IMPAC IGA 140/23 SERIES

Highly accurate, fully digital pyrometers with focusable optics for non-contact temperature measurements on metals, ceramics, graphite, etc. between 50 and 1800°C (122 to 3272°F).

The Impac® IGA 140/23 series pyrometers are digital, highly accurate pyrometers for non-contact temperature measurement on metals, ceramics, graphite, etc. The IGA 140/23 pyrometer is equipped with RS232 and RS485 serial interfaces (switchable). The -PB types are equipped with a Profibus-DP interface, -PN types are equipped with a Profinet interface, and the -ET types are equipped with an Ethernet interface.

PRODUCT HIGHLIGHTS

- Short response times < 1.5 ms
- Very small spot sizes, min 0.5 mm
- Built-in digital display
- Parameter adjustments via integrated key pad or interface
- Optimized through lens view finder or laser targeting light
- Test current output
- Housing with precision mounting rail for safe mounting and accurate alignment
- Interface RS232 / RS485 switchable or built-in Profibus-DP, Profinet, or Ethernet interface

TYPICAL APPLICATIONS

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

AT A GLANCE

Temperature Ranges

50 to 700°C (MB 7)
75 to 900°C (MB 9)
100 to 1300°C (MB 13)
150 to 1800°C (MB 18)

Spectral Ranges

2.0 to 2.6 µm

Measurement Uncertainty

Up to 400°C: 2°C
400 to 1500°C: 0.3% oR in °C + 2°C
Above 1500°C: 0.5% oR in °C

Repeatability

0.1% oR in °C + 1°C

Optics

3 focusable optics:
a = 105 to 150 mm
a = 190 to 440 mm
a = 320 to 4300 mm

Alignment

Laser targeting or through lens sighting

TECHNICAL DATA

Measurement Specifications	
Temperature Range	50 to 700°C (122 to 1292°F) (MB 7)
	75 to 900°C (167 to 1652°F) (MB 9)
	100 to 1300°C (212 to 2372°F) (MB 13)
	150 to 1800°C (302 to 3272°F) (MB 18)
Sub Range	Any range adjustable within the temperature range, minimum span 51°C
Spectral Ranges	2.0 to 2.6 µm
Infrared Detector	Indium Gallium Arsenide photodiode (extended InGaAs)
Signal Processing	Photoelectric current, digitized immediately
Resolution	Interface and display: 0.1°C
	16 bit D/A converter for analog output
Measurement Uncertainty (ε = 1, t_{90} = 1 s, $T_{amb.}$ = 23°C)	Up to 400°C: 2°C
	400 to 1500°C: 0.3% of reading in °C + 2°C
	Above 1500°C: 0.5% of reading in °C
Repeatability (ε = 1, t_{90} = 1 s, $T_{amb.}$ = 23°C)	0.1% of reading in °C + 1°C
Emissivity ε	10 to 100% adjustable in steps of 0.1%

Communication Specifications	
Analog Output	0 to 20 mA or 4 to 20 mA (linear), switchable
Test Current Output	10 mA or 12 mA by pressing test key
Exposure Time t_{90}	< 1.5 ms; with dynamical adaption at low signal levels
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), extern, via interface or automatically with the next measuring object

Electrical Specifications	
Power Supply	24 VAC/DC (14 to 30 VAC/DC) (AC: 48 to 62 Hz)
Power Consumption	Max 7.5 W
Load	0 to 500 Ω
Switch Contact	Max. 0.15 A (only active with automatic clear mode or $t_{CL} \geq 0.25$ s)
Isolation	Power supply, digital interface, analog output are galvanically isolated against each other and housing

Environmental Specifications	
Protection Class	IP65 (DIN 40 050)
Ambient Temperature	0 to 70°C (32 to 158°F) at housing
Storage Temperature	-20 to 80°C (-4 to 176°F)
Weight	~550 g (~1.21 lbs)
CE Label	According to EU directives about electromagnetical immunity

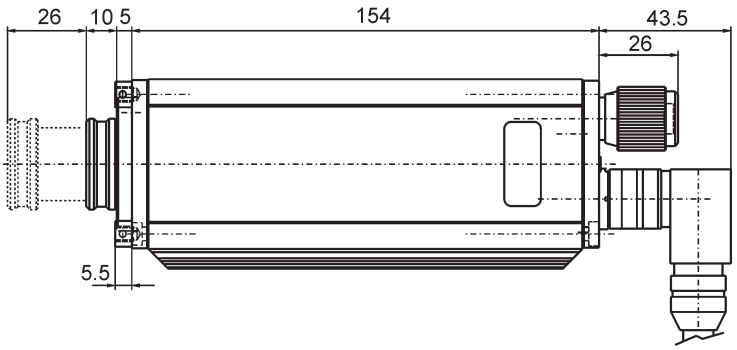
1 MB is a shortcut used for temperature range (in German: Messbereich).
The determination of the technical data of this pyrometer is carried out in accordance with VDI/VDE IEC TS 62942-2, the calibration / adjustment in accordance with VDI/VDE 3511, Part 4.4.

TECHNICAL DATA (CONTINUED)

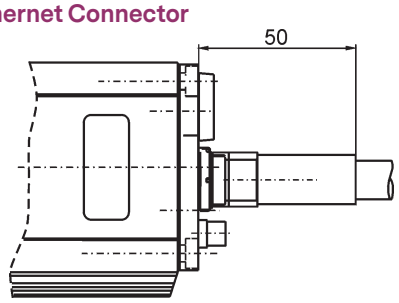
Interface Specifications	
Sighting	Laser targeting light (max. power level < 1 mW, λ = 630-680 nm, CDRH class II) or through lens view finder
Operation Signal	Green LED
LC display	Illuminated LC display for temperature indication or parameter settings
Parameters	Adjustable at the instrument or via serial interface: emissivity; exposure time; analog output; address; baud rate; waiting period; °C or °F; setting of the maximum value storage; temperature sub range

PRODUCT SCHEMATIC

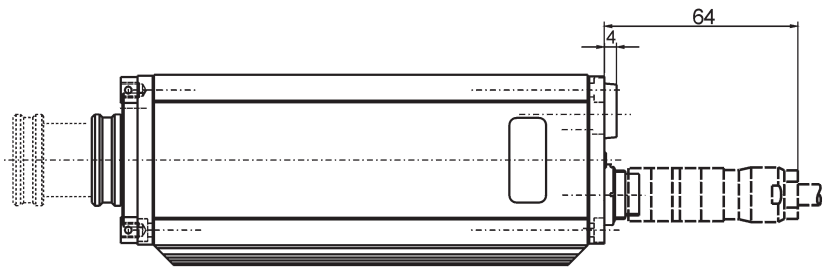
Pyrometer With Through Lens Viewfinder



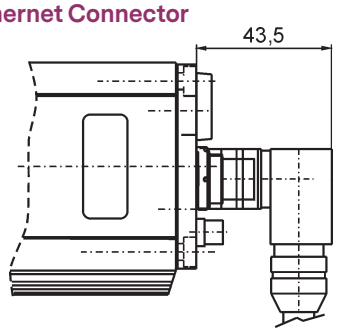
Straight Profinet, Profibus, or Ethernet Connector



Pyrometer With Laser Targeting Light



Angled Profinet, Profibus, or Ethernet Connector



Dimensions in mm

OPTICS

The pyrometers are available with different focusable optics. They offer the smallest possible spot size at any distance. The adjustment can be done easily without additional tools with help of the "turn and clamp" mechanism (one hand).

The spot sizes are shown in the following table (all distances are measured from the front of the lens). The different optics are exchangeable without recalibration of the pyrometer. For spot sizes between those in the table, values can be found by interpolation.

IGA 140/23						
Optics	Measuring Distance a [mm]	Spot Diameter M [mm]				Objective Length S [mm]
		MB 7	MB 9	MB 13	MB 18	
1-23	105	1.7	1.1	0.8	0.5	26
	119	2.1	1.4	0.9	0.6	13
	136	2.4	1.5	0.9	0.6	5
	150	2.8	1.6	1.0	0.6	0
2-23	190	3.0	1.8	1.1	0.8	26
	255	4.1	2.5	1.4	1.0	13
	340	5.6	3.3	1.8	1.1	5
	440	7.6	4.5	2.4	1.5	0
3-23	320	4.5	2.7	1.5	1.1	26
	540	8.0	4.7	2.4	1.5	13
	1530	25	14.4	7.3	4.5	3
	4300	72	42	21	12.5	0
Aperture D [mm]		14 to 18	14 to 18	14 to 18	12 to 15	

SIGHTING OPTIONS

Pyrometer With Laser Targeting Light

Pyrometer With Through Lens View Finder

ADVANTAGES OF DIGITAL SIGNAL PROCESSING

The signal processing of series 140 pyrometers is fully digital, i.e. the detector signal is digitized immediately and digitally processed. With this technique, an extremely high accuracy and repeatability as well as very long measuring ranges are achieved.

Accuracy

The high accuracy is achieved by the digital linearization of the sensor output as well as the digital compensation of the ambient temperature.

Temperature Range

Due to the digital technique, the user can set any temperature sub range within the full temperature range. The minimum span of the sub range is 51°C. The analog measuring output automatically corresponds to the selected sub range. This setting of a sub range can be done without recalibration of the pyrometer and does not affect the high accuracy and repeatability. As almost any sub range is adjustable, the storage of spare instruments or the replacement of other pyrometers is simplified.

Output

The analog measuring outputs 0 to 20 mA or 4 to 20 mA are selectable as well as the serial digital interfaces RS232 or RS485. The interface also allows the pyrometer to be controlled via the PC.

Bus Control

The serial interface RS485 facilitates the integration of the pyrometer into existing field bus systems

Calibration

If a suitable calibration source is available, a calibration of the pyrometers can be done via serial interface without opening the housing.

REFERENCE NUMBERS

IGA 140/23 Series								
Interface	MB 7 (50 to 700°C)		MB 9 (75 to 900°C)		MB 13 (100 to 1300°C)		MB 18 (150 to 1800°C)	
	Targeting Light	View Finder	Targeting Light	View Finder	Targeting Light	View Finder	Targeting Light	View Finder
RS232/RS485	3 911 010	3 911 020	3 911 030	3 911 040	3 911 050	3 911 060	3 911 070	3 911 080
Profibus DP	3 911 210	3 911 220	3 911 230	3 911 240	3 911 250	3 911 260	3 911 270	3 911 280
ProfiNet	3 911 410	3 911 420	3 911 430	3 911 440	3 911 450	3 911 460	3 911 470	3 911 480
Ethernet	3 911 610	3 911 620	3 911 630	3 911 640	3 911 650	3 911 660	3 911 670	3 911 680

Scope of Delivery

Pyrometer with one optics, works certificate with 3 measuring points, InfraWin software

Ordering Notes

When ordering, please select one focusable optics. A connection cable is not included in the scope of delivery and must be ordered separately.

ACCESSORIES

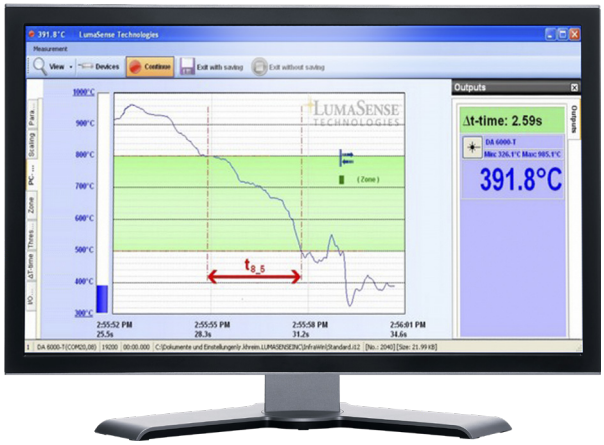
PN	Description
3 820 330	Connection cable, 5 m, straight connector
3 820 500	Connection cable, 10 m, straight connector
3 820 510	Connection cable, 15 m, straight connector
3 820 810	Connection cable, 20 m, straight connector
3 820 820	Connection cable, 25 m, straight connector
3 820 520	Connection cable, 30 m, straight connector
3 820 340	Connection cable, 5 m, 90° connector
3 820 530	Connection cable, 10 m, 90° connector
3 820 540	Connection cable, 15 m, 90° connector
3 820 830	Connection cable, 20 m, 90° connector
3 820 840	Connection cable, 25 m, 90° connector
3 820 550	Connection cable, 30 m, 90° connector
3 820 740	Connection cable, 5 m, straight connector, temperature resistant up to 200°C
3 820 750	Connection cable, 5 m, 90° connector, temperature resistant up to 200°C
3 852 290	Power supply NG DC for DIN rail mounting; 100 to 240 VAC ⇒ 24 VDC, 1 A
3 890 640	DA 4000-N, Digital display, with integrated 2-wire power supply
3 890 650	DA 4000: LED-display, 2-wire power supply, 2 limit switches (relay contacts), 230 VAC
3 890 560	DA 6000-N: LED digital display with digital input RS232 and possibility for pyrometer parameter settings
3 890 520	DA 6000: LED digital display, digital and analog input, 2 limit switches, maximum value storage, analog output, RS232
3 826 500	HT 6000: portable battery driven indicator and instrument for pyrometer parameter settings; RS232 / RS485
3 826 750	USB to RS485 adapter cable, HS-version, 1.8 m long
3 852 580	Converter USB 2.0 ⇔ RS232
3 843 520	SCA 140, Ruggest scanner with quartz glass window (scanning angle adjustable 0 to 12°, scanning frequency adjustable 1 to 5 Hz) window
3 835 290	Air purge for scanner SCA 140
3 835 450	90° mirror with quartz glass window
3 834 270	Ball and socket mounting
3 834 280	Adjustable mounting angle
3 835 230	Air purge
3 837 290	Cooling jacket, stainless steel
3 834 200	Ball and socket mounting for cooling jacket
3 835 060	Air purge for cooling jacket

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.

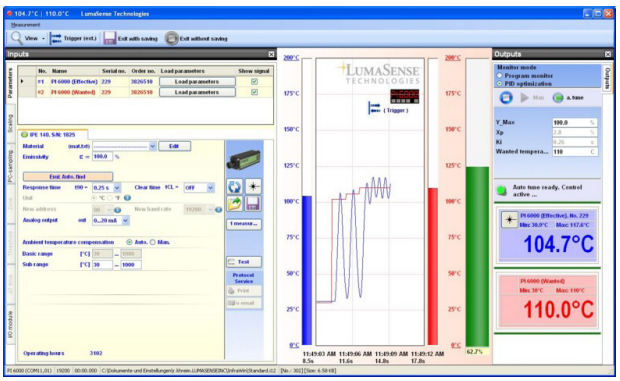
Further special functions are adjustable for example controllers or TV parameters on instruments available with these functions. Changes are transmitted directly to the pyrometer.

Measurement with Color Bar

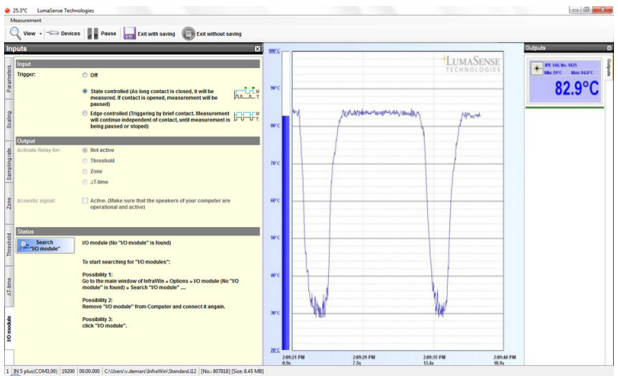
In this window a temperature value for the upper or lower limit can be adjusted numerically or with the mouse.
The acquired minimum and maximum value is indicated as well as the inner temperature of the pyrometer. The emissivity is changeable during the measurement at any time.

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.

ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than four 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.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

PRECISION | POWER | PERFORMANCE | TRUST

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