

# IMPAC IS 50-LO PLUS AND IGA 50-LO PLUS SERIES

Pyrometer with fiber optics for non-contact measurements on metals, ceramics, graphite, etc. with temperature ranges between 250 and 3500°C.



The Impac® pyrometers IS 50-LO plus and IGA 50-LO plus are digital, highly accurate infrared measuring instruments with fiber optics for non-contact temperature measurement on metals, ceramics, graphite, etc. between 250 and 3500°C. The IS 50/055-LO plus and IS 50/067-LO plus are special versions with extremely short wavelengths where e.g. molten metal has a very high emissivity. The instrument type IS 50-Si-LO plus is optimized for measurements on silicon wafers, e.g. in vacuum chambers. The IS 50-AI-LO plus is specially designed for measurements on aluminum parts and profiles.

## PRODUCT HIGHLIGHTS

- Very short response time below 1 ms
- Extremely small spot sizes, min. 0.45 mm with laser targeting light
- Built-in LC display
- Parameter adjustments via integrated key pad or interface
- Interface RS232 / RS485 switchable
- Test current output

## TYPICAL APPLICATIONS

- |                              |               |
|------------------------------|---------------|
| ■ Metal molds                | ■ Sintering   |
| ■ Pressing tools             | ■ Soldering   |
| ■ Bearings, bearing housings | ■ Rolling     |
| ■ Preheating                 | ■ Brazing     |
| ■ Annealing                  | ■ Normalizing |
| ■ Tempering                  |               |

## AT A GLANCE

### Temperature Ranges

- IS 50-LO plus  
550 to 2000°C (1022 to 3632°F)
- IS 50/055-LO plus  
1000 to 2300°C (1832 to 4172°F)
- IS 50/067-LO plus  
1100 to 3500°C (2012 to 6332°F)
- IS 50-AI-LO plus  
400 to 1000°C (752 to 1832°F)
- IS 50-Si-LO plus  
400 to 1600°C (752 to 2912°F)
- IGA 50-LO plus  
300 to 2500°C (572 to 4532°F)

### Measurement Uncertainty

- 0.3% oR in °C + 1°C (< 1500°C)
- 0.5% oR in °C + 1°C (> 1500°C)

### Repeatability

- 0.1% oR in °C + 1°C

**OVERVIEW**

The instruments are equipped with a fiber and an exchangeable optical head. The fiber and optical head are unaffected by electromagnetic interferences (e.g. induction) and can be used in high ambient temperatures up to 250°C.

Two different types of optical heads for different measuring distances and very small spot sizes are available. A laser targeting light enables the exact alignment onto the measuring object.

The very short response time of below 1 ms facilitates the measurement of fastest heating processes. The pyrometers are equipped with a display which shows in measuring mode the current temperature. Additionally, all parameters can be read when they are changed via the integrated keys at the instrument.

The temperature can be displayed and stored via serial interface and the software InfraWin. Parametrizing can also be done via interface or InfraWin.

**TECHNICAL DATA**

Measurement Specifications		
Temperature Ranges	IS 50-LO plus	550 to 1400°C (1022 to 2552°F) (MB 14)
		600 to 1600°C (1112 to 2912°F) (MB 16)
		650 to 1800°C (1202 to 3272°F) (MB 18)
		750 to 2500°C (1382 to 4532°F) (MB 25)
		900 to 3300°C (1652 to 5972°F) (MB 33)
		550 to 1800°C (1022 to 3272°F) (MB 18L)
		600 to 2000°C (1112 to 3632°F) (MB 20L)
	IS 50/055-LO plus	1000 to 2300°C (1832 to 4172°F) (MB 23)
	IS 50/067-LO plus	1100 to 3500°C (2012 to 6332°F) (MB 35)
	IS 50-Al-LO plus	400 to 1000°C (752 to 2912°F) (MB 10)
	IS 50-Si-LO plus	400 to 1300°C (752 to 1832°F) (MB 13)
		500 to 1600°C (932 to 2912°F) (MB 16)
	IGA 50-LO plus	300 to 1300°C (572 to 2372°F) (MB 13)
		350 to 1800°C (1112 to 3272°F) (MB 18)
450 to 2500°C (842 to 4532°F) (MB 25)		
250 to 1350°C (482 to 2462°F) (MB 13, 5L)		
300 to 2000°C (572 to 3632°F) (MB 20L)		
	350 to 2500°C (662 to 4532°F) (MB 25L)	
Sub Range	Any range adjustable within the temperature range, min span 51°C	
Spectral Range	IS 50-LO plus	0.7 to 1.1 µm
	IS 50/055-LO plus	0.55 µm
	IS 50/067-LO plus	0.676 µm
	IS 50-Al-LO plus and IS 50-Si-LO plus	Narrow band in the near infrared
	IGA 50-LO plus	1.45 to 1.8 µm

<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.

TECHNICAL DATA (CONTINUED)

Measurement Specifications	
Signal Processing	Photoelectric current, digitized immediately
Resolution	Interface and display: 0.1 °C
	Analog output: < 0.1% of the adjusted temperature range
Measurement Uncertainty ( $\epsilon = 1$ , $t_{90} = 1$ s, $T_{amb} = 23^{\circ}\text{C}$ )	Below 1500°C: 0.3% of measured value in °C+ 1°C
	Above 1500°C: 0.5% of measured value in °C
Repeatability ( $\epsilon = 1$ , $t_{90} = 1$ s, $T_{amb} = 23^{\circ}\text{C}$ )	0.1% of reading in °C + 1°C
Emissivity $\epsilon$	20 to 100% adjustable inside the instrument or via interface in steps of 0.1%
Exposure Time $t_{90}$	< 1 ms; adjustable to 0.01 s, 0.05 s, 0.25 s, 1 s, 3 s, 10 s
Sighting	Laser targeting (max power level < 1 mW, $\lambda = 630$ to 680 nm, CDRH class II)
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 or DC (12 to 30 VAC or DC) (AC: 48 to 62 Hz)
Power Consumption	Max 2 W
Isolation	Power supply, digital interface, analog output are galvanically isolated against each other

Environmental Specifications	
Operating Temperature (At the converter housing)	IS 50-LO plus and IGA 50-LO plus: 0 to 60°C (32 to 140°F) on the converter, up to 250°C (482°F) on side of fiber/ optical head
	IS 50-Si-LO plus and IS 50-AI-LO plus: 20 to 30°C (68 to 86°F) on the converter, up to 250°C (482°F) on side of fiber/ optical head
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	Non-condensing conditions
Weight	Converter: 600 g (~1.32 lbs)
	Optical head II: 140 g (~4.94 oz)
	Fiber (2.5 m): 250 g (~8.82 oz)
Protection Class	IP54
CE Label	According to EU directives about electromagnetic immunity

Interface and Communication Specifications	
Analog Output	Linear 0 to 20 mA or 4 to 20 mA, DC, switchable; load max. 500 Ohm
Serial Interface	Switchable: RS232 or RS485 (addressable), half duplex, baud rate 1.2 up to 115 kBd
Display	Illuminated LC display for temperature indication or parameter settings
Switch Contact	Max. 0.15 A (to recognize a hot object in the measuring beam)
Test Current Output	Fixed 10 mA (for 0 to 20 mA analog output) or fixed 12 mA (for 4 to 20 mA analog output) for inspection of wiring and connected instruments
Parameters	Adjustable at the instrument or via serial interface: emissivity $\epsilon$ , exposure time $t_{90}$ , analog output, address, baud rate, waiting time, °C / °F, setting of the maximum value storage, temperature sub range

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## FIBER

The transmission between optical head and converter is done via 0.2 mm (red fiber mark) mono fiber with a stainless steel protection hose (exceptions: IS 50-Si-LO plus, MB 13: 0.4 mm mono fiber (blue mark) and IS 50-AI-LO plus: 0.6 mm mono fiber (green mark)).

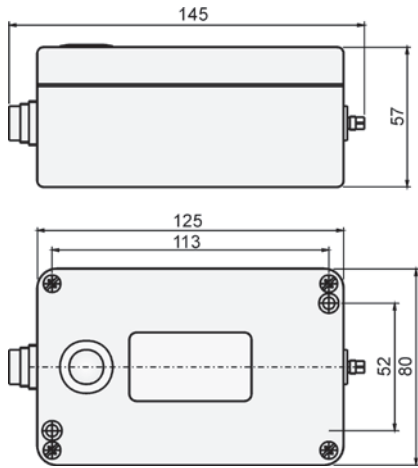
The optical head contains only the lens, the sensor and the electronics are located in the converter. Fiber and optical head can be used in ambient temperatures up

to 250 °C without additional cooling (fiber at converter side max. 125 °C)

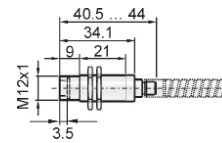
Minimum Bending Radius (in mm)			
	Red	Blue	Green
for short time (max 250°C)	50	100	150
permanent (max 250°C)	120	300	500
wound up (max 50°C)	120	300	500

## PRODUCT SCHEMATIC

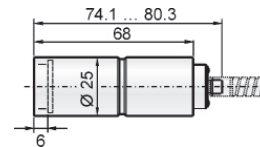
Converter



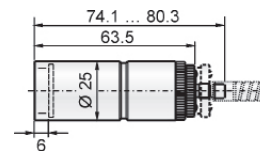
Optical head type I



Optical head type II (Fixed adjusted)

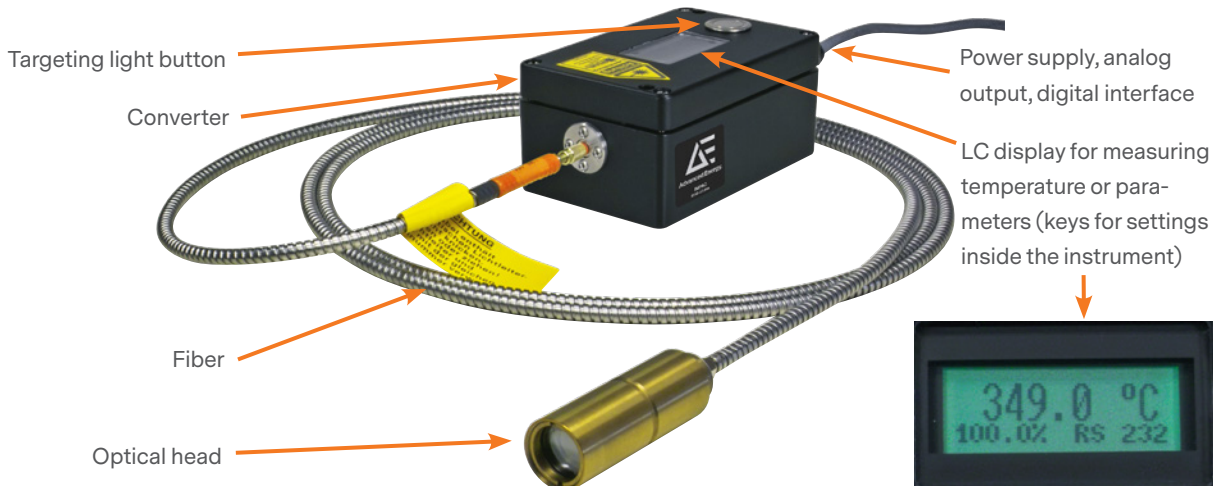


Optical head type II (Focusable)



All dimensions in mm

## FEATURES



**OPTICAL HEAD**

Depending on the application the instrument will be delivered with a small or a large optical head. The selection of the optical head depends not only on its size but also on the required spot size (size of the measuring object) and the measuring distance.

**Optical Head I**

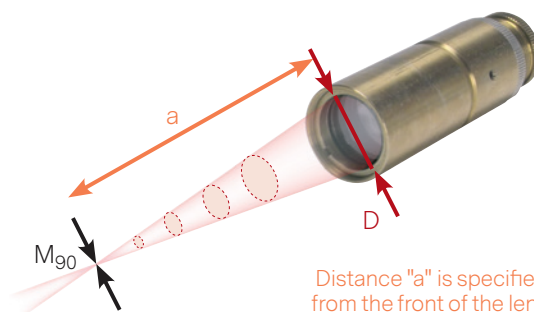
With the very small dimensions the optical head I is suited for use in confined spaces. The optics is adjusted to one of the measuring distances mentioned in the table. The mentioned spot size will be achieved in exactly this distance (other distances on request).




**Optical Head II**

The optics II is bigger, but smaller spot sizes can be achieved. Two designs are available, fixed adjusted or focusable.

Similar to optics I, the fixed adjusted type is adjusted to one of the measuring distances mentioned in the table (other distances on request).

The focusable type is available for 6 different distance ranges. Each measuring distance can be adjusted within the mentioned limits to achieve the smallest spot size in the required distance.



Optics for ISR 12-LO and IGAR 12-LO					
Optical Head	Measuring Distance a [mm]	Spot Size M <sub>90</sub> [mm]			Aperture D [mm]
		IS 50-LO plus IS 50/055-LO plus IS 50/067-LO plus IS 50-Si-LO plus, MB 16 IGA 50-LO plus	IS 50-Si-LO plus MB 13	IS 50-AI-LO plus	
 <p>Optical head I</p>	Adjusted to: 120	1.2	2.2	3.3	7
	Adjusted to: 260	2.6	5	7.5	7
	Adjusted to: 700	7.2	14	21	7
 <p>Optical head II (fixed adjusted)</p>	Adjusted to: 87	0.45	0.75	1.1	17
	Adjusted to: 200	0.8	1.5	2.3	17
	Adjusted to: 600	2.7	5.3	8.0	15
	Adjusted to: 4500	22	42	63	15
 <p>Optical head II (focusable)</p>	Range: 88 to 110	0.45 to 0.6	0.8 to 1.1	1.2 to 1.7	17
	Range: 95 to 129	0.5 to 0.75	0.9 to 1.3	1.4 to 2.0	16
	Range: 105 to 161	0.6 to 1	1.1 to 1.7	1.7 to 2.6	15
	Range: 200 to 346	0.8 to 1.5	1.5 to 2.8	2.3 to 4.2	17
	Range: 247 to 606	1.1 to 2.7	2.0 to 5.2	3.0 to 7.8	16
	Range: 340 to 4500	1.5 to 22	2.8 to 42	4.2 to 63	15

## IMPAC IS 50-LO PLUS AND IGA 50-LO PLUS SERIES

### REFERENCE NUMBERS

The Series 50-LO plus pyrometers can be configured with different optical fiber lengths and optical heads as well as with various optional extras. To determine the part number and the price for the desired combination, please contact your Advanced Energy sales representative.

#### Scope of Delivery

Converter, optical fiber and optical head as per configuration, works certificate, PC software InfraWin, and user manual.

#### Ordering Note

A connection cable is not included in the scope of delivery and needs to be ordered separately.

### ACCESSORIES

PN	Description
3 820 330	Connection cable, straight connector, 5 m
3 820 500	Connection cable, straight connector, 10 m
3 820 510	Connection cable, straight connector, 15 m
3 820 810	Connection cable, straight connector, 20 m
3 820 820	Connection cable, straight connector, 25 m
3 820 520	Connection cable, straight connector, 30 m
3 820 740	Connection cable, straight connector, 5 m, temperature resistant up to 200°C
3 852 290	Power supply NG DC 100 to 240 VAC ⇒ 24 VDC, 1 A
3 852 550	Power supply NG 2D for DIN rail mounting; 85 to 265 VAC ⇒ 24 VDC, 600 mA with 2 settable limit switches
3 852 440	Protocol transducer RS485/RS232 (switch.) ⇔ Profibus-DP for 1 device
3 852 460	Protocol transducer RS485 ⇔ Profibus DP for 32 devices
3 852 620	Protocol converter UPP RS485 or RS232 ⇔ ProfiNet, for 1 pyrometer
3 852 630	Protocol converter UPP RS485 ⇔ 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
3 890 570	DA 6000-N digital display, to allow adjustment of pyrometer through RS485 interface
3 890 520	DA 6000: LED digital display, digital and analog input, 2 limit switches, maximum value storage, analog output, RS232
3 890 530	DA 6000: like the DA 6000-N, but with analog input and 2 limit switches for the RS485 interface.
3 890 150	DA 6000-T, digital display, for measurement of the cool down time $t_{8-5}$ from 800 to 500°C (for welding processes)
3 826 510	PI 6000: PID programmable controller, extremely fast, for digital Impac pyrometers
3 838 280	Laser protection filter for fiber vario-optics (built in), 920 to 1100 nm, for IGAR 12-LO
3 834 390	Ball and socket mounting for optical head I or II
3 834 230	Adjustable mounting support for optical head II
3 835 170	Air purge unit, stainless steel, for optical head I
3 835 180	Air purge unit, stainless steel, for optical head II
3 835 240	Air purge unit with 90° mirror for optical head II

**INFRAWIN 5 OVERVIEW**

InfraWin is easy-to-use measurement and evaluation software for remote configuration of stationary, digital Impac brand pyrometers.

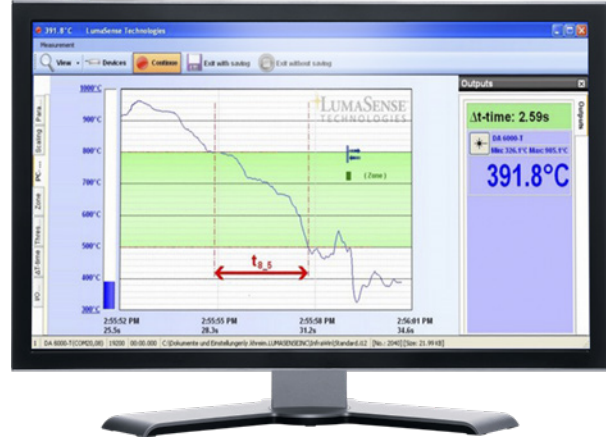
This software allows the user to remotely adjust and control settings for one or two pyrometers from a single computer. InfraWin also allows the user to simultaneously monitor and control temperatures.

- 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.



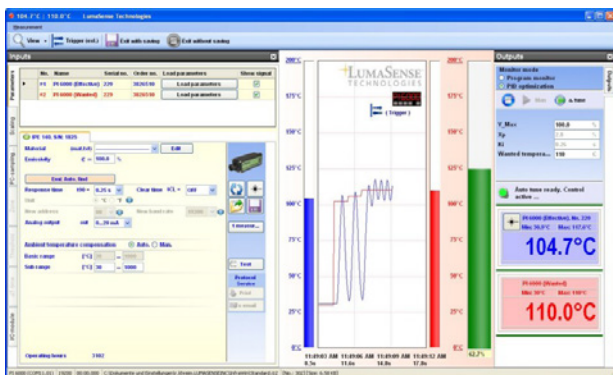
**Measurement with Color Bar**

In this window a temperature value for the upper or lower limit can be adjusted numerically or with the mouse.

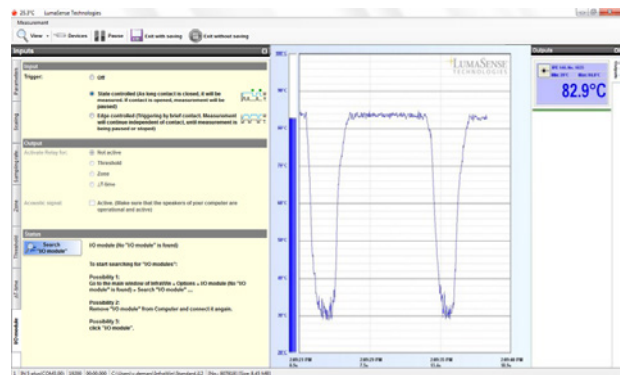
The acquired minimum and maximum value is indicated as well as the inner temperature of the pyrometer. The emissivity is changeable during the measurement at any time.

**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.

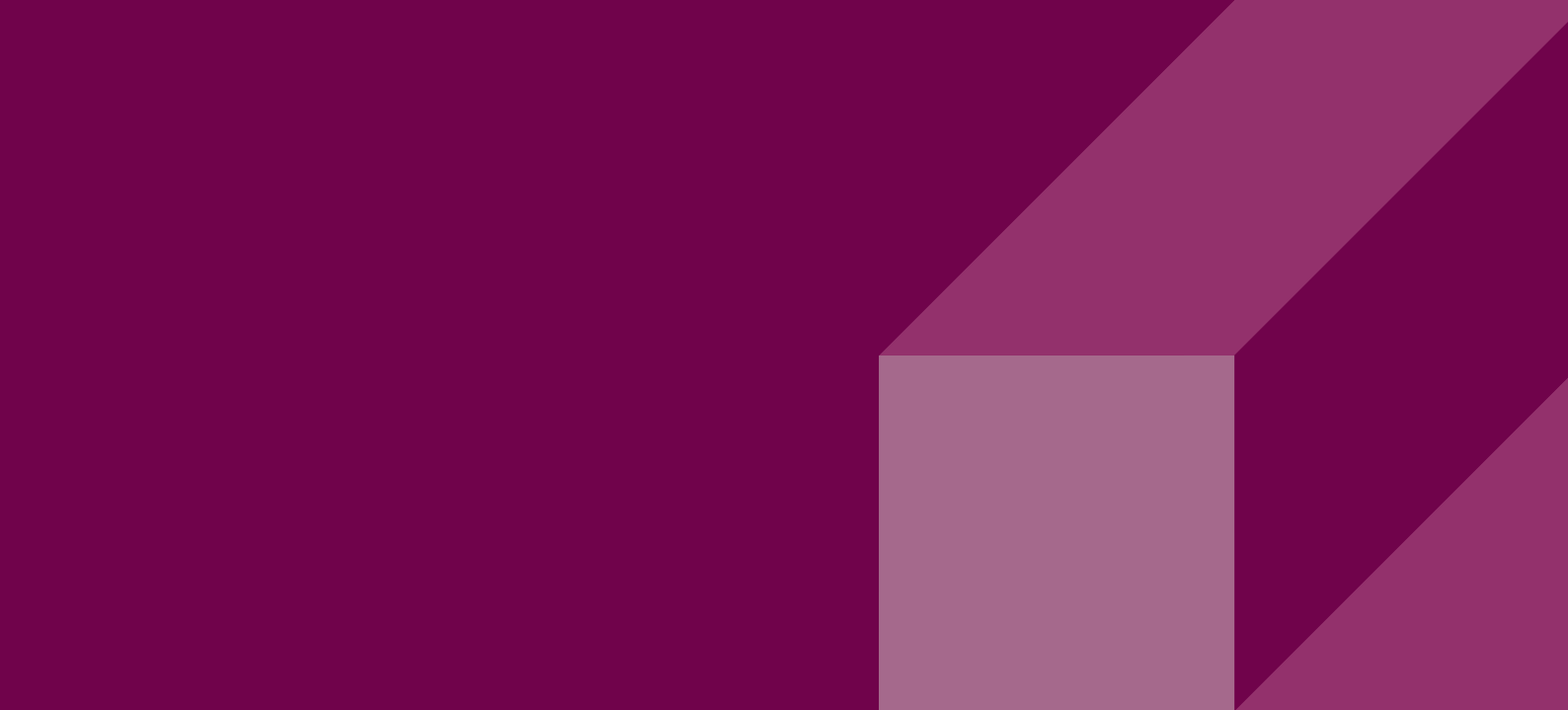


Measurement with Internal Temperature of radiation temperature and internal instrument temperature. Parameters can be changed during the measurement.



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. 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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