

Small, short wavelength digital infrared thermometer with fiber optics for non-contact temperature measurement between 85 and 1200 °C

IGA 320/23-LO



- 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-LO is a short wavelength infrared measuring instrument with fiber optics and internal digital signal processing capabilities. This pyrometer is used for measurements of metallic surfaces, graphite and ceramics, etc.

For optimal match of the instrument to the application 2 different optics are available. The small dimensions of the optics allow easy integration into compact production machines.

The instrument is equipped with a fiber and an exchangeable optical head. The fiber and optical head are unaffected by electromagnetic interferences (e.g. induction) and can be used in high ambient temperatures up to 200 °C without additional cooling.

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:	85 to 600 °C (MB 6) 100 to 700 °C (MB 7) 150 to 1200 °C (MB 12)
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 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: (ε = 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 Note: The temperature of fiber and optical head must be at least 30 °C lower than the measuring temperature to get a correct temperature reading
Repeatability: (ε = 1, t ₉₀ = 1 s, T _{amb.} = 23 °C)	0.1% of measured value in °C + 1 °C Note: The temperature of fiber and optical head must be at least 30 °C lower than the measuring temperature to get a correct temperature reading

Interface

Connection:	8 pin connector
Optics:	Optical head Type I or Type II (short distances only, see table); Ø 0.6 mm (green fiber mark) for MB 6, Ø 0.4 mm (blue fiber mark) for MB 7, Ø 0.2 mm (red fiber mark) for MB 12, DIN connector electronics side and SMA connector optics side
Sighting:	Built-in LED targeting light (default continuously on)
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 , targeting light

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
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

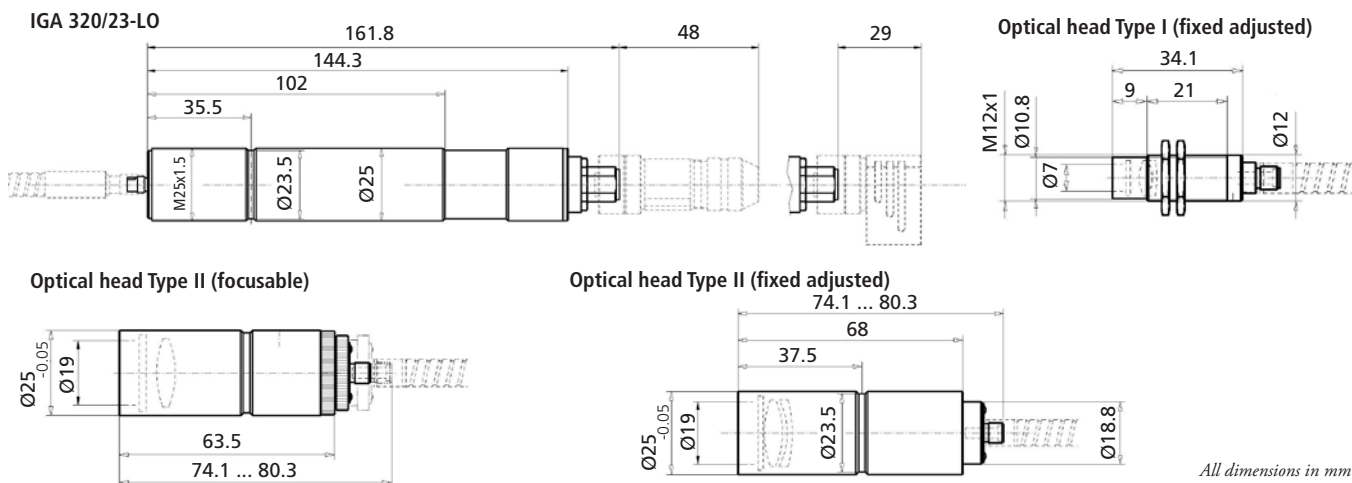
Power Supply:	24 V DC (10 to 30 V DC), ripple must be less than 0.5 V
Power Consumption:	Max. 1 W
Switch Contact:	Opto relays; max. 50 V DC, 0.2 A; P _{max} = 300 mW
Hysteresis:	2 to 20 °C
Load (analog output):	0 to 500 Ω
Isolation:	Power supply, analog output and digital interface are galvanically isolated from each other

Environmental Specifications

Protection Class:	IP 54 (IEC 60529)
Operating Position:	any
Ambient Temperature:	0 to 70 °C at housing; up to 200 °C on side of fiber and optical head
Storage Temperature:	-20 to 70 °C
Relative Humidity:	Non condensing conditions
Weight:	0.53 kg incl. optical fiber and lens assembly
Housing:	Stainless steel
CE Label:	According to EN 61326-1:2006-10

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.

Dimensions



All dimensions in mm

Optics

Depending on the application, the instrument will be delivered with a small or a large optical head. The selection of the optical head depends not only on its size but also on the required spot size (size of the measuring object) and the measuring distance. Distance "a" is specified from the front of the lens.

Optical head Type I (fixed adjusted): With the very small dimensions the optical head Type I is suited for use in confined spaces. The optics is adjusted ex works to one of the measuring distances mentioned in the table below. The mentioned spot size will be achieved in exactly this distance, however other distances can be realized on request.

Optical head Type II (focusable): The optical head Type II is focusable, i.e. each measuring distance can be adjusted within the mentioned limits to achieve the smallest spot size in the required distance. The spot size at the shortest and longest distance is mentioned in the table below. Spot sizes at intermediate distances have to be calculated by interpolation.

Optical head Type II (fixed adjusted): The fixed adjusted optical head Type II has a similar size as the focusable optical head Type II, but offers a fixed focusing distance like optical head Type I. The mentioned spot size will be achieved in exactly this distance, however other distances can be realized on request.

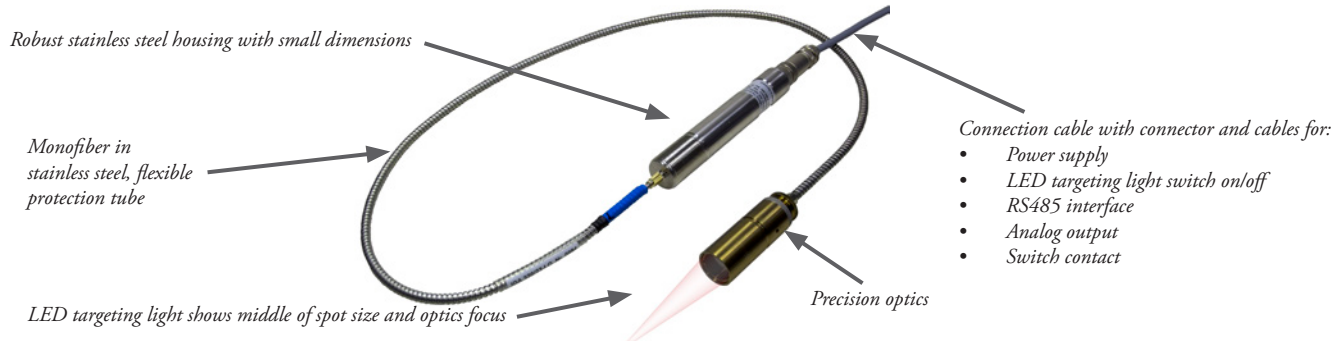
Optics	Ref. Number (Replacement Optics)	Measuring Distance a [mm]	Spot size M90 [mm] for fiber 0.6 mm (MB 6)	Spot size M90 [mm] for fiber 0.4 mm (MB 7)	Spot size M90 [mm] for fiber 0.2 mm (MB 12)	Aperture D [mm]
Optical head Type I (fixed adjusted): 	3 873 320	Adjusted to: 120	3.5	2.3	1.3	7
	3 873 340	Adjusted to: 260	8.3	5.5	3	7
Optical head Type II (focusable): 	3 838 210	Range: 88 to 110	1.2 to 1.8	0.8 to 1.2	0.5 to 0.7	17.5 to 15.5
	3 838 220	Range: 95 to 129	1.5 to 2.1	1.0 to 1.4	0.6 to 0.8	16.5 to 14.5
	3 838 230	Range: 105 to 161	1.7 to 2.7	1.1 to 1.8	0.7 to 1.1	15 to 13.5
	3 838 240	Range: 200 to 346	2.9 to 5.1	1.9 to 3.4	1.1 to 2.0	17.5 to 15.5
Optical head Type II (fixed adjusted): 	3 873 420	Adjusted to: 87	1.2	0.8	0.5	15
	3 873 440	Adjusted to: 200	2.9	1.9	1.1	15

Optional Lightpipe Optics:

The IGA 320/23-LO can also use a sapphire optical rod (so called "lightpipe") as the optics to collect the infrared radiation from the target. Lightpipes can be inserted through small holes or vacuum fittings and can survive harsh temperature and pressure environments as well as strong RF fields. This configuration is ideal for applications using induction heating or when there is not optical access for a traditional lens solution to have sufficient viewing access to the target. Versions with lightpipe optics are available as a special on request.



Equipment Features



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

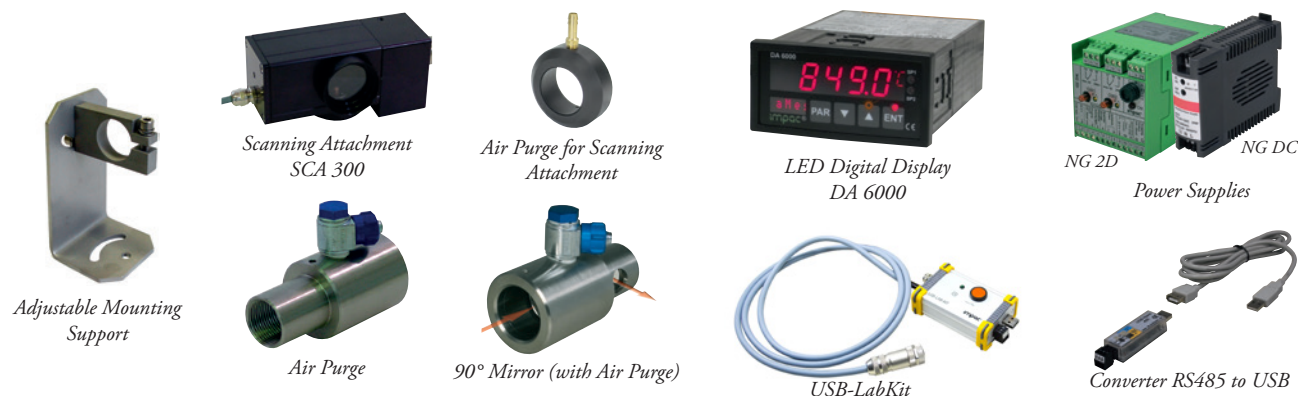
Temperature Range	Reference Number
85 to 600 °C (MB 6)	3 913 930 fiber length 1 m, Ø 0.6 mm (green fiber mark)
100 to 700 °C (MB 7)	3 913 970 fiber length 2.5 m, Ø 0.4 mm (blue fiber mark)
100 to 700 °C (MB 7)	3 913 980 fiber length 1 m, Ø 0.4 mm (blue fiber mark)
150 to 1200 °C (MB 12)	3 913 950 fiber length 2.5 m, Ø 0.2 mm (red fiber mark)

Scope of delivery: Pyrometer with PC adjustment and evaluation software "InfraWin", works certificate, manual, optical fiber, one selectable optical head

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

Accessories

3 826 510	PI 6000: PID programmable controller, extremely fast, for digital IMPAC pyrometers	3 890 650	DA 4000, LED-display, 2-wire power supply, 2 limit switches (relay contacts)
3 826 520	PI 6000-N: PID programmable controller, extremely fast, for pyrometers with analog output	3 920 030	Connection cable, 2 m (straight connector)
3 834 390	Ball and socket mounting for fiber optical head I and II	3 920 040	Connection cable, 5 m (straight connector)
3 834 230	Adjustable mounting support for optical head II	3 920 050	Connection cable, 10 m (straight connector)
3 835 170	Air purge unit for optical head I	3 920 060	Connection cable, 15 m (straight connector)
3 835 180	Air purge unit for optical head II	3 920 070	Connection cable, 20 m (straight connector)
3 835 240	90° mirror (with air purge)	3 920 080	Connection cable, 25 m (straight connector)
3 835 290	Air purge for scanner	3 920 090	Connection cable, 30 m (straight connector)
3 835 500	Air purge unit with ceramic tube (small) for optical head I	3 920 130	Connection cable, 2 m (90° connector)
3 835 510	Air purge unit with ceramic tube (large) for optical head I	3 920 140	Connection cable, 5 m (90° connector)
3 843 460	SCA 300, scanning attachment with quartz glass window; 24 V AC/DC	3 920 150	Connection cable, 10 m (90° connector)
3 846 170	Mounting tube (L 600 x Ø 70 mm)	3 920 160	Connection cable, 15 m (90° connector)
3 852 290	Power supply NG DC, 100 to 240 V AC, 50 to 60 Hz to 24 V DC, 1 A	3 920 170	Connection cable, 20 m (90° 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	3 920 180	Connection cable, 25 m (90° connector)
3 852 580	RS232 to USB converter (matched to DA 6000-T)	3 920 190	Connection cable, 30 m (90° connector)
3 852 600	USB nano: Converter RS485 to USB	3 920 100	Adapter cable (0.2 m) 8 pin onto 12-pin IMPAC standard 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	3 873 320	Replacement optical head design I, a = 120 mm
3 890 150	DA 6000-T, digital display for measurement of the cooling-off time from 800 to 500 °C (for welding processes), RS232 interface	3 873 340	Replacement optical head design I, a = 260 mm
3 890 530	DA 6000, LED-display, RS485, max. value storage, analog output	3 873 420	Replacement optical head design II, fixed adjusted, a = 87 mm
3 890 640	DA 4000-N, LED-display, 2-wire power supply	3 873 440	Replacement optical head design II, fixed adjusted, a = 200 mm
		3 838 210	Focusable optics lens II for fiber optics (Ø25), a = 88...110
		3 838 220	Focusable optics lens II for fiber optics (Ø25), a = 95...129
		3 838 230	Focusable optics lens II for fiber optics (Ø25), a = 105...161
		3 838 240	Focusable optics lens II for fiber optics (Ø25), a = 200...346



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Awakening Your 6th Sense

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