SENSOR THERM
MEMBER OF THE NYNOMIC GROUP

METIS H311 / H322

2-Color High-Speed Pyrometers

Highest Quality Measurements by

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

2-Color High-Speed Pyrometers for Very Fast Non-Contact Temperature Measurement

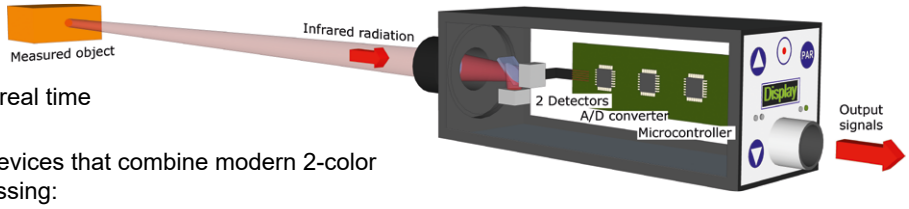
- **Shortwave spectral ranges**
  - for measurements on metals, shiny materials, ceramics, graphite and many more
  - for measurements and laser power control during laser hardening and build-up welding of steels.
- Measurement through polluting window, dust, smoke or objects that are smaller than the pyrometer's spot size
- **Versatile model types** due to modular design
  - Focusable optics: integrated or as optical fiber version
  - Sighting method: laser targeting light, through-lens sighting or color camera
  - Integrated PID controller

Temperature ranges
from 350 – 800°C to 1600 – 3300°C

Response time / Exposure time
< 80 µs < 40 µs

Smallest possible spot size
0.8 mm

25,000 Measurements per Second



2-color high-speed pyrometers of the H3 series perform 25,000 measurements per second and are thus capable, e.g. to perform laser power control almost in real time and react to complex workpiece geometries.

H3 are high-precision and extremely fast measuring devices that combine modern 2-color technology with the advantages of digital signal processing:

- 2 separate measuring detectors for the two spectral ranges for a safe measurement recording even at low signal strengths
- Digital microcontroller signal processing for 100% reproducibility of displayed readings
- IR signal monitoring, used for warning of optic or window contamination

Technical Data

Modell	H311		H322	
Temperature ranges	600–1100°C 650–1300°C 750–1400°C 900–1800°C	1000–2000°C 1100–2200°C 1300–2500°C 1600–3300°C *)	350–800°C 400–1200°C 500–1300°C 550–1400°C	600–1600°C 700–2300°C 1000–2500°C 1300–3000°C **)
Temp. sub ranges	Any temperature sub-range adjustable within the temperature range (minimum span 50°C)			
Spectral range	Channel 1: 0.93–1.1 µm / channel 2: 0.75–0.93 µm *) Channel 1: 0.99 µm / channel 2: 0.87 µm		Channel 1: 1.65–1.8 µm / ch. 2: 1.45–1.65 µm **) Channel 1: 1.64 µm / channel 2: 1.4 µm	
Detector	2 x Silicon		2 x InGaAs	
Response time t_{90}	< 80 µs, adjustable up to 10 s			
Exposure time	< 40 µs			
Uncertainty (ε = 1, t_{90} = 1 s, T_A = 23°C)	0.5% of measured value in °C + 1K			
Repeatability (ε = 1, t_{90} = 1 s, T_A = 23°C)	0.2% of measured value in °C + 1K			
2 analog outputs	0 or 4–20 mA, max. load: 500 Ω, resolution 0.0061% of the (adjusted) temperature (sub) range (14 Bit). Output 1: output of the measured temperature, output 2 adjustable: 2-color or 1-color temperature (optionally of channel 1 or 2), device temperature, control output (devices with PID controller). Outputs can be set within or outside the temperature range.			
Serial interface	RS485 (4.8–921.6 kBd), Resolution 0.1°C / °F			
Inputs / outputs	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. ■ Digital inputs (via supply voltage): laser targeting light on/off, clearing of peak picker, PID controller start, load a set of parameters, trigger input for start / stop of measured value recording. ■ Digital outputs (12-pin devices: max. 50 mA, 17-pin devices: max. 100 mA): limit switch, exceeding the beginning of temperature range, device measuring readiness, device over-temperature, signal strength too low. Devices with PID controller: controller active, control process within limits or finished. ■ Analog input (only 17-pin devices: 0–10 V): analog adjustment of emissivity slope, emissivity or set-point (devices with PID controller).			
Display (only 12-pin devices)	Dot matrix, greenyellow, 128 x 32 Dots (5.6 mm high) for temperature or parameter settings, resolution 0.1°C / °F			
Device parameters	2-color or 1-color temperature measurement (optionally of channel 1 or 2), temperature sub range, response time (<1 ms–10s), emissivity slope (0.800–1.200), emissivity (0.050–1.200), transmittance (5–100%), spot size fill factor (5–100%), peak picker (clear settings: automatic, time clear, externally), device address (00–97), baud rate (4.8–921.6 kBd), analog outputs (0 or 4–20 mA), temperature unit (°C / °F), device menu language (only 12-pin devices: English / German).			
Power requirement	24 V DC (18–30 V DC), max. 12 VA; protected against reverse polarity			
Isolation	Voltage supply, analog outputs and serial interface are galvanically isolated from each other			
Sightings (optional)	■ Through-lens sighting (can be darkened at high measuring temperatures) ■ Laser targeting light (red: λ=650 nm, green: λ=515 nm, P< 1 mW, laser class 2 acc. to IEC 60825-1) ■ Color CCD camera (field of view: ca. 3.6% x 2.7% of measuring distance; output signal: FBAS, ca. 1 V_{pp}, 75 Ω, CCIR, NTSC / PAL switchable; Resolution: NTSC: 720 x 480 pixels; PAL: 720 x 576 pixels; frame rate: NTSC: 60 Hz, PAL: 50 Hz)			
Ambient temperature	Operating: 0–60°C (32 to 140°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 to DIN 40 050 with connector			
Weight	650 g			
CE label	According to EU directives for electromagnetic immunity			

Ordering Specifications

Model: Specify each model in 12- or 17-pin, with temperature range, sighting method (red or green for laser targeting light) as well as optics type. 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 OQ12 or OQ25, special optics OQ30 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

Manually focusable

Fiber optics, manually focusable

Standard: OQ25

Miniature: OQ12

Special: OQ30

Sighting methods

Optional red or green **laser targeting light** to indicate the focus distance and spot size center.

Through-lens sighting for the visual detection of (glowing) objects.

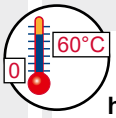
Color camera for alignment and dynamic process monitoring.

Connections / Equipment options

All devices with
- **2 analog outputs**
- **RS485 interface** (switchable)

- With **12-pin connection:** with display, adjustment keys and LED's for displaying operational readiness and active switching outputs, 3 configurable inputs / outputs, optional with integrated PID controller.
- With **17-pin connection:** 4 digital inputs, 2 digital outputs, 1 analog input, PID controller

Ambient temperature



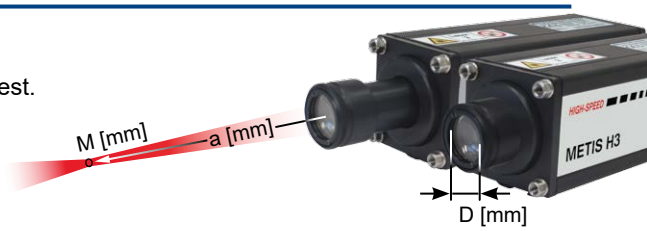
All models are optimized for **changing ambient** or **housing temperatures** between **0** and **60°C** (32 and 140°F).

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 optics. Measurements outside the focus distance are also possible, but the spot size diameter is usually larger.

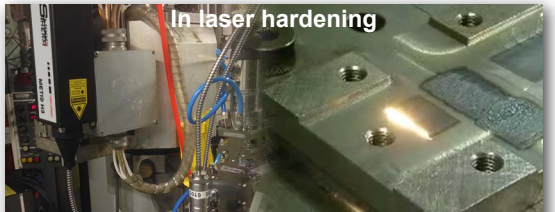


Optics:	Fiber optics						Integrated optics			
Designation:	OQ12-E3		OQ25-B1 (H311) / B2 (H322)		OQ3090-Y1 (H311) / Y2 (H322)		OQ11 (H311)- / OQ22 (H322)-A1 (H311) / A2 (H322)		F1 (H311) / F2 (H322)	
Models and full scale temperature value:	H311: up to 1400 H322: 800	H311: from 1800 H322: from 1200	H311: up to 1400 H322: 800	H311: from 1800 H322: from 1200	H311: up to 1400 H322: 800	H311: from 1800 H322: from 1200	H311: up to 1400 H322: 800	H311: from 1800 H322: from 1200	H311: up to 1400 H322: 800	H311: from 1800 H322: from 1200
Focus distance a [mm]	**Spot size Ø M [mm]**									
120	2.2	1.2								
240	4.8	2.4	2	1						
340	7.6	3.8	2.7	1.6	1.4	0.8	1.4	0.8		
500	12	6	3.7	2.5	2.7	1.5	2.7	1.5		
700			5.2	3.5	3.7	1.8	3.7	1.8		
1000			7.7	5	5.6	2.8	5.6	2.8	5.6	2.8
2000			15.4	10	10	5.8	10	5.8	10	5.8
3000			23	15	14	8	14	8	14	7.8
4000									19	11
5000									24	14
10000									51	29
Aperture D:	7 mm		13 mm		13 mm		16 mm (FSC ≤ 1400°C); 8 mm (FSC > 1400°C)			
Fiber Ø:	0.4 mm	0.2 mm	0.4 mm	0.2 mm	0.4 mm	0.2 mm				

FSC = Full scale temperature value

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

Typical Application: Temperature-Controlled Process Control



SensorTools Software

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

- Measured value display, graphically and numerically. 2-color temperature + 1-color temperature display simultaneously and 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)

Protection

Water cooling housing (aluminum): KG10

Air purge unit: BL12

Mounting bracket: HA12
Heavy ball joint bracket: HA22

Air purge units:
for devices with integrated optics: BL10 BL11

for devices with fiber optics: BL80

Electrical

Pyrometer connection kit, ready made: Wiring-Box

DIN rail power supply 24 V / 1.3 A: NG12-10

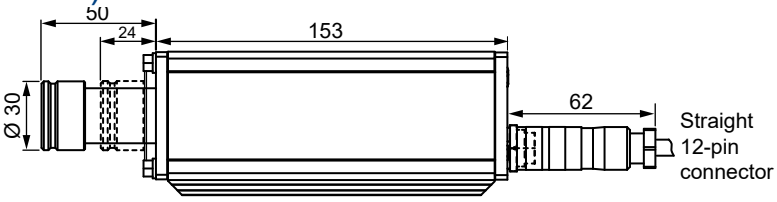
PID controller, programmable: Regulus RF/RD

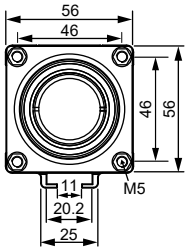
LED digital display: IF00

Dimensions (in mm)

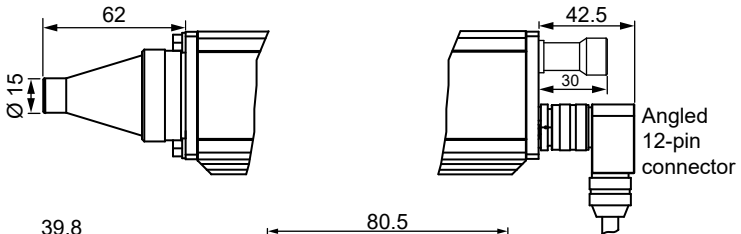
Manual focusable optics

OQ11
OQ22

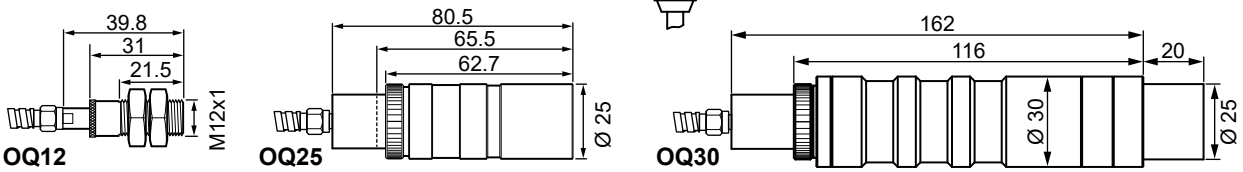




Fiber optic devices



Fiber optics



Sensortherm-Datasheet_Metis_H311_H322 (July 25, 2024)

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