

Small, stationary infrared thermometers in 2-wire technique for non-contact temperature measurement of non-metallic surfaces between -20°C and 600°C

IN 300



- Very small housing dimensions for easy installation, suitable for use in confined spaces
- 2-wire technique for current supply and temperature measurement at the same time
- Stainless steel housing
- Easy electrical and mechanical installation
- Suitable for food industry
- Ambient temperature up to 70°C without cooling



The IN 300 is a stationary pyrometers for non-contact temperature measurement of non-metallic surfaces or painted, coated or anodized metals.

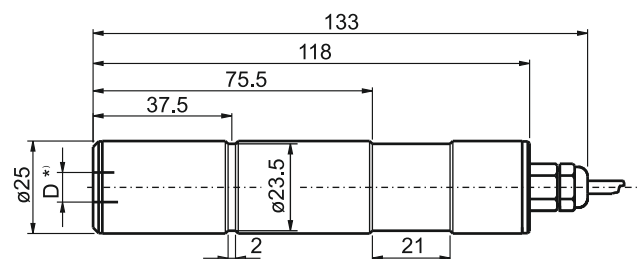
The very small housing dimensions enable the integration of the pyrometer into compact production machines, the 2-wire technique enables very easy electrical connection.

The solid and robust design of the instrument guarantees high operational safety even in rough industrial environments.

Typical applications are measurements on:

- Plastics
- Rubber
- Paper
- Ceramics
- Textiles
- Food
- Fluids
- Painted parts
- Asphalt
- Wood
- Glass
- Coated metals

Dimensions [mm]:

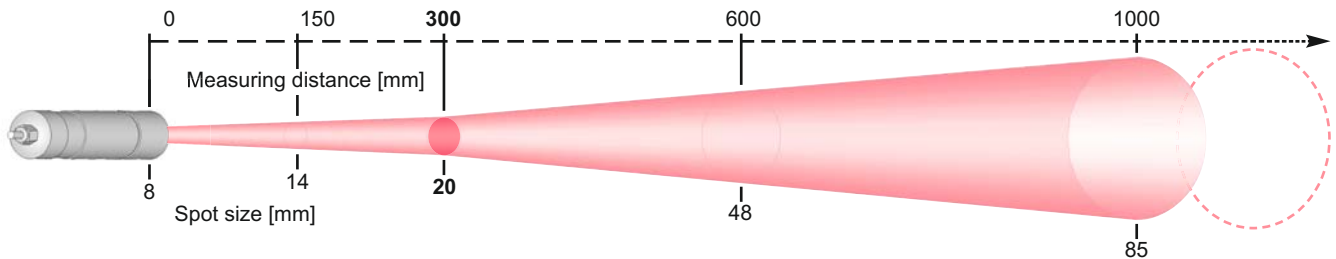


Technical Data

Temperature ranges:	0 ... 100°C 0 ... 200°C -20 ... 300°C	0 ... 500°C 0 ... 600°C
Spectral range:	8 ... 14 μm	
Optics:	Ge lens	
Output:	4 ... 20 mA, load independent current, temperature linear	
Max load:	500 Ω at 24 V power supply	
Emissivity ε:	0.4 ... 1; adjustable	
Response time t_{90} :	300 ms	
Uncertainty: ($\epsilon = 1, T_{amb.} = 23^\circ\text{C}$)	1.5% of measuring range / °C	
Repeatability:	1% of measuring range	

Temp. dependence:	0 ... 60°C: 0.03% of measuring range per °C (23°C)
Distance ratio:	15 : 1
Power supply:	24 V DC ± 25% stabilized, ripple < 50 mV
Ambient temperature:	0 ... 70°C
Storage temperature:	-20 ... 70°C
Housing:	stainless steel
Protection class:	IP65 (DIN 40 050)
Weight:	215 g
Connection cable:	2 m length, fixed
CE label:	according to EU directives about electromagnetic immunity

Optics



Reference Numbers

3 856 310	0 ... 100°C	3 856 350	0 ... 500°C
3 856 320	0 ... 200°C	3 856 360	0 ... 600°C
3 856 330	-20 ... 300°C		

Accessories:

3 852 290	Power supply NG DC, 100 to 240 V AC, 50 to 60 Hz ⇒ 24 V DC, 1 A	3 863 010	Converter 4 ... 20 mA to 0 ... 20 mA
3 852 550	Power supply NG 2D; 85 ... 265 V AC ⇒ 24 V DC, 600 mA, with 2 limit switches	3 834 230	Adjustable mounting support
3 890 640	DA 4000-N, LED-display, 2-wire power supply	3 846 170	Mounting tube
3 890 650	DA 4000, LED-display, 2-wire power supply, 2 limit switches (relay contacts)	3 835 180	Air purge unit, stainless steel
3 890 520	DA 6000, LED-display, RS232, 2-wire power supply, maximum value storage, analog output	3 835 220	Air purge unit, stainless steel, short version
3 890 530	DA 6000 with RS485	3 835 240	90° mirror
3 890 610	Galvanic separator for measuring output (carrier rail mounting housing)	3 827 070	Laser targeting light
		3 827 100	Twin laser targeting light
		3 837 160	Stainless steel water cooling jacket with integrated air purge unit
		3 834 210	Adjustable mounting support for water cooling jacket

Accessory overview

Mechanical:



Electrical:



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Small, stationary infrared thermometer in 2-wire-form for non-contact temperature measurement of glass surfaces and quartz surfaces between 300°C and 1300°C

IN 300/5



- Spectral range optimized for measurement of glass surfaces
- Very small housing dimensions
- 2-wire form
- Short response time
- Small spot sizes
- Stainless steel housing
- Easy electrical and mechanical installation
- Ambient temperature up to 70°C without cooling



The **IN 300/5** is a stationary pyrometer for non-contact temperature measurement of glass surfaces and quartz surfaces.

The very small housing dimensions enable the integration of the IN 300/5 in compact glass production machines, e.g. for production of bulbs or glass tubes.

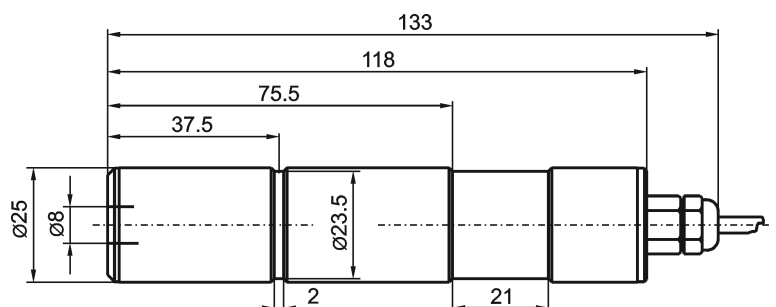
The small spot sizes enable measurements of smallest objects, e.g. miniatur bulbs for illumination of car instruments.

The solid and robust design of the instrument guarantees high operational safety even in rough industrial environments.

Typical applications:

- float glass
- hollow glass
- Glass hardening
- Glass bending
- bulb production
- heat treatment

Dimensions [mm]:



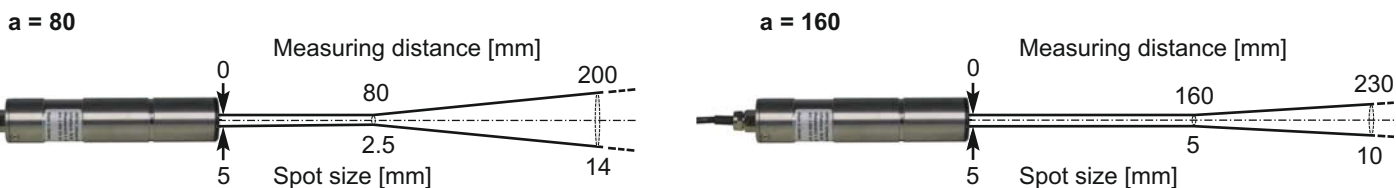
Technical Data

Temperature ranges:	300 - 800°C (MB 8); 300 - 1300°C (MB 13)
Optics:	CaF ₂ lens
IR-detector:	Si-based thermopile
Spectral range:	5.14 µm, narrow band
Output:	4 - 20 mA, load independent current, linear to temperature
Max load:	500 Ohms at 24 V supply
Emissivity ε:	0.4 - 1; adjustable
Response time t ₉₀ :	100 ms; fixed
Uncertainty:	1.5% of the measuring range (ε = 1, T _{amb.} = 23°C)
Temp. dependance:	0 - 60°C: 0.03% of measuring range / °C
Repeatability:	1% of the measuring range

Safety system:	IP65 (according to DIN 40 050)
Ambient temperature:	0 - 70°C
Storage temperature:	-20 - 70°C
Power supply:	24 V DC ± 25%, stabilized, ripple < 50 mV
Housing:	Stainless steel
Dimensions:	133 mm x 25 mm (L x D)
Mounting position:	Any
Weight:	215 g
Connection cable:	2 m, fixed
CE-label:	According to EU directives about electromagnetic immunity

Optics

The pyrometer is equipped ex works with one of the optics a = 80 or 160 mm. In this distance the instruments features the smallest possible spot size. Decreasing or increasing the measuring distance changes the spot size as shown by the example values in the below.



Reference Numbers

Instruments:

3 856 420 IN 300/5, 300 - 800°C
 3 856 430 IN 300/5, 300 - 1300°C

optics a = 80 or a = 160 mm please specify when ordering

Accessories:

- | | |
|--|---|
| 3 852 290 Power supply NG DC; 100 ... 240 V AC ⇒ 24 V DC, 50 - 60 Hz, 1 A | 3 890 610 Galvanic separator for measuring output (carrier rail mounting housing) |
| 3 852 550 Power supply NG 2D; 85 ... 265 V AC ⇒ 24 V DC, 48 ... 62 Hz, 600 mA, with 2 limit switches | 3 863 010 Converter 4 - 20 mA to 0 - 20mA |
| 3 890 640 DA 4000-N, LED-display, 2-wire power supply | 3 834 230 Adjustable mounting support, stainless steel |
| 3 890 650 DA 4000, LED-display, 2-wire power supply, 2 limit switches (relay contacts) | 3 835 180 Air purge unit, stainless steel |
| 3 890 520 DA 6000, LED-display, RS232, 2-wire power supply, maximum value storage, analog output | 3 837 160 Water cooling jacket, stainless steel, with integrated air purge unit |
| 3 890 530 DA 6000with RS485 interface | 3 834 210 Adjustable mounting support for water cooling jacket |
| | 3 846 170 Mounting tube |
| | 3 827 070 Laser targeting light attachment |
| | 3 827 100 Twin laser targeting light attachment |

Overview:



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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 300 • IS 310

IGA 300 • IGA 310



- 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 300**, **IS 310**, **IGA 300** 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 ensuring very easy electrical connection, the solid and robust design of the instrument guarantees reliability even in rough industrial environments.

The types 300 and 310 differ in the optical data and slightly different housings. Additionally the type 310 is equipped with a connector for electrical installation, this offers the option to use connection cables up to 30 m. The type 300 has a fixed installed 2 m cable.

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
- tempering

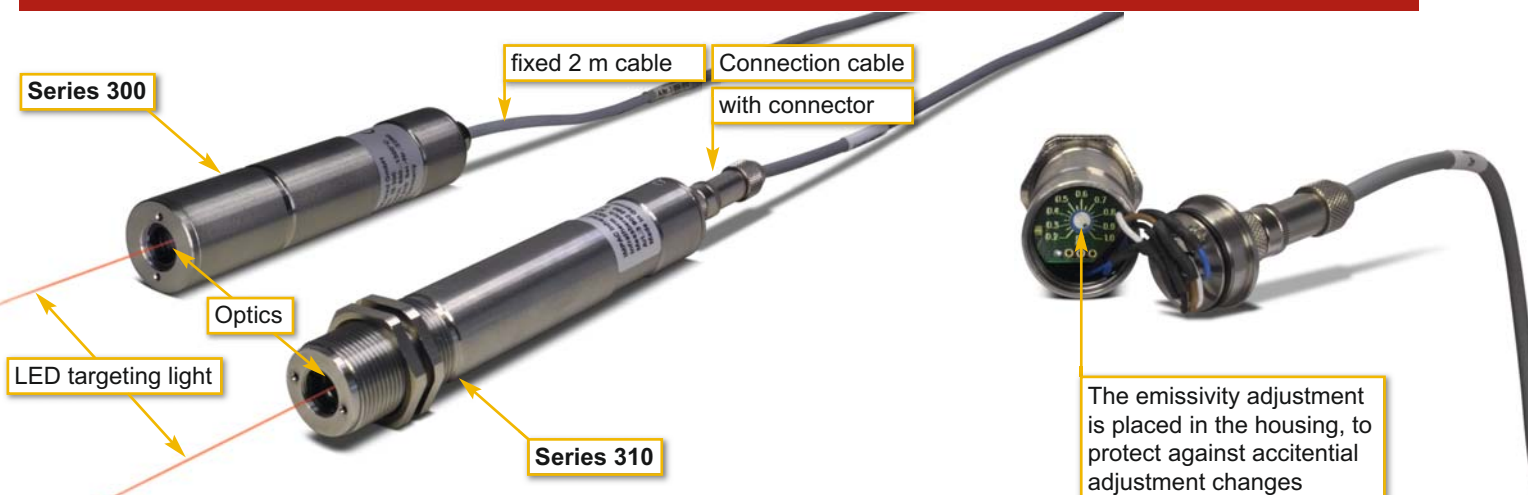
Technical data

	IS 300	IS 310	IGA 300	IGA 310
Temperature range:	650 to 1300°C (MB 13) 650 to 1800°C (MB 18) 800 to 2300°C (MB 23) 1100 to 2500°C (MB 25)	650 to 1800°C (MB 18) 800 to 2300°C (MB 23) 1100 to 2500°C (MB 25)	300 to 800°C (MB 8) 400 to 1200°C (MB 12) 300 to 1300°C (MB 13L) 500 to 1500°C (MB 15)	300 to 1300°C (MB 13L) 500 to 1500°C (MB 15)
Spectral range:	0.8 to 1.1 μm		1.45 to 1.8 μm	
Detector:	Si photo diode		InGaAs photo diode	
Output:	4 to 20 mA, load independent current, linear temperature output			
Max load:	500 Ω at 24 V power supply, max. 200 Ω at 18 V, max. 800 Ω at 30 V			
Emissivity ϵ :	0.2 to 1; adjustable			
Response time t_{90} :	10 ms			
Accuracy:	Up to 1500°C: 0.8% of measured value + 1°C ($\epsilon=1, T_{\text{amb.}}=23^\circ\text{C}$) Above 1500°C: 1% of measured value + 1°C			
Repeatability:	0.3% of measured value ($\epsilon=1, T_{\text{amb.}}=23^\circ\text{C}$)			
Power supply:	24 V DC \pm 25% stabilised, ripple < 50 mV 5 to 30 V DC for LED targeting light ($I \leq 30$ mA)			
Sighting:	LED targeting light			
Ambient temp.:	0 to 70°C			
Storage temp.:	-20 to 70°C			
Relative humidity:	No condensing conditions			
Housing:	Stainless steel			

Dimensions:		
IS 300 / IGA 300:		
IS 310 / IGA 310:		
	<p>*) Aperture D depending on instrument type, see right page</p> <p>All dimensions in mm</p>	

Protection class:	IP65 (DIN 40 050)
Mounting position:	Any
Weight :	275 g
Connection cable:	IS 300; IGA 300: 2 m length IS 310; IGA 310: 2 m - 30 m length, connection via connector
CE label:	According to EU directives about electromagnetic immunity

Details

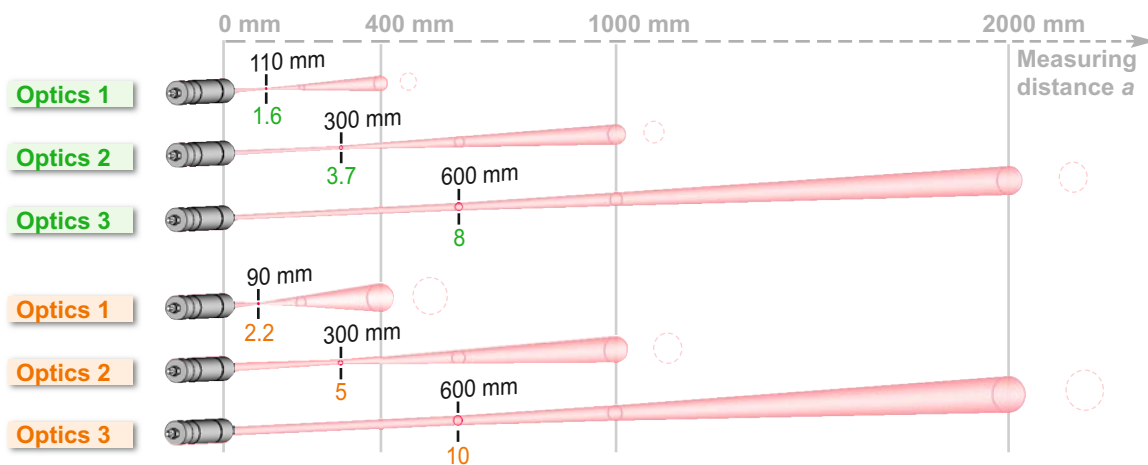


Optics

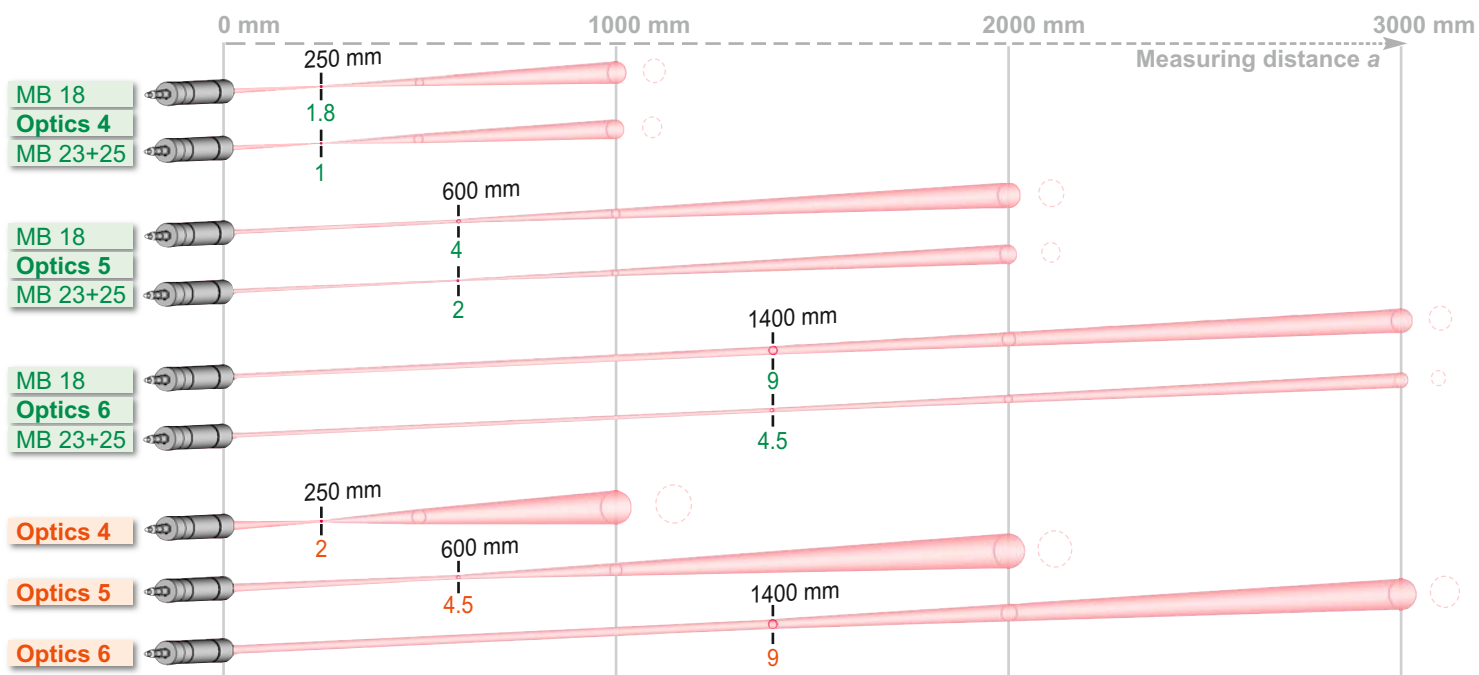
The pyrometers are equipped ex works with one of the following optics. These optics are fixed to a certain distance, i.e. at these distances each optic achieves its smallest spot size in relation to the measuring distance. The spot size will change in any other distance (shorter or longer). Please note 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	$a : M$ *)	Optics	a [mm]	M [mm]	a_1 [mm]	M_1 [mm]	a_2 [mm]	M_2 [mm]	D [mm]
IS 300	65 : 1	1	110	1.6	200	6	400	16	5
	80 : 1	2	300	3.7	600	11	1000	21	
	75 : 1	3	600	8	1000	14	2000	30	
IGA 300	40 : 1	1	90	2.2	200	11	400	30	9
	60 : 1	2	300	5	600	15	1000	28	
	60 : 1	3	600	10	1000	16	2000	38	



Type		$a : M$ *)	Optics	a [mm]	M [mm]	a_1 [mm]	M_1 [mm]	a_2 [mm]	M_2 [mm]	D [mm]
IS 310	(MB 18)	140 : 1	4	250	1.8	600	11.6	1000	23	5.2
	(MB 23+25)	250 : 1			1		9.7		20	
	(MB 18)	150 : 1	5	600	4	1000	10.1	26		
	(MB 23+25)	300 : 1			2		6.8	20		
	(MB 18)	155 : 1	6	1400	9	2000	15.1	25		
	(MB 23+25)	310 : 1			4.5		8.7	16		
IGA 310	MB 13L + MB 15	125 : 1	4	250	2	600	17.4	1000	35	9
		135 : 1	5	600	4.5	1000	13.5	2000	36	
		155 : 1	6	1400	9	2000	16.8	3000	30	



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

Reference numbers

Type	Optics	Temperature range			
		650 to 1300°C (MB 13)	650 to 1800°C (MB 18)	800 to 2300°C (MB 23)	1100 to 2500°C (MB 25)
IS 300	1, 2 or 3 (specify when ordering)	3 856 610	3 856 620	3 856 630	3 856 650
IS 310	4 (focus: 250 mm)	-	3 902 210	3 902 250	3 902 310
	5 (focus: 600 mm)	-	3 902 220	3 902 260	3 902 320
	6 (focus: 1400 mm)	-	3 902 230	3 902 270	3 902 330

Type	Optics	Temperature range			
		300 to 800°C (MB 8)	400 to 1200°C (MB 12)	300 to 1300°C (MB 13L)	500 to 1500°C (MB 15)
IGA 300	1, 2 or 3 (specify when ordering)	3 856 500	3 856 510	3 856 530	3 856 540
IGA 310	4 (focus: 250 mm)	-	-	3 902 050	3 902 110
	5 (focus: 600 mm)	-	-	3 902 060	3 902 120
	6 (focus: 1400 mm)	-	-	3 902 070	3 902 130

Scope of delivery: Instrument, works certificate, user manual.

Ordering note: A connection cable for the series 310 is not included in scope of delivery and has to be ordered separately.

Accessory

3 821 610	Connection cable IS / IGA 310, 2 m	3 890 610	Galvanic separator for measuring output (carrier rail mounting housing)
3 821 620	Connection cable IS / IGA 310, 5 m	3 863 010	Converter (4 - 20 mA to 0 - 20 mA)
3 821 630	Connection cable IS / IGA 310, 10 m	3 834 230	Adjustable mounting support, stainless steel
3 821 640	Connection cable IS / IGA 310, 15 m	3 846 170	Mounting tube
3 821 650	Connection cable IS / IGA 310, 20 m	3 835 180	Air purge unit, stainless steel
3 821 660	Connection cable IS / IGA 310, 25 m	3 835 240	90°-mirror
3 821 670	Connection cable IS / IGA 310, 30 m	3 837 160	Water cooling jacket series 300, stainless steel, with integrated air purge unit
3 852 290	Power supply NG DC, 100 to 240 V AC, 50 to 60 Hz ⇒ 24 V DC, 1 A	3 834 210	Adjustable mounting support for water cooling jacket
3 852 550	Power supply NG 2D, 85 to 265 V AC, 48 to 62 Hz ⇒ 24 V DC, 600 mA, with 2 limit contacts	3 890 150	DA 6000-T, digital display, RS232, measures the time to cool from 800°C to 500°C (for welding processes)
3 890 640	DA 4000-N: LED-display, 2-wire power supply	3 843 460	SCA 300, scanning attachment with quartz glass window; 24 V AC/DC
3 890 650	DA 4000: like DA 4000-N with 2 limit contacts	3 835 290	Air purge unit for scanning attachment
3 890 520	DA 6000, LED display, RS232, 2-wire power supply, maximum value storage, analog output		
3 890 530	DA 6000 with RS485		

Accessory overview



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Compact, Short Wavelength Digital Infrared Thermometer for Non-Contact Temperature Measurement of Metallic Surfaces, Graphite or Ceramics between 300 and 1800°C



IMPAC IS 320 • IMPAC IGA 320

- Small housing dimensions for easy installation in confined spaces
- RS485 interface for connection to a PC in long transmission networks
- Analog output adjustable to 0 or 4 to 20 mA for connection to standard analyzing instruments
- Internal digital signal processing for high accuracy and long temperature ranges
- High quality optics for measurement of small objects
- Built-in LED targeting light for easy alignment to the measuring object



The IMPAC IS 320 and IGA 320 are short wavelength infrared measuring instruments with internal digital signal processing capabilities. IS 320 and IGA 320 pyrometers are used for measurements of metallic surfaces, graphite and ceramics, and much more.

The compact housing dimensions of both instruments allow easy integration of the pyrometers into compact production machines, and the solid and robust designs guarantee reliability even in the harshest industrial environments.

The instruments are equipped with a choice of optics for small spot sizes.

An LED targeting light enables precise alignment on the measurement object. It is automatically active and can be used during measurement.

In addition to the analog output, the pyrometers are equipped with digital RS485 interfaces, which enable 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.

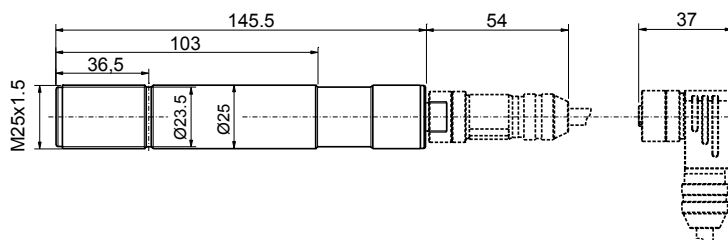
Typical Applications:

- Preheating
- Annealing
- Tempering
- Welding
- Forging
- Hardening
- Sintering
- Melting
- Soldering
- Brazing
- Rolling

Technical Data

	IMPAC IS 320	IMPAC IGA 320
Temperature Ranges:	550 - 1400°C (MB14); 600 - 1600°C (MB16); 650 - 1800°C (MB18)	300 - 1300°C (MB 13); 400 - 1800°C (MB 18)
Sub Range:	Any range adjustable within the temperature range, minimum span 51°C	
Spectral Range:	0.8 - 1.1 µm	1.45 - 1.8 µm
IR Detector:	Silizium-Fotodiode (Si)	Indium Gallium Arsenide photo diode (InGaAs)
Power Supply:	24 V DC (10 to 30 V DC), ripple must be less than 0.5 V	
Power Consumption:	Max. 1 W	
Analog Output:	0 to 20 mA or 4 to 20 mA (linear), switchable	
Load:	0 to 500 Ω	
Switch Contact:	Opto relays; max. 50 V DC, 0.2 A; Pmax = 300 mW	
Hysteresis:	2 ... 20°C, adjustable	
Digital Interface:	RS485 addressable (half duplex), baud rate 1200 up to 38400 Bd	
Resolution:	0.1°C on interface; < 0.025% of the adjusted temperature sub range at the analog output	
Isolation:	Power supply, analog output and digital interface are galvanically isolated from each other	
Parameters:	Adjustable via interface: Emissivity ϵ , transmittance t , exposure time t_{90} , max./min. value storage, analog output, sub temperature range, ambient temperature compensation, pyrometer address, switch contact, hysteresis, baud rate, wait time t_w	
Emissivity ϵ:	10.0 to 100.0% adjustable via interface in steps of 0.1%	
Transmittance t:	10.0 to 100.0% adjustable via interface in steps of 0.1%	
Exposure Time t_{90}:	2 ms (with dynamical adaptation at low signal levels); adjustable to 0.01 s; 0.05 s; 0.25 s; 1 s; 3 s; 10 s	
Maximum/Minimum 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 or automatically with the next measuring object	
Uncertainty:	Up to 1500°C: 0.3% of reading in °C + 1°C; Above 1500°C: 0.5% of reading in °C	
Repeatability:	0.2% of reading in °C + 1°C ($\epsilon = 1, t_{90} = 1 \text{ s}, T_{amb.} = 23^\circ\text{C}$)	
Protection Class:	IP65 (IEC 60529)	
Mounting Position:	any	
Ambient Temperature:	0 to 70°C	
Storage Temperature:	-20 to 70°C	
Rel. Humidity:	None condensing conditions	
Weight:	0.3 kg	
Housing:	Stainless steel	

Dimensions:



All dimensions in mm

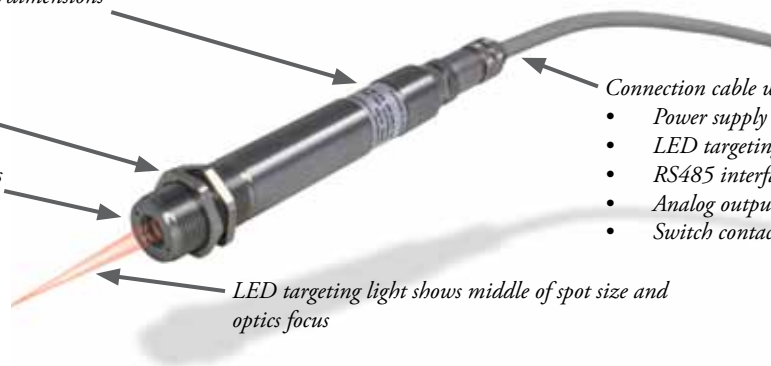
Connector:	8 pin connector
Sighting:	Built-in LED targeting light
CE Label:	According to EU directives about electromagnetic immunity

Equipment Features

Robust stainless steel housing with small dimensions

Mounting thread incl. screw nuts

Precision optics



LED targeting light shows middle of spot size and optics focus

Connection cable with connector and cables for:

- Power supply
- LED targeting light switch on/off
- RS485 interface
- Analog output
- Switch contact

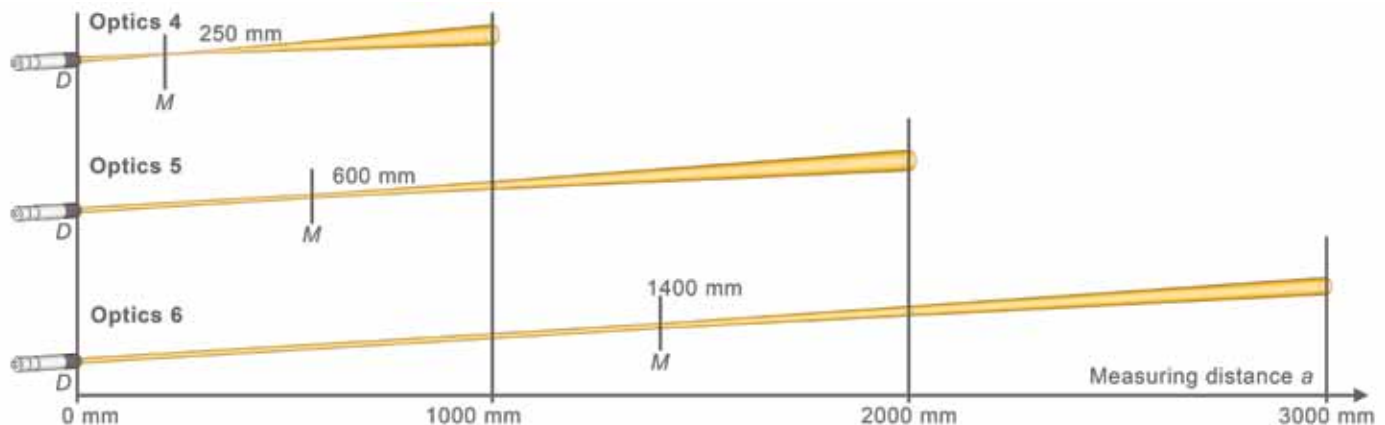
Optics

Depending on the selected type the pyrometers are equipped ex works with different optics which are focusing on different distances, i.e. in this distances they achieve the smallest spot size in relation to the measuring distance. At any other distances (shorter or longer) the spot size will decrease or increase. 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 (M in mm) at a given measuring distance a [mm]; the drawings show an impression of the proportions. Values between the stated data can be calculated by interpolation. The aperture D indicates the diameter of the optics (at measuring distance 0), this value is used to calculate measuring distances in intermediate distances, e.g. with the spot size calculator in the InfraWin software.

Type	Optics	Temperature Range	a : M *	a [mm]	M [mm]	a1 [mm]	M1 [mm]	a2 [mm]	M2 [mm]	D [mm]
IS 320	4	550 ... 1400°C (MB 14)	83 : 1	250	3	500	15	1000	39	9
		600 ... 1600°C (MB 16)	125 : 1		2	500	13	1000	35	
		650 ... 1800°C (MB 18)	192 : 1		1.3	500	12	1000	33	
	5	550 ... 1400°C (MB 14)	92 : 1	600	6.5	1000	17	2000	43	
		600 ... 1600°C (MB 16)	133 : 1		4.5	1000	14	2000	36	
		650 ... 1800°C (MB 18)	188 : 1		3.2	1000	11.3	2000	32	
	6	550 ... 1400°C (MB 14)	93 : 1	1400	15	2000	26	3000	43	
		600 ... 1600°C (MB 16)	156 : 1		9	2000	17	3000	30	
		650 ... 1800°C (MB 18)	200 : 1		7	2000	14	3000	26	
IGA 320	4	300 ... 1300°C (MB 13)	125 : 1	250	2	500	13	1000	3	9
		400 ... 1800°C (MB 18)	208 : 1		1.2	500	11.4	1000	32	
	5	300 ... 1300°C (MB 13)	133 : 1	600	4.5	1000	13.5	2000	36	
		400 ... 1800°C (MB 18)	231 : 1		2.6	1000	10.3	2000	30	
	6	300 ... 1300°C (MB 13)	156 : 1	1400	9	2000	16.8	3000	30	
		400 ... 1800°C (MB 18)	233 : 1		6	2000	12.4	3000	24	

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



Settings and Operation via the RS485 Interface

With connection to the power supply the instruments are ready for use immediately. Following the signal processing either 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). The included InfraWin software enables easy instrument settings and multiple graphical temperature illustration views.

With RS485, long transmission distances can be realized and several pyrometers can be connected in a bus system.

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

Type	Optics	Temperature Range			Type	Optics	Temperature Range	
		550 - 1400°C (MB 14)	600 - 1600°C (MB 16)	650 - 1800°C (MB 18)			300 - 1300°C (MB 13)	400 - 1800°C (MB 18)
IMPAC IS 320	4	3 903 200	3 903 400	3 903 230	IMPAC IGA 320	4	3 903 300	3 903 330
	5	3 903 210	3 903 410	3 903 240		5	3 903 310	3 903 340
	6	3 903 220	3 903 420	3 903 250		6	3 903 320	3 903 350

Scope of delivery: Instrument with selectable optics, inspection sheet, and manual

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

Accessories

3 920 030	Connection cable, 2 m (straight connector)	3 852 610	USB LabKit, adapter RS485 to USB with targeting light push-button and analog output clamp, pyrometer cable, power supply 100...240 V AC
3 920 040	Connection cable, 5 m (straight connector)	3 890 640	DA 4000-N, LED-display, 2-wire power supply (specify 230 or 115 V AC)
3 920 050	Connection cable, 10 m (straight connector)	3 890 650	DA 4000, LED-display, 2-wire power supply, 2 limit switches (relay contacts) (specify 230 or 115 V AC)
3 920 060	Connection cable, 15 m (straight connector)	3 890 530	DA 6000, LED-display, RS485, max. value storage, analog output
3 920 070	Connection cable, 20 m (straight connector)	3 826 510	PI 6000: PID programmable controller, extremely fast, for digital IMPAC pyrometers
3 920 080	Connection cable, 25 m (straight connector)	3 826 520	PI 6000-N: PID programmable controller, extremely fast, for pyrometers with analog output
3 920 090	Connection cable, 30 m (straight connector)	3 890 150	DA 6000-T, digital display for measurement of the cooling-off time from 800°C to 500°C (for welding processes), RS232 interface
3 920 130	Connection cable, 2 m (90° connector)	3 852 580	RS232 to USB converter (matched to DA 6000-T)
3 920 140	Connection cable, 5 m (90° connector)	3 834 230	Adjustable mounting support, stainless steel
3 920 150	Connection cable, 10 m (90° connector)	3 846 170	Mounting tube (L 600 x Ø 70 mm)
3 920 160	Connection cable, 15 m (90° connector)	3 835 180	Air purge unit, stainless steel
3 920 170	Connection cable, 20 m (90° connector)	3 835 240	90° mirror (with air purge)
3 920 180	Connection cable, 25 m (90° connector)	3 843 460	SCA 300, scanning attachment with quartz glass window; 24 V AC/DC
3 920 190	Connection cable, 30 m (90° connector)	3 835 290	Air purge for scanner
3 920 100	Adapter cable (0.2 m) 8 pin onto 12-pin IMPAC standard connector		
3 852 290	Power supply NG DC, 100 ... 240 V AC, 50 ... 60 Hz to 24 V DC, 1 A		
3 852 550	Power supply NG 2D, 85 ... 265 V AC, 48 ... 62 Hz to 24 V DC, 600 mA, with 2 limit switches		
3 852 600	USB nano: Converter RS485 to USB		

Accessory Overview

Mechanical Overview



Electrical Overview



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IS-IGA-320_Datasheet-EN - Rev. 10/04/2011

Temperature and Gas Sensing Solutions

Small, short wavelength digital infrared thermometer for non-contact temperature measurement of metallic surfaces, graphite or ceramics between 75 and 1800°C

IGA 320/23

CE

- Small housing dimensions for easy installation, suitable for use in confined spaces
- RS485 interface for long transmission networks for connection to a PC
- Analog output adjustable to 0 or 4 to 20 mA for connection of standard analyzing instruments
- Internal digital signal processing for high accuracy and long temperature ranges
- High quality optics for measurement of small objects
- Built-in LED targeting light for easy alignment to the measuring object



The **IGA 320/23** is a short wavelength infrared measuring instrument with internal digital signal processing. It is used for measurements of metallic surfaces, graphite and ceramics, etc.

The very small housing dimensions enable the integration of the pyrometer into compact production machines and the solid and robust design guarantees reliability even in rough industrial environments.

The instruments are equipped with a choice of optics for small spot sizes. Using an additional close-up lens these spot sizes can be re-

duced even more, with a measuring distance 50 or 120 mm.

The LED targeting light enables precise alignment on the measurement object. It is automatically active and can be used during measurement.

Additional to the analog output the pyrometer is equipped with a digital RS485 interface. This enables secure data transmission to a PC or a PLC, over long distances. The provided *InfraWin* software enables the graphical display and storage of measurement values; plus the setting of all instrument parameters.

Typical applications:

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

Technical Data

Temperature ranges:	75 ... 550°C (MB 5.5) 150 ... 1200°C (MB 12) 100 ... 700°C (MB 7) 200 ... 1800°C (MB 18)
Sub range:	Any range adjustable within the temperature range, minimum span 51°C
Spectral range:	2 ... 2.6 µm (main wavelength 2.3 µm)
IR detector:	Extended InGaAs
Power supply:	24 V DC (10 to 30 V DC), ripple must be less than 0.5 V
Power consumption:	Max. 1 W
Analog output:	0 to 20 mA or 4 to 20 mA (linear), switchable
Load:	0 to 500 Ω
Switch contact:	Opto relays; max. 50 V DC, 0.2 A; P _{max} = 500 mW
Hysteresis:	2 ... 20°C, adjustable
Digital Interface:	RS485 addressable (half duplex), baud rate 1200 up to 38400 Bd
Resolution:	0.1°C on interface; < 0.025% of the adjusted temperature sub range at the analog output
Isolation:	Power supply, analog output and digital interface are galvanically isolated from each other
Parameters:	Adjustable via interface: Emissivity ε, transmittance τ, exposure time t ₉₀ , max. / min. value storage, analog output, sub temperature range, ambient temperature compensation, pyrometer address, switch contact, hysteresis, baud rate, wait time t _w
Emissivity ε:	10.0 to 100.0% adjustable via interface in steps of 0.1%
Transmittance τ:	10.0 to 100.0% adjustable via interface in steps of 0.1%
Exposure time t ₉₀ :	2 ms (with dynamical adaptation at low signal levels); adjustable to 0.01 s; 0.05 s; 0.25 s; 1 s; 3 s; 10 s
Maximum / minimum 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 or automatically with the next measuring object
Uncertainty:	Up to 400°C: 2°C above 400°C: 0.3% of measured value in °C + 1°C (ε=1, t ₉₀ =1 s, T _{amb.} =23°C; the pyrometer must be operate at least 30 min before these values are valid) above 1500°C: 0.5% of measured value in °C
Repeatability:	0.1% of measured value in °C + 1°C (ε = 1, t ₉₀ = 1 s, T _{amb.} = 23°C)
Protection class:	IP65 (IEC 60529)
Mounting position:	any
Ambient temperature:	0 to 70°C
Storage temperature:	-20 to 70°C
Rel. humidity:	None condensing conditions
Weight:	0.3 kg
Housing:	Stainless steel
Dimensions:	<p style="text-align: right;">All dimensions in mm</p>
Connector:	8 pin connector
Sighting:	Built-in LED targeting light
CE-label:	According to EU directives about electromagnetic immunity

Equipment Features

Stainless steel housing with small dimensions

Mounting thread incl. screw nuts

Optics

LED targeting light shows middle of spot size

Connection cable with connector and cables for:

- Power supply
- LED targeting light switch on / off
- RS485 interface
- Analog output
- Switch contact

RS485 interface for connection to a PC, also for long transmission distances.

Software *InfraWin* for:

- instrument settings
- display of temperature curves
- subsequent graphic or tabular analysis, e.g. for printing out or export.
- spot size calculation

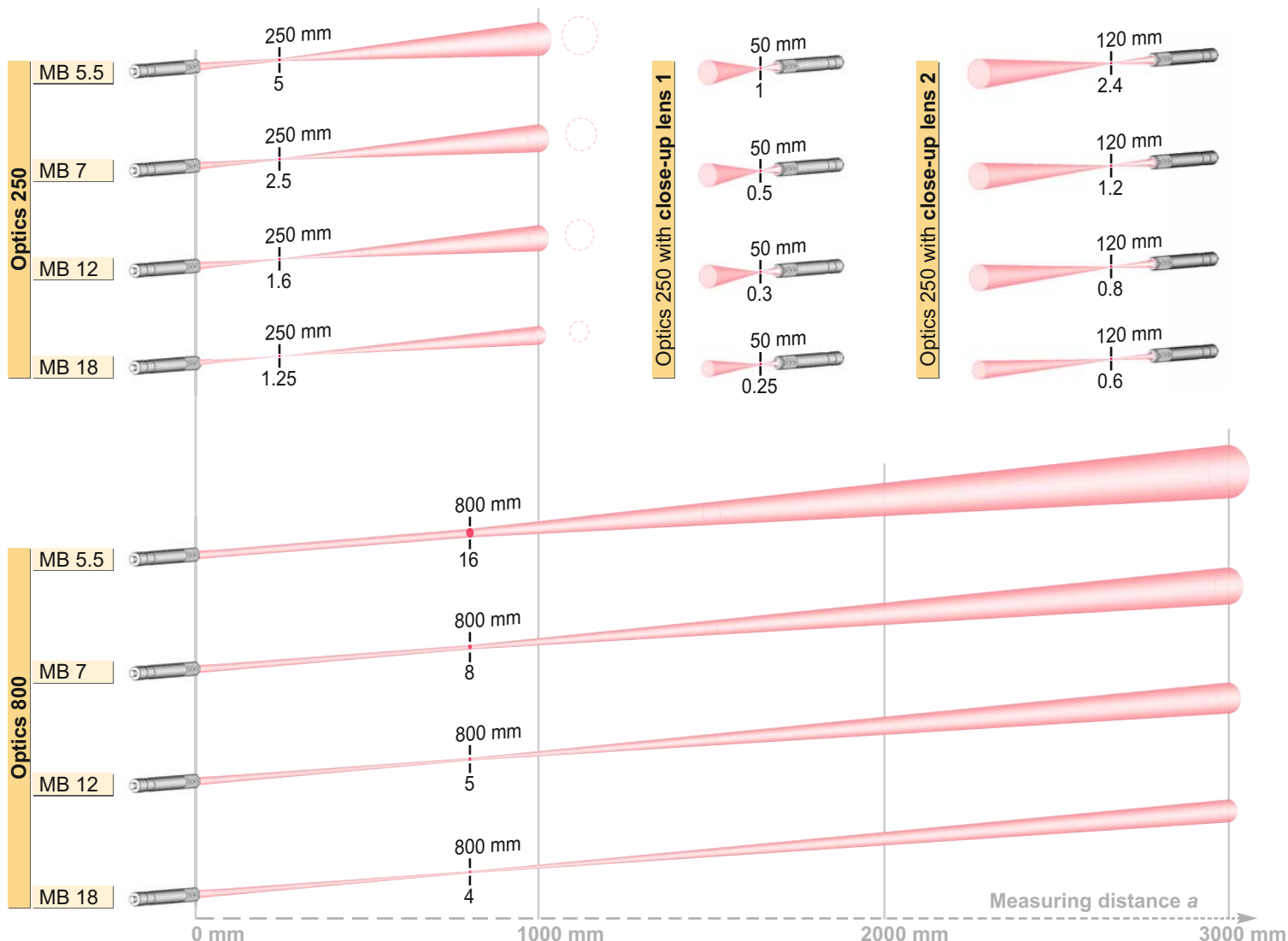
Optics

Depending on the selected type the pyrometers are equipped ex works with optics 250 or 800 mm. At these distances the optics are focused, i.e. where they achieve the smallest spot size in relation to the measuring distance. At any other distances (shorter or longer) the spot size will change, normally it will increase. With a close-up lens (optional) the distances can be decreased and smaller spot sizes achieved.

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 (M in mm) at a given measuring distance a [mm]; the drawings show an impression of the proportions. Values between the stated data can be calculated by interpolation. The aperture D indicates the diameter of the optics (at measuring distance 0), this value is used to calculate measuring distances in intermediate distances, e.g. with the spot size calculator in the *InfraWin* software.

Optics			$a : M$ *)	a [mm]	M [mm]	a_1 [mm]	M_1 [mm]	a_2 [mm]	M_2 [mm]	D [mm]
250	MB 5.5	without close-up lens		250	5	500	24	1000	62	14
		with close-up lens 1	50 : 1	50	1	100	16	200	46	
		with close-up lens 2		120	2.4	300	27	500	55	
	MB 7	without close-up lens		250	2.5	500	19	1000	52	14
		with close-up lens 1	100 : 1	50	0.5	100	15	200	44	
		with close-up lens 2		120	1.2	300	24	500	50	
	MB 12	without close-up lens		250	1.6	500	17	1000	48	14
		with close-up lens 1	160 : 1	50	0.3	100	15	200	43	
		with close-up lens 2		120	0.8	300	23	500	48	
	MB 18	without close-up lens		250	1.25	500	12	1000	35	10
		with close-up lens 1	200 : 1	50	0.25	100	10	200	31	
		with close-up lens 2		120	0.6	300	16	500	34	
800	MB 5.5	without close-up lens	50 : 1	800	16	1500	42	3000	98	14
	MB 7		100 : 1		8		27		68	
	MB 12		160 : 1		5		22		57	
	MB 18		200 : 1		4		16		42	



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

Reference Numbers

Temperature range	a = 250 mm	a = 800 mm
75 ... 550°C	3 903 010	3 903 020
100 ... 700°C	3 903 030	3 903 040
150 ... 1200°C	3 903 050	3 903 060
200 ... 1800°C	3 903 070	3 903 080

Scope of delivery: Instrument with selectable optics, inspection sheet, manual

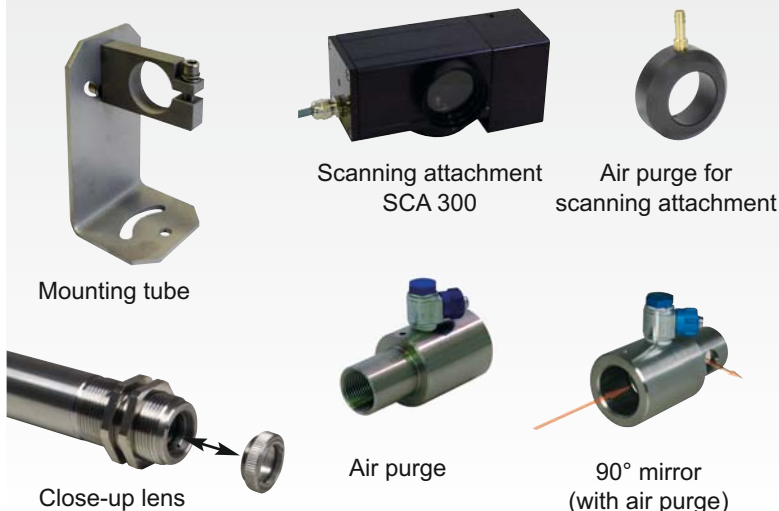
Ordering note: A connection cable is not included in scope of delivery and has to be ordered separately

Accessories

3 920 030	Connection cable, 2 m (straight connector)		
3 920 040	Connection cable, 5 m (straight connector)	3 890 640	pyrometer cable, power supply 100...240 V AC
3 920 050	Connection cable, 10 m (straight connector)		DA 4000-N, LED-display, 2-wire power supply (specify 230 or 115 V AC)
3 920 060	Connection cable, 15 m (straight connector)	3 890 650	DA 4000, LED-display, 2-wire power supply, 2 limit switches (relay contacts) (specify 230 or 115 V AC)
3 920 070	Connection cable, 20 m (straight connector)		3 890 530
3 920 080	Connection cable, 25 m (straight connector)		DA 6000, LED-display, RS485, max. value storage, analog output
3 920 090	Connection cable, 30 m (straight connector)	3 826 510	PI 6000: PID programmable controller, extremely fast, for digital IMPAC pyrometers
3 920 130	Connection cable, 2 m (90° connector)	3 826 520	PI 6000-N: PID programmable controller, extremely fast, for pyrometers with analog output
3 920 140	Connection cable, 5 m (90° connector)	3 890 150	DA 6000-T, digital display for measurement of the cooling-off time from 800°C to 500°C (for welding processes), RS232 interface
3 920 150	Connection cable, 10 m (90° connector)		3 852 580
3 920 160	Connection cable, 15 m (90° connector)		RS232 ↔ USB converter (matched to DA 6000-T)
3 920 170	Connection cable, 20 m (90° connector)		
3 920 180	Connection cable, 25 m (90° connector)	3 848 770	Close-up lens (for a = 50 mm at optics a = 250 mm)
3 920 190	Connection cable, 30 m (90° connector)	3 848 780	Close-up lens (for a = 120 mm at optics a = 250 mm)
3 920 100	Adapter cable (0.2 m) 8 pin onto 12-pin IMPAC standard connector	3 834 230	Adjustable mounting support, stainless steel
3 852 290	Power supply NG DC, 100 ... 240 V AC, 50 ... 60 Hz ⇒ 24 V DC, 1 A	3 846 170	Mounting tube (L 600 x Ø 70 mm)
3 852 550	Power supply NG 2D, 85 ... 265 V AC, 48 ... 62 Hz ⇒ 24 V DC, 600 mA, with 2 limit switches	3 835 180	Air purge unit, stainless steel
3 852 600	USB nano: Converter RS485 ↔ USB	3 835 240	90° mirror (with air purge)
3 852 610	USB-LabKit, adapter RS485 ↔ USB with targeting light push-button and analog output clamp,	3 843 460	SCA 300, scanning attachment with quartz glass window; 24 V AC/DC
		3 835 290	Air purge for scanner

Accessory Overview

Mechanical overview:



Electrical overview:



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