LUMASENSE TECHNOLOGIES

IMPAC Infrared Temperature Sensors

Stationary, digital ratio pyrometer with possible combination of 1-color and 2-color measurement for non-contact temperature measurements in ranges between 100 and 2000 °C

IGAR 6 Advanced

CE

- Wide temperature ranges and various operating modes:
  - 1-color mode: 100 ... 2000 °C
  - 2-color mode: 250 ... 2000 °C
  - Smart mode: automatic (temperature-dependent) transition from 1-color to 2-color mode
- Automatic emissivity determination
- "Dirty Window" Warning
- Fully digital core for sub-ranging and adopted analog output
- Very fast 2 ms response time for highly dynamic processes
- Best optics in its class with manual focus capability
- 4 digit LED display
- Robust, stainless steel sensor for harsh environments (IP65/NEMA4)

The IGAR 6 Advanced pyrometer is a digital, compact and fast pyrometer which - depending on the individual requirements - can be operated in different modes. Besides the 1-color mode (100 ... 2000 °C) a 2-color mode (250 ... 2000 °C) or a special Smart mode can be selected. In Smart mode, the measurements in the range between 100 ... 250 °C will be taken in 1-color mode whereas in the range between 280 ... 2000 °C the measurements will be based on the 2-color method (ratio method). In the range from 250 to 280 °C, a continuous transition from 1-color to 2-color measurement automatically takes place.

In 2-color mode (ratio method) 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, measurements through dirty viewing windows are possible up to a certain contamination.

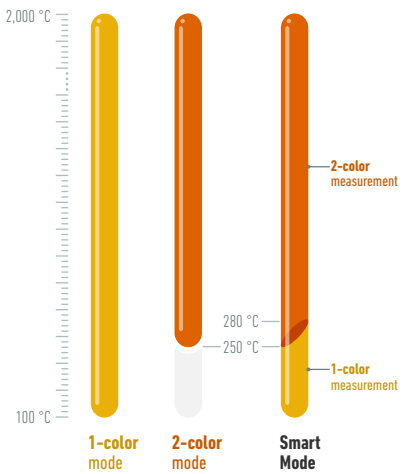
When the instrument is operated in 2-color or Smart mode, InfraWin provides the option to automatically determine the emissivity. By pushing the button "Emi=xxx% Accept", this emissivity is set and used for all measurements in 1-color mode or in Smart mode below 280 °C.

The response time of only 2 ms facilitates the measurement of fast processes. The IGAR 6 is equipped with a built-in "dirty window" warning.

The pyrometer can be connected to a PC through an RS485 to USB connection, enabling parameter adjustments to be made using the InfraWin software. This can be used for temperature indication, data logging and further analyzing of complete temperature processes.

Typical applications:

- Steel Making
- Metal Processing - e.g. Induction Processes: Hardening, Tempering, Annealing, Soldering, Brazing, Welding, Froging, etc.
- Metal Processing - Wire/Rod Mill, Heating and Cooling Processes
- Sintering
- Vacuum Processes - e.g. Coating, Brazing, etc.
- Laser Applications



Technical Data

Measurement Specifications

Temperature Ranges:	1-color and Smart mode: 100 to 2000 °C 2-color (ratio) mode: 250 to 2000 °C
Sub Range:	Any range adjustable within the temperature range, minimum span 50 °C
Spectral Ranges:	Channel 1: 1.5 ... 1.6 µm; Channel 2: 2.0 ... 2.5 µm
Resolution:	0.1 °C or 0.2 °F at interface; < 0.0015% of selected sub range at analog output, min. 0.1 °C, 16 bit; 1 °C or 1 °F on display
Emissivity ε:	0.050 to 1.000 in steps of 1/1000 (1-color mode)
Transmittance τ:	0.050 to 1.000 in steps of 1/1000 (1-color mode)
Emissivity Slope K:	0.800 to 1.200 in steps of 1/1000 (2-color mode)
Measurement Uncertainty: ε (κ = 1 or ε = 1, t_{90} = 1 S, $T_{amb.}$ = 25°C)	< 1500 °C: 0.4% of reading in °C + 2 °C > 1500 °C: 0.8% of reading in °C
Repeatability: (κ = 1 or ε = 1, t_{90} = 1 S, $T_{amb.}$ = 25°C)	0.2% of reading in °C + 1°C

Optical Specifications

Sighting: 	Built-in laser aiming light (max. power level < 1 mW, λ = 630 to 680 nm, CDRH class II) or through-lens sighting
Optics:	Manually focusable from rear cover measuring distance a = 210 to 5000 mm
Distance Ratio:	approx. 100 : 1

Environmental Specifications

Protection Class:	IP 65 IEC 60529 (value in mated condition)
Operating Position:	any
Ambient Temperature:	0 to 65°C at housing
Storage Temperature	-20 to +80°C
Relative Humidity:	Non condensating conditions
Weight:	0.6 kg
Housing:	Stainless steel
CE Label:	According to EU directives about electromagnetical immunity

Note: MB is a shortcut used for temperature range (in German: **M**ess**b**ereich)

Interface

Connection:	12-pin connector
Display (in rear cover):	LED, 4 digit matrix, 5 mm high for 2-color or 1-color temperature signal or measuring distance
Parameters	Adjustable via interface: 2-color / 1-color temperature signal, Smart mode, metal mode, accordingly emissivity slope or emissivity, temperature sub range, settings for maximum value storage, address, baud rate, switch off limit, "dirty window" warning, 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, measuring distance

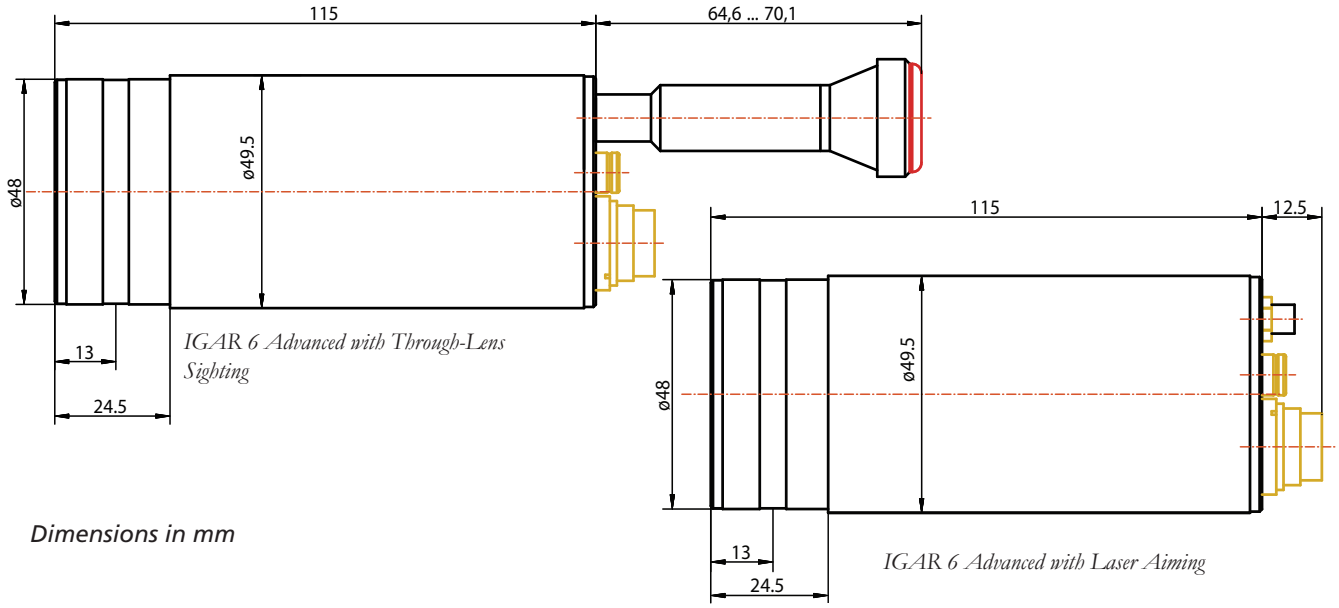
Communication

Analog Output:	Adjustable 0 to 20 mA or 4 to 20 mA, linear (via digital interface)
Digital Interface:	RS485 addressable (half-duplex) Baud rate: 1200 to 115.2 kBd (on request RS232, not addressable)
Switch Off Limit:	2% to 50% (adjustable via interface)
"Dirty Window" Warning:	Relay contact, max. continuous current 0.4 A, setting of the warning level: 0 (off) to 99%
Response Time t_{90}:	2 ms (with dynamic adaption at low signal levels); adjustable to 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, external contact, hold-function

Electrical

Power Supply:	24 V DC ± 25%, ripple must be less than 50 mV
Power Consumption:	Max. 3 W (incl. laser)
Load (analog output):	0 to 500 Ω
Isolation:	Power supply, analog output and digital interface are electrically isolated from each other

Product Schematic



IGAR 6 Advanced with Through-Lens Sighting

IGAR 6 Advanced with Laser Aiming

Dimensions in mm

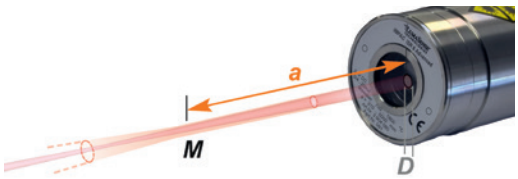
Sighting

IGAR 6 Advanced with Through-Lens Sighting

IGAR 6 Advanced with Laser Aiming

Optics

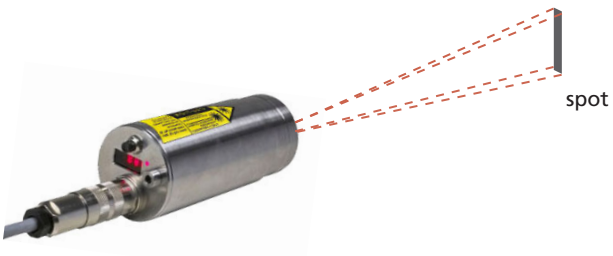
The optics can be manually adjusted at all distances between 210 mm and 5000 mm. The table shows examples of distances and the corresponding spot diameters:



IGAR 6 Advanced	
	100 to 2000 °C
distance a [mm]	Spot diameter M [mm]
210	2.1
300	3
500	5
800	8
1300	13
2000	20
5000	50

Effective aperture D for all temperature ranges: 13 mm (focused to longest distance) to 15 mm (focused to shortest distance)

Optional Integrated Line Optics
Besides the standard optical heads the IGAR 6 is optionally also available with integrated line optics which features a special spot in shape of a line. It provides additional advantages for some applications such as wire production or pouring stream measurements.



The length of the spot equals 5% of the measuring distance.

Reference Numbers

Type	Temperature Range	With Through-Lens Sighting	With Laser Aiming	With Laser Targeting and line shaped spot (5%)
IGAR 6 Advanced	**100 to 2000 °C**	**3 914 710**	**3 914 700**	**3 914 780**

Scope of delivery: Pyrometer with PC software InfraWin for adjustment and evaluation, Works Certificate, and Manual

Ordering note: A connection cable is not included in scope of delivery and must be ordered separately

Accessories

3 820 330 Connection cable, 5 m, straight connector*
3 820 500 Connection cable, 10 m, straight connector*
3 820 510 Connection cable, 15 m, straight connector*
3 820 810 Connection cable, 20 m, straight connector*
3 820 820 Connection cable, 25 m, straight connector*
3 820 520 Connection cable, 30 m, straight connector*
3 820 340 Connection cable, 5 m, 90° connector*
3 820 530 Connection cable, 10 m, 90° connector*
3 820 540 Connection cable, 15 m, 90° connector*
3 820 830 Connection cable, 20 m, 90° connector*
3 820 840 Connection cable, 25 m, 90° connector*
3 820 550 Connection cable, 30 m, 90° connector*
3 852 290 Power supply NG DC for DIN rail mounting; 100 to 240 V AC ⇒ 24 V DC, 1 A
3 852 550 Power supply NG 2D for DIN rail mounting; 85 to 265 V AC ⇒ 24 V DC, 600 mA with 2 settable limit switches
3 826 720 USB to RS485 adapter cable, 1.8 m long

*All connection cables include a short adapter cable with a 9-pin SUB-D connector. This connector may be used in combination with the RS485 to USB adapter.

3 826 510 PI 6000: PID programmable controller
3 890 640 DA 4000-N: LED digital display to be built into the switchboard
3 890 650 DA 4000: like the DA 4000-N, but additionally with 2 limit switches
3 890 570 DA 6000-N digital display, to allow adjustment of Pyrometer through RS485 interface
3 890 530 DA 6000: like the DA 6000-N, but with analog input and 2 limit switches for the RS485 interface.
3 890 630 LD24-UTP; large digital indicator, 57 mm height of digits
3 843 250 ROT 5 scanning mirror attachment up to 70°
3 843 490 External Scanner Series 5 & 6 with fused silica window; 24V AC/DC
3 834 210 Adjustable mounting support
3 846 260 Mounting support
3 846 290 Mounting support with fused silica window
3 835 160 Air purge unit, aluminium
3 835 590 90° mirror for Series 5, quartz glass window
3 837 230 Water cooling jacket (heavy duty) with integrated air purge unit
3 846 590 Vacuum flange KF16 with quartz glass window

Accessory Overview

Industrial Power Supplies

Digital Display

Fast Digital Controllers

Mounting Brackets

Air Purges

Air/Water Cooled enclosures

Scanning Mirror Attachments

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