

# 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 µs
- 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 µm

IGA 140  
1.45 to 1.8 µm

### 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

## IMPAC IS 140 AND IGA 140 SERIES

### 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 $\mu\text{m}$                                                                       |                                                                   |
|                                                                                                     | IGA 140 (all versions): 1.45 to 1.8 $\mu\text{m}$                                                                     |                                                                   |
| Resolution                                                                                          | 0.1°C on interface                                                                                                    |                                                                   |
|                                                                                                     | < 0.1% of the adjusted temperature sub range at the analog output                                                     |                                                                   |
| Emissivity $\epsilon$                                                                               | 10.0 to 100.0% adjustable via interface in steps of 0.1%                                                              |                                                                   |
| Measurement Uncertainty<br>( $\epsilon = 1$ , $t_{90} = 1$ s, $T_{\text{amb}} = 23^\circ\text{C}$ ) | 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 ( $T_{\text{amb}} = 15$ to 30°C)           |
|                                                                                                     |                                                                                                                       | 1.2% of reading in °C ( $T_{\text{amb}} = 0$ to 15 or 30 to 70°C) |
| Repeatability<br>( $\epsilon = 1$ , $t_{90} = 1$ s, $T_{\text{amb}} = 23^\circ\text{C}$ )           | 0.1% of measured value in °C + 1°C                                                                                    |                                                                   |
| Response Time $t_{90}$                                                                              | < 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, $\lambda = 630$ 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<br>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 $t_w$ ; 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 |

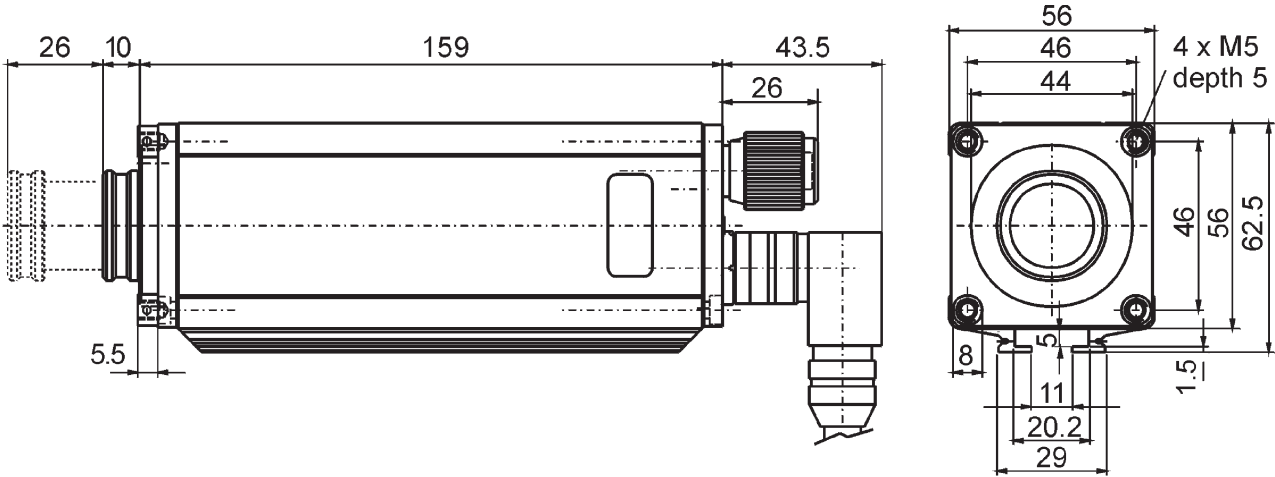
| Environmental Specifications |                                                             |
|------------------------------|-------------------------------------------------------------|
| Protection Class             | IP65 (DIN 40 050)                                           |
| Ambient Temperature          | 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 electromagnetical immunity |

<sup>1</sup> MB is a shortcut used for temperature range (in German: Messbereich).

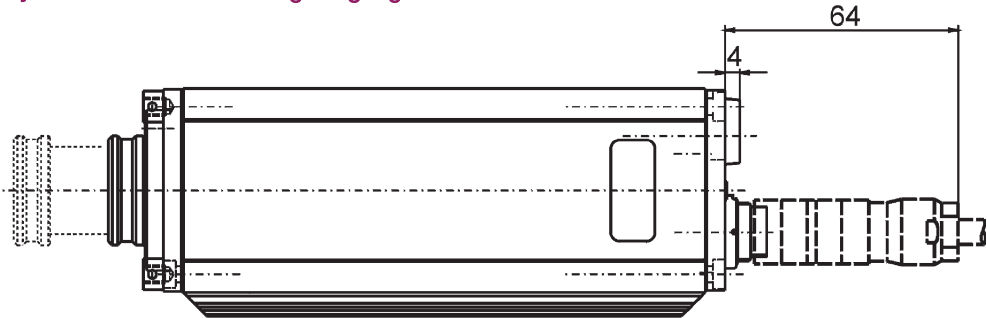
The determination of the technical data of this pyrometer is carried out in accordance with VDI/VDE IEC TS 62942-2, the calibration / adjustment in accordance with VDI/VDE 3511, Part 4.4.

DIMENSIONS

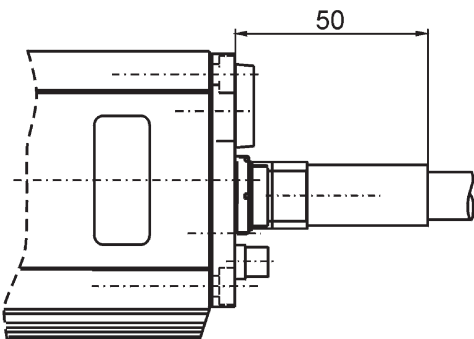
Pyrometer With Through Lens Viewfinder



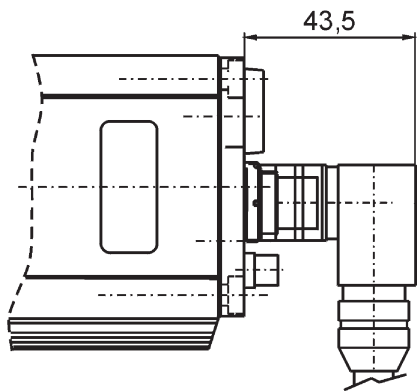
Pyrometer With Laser Targeting Light



Straight Profibus, Profinet, or Ethernet Connector



Angled Profibus, Profinet, or Ethernet Connector



Dimensions in mm

IMPAC IS 140 AND IGA 140 SERIES

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

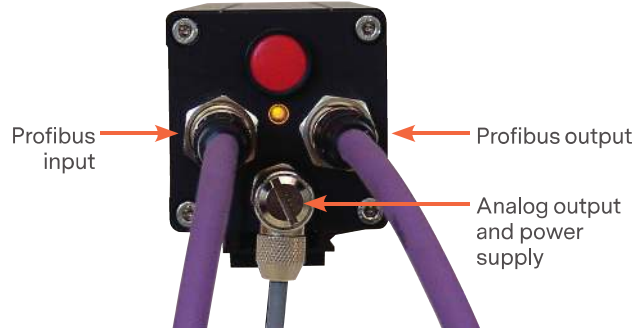


Pyrometer With Through Lens View Finder



## 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

## IMPAC IS 140 AND IGA 140 SERIES

### 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 $\Rightarrow$ 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

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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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