

# Technical Data Sheet



## Flame Pyrometer *Metis MF11*

On the basis of our Two-Colour Pyrometer *Metis MQ11*, we developed a special pyrometer for non-contact temperature measurement of flames with a varying content of soot particles.

Applications: coaldust power plants, incinerator plants and all other furnaces with yellow shining flames.

The measurement is based on the "Rössler Algorithmus" which calculates the flame temperature out of the "black temperature" measured by a single wavelength pyrometer and out of the "coloured temperature" measured by the two-colour-pyrometer. The advantage of this procedure is the automatically compensation of the "optical thickness" or the depth of the measurement into the flame. This results in an increase of accuracy.

Not only the signals of the single wavelength measurements which are necessary to calculate the "coloured temperature", but also the flame temperature are available to the user via digital interface when using our Flame Pyrometer *Metis MF11*

**Chart 1: Temperature Ranges**

Model	MF11
Spectral Response	0.7 – 1.1 µm
Temperature Range	600 – 1300°C 750 – 1800°C 900 – 2500°C



**Metis MF11, Standard Version and Fiber-Optic Cable Version**

**Lenses and Fibre-Optic Cable:** The infrared energy radiated by the target is transferred via focusable lenses either directly on the detector (standard version) or on one end of a fibre optic cable. For installations with limited space, there is a focusable miniature version. This feature offers the advantage of measuring the smallest spot (focused) or the average temperature of a bigger spot (out of focus) for the particular distance. Lenses are made of BK7 (quartz glass), an optical glass which is highly transparent within the spectral range of *Metis MF11*. If additional windows are necessary, they must offer similar optical characteristics.

**Chart 2: Focusable Lens of *Metis* Standard Version**

Lens	Distance	Spot Size Ø
OQ11-B0	340 mm	1 mm
	500 mm	2 mm
	750 mm	3.1 mm
	1000 mm	4.3 mm
	2000 mm	8.5 mm
	3000 mm	13 mm

The detector is sensitive to infrared radiation in an area called the **cone of vision**. For the spot size diameter Ø of this area at the shortest, medium and widest distances, when focused, please refer to **Chart 2**. The cone of vision diameter in front of the lens is max. 17 mm. This changes continuously in relation to the spot size diameter given in the chart. This area has to be kept free from any intervening objects. The spot size diameter for distances not given in the chart can be calculated by interpolation.

The spot size of the focusable lenses to be used with the *Metis MF* Fibre-Optic version can be taken from **Charts 3 and 4**. The cone of vision diameter (aperture) in front of Chart 3 lens is 18 mm and 7 mm in general for Chart 3 lens. The larger lens tube diameter of 25 mm offers the advantage of a smaller spot at the same distance. Fibre-optic versions are supplied with 2.5 m single mode fibre having a diameter of 0.2 mm. Longer cables with up to 20 m are available on request.

**Chart 3 and 4: Focusable Lenses of *Metis* Fibre-Optic Version with 25 mm tube diameter and 12 mm tube diameter**

Lens	Distance	Spot Size Ø
OQ25-B0	140 mm	0.5 mm
	500 mm	2.5 mm
	750 mm	3.8 mm
	1000 mm	5 mm
	2000 mm	10 mm
	3000 mm	15 mm

Lens	Distance	Spot Size Ø
OQ12-C0	120 mm	1.2 mm
	250 mm	2.5 mm
	500 mm	6 mm

**Optical Alignment: *Metis MF*** Standard Pyrometers are available with 3 different solutions for aiming the sensor onto the target. The first, and most popular, method is the built-in laser pointer which is also

helpful for focusing. The second is a sight-through optics version with reticle-defined target which is advantageous for applications where aiming onto hot, incandescent targets is needed. The viewing telescope is equipped with a dimmable sight attenuation filter to protect the eye. And finally, the third solution is a built-in b/w video camera for all applications where neither the laser nor the sight-through version can be used. This feature offers also possibilities for remote controlling of the heating process in dangerous environments. The fibre-optic version of *Metis* can be equipped with laser pointer only.

**Temperature Output Signals:** *Metis* Pyrometers offer a variety of analog and digital output signals for indication, recording, archiving and controlling of measured process temperatures. The isolated analog output is switch able from 0 to 4 to 20 mA. Zero- and full-scale temperatures are adjustable to cover any portion of the instrument's available temperature span to a minimum of 50°C.

There is a choice of 3 digital communication interfaces: **RS 232** or **RS 485** max. 57.6 kBd (internal) or **Profibus** (external).

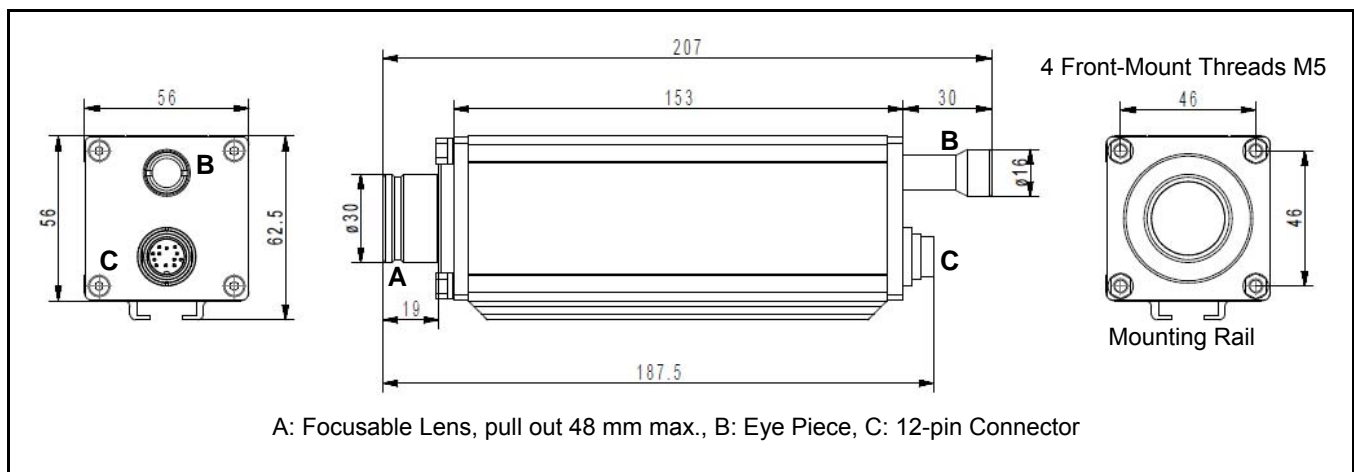
**Signal Filtering:** For measuring and holding of the highest instantaneous temperature values, a **peak picker** (maximum value storage) is installed to compensate interruptions or attenuations in radiation caused by bursts of steam, smoke or dust. It can be either reset automatically or manually by an external contact closure or periodically by using preset clear time. In the automatic 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 to avoid a decrease of the temperature output, should a short "cold" period appear just at the reset moment. The **exposition time** is the length of time it takes for the output signal to reach 90% of a step change in measured temperature. It can be used to filter out rapid variations in temperature and achieve a "more quiet" signal for control or display purposes.

The **Sensorwin Software** is available for automatic or manual set up of the pyrometer, for recording and for saving of graphical or table files. At the same time, these files can be used for quality assurance purposes since the parameter settings are recorded as well. Minimum computer requirements are: 500 MHz clock frequency and and current Windows operating systems.

**Additional Specifications:**

Measurement Uncertainty: ( $T_A = 23^\circ\text{C}$ , $\epsilon = 1$ , $t_{90} = 1\text{s}$ )	fullscale temperatures < 1500°C: 0.3 % of measured value in °C + 1°C fullscale temperatures < 2500°C: 0.5 % of measured value in °C
Repeatability:	0.1% of measured value in °C + 1°C ( $T_A = 23^\circ\text{C}$ , $\epsilon = 1$ , $t_{90} = 1\text{s}$ )
Exposition Time $t_{90}$ :	2 ms with dynamic adaptation at low signal levels, adjustable up to 10 s
Analog Output Signal:	0 or 4 – 20 mA selectable, 500 Ω max. load
Digital Interface:	either RS 232 or RS 485 max. 57,6 kBd (standard supply), Profibus (optional)
Temperature Resolution:	analog < 0.1% of adjusted temperature range, digital 0.1°C
Ambient Temperature Range:	<b>Pyrometer:</b> operation 0 – 70°C, storage -20 – 70°C, <b>Fibre Optic Cable and Lens:</b> 0-250°C
Power Supply:	24 V AC/DC (15 – 30 V AC/DC), AC: 48 – 62 Hz, max. 7,5 VA
Isolation:	power supply, analog and digital output are galvanically isolated against each other and against housing
Housing and Rating:	extruded aluminium profile, IP 65 per DIN 40 050
Weight:	700 g
CE Label:	according to EU directives for electromagnetic immunity
Laser Pointer:	(optional) 650 nm, < 1 mW, class II per IEC 60825-1-3-4
<b>Optional Video Modul:</b>	PAL or NTSC
Video Signal:	isolated BAS signal about 1 V <sub>SS</sub> at 75 Ω, CCIR standard, 50 Hz
Resolution:	black/white 628 x 582 pixel
Field of View:	about 14% x 10% of focused distance
Signal Port:	cinch connector with SCART adapter connected to cable assembly (accessory)
Date, Time:	real time clock with 5 year buffer
Image Overlays:	reticle, model no. or text of your choice, max. 12 characters, time or date, temperature and emissivity

**Dimensions:** *Metis MQ* with focusable lens and through the lens sighting



**Special Accessories** available with *Metis MF* only:

Description	Model
Video Cable Assembly for MetisMF, length 5 m	AK50-05
Air Purge for Fibre-Optic Lens OL12	BL13-00
Air Purge for Fibre-Optic Lens OL25	BL14-00
Adjustable Mounting Bracket for Fibre-Optic Lens OL12	HA13-00
Adjustable Mounting Bracket for Fibre-Optic Lens OL25	HA14-00
2.5 m Spare Fibre-Optic Cable Metis MS09 and MI16, Ø 0.2 mm	LL02-02

**Notice:** For standard accessories for mounting and protecting the *Metis* Pyrometer series, please refer to the back page of the *Metis* brochure

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