

IMPAC IGA 320/23-LO

Small, short wavelength digital infrared thermometer with fiber optics for non-contact temperature measurement between 85 and 1200°C (185 and 2192°F).



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

PRODUCT HIGHLIGHTS

- 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

TYPICAL APPLICATIONS

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

AT A GLANCE

Temperature Ranges

85 to 600 °C (MB 6)
100 to 700 °C (MB 7)
150 to 1200 °C (MB 12)

Spectral Range

2 to 2.6 μm
(Main wavelength 2.3 μm)

Measurement Uncertainty

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

Repeatability

0.1% oR + 1°C

Optics

3 optical heads:

Optics I: 3 fixed distances
Optics II: 4 fixed distances
Optics III: 6 focusable optics

Alignment

LED targeting light

OVERVIEW

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

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

TECHNICAL DATA

Measurement Specifications	
Temperature Ranges	85 to 600°C (185 to 1112°F) (MB 6)
	100 to 700°C (212 to 1292°F) (MB 7)
	150 to 1200°C (302 to 2192°F) (MB 12)
Sub Range	Any range adjustable within the temperature range, min span 51°C
Spectral Range	2 to 2.6 μm (main wavelength 2.3 μm)
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 ^{1,2} (ε = 1, t ₉₀ = 1 s, T _{amb} = 23°C)	< 400°C: 2°C
	> 400°C: 0.3% of measured value in °C + 1°C
Repeatability ² (ε = 1, t ₉₀ = 1 s, T _{amb} = 23°C)	0.1% of measured value in °C + 1°C

Interface Specifications	
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

1 The pyrometer must operate at least 30 min before these values are valid

2 The temperature of fiber and optical head must be at least 30°C lower than the measuring temperature to get a correct temperature reading

3 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 (CONTINUED)

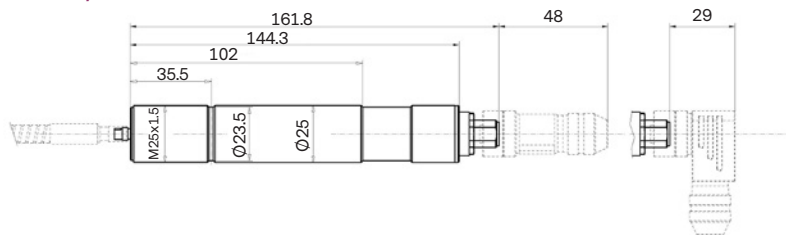
Communication Specifications	
Analog Output	0 to 20 or 4 to 20 mA (linear), switchable
Digital Interface	RS485 addressable (half duplex); baud rate 1200 up to 38,400 Bd or RS232; baud rate 1200 up to 115,200 Bd
Exposure Time t_{90}	2 ms (with dynamic adaptation at low signal levels); adjustable to 0.01 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 Specifications	
Power Supply	24 VDC (10 to 30 VDC), ripple must be less than 0.5 V
Power Consumption	Max 1 W
Switch Contact	Opto relays; max. 50 VDC, 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 against each other

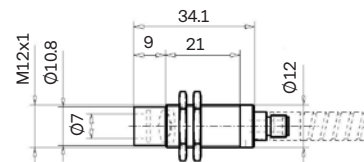
Environmental Specifications	
Protection System	IP 54 (IEC 60529)
Operating Position	Any
Ambient Temperature	0 to 70°C (32 to 158°F) at housing Up to 200°C (392°F) on side of fiber and optical head
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	Non-condensing conditions
Weight	0.53 kg (~1.17 lb) including optical fiber and lens assembly
Housing	Stainless steel
CE Label	According to EN 61326-1:2006-10

DIMENSIONS

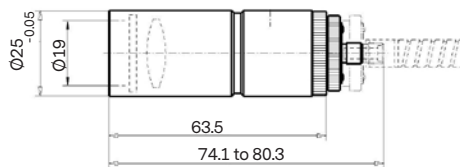
IGA 320/23-LO



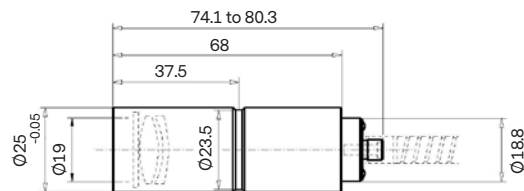
Optical Head Type I (fixed adjusted)



Optical Head Type II (focusable)



Optical Head Type II (fixed adjusted)



All dimensions in mm

OPTICAL HEAD

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 (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.

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 can be calculated by interpolation.

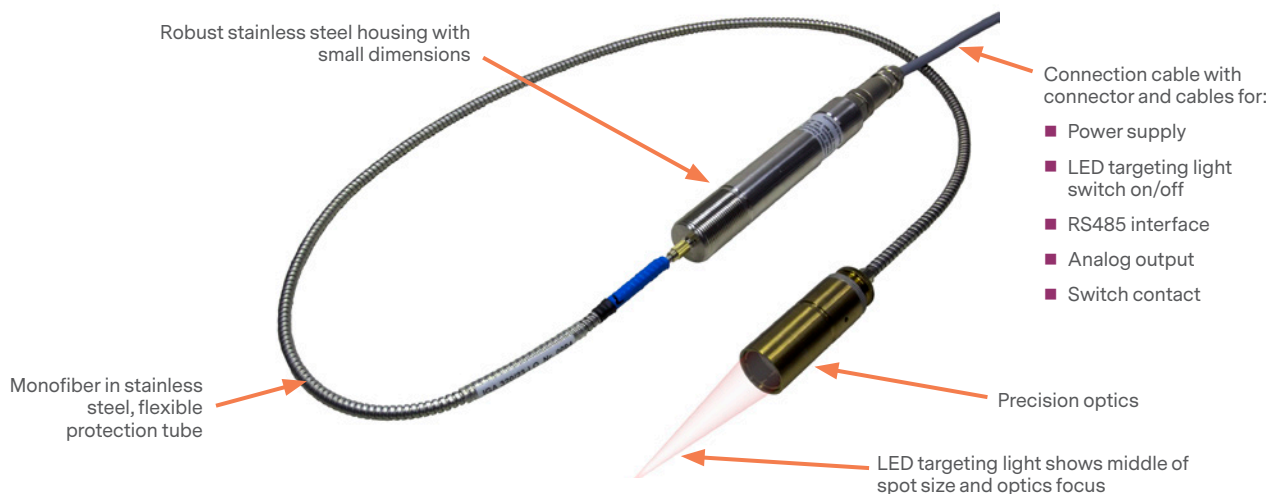
Optics for IGA 320/23-LO						
Optical Head	Ref. Number (Replacement Optics)	Measuring Distance a [mm]	Spot Size M ₉₀ [mm]			Aperture D [mm]
			Fiber 0.6 mm (MB 6)	Fiber 0.4 mm (MB 7)	Fiber 0.2 mm (MB 12)	
	3 873 320	Adjusted to: 120	3.3	2.2	2.2	7
	3 873 340	Adjusted to: 260	7.5	5	2.6	7
	3 873 350	Adjusted to: 700	21	14	7.2	7
	3 873 420	Adjusted to: 87	1.1	0.75	0.45	17
	3 873 440	Adjusted to: 200	2.3	1.5	0.8	17
	3 873 460	Adjusted to: 600	8.0	5.3	2.7	15
	3 873 470	Adjusted to: 4500	63	42	22	15
	3 838 210	Range: 88 to 110	1.2 to 1.7	0.8 to 1.1	0.45 to 0.6	17.5 to 15.5
	3 838 220	Range: 95 to 129	1.4 to 2.0	0.9 to 1.3	0.5 to 0.75	16.5 to 14.5
	3 838 230	Range: 105 to 161	1.7 to 2.6	1.1 to 1.7	0.6 to 1	15 to 13.5
	3 838 240	Range: 200 to 346	2.3 to 4.2	1.5 to 2.8	0.8 to 1.5	17.5 to 15.5
	3 838 250	Range: 247 to 606	3.0 to 7.8	2.0 to 5.2	1.1 to 2.7	16.5 to 14.5
	3 838 260	Range: 340 to 4500	4.2 to 63	2.8 to 42	1.5 to 22	15 to 13.5

OPTICAL LIGHTPIPE OPTICS

The IGA 320/23-LO can also use a sapphire optical rod ("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.



FEATURES



REFERENCE NUMBERS

Temperature Range	Optical Fiber	Ref. Number (RS485)	Ref. Number (RS232)
85 to 600°C (MB 6)	Fiber length 1 m, Ø 0.6 mm (green fiber mark)	3 913 930	3 913 790
100 to 700°C (MB 7)	Fiber length 1 m, Ø 0.4 mm (blue fiber mark)	3 913 980	3 913 800
100 to 700°C (MB 7)	Fiber length 2.5 m, Ø 0.4 mm (blue fiber mark)	3 913 970	3 913 810
150 to 1200°C (MB 12)	Fiber length 2.5 m, Ø 0.2 mm (red fiber mark)	3 913 950	3 913 820

Scope of Delivery

Pyrometer, optical fiber and optical head as per configuration, works certificate, PC software InfraWin, and user manual.

Ordering Note

A connection cable is not included in the 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 ⇒ 24 VDC, 1 A
3 852 550	Power supply NG 2D for DIN rail mounting; 85 to 265 VAC ⇒ 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	RS232 to USB converter (matched to DA 6000-T)
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
3 890 150	DA 6000-T, digital display for measurement of the cooling-off time from 800 to 500 °C (for welding processes), RS232 interface
3 826 510	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
3 846 170	Mounting tube
3 834 390	Ball and socket mounting for fiber optical head I and 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
3 835 290	Air purge for scanning attachment
3 835 500	Air purge unit with ceramic tube (small) for optical head I
3 835 510	Air purge unit with ceramic tube (large) for optical head I
3 843 460	SCA 300, scanning attachment with quartz glass window; 24 VAC/DC
3 873 320	Replacement optical head design I, a = 120 mm
3 783 340	Replacement optical head design I, a = 260 mm

ACCESSORIES (CONTINUED)

PN	Description
3 873 350	Replacement optical head design I, a = 700 mm
3 873 420	Replacement optical head design II, fixed adjusted, a = 87 mm
3 873 440	Replacement optical head design II, fixed adjusted, a = 200 mm
3 873 460	Replacement optical head design II, fixed adjusted, a = 600 mm
3 873 470	Replacement optical head design II, fixed adjusted, a = 4500 mm
3 838 210	Focusable optics lens II for fiber optics (Ø25), a = 88 to 110 mm
3 838 220	Focusable optics lens II for fiber optics (Ø25), a = 95 to 129 mm
3 838 230	Focusable optics lens II for fiber optics (Ø25), a = 105 to 161 mm
3 838 240	Focusable optics lens II for fiber optics (Ø25), a = 200 to 346 mm
3 838 250	Focusable optics lens II for fiber optics (Ø25), a = 247...606 mm
3 838 260	Focusable optics lens II for fiber optics (Ø25), a = 340 to 4500 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.



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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