

# IMPAC IS 140 AND IGA 140 SERIES

Pyrometer with focusable optics for non-contact temperature measurements on metals, ceramics, graphite, etc.



The Impac® IS 140 and IGA 140 series pyrometers are digital, highly accurate pyrometers for non-contact temperature measurement on metals, ceramics, graphite, etc. between 220 and 3500°C (428 and 6332°F). The IS 140 and IGA 140 are 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 ET types are equipped with an Ethernet interface.

## PRODUCT HIGHLIGHTS

- Short response times < 1 ms optional 500  $\mu$ s
- Extremely small spot sizes, min. 0.35 mm
- Built-in digital display
- 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 | ■ Sintering   |
| ■ Annealing  | ■ Melting     |
| ■ Tempering  | ■ Soldering   |
| ■ Welding    | ■ Rolling     |
| ■ Forging    | ■ Brazing     |
| ■ Hardening  | ■ Normalizing |

## AT A GLANCE

### Temperature Ranges

IS 140  
550 to 2000°C (1022 to 3632°F)

IGA 140  
300 to 3000°C (572 to 5432°F)

### Spectral Ranges

IS 140  
0.7 to 1.1  $\mu$ m

IGA 140  
1.45 to 1.8  $\mu$ m

### Measurement Uncertainty

< 1500°C: 0.3% oR + 1°C

> 1500°C: 0.5% oR

### Repeatability

0.1% oR in °C + 1°C

### Optics

3 focusable optics:  
a = 130 to 200 mm  
a = 190 to 420 mm  
a = 340 to 4000 mm

TECHNICAL DATA

Measurement Specifications		
Temperature Ranges	See reference numbers, other temperature ranges on request	
Sub Range	Any range adjustable within the temperature range, minimum span 51°C	
Signal Processing	Photoelectric current, digitized immediately	
Spectral Ranges	IS 140 (all versions): 0.7 to 1.1 μm IGA 140 (all versions): 1.45 to 1.8 μm	
Resolution	0.1°C on interface < 0.1% 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%	
Measurement Uncertainty (ε = 1, t <sub>90</sub> = 1 s, T <sub>amb</sub> = 23°C)	Below 1500°C	0.3% of reading in °C + 1°C
		0.5% of reading in °C
	Above 1500°C	0.8 % of reading in °C (T <sub>amb</sub> = 15 to 30°C)
		1.2% of reading in °C (T <sub>amb</sub> = 0 to 15 or 30 to 70°C)
Repeatability (ε = 1, t <sub>90</sub> = 1 s, T <sub>amb</sub> = 23°C)	0.1% of measured value in °C + 1°C	
Response Time t <sub>90</sub>	< 1 ms, adjustable up to 10 s ("L" temperature ranges: with dynamical adaption at low signal levels)	
Sighting	Through lens view finder or laser targeting light (max. power level < 1 mW, λ = 630 to 680 nm, CDRH class II)	

Communication and Interface Specifications	
Analog Output	Linear 0 to 20 mA or 4 to 20 mA, DC, switchable; load max. 500 Ohm
Test Current Output	Fixed 10 mA (for 0 to 20 mA analog output) or fixed 12 mA (for 4 to 20 mA analog output)
Serial Interface	Switchable inside the pyrometer: RS232 or RS485 addressable, half duplex; baud rate up to 115 kBd Alternatively: Profibus, Profinet, or Ethernet
Maximum Value Storage	Single or double storage; cleared by: preselected time interval; external deletion contact or via digital interface; automatically with the next measuring object
Parameters	Adjustable at the instrument or via serial interface: emissivity; response time; analog output; address; baud rate; waiting period t <sub>W</sub> ; temperature unit °C or °F; setting of the maximum value storage; temperature sub range

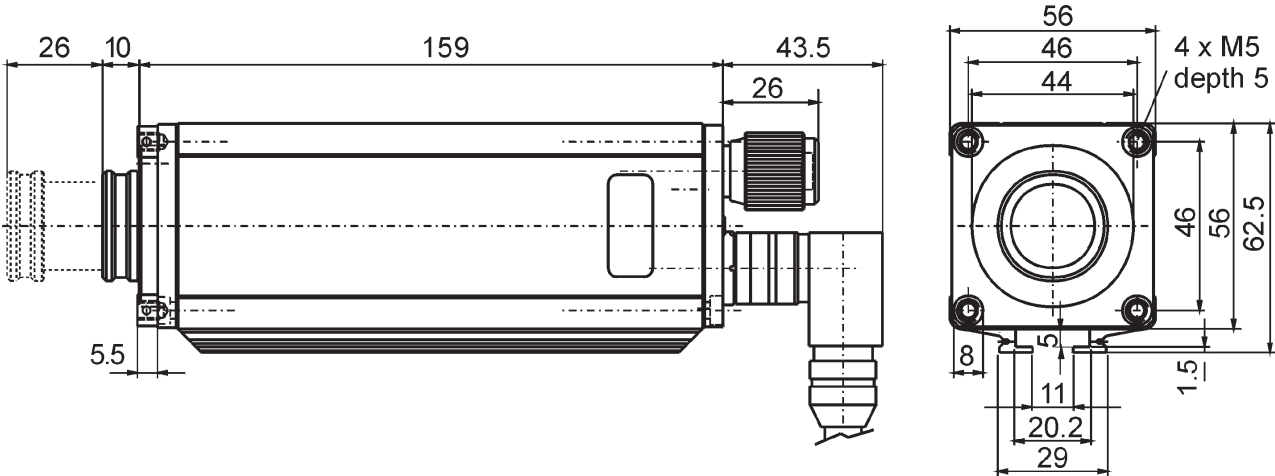
Electrical Specifications	
Power Supply	24 V AC/DC (14 to 30 V AC/DC) (AC: 48 to 62 Hz)
Power Consumption	Max 2 VA
Isolation	Power supply, analog output, and digital interface are galvanically isolated from each other

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 electromagnetic immunity

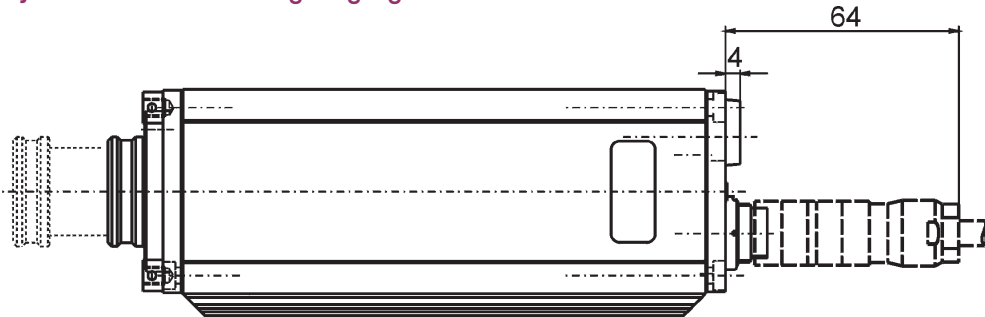
<sup>1</sup> MB is a shortcut used for temperature range (in German: Messbereich).  
The determination of the technical data of this pyrometer is carried out in accordance with VDI/VDE IEC TS 62942-2, the calibration / adjustment in accordance with VDI/VDE 3511, Part 4.4.

**DIMENSIONS**

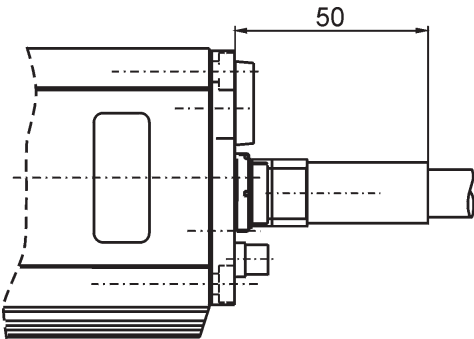
**Pyrometer With Through Lens Viewfinder**



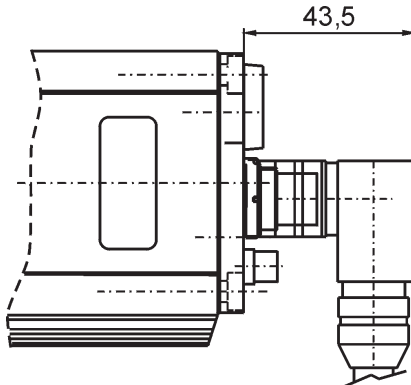
**Pyrometer With Laser Targeting Light**



**Straight Profibus, Profinet, or Ethernet Connector**



**Angled Profibus, Profinet, or Ethernet Connector**



Dimensions in mm

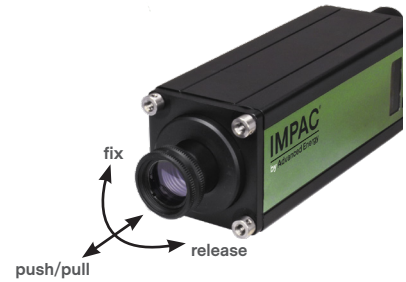
OPTICS

IS 140 and IGA 140 Focusable Optics<sup>1</sup>

Optics	Measuring Distance a [mm]	Spot Size M [mm]
1	130	0.35
	160	0.5
	200	0.7
2	190	0.5
	300	0.8
	420	1.3
3	340	0.9
	2000	6.5
	4000	15

The series 140 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 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.



<sup>1</sup> Aperture D (depends on the objective distance): Basic temperature range up to 1500°C: 14 to 16 mm; Basic temperature range above 1500°C: 8 to 9 mm

SIGHTING OPTIONS

For exact aiming to the object, different alignment systems are available:

- Laser targeting light: the laser targeting light is a red laser beam used to align the pyrometer to a target. The laser marks the center of the measuring spot. The laser targeting light can be used during operation without effecting the measurement.
- Through lens view finder: the view finder can be used to align the measured object through direct observation. The view finder is true-sided and parallax-free; a circle marks the position of the measuring area.

Pyrometer With Laser Targeting Light

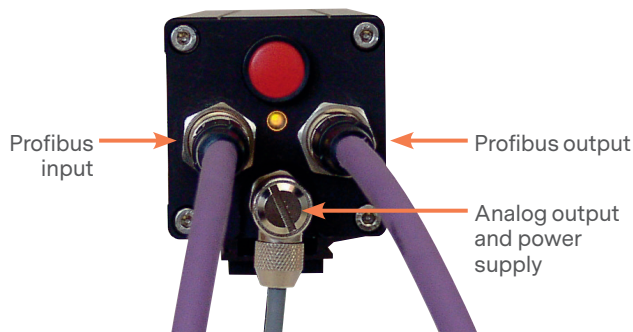


Pyrometer With Through Lens View Finder



**PROFIBUS, PROFINET, AND ETHERNET INTERFACE**

Alternatively to the RS232/RS485 interface, the pyrometers are also available with built in Profibus-DP (PB types), Profinet (PN types) or Ethernet (ET types) interface. The PB and PN types can easily be integrated in existing Profibus and Profinet systems, respectively. The GSD (Profibus) and GSDML (Profinet) files are part of standard delivery and offer a selection of five different module configurations corresponding to your requirements. The project planning can be done with any project tool.



**PROFIBUS, PROFINET, AND ETHERNET REFERENCE NUMBERS**

**IS 140 -PB, -PN, and -ET**

Temperature Range	MB	Profibus DP		Profinet		Ethernet	
		Targeting Light	View Finder	Targeting Light	View Finder	Targeting Light	View Finder
550 to 1400°C	14	3 876 100	3 876 110	3 908 100	3 908 110	3 912 100	3 912 110
600 to 1600°C	16	3 876 120	3 876 130	3 908 120	3 908 130	3 912 120	3 912 130
650 to 1800°C	18	3 876 140	3 876 150	3 908 140	3 908 150	3 912 140	3 912 150
750 to 2500°C	25	3 876 160	3 876 170	3 908 160	3 908 170	3 912 160	3 912 170
900 to 3300°C	33	3 876 180	3 876 190	3 908 180	3 908 190	3 912 180	3 912 190
550 to 1800°C	18L	3 876 200	3 876 210	3 908 200	3 908 210	3 912 200	3 912 210
1100 to 3500°C	35L	3 876 280	3 876 290	-	-	-	-

**IGA 140 -PB, -PN, and -ET**

Temperature Range	MB	Profibus DP		Profinet		Ethernet	
		Targeting Light	View Finder	Targeting Light	View Finder	Targeting Light	View Finder
300 to 1300°C	13	3 876 300	3 876 310	3 908 300	3 908 310	3 912 300	3 912 310
350 to 1800°C	18	3 876 320	3 876 330	3 908 320	3 908 330	3 912 320	3 912 330
450 to 2500°C	25	3 876 340	3 876 350	3 908 340	3 908 350	3 912 340	3 912 350
250 to 1350°C	13.5L	3 876 360	3 876 370	3 908 360	3 908 370	3 912 360	3 912 370
300 to 2000°C	20L	3 876 380	3 876 390	3 908 380	3 908 390	3 912 380	3 912 390
350 to 2500°C	25L	3 876 400	3 876 410	3 908 400	3 908 410	3 912 400	3 912 410

**Connection Cables**

A connection cable for power supply and analog output is not included in scope of delivery and must be ordered separately. The Profibus, Profinet, or Ethernet cables are customer provided.

**Ordering Notes**

When ordering please specify the following:

- One focusable optics
- If required, the adjustment of a sub range
- Analog output: 0 to 20 mA or 4 to 20 mA

REFERENCE NUMBERS

IS 140			
Temperature Range	MB	Targeting Light	View Finder
550 to 1400°C	14	3 875 100	3 875 110
600 to 1600°C	16	3 875 120	3 875 130
650 to 1800°C	18	3 875 140	3 875 150
750 to 2500°C	25	3 875 160	3 875 170
900 to 3300°C	33	3 875 180	3 875 190
550 to 1800°C	18L	3 875 200	3 875 210
650 to 1400°C	14 <sup>1</sup>	3 875 290	-
750 to 3500°C	35L	-	3 875 270
1100 to 3500°C	35L <sup>2</sup>	-	3 875 280
1000 to 2000°C	20 <sup>3</sup>	3 875 240	-

<sup>1</sup> Forging version

<sup>2</sup> 0.676 µm version

<sup>3</sup> 0.55 µm version

IGA 140			
Temperature Range	MB	Targeting Light	View Finder
300 to 1300°C	13	3 875 300	3 875 310
350 to 1800°C	18	3 875 320	3 875 330
450 to 2500°C	25	3 875 340	3 875 350
220 to 1500°C	11.5L	3 875 440	-
250 to 1350°C	13.5L	3 875 360	3 875 370
300 to 2000°C	20L	3 875 380	3 875 390
350 to 2500°C	25L	3 875 400	3 875 410
300 to 3000°C	30L	-	3 875 470

**Scope of Delivery**

Pyrometer with one optics, works certificate, InfraWin operating and analyzing software.

**Ordering Notes**

When ordering please select one focusable optics. A connection cable (and a video cable for the instruments with video module) is not included in scope of delivery and has to 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
3 890 650	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
3 843 520	SCA 140, Ruggest scanner with quartz glass window (scanning angle adjustable 0 to 12°, scanning frequency adjustable 1 to 5 Hz)
3 835 290	Air purge for scanner SCA 140
3 834 280	Adjustable mounting angle
3 834 270	Ball and socket mounting
3 835 230	Air purge
3 897 290	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

## CONNECTION CABLES FOR INSTRUMENTS WITH PROFIBUS, PROFINET, OR ETHERNET INTERFACE

PN	Description
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



For international contact information,  
visit [advancedenergy.com](http://advancedenergy.com).

[sales.support@aei.com](mailto: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

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