

IMPAC IS 320 AND IGA 320

Compact, short wavelength digital infrared thermometer for non-contact temperature measurement of metallic surfaces, graphite, or ceramics between 300 and 2500°C.



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, 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.

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

IS 320
550 to 1400°C (MB 14)
600 to 1600°C (MB 16)
650 to 1800°C (MB 18)

IGA 320
300 to 1300°C (MB 13)
350 to 1650°C (MB 16.5)
400 to 1800°C (MB 18)
500 to 2500°C (MB 25)

Spectral Range

IS 320
0.8 to 1.1 μm

IGA 320
1.45 to 1.8 μm

Measurement Uncertainty

< 1500°C: 0.3% oR in °C + 1°C
> 1500°C: 0.5% oR in °C

Repeatability

0.2% oR in °C + 1°C

TECHNICAL DATA

Measurement Specifications		
Temperature Ranges	IS 320	550 to 1400°C (1022 to 2552°F) (MB 14)
		600 to 1600°C (1112 to 2912°F) (MB 16)
		650 to 1800°C (1202 to 3272°F) (MB 18)
	IGA 320	300 to 1300°C (572 to 2372°F) (MB 13)
		350 to 1650°C (662 to 3002°F) (MB 16.5)
		400 to 1800°C (752 to 3272°F) (MB 18)
		500 to 2500°C (932 to 4532°F) (MB 25)
Sub Range	Any range adjustable within the temperature range, minimum span 51°C	
Spectral Range	IS 320: 0.8 to 1.1 μm	
	IGA 320: 1.45 to 1.8 μm	
IR Detector	IS 320: Silicon photo diode (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 (ε = 1, t ₉₀ = 1 s, T _{amb} = 23°C)	Up to 1500°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)	0.2% 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
Max Load	0 to 500 Ω
Switch Contact	Opto relays; max 50 VDC, 0.2 A; P _{max} = 300 mW
Isolation	Power supply, analog output, and digital interface are galvanically isolated from each other

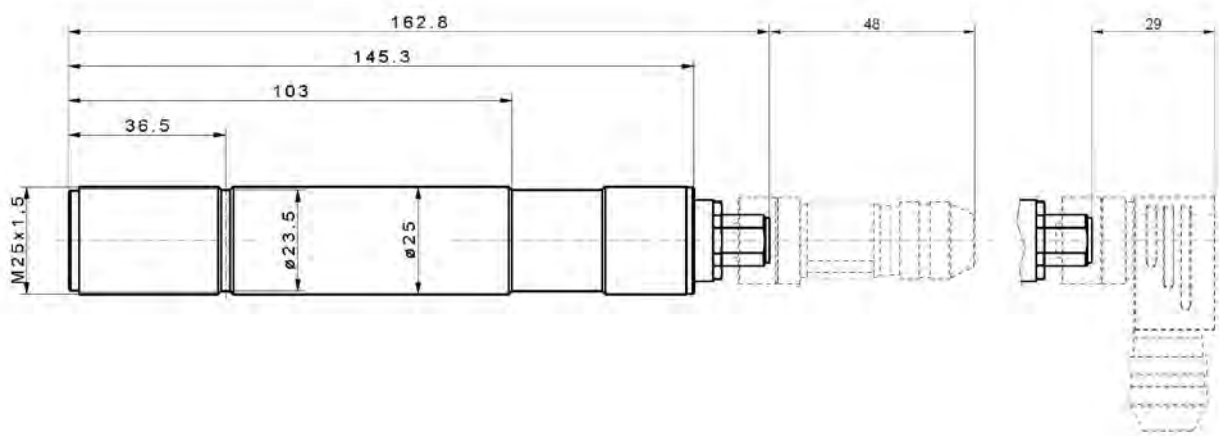
Environmental Specifications	
Protection Class	IP 65 (DIN 60 529)
Mounting Position	Any
Ambient Temperature	0 to 70°C (32 to 158°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	Non-condensing conditions
Housing	Stainless steel
Weight	0.3 kg (~0.661 lb)
CE Label	According to EU directives about electromagnetic immunity

¹ 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

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 115,200 Bd
Hysteresis	2 to 20°C, adjustable
Exposure Time t_{g0}	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 ϵ , transmittance τ , exposure time t_{g0} , max/min value storage, analog output, sub temperature range, ambient temperature compensation, pyrometer address, switch contact, hysteresis, baud rate, wait time t_w

DIMENSIONS



Dimensions in mm

OPTICS

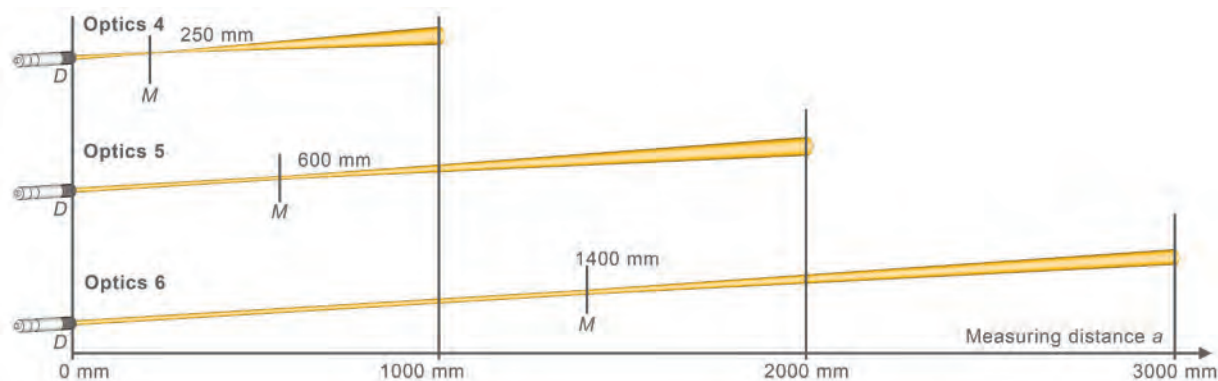
Depending on the selected type, the pyrometers are equipped ex works with different optics which are focusing on different distances, i.e. in this distances they achieve the smallest spot size in relation to the measuring distance. At any other distances (shorter or longer) the spot size will decrease 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 ¹	a [mm]	M [mm]	a ₁ [mm]	M ₁ [mm]	a ₂ [mm]	M ₂ [mm]	D [mm]
4	550 to 1400°C (MB 14)	83 : 1	250	3	500	15	1000	39	9
	600 to 1600°C (MB 16)	125 : 1	250	2	500	13	1000	35	
	650 to 1800°C (MB 18)	192 : 1	250	1.3	500	12	1000	33	
5	550 to 1400°C (MB 14)	92 : 1	600	6.5	1000	17	2000	43	
	600 to 1600°C (MB 16)	133 : 1	600	4.5	1000	14	2000	36	
	650 to 1800°C (MB 18)	188 : 1	600	3.2	1000	11.3	2000	32	
6	550 to 1400°C (MB 14)	93 : 1	1400	15	2000	26	3000	43	
	600 to 1600°C (MB 16)	156 : 1	1400	9	2000	17	3000	30	
	650 to 1800°C (MB 18)	200 : 1	1400	7	2000	14	3000	26	

IGA 320									
Optics	Temperature Range	a:M ¹	a [mm]	M [mm]	a ₁ [mm]	M ₁ [mm]	a ₂ [mm]	M ₂ [mm]	D [mm]
4	300 to 1300°C (MB 13)	125 : 1	250	2	500	13	1000	35	9
	400 to 1800°C (MB 18)	208 : 1	250	1.2	500	11.4	1000	32	
	500 to 2500°C (MB 25)	250 : 1	250	1	500	11	1000	31	
5	300 to 1300°C (MB 13)	133 : 1	600	4.5	1000	13.5	2000	36	
	350 to 1650°C (MB 16.5)	188 : 1	600	3.2	1000	11.4	2000	32	
	400 to 1800°C (MB 18)	231 : 1	600	2.6	1000	10.3	2000	30	
6	300 to 1300°C (MB 13)	156 : 1	1400	9	2000	16.8	3000	30	
	400 to 1800°C (MB 18)	233 : 1	1400	6	2000	12.4	3000	24	

¹ 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

IS 310 and IGA 320

Type	Temperature Range	Optics		
		4	5	6
IS 320	550 to 1400°C (MB 14)	3 913 200	3 913 210	3 913 220
	600 to 1600°C (MB 16)	3 913 400	3 913 410	3 913 420
	650 to 1800°C (MB 18)	3 913 230	3 913 240	3 913 250
IGA 320	300 to 1300°C (MB 13)	3 913 300	3 913 310	3 913 320
	350 to 1650°C (MB 16.5)	-	3 913 370	-
	400 to 1800°C (MB 18)	3 913 330	3 913 340	3 913 350
	500 to 2500°C (MB 25)	3 913 380	-	-

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 ⇒ 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	Converter USB 2.0 ⇔ 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
3 837 480	Water cooling jacket, stainless steel, with integrated air purge unit
3 837 490	Cooling jacket with fused silica window, with integrated air purge

INFRAWIN 5 OVERVIEW

InfraWin is easy-to-use measurement and evaluation software for remote configuration of stationary, digital Impac brand pyrometers.

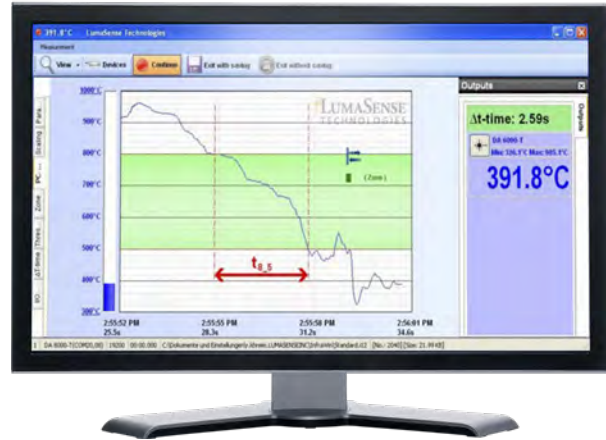
This software allows the user to remotely adjust and control settings for one or two pyrometers from a single computer. InfraWin also allows the user to simultaneously monitor and control temperatures.

- 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

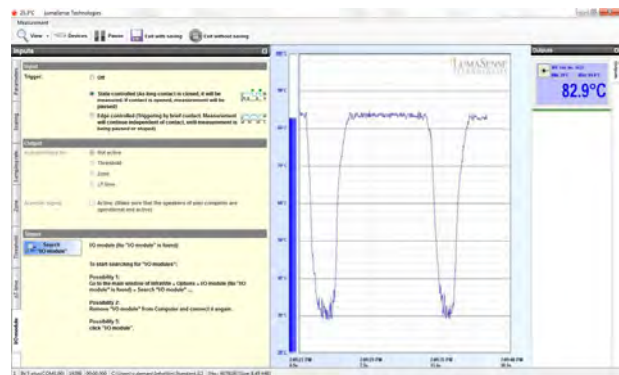
In this window a temperature value for the upper or lower limit can be adjusted numerically or with the mouse. The acquired minimum and maximum value is indicated as well as the inner temperature of the pyrometer. The emissivity is changeable during the measurement at any time.

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.



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



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



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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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