

Stationary, digital ratio pyrometer for non contact temperature measurement between 600°C and 3000°C

ISQ 5



- Temperature ranges between 600 and 3000°C
- Very small spot sizes, min. 1.5 mm
- Sighting: laser targeting light, thru-lens view finder or video module
- Analog output adjustable
0 - 20 mA or 4 - 20 mA
- Built-in lens contamination control system
- Built-in maximum value storage
- Digital interface
- Small dimensions
- Bus capable with RS485 interface



The pyrometer **ISQ 5** is a 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 independent of the object's emissivity in wide ranges and is 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.

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

The response time of only 10 ms facilitates the measurement of fast heating processes.

The ISQ 5 is equipped with a built-in lens contamination control system.

The most important parameters as emissivity slope, exposure time and analog output can be set directly in the instrument.

Additionally the pyrometer can be connected to a PC via serial interface, enabling adjustments of further parameters with the delivered software InfraWin. This can be used for temperature indication, data logging and further analyzing of complete temperature processes.

Typical Applications:

- Induction heating
- Annealing
- Welding
- Forging
- Sintering
- Melting
- Rolling mill
- Rotary kilns
- Crystal growing

Technical Data

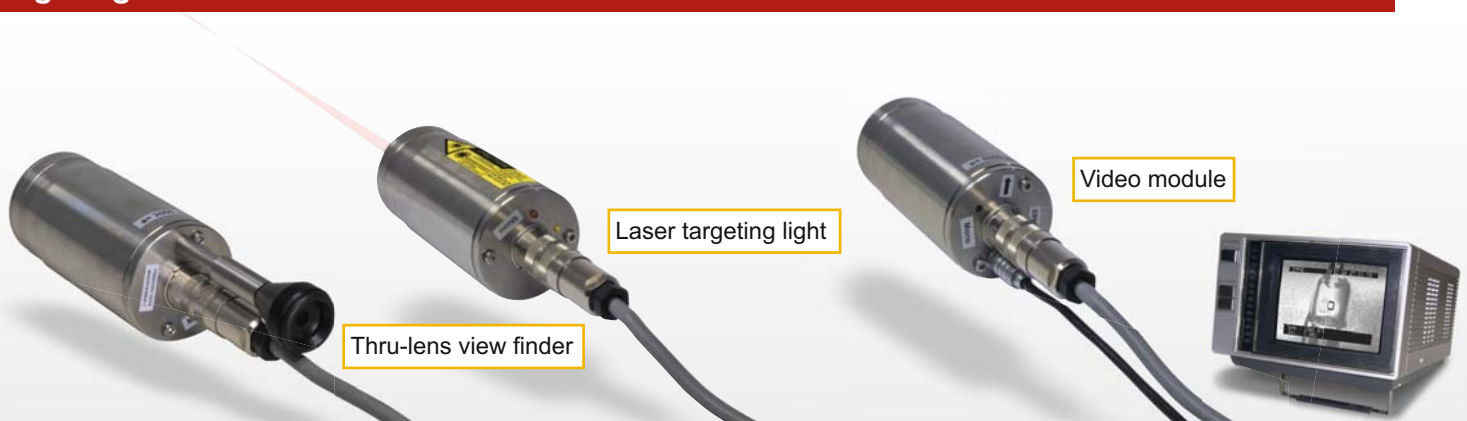
Temperature ranges:	600 to 1400°C (MB 14) 700 to 1800°C (MB 18) 800 to 2500°C (MB 25) 1000 to 3000°C (MB 30)
Sub range:	any range adjustable within the temperature range, minimum span 51°C
Spectral ranges:	channel 1: 0.9 µm; channel 2: 1.05 µm
Power supply:	24 V DC ± 25%, stabilised, ripple < 50 mV
Power consumption:	≤ 3 W (incl. active laser targeting light)
Analog output:	0 to 20 mA or 4 to 20 mA, switchable, linear in temperature, load independent DC
Interface:	optional RS232 or RS485 (addressable), half duplex, baud rate 1.2 up to 38.4 kBd
Resolution:	0.1°C at the interface at the analog output < 0.1% of the adjusted temperature range but min. 0.1°C
Isolation:	power supply and digital output and analog output are galvanically isolated against each other
Parameters:	adjustable on the converter's rear side: emissivity slope, response time, analog output 0 to 20 mA or 4 to 20 mA, online / offline mode additionally via interface adjustable and readable: 2-color / 1-color temperature signal, according to this emissivity slope or emissivity, temperature sub range, settings for maximum value storage, address, baud rate, switch off limit, warning level lens contamination monitoring system. via interface readable only: measured value, internal temperature of the unit
Maximum value storage:	single or double storage, clear modes: time (off; 0.01 s; 0.05 s; 0.25 s; 1 s; 5 s; 25 s), external clear contact, via interface or automatic „hot object mode“, hold-function for freezing the current temperature reading (not for ISQ 5-C)
Emissivity slope K:	(ε1 / ε2): 0.800 ... 1.250
Emissivity ε (in 1-color mode):	0.05 ... 1.00
Response time: t ₉₀ :	< 10 ms, adjustable to 0.01 s; 0.05 s; 0.25 s; 1 s; 3 s; 10 s
Switch off limit:	adjustable via interface: 2% to 50%
Contamination warning:	Relay contact, max. continuous current 0.4 A, setting of the switch level: 0 (off) ... 99%
Accuracy: (25°C, K=1, t ₉₀ =1 s)	< 1500°C: 0.5% of reading in °C + 2°C > 1500°C: 1% of reading in °C
Repeatability:	0.2% of reading in °C + 2°C
Noise equivalent temperature difference (NETD): (K=1, t ₉₀ =10 ms, T _{amb.} =10...40°C)	MB 14: 1°C (at 610°C meas. temperature) MB 25: 0.4°C (at 810°C meas. temperature) 0.1°C (at 800°C meas. temperature) 0.1°C (at 900°C meas. temperature) MB 18: 0.4°C (at 710°C meas. temperature) MB 30: 0.2°C (at 1010°C meas. temperature) 0.1°C (at 800°C meas. temperature) 0.1°C (at 1100°C meas. temperature)
Temperature dependence:	0.25°C per °C deviation of ambient temperature from 25°C
Sighting system:	Laser targeting light (max. power level < 1 mW, λ = 630-680 nm, CDRH class II) or thru-lens view finder or video module
Protection class:	IP65 (DIN 40050)
Ambient temperature:	0 to 70°C
Storage temperature:	-20 to 70°C
Weight:	550 g
Housing:	stainless steel, dimension see drawing on the right side
CE-label:	according to EU directives about electromagnetic immunity



Additional technical data for pyrometers with built-in video module:

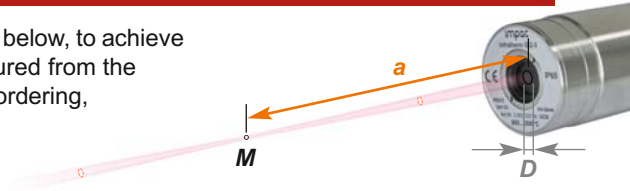
Video signal:	CCIR norm approx. 1 Vpp at 75 W, 50 Hz (special option: EIA norm 60 Hz)
Array size:	CCIR norm: 628 x 583 pixels, black & white EIA norm: 510 x 492 pixels, black & white
Exposure:	automatic, additionally 3-levels controlled by the measuring temperature
Field of view:	approx. 10% x 14% of focused distance
Date/time:	real-time clock with at least 3 days spare run
Video output plug:	separate round plug at the pyrometer, not galvanically separated to the pyrometers power supply
Picture insertions:	target marking; unit number or user text (max. 12 characters), time and/or date; (individually switchable), measuring temperature, emissivity slope or emissivity

Sighting



Optics

The optics is adjusted ex works to one of the distances “a” mentioned in the table below, to achieve the smallest possible spot size in the corresponding measuring distance (measured from the front of the housing). The required measuring distance has to be specified when ordering, other distances between 250 and 6000 mm on request.



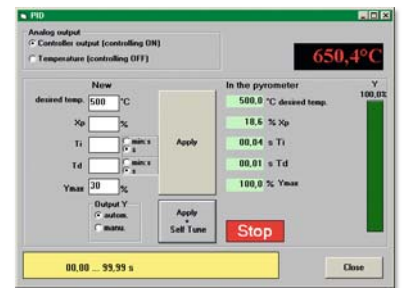
Distance a [mm]	Temperature range			
	600 to 1400°C (MB 14)	700 to 1800°C (MB 18)	800 to 2500°C (MB 25)	1000 to 3000°C (MB 30)
	Spot size M_{90} [mm]			
250 mm	6	3	1.5	1.5
300 mm	8	4	2	2
500 mm	11	5.5	2.8	2.8
800 mm	16	8	4	4
1300 mm	26	13	6.5	6.5
2000 mm	40	20	10	10
4000 mm	90	45	25	25
6000 mm	150	80	45	45
Aperture D [mm]	6	6	6	6

ISQ 5-C: Special Version with Integrated PID Controller

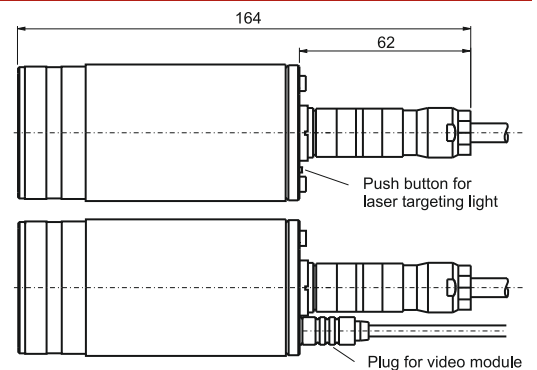
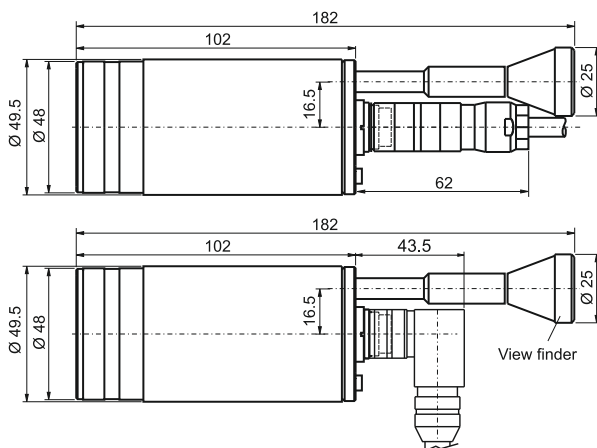
The ISQ 5-C is equipped with an integrated PID controller. This enables automatic controlling and monitoring of processes. The controller compares the current measuring temperature with the target temperature value, calculates the control signal and gives an output signal of 0 or 4 to 20 mA (instead of the temperature signal output). The controller is very fast and updates the signal with the pyrometer's response time (< 10 ms).

The built-in self-tuning algorithm determines automatically and a very good approximation of the controlling parts P, I and D.

Activating and deactivating of the controller as well as setting the parameters can be done via interface and software or via portable parametrizing device HT 6000 or the LED digital display DA 6000 or DA 6000-N.



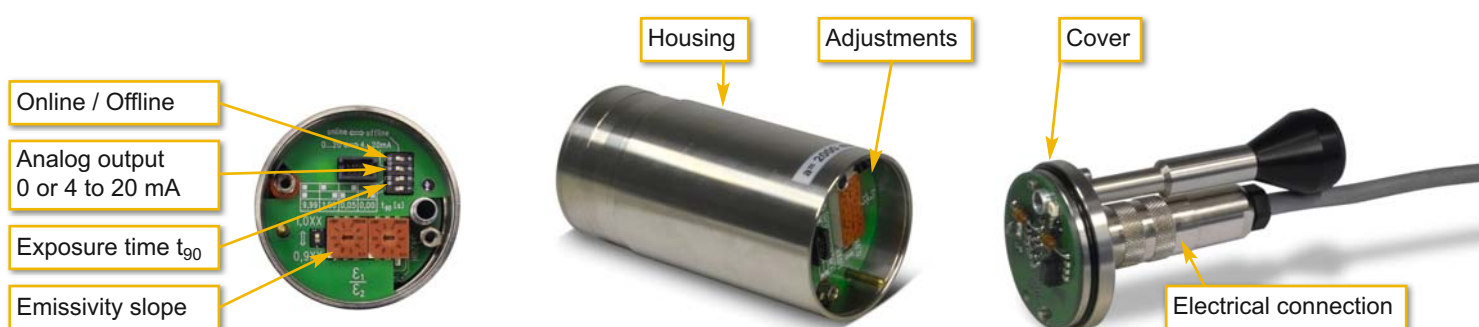
Dimensions



All dimensions in mm

Instrument Settings in Offline Mode

The most important parameters as emissivity slope, exposure time and analog output can be set directly in the instrument. After removing the cover on the back side of the pyrometer, the corresponding adjustments are available.



Reference Numbers

Type	Temperature ranges	with laser targeting light		with thru-lens view finder		with video module *)	
		Interface		Interface		Interface	
		RS232	RS485	RS232	RS485	RS232	RS485
ISQ 5	MB 14: 600 to 1400°C	3 853 100	3 853 110	3 853 120	3 853 130	3 847 500	3 847 510
	MB 18: 700 to 1800°C	3 853 200	3 853 210	3 853 220	3 853 230	3 847 600	3 847 610
	MB 25: 800 to 2500°C	3 853 300	3 853 310	3 853 320	3 853 330	3 847 700	3 847 710
	MB 30: 1000 to 3000°C	3 853 400	3 853 410	3 853 420	3 853 430	3 847 800	3 847 810
ISQ 5-C	MB 14: 600 to 1400°C	3 853 500	3 853 510	3 853 520	3 853 530	–	–
	MB 18: 700 to 1800°C	3 853 600	3 853 610	3 853 620	3 853 630	–	–
	MB 25: 800 to 2500°C	3 853 700	3 853 710	3 853 720	3 853 730	–	–
	MB 30: 1000 to 3000°C	3 853 800	3 853 810	3 853 820	3 853 830	–	–

*) Standard in CCIR norm. Video module with EIA norm please order separately.

Scope of delivery: Converter, works certificate, PC operating and analyzing software *InfraWin*.

Ordering details: - When ordering please select the required measuring distance.
- A connection cable or video cable is not included in scope of delivery, it has to be ordered separately

Accessories:

3 820 330	connection cable, 5 m, straight connector	3 837 370	Water cooling jacket (lightweight design, only pyrometers with laser targeting light) with integrated air purge unit
3 820 500	connection cable, 10 m, straight connector		Vacuum flange KF16 with quartz glass window
3 820 510	connection cable, 15 m, straight connector	3 846 590	Power supply NG DC for DIN rail mounting;
3 820 810	connection cable, 20 m, straight connector	3 852 290	100 to 240 V AC ⇒ 24 V DC, 1 A
3 820 820	connection cable, 25 m, straight connector		Power supply NG 0D for DIN rail mounting (with 12 pin cable connector) (85 ... 265 V AC ⇒ 24 V DC, 600 mA)
3 820 520	connection cable, 30 m, straight connector	3 852 540	Power supply NG 2D, as NG 0D with 2 limit switches
3 820 740	connection cable, 5 m, straight connector, temperature resistant up to 200°C	3 852 550	DA 4000-N: LED digital display (switchboard assembling)
3 821 050	connection cable, 5 m, 90° connector	3 890 640	DA 4000: as DA 4000-N, additionally with 2 limit switches
3 821 060	connection cable, 10 m, 90° connector	3 890 650	DA 6000-N: LED digital display with digital input RS232
3 821 330	connection cable, 12 m, 90° connector	3 890 560	and possibility for setting pyrometer parameters
3 821 280	connection cable, 20 m, 90° connector		DA 6000-N with RS485
3 820 430	Video cable with Cinch-/SCART plug 5 m (other length up to 30 m available)	3 890 570	DA 6000: LED digital display, digital- and analog input, 2 limit switches, maximum value storage, analog output, RS232
3 821 220	Video cable with BNC plug 5 m (other length up to 20 m available)	3 890 520	DA 6000 with RS485
3 834 210	Adjustable mounting support	3 890 530	HT 6000: portable battery driven indicator and instrument for pyrometer parameter settings; RS232 / RS485
3 835 160	Air purge unit, aluminium	3 826 500	PI 6000: Programmable PID controller
3 835 440	Air purge unit, stainless steel		
3 837 230	Water cooling jacket (heavy design) with integrated air purge unit	3 826 510	

Overview Accessories

Mechanical accessories:



Water cooling jacket (heavy design)



Adjustable mounting support



Air purge unit, stainless steel

Electrical accessories:



HT 6000 for pyrometer parameter settings



LED digital display DA 6000



Power supplies NG DC, NG 0D, NG 2D

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