

Metis MY51 Self-Contained, Stand Alone Pyrometer Series for non-contact temperature measurement of glass

The Pyrometer Series *Metis MY51* with pyroelectric detector operates in a narrow spectral band at 5.14 μm , where glass above 1 mm thickness is completely opaque. In addition, uncoated soda lime glass has a low reflection value at this wavelength. The combination of these two elements exhibits a near “Black Body” condition when measuring glass surface temperature with the *Metis MY51* Series. It is the ideal choice for glass applications for forming, bending, tempering, annealing, sealing and hardening of glass in float, construction, automotive and lamp manufacturing processes. Optical and electronic components are contained in a rugged IP65 extruded aluminium housing and with its’ companion water cooling jacket and air purge assembly can reliably operate in harsh industrial environments.



Chart 1: Temperature Ranges *Metis MY51*

Spectral Response	5.14 μm
Temperature Ranges	80 – 800°C
	100 – 1000°C
	300 – 1300°C
	500 – 2500°C

Each temperature range of MY51 is available with different speed of response times of 5, 30, or 100ms. Slower response models offer better optical resolution (smaller spot size). To achieve effectively the best optical resolution of 200:1, the 100 ms version is supplied with fixed focus lenses only. Refer to **Chart 3** below

Lenses: The infrared energy radiated by the target is centered via focusable or fixed focus lenses directly on the detector. The focussing feature allows control of the cone of vision and offers the possibility to measure either a small spot (focused) or the average of a bigger spot (out of focus). Fixed focus lenses with larger diameter lenses collect more infrared energy and therefore provide smaller spot sizes. The lenses are made of calcium fluoride CaF_2 which is highly transparent in the visible and infrared regions up to 10 μm . If additional windows are used they must offer similar optical characteristics.

Chart 2: Focusable Lenses *Metis MY51*

Lens Type	Focus Distance	Model MY51 with 5 or 30 ms response time			
		Temperature Ranges			
		80 – 800°C	100 – 1000°C	300 – 1300°C	500 – 2500°C
		Spot Size	Spot Size	Spot Size	Spot Size
OM51-C0	110 mm	1.7 mm	1.2 mm	1.0 mm	0.8 mm
	150 mm	2.6 mm	2.2 mm	1.9 mm	1.2 mm
	200 mm	3.6 mm	3.0 mm	2.5 mm	1.8 mm
OM51-D0	190 mm	2.5 mm	2.1 mm	1.7 mm	1.3 mm
	400 mm	7.0 mm	5.8 mm	4.8 mm	3.6 mm
	680 mm	12.6 mm	10.5 mm	8.5 mm	6.5 mm
OM51-L0	260 mm	3.5 mm	2.9 mm	2.3 mm	1.8 mm
	1500 mm	27.6 mm	23 mm	18 mm	13.7 mm
	4000 mm	64 mm	62 mm	52 mm	37 mm

The detector is sensitive to infrared radiation in an area called **cone of vision**. For the spot size diameter at the shortest, medium and longest focal distances, Refer to **Chart 2**. The aperture diameter at the MY51 lens is approx. 16mm for full scale temperatures up to 1300°C, and 9mm for full scale temperatures above 1300°C. 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.

Chart 3: Fixed-Focus Lenses *Metis MY51* with response times of 5, 30 and 100 milliseconds

Temperature Ranges		80 - 800°C		100 - 1000°C		300 - 1300°C & 500 - 2500°C			
Response Times		100 ms	5 or 30ms	100 ms	5 or 30ms	100 ms	30 ms	5 ms	
Lens Type	Tube Length *)	Focus Distance	Spot size	Spot size	Spot size	Spot size	Spot size	Spot size	
OM51-0E	89 mm	185 mm	2.8 mm	3.9 mm	2.0 mm	2.8 mm	0.9 mm	1.3 mm	1.5 mm
OM51-0F	89 mm	390 mm	3.5 mm	4.9 mm	2.5 mm	3.5 mm	1.2 mm	1.5 mm	1.7 mm
OM51-0G	89 mm	820 mm	5.6 mm	9.5 mm	4.0 mm	6.8 mm	2.5 mm	3.0 mm	3.3 mm
OM51-0H	45 mm	250 mm	3.5 mm	4.8 mm	2.5 mm	3.4 mm	1.4 mm	1.7 mm	2.0 mm
OM51-0K	45 mm	600 mm	8.4 mm	9.8 mm	6.0 mm	7.0 mm	3.0 mm	3.8 mm	4.5 mm

*) see drawing on back page

Spot size and different tube lengths of several fixed focus lenses available with Metis MY51 can be taken from **Chart 3**. The lenses with a longer tube length of 89 mm offer better optical resolution and therefore provide smaller spot sizes than with a tube length of 45mm. The aperture size at the MY51 fixed focus lens is **27 mm** for full scale temperatures up to 1300°C and **15 mm** for full scale temperatures above 1300°C.

Optical Alignment: *Metis MY51* Pyrometers offer two different techniques 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 solution is sight-through optics which includes a reticule in the viewfinder, that defines the target size. This method is used for applications where aiming onto hot incandescent target or down a long sight tube is required. The eye piece of MY51 sensor is equipped with an adjustable dimmable attenuation filter to protect the human eye from bright light that can be generated by a hot target.

Temperature Output Signals: *Metis* Pyrometers offer a variety of analog and digital output signals for displaying, recording, archiving and controlling of measured process temperatures. The isolated analog output is selectable from 0 to 4 - 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 2 digital communication interfaces: **RS 232** or **RS 485** max. 19.2 kBd.

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 reset either automatically or manually by an external contact closure or periodically by user preset clear time. In the last 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.

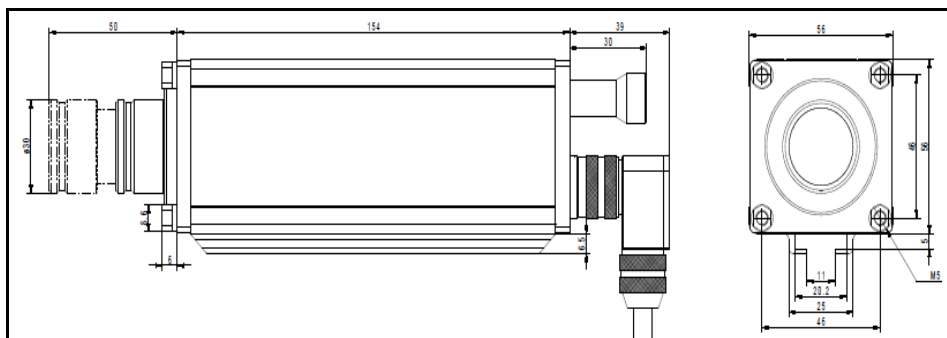
The **response time** is the length of time it takes for the output signal to reach 90% of a step change in measured temperature. It can be used to filter out rapid variations in temperature and achieve a "more stable" signal for control or display purposes.

Software: The **PSCwin 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 because the parameter settings are recorded as well. Minimum computer requirements: 500 MHz clock frequency and Windows 95, 98, ME or XP operating system.

Metis MY51 Specifications:

Measurement Accuracy:	1°C + 0.5% of difference between measured & housing temp. (T _A = 23°C, ε = 1, t ₉₀ = 1 s)
Repeatability:	0.1% of measured temperature in °C + 0.2°C (T _A = 23°C, ε = 1, t ₉₀ = 1 s)
Response Time t₉₀:	Depending on model, 5 ms, 30 ms or 100 ms adjustable up to 10 s
Analog Output Signal:	0 or 4 to 20 mA selectable, max. load 500 Ω
Emissivity Range:	0.20 to 1.00
Temperature Resolution:	Analog: < 0.1% of adjusted temperature range, digital 0.1°C
Ambient Temperature:	Pyrometer: operation 0 to 70°C, storage -20 to 80°C
Power Supply:	24 VDC (15 to 30 VDC), max. 2.5 VA
Isolation:	Power supply, analog and digital outputs are galvanically isolated from one another and from the housing
Housing and Rating:	Extruded aluminium profile, IP65
Weight:	1lb. 8 ounces (700 g)
CE Label:	according to EU directives for electromagnetic immunity
Laser Pointer:	650 nm, < 1 mW, class II per IEC 60825-1-3-4

Dimensions: Metis MY51 with Focusable Lens and Interconnecting Cable

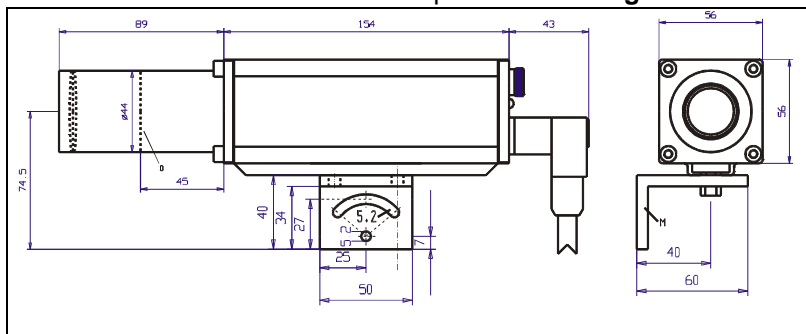


Water Cooling Jacket KG10-00 with Air Purge BL11-00

For use in ambient temperature up to 200°C



Metis with Fixed Focus Lens and optional Mounting Bracket HA10



Depending on order, length of lens tube is either 45 mm or 89 mm.

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Specifications are subject to change without notice. MY51_031314

Technical Data Sheet

Stand Alone Pyrometer Series *Metis MY80, MY81* and *MY84* for common applications

Pyrometer Series *Metis MY80, MY81* and *MY84* using pyroelectrical detectors and operating in a long wave band area between 8 and 14 μm . They were developed especially to measure small spot sizes at lower temperatures with fast exhibition times.

The pyrometer model *Metis MY 84* is ideally suited to all types of applications like measurement of organic materials, painted metal surfaces, rubber, paper, textiles and thicker plastics.

Model *Metis MY81* with spectral response between 8 und 10 μm can be used for similar applications like *Metis MY 84*. It offers however the advantage of using calcium fluoride as lens or window material which is easier to handle than the zinc sulphide material used for *Metis MY84* ser. We recommend using this model also for all kind of applications where the Scanners SC10 SC11 or SC12 are necessary. The only disadvantage is the somewhat bigger spot size diameter at the same distance.

For none contact temperature measurement of thin polyester films and all kind of fluorocarbon-plastics the narrow band model *Metis MY80* was developed. Further more it is best choice to measure thin glass surfaces in furnaces because glass is neither transparent nor reflective at 8,05 μm . It meets therefore the so called black body conditions of an ideal radiator.



Model	MY80	MY81	MY84
Spectral Response	8,05 μm	8 – 10 μm	8 – 14 μm
Temperature-Range	50 – 400°C	0 – 400°C	0 – 400°C 0 – 700°C 0 – 1000°C

Chart 1. Temperature ranges of each model

Lenses: The infrared energy radiated by the target is centered via focusable or fixed focus lenses directly on the detector. The focussing feature allows control of the cone of vision and offers the possibility to measure either a small spot (focused) or the average of a bigger spot (out of focus). Fixed focus lenses with larger diameter collect more infrared energy and therefore result in smaller spot sizes. The lenses are made of calcium fluoride CaF_2 (*MY80 and MY81*) or zinc sulphide ZnS (*MY84*). If additional windows are necessary they must offer similar optical characteristics.

Chart 2: Focusable Lenses *Metis MY81*.

Lens	Distance	Spot Size Diameter	
		5 ms or 30 ms	100 ms
OM81-A0	110 mm	1.7 mm	1.2 mm
	150 mm	2.7 mm	1.8 mm
	200 mm	4.8 mm	2.8 mm
OM81-B0	190 mm	3.1 mm	2.5 mm
	350 mm	6.4 mm	4.3 mm
	680 mm	14 mm	10 mm

Chart 3: Focusable Lenses *Metis MY84*

Lens	Distance	Spot Size Diameter	
		5 ms oder 30 ms	100 ms
OM84-A0	112 mm	1.5 mm	0.9 mm
	150 mm	2.5 mm	1.6 mm
	210 mm	4.5 mm	2.6 mm
OM84-B0	200 mm	3 mm	1.8 mm
	800 mm	14 mm	7.2 mm
	1400 mm	26 mm	15 mm

Chart 4: Focusable Lens *MY80* (100 ms only)

Lens	Distance	Spot Size Diameter
OM80-A0	115 mm	2.5 mm
	150 mm	3.7 mm
	200 mm	4.8 mm
	250 mm	6.0 mm

Chart 5: 3 different Fixed-Focus Lenses *Metis MY81*

Lens	Distance	Spot Size Diameter	
		5 ms or 30 ms	100 ms
OM81-0C	230 mm	2.3 mm	1.5 mm
OM81-0D	370 mm	3.4 mm	2.0 mm
OM81-0E	1200 mm	11 mm	7.0 mm

The detector is sensitive to infrared radiation in an area called the **cone of vision**. For the spot size diameter of the cone of vision at shortest, medium and widest focal distances, please see **Chart 2, 3 and 4**. For full scale temperatures up to 700°C the cone of vision diameter in front of the lens is about 16 mm and about 8 mm for full scale temperature of 1000°C. 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.

Each temperature range of *MY81* and *MY84* are available as well with different fast exposition times of 5, 30, or 100 ms. Slower models offer better optical resolution (smaller spot size). To achieve effectively the best optical resolution of 170:1, with 100 ms exhibition time, the *Metis MY81* can be supplied with fixed focus lenses also. For the spot size diameter of the 3 different fixed focus lenses available with *MY81* ser., please see **Chart 5**

Optical Alignment: *Metis MY* Pyrometers are available with 2 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 solution is a sight-through optics version with reticle-defined target which is advantageous for applications like measurement into furnaces where the laser is not visible from the outside of the furnace.

Temperature Output Signals: *Metis* Pyrometers offer a variety of analog and digital output signals for displaying, recording, archiving and controlling of measured process temperatures. The isolated analog output is selectable from 0 to 4 - 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 2 digital communication interfaces: **RS 232** or **RS 485** max. 19.2 kBd.

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 reset either automatically or manually by an external contact closure or periodically by user preset clear time. In the last 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.

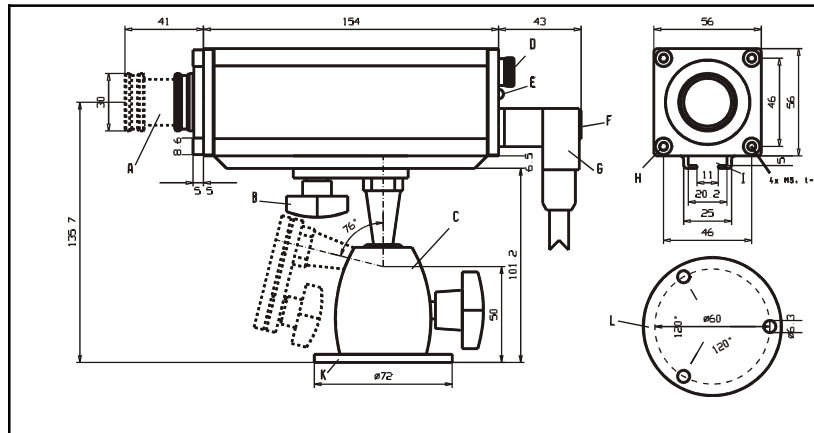
Software: The *PSCWin Software* is available for automatic or manual set up of the pyrometer, for recording and for saving of graphical or table files. At the same time these files can be used for quality assurance purposes because the parameter settings are recorded, too.

Minimum computer requirements: 500 MHz clock frequency and Windows 95, 98, ME or XP operating system.

Additional Specifications

Measurement Uncertainty:	1°C + 0.5% of difference between measured and housing temp. (T _A = 23°C, ? = 1, t ₉₀ = 10 s)
Repeatability:	0.1% of measured temperature in °C + 0.2°C (T _A = 23°C, ? = 1, t ₉₀ = 10 s)
Exposition Time t ₉₀ :	<i>MY81 und 84</i> : 5 ms, 30 ms or 100 ms adjustable up to 10 s. <i>MY80</i> : only 100 ms – 10 s
Spot Size Diameter	<i>Metis MY80</i> , see chart 4; <i>Metis MY81 and MY84</i> see chart 2, 3 and 5
Analog Output Signal:	0 or 4 – 20 mA selectable, max. load 500 Ω
Emissivity Range:	0.40 – 1.00
Temperature Resolution:	analog: < 0.1% of adjusted temperature range, digital 0.1°C
Ambient Temperature:	Pyrometer: operation 0 – 70°C, storage -20 – 80°C
Power Supply:	24 V AC/DC (12 – 30 V AC/DC), AC: 48 – 62 Hz, max. 2 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:	500 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

Dimensions: *Metis* with Focusable Lens and Swivel Base HA20



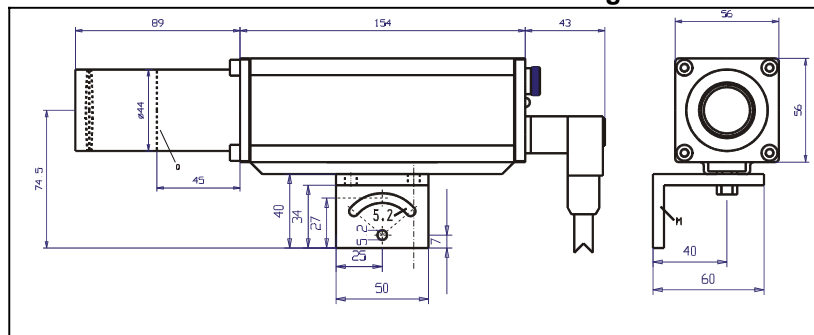
- A: Focusable Lens
- B: Fast-Mount Screw
- C: Swivel Mounting Base
- D: Eye Piece (sight-through optics)
- E: Operation LED
- F: Laser Push Button
- G: 12-pin Connector
- H: Front-Mount Threads
- I: Mounting Rail
- K: Swivel Base Mounting Flange
- L: Base View of item K with Mounting Holes
- M: Mounting Bracket

Water Cooling Jacket KG10 and Air Purge BL12 for use of *Metis MY* in hot ambient up to 200°C



For additional accessories for mounting and protecting of *Metis* Pyrometers, please see back page of *Metis* brochure.

***Metis MY81* with Fixed Focus Lens and Mounting Bracket HA10**



Length of standard lens tube is 89 mm.

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