



## Precise non-contact temperature measurement of metal from 30 °C to 1500 °C



### Features:

- Miniaturized Infrared Thermometer with 2.3  $\mu\text{m}$  wave length range for measurements of metals, of secondary metal processing, metal oxides and ceramic materials
- Very small sensing head of 14 mm diameter and 28 mm length fits everywhere and is usable up to 85 °C ambient temperature without cooling
- Temperature measuring ranges from 30 °C to 1500 °C and exposure times starting from 110  $\mu\text{s}$
- Short wave length range of 2.3  $\mu\text{m}$  to reduce error of reading with measurements on materials with unknown emissivity

### General Specifications

|                              |                                                                    |
|------------------------------|--------------------------------------------------------------------|
| Environmental rating         | IP 65 (NEMA-4)                                                     |
| Operating temperature        | -20 °C ... 85 °C (sensing head)<br>0 °C ... 85 °C (electronics)    |
| Storage temperature          | -40 °C ... 125 °C (sensing head)<br>-40 °C ... 85 °C (electronics) |
| Operating air humidity range | 10 ... 95 %, non-condensing                                        |
| Vibration (sensor)           | IEC 60068-2-6 (sinus shaped)<br>IEC 60068-2-64 (broadband noise)   |
| Shock (sensor)               | IEC 60068-2-27 (25G and 50G)                                       |
| Weight                       | 40 g (sensing head)<br>420 g (electronics)                         |

### Electrical Specifications

|                    |                                                                                                                                              |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs / analog   | 0/4 – 20 mA, 0 – 5/10 V, thermocouple K, alarm                                                                                               |
| Outputs / alarm    | 24 V/ 50 mA (open collector)                                                                                                                 |
| Optional           | Relay: 2 x 60 V DC/ 42 V AC <sub>eff</sub> ; 0.4 A;<br>optically isolated                                                                    |
| Digital interfaces | built-in USB-interface, Optional: USB, RS232,<br>RS485, EtherNet/IP, Profinet, Ethernet TCP/IP,<br>Modbus TCP, Modbus RTU                    |
| Output impedances  | mA max. 500 $\Omega$ (with 8 – 36 V DC)<br>mV min. 100 k $\Omega$ load impedance<br>thermocouple 20 $\Omega$                                 |
| Inputs             | Programmable functional inputs for external<br>emissivity adjustment, ambient temperature<br>compensation, trigger (reset of hold functions) |
| Cable length       | 3 m (standard), 8 m, 15 m                                                                                                                    |
| Power Supply       | 8 – 36 V DC                                                                                                                                  |
| Current draw       | Max. 100 mA                                                                                                                                  |

### Measurement Specifications

|                                                                      |                                                                                                                                        |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Temperature ranges<br>(scalable via programming<br>keys or software) | 30 °C ... 350 °C (3MXL)<br>50 °C ... 475 °C (3ML)<br>100 °C ... 600 °C (3MH)<br>150 °C ... 1000 °C (3MH1)<br>200 °C ... 1500 °C (3MH2) |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                         |                                                                                                                 |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Spectral ranges                                                                         | 2.3 $\mu\text{m}$                                                                                               |
| Optical resolution<br>(90 % energy)                                                     | 12:1 (3MXL)<br>22:1 (3ML)<br>33:1 (3MH)<br>75:1 (3MH1 / 3MH2)                                                   |
| Short-term stability <sup>2), 3)</sup>                                                  | typically: 0.09 K/h<br>typically: 0.10 K/h<br>typically: 0.13 K/h<br>typically: 0.25 K/h                        |
| Temperature coefficient <sup>1), 2), 3)</sup>                                           | $\pm 0,01$ K/K (3MH2)<br>$\pm 0,05$ K/K (3MH)<br>$\pm 0,08$ K/K (3MXL / 3ML / 3MH1)                             |
| measurement uncertainty                                                                 | $\pm 1,5$ °C (3MXL / 3ML / 3MH)<br>$\pm (1,5$ °C + 0,3%) (3MH1 / 3MH2)                                          |
| NEDT <sup>3)</sup>                                                                      | typically: 85 mK (3MXL)<br>typically: 95 mK (3ML)<br>typically: 105 mK (3MH / 3MH2)<br>typically: 200 mK (3MH1) |
| System accuracy <sup>1)</sup><br>(at ambient temp. 23 $\pm$ 5 °C)                       | $\pm(0,3$ % of reading + 2 °C)                                                                                  |
| Repeatability<br>(at ambient temp. 23 $\pm$ 5 °C)                                       | $\pm(0,1$ % of reading + 1 °C)                                                                                  |
| Temperature resolution                                                                  | 0.1 K                                                                                                           |
| Exposure time <sup>2)</sup>                                                             | 110 $\mu\text{s}$                                                                                               |
| Response time                                                                           | 320 $\mu\text{s}$                                                                                               |
| Emissivity / Gain<br>(adjustable via programming<br>keys or software)                   | 0.05...1.100                                                                                                    |
| Transmissivity / Gain<br>(adjustable via programming<br>keys or software)               | 0.05...1.100                                                                                                    |
| Signal processing (parameter adjustable via programming keys or software, respectively) | Peak hold, valley hold, average; extended hold function with threshold and hysteresis                           |
| Software                                                                                | optris CompactPlus Connect / IRmobile                                                                           |

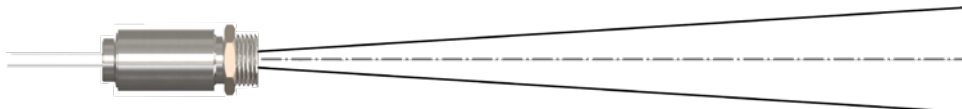
<sup>1)</sup>  $\varepsilon = 1$ , response time 1 s

<sup>2)</sup> With dynamic adaptation at low signal levels

<sup>3)</sup> Specification valid at  $T_{\text{object}} \geq \text{start of measurement range} + 50$  °C

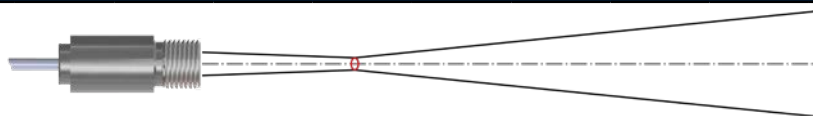
# optris CTi 3M

## Optical specifications - Standard Focus (SF)



| Device        | D:S  | Optical values |      |      |      |      |      |      |      |      |      |      |               |               |
|---------------|------|----------------|------|------|------|------|------|------|------|------|------|------|---------------|---------------|
|               |      | 0              | 100  | 200  | 300  | 400  | 500  | 600  | 700  | 800  | 900  | 1000 | Distance (mm) |               |
| 3MXL          | 12:1 | 6.5            | 13.2 | 19.9 | 26.6 | 33.3 | 43.3 | 53.3 | 63.2 | 73.2 | 83.1 | 93.1 | Spotsize (mm) |               |
|               |      | 0              | 100  | 200  | 300  | 400  | 500  | 600  | 700  | 800  | 900  | 1000 | 1100          | Distance (mm) |
| 3ML           | 22:1 | 6.5            | 10.5 | 14.4 | 18.4 | 22.3 | 26.3 | 30.2 | 34.2 | 38.1 | 42.1 | 46.0 | 50.0          | Spotsize (mm) |
|               |      | 0              | 200  | 400  | 600  | 800  | 1000 | 1200 | 1400 | 1600 | 1800 | 2000 | Distance (mm) |               |
| 3MH           | 33:1 | 6.5            | 11.8 | 17   | 22.3 | 27.5 | 32.8 | 38.1 | 43.3 | 48.5 | 53.8 | 60.3 | Spotsize (mm) |               |
| 3MH1/<br>3MH2 | 75:1 | 6.5            | 8.4  | 10.3 | 12.5 | 13.9 | 15.8 | 17.6 | 19.5 | 21.3 | 24.8 | 28.3 | Spotsize (mm) |               |

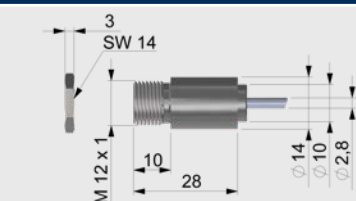
## Optical specifications - Close Focus (CF)



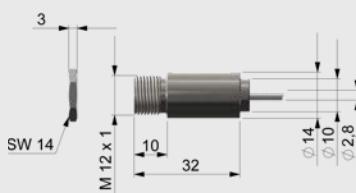
| Device        | D:S  | Optical values |     |     |     |      |      |      |      |      |      |               |
|---------------|------|----------------|-----|-----|-----|------|------|------|------|------|------|---------------|
|               |      | 0              | 15  | 30  | 50  | 75   | 100  | 125  | 150  | 175  | 200  | Distance (mm) |
| 3MXL CF1      | 12:1 | 6.5            | 4.5 | 2.5 | 8.5 | 16   | 23.5 | 31   | 38.5 | 46   | 53.5 | Spotsize (mm) |
| 3ML CF 1      | 22:1 | 6.5            | 3.9 | 1.4 | 6.6 | 13.2 | 19.7 | 26.3 | 32.8 | 39.4 | 45.9 | Spotsize (mm) |
| 3MH CF 1      | 33:1 | 6.5            | 3.8 | 1   | 6   | 23.3 | 18.5 | 24.8 | 31   | 37.3 | 43.5 | Spotsize (mm) |
|               |      | 0              | 40  | 80  | 110 | 150  | 200  | 250  | 300  | 350  | 400  | Distance (mm) |
| 3MXL CF       | 12:1 | 6.5            | 7.5 | 8.4 | 9.2 | 14.9 | 22.0 | 29.1 | 36.2 | 43.3 | 50.5 | Spotsize (mm) |
| 3ML CF        | 22:1 | 6.5            | 6.0 | 5.4 | 5   | 9.2  | 14.4 | 19.6 | 24.9 | 30.1 | 35.3 | Spotsize (mm) |
| 3MH CF        | 33:1 | 6.5            | 5.3 | 4.2 | 3.3 | 6.9  | 11.4 | 15.8 | 20.3 | 24.8 | 29.3 | Spotsize (mm) |
| 3MH1/<br>3MH2 | 75:1 | 6.5            | 4.7 | 2.8 | 1.5 | 4.4  | 8    | 11.6 | 15.2 | 18.8 | 22.5 | Spotsize (mm) |

## Dimensions

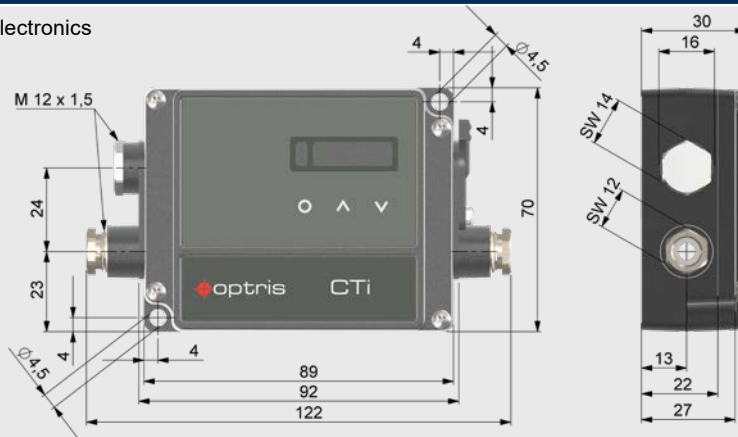
Sensing head  
(standard)



Sensing head  
(built-in  
CF lens)

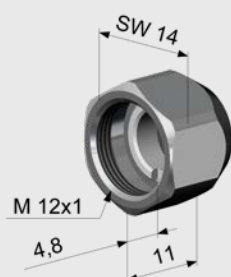


Electronics

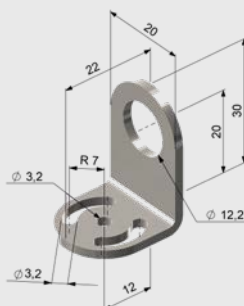


## Accessories (examples)

CF-lens  
(ACCTCFHT)



Mounting bracket, fixed  
(ACCTFB)



Air purge collar with integrated CF-lens  
(ACCTAPLCFHT)

