

Metis HQ High-speed 2-Color Pyrometer

More than 25,000 measurements per second

Two-color pyrometer models; **Metis HQ11** and **HQ22** are high speed versions of the reliable and reputable Metis MQ series. Two-color- or ratio pyrometers measure temperatures from the ratio of radiation signals of two adjacent wave-lengths as opposed to measuring the absolute intensity like single wavelength units do.

The advantages for customers are the following:

- Gray bodies, i.e. targets with the same emissivity on both wavelengths, can be measured without emissivity setting.
- There is automatic compensation for dust, smoke or a dirty viewing window between pyrometer and target as long as they are unique transparent in the spectral region of the two-color pyrometer.
- Targets smaller than the spot size can be measured.

Metis two-color pyrometers have universal applications. They can not only be used as two-color pyrometers but also as single wavelength pyrometers. In single wavelength mode, customers have the choice of deriving output signals from shorter or longer wavelengths, or both via analog and serial communication port.

Chart 1: Temperature Ranges and Spectral Responses

Model	HQ11	HQ22
Spectral range	0.75 – 1.1 μm	1.45 – 1.8 μm
Temperature ranges	600 – 1100°C	350 – 800°C
	650 – 1300°C	500 – 1300°C
	750 – 1400°C	800 – 2000°C
	900 – 1800°C	1000 – 2500°C
	1000 – 2000°C	
	1100 – 2200°C	
	1300 – 2500°C	

Non-fiber / fiber optic versions employ **focusable lenses** which provide for the smallest spot size in respect to the sensor's field of view, selected by lens type, at any distance.



The **fiber optic model** is equipped with a standard rugged stainless steel sheathed 2.5 m long mono glass fiber. Depending on zero scale temperature, up to 30 m long cable can be selected.

Chart 2: Focusable Lens of Standard Version

Lens	Distance	Spot Size Diameter for Full Scale Temperatures	
		below 1200°C	above 1200°C
OQ11-B0	340 mm	1.5 mm	1 mm
	500mm	3.1 mm	2 mm
	750 mm	5.0 mm	3.1 mm
	1000 mm	6.9 mm	4.3 mm
	2000 mm	14.3 mm	8.5 mm
	3000 mm	22 mm	13 mm

The detector is sensitive to infrared radiation in an area called the **cone of vision** or aperture. For determining the diameter of it (spot size) at the shortest, medium and longest distances, when focused, refer to **chart 2** and **3**. The cone of vision diameter (aperture) in front of **chart 2** lens is 17 mm for full scale temperatures up to 1200°C, 12 mm for full scale temperatures above 1200°C and 18 mm in general for **chart 3** lenses. This changes continuously in relation to the spot size diameter given in the chart.

The spot size diameter for distances not given in the chart can be calculated by interpolation.

Chart 3: Focusable 25 mm Lens of Fiber-Optic Version

Lens	Distance	Spot Size Diameter for Full Scale Temperatures	
		below 1200°C	above 1200°C
OQ25-B0	140 mm	1 mm	0.5 mm
	500 mm	3.7 mm	2.5 mm
	750 mm	5.6 mm	3.8 mm
	1000 mm	7.7 mm	5 mm
	2000 mm	15.4 mm	10 mm
	3000 mm	23 mm	15 mm

A small 12 mm diameter focusable lens with a cone of vision (aperture) diameter of 7 mm in front of the lens is available for applications where a miniature reimaging lens is necessary. To determine spot size at the focal distance, please refer to **chart 4**.

Chart 4: Focusable 12 mm Lens of Fiber-Optic Version

Lens	Distance	Spot Size Diameter for Full Scale Temperatures	
		below 1200°C	above 1200°C
OQ12-C0	120 mm	2.2 mm	1.2 mm
	250 mm	5 mm	2.5 mm
	500 mm	12 mm	6 mm

Focusable lenses offer an optimal adaptation of spot size diameter depending on application and sensor type: Infrared energy emitted by a target is collimated by focusable lenses either directly onto the detector (standard version), or on one end of the fiber optic cable.

This focussing feature offers:

- Temperature measurement of the smallest possible spot at its focal point
- Measures the average temperature of a bigger spot size when focusable lens is out of focus

Lenses are made of BK7, an optical glass which is highly transparent in the spectral region of *Metis HQ*. If additional windows are necessary, they must offer similar optical characteristics.

3 different solutions are offered for **optical alignment** and **focusing** onto a target:

- Laser aiming, standard method and the only method of sighting for fiber optic versions.
- Through the lens sighting with reticle. Advantageous for aiming down sight tubes or onto hot incandescent targets. For full scale temperatures above 1500°C, a dimmable sight attenuation filter is incorporated into the IR sensor to protect the operator's eye from high intensity radiation.
- Built-in color video camera for remote monitoring of the heating process in harsh & difficult to reach environments.

Analog and digital temperature output signals for indication, recording, archiving and controlling:

- Isolated analog output signal, 0 – 20 mA switchable to 4 – 20 mA. Zero- and full-scale temperatures are adjustable to cover any portion of the instrument's available temperature span
- Ultra-fast RS485 digital com. interface max. 921 kBd; min. measurement interval of 60µs via *SensorWin* Software.

Optional: external USB converter supplied with interconnecting cable AS10

Signal Filtering:

For measuring and holding of the highest instantaneous temperature value, a peak picker (maximum value storage) is installed to compensate interruptions or attenuations in radiation caused by bursts of steam, smoke or dust. It can be either reset automatically or manually by an external contact closure or periodically by user preset clear time. In the latter case, the highest temperature will be held in a dual storage and will be reset in only one of the two storages after preset clear time. This advanced circuitry enables it to avoid a decrease of temperature output, should a short "cold period" duration occur at the exact moment of reset, of the clear time.

Software:

The **SensorWin** software is available for automatic or manual set up of the pyrometer, for recording and for saving of graphical, text or table files. These files can be extremely important for quality assurance purposes and for analyzing historical data. Minimum computer requirements are: 1 GHz clock frequency and current Windows operating systems.

Technical Data:

Measurement uncertainty:	0.5 % of measured value in °C ($\epsilon_1/\epsilon_2 = 1$, $t_{90} = 1$ s, $T_{Amb.} = 23^\circ\text{C}$)
Repeatability:	0.2% of measured value in °C + 1 K ($\epsilon_1/\epsilon_2 = 1$, $t_{90} = 1$ s, $T_{Amb.} = 23^\circ\text{C}$)
Response time t_{90} :	< 80 µs adjustable via software up to 10 s in 0.1 ms steps
Exposure time:	< 40 µs
Emissivity ratio ϵ_1/ϵ_2 :	0.800 to 1.200
Emissivity per channel:	0.05 to 1.20
Temperature resolution:	analog < 0.025 % of adjusted temperature range, digital 0.1°C
Peak picker reset rate:	in 0.1 ms steps up to 25 s adjustable via software
Analog output signal:	0 to 20 mA switchable to 4 to 20 mA, 500 Ω max. load
Digital Interface:	RS 485, 921 kBd max, optional: external USB converter
Ambient temp. range:	Pyrometer: operation 0 to 65°C, storage -20 to 65°C, Fiber Optic Version: Cable and Lens: 0 to 250°C
Power supply:	24 V DC (15 to 30 V DC), 14 VA
Isolation:	power supply, analog and digital output are galvanically isolated from each other
Housing and rating:	extruded aluminum profile, IP 65 per DIN 40 050 with cable connector installed
Weight:	700 g
CE label:	according to EU directives for electromagnetic immunity
Laser aiming light:	optional: 650 nm, < 1 mW, class II per IEC 60825-1-3-4
Video module (option):	Output signal: FBAS signal ca. 1 V _{SS} , 75 Ω, CCIR, PAL / NTSC switchable Resolution: PAL: 720x576 Pixel; NTSC: 720x480 Pixel Field of view: ca. 14% x 10% of measuring distance Connector: Limosa connector

Dimensions:

