

METIS M306 / M308 / M313

Versatile Narrowband Radiation Pyrometer Series



Highest Quality Measurements by

- Digital signal processing
- Continuous ambient temperature compensation
- Optimized optical components

1-color pyrometers for non-contact temperature measurement

■ Special narrow-band spectral ranges

- for measuring the molten metal or the pouring stream (M306)
- for measuring titanium under oxidizing conditions (M308)
- for measuring tungsten in a vacuum and under inert gas (M313)

■ Versatile model types due to modular design

- Optics: focusable, optical fiber version, with motorized focus or fixed focus
- Sighting method: laser targeting light, through-lens sighting or color camera
- Optional integrated features: Profibus, Profinet, Ethernet or PID controller

Temperature ranges

from 400 – 1400°C (2552°F)
to 600 – 3800°C (6872°F)

Response time / Exposure time

< 1 ms
< 0.5 ms

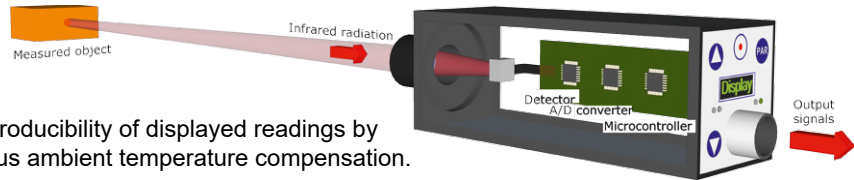
Smallest possible spot size

0.3 mm

Digital, Precise, Versatile

Series M3 radiation pyrometers are fast and high-precision instruments that combine the versatility and benefits of digital signal processing.

Digital microcontroller signal processing ensures 100% reproducibility of displayed readings by computational integration of emissivity settings or continuous ambient temperature compensation.



Technical Data

Model		M306	M308	M313	
Temperature ranges		900 – 2500°C	600 – 1400°C 700 – 1800°C	400 – 1400°C 450 – 1800°C 500 – 2200°C 550 – 3000°C 600 – 3800°C	
		Any temperature sub-range adjustable within the temperature range (minimum span 50°C)			
		0.6 µm		0.88 µm	
		Silicon		Silicon	
		InGaAs			
Temp. sub ranges					
Spectral range					
Detector					
Response time t ₉₀		< 1 ms (with dynamical adaptation at low signal levels), adjustable up to 10 s			
Exposure time		< 0.5 ms			
Uncertainty (ε = 1, t ₉₀ = 1s, T _A = 23°C)		Full-scale temp. ≤2500°C: 0.25% of reading in °C + 1K Full-scale temp. >2500°C: 0.5% of reading in °C			
Repeatability (ε = 1, t ₉₀ = 1s, T _A = 23°C)		0.1% of reading in °C + 1K			
Temperature coefficient		From 10 to 60°C: 0.02%/K deviation to 23°C; From 0 to 10°C and 60 to 80°C: 0.04%/K deviation to 23°C			
Analog outputs		2 x 0 or 4–20 mA, max. load: 500 Ω, resolution 0.0015% of the (adjusted) temperature (sub) range (16 Bit). Output 1: output of the measured temperature; output 2 adjustable: measured temperature, device temp., control output (devices with PID controller). Outputs can be scaled within or outside the temp. range.			
Serial interface		RS232 (4.8–115.2 kBd) or RS485 (4.8–921.6 kBd), switchable. Resolution 0.1°C / °F 12-pin connector: 3 configurable connectors (digital input, output or one analog input) 17-pin connector: 4 digital inputs, 2 digital outputs, 1 analog input.			
Inputs / outputs		<ul style="list-style-type: none">■ Digital input (via supply voltage): laser targeting light on/off, clearing of peak picker, load a set of parameters, start / stop of measured value recording, PID controller start■ Digital output (12-pin devices: max. 50 mA, 17-pin devices: max. 100 mA): limit switch, beginning of temperature range exceeding, device measuring readiness, device over-temperature. Devices with PID controller: controller active, control process within limits, control process finished.■ Analog input (12-pin: 0–20 mA, 17-pin: 0–10 V): analog adjustment of emissivity, measuring distance (for devices with motorized focus) or setpoint (for devices with PID controller).			
PROFIBUS	optional for 12-pin devices	Supports PROFIBUS DP-V0 (and DP-V1) according to IEC61158 type 3			
PROFINET		Supports PROFINET-RT and IRT according to specification 2.3.			
Ethernet		Pre-certified, supports class A, B and C functionalities			
Display (only 12-pin devices)		Compliant with IEEE802.3/802.3u (Fast Ethernet) and ISO 802-3/IEEE 802.3 (10BASE-T) OLED dot matrix, green-yellow, 128x32 dots, 5.6 mm high, for temperature display (resolution 0.1°C / °F) or parameter settings			
Device parameters		Temperature sub range, response time (<1 ms–10s), emissivity (0.050–1.200), transmittance (5–100%), spot size fill factor (5–100%), peak picker (clear settings: automatic, time clear or externally via digital input), device address (00–97), baud rate (RS232: 4.8–115.2 kBd / RS485: 4.8–921.6 kBd), analog outputs (0 or 4–20 mA), interface (RS232/RS485), temperature unit (°C/°F), device menu language (only 12-pin devices: English/German), focus distance (motorized focus devices)			
Power requirement		24 V DC (18–30 V DC), max. 6 VA; protected against reverse polarity			
Isolation		Voltage supply, analog outputs and serial interface are galvanically isolated from each other			
Sightings		<ul style="list-style-type: none">■ Through-lens view finder (can be darkened to protect the eyes from high measuring temperatures)■ Laser targeting light (red, λ = 650 nm, P<1 mW, laser class 2 to IEC 60825-1)■ Color CCD camera (FBAS, ca. 1 V_{pp}, 75 Ω, CCIR, NTSC / PAL switchable; Resolution: NTSC: 720 x 480 px; PAL: 720 x 576 px; frame rate: NTSC: 60 Hz, PAL: 50 Hz), field of view: ca. 3.6% x 2.7% of measuring distance			
Ambient temperature		0 to 80°C (32 to 176°F), fiber optic devices on optics side: -20 to 250°C (-4 to 482°F)			
Storage		-20 to 85°C (-4 to 185°F)			
Relative humidity		Non-condensing conditions			
Housing/protection class		Aluminum / IP65 (with plugged in connector)			
Weight		min. 660 g			
CE label		According to EU directives			

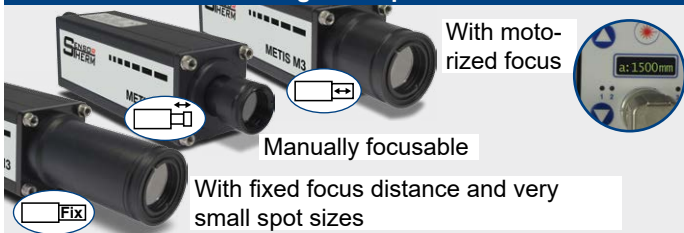
Ordering Specifications

Model: Specify each model in 12- or 17-pin, with temperature range, sighting method as well as optics type and if required Profibus, Profinet or Ethernet. For fiber-optic devices additional the optical fiber length between 2.5 and 30 m (in 2.5 m increments).

Scope of delivery: Device (optical fiber devices optionally with optics OL12 or OL25, special optics OQ30 with smaller spot sizes on request and for an additional charge. Optical fiber: 2.5 m; surcharge for each additional 2.5 m), works certificate, operating manual, *SensorTools* software. Connection cables are not included and have to be ordered separately.

Optics / Device Versions / Features

Integrated optics



Fiber optics, manually focusable



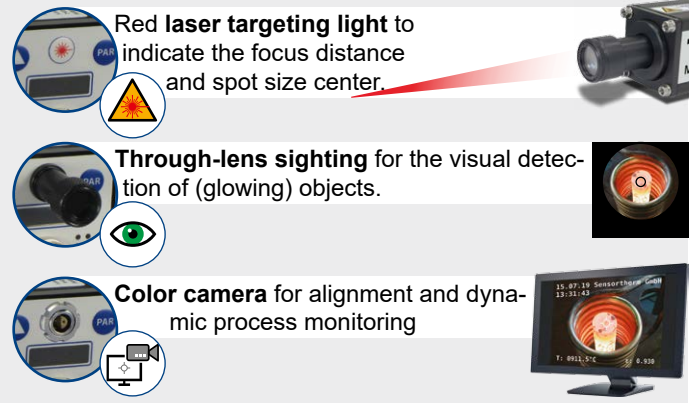
Connections / Equipment options

All devices with

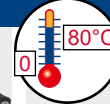
- **2 analog outputs**
- **RS232 / RS485 interface** (switchable)
- With **12-pin connector**: with display, adjustment keys and LED's for displaying operational readiness and active switching outputs, 3 configurable inputs / outputs, optional with integrated PID controller or with Profinet, Profibus or Ethernet.
- With **17-pin connection**: 4 digital inputs, 2 digital outputs, 1 analog input, PID controller



Sighting methods



Ambient temperature



M306, M308 and M313 are optimized for **changing ambient or housing temperatures** between **0 and 80°C** (32 and 176°F).

Influences due to temperature fluctuations are continuously digitally compensated.

Optics Data

The **focus distance** is the measuring distance in which the **spot size is smallest**.

It can be continuously adjusted in the specified range for all focusable optics. Measurements outside the focus distance are also possible, but usually the spot size diameter is larger.



Optics	Focus distance a [mm]	Spot size diameter M [mm]					Aperture diameter D [mm]
		M306 900-2500°C	M308 600-1400°C 700-1800°C	M313 400-1400°C	M313 450-1800°C 500-2200°C	M313 550-3000°C 600-3800°C	

Focusable optics with motorized focus or manually focusable, with laser targeting light (🔴) or through-lens view finder (👁)

OM09-A0 🔴 / 👁	130	0.5	0.75	0.7	0.45	0.3	M306 / M308: full scale value ≤ 1400°C: 14-16 mm > 1400°C: 7-8 mm M313: full scale value ≤ 2200°C: 14-16 mm > 2200°C: 7-8 mm
	160	0.7	1	0.9	0.6	0.4	
	200	1	1.8	1.3	0.8	0.6	
OM09-B0 🔴 / 👁	190	0.6	1.5	0.9	0.55	0.4	
	300	1.2	2	1.6	0.95	0.75	
	420	1.7	3	2.6	1.45	1.15	
OM09-C0 🔴 / 👁	340	0.9	2	1.5	0.8	0.7	
	1000	3.3	5	5.3	2.9	2.4	
	4000	14	22	23.1	12.6	10.5	

Focusable optics with motorized focus or manually focusable, with color camera (📷)

OV09-D1 📷 / 🔴	340	0.9	2.3	1.4	0.8	0.7	
	1000	3.3	7	4.6	2.5	2.3	
	3000	11	22	14.7	7.4	7.1	

Focusable fiber optic optics (outer diameter 25 mm or 12 mm) with laser targeting light (🔴)

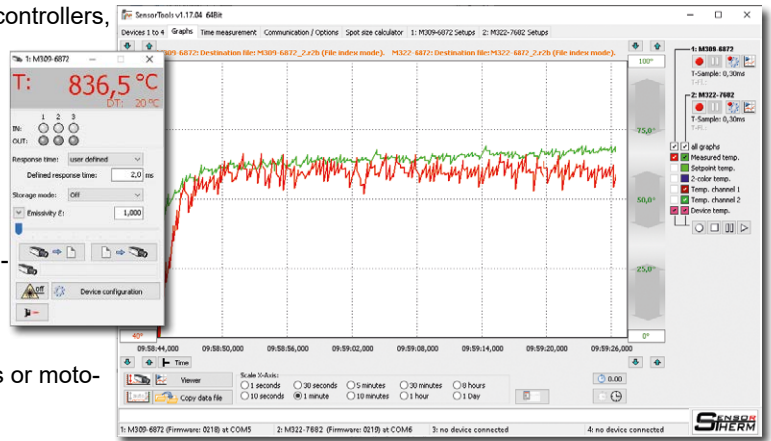
OL25-G0 🔴	75	0.8	0.7	0.6	0.45	10-13 mm
	130	1.5	0.85	1.3	1	
	180	2.2	1	1.8	1.4	
OL25-H0 🔴	170	1.5	1.4	1.6	1	10-13 mm
	2000	22	17	23	15	
	4500	49	40	52	34	
OL12-A0 🔴	100	2.8	2	1.5	0.9	5-7 mm
	350	5	7.4	6.4	3.7	
	600	9	14	10.9	6	
Fiber Ø:		0.2	0.4	0.4	0.2	

The values in the tables are exemplary, intermediate values can be interpolated.

SensorTools Software (included in delivery)

Communication and evaluation software for all pyrometers, controllers, digital displays and calibration sources.

- Measured value display, graphically and numerically, device temperature
- Measured value recording incl. parameters
- View and compare up to 4 measurement data files simultaneously in the *SensorTools Viewer*
- Make all device settings
- Special recording settings: externally start / stop, retroactive or extended recording via signal input
- Print or save pyrometer settings, or transfer settings to other devices or export to csv files
- Switch on / off laser targeting light, adjust camera settings or motorized focus (depending on features)



Accessories (selection)

Pyrometer assembly

- Mounting bracket for pyrometers: HA10
- Ball joint bracket for pyrometers: HA20
- Mounting bracket for fiber optics: OL12: HA80
OL25 / OQ30: HA14

Connection cable

- 12-pin: with angled plug / straight: AL11 / 43
- 17-pin: only straight plug: AS54
- Optional: with interface converter, integrated or via sub-D adapter (all cables available in 5m increments)

Elektrisch

- Pyrometer connection kit, ready made: Wiring-Box
- DIN rail power supply 24 V / 1.6 A: NG12

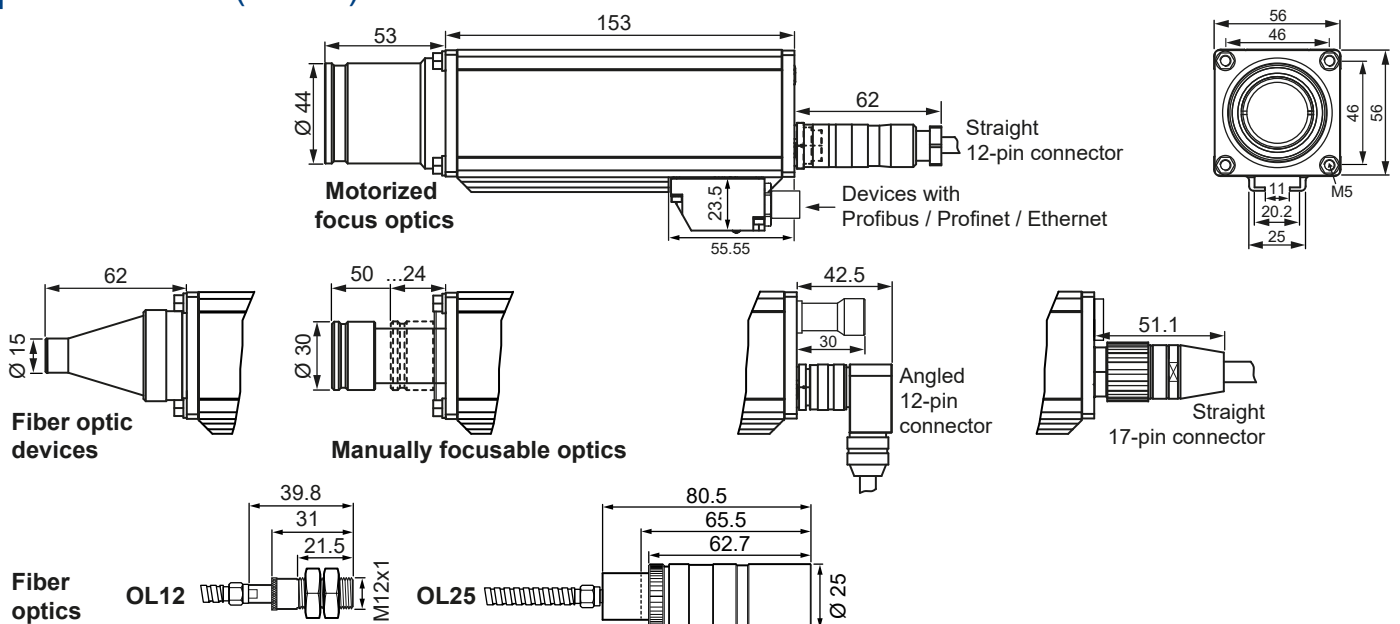
Protection

- Water cooling housing: KG10
- Air purge unit: BL12
- Mounting bracket: HA12
- Heavy ball joint bracket: HA22
- Air purge units:
 - for fiber optics OL12: BL80
 - for fiber optics OL25/OQ30: BL14
 - for fixed focus and motorized focus optics: BL10
 - for M309/16/18 with focusable optics: BL11

PID controller, programmable: Regulus RF/RD

LED digital display: IF00

Dimensions (in mm)



Sensortherm reserves the right to make changes in scope of technical progress or further developments.

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