

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

IGA 320/23



- Small housing dimensions for easy installation suitable for use in confined spaces
- RS485 interface for long transmission networks for connection to a PC via USB converter or machine control (PLC)
- 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 capabilities. This pyrometer is 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 rough industrial environments.

The instrument is equipped with a choice of optics for small spot sizes. Using an additional close-up lens, these spot sizes can be reduced even more, with a measuring distance of 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.

In addition to the analog output, the pyrometer is equipped with a digital RS485 interface, which enables secure data transmission to a PC or a PLC over long distances.

The included InfraWin software enables graphical display and storage of measurement values, as well as easy set-up of all instrument parameters.

Typical Applications:

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

Technical Data

Measurement Specifications

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)
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)
IR Detector:	Extended InGaAs
Resolution:	0.1 °C on interface; < 0.025% of the adjusted temperature sub range at the analog output
Emissivity:	10.0 to 100.0% adjustable via interface in steps of 0.1%
Transmittance:	10.0 to 100.0% adjustable via interface in steps of 0.1%
Measurement Uncertainty: ($\epsilon = 1$, $t_{90} = 1$ s, $T_{amb} = 23$ °C) Note: the pyrometer must operate at least 30 min before these values are valid	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: ($\epsilon = 1$, $t_{90} = 1$ s, $T_{amb} = 23$ °C)	0.1% of measured value in °C + 1 °C

Interface

Connection:	8 pin connector
Sighting:	Built-in LED targeting light
Parameters:	Adjustable via interface: Emissivity, transmittance t , 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

Note: 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.
See <http://info.lumasenseinc.com/calibration> for more information.

Communication

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_{90} :	2 ms (with dynamic 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_{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

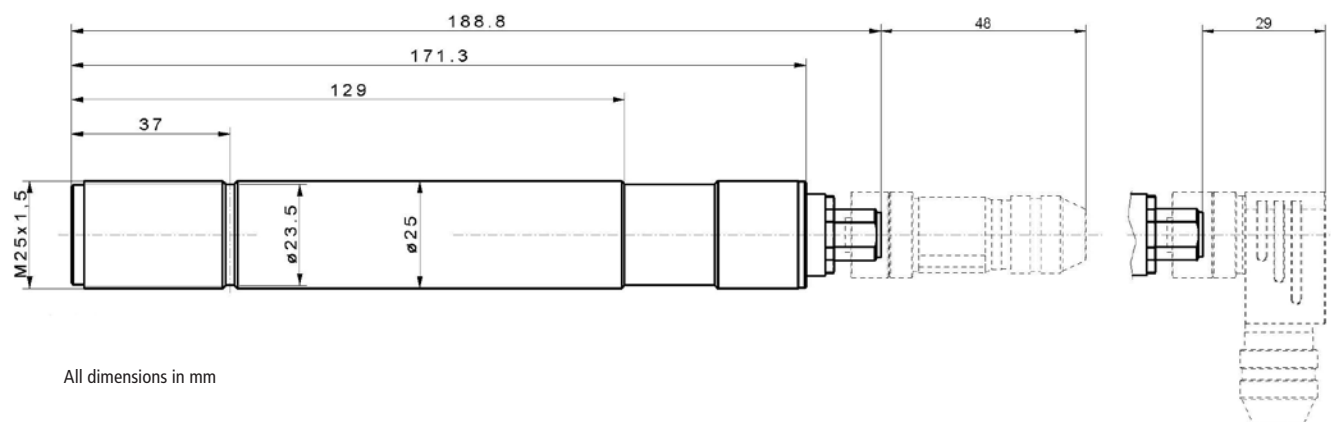
Electrical

Power Supply:	24 V DC (10 to 30 V DC), ripple must be less than 0.5 V
Power Consumption:	Max. 1 W
Switch Contact:	Opto relays; max. 50 V DC, 0.2 A; $P_{max} = 500$ mW
Hysteresis:	2 to 20 °C, adjustable
Load (analog output):	0 to 500 Ω
Isolation:	Power supply, analog output and digital interface are galvanically isolated from each other

Environmental Specifications

Protection Class:	IP 65 (IEC 60529)
Operating Position:	any
Ambient Temperature:	0 to 70 °C at housing
Storage Temperature:	-20 to 70 °C
Relative Humidity:	Non condensing conditions
Weight:	0.3 kg
Housing:	Stainless steel
CE Label:	According to EU directives about electromagnetic immunity

Dimensions



All 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 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]. 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]	a1 [mm]	M1 [mm]	a2 [mm]	M2 [mm]	D [mm]	
250 mm	75 to 550 °C (MB 5.5)	without close-up lens	250	5	500	24	1000	62	14	
		with close-up lens 1	50	1	100	16	200	46		
		with close-up lens 2	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	14
		with close-up lens 1		50	0.5	100	15	200	44	
		with close-up lens 2		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	14
		with close-up lens 1		50	0.3	100	15	200	43	
		with close-up lens 2		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	10
		with close-up lens 1		50	0.25	100	10	200	31	
		with close-up lens 2		120	0.6	300	16	500	34	
800 mm	75 to 550 °C (MB 5.5)	50:1		16		42		98	14	
	100 to 700 °C (MB 7)	without close-up lens	100:1	800	8	1500	27	3000		68
	150 to 1200 °C (MB 12)	160:1		5		22		57		
	200 to 1800 °C (MB 18)	200:1		4		16		42		

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

Equipment Features

Robust stainless steel housing with small dimensions

Mounting thread incl. screw nuts

Precision optics



Connection cable with connector and cables for:

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

LED targeting light shows middle of spot size and optics focus

Settings and Operation via the RS485 Interface and InfraWin

Once connected, the signal processing can be done via the analog output (e.g. for connection of a digital display) or via the digital RS485 interface (for connection of a PC or to a PLC). With RS485, long transmission distances can be realized and several pyrometers can be connected in a bus system. The included InfraWin software enables easy instrument settings and provides multiple temperature illustration views.

InfraWin software enables:

- Easy instrument settings
- Display of temperature curves
- Graphic or tabular analysis, e.g. for printing out or exporting
- Quick spot size calculation



Reference Numbers

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

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

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

Accessories

3 920 030 Connection cable (RS485 versions), 2 m (straight connector)	3 852 290 Power supply NG DC, 100 to 240 V AC, 50 to 60 Hz to 24 V DC, 1 A
3 920 040 Connection cable (RS485 versions), 5 m (straight connector)	3 852 550 Power supply NG 2D, 85 to 265 V AC, 48 to 62 Hz to 24 V DC, 600 mA, with 2 limit switches
3 920 050 Connection cable (RS485 versions), 10 m (straight connector)	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 V AC
3 920 060 Connection cable (RS485 versions), 15 m (straight connector)	3 852 600 USB nano: Converter RS485 to USB
3 920 070 Connection cable (RS485 versions), 20 m (straight connector)	3 826 750 USB to RS485 adapter cable, HS-version, 1.8 m long
3 920 080 Connection cable (RS485 versions), 25 m (straight connector)	3 852 580 RS232 to USB converter (matched to DA 6000-T)
3 920 090 Connection cable (RS485 versions), 30 m (straight connector)	3 890 650 DA 4000, LED-display, 2-wire power supply, 2 limit switches (relay contacts)
3 920 130 Connection cable (RS485 versions), 2 m (90° connector)	3 890 530 DA 6000, LED-display, RS485, max. value storage, analog output
3 920 140 Connection cable (RS485 versions), 5 m (90° connector)	3 890 150 DA 6000-T, digital display for measurement of the cooling-off time from 800°C to 500°C (for welding processes), RS232 interface
3 920 150 Connection cable (RS485 versions), 10 m (90° connector)	3 826 510 PI 6000: PID programmable controller, extremely fast, for digital IMPAC pyrometers
3 920 160 Connection cable (RS485 versions), 15 m (90° connector)	3 826 520 PI 6000-N: PID programmable controller, extremely fast, for pyrometers with analog output
3 920 170 Connection cable (RS485 versions), 20 m (90° connector)	3 834 230 Adjustable mounting support, stainless steel
3 920 180 Connection cable (RS485 versions), 25 m (90° connector)	3 835 180 Air purge unit, stainless steel
3 920 190 Connection cable (RS485 versions), 30 m (90° connector)	3 835 240 90° mirror (with air purge)
3 920 100 Adapter cable (0.2 m) 8 pin onto 12-pin IMPAC standard connector (RS485 versions only)	3 835 290 Air purge for scanner
3 921 030 Connection cable (RS232 versions), 2 m (straight connector)	3 837 570 Cooling jacket with integrated air purge
3 921 040 Connection cable (RS232 versions), 5 m (straight connector)	3 837 580 Cooling jacket with fused silica window and integrated air purge
	3 843 460 SCA 300, scanning attachment with quartz glass window; 24 V AC/DC
	3 846 170 Mounting tube (L 600 x Ø 70 mm)
	3 848 770 Close-up lens (for a = 50 mm at optics a = 250 mm)
	3 848 780 Close-up lens (for a =120 mm at optics a = 250 mm)

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