IMPAC IPE 140

Highly accurate, fully digital pyrometer with focusable optics for non-contact temperature measurements on metals, ceramics, graphite, etc. between 5 and 1200°C (41 to 2192°F).

The Impac® IPE 140 is a digital, highly accurate infrared thermometer for non-contact temperature measurement on metals, ceramics, graphite, etc. Different focusable optics with extremely small spot sizes are available for optimal match of the instrument to the application. The pyrometer parameters can be selected via the integrated key pad. These settings are indicated on the built-in LCD display. In measuring mode, the actual temperature is indicated.

PRODUCT HIGHLIGHTS

- Short response times, min. 1.5 ms
- Focusable optics with small spot sizes, min. 0.9 mm
- Built-in digital display with temperature indication
- 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

TYPICAL APPLICATIONS

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

AT A GLANCE

Temperature Ranges

5 to 500°C (41 to 932°F)
30 to 1000°C (86 to 1832°F)
50 to 1200°C (122 to 2192°F)

Spectral Range

3 to 5 µm

Measurement Uncertainty

< 400°C: 2.5°C
> 400°C: 0.4% oR +1°C

Repeatability

0.1% oR + 1°C

Optics

4 focusable optics:
a = 71 to 90 mm
a = 105 to 150 mm
a = 200 to 440 mm
a = 345 to 4300 mm

Alignment

Laser targeting or through lens sighting

IMPAC IPE 140

TECHNICAL DATA

Measurement Specifications

Temperature Range	5 to 500°C (41 to 932°F) (MB 5)	
	30 to 1000°C (86 to 1832°F) (MB 10)	
	50 to 1200°C (122 to 2192°F) (MB 12)	
Sub Range	Any range adjustable within the temperature range, minimum span 51°C	
Spectral Ranges	3 to 5 µm	
Signal Processing	Alternating light signal, digitized immediately	
Resolution	Interface and display: 0.1°C	
	Analog output: < 0.03% of temperature range	
Measurement Uncertainty ($\varepsilon = 1$, $t_{90} = 1$ s, $T_{amb.} = 23°C$)	MB 5	5 to 30°C: 2°C
		30 to 400°C: 2.5°C
		> 400°C: 0.4% of reading in °C + 1°C
	All others	< 400°C: 2.5°C
		> 400°C: 0.4% of reading in °C + 1°C
Repeatability[1] ($\varepsilon = 1$, $t_{90} = 1$ s, $T_{amb.} = 23°C$)	MB 5	5 to 30°C: 2°C
		> 30°C: 0.1% of reading in °C + 1°C
	All others	0.1% of reading in °C + 1°C
Emissivity ε	10 to 100% adjustable in steps of 0.1%	

Communication 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
Exposure Time t_{90}	1.5 ms, with dynamical adaption at low signal levels; adjustable up to 10 s
Maximum Value Storage	Single or double storage
	Cleared by: preselected time interval or external deletion contact or via digital interface or automatically with the next measuring object

Electrical Specifications

Power Supply	24 VAC/DC (14 to 30 V AC/DC) (AC: 48 to 62 Hz)
Power Consumption	Max 6 VA
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 53°C (32 to 127.4°F) at housing
Storage Temperature	-20 to 60°C (-4 to 140°F)
Relative Humidity	Non-condensing conditions
Weight	~550 g (~1.21 lbs)
Dimensions (L x W x D)	195 mm x 56 mm x 62.5 mm (7.68" x 2.20" x 2.46")

[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.

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TECHNICAL DATA (CONTINUED)

| Environmental Specifications	
Housing	Stainless steel
Mechanical Tests	Vibration proof corresponding DIN EN 60068-2-6, shock proof corresponding DIN EN 60068-2-27
CE Label	According to EU directives about electromagnetical immunity

Interface Specifications	
Sighting	Laser targeting light (max. power level < 1 mW, λ = 630-680 nm, CDRH class II) or through lens view finder
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

DIMENSIONS

Pyrometer With Through Lens View Finder
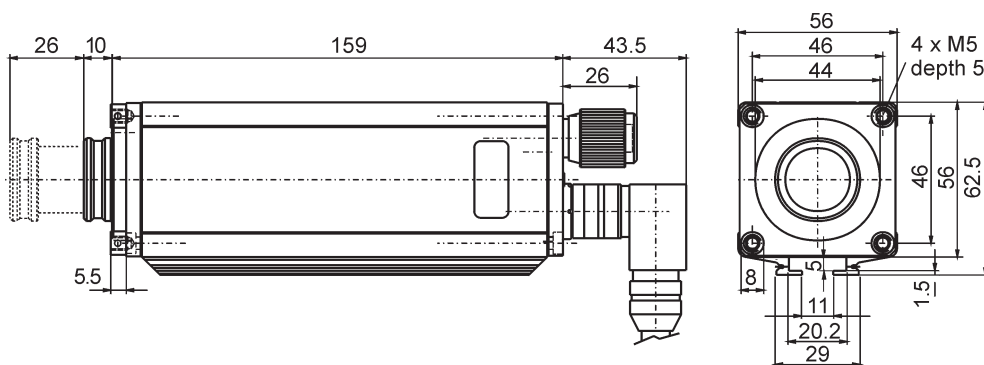
Pyrometer With Laser Targeting Light

Dimensions in mm

IMPAC IPE 140
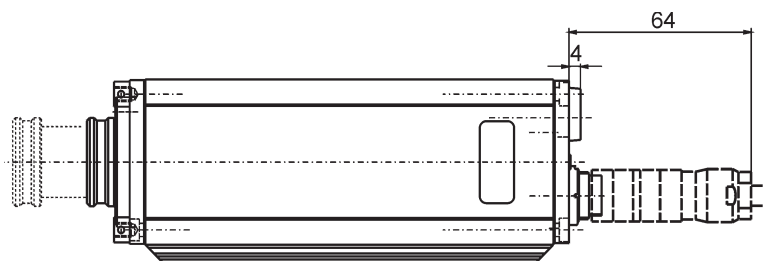
OPTICS

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.

fix

push/pull

release

IPE 140				
Optics	Measuring Distance a [mm]	Spot Diameter M [mm]		
		MB 5	MB 10	MB 12
0-PE	71	1.6	-	-
	78	2.0	-	-
	90	2.4	-	-
1-PE	105	2.4	1.1	0.9
	120	2.9	1.3	1.0
	150	4.1	1.7	1.4
2-PE	200	4.2	1.8	1.4
	260	5.7	2.4	1.8
	440	11.4	4.6	3.5
3-PE	345	6.8	2.9	2.3
	580	12.6	5.1	4
	1000	23	9.2	7.1
	4300	105	42	32
Aperture D [mm]		14 to 17		

SIGHTING OPTIONS

Pyrometer With Laser Targeting Light

Laser button

Pyrometer With Through Lens View Finder

View finder

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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

IPE 140			
Temperature Range		With Laser Targeting Light	With Through Lens View Finder
MB 5	5 to 500°C	3 875 740	3 875 750
MB 10	30 to 1000°C	3 875 720	3 875 730
MB 12	50 to 1200°C	3 875 700	3 875 710

Scope of Delivery

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

Ordering Notes

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

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
3 852 550	Power supply NG 2D for DIN rail mounting; 85 to 265 VAC $\Rightarrow$ 24 VDC, 600 mA with 2 settable limit switches
3 852 440	Protocol transducer RS485/RS232 (switch.) $\Leftrightarrow$ Profibus-DP for 1 device
3 852 460	Protocol transducer RS485 $\Leftrightarrow$ Profibus DP for 32 devices
3 852 620	Protocol converter UPP RS485 or RS232 $\Leftrightarrow$ ProfiNet, for 1 pyrometer
3 852 630	Protocol converter UPP RS485 $\Leftrightarrow$ ProfiNet, for max. 32 pyrometers
3 891 220	DA 4000: LED-display, 2-wire power supply, 2 limit switches (relay contacts), 115 VAC
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
3 826 510	PI 6000: PID programmable controller, very fast, for digital Impac pyrometers
3 843 530	SCA 140, Rugged scanner with CaF2 window for IPE 140
3 835 290	Air purge for scanner SCA 140
3 834 270	Ball and socket mounting
3 834 280	Adjustable mounting angle
3 835 230	Air purge
3 897 290	Cooling jacket, stainless steel
3 834 200	Ball and socket mounting
3 837 240	Cooling plate
3 835 460	90° mirror for IPE 140
3 848 600	Replacement optics 0-PE for IPE 140, a = 70 to 90
3 848 370	Replacement optics 1-PE for IPE 140, a = 105 to 150
3 848 380	Replacement optics 2-PE for IPE 140, a = 200 to 440
3 848 390	Replacement optics 3-PE for IPE 140, a = 345 to 4300

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.
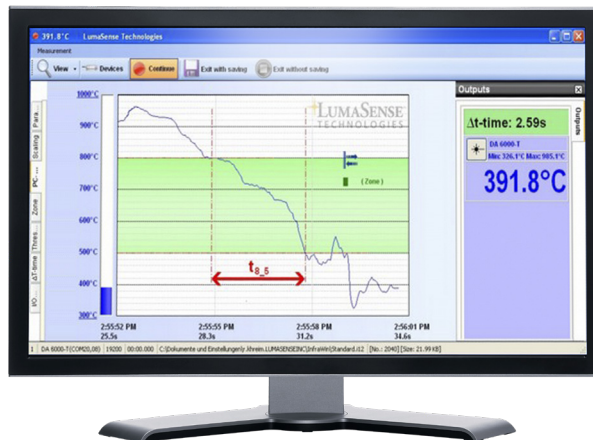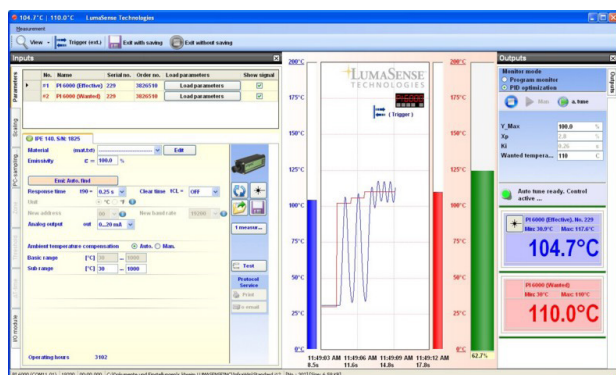
Measurement with Color Bar

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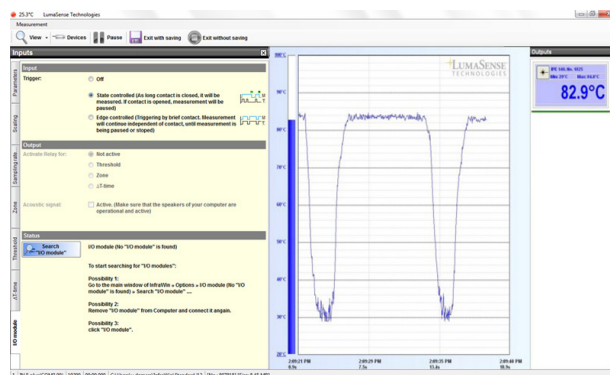
I/O Module allows users to trigger measurement externally and gives a potential free output contact.

ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. We design and manufacture 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

Advanced Energy®

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