

## High-speed pyrometer for temperature measurement from 0 °C to 500 °C



### Features:

- Miniaturized Infrared Thermometer with ultra-fast exposure time of 110 µs
- Small-sized head of 14 mm diameter and 28 mm length fits everywhere and is usable up to 70 °C without cooling
- The CTi 4ML is ideal for precise temperature measurements in all ultra-fast processes with low object temperatures starting at 0 °C

### General specifications

Environmental rating	IP 65 (NEMA-4)
Operating temperature range	-20 °C ... 70 °C (sensing head) -20 °C ... 85 °C (electronics)
Storage temperature	-40 °C ... 85 °C (sensing head) -40 °C ... 85 °C (electronics)
Operating air humidity range	10–95 %, non-condensing
Vibration (sensor)	IEC 60068-2-6 (sinus shaped) IEC 60068-2-64 (broadband noise)
Shock (sensor)	IEC 60068-2-27 (25 G and 50 G)
Weight	40 g (sensing head) 420 g (electronics)

### Electrical specifications

Outputs / analog (2x)	0/4–20 mA, 0–5/10 V, thermocouple K, alarm
Output / alarm	24 V / 50 mA (open collector)
Relay outputs (optional)	Relay: 2 x 60 V DC / 42 V AC <sub>RMS</sub> ; 0.4 A; optically isolated
Digital interfaces	built-in USB-interface, Optional: EtherNet/IP, Profinet, EtherCAT, Ethernet TCP/IP / Modbus TCP, Modbus RTU, RS485, RS232 or relay outputs (2 x optically isolated)
Output impedances	mA max. 500 Ω (with 8–36 V DC) mV min. 100 kΩ load impedance thermocouple 20 Ω
I/O Pins (3x)	flexible programming as in- or output: external emissivity adjustment, ambient temperature compensation, uncommitted value, trigger (reset of hold functions), alarm output (open collector 24 V / 50 mA)
Cable length	3 m, 8 m, 15 m
Power supply	8–30 V DC / 1.2 W

### Measurement specifications

Measuring temperature range	0 °C ... 600 °C
Spectral range	2.2 ... 6.0 µm
Optical resolution (90 % energy)	10:1
CF optics (optional)	5.0 mm @ 50 mm
Measurement uncertainty <sup>2), 3), 4), 7)</sup>	±(0.3 % of reading +2 °C)
Repeatability <sup>3), 4), 5), 6)</sup>	± 0.16 K
Temperature coefficient <sup>2), 3), 4)</sup>	± 0,05 K/K or ± 0,03 %/K
NETD (typically) <sup>3), 4), 5), 6)</sup>	70 mK
Exposure time	110 µs
Response time	320 µs
Emissivity / Gain (adjustable via programming keys or software)	0.05...1.100
Transmissivity / Gain (adjustable via programming keys or software)	0.05...1.100
Signal processing (parameter adjustable via programming keys or software, respectively)	Peak hold, valley hold, peak picker, average; extended hold function with threshold and hysteresis
Software / App	optris CompactPlus Connect / IRmobile App

<sup>1)</sup> The LCD display capacity may be limited at ambient temperatures below 0 °C

<sup>2)</sup> Whichever is greater

<sup>3)</sup> Response time = 200 ms (90%)

<sup>4)</sup> ε = 1.000

<sup>5)</sup> Tobj = Tmin + 50 °C

<sup>6)</sup> Response time = 1 ms (90%)

<sup>7)</sup> at ambient temperature (23 ± 5) °C

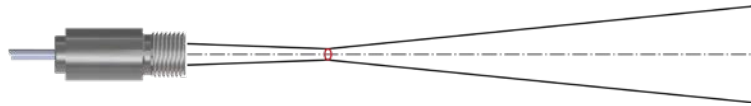
# optris CTi 4ML

## Optical specifications - Standard Focus (SF)



Device	D:S	Optical values											
		0	100	200	300	400	500	600	700	800	900	1000	Distance (mm)
4M	10:1	6.5	14.9	23.3	31.6	40	51.6	63.3	74.9	86.5	98.1	109.8	Spotsize (mm)

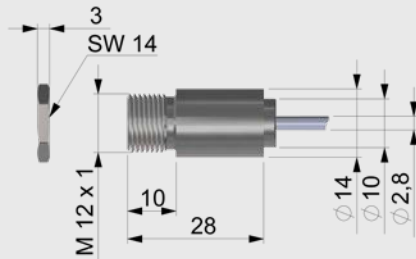
## Optical specifications - Close Focus (CF)



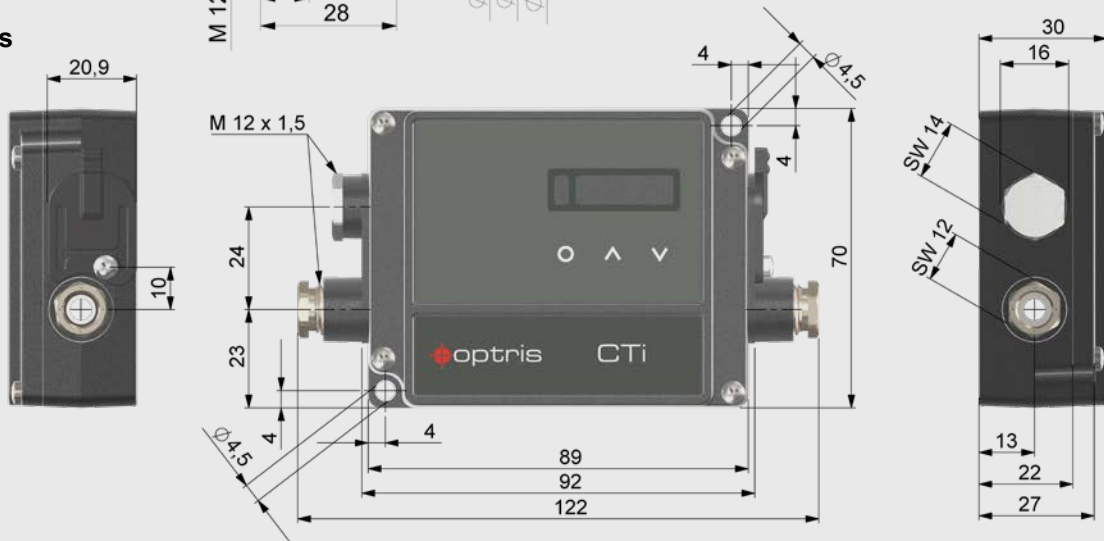
Device	D:S	Optical values											
		0	25	40	50	60	75	100	125	150	175	200	Distance (mm)
4M CF	10:1	6.5	5.8	5.3	5.0	7.3	10.8	16.5	22.3	28.0	33.8	39.5	Spotsize (mm)

## Dimensions (in mm)

### Sensing head



### Electronics



## Software / App



The CTi 4ML can be directly connected to a PC or smartphone.

