Metis H309 / H316 / H318
1-Color High-Speed Pyrometers

1-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 in plastic welding.

- 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 120 – 520°C (248°F) to 700 – 2500°C (4532°F)

Response time / Exposure time
< 40 µs
< 20 µs

Smallest possible spot size
0.4 mm

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50,000 Measurements per Second

1-color high-speed pyrometers of the H3 series perform 50,000 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 pyrometer technology with the advantages of digital signal processing. The digital microcontroller signal processing ensures 100% reproducibility of displayed readings by computational integration of emissivity settings or continuous ambient temperature compensation.

Technical Data

<table>
<thead>
<tr>
<th>Model</th>
<th>H309</th>
<th>H316</th>
<th>H318</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature ranges</td>
<td>550 – 1200°C</td>
<td>750 – 1800°C</td>
<td>120 – 520°C</td>
</tr>
<tr>
<td>600 – 1400°C</td>
<td>750 – 2000°C</td>
<td>180 – 800°C</td>
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<tr>
<td>650 – 1600°C</td>
<td>400 – 1200°C</td>
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<tr>
<td>Temp. sub ranges</td>
<td>Any temperature sub-range adjustable within the temperature range (minimum span 50°C)</td>
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</tr>
<tr>
<td>Spectral range</td>
<td>0.7–1.1 µm</td>
<td>1.45–1.8 µm</td>
<td>1.65–2.1 µm</td>
</tr>
<tr>
<td>Detector</td>
<td>Silicon</td>
<td>InGaAs</td>
<td>InGaAs</td>
</tr>
<tr>
<td>Response time $t_{90}$</td>
<td>&lt; 40 µs, adjustable up to 10 s</td>
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<td></td>
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<tr>
<td>Exposure time</td>
<td>&lt; 20 µs</td>
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<tr>
<td>Uncertainty ($c = 1, t_w = 1 s, T_A = 23°C$)</td>
<td>0.5% of measured value in °C + 1K</td>
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<tr>
<td>Repeatability ($c = 1, t_w = 1 s, T_A = 23°C$)</td>
<td>0.2% of measured value in °C + 1K</td>
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<tr>
<td>2 analog outputs</td>
<td>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 temperature, control output (devices with PID controller). Outputs can be set within or outside the temperature range.</td>
<td></td>
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<tr>
<td>Serial interface</td>
<td>RS485 (4.8–921.6 kBd), Resolution 0.1°C / °F</td>
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<td></td>
</tr>
<tr>
<td>Inputs / outputs</td>
<td>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.</td>
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<tr>
<td>■ 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.</td>
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<tr>
<td>■ 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.</td>
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<tr>
<td>■ Analog input (12-pin: 0–20 mA, 17-pin: 0–10 V): analog adjustment of emissivity slope, emissivity or setpoint (devices with PID controller).</td>
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<tr>
<td>Display (only 12-pin devices)</td>
<td>Dot Matrix, greenyellow, 128 x 32 Dots (5.6 mm high) for temperature or parameter settings, resolution 0.1°C / °F</td>
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<tr>
<td>Device parameters</td>
<td>Temperature sub range, response time (&lt;1 ms–10s), emissivity (0.050–1.000), transmittance (0.050–1.000), spot size fill factor (0.050–1.000), 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).</td>
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<tr>
<td>Power requirement</td>
<td>24 V DC (18–30 V DC), max. 12 VA; protected against reverse polarity</td>
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<tr>
<td>Isolation Voltage supply, analog outputs and serial interface are galvanically isolated from each other</td>
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<tr>
<td>Sightings (optional)</td>
<td>Through-lens sighting (can be darkened at high measuring temperatures)</td>
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<tr>
<td>■ Color CCD camera (field of view: ca. 3.6 % x 2.7% of measuring distance; output signal: FBAS, ca. 1 Vpp, 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)</td>
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<tr>
<td>Ambient temperature</td>
<td>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)</td>
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<tr>
<td>Relative humidity</td>
<td>Non-condensing conditions</td>
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<tr>
<td>Housing / protection class</td>
<td>Aluminum / IP65 to DIN 40 050 with connector</td>
<td></td>
<td></td>
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<tr>
<td>Weight</td>
<td>650 g</td>
<td></td>
<td></td>
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<tr>
<td>CE label</td>
<td>According to EU directives for electromagnetic immunity</td>
<td></td>
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</tbody>
</table>

Ordering Specifications

Model: Specify each model in 12- or 17-pin, with temperature range, sighting method 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 OL12 or OL25, 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

Fiber optics, manually focusable

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

Red laser targeting light for displaying the focus distance and spot size center.

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:

<table>
<thead>
<tr>
<th>Designation</th>
<th>OL12- E</th>
<th>OL25- E</th>
<th>OQ30- 90</th>
<th>Integrated optics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models and full scale temperature value:</td>
<td>H309: all</td>
<td>H316: ≤1200</td>
<td>H318: 800</td>
<td>H316: ≥1200</td>
</tr>
<tr>
<td>Fiber optics</td>
<td>OL12: 1.0</td>
<td>OL25: 1.0</td>
<td>OQ30: 1.0</td>
<td></td>
</tr>
<tr>
<td>Integrated optics</td>
<td>OM09: 1.0</td>
<td>CO: 1.0</td>
<td>OV09-D1 / D2: 1.0</td>
<td></td>
</tr>
</tbody>
</table>

Focus distance a [mm]

| 75 | 100 | 130 | 160 | 170 | 175 | 180 | 190 | 200 | 210 | 230 | 260 | 290 | 310 | 330 | 340 | 350 | 360 | 370 |
| 0.6 | 0.9 | 1.2 | 1.5 | 1.7 | 1.9 | 2.1 | 2.3 | 2.5 | 2.7 | 2.9 | 3.1 | 3.3 | 3.5 | 3.7 | 3.9 | 4.1 | 4.3 |

Aperture D: 7 mm

Fiber Ø: 0.4 mm 0.2 mm 0.4 mm 0.2 mm 0.4 mm 0.2 mm 0.4 mm 0.2 mm

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

FSC = Full scale temperature value
**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)

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

**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

**PID controller, programmable**: Regulus RF/RD

**LED digital display**: IF00

**Dimensions (in mm)**

- Manual focusable optics
- Fiber optic devices
- Fiber optics

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

Sensortherm-Datasheet Metis_H309_H316_H318 (Nov. 05, 2020)

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