

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 μm
(main wavelength 2.3 μm)

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 ¹ (ε = 1, t ₉₀ = 1 s, T _{amb} = 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 ₉₀ = 1 s, T _{amb} = 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 _{max} = 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 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 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, automatically with the next measuring object |
| Connection | 8-pin connector |
| Parameters | Adjustable via interface: Emissivity, 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 |

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

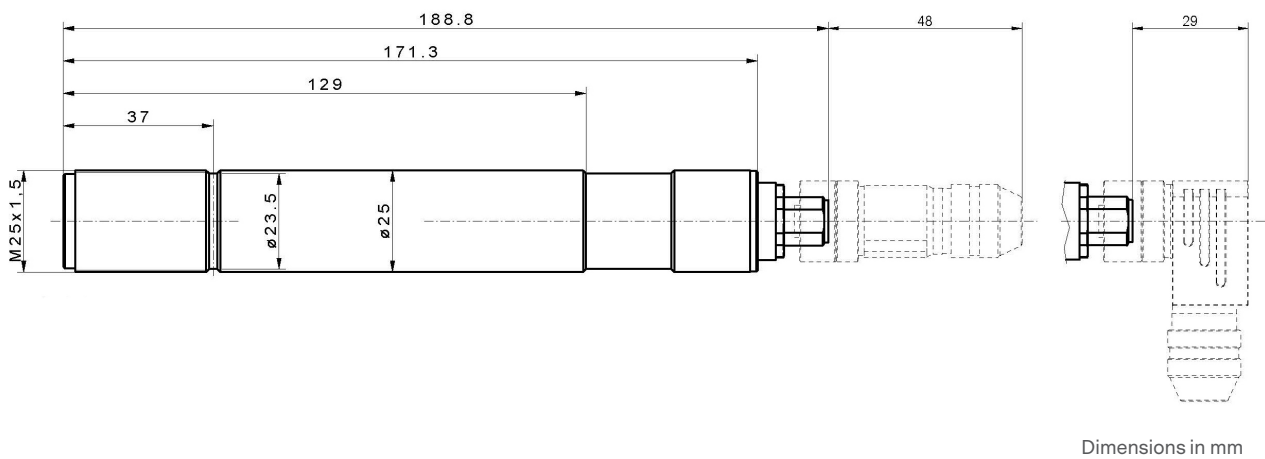
² MB is a shortcut used for temperature range (in German: Messbereich).

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



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 ¹ | a [mm] | M [mm] | a ₁ [mm] | M ₁ [mm] | a ₂ [mm] | M ₂ [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 | |
| | | with close-up lens 1 | 50:1 | 50 | 1 | 100 | 16 | 200 | 46 | | |
| | | with 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 | | |
| | | with close-up lens 1 | 100:1 | 50 | 0.5 | 100 | 15 | 200 | 44 | | |
| | | with 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 |
| | | with close-up lens 1 | 160:1 | 50 | 0.3 | 100 | 15 | 200 | 43 | | |
| | | with 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 | | |
| | | with close-up lens 1 | 200:1 | 50 | 0.25 | 100 | 10 | 200 | 31 | | |
| | | with 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 | | |

¹ 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 Internal Temperature of radiation temperature and internal instrument temperature. Parameters can be changed during the measurement.

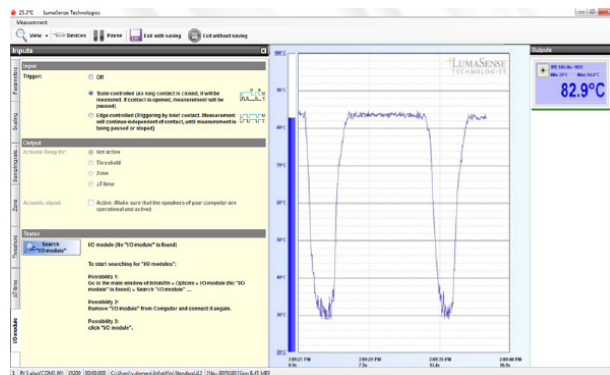


Measurement with Color Bar

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.



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



For international contact information,
visit advancedenergy.com.

sales.support@aei.com
+1 970 221 0108

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.

PRECISION | POWER | PERFORMANCE

Specifications are subject to change without notice. Not responsible for errors or omissions. ©2021 Advanced Energy Industries, Inc. All rights reserved. Advanced Energy®, Impac®, and AE® are U.S. trademarks of Advanced Energy Industries, Inc.

