Small, stationary infrared thermometer using 2-wire technique for non-contact temperature measurement of metallic surfaces, graphite or ceramics between 300 °C and 2500 °C

IS 310 • IGA 310

CE

- Very small housing dimensions for easy installation, suited for use in confined spaces
- 2-wire technique for current supply and temperature measurement at the same time
- Internal digital signal processing for high accuracy
- High quality optics for detection of small measuring objects
- Built-in LED targeting light for easy alignment to the measuring object

The IS 310 and IGA 310 are stationary pyrometers for non-contact temperature measurement of metallic surfaces, graphite, ceramics, etc.

The very small housing dimensions enable the integration of the pyrometer in compact production machines, the 2-wire technique ensures very easy electrical connection, and the solid and robust design of the instrument guarantees reliability, even in rough industrial environments.

The pyrometers are equipped with a connector for electrical installation, this offers the option to use connection cables up to 30 m.

For optimal match 3 different focusable optics with small spot sizes are available.

**Typical Applications:**

- preheating
- annealing
- tempering
- welding
- forging
- hardening
- sintering
- melting
- soldering
- brazing
- rolling

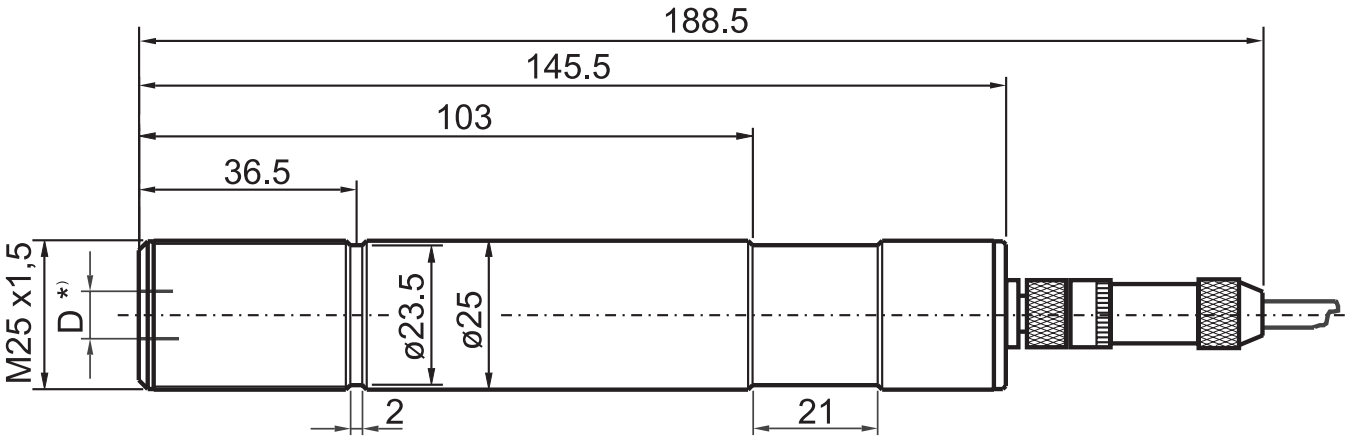
## Technical Data

| | | |
|---|---|---|
| Temperature Range: | IS 310 | 650...1800 °C (MB 18)<br>800...2300 °C (MB 23)<br>1150...2500 °C (MB 25) |
| | IGA 310 | 300...1300 °C (MB 13L)<br>500...1500 °C (MB 15) |
| Spectral Ranges: | IS 310 | 0.8 ... 1.1 µm |
| | IGA 310 | 1.45 ... 1.8 µm |
| Detector: | IS 310 | Si photo diode |
| | IGA 310 | InGaAs photo diode |
| Output: | 4 to 20 mA, load independent current, linear temperature output | |
| Max load: | 500 Ω at 24 V power supply,<br>max. 200 Ω at 18 V<br>max. 800 Ω at 30 V | |
| Emissivity ε: | 0.2 to 1; adjustable | |
| Response Time $t_{90}$: | 10 ms | |
| Meas. uncertainty: (at ε=1, $T_{amb}$.=23 °C) | Up to 1500 °C: 0.8% of measured value + 1 °C<br>Above 1500 °C: 1% of measured value + 1 °C | |
| Repeatability: | 0.3% of measured value (at ε=1, $T_{amb}$.=23 °C) | |
| Power supply: | 24 V DC ± 25% stabilized, ripple < 50 mV<br>5 to 30 V DC for LED targeting light (I ≤ 30 mA) | |

| | |
|---|---|
| Sighting: | LED targeting light |
| Ambient temperature: | 0 to 70 °C |
| Storage temperature: | -20 to 70 °C |
| Relative humidity: | No condensing conditions |
| Housing: | Stainless steel |
| Protection class: | IP65 (DIN 40 050) |
| Mounting position: | Any |
| Weight: | 275 g |
| Connection cable: | 2 m - 30 m length, connection via connector |
| 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




*) Aperture D depending on instrument type, see next page

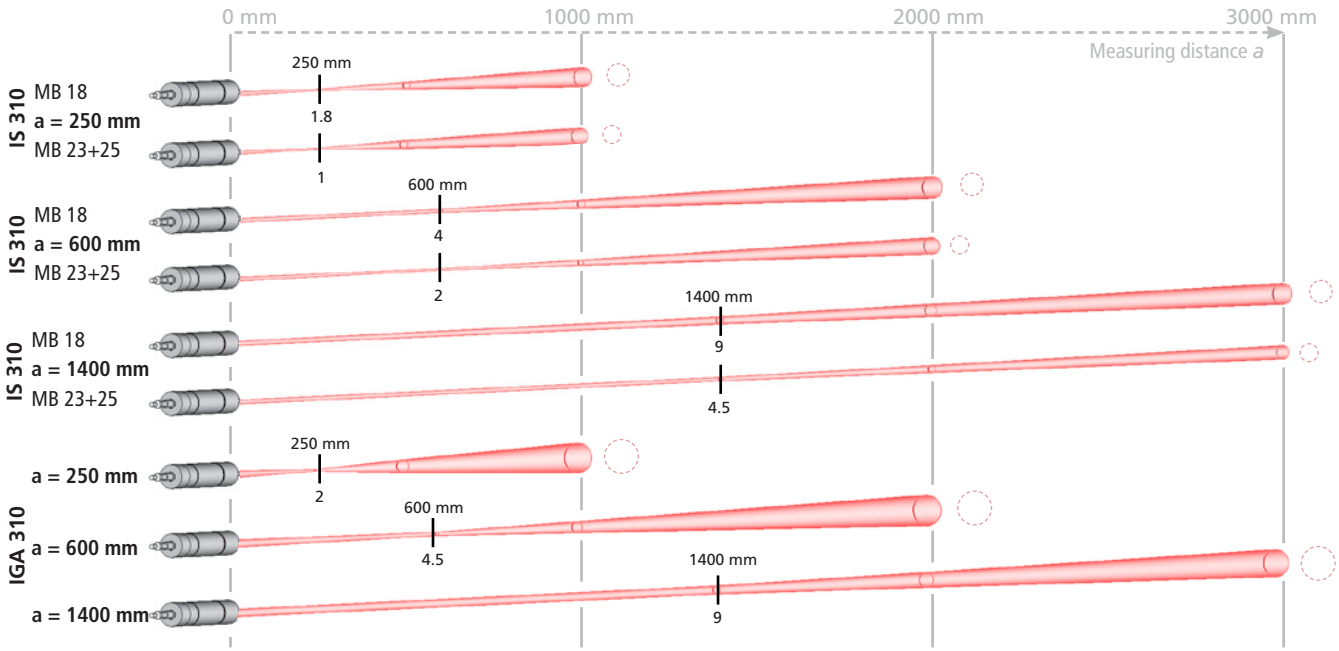
All dimensions in mm

# Optics

The pyrometers are equipped ex works with one of the following optics. These optics are fixed to a certain distance, i.e. at these distances each optic achieves its smallest spot size in relation to the measuring distance. The spot size will change in any other distance (shorter or longer). Please note that the measuring object must be at least as big as the spot size.

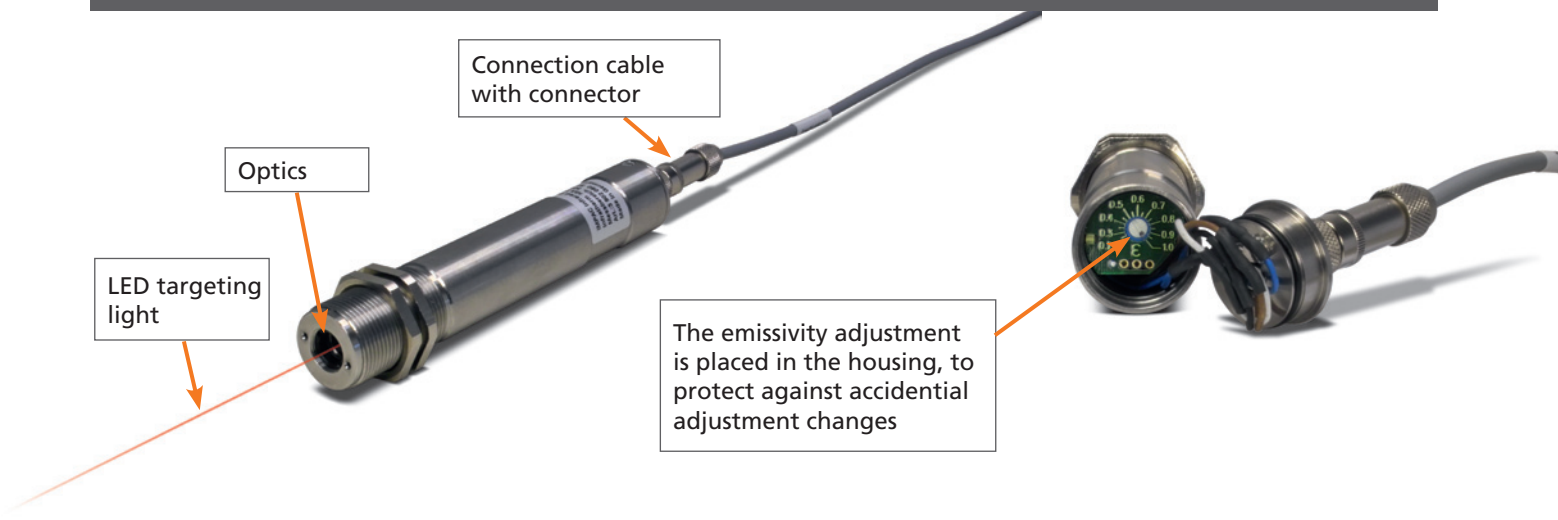
The following table shows the size of the spots (spot size M in mm) at a given measuring distance a. Values between the stated data can be calculated by interpolation. The spot size for measuring distance 0 is equivalent to the aperture diameter D of the optics, this value is used e.g. to calculate measuring distances in intermediate distances.

| Type | | *a : M* *) | *a* [mm] | *M* [mm] | $a_1$ [mm] | $M_1$ [mm] | $a_2$ [mm] | $M_2$ [mm] | *D* [mm] |
|---|---|---|---|---|---|---|---|---|---|
| IS 310 | MB 18 | 140 : 1 | 250 | 1.8 | 600 | 11.6 | 1000 | 23 | 5.2 |
| | MB 23 + 25 | 250 : 1 | | 1 | | 9.7 | | 20 | |
| | MB 18 | 150 : 1 | 600 | 4 | 1000 | 10.1 | 2000 | 26 | |
| | MB 23 + 25 | 300 : 1 | | 2 | | 6.8 | | 20 | |
| | MB 18 | 155 : 1 | 1400 | 9 | 2000 | 15.1 | 3000 | 25 | |
| | MB 23 + 25 | 310 : 1 | | 4.5 | | 8.7 | | 16 | |
| IGA 310 | MB 13L + MB 15 | 125 : 1 | 250 | 2 | 600 | 17.4 | 1000 | 35 | 9 |
| | | 135 : 1 | 600 | 4.5 | 1000 | 13.5 | 2000 | 36 | |
| | | 155 : 1 | 1400 | 9 | 2000 | 16.8 | 3000 | 30 | |




*) a : M; distance ratio (90% intensity), M: spot size, a: measuring distance, D: aperture (effective lens diameter)

# Features



## Reference numbers

| IS 310 | | | |
|---|---|---|---|
| | Temperature Range | | |
| Optics | 650 to 1800 °C (MB 18) | 800 to 2300 °C (MB 23) | 1100 to 2500 °C (MB 25) |
| a = 250 mm | 3 902 210 | 3 902 250 | 3 902 310 |
| a = 600 mm | 3 902 220 | 3 902 260 | 3 902 320 |
| a = 1400 mm | 3 902 230 | 3 902 270 | 3 902 330 |

| IGA 310 | | |
|---|---|---|
| | Temperature Range | |
| Optics | 300 to 1300 °C (MB 13L) | 500 to 1500 °C (MB 15) |
| a = 250 mm | 3 902 050 | 3 902 110 |
| a = 600 mm | 3 902 060 | 3 902 120 |
| a = 1400 mm | 3 902 070 | 3 902 130 |

**Scope of delivery:** Instrument, works certificate, and user manual.
**Ordering note:** A connection cable is not included in scope of delivery and needs to be ordered separately.

## Accessories

| | |
|---|---|
| 3 821 610 | Connection cable IS / IGA 310, 2 m |
| 3 821 620 | Connection cable IS / IGA 310, 5 m |
| 3 821 630 | Connection cable IS / IGA 310, 10 m |
| 3 821 640 | Connection cable IS / IGA 310, 15 m |
| 3 821 650 | Connection cable IS / IGA 310, 20 m |
| 3 821 660 | Connection cable IS / IGA 310, 25 m |
| 3 821 670 | Connection cable IS / IGA 310, 30 m |
| 3 834 210 | Adjustable mounting support for water cooling jacket |
| 3 843 460 | SCA 300, scanning attachment with quartz glass window; 24 V AC/DC |
| 3 834 230 | Adjustable mounting support, stainless steel |
| 3 835 180 | Air purge unit, stainless steel |
| 3 835 240 | 90°-mirror |
| 3 837 480 | Water cooling jacket for Series 310 & 320, stainless steel, with integrated air purge unit |
| 3 835 290 | Air purge unit for scanning attachment |
| 3 890 610 | Galvanic separator for measuring output (carrier rail mounting housing) |
| 3 863 010 | Converter (4 - 20 mA to 0 - 20 mA) |
| 3 846 170 | Mounting tube |
| 3 852 290 | Power supply, NG DC, 100 to 240 V AC, 50 to 60 Hz ⇒ 24 V DC, 1 A |
| 3 852 280 | Power supply, 230 V AC, 500 mA, ⇒ 24 V DC, for C/Z-carrier rail mounting |
| 3 890 640 | DA 4000-N: LED-display, 2-wire power supply, 230 V AC |
| 3 891 210 | DA 4000-N: LED-display, 2-wire power supply, 115 V AC |
| 3 890 650 | DA 4000: like DA 4000-N with 2 limit contacts, 230 V AC |
| 3 891 220 | DA 4000: like DA 4000-N with 2 limit contacts, 115 V AC |
| 3 890 520 | DA 6000: LED display, RS232, 2-wire power supply, maximum value storage, analog output |
| 3 890 530 | DA 6000 with RS485 |
| 3 890 150 | DA 6000-T, digital display, RS 232, measures the time to cool from 800 °C to 500 °C (for welding processes) |


Mounting support


Air purge unit


scanning attachment


90° mirror with air purge unit


Water cooling jacket with air purge unit

LED digital display


Power supplies NG DC / NG2D

**LumaSense Technologies** — **Awakening Your 6th Sense**

**Americas and Australia**
**Sales & Service**
**Santa Clara, CA**
Ph: +1 800 631 0176
Fax: +1 408 727 1677

**Europe, Middle East, Africa**
**Sales & Service**
**Frankfurt, Germany**
Ph: +49 69 97373 0
Fax: +49 69 97373 167

**India**
**Sales & Support Center**
**Mumbai, India**
Ph: +91 22 67419203
Fax: +91 22 67419201

**China**
**Sales & Support Center**
**Shanghai, China**
Ph: +86 133 1182 7766
Fax: +86 21 5877 2383

**info@lumasenseinc.com**
**www.lumasenseinc.com**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