

Small, stationary, digital ratio pyrometer for non-contact temperature measurement between 700 and 1700 °C

ISR 320



- Small housing dimensions for easy installation, suitable for use in confined spaces
- Fast 10 ms response time for dynamic processes
- RS485 interface for long transmission networks for connection to 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
- Built-in LED targeting light for easy alignment to the measuring object
- Thermal intensity alignment using intensity indicator LEDs at the backside of the instrument
- Integrated Dirty Window warning



The IMPAC ISR 320 pyrometer is a stationary, digital, compact, and fast 2-color pyrometer for non-contact temperature measurement. The pyrometer measures in the 2-color method (ratio method) in which two adjacent wavelengths are used for the temperature determination.

This technique offers the following advantages compared to standard 1-color pyrometers:

- The temperature measurement is largely independent of the object's emissivity and in wide ranges unaffected by dust and other contaminants in the field of view.
- The measuring object can be smaller than the spot size and measurements through dirty viewing windows are possible up to a certain contamination.

The pyrometer can also be switched to 1-color mode and used like a conventional pyrometer in a spectral range near 0.9 µm.

The alignment of the ISR 320 to the measuring object is possible with the built-in LED targeting light or with the help of two LEDs at the backside of the instrument, which indicate a rise or fall in thermal intensity.

The response time of 10 ms facilitates the measurement of fast processes. The ISR 320 is equipped with a built-in "dirty window" warning.

In addition to the analog output, the pyrometer is equipped with a digital RS485 interface, which enables secure data transmission to a PC or a PLC over long distances.

The included InfraWin software enables graphical display and storage of measurement values, as well as easy set-up of all instrument parameters.

Typical Applications:

- Metal Processing - Induction Processes: Hardening, Welding, Forging, Brazing, Soldering, etc.
- Metal Processing - Noble Metals Melting and Purifying
- Metal Processing - Wire/Rod Mill Water Box Measurement, Laying Head & 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

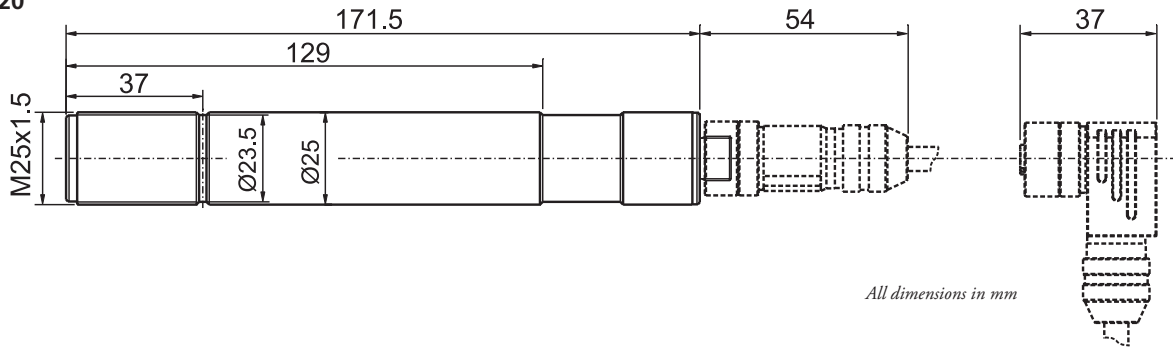
Technical Data

Measurement Specifications	
Temperature Range:	700 to 1700 °C (MB 17)
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:	< 1300 °C: 0.5 % of reading in °C + 1°C (κ = 1, t ₉₀ = 1 s, T _{amb.} = 25 °C) > 1300 °C: 1 % of reading in °C
Note: the pyrometer must operate at least 30 min before these values are valid	
Repeatability:	0.2 % of reading in °C + 2°C (κ = 1, t ₉₀ = 1 s, T _{amb.} = 25 °C)
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:	ca 100 : 1
Interface	
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.
Communication	
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
Electrical	
Power Supply:	24 V DC ± 25%, ripple must be less than 50 mV
Power Consumption:	Max. 6 W (incl. LED)
Switch Contact:	Opto relays; max. 50 V DC, 0.2 A; P _{max} = 300 mW
Load (analog output):	0 to 500 Ω
Isolation:	Power supply, analog output, and digital interface are electrically isolated from each other
Environmental Specifications	
Protection Class:	IP 65 (IEC 60529) (value in mated condition)
Operating Position:	any
Ambient Temperature:	0 to 70 °C at housing
Storage Temperature:	-20 to 80 °C
Relative Humidity:	Non condensing conditions
Weight:	0.3 kg
Housing:	Stainless steel
CE Label:	According to EU directives about electromagnetic immunity

Note: The calibration / adjustment of this pyrometer is carried out in accordance with VDI/VDE 3511, Part 4.4. See <http://info.lumasenseinc.com/calibration> for more information.

Dimensions

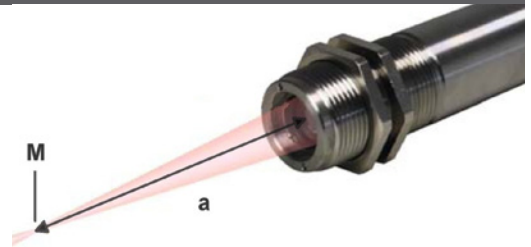
ISR 320



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	a = 800	700 to 1700 °C
Measuring distance a [mm]	Spot diameter M [mm]	Measuring distance a [mm]	Spot diameter M [mm]
300	3	800	8
500	12.3	1300	19.9
1000	35.7	2000	36.5

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

Settings and Operation via the RS485 Interface and InfraWin

Once connected, the signal processing can be done via the analog output (e.g. for connection of a digital display) or via the digital RS485 interface (for connection of a PC or to a PLC). With RS485, long transmission distances can be realized and several pyrometers can be connected in a bus system. The included InfraWin software enables easy instrument settings and provides multiple temperature illustration views.

InfraWin software enables:

- Easy instrument settings
- Display of temperature curves
- Graphic or tabular analysis, e.g. for printing out or exporting
- Quick spot size calculation



Reference Numbers

Temperature Range	Reference Number	a / mm
ISR 320, 700 to 1700 °C	3 903 500	300
ISR 320, 700 to 1700 °C	3 903 510	800

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 must 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 adaptor).

Accessories

3 826 510	PI 6000: PID programmable controller, extremely fast, for digital IMPAC pyrometers	3 890 630	LD24-UTP; large digital indicator, 57 mm height of digits
3 826 520	PI 6000-N: PID programmable controller, extremely fast, for pyrometers with analog output	3 890 640	DA 4000-N, LED-display, 2-wire power supply (specify 230 or 115 V AC)
3 826 720	USB to RS485 adaptor cable, 1.8 m long	3 890 650	DA 4000, LED-display, 2-wire power supply, 2 limit switches (relay contacts) (specify 230 or 115 V AC)
3 834 230	Adjustable mounting support, stainless steel	3 920 030	Connection cable, 2 m (straight connector)
3 835 180	Air purge unit, stainless steel	3 920 040	Connection cable, 5 m (straight connector)
3 835 240	90° mirror (with air purge)	3 920 050	Connection cable, 10 m (straight connector)
3 835 290	Air purge for scanner	3 920 060	Connection cable, 15 m (straight connector)
3 837 480	Cooling jacket with integrated air purge	3 920 070	Connection cable, 20 m (straight connector)
3 837 490	Cooling jacket with fused silica window and integrated air purge	3 920 080	Connection cable, 25 m (straight connector)
3 843 460	SCA 300, scanner with quartz glass window; 24 V AC/DC	3 920 090	Connection cable, 30 m (straight connector)
3 846 170	Mounting tube (L 600 x Ø 70 mm)	3 920 100	Adapter cable (0.2 m) 8 pin onto 12-pin IMPAC standard connector
3 852 290	Power supply NG DC, 100 to 240 V AC, 50 to 60 Hz to 24 V DC, 1 A	3 920 130	Connection cable, 2 m (90° connector)
3 852 550	Power supply NG 2D, 85 to 265 V AC, 48 to 62 Hz to 24 V DC, 600 mA, with 2 limit switches	3 920 140	Connection cable, 5 m (90° connector)
3 852 600	USB nano: Converter RS485 to USB	3 920 150	Connection cable, 10 m (90° connector)
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 V AC	3 920 160	Connection cable, 15 m (90° connector)
3 890 530	DA 6000, LED-display, RS485, max. value storage, analog output	3 920 170	Connection cable, 20 m (90° connector)
3 890 570	DA 6000-N digital display to allow adjustment of the Pyrometer through the RS485 interface.	3 920 180	Connection cable, 25 m (90° connector)
		3 920 190	Connection cable, 30 m (90° connector)
		3 820 320	Special connection cable with angled connector and additional targeting light push button, 5 m long

Accessory Overview

Mechanical Overview



Electrical Overview



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Awakening Your 6th Sense

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