

IMPAC ISR 50-LO

Digital two-color pyrometer with fiber optic for non-contact temperature measurement on metals, ceramics, graphite, etc. between 700 and 3000°C (1292 and 5432°F).



The Impac® ISR 50-LO digital, highly is an accurate two-color pyrometer with fiber optic for non-contact temperature measurements in temperature ranges between 700 and 3000°C. The instrument is equipped with an optical fiber, which can be used in very high ambient temperatures up to 250°C without cooling and it is unaffected by electromagnetic interferences.

PRODUCT HIGHLIGHTS

- Short exposure time
- Very small spot sizes
- Built-in lens contamination control system
- Heavy duty fiber connector for harsh application conditions
- Built-in LC display
- All settings adjustable at the instrument or via interface
- Digital interface RS232 / RS485 (switchable)
- Test current output for diagnostics

TYPICAL APPLICATIONS

- Induction heating
- Annealing
- Welding
- Forging
- Sintering
- Melting
- Rolling mill
- Rotary kilns
- Pouring stream
- Research and development
- Laser application

AT A GLANCE

Temperature Ranges

700 to 1800°C (MB 18)
800 to 2500°C (MB 25)
1000 to 3000°C (MB 30)

Spectral Range

Ch. 1: 0.9 μm
Ch. 2: 1.05 μm

Measurement Uncertainty

< 1500 °C: 0.5% oR + 2 °C
> 1500 °C: 1% oR

Repeatability

0.2% oR + 1°C

Optics

4 fixed optics
a = 340 mm, 600 mm, 1000 mm, or 4500 mm

Field of View

min 200:1 (min 1.7 mm)

OVERVIEW

The ISR 50-LO pyrometer measures in the two-color principle (ratio principle) in which two adjacent wavelengths are used to calculate the temperature. This technique offers the following advantages compared with the standard one-color pyrometers:

- The temperature measurement is independent of the emissivity of the object in wide ranges.
- The measuring object can be smaller than the spot size.
- Measurements are unaffected by dust and other contaminants in the field of view or by dirty viewing windows.

Additionally, the pyrometer can be switched to one-color mode and used like a conventional pyrometer.

The built-in display shows the current temperature or all instrument settings. Using the built-in keys, users can change all parameters, if necessary.

With serial interface and the provided software InfraWin, the temperature can be displayed and stored on a PC. The software also allows for parametrizing.

TECHNICAL DATA

Measurement Specifications	
Temperature Range	700 to 1800°C (1292 to 3272°F) (MB 18)
	800 to 2500°C (1472 to 4532°F) (MB 25)
	1000 to 3000°C (1832 to 5432°F) (MB 30)
Sub Range	Any range adjustable within the measuring range, minimum range 51°C
IR Detector	Silicon photo diode (Si/Si)
Spectral Range	Channel 1: 0.9 µm
	Channel 2: 1.05 µm
Fiber	MB 18: HD multi fiber 0.6 mm (green fiber mark)
	MB 25 and MB 30: HD mono fiber 0.2 mm (red fiber mark)
Measurement Uncertainty ($\epsilon = 1, t_{90} = 1 \text{ s}, T_{\text{amb}} = 23^\circ\text{C}$)	Up to 1500°C: 0.5% of measured value in °C + 2°C
	Above 1500°C: 1% of measured value in °C
Repeatability ($\epsilon = 1, t_{90} = 1 \text{ s}, T_{\text{amb}} = 23^\circ\text{C}$)	0.2% of measured value in °C + 2°C
Resolution	0.1°C on interface and display
	< 0.1% of temperature range at the analog output
Exposure Time t_{90}	10 ms; adjustable to 0.01 s, 0.05 s, 0.25 s, 1 s, 3 s, 10 s
Emissivity Slope K	0.8 to 1.2 adjustable in steps of 0.001
Emissivity ϵ	5 to 100% adjustable in steps of 0.1%
Switch-off Level	2 to 50%, adjustable
Maximum Value Storage	Built-in single or double storage
	Clearing with adjusted t_{clear} (off, 0.01 s, 0.05 s, 0.25 s, 1 s, 5 s, 25 s), extern, via interface or automatically with the next measuring object

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.

Electrical Specifications	
Power Supply	24 VDC (18 to 36 VDC), ripple < 500 mV
Power Consumption	Max 1 W
Load	0 to 500 Ω
Isolation	Power supply, analog output and digital interface are galvanically isolated from each other
Switch Contact	Switch contact for dirty window alarm 0 to 500 Ω
	Opto relay (AC/DC): max switch current: 0.5 A; max switch supply 60 VAC/DC

Communication and Interface Specifications	
Analog Output	0 to 20 mA or 4 to 20 mA (linear), switchable
	Test current 10 mA or 12 mA by pressing test key
Internal LC Display	LC display for temperature indication or parameter settings
Digital Interface	RS232 or RS485 addressable (half duplex), switchable
	Baud rate 1200 up to 115,200 Bd
Interface	Service interface RS232
Parameter Settings	Adjustable or readable at the instrument or via interface: Measuring temperature, operation mode (ratio/ (mono) single), emissivity slope or emissivity, exposure time, clear times for maximum value storage, hold function, analog output 0 to 20 or 4 to 20 mA, temperature sub range, switch-off level, contamination limit, RS485 address, baud rate, RS485 wait time, temperature display in $^{\circ}\text{C}$ or $^{\circ}\text{F}$, error status, maximum internal temperature

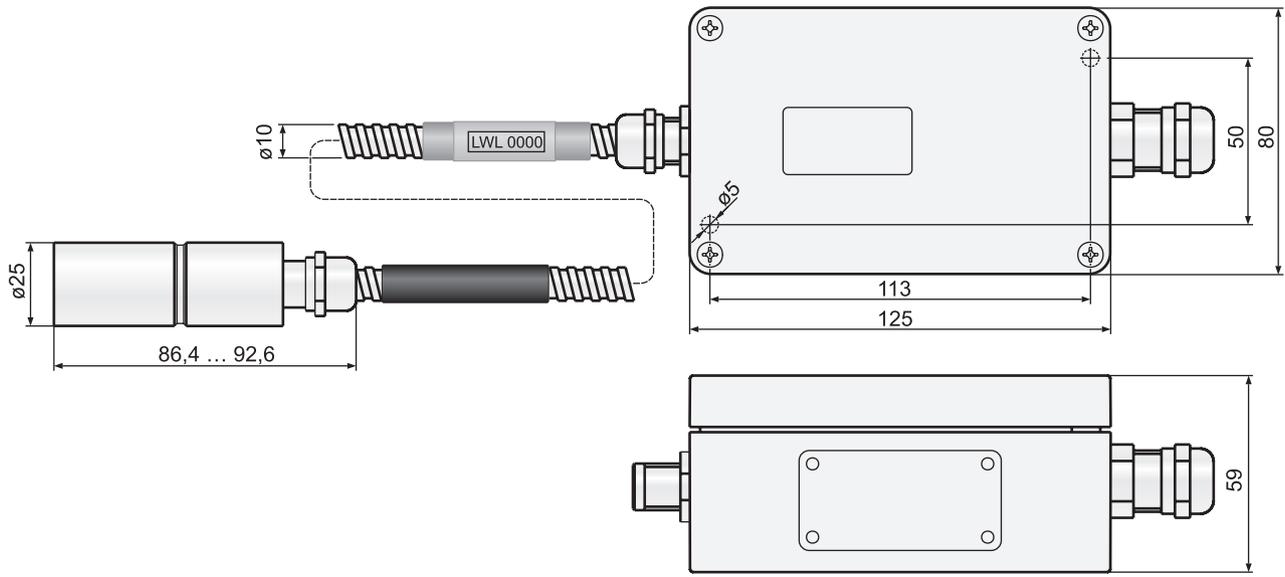
Environmental Specifications	
Protection Class	IP65 (DIN 40050)
Ambient Temperature	0 to 50 $^{\circ}\text{C}$ (32 to 122 $^{\circ}\text{F}$) on the converter
	0 to 250 $^{\circ}\text{C}$ (32 to 482 $^{\circ}\text{F}$) on side of the optical head
Storage Temperature	-20 to 60 $^{\circ}\text{C}$ (-7 to 140 $^{\circ}\text{F}$)
Relative Humidity	Non-condensing conditions
Weight	Converter: ~600 g (~1.32 lb)
	Optical head: ~140 g (~0.31 lb)
	Fiber (2.5 m): ~630 g (~1.39 lb)
CE Label	According to EU directives about electromagnetic immunity

SIGNAL PROCESSING

The signal processing of series 50 pyrometers is fully digital, i.e. the detector signal are digitized immediately and digitally processed. With this technique an extremely high accuracy and repeatability is achieved.

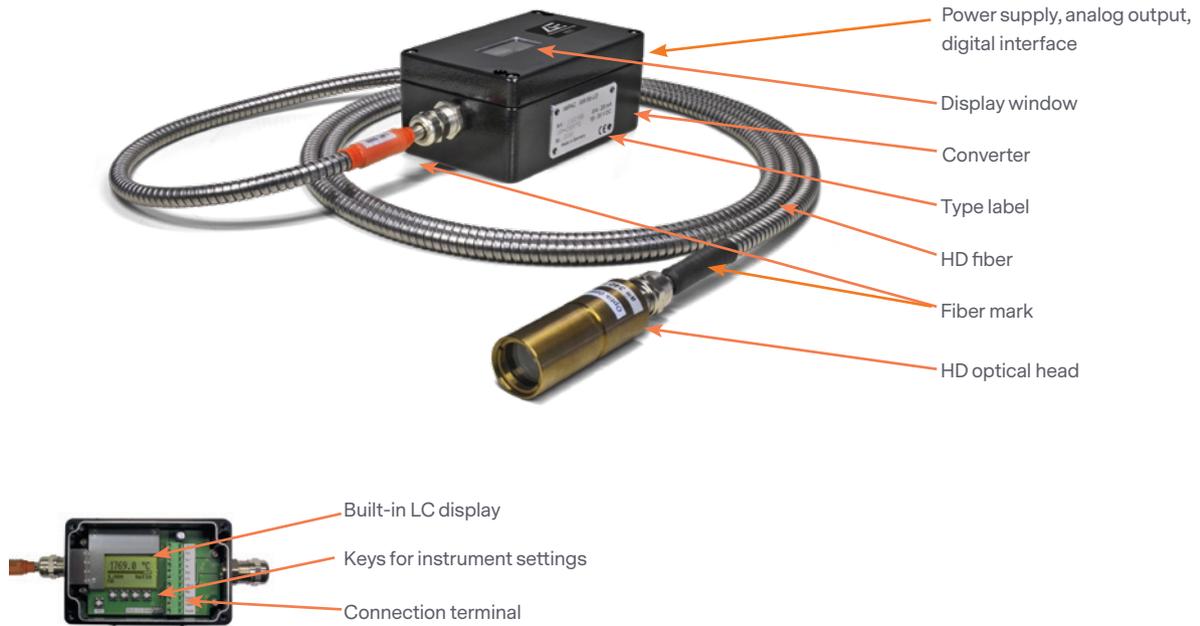
- **Accuracy:** The high accuracy is achieved by the digital linearisation of the sensor output as well as the digital compensation for the ambient temperature.
- **Temperature range:** Due to the digital technique, any temperature sub range within the full temperature range can be set. The analog measuring output corresponds automatically to the selected sub range. This setting of a sub range does not effect the high accuracy and repeatability.
- **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. Additionally the interface allows the controlling of the pyrometer via PC.
- **Bus control:** The serial interface RS485 facilitates the integration of the pyrometer into existing field bus systems.
- **Calibration:** If necessary a calibration of the pyrometers can be done with help of a PC and a calibration source without opening the housing.

DIMENSIONS



Dimensions in mm

FEATURES



HD OPTICAL HEAD

The instrument is delivered with a HD optical head II that is specially designed for the connection of a HD fiber. The optics has to be adjusted ex-works to the required measuring distance (possible range 340 to 4500 mm, measured from the front of the lens). Only in this distance the specified spot sizes will be achieved.



Measuring Distance a [mm]	Spot Size M ₉₀ [mm]		Aperture D [mm]
	0.6 mm fiber (700 to 1800°C (MB 18))	0.2 mm fiber (800 to 2500°C (MB 25)) (1000 to 3000°C (MB 30))	
340	5.1	1.7	17
600	9	3	17
1000	15	5	17
4500	66	22	17

HD FIBER

The transmission between optical head and converter is done via a heavy duty fiber with a stainless steel protection hose. Depending on the temperature range, the fiber is designed in different thicknesses and built as mono fiber or multi fiber.

- MB 18: HD multi fiber 0.6 mm (green fiber mark)
- MB 25 and MB 30: HD mono fiber 0.2 mm (red fiber mark)

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 (fiber at converter side max. 125°C).

Minimum Bending Radius (in mm)		
	0.6 mm fiber	0.2 mm fiber
for short time (max 250°C)	30	50
permanent (max 250°C)	50	120
wound up (max 50°C)	50	120

REFERENCE NUMBERS

PN	Description
3 882 900	ISR 50-LO, 700 to 1800°C (MB 18)
3 882 910	ISR 50-LO, 800 to 2500°C (MB 25)
3 882 920	ISR 50-LO, 1000 to 3000°C (MB 30)

Scope of Delivery

Pyrometer ISR 50-LO consisting of converter, HD fiber, length: 2.5 m (other length 5 m, 6 m, 10 m or 15 m possible for extra charge) and optical head; works certificate, software InfraWin, and user manual.

Ordering Notes

A connection cable is not included in scope of delivery. When ordering the following data is necessary:

- the measuring distance the optical head has to be adjusted
- the length of the fiber in case of another length as the standard length of 2.5 m

ACCESSORIES

PN	Description
3 821 440	Connection cable 5 m, 11 wires, with additional digital cable (1 m)
3 821 450	Connection cable 5 m, 4 wires (supply and analog output only)
on request	Fiber extension to total length of 5 m
on request	Fiber extension to total length of 6 m
on request	Fiber extension to total length of 10 m
on request	Fiber extension to total length of 15 m
3 834 390	Ball and socket mounting
3 834 230	Adjustable mounting support, stainless steel
3 835 180	Air purge unit, stainless steel
3 835 240	Air purge unit with 90° mirror
3 852 290	Air purge for scanning attachment
3 852 540	Power supply NG 0D 85 to 265 VAC ⇒ 24 VDC, 600 mA
3 852 550	Power supply NG 2D for DIN rail mounting; 85 to 265 VAC ⇒ 24 VDC, 600 mA with 2 settable limit switches
3 890 640	DA 4000-N, Digital display, with integrated 2-wire power supply
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
3 890 630	LD24-UTP; large digital indicator, 57 mm height of digits
3 826 500	HT 6000: portable battery driven indicator and instrument for pyrometer parameter settings; RS232 / RS485

INFRAWIN 5 OVERVIEW

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

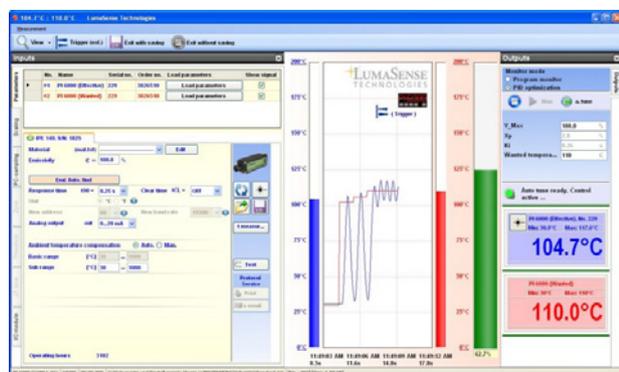
This software allows the user to remotely adjust and control settings for one or two pyrometers from a single computer. InfraWin also allows the user to simultaneously monitor and control temperatures.

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

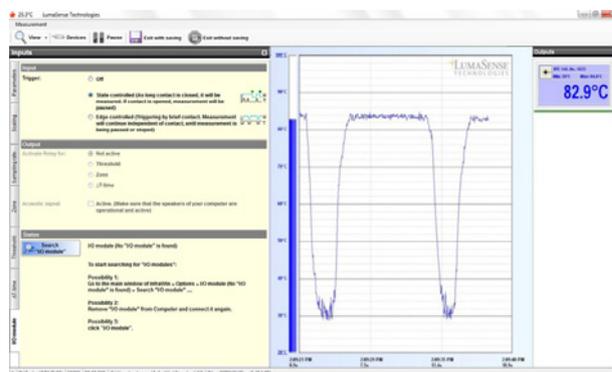


Measurement with Color Bar

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.



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



For international contact information,
visit advancedenergy.com.

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.

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