IMPAC ISR 320

Small, stationary, digital ratio pyrometer for non-contact temperature measurement between 700 and 2500°C (1292 to 4532°F).

The Impac® ISR 320 is a stationary, digital, compact, and fast two-color pyrometer for non-contact temperature measurement. The pyrometer measures in the two-color method (ratio method) in which two adjacent wavelengths are used for the temperature determination.

PRODUCT HIGHLIGHTS

- Small housing dimensions for easy installation in confined spaces
- Fast 10 ms response time for dynamic processes
- RS485 interface for long transmission networks for connectionto a PC via USB converter or machine control (PLC)
- Analog output adjustable to 0 to 20 mA or 4 to 20 mA for connection of standard analyzing instruments
- Internal digital signal processing for high accuracy
- Thermal intensity alignment using intensity indicator LEDs at the backside of the instrument
- Integrated "Dirty Window" warning

TYPICAL APPLICATIONS

- Metal induction processes: hardening, welding, forging, brazing, soldering, etc.
- Metal processes: noble metals melting and purifying
- Metal processes: wire/rod mill water box measurement, laying head and air cooling conv.
- Solar industry: silicon processing polycrystalline casting in vacuum melting furnace, silicon ingot growth in CVD reactors (Siemens process), crystal pulling of monocrystalline silicon (Czochralski process)
- Glass industry: gob temperature measurement
- Cement industry: clinker temperature in rotary kilns

AT A GLANCE

Temperature Ranges

700 to 1700°C (MB 17)
900 to 2500°C (MB 25)

Spectral Range

Channel 1: 0.9 µm
Channel 2: 1.05 µm

Measurement Uncertainty

< 1300°C: 0.5% oR in °C + 1°C
> 1300°C: 1 % oR in °C

Repeatability

0.2% oR in °C + 2°C

Optics

2 fixed optics:
a = 300 mm and a = 800 mm

Sighting

Built-in LED targeting light and LEDs for intensity alignment

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TECHNICAL DATA

Measurement Specifications	
Temperature Ranges	700 to 1700°C (1292 to 3092°F) (MB 17)
	900 to 2500°C (1652 to 4532°F) (MB 25)
Sub Range	Any range adjustable within the temperature range, minimum span 50°C
Spectral Range	Channel 1: 0.9 µm
	Channel 2: 1.05 µm
Resolution	0.1 °C or 0.2°F at interface
	< 0.03% of selected sub range at analog output, min. 0.1°C, 12 bit
Emissivity ε	0.100 to 1.000 in steps of 1/1000 (1-color mode)
Transmittance τ	0.100 to 1.000 in steps of 1/1000 (1-color mode)
Emissivity Slope K	0.800 to 1.250 in steps of 1/1000 (2-color mode)
Measurement Uncertainty[1] ($\varepsilon = 1$, $t_{90} = 1$ s, $T_{amb} = 25°C$)	< 1300°C: 0.5% of reading in °C + 1°C
	> 1300°C: 1% of reading in °C
Repeatability ($\varepsilon = 1$, $t_{90} = 1$ s, $T_{amb} = 25°C$)	0.2% of reading in °C + 2°C

Electrical Specifications	
Power Supply	24 V DC ± 25%, ripple must be less than 50 mV
Power Consumption	Max 6 W (including LED)
Load (Analog Output)	0 to 500 Ω
Switch Contact	Opto relays; max 50 VDC, 0.2 A; P_{max} = 300 mW
Isolation	Power supply, analog output, and digital interface are galvanically isolated from each other

Communication and Interface Specifications	
Analog Output	Adjustable 0 to 20 mA or 4 to 20 mA, linear with temperature
Digital Interface	RS485 addressable (half-duplex)Baud rate: 1200 to 115.2 kBd
Switch Off Limit	2% to 50% (adjustable via interface)
"Dirty Window" Warning or Temperature Contact	Opto Relay contact, max continuous current 0.2 A, 50 V DC, P_{max} = 300 mW
Hysteresis	2 to 20°C
Exposure Time t_{90}	10 ms adjustable to min; 0.01 s, 0.05 s, 0.25 s, 1 s, 3 s, 10 s
Maximum Value Storage	Built-in single or double storage. Clearing with adjusted time t_{clear} (off, 0.01 s, 0.05 s, 0.25 s, 1 s, 5 s, 25 s), via interface, automatically with the next measuring object
Connection	8-pin connector
Parameters	Adjustable via interface: 2-color / 1-color temperature signal, accordingly emissivity slope or emissivity, temperature sub range, settings for maximum value storage, address, baud rate, switch off limit, warning level lens contamination monitoring system, transmittance, response time t_{90}, 0 to 20 mA or 4 to 20 mA analog output range, °C / °F.
	Readable via interface: measured value, internal temperature of the unit.

1 The pyrometer must operate at least 30 min before these values are valid

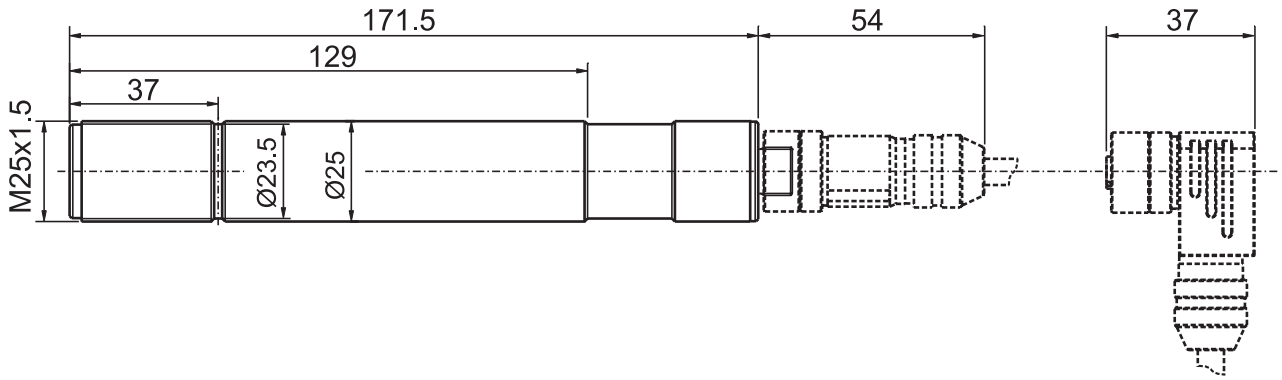
2 MB is a shortcut used for temperature range (in German:Messbereich).
The determination of the technical data of this pyrometer is carried out in accordance with VDI/VDE IEC TS 62942-2, the calibration / adjustment in accordance with VDI/VDE 3511, Part 4.4.

TECHNICAL DATA

Optical Specifications	
Sighting	Built-in LED targeting light and LEDs for intensity alignment
Optics	Fixed optics: a=300 mm or a=800 mm
Distance Ratio	Approx. 100:1

Environmental Specifications	
Protection Class	IP 65 (DIN 60 529) (value in mated condition)
Operating Position	Any
Ambient Temperature	0 to 70°C (32 to 158°F) at housing
Storage Temperature	-20 to 80°C (-4 to 176°F)
Relative Humidity	Non-condensing conditions
Housing	Stainless steel
Weight	0.3 kg (~0.661 lb)
CE Label	According to EU directives about electromagnetical immunity

DIMENSIONS



Dimensions in mm

OPTICS

The ISR 320 has fixed optics for 300 mm or 800 mm measuring distances.

The table of spot sizes in relation to measuring distance shows examples of the pyrometer's spot size M [mm] in relation to the measuring distance a [mm] (min. 90% of the radiation intensity). Increasing or decreasing the measuring distance will change the spot size.

ISR 320					
a = 300	700 to 1700°C	900 to 2500°C	a = 800	700 to 1700°C	900 to 2500°C
Measuring Distance a [mm]	Spot Diameter M [mm]	Spot Diameter M [mm]	Measuring Distance a [mm]	Spot Diameter M [mm]	Spot Diameter M [mm]
300	3	1.6	800	8	4.2
500	12.3	10	1300	19.9	13.7
1000	35.7	31	2000	36.5	27

1 Effective aperture D for all temperature ranges is 11 mm.

ALIGNING WITH VARIOMETER LEDS

The alignment of the ISR 320 to the measuring object is possible with the built-in aiming light or by using the Variometer LEDs, which are located on the back of the device. These Variometer LEDs indicate when there is a change in thermal intensity.

The green LED indicates operational readiness

The blue LED indicates falling thermal intensity

The red LED indicates rising thermal intensity

REFERENCE NUMBERS

ISR 320		
Temperature Range	**a / mm**	**PN**
700 to 1700°C	300	3 903 500
	800	3 903 510
900 to 2500°C	300	3 903 520
	800	3 903 530

Scope of Delivery

Pyrometer with PC adjustment and evaluation software InfraWin, works certificate, and manual.

Ordering Note

A connection cable is not included in scope of delivery and needs to be ordered separately. (All connection cables include a short adaptor cable with a 9-pin D-SUB connector. This connector may be used in combination with the RS485 to USB adapter).

ACCESSORIES

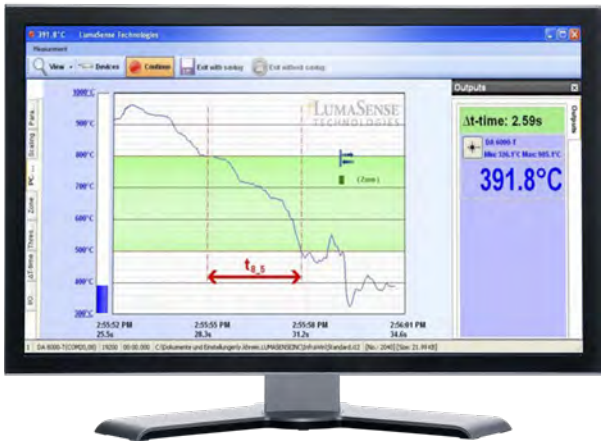
PN	Description
3 920 030	Connection cable, 2 m (straight connector)
3 920 040	Connection cable, 5 m (straight connector)
3 920 050	Connection cable, 10 m (straight connector)
3 920 060	Connection cable, 15 m (straight connector)
3 920 070	Connection cable, 20 m (straight connector)
3 920 080	Connection cable, 25 m (straight connector)
3 920 090	Connection cable, 30 m (straight connector)
3 920 130	Connection cable, 2 m (90° connector)
3 920 140	Connection cable, 5 m (90° connector)
3 920 150	Connection cable, 10 m (90° connector)
3 920 160	Connection cable, 15 m (90° connector)
3 920 170	Connection cable, 20 m (90° connector)
3 920 180	Connection cable, 25 m (90° connector)
3 920 190	Connection cable, 30 m (90° connector)
3 920 100	Adapter cable (0.2 m) 8 pin onto 12-pin Impac standard connector (RS485 versions only)
3 820 320	Special connection cable with angled connector and additional targeting light push button, 5 m long
3 852 290	Power supply NG DC for DIN rail mounting; 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
3 852 610	USB LabKit, adapter RS485 to USB with targeting light push-button and analog output clamp, pyrometer cable, power supply 100 to 240 VAC
3 852 600	USB nano: Converter RS485 to USB
3 826 750	USB to RS485 adapter cable, HS-version, 1.8 m long
3 890 650	DA 4000: LED-display, 2-wire power supply, 2 limit switches (relay contacts), 230 VAC
3 890 570	DA 6000-N digital display to allow adjustment of the pyrometer through the RS485 interface
3 890 530	DA 6000: like the DA 6000-N, but with analog input and 2 limit switches for the RS485 interface
3 826 510	PI 6000: PID programmable controller, extremely fast, for digital Impac pyrometers
3 826 520	PI 6000-N: PID programmable controller, extremely fast, for pyrometers with analog output
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
3 835 290	Air purge for scanning attachment
3 846 170	Mounting tube
3 843 460	SCA 300, scanning attachment with quartz glass window; 24 VAC/DC
3 837 480	Cooling jacket with integrated air purge
3 837 490	Cooling jacket with fused silica window and integrated air purge
3 890 630	LD24-UTP; large digital indicator, 57 mm height of digits

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.

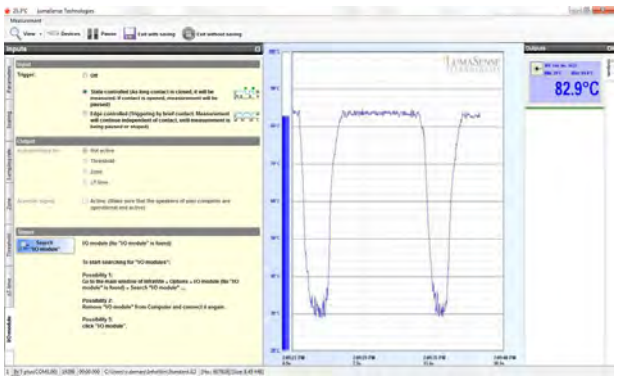
Measurement with Color Bar

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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