Pyrometer with focusable optics for non-contact temperature measurements on metals, ceramics, graphite etc. between 50 and 1800 °C

IGA 140/23 • IGA 140/23-PB
IGA 140/23-PN • IGA 140/23-ET

- 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 thru-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
- Focusable optics

The IGA 140/23 pyrometers are digital, highly accurate pyrometers for non-contact temperature measurement on metals, ceramics, graphite etc.

The pyrometer is equipped with RS232 and RS485 serial interfaces (switchable). This enables additionally the reading of temperature and pyrometer parameters via the provided InfraWin PC software. If necessary, the parameters also can be changed via PC.

The PB types are equipped with a Profibus-DP interface, PN types are equipped with a Profinet interface. They can easily be integrated in existing Profibus respectively Profinet systems. The GSD file (Profibus) respectively the GSDML file (Profinet) (part of standard delivery) offer a selection of 5 different module configurations corresponding your requirements. The project planning can be done with any project tool. ET types are equipped with an Ethernet interface.

For optimal match of the instrument to the application, 3 different focusable optics with extremely small spot sizes are available.

The pyrometer parameters can be selected via the integrated key pad, the settings are indicated on the built-in LC-Display. In measuring mode the actual temperature is indicated.

A laser targeting light or a thru-lens view finder for exact alignment of the pyrometer is available.

Typical applications:

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

Technical Data

Measurement Specifications

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)
Sub Range:	Any range adjustable within the temperature range, minimum span 51 °C
Spectral Ranges:	2.0 to 2.6 µm
IR Detector:	Indium Gallium Arsenide photodiode (extended InGaAs)
Signal processing:	Photoelectric current, digitized immediately
Measurement Uncertainty: ($\varepsilon = 1$, $t_{90} = 1$ 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: ($\varepsilon = 1$, $t_{90} = 1$ s, $T_{amb.} = 23$ °C)	0.1% of reading in °C + 1°C
Resolution:	0.1 °C on interface and display; 16 bit D/A converter for analog output
Emissivity ε:	10.0 to 100.0% adjustable via interface in steps of 0.1%

Interface

Sighting:	Laser targeting light (max. power level < 1 mW, λ = 630-680 nm, CDRH class II) or thru-lens view finder
Operation signal:	Green LED
LC display:	Illuminated LC display for temperature indication or parameter settings
Parameters:	*Adjustable at the device or via interface:* Emissivity, Transmittance τ, exposure time t_{90}, 0 to 20 or 4 to 20 mA, sub range, clear times for maximum value storage, automatically or external deletion of maximum value storage, address, baud rate, wait time t_W *Readable at the device or via interface:* Measuring temperature, internal instrument temperature.

Communication

Analog Output:	0 to 20 mA or 4 to 20 mA (linear), switchable; Test current 10 mA or 12 mA by pressing test key
Digital Interface:	RS232 or RS485 addressable (half duplex), switchable; Baud rate 1200 up to 115200 Bd Alternatively: Profibus, Profinet, or Ethernet
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 tclear (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

Power Supply:	24 V AC/DC (12 to 30 V AC/DC) (AC: 48 to 62 Hz)
Power Consumption:	Max. 7.5 W
Load:	0 ... 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 at housing
Storage Temperature:	-20 to 80 °C
Weight:	Approx. 550 g
CE Label:	According to EU directives about electromagnetical immunity

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.

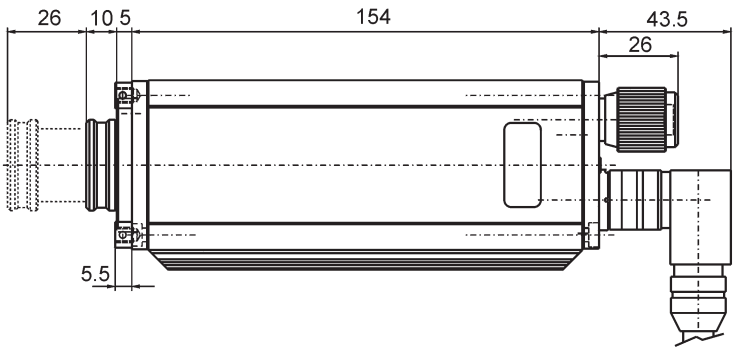
Optics

The IGA 140/23 pyrometers are available with 3 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 surface 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.

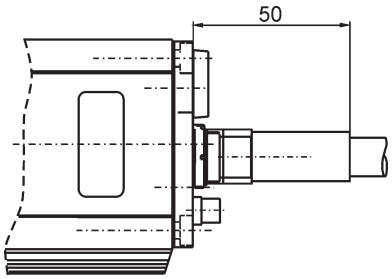
	Optics					
	Measuring Distance a [mm]	**Spot Size MB 7 [mm]**	**Spot Size MB 9 [mm]**	**Spot Size MB 13 [mm]**	**Spot Size MB 18 [mm]**	**Objective Length S (mm)**
Optics 1-23	a = 105 mm	1.7	1.1	0.8	0.5	26
	a = 119 mm	2.1	1.4	0.9	0.6	13
	a = 136 mm	2.4	1.5	0.9	0.6	5
	a = 150 mm	2.8	1.6	1.0	0.6	0
Optics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

Dimensions

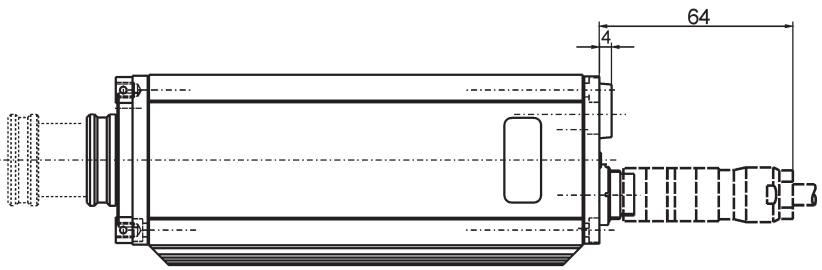
Pyrometer with thru-lens viewfinder



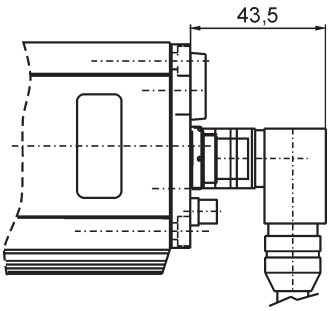
Straight Profinet, Profibus, or Ethernet Connector



Pyrometer with laser targeting light



Angled Profinet, Profibus, or Ethernet Connector



All dimensions in mm

Reference Numbers IGA 140/23

	MB 7 50 ... 700 °C		MB 9 75 ... 900 °C		MB 13 100 ... 1300 °C		MB 18 150 ... 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

Ordering notes:
When ordering please select one focusable optics. A connection cable is not included in scope of delivery and has to be ordered separately.

Scope of delivery:
Pyrometer with one optics, works certificate with 3 measuring points, InfraWin operating and analyzing software

Accessory Reference Numbers

3 820 340 Connection cable, length 5 m, 90° connector
3 820 530 Connection cable, length 10 m, 90° connector
3 820 540 Connection cable, length 15 m, 90° connector
3 820 830 Connection cable, length 20 m, 90° connector
3 820 840 Connection cable, length 25 m, 90° connector
3 820 550 Connection cable, length 30 m, 90° connector
3 820 330 Connection cable, length 5 m, straight connector
3 820 500 Connection cable, length 10 m, straight connector
3 820 510 Connection cable, length 15 m, straight connector
3 820 810 Connection cable, length 20 m, straight connector
3 820 820 Connection cable, length 25 m, straight connector
3 820 520 Connection cable, length 30 m, straight connector
3 820 740 Connection cable, length 5 m, straight connector, temperature resistant up to 200 °C
3 820 750 Connection cable, length 5 m, 90° connector, temperature resistant up to 200 °C
3 834 280 Adjustable mounting angle
3 834 270 Ball and socket mounting
3 835 230 Air purge
3 837 290 Cooling jacket, stainless steel
3 835 060 Air purge for cooling jacket
3 834 200 Ball and socket mounting for cooling jacket
3 835 450 90° mirror with quartz glass window
3 843 520 Rugged scanner SCA 140, (scanning angle adjustable 0 ... 12°, scanning frequency adjustable 1 ... 5 Hz), with quartz glass window
3 835 290 Air purge for scanner SCA 140
3 852 290 Power supply NG DC for DIN rail mounting; 100 to 240 V AC ⇒ 24 V DC, 1 A 2 limit switches
3 890 640 LED digital display DA 4000-N
3 890 650 LED digital display DA 4000: with 2 limit switches
3 890 560 LED digital display DA 6000-N: with possibility for pyrometer parameter settings for digital IMPAC pyrometers; RS232 interface
3 890 520 LED digital display DA 6000; DA 6000-N additional with 2 limit switches and analog input and output
3 826 500 HT 6000, portable battery driven indicator and instrument for pyrometer parameter setting
3 826 750 USB ⇔ RS485 converter cable
3 852 580 USB ⇔ RS232 converter cable

Connection cables for instruments with Profibus, Profinet, or Ethernet interface

3 821 070 Connection cable (cables for power supply and analog output), 5 m, with angled connector
3 821 080 Connection cable (cables for power supply and analog output), 10 m, with angled connector
3 821 090 Connection cable (cables for power supply and analog output), 15 m, with angled connector
3 821 100 Connection cable (cables for power supply and analog output), 30 m, with angled connector

LumaSense Technologies **Awakening Your 6th Sense**

Americas and Australia
Sales & Service
Santa Clara, CA
Ph: +1 800 631 0176
Fax: +1 408 727 1677

Europe, Middle East, Africa
Sales & Service
Frankfurt, Germany
Ph: +49 69 97373 0
Fax: +49 69 97373 167

India
Sales & Support Center
Mumbai, India
Ph: +91 22 67419203
Fax: +91 22 67419201

China
Sales & Support Center
Shanghai, China
Ph: +86 133 1182 7766
Fax: +86 21 5877 2383

info@lumasenseinc.com **www.lumasenseinc.com**

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