overview:



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