IMPAC ISR 12-LO AND IGAR 12-LO

Digital 2-color pyrometer with fiber optics for temperature measurement on metals, ceramics, graphite, etc. between 300 and 3300°C.

The Impac® ISR 12-LO and IGAR 12-LO are digital, highly accurate 2-color infrared thermometers with fiber optics for non-contact temperature measurement. The pyrometers measure using the 2-color principle in which two adjacent wavelength are used to calculate the temperature and can be switched to 1-color mode and used like a conventional pyrometer. The metal mode allows for measurements of metals and alloys with unknown K-factor (emissivity slope). Optical head and fiber can be used in very high ambient temperatures up to 250°C without cooling and are unaffected by electromagnetical interferences.

PRODUCT HIGHLIGHTS

- Extremely fast exposure time
- Very small spot sizes with built-in laser targeting light
- Built-in lens contamination control system
- Switchable 2-color, 1-color, and metal modes
- All parameters adjustable at the instrument
- Output 0 to 20 mA or 4 to 20 mA (switchable)

TYPICAL APPLICATIONS

- Induction heating
- Welding
- Casting
- Forging
- Annealing
- Sintering
- Rolling mill
- Rotary kilns
- Glass drop
- Pouring stream
- Research and development
- Laser applications

AT A GLANCE

Temperature Ranges

ISR 12-LO
600 to 1300°C (MB 13)
750 to 1800°C (MB 18)
900 to 2500°C (MB 25)
1000 to 3300°C (MB 33)

IGAR 12-LO
300 to 1000°C (MB 10)
350 to 1300°C (MB 13)
450 to 1700°C (MB 17)
500 to 2200°C (MB 22)
550 to 2500°C (MB 25)

Measurement Uncertainty

ISR 12-LO
0.4% oR in °C + 1°C (< 1500°C)
0.6% oR in °C + 1°C (> 1500°C)

IGAR 12-LO
0.5% oR in °C + 1°C (< 1500°C)
0.7% oR in °C + 1°C (> 1500°C)

Repeatability

ISR 12-LO
0.2% oR in °C + 1°C

IGAR 12-LO
0.3% oR in °C + 1°C

TECHNICAL DATA

Measurement Specifications		
Temperature Ranges	ISR 12-LO	600 to 1300°C (1112 to 2372°F) (MB 13)
		750 to 1800°C (1382 to 3272°F) (MB 18)
		900 to 2500°C (1652 to 4532°F) (MB 25)
		1000 to 3300°C (1832 to 5972°F) (MB 33)
	IGAR 12-LO	300 to 1000°C (572 to 1832°F) (MB 10)
		350 to 1300°C (662 to 2372°F) (MB 13)
		450 to 1700°C (842 to 3092°F) (MB 17)
		500 to 2200°C (932 to 3992°F) (MB 22)
		550 to 2500°C (1022 to 5972°F) (MB 25)
Sub Range	Any range adjustable within the temperature range, min span 51°C	
Spectral Range	ISR 12-LO	Channel 1: 0.8 µm
		Channel 2: 1.05 µm
	IGAR 12-LO (MB 10)	Channel 1: 1.52 µm
		Channel 2: 1.64 µm
	All other MB	Channel 1: 1.28 µm
		Channel 2: 1.65 µm
Resolution	Display: 1°C; Interface: 0.1°C	
	Analog output: < 0.025% of adjusted temperature range	
Accuracy ($K = 1, t_{90} = 1$ s, $T_{amb} = 23$°C)	ISR 12-LO	0.4% of reading in °C + 1°C (< 1500°C)
		0.6% of reading in °C + 1°C (> 1500°C)
	IGAR 12-LO	0.5% of reading in °C + 1°C (< 1500°C)
		0.7% of reading in °C + 1°C (> 1500°C)
Repeatability ($K = 1, t_{90} = 1$ s, $T_{amb} = 23$°C)	ISR 12-LO: 0.2% of reading in °C + 1°C	
	IGAR 12-LO: 0.3% of reading in °C + 1°C	
Signal Processing	Photo current, digitized immediately	
Emissivity Slope K	$\varepsilon_1 / \varepsilon_2$: 0.800 to 1.200 adjustable in steps of 0.001	
Emissivity ε	0.1 to 1 adjustable in steps of 0.001	
Measuring Modes	Adjustable: ratio (2-color), mono (1-color), and metal mode	
Switch-off Limit	2 to 50% in 1% steps	
Exposure Time t_{90}	2 ms (with dynamical adaption at low signal levels), adjustable up to 10 s	
Maximum Value Storage	Built-in single or double storage. Cleared by preselected time interval t_{clear} (off, 0.01 s, 0.05 s, 0.25 s, 1 s, 5 s, 25 s) or extern or automatically with the next measuring object	
Sighting System	Laser targeting (max power level < 1 mW, λ = 630 to 680 nm, CDRH class II)	

Electrical Specifications	
Power Supply	24 VDC (15 to 40 VDC) or 24 VAC (12 to 30 VAC), 48 to 62 Hz
Current Consumption	Max 600 mA
Isolation	Power supply, analog output, and digital interface are galvanically isolated against each other
Switch Contact	Max 0.15 A

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.

TECHNICAL DATA (CONTINUED)

Environmental Specifications	
Operating Temperature (At the converter housing)	ISR 12-LO: 0 to 60°C (32 to 140°F)
	IGAR 12-LO: 0 to 50°C (32 to 122°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	Non-condensing conditions
Weight	Converter: 2.2 kg (~2.20 lbs)
	Optical head II: 140 g (~4.94 oz)
	Fiber (2.5 m): 250 g (~8.82 oz)
Protection System	IP65 (according to DIN 40 050)
CE Label	According to EU directives about electromagnetic immunity

Interface and Communication Specifications	
Analog Output	0 to 20 or 4 to 20 mA switchable, load 0 to 500 Ohm
	Test current 10 mA for inspection of wiring and connected instruments
Interfaces	Switchable: RS232 or RS485 addressable, half duplex; baud rate 2.4 up to 115.2 kBd
Display	Built-in 4-digit 7-segment-LED, height 13 mm; LED for °C/°F, clear mode "auto", "ext", ratio (2-color), mono (1-color), metal mode
Control Panel	4 keys, switch for interface, key for test current
Parameters	Adjustable at the instrument or via serial interface: Emissivity ε, Emissivity slope K, response time t_{90}, clear times t_{clear} for maximum value storage, automatic or external deletion of the maximum value storage, setting of ratio, mono, or metal mode, switch-off limit, analog output 0 to 20 or 4 to 20 mA, Temperature sub range, address, baud rate, Temperature display in °C / °F

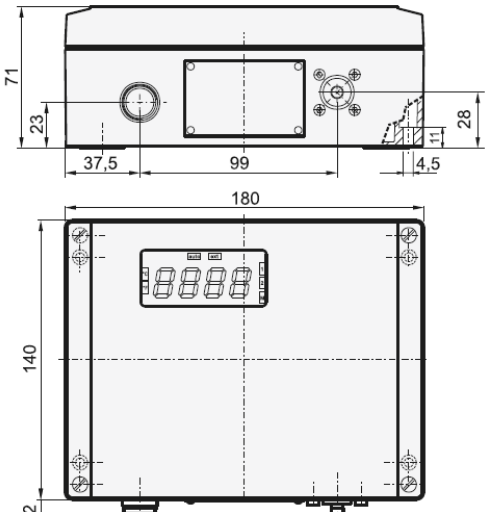
FIBER OPTICS

The radiation, coming in through the optical head, is transported via the lens system into the mono glass fiber with flexible stainless steel protection tube where it is transmitted along to the converter. As the optical head contains only the lens system and the sensor and the electronics are located in the converter box, fiber and optical head can withstand ambient temperatures up to 250°C without cooling. Depending on the measuring range 2 different fibers are used. They are marked red or blue.

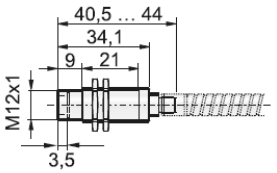
Length	2.5 m, 5 m, 7.5 m, 10 m, 15 m, 30 m on request
Color mark at the fiber	Blue: ISR 12-LO, MB 13; IGAR 12-LO, MB 10
	Red: ISR 12-LO, MB 18, 25, 33; IGAR 12-LO MB 13, 17, 22, 25
Max ambient temperature	Max 250°C (instrument's side with color mark max 125°C)
Minimum bending radius	Blue: 100 mm for short time, 300 mm permanently
	Red: 50 mm for short time, 120 mm permanently

DIMENSIONS

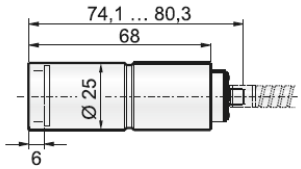
Converter



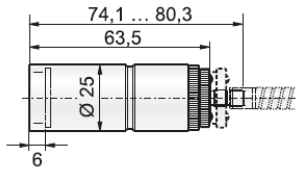
Optical head type I



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

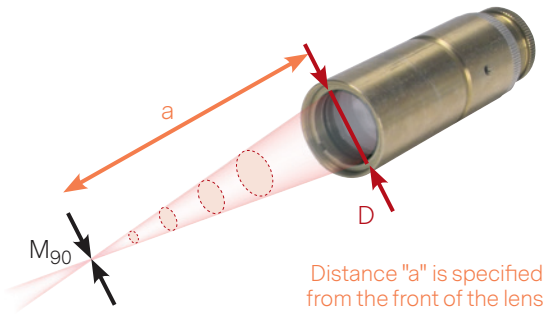
With the very small dimensions the optical head I is suited for use in confined spaces. The optics is adjusted to one of the measuring distances mentioned in the table. The mentioned spot size will be achieved in exactly this distance (other distances on request).

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_{90} [mm]		Aperture D [mm]
		ISR 12-LO: MB 13 IGAR 12-LO: MB 10	ISR 12-LO: MB 18, 25, 33 IGAR 12-LO: MB 13, 17, 22, 25	
Optical head I 	Adjusted to: 120	2.2	1.2	7
	Adjusted to: 260	5	2.6	7
	Adjusted to: 700	14	7.2	7
Optical head II (fixed adjusted) 	Adjusted to: 87	0.75	0.45	17
	Adjusted to: 200	1.5	0.8	17
	Adjusted to: 600	5.3	2.7	15
	Adjusted to: 4500	42	22	15
Optical head II (focusable) 	Range: 88 to 110	0.8 to 1.1	0.45 to 0.6	17
	Range: 95 to 129	0.9 to 1.3	0.5 to 0.75	16
	Range: 105 to 161	1.1 to 1.7	0.6 to 1	15
	Range: 200 to 346	1.5 to 2.8	0.8 to 1.5	17
	Range: 247 to 606	2.0 to 5.2	1.1 to 2.7	16
	Range: 340 to 4500	2.8 to 42	1.5 to 22	15

REFERENCE NUMBERS

The pyrometers ISR 12-LO and IGAR 12-LO 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

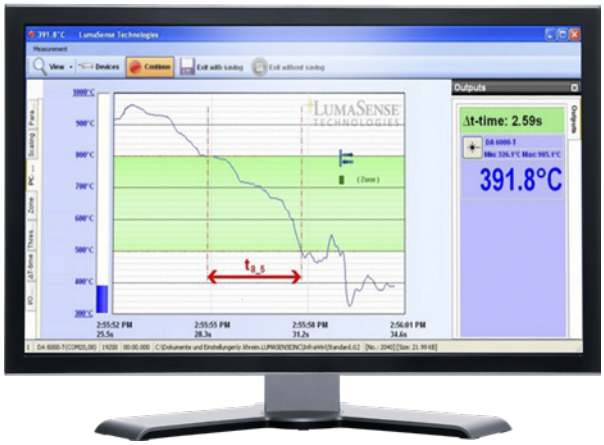
PN	Description
3 820 330	Connection cable, straight connector, 5 m
3 820 500	Connection cable, straight connector, 10 m
3 820 510	Connection cable, straight connector, 15 m
3 820 810	Connection cable, straight connector, 20 m
3 820 820	Connection cable, straight connector, 25 m
3 820 520	Connection cable, straight connector, 30 m
3 852 290	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.

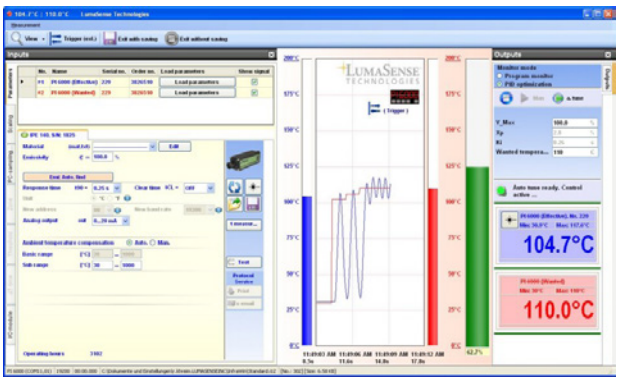
Further special functions are adjustable for example controllers or TV parameters on instruments available with these functions. Changes are transmitted directly to the pyrometer.

Measurement with Color Bar

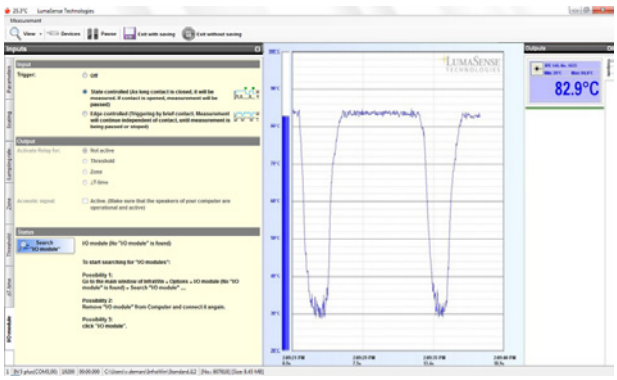
In this window a temperature value for the upper or lower limit can be adjusted numerically or with the mouse.
The acquired minimum and maximum value is indicated as well as the inner temperature of the pyrometer. The emissivity is changeable during the measurement at any time.

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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