

Compact, Short Wavelength Digital Infrared Thermometer for Non-Contact Temperature Measurement of Metallic Surfaces, Graphite or Ceramics between 300 and 1800 °C

IS 320 • IGA 320



- 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 measurement of small objects
- Built-in LED targeting light for easy alignment to the measuring object



The IMPAC IS 320 and IGA 320 are short wavelength infrared measuring instruments with internal digital signal processing capabilities. IS 320 and IGA 320 pyrometers are used for measurements of metallic surfaces, graphite and ceramics, and much more.

The compact housing dimensions of both instruments allow easy integration of the pyrometers into compact production machines, and the solid and robust designs guarantee reliability even in the harshest industrial environments.

The instruments are equipped with a choice of optics for small spot sizes.

An 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 pyrometers are equipped with digital RS485 interfaces, which enable 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:	IS 320	550 ... 1400 °C (MB 14) 600 ... 1600 °C (MB 16) 650 ... 1800 °C (MB 18)
	IGA 320	300 ... 1300 °C (MB 13) 350 ... 1650 °C (MB 16.5) 400 ... 1800 °C (MB 18)
Sub Range:	Any range adjustable within the temperature range, minimum span 51 °C	
Spectral Ranges:	IS 320: 0.8 - 1.1 µm; IGA 320: 1.45 - 1.8 µm	
IR Detector:	IS 320: Silizium-Fotodiode (Si) IGA 320: Indium Gallium Arsenide photo diode (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:	Up to 1500 °C: 0.3% of reading in °C + 1 °C; Above 1500 °C: 0.5% of reading in °C (ε = 1, t ₉₀ = 1 s, T _{amb} = 23 °C)	
Repeatability:	0.2% of reading in °C + 1 °C (ε = 1, t ₉₀ = 1 s, T _{amb} = 23 °C)	

Environmental Specifications

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

Interface

Connection:	8 pin connector
Sighting:	Built-in LED targeting light
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

Communication

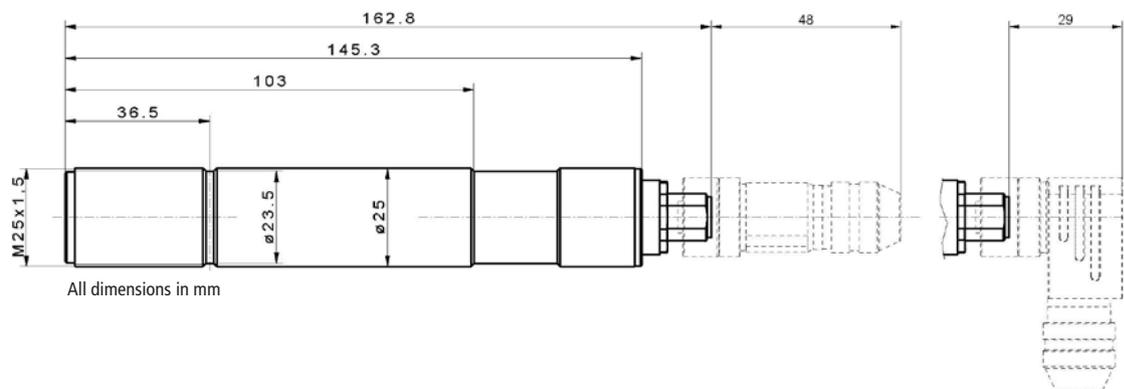
Analog Output:	0 to 20 mA or 4 to 20 mA (linear); switchable
Digital Interface:	RS485 addressable (half duplex), baud rate 1200 up to 38400 Bd
Hysteresis:	2 ... 20 °C, adjustable
Exposure Time t ₉₀ :	2 ms (with dynamical adaptation at low signal levels); adjustable to 0.01 s; 0.05 s; 0.25 s; 1 s; 3 s; 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

Electrical

Power Supply:	24 V DC (10 to 30 V DC), ripple must be less than .5 V
Power Consumption:	Max. 1 W
Load:	0 to 500 Ω
Switch Contact:	Opto relays; max. 50 V DC, 0.2 A; P _{max} = 300 mW
Isolation:	Power supply, analog output and digital interface are galvanically isolated from each other

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



Optics

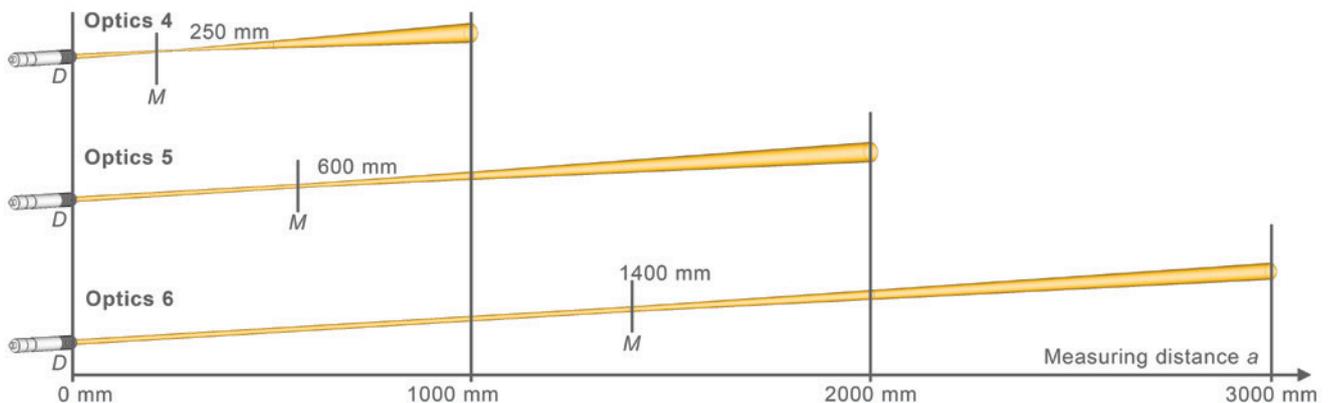
Depending on the selected type the pyrometers are equipped ex works with different optics which are focusing on different distances, i.e. in this distances they achieve the smallest spot size in relation to the measuring distance. At any other distances (shorter or longer) the spot size will decrease or increase. 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.

IS 320									
Optics	Temperature Range	a : M *	a [mm]	M [mm]	a1 [mm]	M1 [mm]	a2 [mm]	M2 [mm]	D [mm]
4	550 ... 1400 °C (MB 14)	83 : 1	250	3	500	15	1000	39	9
	600 ... 1600 °C (MB 16)	125 : 1		2	500	13	1000	35	
	650 ... 1800 °C (MB 18)	192 : 1		1.3	500	12	1000	33	
5	550 ... 1400 °C (MB 14)	92 : 1	600	6.5	1000	17	2000	43	
	600 ... 1600 °C (MB 16)	133 : 1		4.5	1000	14	2000	36	
	650 ... 1800 °C (MB 18)	188 : 1		3.2	1000	11.3	2000	32	
6	550 ... 1400 °C (MB 14)	93 : 1	1400	15	2000	26	3000	43	
	600 ... 1600 °C (MB 16)	156 : 1		9	2000	17	3000	30	
	650 ... 1800 °C (MB 18)	200 : 1		7	2000	14	3000	26	

IGA 320									
Optics	Temperature Range	a : M *	a [mm]	M [mm]	a1 [mm]	M1 [mm]	a2 [mm]	M2 [mm]	D [mm]
4	300 ... 1300 °C (MB 13)	125 : 1	250	2	500	13	1000	35	9
	400 ... 1800 °C (MB 18)	208 : 1		1.2	500	11.4	1000	32	
5	300 ... 1300 °C (MB 13)	133 : 1	600	4.5	1000	13.5	2000	36	
	350 ... 1650 °C (MB 16.5)	188 : 1		3.2	1000	11.4	2000	32	
6	400 ... 1800 °C (MB 18)	231 : 1	1400	2.6	1000	10.3	2000	30	
	300 ... 1300 °C (MB 13)	156 : 1		9	2000	16.8	3000	30	
	400 ... 1800 °C (MB 18)	233 : 1		6	2000	12.4	3000	24	

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



Settings and Operation via the RS485 Interface

With connection to the power supply the instruments are ready for use immediately. Following the signal processing either 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). The included InfraWin software enables easy instrument settings and multiple graphical temperature illustration views.

With RS485, long transmission distances can be realized and several pyrometers can be connected in a bus system.

InfraWin software enables easy instrument settings, display of temperature curves, graphic or tabular analysis, e.g. for printing out or exporting, and quick spot size calculation.



Reference Numbers

Type	Temperature Range	Optics		
		4	5	6
IS 320	550 ... 1400 °C (MB 14)	3 913 200	3 913 210	3 913 220
	600 ... 1600 °C (MB 16)	3 913 400	3 913 410	3 913 420
	650 ... 1800 °C (MB 18)	3 913 230	3 913 240	3 913 250
IGA 320	300 ... 1300 °C (MB 13)	3 913 300	3 913 310	3 913 320
	350 ... 1650 °C (MB 16.5)	-	3 913 370	-
	400 ... 1800 °C (MB 18)	3 913 330	3 913 340	3 913 350

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, 2 m (straight connector) | 3 890 640 DA 4000-N, LED-display, 2-wire power supply |
| 3 920 040 Connection cable, 5 m (straight connector) | 3 890 650 DA 4000, LED-display, 2-wire power supply, 2 limit switches (relay contacts) |
| 3 920 050 Connection cable, 10 m (straight connector) | 3 890 530 DA 6000, LED-display, RS485, max. value storage, analog output |
| 3 920 060 Connection cable, 15 m (straight connector) | 3 826 510 PI 6000: PID programmable controller, extremely fast, for digital IMPAC pyrometers |
| 3 920 070 Connection cable, 20 m (straight connector) | 3 826 520 PI 6000-N: PID programmable controller, extremely fast, for pyrometers with analog output |
| 3 920 080 Connection cable, 25 m (straight 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 |
| 3 920 090 Connection cable, 30 m (straight connector) | 3 852 580 RS232 to USB converter (matched to DA 6000-T) |
| 3 920 130 Connection cable, 2 m (90° connector) | 3 834 230 Adjustable mounting support, stainless steel |
| 3 920 140 Connection cable, 5 m (90° connector) | 3 846 170 Mounting tube (L 600 x Ø 70 mm) |
| 3 920 150 Connection cable, 10 m (90° connector) | 3 835 180 Air purge unit, stainless steel |
| 3 920 160 Connection cable, 15 m (90° connector) | 3 835 240 90° mirror (with air purge) |
| 3 920 170 Connection cable, 20 m (90° connector) | 3 843 460 SCA 300, scanning attachment with quartz glass window; 24 V AC/DC |
| 3 920 180 Connection cable, 25 m (90° connector) | 3 835 290 Air purge for scanner |
| 3 920 190 Connection cable, 30 m (90° connector) | 3 837 480 Cooling jacket with integrated air purge |
| 3 920 100 Adapter cable (0.2 m) 8 pin onto 12-pin IMPAC standard connector | 3 837 490 Cooling jacket with fused silica window and integrated air purge |
| 3 852 290 Power supply NG DC, 100 ... 240 V AC, 50 ... 60 Hz to 24 V DC, 1 A | |
| 3 852 550 Power supply NG 2D, 85 ... 265 V AC, 48 ... 62 Hz to 24 V DC, 600 mA, with 2 limit switches | |
| 3 852 600 USB nano: Converter RS485 to USB | |
| 3 852 610 USB LabKit, adapter RS485 to USB with targeting light push-button and analog output clamp, pyrometer cable, power supply 100...240 V AC | |



Adjustable Mounting Support



Scanning Attachment SCA 300



Air Purge for Scanning Attachment



Air Purge



90° Mirror (with Air Purge)



LED Digital Display DA 6000



NG 2D Power Supplies



USB-LabKit



Converter RS485 to USB

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