

ISQ 5

Highly accurate, digital, fast

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

- ◆ 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

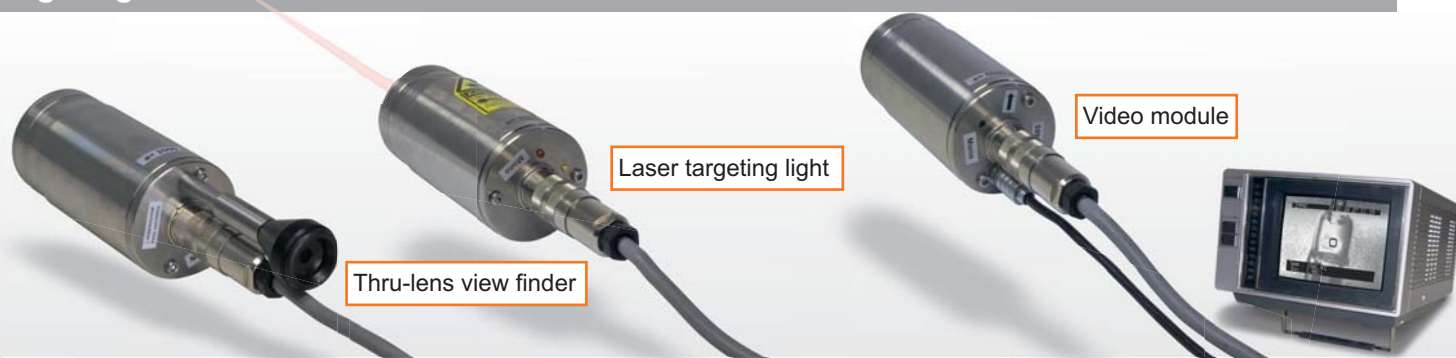
Technical Data

| | |
|--|--|
| Temperature ranges: | 600 ... 1400°C (MB 14) 700 ... 1800°C (MB 18) 800 ... 2500°C (MB 25) 1000 ... 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 ... 20 mA or 4 ... 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 ... 20 mA or 4 ... 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 (in 1-color mode): | 0.05 ... 1.00 |
| Exposure 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% ... 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) 0.1°C (at 800°C meas. temperature) MB 18: 0.4°C (at 710°C meas. temperature) 0.1°C (at 800°C meas. temperature) MB 25: 0.4°C (at 810°C meas. temperature) 0.1°C (at 900°C meas. temperature) MB 30: 0.2°C (at 1010°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 (laser class 2, max. power < 1 mW, 630-660 nm) or thru-lens view finder or video module |
| Protection class: | IP65 (DIN 40050) |
| Ambient temperature: | 0 ... 70°C |
| Storage temperature: | -20 ... 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:

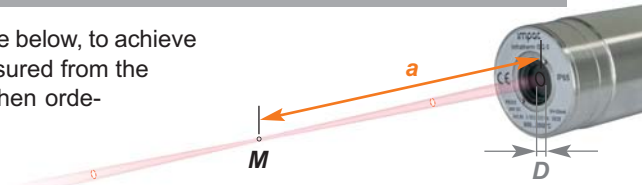
| | |
|---------------------|---|
| Video signal: | CCIR norm approx. 1 V _{pp} at 75 Ω, 50 Hz (special option: EIA norm 60 Hz) |
| Array size: | CCIR norm: 628 x 583 pixels, black & white EIA norm: 510 x 492 pixels, black & white |
| Exposure: | automatic, additionally 3-levels controlled by the measuring 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.



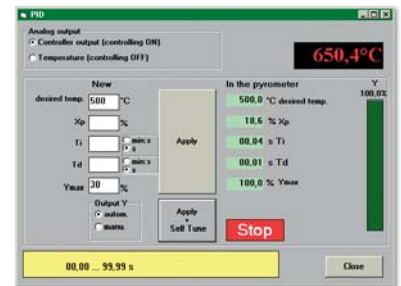
| Distance a [mm] | Temperature range | | | |
|-----------------|-------------------------|-----------------------|-----------------------|------------------------|
| | MB 14: 600 ... 1400°C | MB 18: 700 ... 1800°C | MB 25: 800 ... 2500°C | MB 30: 1000 ... 3000°C |
| | Spot size M_{90} [mm] | | | |
| 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

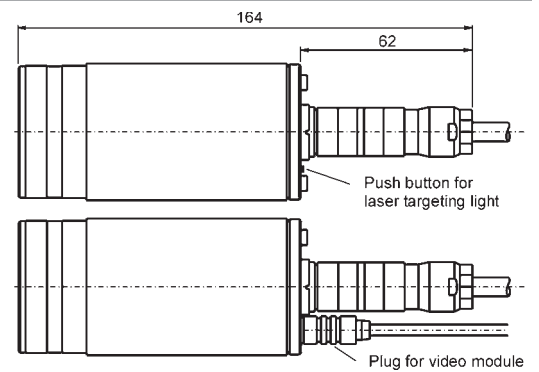
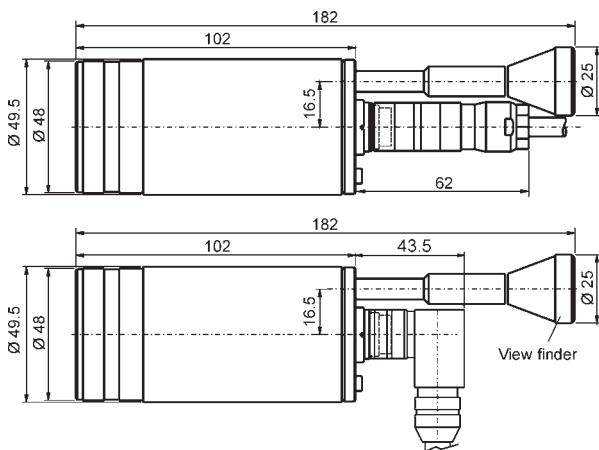
The **ISQ 5-C** is equipped with an integrated PID controller. This enables automatic controlling and monitoring of processes. The controller compares the current measuring temperature with the target temperature value, calculates the control signal and gives an output signal of 0 or 4 ... 20 mA (instead 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.



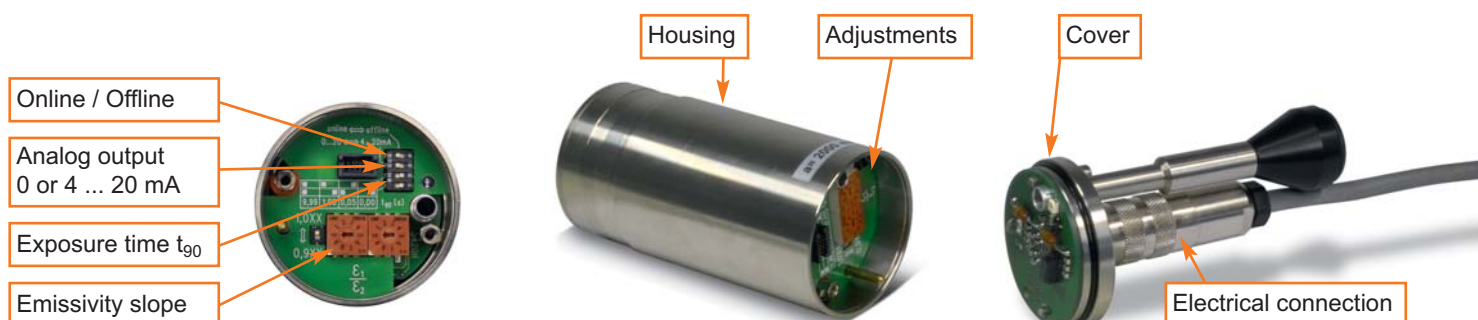
Dimensions



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 ... 1400°C | 3 853 100 | 3 853 110 | 3 853 120 | 3 853 130 | 3 847 500 | 3 847 510 |
| | MB 18: 700 ... 1800°C | 3 853 200 | 3 853 210 | 3 853 220 | 3 853 230 | 3 847 600 | 3 847 610 |
| | MB 25: 800 ... 2500°C | 3 853 300 | 3 853 310 | 3 853 320 | 3 853 330 | 3 847 700 | 3 847 710 |
| | MB 30: 1000 ... 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 ... 1400°C | 3 853 500 | 3 853 510 | 3 853 520 | 3 853 530 | | |
| | MB 18: 700 ... 1800°C | 3 853 600 | 3 853 610 | 3 853 620 | 3 853 630 | | |
| | MB 25: 800 ... 2500°C | 3 853 700 | 3 853 710 | 3 853 720 | 3 853 730 | | |
| | MB 30: 1000 ... 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 | 3 837 230 | Water cooling jacket (heavy design) with integrated air purge unit |
| 3 820 500 | connection cable, 10 m, straight connector | | |
| 3 820 510 | connection cable, 15 m, straight connector | 3 837 370 | Water cooling jacket (lightweight design, only pyrometers with laser targeting light) with integrated air purge unit |
| 3 820 810 | connection cable, 20 m, straight connector | | |
| 3 820 820 | connection cable, 25 m, straight connector | 3 846 590 | Vacuum flange KF16 with quartz glass window |
| 3 820 520 | connection cable, 30 m, straight connector | 3 852 540 | Power supply NG 0D for DIN rail mounting (85 ... 265 V AC ⇒ 24 V DC, 600 mA) |
| 3 820 740 | connection cable, 5 m, straight connector, temperature resistant up to 200°C | 3 852 550 | Power supply NG 2D, as NG 0D with 2 limit switches |
| 3 821 050 | connection cable, 5 m, 90° connector | 3 890 640 | DA 4000-N: LED digital display (switchboard assembling) |
| 3 821 060 | connection cable, 10 m, 90° connector | 3 890 650 | DA 4000: as DA 4000-N, additionally with 2 limit switches |
| 3 821 330 | connection cable, 12 m, 90° connector | 3 890 560 | DA 6000-N: LED digital display with digital input RS232 and possibility for setting pyrometer parameters |
| 3 821 280 | connection cable, 20 m, 90° connector | | |
| 3 820 430 | Video cable with Cinch-/SCART plug 5 m (other length up to 30 m available) | 3 890 570 | DA 6000-N with RS485 |
| 3 821 220 | Video cable with BNC plug 5 m (other length up to 20 m available) | 3 890 520 | DA 6000: LED digital display, digital- and analog input, 2 limit switches, maximum value storage, analog output, RS232 |
| 3 834 210 | Adjustable mounting support | 3 890 530 | DA 6000 with RS485 |
| 3 835 160 | Air purge unit, aluminium | 3 826 500 | HT 6000: portable battery driven indicator and instrument for pyrometer parameter settings; RS232 / RS485 |
| 3 835 440 | Air purge unit, stainless steel | 3 826 510 | PI 6000: Programmable PID controller |

Overview accessories



Water cooling jacket (heavy design)



Adjustable mounting support



Air purge unit, stainless steel



HT 6000 for pyrometer parameter settings



LED digital display DA 6000



Power supplies NG 0D; NG 2D

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Specifications are subject to change without notice