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More Precision

thermoMETER // Non-contact infrared temperature sensors



Non-contact temperature measurement - precise and reliable.

Temperature measurement with Micro-Epsilon

Infrared pyrometers from Micro-Epsilon are designed for measuring surface temperatures from $-50\text{ }^{\circ}\text{C}$ to $3000\text{ }^{\circ}\text{C}$. The infrared radiation emitted by a body is used for the measurement. As this measurement is a non-contact technology, the devices perform wear-free and can therefore be reliably used in the long term. Selectable models and optical systems enable to install the cameras in different distances from the surface. This enables measurements to the target from a safe distance in critical operation areas.

Large range of applications

Infrared pyrometers are used in a variety of applications for non-contact temperature measurement within any industry from factory automation, R&D to maintenance and process monitoring.

Proven technology

Infrared sensors developed and produced by Micro-Epsilon stand out due to their long service life, their robust construction and precise measurement results. These sensors are based on proven technologies which have been developed further by Micro-Epsilon. This is why these sensors also provide highly precise and reliable measurements in harsh environmental conditions.

Compact sensor design

For applications in restricted spaces, the sensors of the CT series are perfectly suitable. Even the standard models are considered one of the smallest sensors. For extremely tiny installation environments, miniaturized IR sensors are used.



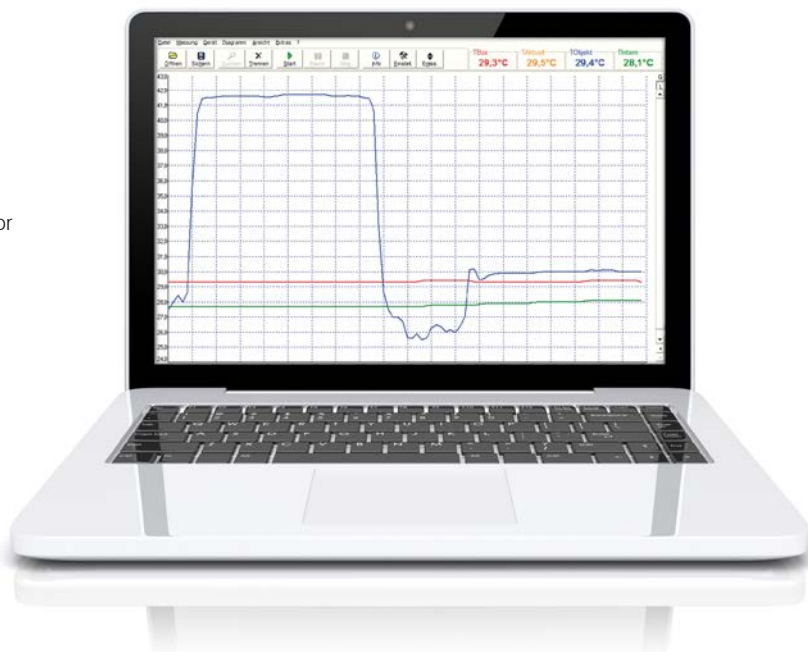
Software included

Sensors with digital interface include the specially programmed CompactConnect software for free.

- Graphic display and recording of temperature readings for subsequent analysis and documentation
- Complete set up of parameters and remote control of the sensor
- Sophisticated signal processing features
- Output scaling and parameter set up of functional inputs

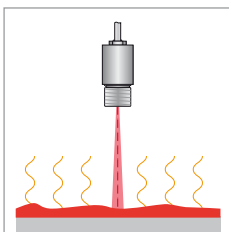
System requirements

- Windows XP / Vista / Windows 10
- USB 2.0 interface
- Hard drive with at least 30 MB of free disk space
- At least 128 MB of RAM
- CD-ROM drive



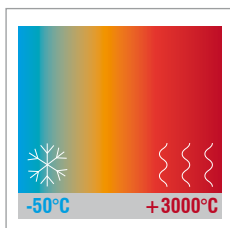
Non-contact measurement of the surface temperature

Each Micro-Epsilon IR sensor model incorporates different technologies that have a common denominator: non-contact temperature measurement. Due to this non-contact technology, measurement objects can be detected precisely and wear-free without physical influences.



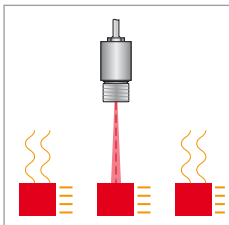
Large temperature measuring range

IR sensors from Micro-Epsilon are suitable for use across a wide measuring range. From low temperatures prevalent in cooling chains or laboratories, to the highest temperatures in hot melting materials or blast furnaces - the portable thermoMETER handheld products measure these temperatures precisely.



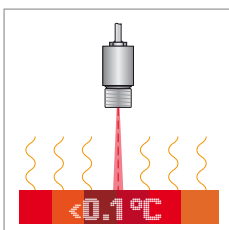
High speed measurements

For moving objects e.g. in transportation lines, thermoMETER sensors with extremely fast response times are available. These response times can only be achieved using high quality components.



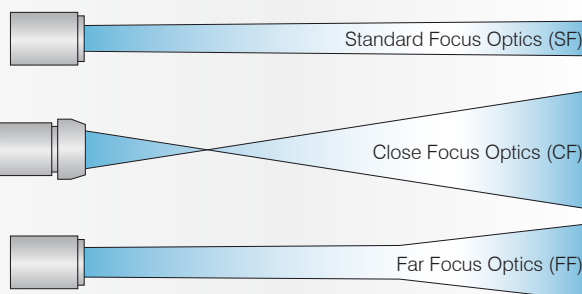
Precise and stable measurements

The thermoMETER product group is renowned for its high accuracy and high resolution. Particularly in temperature-critical applications, IR sensors from Micro-Epsilon are the preferred choice for easy, precise measurements.



thermoMETER lenses

The measurement spot size with the desired working distance is a critical factor. In order to enable the ideal choice for any application, a large number of different lenses is available. These differ with respect to the relation between the target distance and the spot diameter.



SF lenses (Standard Focus) have an almost linear relation while the CF lenses (Close Focus) have a smaller measurement spot in sensor-close distances. FF lenses (Far Focus) are especially suitable for large distances from the measurement object with a comparatively small measurement spot.

Detection of smallest measurement objects

Often, conventional IR sensors can not detect tiny, temperature-critical parts e.g. on chips and circuit boards. Due to the comprehensive range of optical systems, even smallest measurement objects <1mm can be detected precisely.

Freely selectable distance from the measurement object

Depending on the application environment and the available installation space, the measurement distance of thermoMETER is freely selectable. Due to the large number of different lens types, small measurement diameters can also be detected with large distances.



High-Performance infrared pyrometer with double laser sighting

Page	Model	Temperature range
6 - 7	CTRatioM1/M2	200°C to 2200°C
8 - 9	CTLaser / FAST	-100°C to 900°C
10 - 11	CTLaserGLASS	200°C to 1600°C
12 - 13	CTLaserM1/M2	200°C to 2100°C
14 - 15	CTLaserM3	0°C to 1700°C
16 - 17	CTLaserM5	900°C to 1900°C
18 - 19	CTLaser COMBUSTION	200°C to 1400°C



Infrared pyrometer for general purpose applications

Page	Model	Temperature range
22 - 23	CT	-100°C to 900°C
24 - 25	CTfast	-100°C to 900°C
26 - 27	CThot	-100°C to 900°C
28 - 29	CTM1/M2	200°C to 2100°C
30 - 31	CTM3	0°C to 1700°C
32 - 33	CTM3-XL	0°C to 1700°C
34 - 35	CTP-3	0°C to 400°C
36 - 37	CTP-7	0°C to 450°C
38 - 39	CTex	0°C to 400°C



Compact infrared pyrometer for OEM applications

Page	Model	Temperature range
44 - 45	CSLaser	0°C to 1500°C
46 - 47	CS	0°C to 400°C
48 - 49	CSmicro	0°C to 1000°C
50 - 51	CSmicro 2W	0°C to 1500°C
52 - 53	CX	0°C to 800°C

High-Performance infrared pyrometer with double laser sighting

	Spectral range	Ambient temperature	Description	Model	Page
	0.8 to 1.75 μm	-20 °C to +200 °C	Ratio pyrometers for metal objects	CTRatioM1/M2	6 - 7
	8 to 14 μm	-20 °C to +85 °C	Universal Infrared pyrometer with laser spot marking	CTLaser / FAST	8 - 9
	5.0 μm	-20 °C to +85 °C	Infrared pyrometer with laser sighting for the glass industry	CTLaserGLASS	10 - 11
	1 μm / 1.6 μm	-20 °C to +85 °C	Infrared pyrometer with laser sighting for the metal production	CTLaserM1/M2	12 - 13
	2.3 μm	-20 °C to +85 °C	Infrared pyrometer with laser sighting for metals & composite materials	CTLaserM3	14 - 15
	0.525 μm	-20 °C to +85 °C	Infrared pyrometer with laser sighting for liquid metals	CTLaserM5	16 - 17
	3.9 / 4.24 / 4.64 μm	-20 °C to +85 °C	IR pyrometer with laser sighting for measurements through & on flames	CTLaser COMBUSTION	18 - 19

Infrared pyrometer for general purpose applications

	Spectral range	Ambient temperature	Description	Model	Page
	8 to 14 μm	-20 °C to +180 °C	Universal IR pyrometer for common applications	CT	22 - 23
	8 to 14 μm	-20 °C to +120 °C	Infrared pyrometer for high speed measurements	CTfast	24 - 25
	8 to 14 μm	-20 °C to +250 °C	Infrared pyrometer for extremely hot ambient temperature	CThot	26 - 27
	1 μm / 1.6 μm	-20 °C to +125 °C	Infrared pyrometer for metal processing	CTM1/M2	28 - 29
	2.3 μm	-40 °C to +85 °C	Infrared pyrometer for metals & composite materials	CTM3	30 - 31
	2.3 μm	-40 °C to +85 °C	Infrared pyrometer for laser welding processes	CTM3-XL	32 - 33
	3.43 μm	0 °C to +75 °C	Infrared pyrometer for measurement of thin plastic film	CTP-3	34 - 35
	7.9 μm	-20 °C to +85 °C	Economic pyrometer for measurement of plastics	CTP-7	36 - 37
	8 to 14 μm	-20 °C to +60 °C	Conversion kit for applications in hazardous EX environment	CTex	38 - 39

Compact infrared pyrometer for OEM applications

	Spectral range	Ambient temperature	Description	Model	Page
	1.6 μm / 8 to 14 μm	-20 °C to +85 °C	Two-wire infrared pyrometer with laser sighting & integrated controller	CSLaser	44 - 45
	8 to 14 μm	-20 °C to +80 °C	OEM infrared pyrometer with integrated controller	CS	46 - 47
	8 to 14 μm	-20 °C to +120 °C	Compact OEM infrared pyrometer with external controller	CSmicro	48 - 49
	1.6 μm / 8 to 14 μm	-20 °C to +180 °C	Compact two-wire OEM infrared pyrometer with external controller	CSmicro 2W	50 - 51
	8 to 14 μm	-20 °C to +75 °C	Two-wire infrared pyrometer for robust, industrial applications	CX	52 - 53



thermoMETER CTRatioM1/M2

Glass fiber ratio pyrometer provides extremely short response time with metal objects

- Measuring range from 250 °C to 3000 °C
- Extremely short response times from 1 ms
- Resistant to disturbances such as smoke, fog and partially concealed or moving objects
- Measurement depends only on the emissivity ratio but not on the absolute emissivity
- The measurement object can be smaller than the measurement spot
- Up to 200 °C ambient temperature without cooling
- High optical resolution with selectable focal point
- Integrated sighting laser marks spot size
- Programmable 1- or 2-channel mode
- Separate controller with programming keys and backlit display

Optical parameters thermoMETER CTRatioM1/M2

Standard Focus									
SF38 lens	38:1	7.9	13.2	19.7	26.3	39.5	52.6	65.8	131.6
SF50 lens	50:1	6	10	15	20	30	40	50	100
SF100 lens	100:1	3	5	7.5	10	15	20	25	50
	distance in mm	300	500	750	1000	1500	2000	2500	5000

Note: The measuring spot size refers to 90 % of the radiation energy.
The distance is measured from the front edge of the sensor head.



Model		CTRM-1LSF38-C3	CTRM-1HSF100-C3	CTRM-1H1SF100-C3	CTRM-2LSF38-C3	CTRM-2HSF50-C3	CTRM-2H1SF100-C3
Optical resolution (90 % energy)		38:1	100:1		38:1	50:1	100:1
Temperature ranges	1-channel	450 to 1400 °C	650 to 2000 °C	900 to 3000 °C	250 to 1000 °C	375 to 1500 °C	500 to 3000 °C
	2-channel	525 to 1400 °C	700 to 2000 °C	1000 to 3000 °C	275 to 1000 °C	400 to 1500 °C	550 to 3000 °C
Spectral range		0.8 to 1.1 μm			1.45 to 1.75 μm		
Variable focus		300 mm to infinity, continuously adjustable					
System accuracy ^{2), 4)}		±(0.5 % T _{of reading} +2 °C)					
Repeatability ^{2), 4)}		±0.3 % of reading					
Temperature resolution (> 900 °C)		0.1 °C					
Response time (95 % signal) ³⁾		1 ms - 10 s					
Emissivity ratio ⁵⁾		0.800 - 1.200					
Emissivity ⁵⁾		0.050 - 1.000					
Signal processing ⁵⁾		1-channel / 2-channel mode; alarm monitoring; peak hold, valley hold, average; extended hold function with threshold and hysteresis					
Software/App		CompactPlus Connect					
Outputs/analog		2x 0/4-20 mA (12 bit)					
Outputs/analog	optional	2x 0/4-20 mA (16 bit) isolated					
Relay interface	optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated					
Digital interface		USB (Micro-USB, USB-C, USB-A cables included)					
Digital interface	optional	RS232, RS485, Ethernet					
Output impedances		max. 500 Ω (with 8-30 VDC)					
Inputs/outputs digital		three programmable in-/ outputs, usable as: alarm output (open collector 24 V/1 A), digital input for triggered signal output & peak hold function or as analog input for external emissivity or slope settings.					
Length of fiber-optic cable		3 m (standard), 8 m, 15 m					
Power supply		8 - 30 VDC or USB ¹⁾					
Power consumption		max. 5 W					
Sighting laser		laser 520 nm, <1 mW, ON/OFF via electronic box or software					
Protection class		IP65 (NEMA-4)					
Ambient temperature		sensor: -20 °C to 200 °C (optional up to 315 °C); controller: 0 °C to 50 °C					
Storage temperature		sensor: -40 °C to 200 °C; controller: -40 °C to 85 °C					
Relative humidity		10 to 95 %, non-condensing					
Vibration ³⁾	sensor	IEC 60068-2-6 (sinus-shaped), IEC 60068-2-64 (broadband noise)					
Shock ³⁾	sensor	IEC 60068-2-27 (25 g and 50 g)					
Housing (size) ³⁾		36.6 mm x 70 mm x 95.5 mm					
Weight		sensor with fiber-optic cable: 210 g; controller: 420 g					

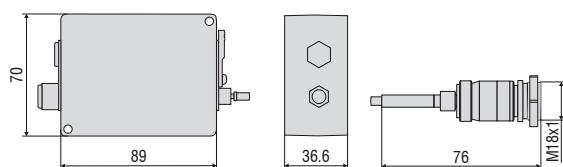
¹⁾ USB powered device works only in digital communication mode

²⁾ $\epsilon = 1$, response time 1 s; no signal attenuation / Specification valid for 5 - 95 % of measuring range

³⁾ With dynamic adaptation to low signal levels

⁴⁾ with ambient temperature of $23 \pm 5 ^\circ\text{C}$

⁵⁾ adjustable via programming keys or software/app



Product identification

CTRM -	1	L	SF38-	C3
				Cable length [3 m (standard) / 8 m / 15 m]
				Focus [SF38 / SF50 / SF100]
				Temperature range [L / H/ H1]
				Spectral range [1=0.8 to 1.1 μm / 2=1.45 to 1.75 μm]
				thermoMETER CTRatioM



thermoMETER CTLaser / CTLaserFAST

Innovative infrared temperature sensor with laser sighting

- Measuring range from -50 °C to 975 °C
- thermoMETER CTLaserFAST with response times of just 9 ms
- Smallest spots from 0.9 mm - even with low object temperatures
- Double laser sighting for exact measuring field marking and focusing
- Optical system 75:1 with selectable focus settings
- Separate controller with programming keys and backlit display
- Up to 85 °C ambient temperature without cooling
- Automatic laser switch-off at 50 °C
- Selectable and scalable analog output, optional digital interfaces

Optical specifications thermoMETER CTLaser

□ = smallest spot size / focal point (mm)

Standard Focus

SF75 lens	75:1	20	19.5	19	18.5	18	17.5	17	16.5	16	20.5	25	34	43	52		
distance in mm		0	150	300	450	600	750	900	1050	1200	1350	1500	1800	2100	2400		

Close Focus

CF1 lens	75:1	20	9.1	6.4	0.9	9.9	24.8	39.7	54.6	69.6	84.5	99.4	114.4	129.3	159.1	189	218.9
CF2 lens	75:1	20	15.2	14	11.6	7.9	1.9	9.2	16.5	23.8	31.1	38.4	45.7	53	67.6	82.2	96.8
CF3 lens	75:1	20	16.6	15.7	14	11.4	7.1	2.75	8.4	14.1	19.8	25.5	31.2	36.9	48.3	59.6	71
CF4 lens	75:1	20	18.7	18.4	17.8	16.9	15.3	13.7	12.2	10.6	9	7.5	5.9	8.8	14.5	20.3	26
distance in mm		0	40	50	70	100	150	200	250	300	350	400	450	500	600	700	800

Optical specifications thermoMETER CTLaserFAST

□ = smallest spot size / focal point (mm)

Standard Focus

SF50 lens	50:1	20	20.5	21	21.5	22	22.5	23	23.5	24	29.5	35	46	57	68		
distance in mm		0	150	300	450	600	750	900	1050	1200	1350	1500	1800	2100	2400		

Close Focus

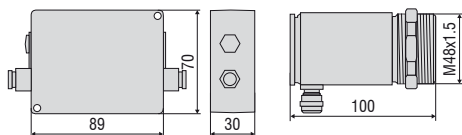
CF1 lens	50:1	20	9.4	6.7	1.4	10.6	25.9	41.1	56.4	71.7	87	102.3	117.6	132.9	163.4	194	224.6
CF2 lens	50:1	20	15.5	14.3	12.1	8.7	3	10.7	18.3	26	33.7	41.3	49	56.7	72	87.3	102.7
CF3 lens	50:1	20	16.8	16	14.4	12	8	4	10	16	22	28	34	40	52	64	76
CF4 lens	50:1	20	19	18.8	18.3	17.6	16.3	15.1	13.9	12.7	11.4	10.2	9	12.2	18.7	25.1	31.6
distance in mm		0	40	50	70	100	150	200	250	300	350	400	450	500	600	700	800

Model	CTL-SF75-C3	CTLF-SF50-C3
Optical resolution	75:1	50:1
Temperature range ¹⁾	-50 °C to 975 °C	
Spectral range	8 to 14 µm	
System accuracy ^{2), 3)}	±1 % or ±1 °C	±1.5 % or ±1.5 °C
Repeatability ²⁾	±0.5 % or ±0.5 °C	±1 % or ±1 °C
Temperature resolution	0.1 °C	0.5 °C
Response time (90 % signal)	120 ms	9 ms
Emissivity/gain ¹⁾	0.100 to 1.100	
Transmissivity/gain ¹⁾	0.100 to 1.000	
Signal processing ¹⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis	
Certificate of calibration	optional	
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K
	channel 2	sensor temperature (-20 to 180 °C as 0 to 5 V or 0 to 10 V), alarm output
Outputs/analog	optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated
Alarm output		open collector (24 V / 50 A)
Outputs/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet
Output impedances	current output	mA max. 500 Ω (with 5 to 36 VDC)
	voltage output	min. 100 kΩ load impedance, thermocouple 20 Ω
Inputs	programmable functional inputs for external emissivity adjustment ambient temperature compensation, trigger (reset of hold functions)	
Cable length	3 m (standard), 8 m, 15 m	
Power supply	8 to 36 VDC; max. 160 mA	
Laser	class II (635 nm), 1 mW, ON/OFF via controller or software	
Protection class	IP65 (NEMA-4)	
Ambient temperature	sensor: -20 °C to 85 °C (50 °C if Laser ON); controller: 0 °C to 85 °C	
Storage temperature	sensor: -40 °C to 85 °C; controller: -40 °C to 85 °C	
Relative humidity	10 to 95 %, non-condensing	
Vibration	sensor	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis
Weight	sensor: 600 g; controller: 420 g	

¹⁾ adjustable via programming keys or software

²⁾ ambient temperature: 23 ± 5 °C; whichever is greater

³⁾ temperature of the object > 0 °C



Product identification

CTL -	SF75-	C3
		Cable length [3 m (standard) / 8 m / 15 m]
		Focus [SF75 / CF1 / CF2 / CF3 / CF4]
thermoMETER CTLaser		

Product identification

CTLF -	SF50-	C3
		Cable length [3 m (standard) / 8 m / 15 m]
		Focus [SF50 / CF1 / CF2 / CF3 / CF4]
thermoMETER CTLaserFAST		

Accessories page 20 - 21

- Mounting bracket
- Air purge collar
- Rail mount adapter for controller
- Water cooled housing
- Interface kit
- CompactConnect software
- Certificate of calibration





thermoMETER CTLaserGLASS

Non-contact infrared temperature sensor for the glass industry

- Measuring range from 100 °C to 1650 °C
- Accurate glass temperature measurements on flat glass lines and container glass machines, e.g. with bulb manufacturing, car glass finishing and the production of solar panels and glass bottles
- Double laser marks the exact spot size from 1 mm
- Optical systems 70:1 and 45:1 with selectable focus
- Compact sensor design
- Up to 85 °C ambient temperature without cooling, laser switch-off at 50 °C
- Cooling and protection accessories for harsh environmental conditions
- Selectable and scalable analog output, optional digital interfaces

Optical specifications thermoMETER CTLaserGLASS

□ = smallest spot size / focal point (mm)

Standard Focus

SF45L	45:1	20	20.9	21.8	22.6	23.5	24.4	25.3	26.1	27	32.9	38.8	50.5	62.3	74		
SF70H	70:1	20	19.6	19.3	18.9	18.5	18.1	17.8	17.4	17	21.6	26.3	35.5	44.8	54		
distance in mm		0	150	300	450	600	750	900	1050	1200	1350	1500	1800	2100	2400		

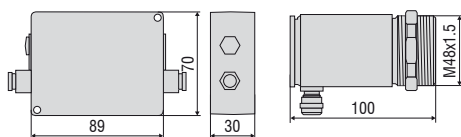
Close Focus

CF1L	45:1	20	9.5	6.9	1.6	10.9	26.3	41.7	57.1	72.6	88	103.4	118.9	134.3	165.1	196	226.9
CF1H	70:1	20	9.1	6.4	1	10	25	40	55	70	85	100	115	130	160	190	220
CF2L	45:1	20	15.6	14.5	12.3	8.9	3.4	11.2	19	26.8	34.6	42.4	50.2	58	73.6	89.2	104.8
CF2H	70:1	20	15.3	14.1	11.7	8.1	2.2	9.6	17	24.4	31.8	39.2	46.6	54	68.8	83.6	98.4
CF3L	45:1	20	16.9	16.1	14.6	12.3	8.4	4.5	10.6	16.8	22.9	29	35.1	41.3	53.5	65.8	78
CF3H	70:1	20	16.6	15.7	14	11.5	7.2	2.9	8.6	14.3	20.1	25.8	31.5	37.3	48.7	60.1	71.6
CF4L	45:1	20	19.1	18.9	18.4	17.8	16.7	15.6	14.4	13.3	12.2	11.1	10	13.3	20	26.7	33.3
CF4H	70:1	20	18.8	18.5	17.9	17	15.5	14	12.5	11	9.5	8	6.5	9.4	15.3	21.2	27.1
distance in mm		0	40	50	70	100	150	200	250	300	350	400	450	500	600	700	800

Model	CTLG-SF45L-C3	CTLGF-SF45H-C3	CTLG-SF70H-C3
Optical resolution	45:1		70:1
Temperature range ¹⁾	100 to 1200 °C	200 to 1450 °C	250 to 1650 °C
Spectral range	5.0 µm		
System accuracy ²⁾	± 1 % or ± 1.5 °C		
Repeatability ²⁾	± 0.5 % or ± 0.5 °C		
Temperature resolution	0.1 °C		
Response time (90 % signal)	120 ms	10 ms	80 ms
Emissivity/gain ¹⁾	0.100 to 1.100		
Transmissivity/gain ¹⁾	0.100 to 1.000		
Signal processing ¹⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis		
Certificate of calibration	optional		
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K	
	channel 2	sensor temperature (-20 to 180 °C as 0 to 5 V or 0 to 10 V), alarm output	
Outputs/analog	optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated	
Alarm output		open collector (24 V / 50 A)	
Outputs/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet	
Output impedances	current output	mA max. 500 Ω (with 5 to 36 VDC)	
	voltage output	min. 100 kΩ load impedance, thermocouple 20 Ω	
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger	
Cable length		3 m (standard), 8 m, 15 m	
Power supply		8 to 36 VDC; max. 160 mA	
Laser		class II (635 nm), 1 mW, ON/OFF via controller or software	
Protection class		IP65 (NEMA-4)	
Ambient temperature		sensor: -20 °C to 85 °C (50 °C if Laser ON); controller: 0 °C to 85 °C	
Storage temperature		sensor: -40 °C to 85 °C; controller: -40 °C to 85 °C	
Relative humidity		10 to 95 %, non-condensing	
Vibration	sensor	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis	
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis	
Weight		sensor: 600 g; controller: 420 g	

¹⁾ adjustable via programming keys or software

²⁾ ambient temperature: 23 ± 5 °C; whichever is greater



Product identification

CTLG -	SF45L-	C3
		Cable length [3 m (standard) / 8 m / 15 m]
		Focus [SF45L/ SF70H / CF1L/H / CF2L/H / CF3L/H / CF4L/H]
		thermoMETER CTLaserGLASS

Accessories page 20 - 21

- Mounting bracket
- Air purge collar
- Rail mount adapter for controller
- Water cooled housing
- Interface kit
- Certificate of calibration





thermoMETER CTLaserM1/M2

Non-contact IR temperature sensor with laser sighting for metal processing

- Measuring range 250 °C to 2200 °C
- 1 μm /1.6 μm measuring wavelength for accurate temperature measurements in difficult emissivity conditions
- Response time of 1 ms
- Double laser marks exact spot size from 0.45 mm
- For metal processing and measurements of metal oxides and ceramics
- Optical resolution 300:1 and 150:1 with selectable focus
- Up to 85 °C ambient temperature without cooling, automatic laser switch-off at 50 °C, up to 315 °C with water cooled housing
- Selectable and scalable analog output, optional digital interfaces

Optical specifications thermoMETER CTLaserM1/M2

□ = smallest spot size (mm) / focal point (mm)

Standard Focus

1L/2L SF	150:1	20	18.3	16.5	14.8	13.1	11.3	9.6	8.5	7.3	9.8	13.5	17.2	23.4	29.6
1H/2H/H1 SF	300:1	12	10.9	9.7	8.6	7.5	6.3	5.2	4.5	3.7	5.1	7.3	9.4	13	16.5
distance in mm		0	150	300	450	600	750	900	1000	1100	1200	1350	1500	1750	2000

Close Focus

1L/2L CF2	150:1	20	13.7	7.3	1	8	15	22	36	50	64	78	92		
1H/2H/H1 CF2	300:1	12	8.2	4.3	0.5	4.7	8.8	13	21.3	29.7	38	46.3	54.7		
1L/2L CF3	150:1	20	15.3	10.7	6	1.3	6.6	12	22.6	33.3	43.9	54.6	65.2		
1H/2H/H1 CF3	300:1	12	9.2	6.4	3.5	0.7	3.9	7	13.4	19.8	26.1	32.4	38.8		
distance in mm		0	50	100	150	200	250	300	400	500	600	700	800		

Close Focus

1L/2L CF4	150:1	20	18.1	16.2	14.3	12.4	10.6	8.7	6.8	4.9	3	5.6	10.7	15.8	20.9
1H/2H/H1 CF4	300:1	12	10.8	9.7	8.5	7.3	6.2	5	3.8	2.7	1.5	3	6	9	12
distance in mm		0	50	100	150	200	250	300	350	400	450	500	600	700	800

Far Focus

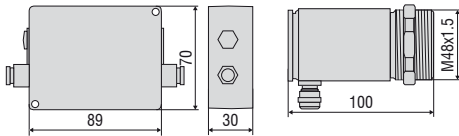
1L/2L FF	150:1	20	20.5	21	21.5	22	22.5	23	23.3	24	28.9	41.1	53.3	62.5	
1H/2H/H1 FF	300:1	12	12	12	12	12	12	12	12	12	14.7	21.3	28	33	
distance in mm		0	450	900	1350	1800	2250	2700	3000	3600	4000	5000	6000	6750	

Model	CTLM-1LSF150-C3	CTLM-1HSF300-C3	CTLM-1H1SF300-C3	CTLM-2LSF150-C3	CTLM-2HSF300-C3	CTLM-2H1SF300-C3
Optical resolution	150:1	300:1		150:1	300:1	
Temperature range ¹⁾	485 to 1050 °C	650 to 1800 °C	800 to 2200 °C	250 to 800 °C	385 to 1600 °C	490 to 2000 °C
Spectral range	1 μm			1.6 μm		
System accuracy ²⁾	± (0.3 % of reading + 2 °C)					
Repeatability ²⁾	± (0.1 % of reading + 1 °C)					
Temperature resolution	0.1 °C	0.2 °C		0.1 °C	0.2 °C	
Response time (90 % signal) ³⁾	1 ms					
Emissivity/gain ¹⁾	0.100 to 1.100					
Transmissivity/gain ¹⁾	0.100 to 1.000					
Signal processing ¹⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis					
Certificate of calibration	optional					
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K				
Outputs/analog	optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated				
Alarm output		open collector (24 V / 50 A)				
Outputs/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet				
Output impedances	current output	mA max. 500 Ω (with 5 - 36 VDC)				
	voltage output	mV min. 100 kΩ load impedance; thermocouple 20 Ω				
Inputs		programmable functional inputs for external emissivity adjustment ambient temperature compensation, trigger (reset of hold functions)				
Cable length		3 m (standard), 8 m, 15 m				
Power supply		8 to 36 VDC; max. 160 mA				
Laser		class II (635 nm), 1 mW, ON/OFF via controller or software				
Protection class		IP65 (NEMA-4)				
Ambient temperature		sensor: -20 °C to 85 °C (50 °C if Laser ON); controller: 0 °C to 85 °C				
Storage temperature		sensor: -40 °C to 85 °C; controller: -40 °C to 85 °C				
Relative humidity		10 to 95 %, non-condensing				
Vibration	sensor	IEC 68-2-6: 3 G, 11-200 Hz, any axis				
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis				
Weight		sensor: 600 g; controller: 420 g				

¹⁾ adjustable via controller or software

²⁾ ε=1, response time 1 s; ambient temperature: 23 ± 5 °C

³⁾ with dynamic adaption at low signal levels



Product identification

CTLM -	1	L	SF150-	C3
Cable length [3 m (standard) / 8 m / 15 m]				
Focus [SF / CF2 / CF3 / CF4 / FF]				
Temperature range [L / H / H1]				
Spectral range [1=1 µm / 2=1.6 µm]				
thermoMETER CTLaserM				

Accessories page 20 - 21

- Mounting bracket
- Air purge collar
- Rail mount adapter for controller
- Water cooled housing
- Interface kit
- Certificate of calibration





thermoMETER CTLaserM3

Non-contact IR temperature sensor with laser sighting for metals and composite material processing from 50 °C

- Measuring range 50 °C to 1800 °C
- 2.3 μm measuring wavelength for exact measurement in difficult emissivity conditions
- Response time of 1 ms
- Double laser marks exact spot size from 0.5 mm
- Optical resolution 300:1, 100:1 and 60:1 with selectable focus
- Up to 85 °C ambient temperature without cooling, automatic laser switch-off at 50 °C, up to 315 °C with water cooled housing

Optical specifications thermoMETER CTLaserM3

□ = smallest spot size / focal point (mm)

Standard Focus

3LSF	60:1	20	19.8	19.5	19.3	19.1	18.8	18.6	18.5	18.3	21.8	27	32.2	40.9	56.6
3HSF	100:1	20	18.8	17.5	16.3	15.1	13.9	12.6	11.8	11	13.8	18	22.3	29.3	42
3 H1/H2/H3 SF300	300:1	12	10.9	9.7	8.6	7.5	6.3	5.2	4.5	3.7	5.1	7.3	9.4	13	19.4
distance in mm		0	150	300	450	600	750	900	1000	1100	1200	1350	1500	1750	2200

Close Focus

3LCF1	60:1	20	11.2	1.4	10.2	17.8	30.4	42.9	55.5	80.7	105.9	131.1	156.2	181.4	
3HCF1	100:1	20	11	0.9	9.5	16.9	29.2	41.5	53.8	78.4	102.9	127.5	152.1	176.7	
distance in mm		0	40	85	120	150	200	250	300	400	500	600	700	800	

Close Focus

3LCF2	60:1	20	14.2	8.3	2.5	10	17.5	25	40	55	70	85	100		
3HCF2	100:1	20	13.8	7.7	1.5	8.7	15.8	23	37.3	51.7	66	80.3	94.7		
3 H1/H2/H3 CF2	300:1	12	8.2	4.3	0.5	4.7	8.8	13	21.3	29.7	38	46.3	54.7		
3LCF3	60:1	20	15.8	11.7	7.5	3.3	9.1	15	26.6	38.3	49.9	61.6	73.2		
3HCF3	100:1	20	15.5	11	6.5	2	7.5	13	24	35	46	57	68		
3 H1/H2/H3 CF3	300:1	12	9.2	6.4	3.5	0.7	3.9	7	13.4	19.8	26.1	32.4	38.8		
distance in mm		0	50	100	150	200	250	300	400	500	600	700	800		

Close Focus

3LCF4	60:1	20	18.6	17.2	15.8	14.4	13.1	11.7	10.3	8.9	7.5	10.6	16.7	22.8	28.9
3HCF4	100:1	20	18.3	16.6	14.8	13.1	11.4	9.7	7.9	6.2	4.5	7.2	12.7	18.1	23.6
3 H1/H2/H3 CF4	300:1	12	10.8	9.7	8.5	7.3	6.2	5	3.8	2.7	1.5	3	6	9	12
distance in mm		0	50	100	150	200	250	300	350	400	450	500	600	700	800

Far Field

3 H1/H2/H3 FF	300:1	12	12	12	12	12	12	12	12	12	12	14.7	21.3	28	33
distance in mm		0	450	900	1350	1800	2250	2700	3000	3600	4000	5000	6000	6750	

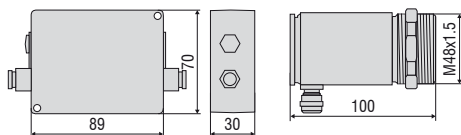
Model	CTLM-3LSF60-C3	CTLM-3HSF100-C3	CTLM-3H1SF300-C3	CTLM-3H2SF300-C3	CTLM-3H3SF300-C3
Optical resolution	60:1	100:1	300:1		
Temperature range ^{1), 2)}	50 to 400 °C	100 to 600 °C	150 to 1000 °C	200 to 1500 °C	250 to 1800 °C
Spectral range	2.3 µm				
System accuracy ³⁾	±(0.3 % of reading + 2 °C)				
Repeatability ³⁾	±(0.1 % of reading + 1 °C)				
Temperature resolution (digital)	0.1 °C				
Response time (90 % signal) ⁴⁾	1 ms				
Emissivity/gain ¹⁾	0.100 to 1.100				
Transmissivity/gain ¹⁾	0.100 to 1.100				
Signal processing ¹⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis				
Certificate of calibration	optional				
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K			
Outputs/analog	optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated			
Alarm output		open collector (24 V / 50 A)			
Outputs/digital		USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet			
Output impedances	current output	mA max. 500 Ω (with 5 - 36 VDC)			
	voltage output	mV min. 100 kΩ load impedance; thermocouple 20 Ω			
Inputs		programmable functional inputs for external emissivity adjustment ambient temperature compensation, trigger (reset of hold functions)			
Cable length		3 m (standard), 8 m, 15 m			
Power supply		8 to 36 VDC; max. 160 mA			
Laser		class II (635 nm), 1 mW, ON/OFF via controller or software			
Protection class		IP65 (NEMA-4)			
Ambient temperature		sensor: -20 °C to 85 °C (50 °C if Laser ON); controller: 0 °C to 85 °C			
Storage temperature		sensor: -40 °C to 85 °C; controller: -40 °C to 85 °C			
Relative humidity		10 to 95 %, non-condensing			
Vibration	sensor	IEC 68-2-6: 3 G, 11-200 Hz, any axis			
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis			
Weight		sensor: 600 g; controller: 420 g			

¹⁾ adjustable via controller or software

²⁾ target temperature > sensor temperature + 25 °C

³⁾ ε=1, response time 1 s; ambient temperature: 23 ±5 °C

⁴⁾ with dynamic adaption at low signal levels



Product identification

CTLM -	3	L	SF60-	C3
Cable length [3 m (standard) / 8 m / 15 m]				
Focus [SF60/100 / CF1 / CF2 / CF3 / CF4]				
Temperature range [L / H / H1 / H2 / H3]				
Spectral range [2.3 µm]				
thermoMETER CTLaserM				

Accessories page 20 - 21

- Mounting bracket
- Air purge collar
- Rail mount adapter for controller
- Water cooled housing
- Interface kit
- Certificate of calibration





thermoMETER CTLaserM5

Non-contact IR temperature sensor with laser sighting for exact temperature measurement of molten metals

- Measuring range from 1000 °C to 2000 °C
- Short measuring wavelength of 525 nm minimizes errors due to emissivity uncertainty and misadjustment
- Response time of 1 ms
- Double laser marks the exact spot size from 1 mm
- For metal processing and measurements of metal oxides and ceramics
- Optical resolution 150:1 with selectable focus
- Up to 85 °C ambient temperature without cooling, automatic laser switch-off at 50 °C
- Selectable and scalable analog output, optional digital interfaces

Optical specifications thermoMETER CTLaserM5

□ = smallest spot size / focal point (mm)

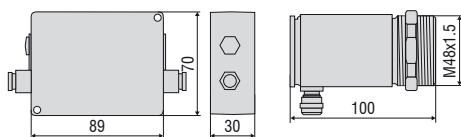
Standard Focus															
1L/2L SF	150:1	20	18.3	16.5	14.8	13.1	11.3	9.6	8.5	7.3	9.8	13.5	17.2	23.4	29.6
distance in mm		0	150	300	450	600	750	900	1000	1100	1200	1350	1500	1750	2000
Far Focus															
1L/2L FF	150:1	20	20.5	21	21.5	22	22.5	23	23.3	24	28.9	41.1	53.3	62.5	
distance in mm		0	450	900	1350	1800	2250	2700	3000	3600	4000	5000	6000	6750	

Model		CTLM-5SF150-C3
Optical resolution		150:1
Temperature range ¹⁾		1000 to 2000 °C
Spectral range		525 nm
System accuracy ²⁾		±1 % of reading (≤ 1100 °C) ±0.3 % of reading +2 °C (> 1100 °C)
Repeatability ²⁾		±0.5 % of reading (≤ 1100 °C) ±0.1 % of reading +1 °C (> 1100 °C)
Temperature resolution		0.2 °C
Response time (90 % signal) ³⁾		1 ms
Emissivity/gain ¹⁾		0.100 to 1.100
Transmissivity/gain ¹⁾		0.100 to 1.000
Signal processing ¹⁾		peak hold, valley hold, average; extended hold function with threshold and hysteresis
Certificate of calibration		optional
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K
Outputs/analog	optional	relays: 2 x 60 VDC/42 VAC, ϵ_{eff} : 0.4 A; electrically isolated
Alarm output		open collector (24 V / 50 A)
Outputs/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet
Output impedances	current output	mA max. 500 Ω (with 5 - 36 VDC)
	voltage output	mV min. 100 k Ω load impedance; thermocouple 20 Ω
Inputs		programmable functional inputs for external emissivity adjustment ambient temperature compensation, trigger (reset of hold functions)
Cable length		3 m (standard), 8 m, 15 m
Power supply		8 to 36 VDC; max. 160 mA
Laser		class II (635 nm), 1 mW, ON/OFF via controller or software
Protection class		IP65 (NEMA-4)
Ambient temperature		sensor: -20 °C to 85 °C (50 °C if Laser ON); controller: 0 °C to 85 °C
Storage temperature		sensor: -40 °C to 85 °C; controller: -40 °C to 85 °C
Relative humidity		10 to 95 %, non-condensing
Vibration	sensor	IEC 68-2-6: 3 G, 11-200 Hz, any axis
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis
Weight		sensor: 600 g; controller: 420 g

¹⁾ adjustable via controller or software

²⁾ $\epsilon = 1$, response time 1 s; ambient temperature: 23 ± 5 °C

³⁾ with dynamic adaption at low signal levels



Product identification

CTLM -	5	SF150-	C3
Cable length [3 m (standard) / 8 m / 15 m]			
Focus [SF / FF]			
Spectral range [525 nm]			
thermoMETER CTLaserM			

Accessories page 20 - 21

- Mounting bracket
- Air purge collar
- Rail mount adapter for controller
- Water cooled housing
- Interface kit
- Certificate of calibration





thermoMETER CTLaserCOMBUSTION

Non-contact IR temperature sensor with laser sighting for measurements through flames and of flame gases in combustion processes from 200 °C to 1450 °C (optional up to 1650 °C).

The CTLC-4 is ideally suitable to monitor workpieces inside ovens, to measure inside chemical reactors and to inspect the brick temperature in combustion chambers.

- Measuring range 200 °C to 1450 °C
- Double laser marks exact spot size from 1.6 mm
- Usable in all modern applications where "size of spot matters"
- Optical system 45:1 with selectable focus
- Up to 85 °C ambient temperature without cooling
- Automatic laser switch-off at 50 °C
- Cooling and protection accessories for harsh environmental conditions

Optical specifications thermoMETER CTLasercombustion

□ = smallest spot size / focal point (mm)

Standard Focus

SF45 lens	45:1	20	20.8	21.7	22.5	23.4	24.2	25	25.9	26.7	32.5	38.4	50.1	61.7	73.4		
distance in mm		0	150	300	450	600	750	900	1050	1200	1350	1500	1800	2100	2400		

Close Focus

CF1 lens	45:1	20	9.5	6.9	1.6	10.9	26.3	41.7	57.1	72.6	88	103.4	118.9	134.3	165.1	196	226.9
CF2 lens	45:1	20	15.6	14.5	12.3	8.9	3.4	11.2	19	26.8	34.6	42.4	50.2	58	73.6	89.2	104.8
CF3 lens	45:1	20	16.9	16.1	14.6	12.3	8.4	4.5	10.6	16.8	22.9	29	35.1	41.3	53.5	65.8	78
CF4 lens	45:1	20	19.1	18.9	18.4	17.8	16.7	15.6	14.4	13.3	12.2	11.1	10	13.3	20	26.7	33.3
distance in mm		0	40	50	70	100	150	200	250	300	350	400	450	500	600	700	800

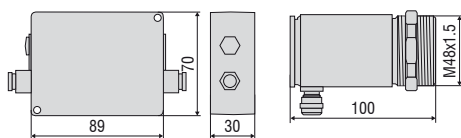
Model	CTLC-4SF45-C3		CTLC-2SF45-C3	CTLC-6SF45-C3
Optical resolution	45:1		45:1	45:1
Temperature range ¹⁾	200 °C to 1450 °C (optional 400 °C to 1650 °C)			
Spectral range	3.9 μm		4.24 μm	4.64 μm
Fields of application	through flames to monitor workpieces inside ovens, to measure inside chemical reactors, to observe the brick temperature in combustion chambers		CO ₂ flame gases in combustion processes, garbage burning or processes inside chemical reactors	CO flame gases in combustion processes, garbage burning or processes inside chemical reactors
System accuracy ^{3), 4)}	±1 %			
Repeatability ³⁾	±0.5 % or ±0.5 °C			
Temperature resolution (digital)	0.1 °C			
Response time (90% signal) ²	10 ms			
Emissivity/gain ¹⁾	0.100 to 1.100			
Transmissivity/gain ¹⁾	0.100 to 1.000			
Signal processing ¹⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis			
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V; thermocouple J, K		
	channel 2	sensor temperature (-20 °C to 180 °C as 0 to 5 V/10 V), alarm output		
Alarm output	open collector (24 V / 50 A)			
Optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated			
Outputs/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet		
Output impedances	current output	mA max. 500 Ω (with 8 to 36 VDC)		
	voltage output	mV min. 100 kΩ load impedance, thermocouple 20 Ω		
Inputs	programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger			
Cable length	3 m (standard), 8 m, 15 m			
Power supply	8 to 36 VDC; max. 160 mA			
Laser	class II (635 nm), 1 mW, ON/OFF via controller or software			
Protection class	IP65 (NEMA-4)			
Ambient temperature	sensor: -20 °C to 85 °C (50 °C if Laser ON); controller: 0 °C to 85 °C			
Storage temperature	-40 °C to 85 °C			
Relative humidity	10 to 95 %, non-condensing			
Vibration	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis			
Shock	IEC 68-2-27: 50 G, 11 ms, any axis			
Weight	sensor: 600 g; controller: 420 g			

¹⁾ adjustable via programming keys or software

²⁾ with dynamic adaption at low signal levels

³⁾ ambient temperature 23 ± 5 °C; whichever is greater; object temperature ≥ 0 °C

⁴⁾ ε = 1, response time 1 s



Product identification

CTLC -	4	SF45-	C3
Cable length [3 m (standard) / 8 m / 15 m]			
Focus [SF45 / CF1 / CF2 / CF3 / CF4]			
Spectral range [4 = 3.9 µm / 2 = 4.24 µm / 6 = 4.64 µm]			
thermoMETER CTLaserCOMBUSTION			

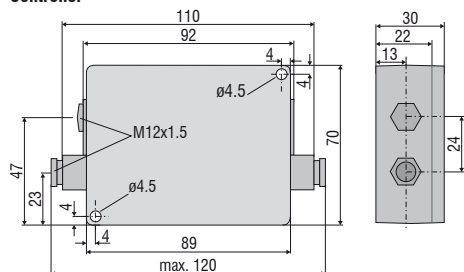
Accessories page 20 - 21

- Mounting bracket
- Air purge collar
- Rail mount adapter for controller
- Water cooled housing
- Interface kit
- Certificate of calibration

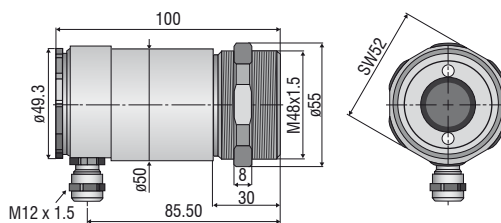


CTLaser / CTLaserFAST / CTLaserGLASS / CTLaserM1/M2/M3/M5 / CTLaserCOMBUSTION

Controller

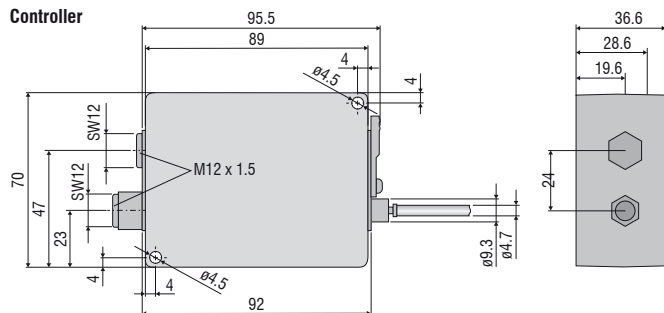


Sensor

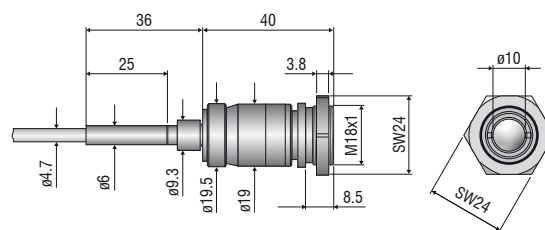


CTRatioM1/M2

Controller



Sensor



TM-FB-CTL Mounting bracket (fixed);
included in CTL scope of supply



TM-AB-CTL Mounting bracket (adjustable)



TM-W-CTL Water cooled housing and
air purge collar TM-AP-CTL,
mounted on adjustable mounting bracket TM-AB-CTL



TM-W-CTL Water cooled housing



TM-AP-CTL Air purge collar



TM-CJA-CTL Cooling Jacket Advanced - cooling jacket suitable for ambient temperatures up to 315 °C (mounting bracket is included in the scope of delivery)



TM-PF-CTL and TM-MF-CTL mounting flange M48x1.5 for directly mounting a CTL sensor



TM-RM-CTL Furnace wall mount accessory for CTLaser / CTRatio: TM-MF-CTL, TM-PF-CTL, TM-AST300-CTL and TM-PA-CTL



TM-AP-CTR Air purge collar

Mechanical accessories		
Art. No.	Model	
2970238	TM-AB-CTL	Mounting bracket, adjustable, stainless steel
2970239	TM-AP-CTL	Air purge collar, stainless steel
2970241	TM-RAIL-CTL	Rail mount adapter for CTLaser controller
2970242	TM-COV-CTL	Closed cover for controller
2970243	TM-MN-CTL	Mounting nut, stainless steel (spare)
2970244	TM-FB-CTL	Mounting bracket, fixed, stainless steel (spare)
2970298	TM-A20UN-CTL	Screw adapter M48x1.5 on 20UN-2A screw including mounting nut

High temperature accessories		
2970240	TM-W-CTL	Water cooled housing, stainless steel, for ambient temperatures up to 175 °C
2970369	TM-MF-CTL	Mounting flange M48x1.5 for TM-PF-CTL
2970370	TM-AST300-CTL	Reflection protection tube M48x1.5, 300 mm length
2970371	TM-PA-CTL	Pipe adapter M48x1.5
2970372	TM-RM-CTL	Furnace wall mount accessory for CTL (TM-MF-CTL, TM-AST300-CTL and TM-PA-CTL)
2970412	TM-PF-CTL	Pipe flange M48x1.5 for directly mounting a CTL sensor
2970487	TM-CJA-CTL	Cooling Jacket Advanced - universal cooling jacket for CSLaser, CTLaser and CTVideo / CSVideo up to 315 °C (TM-CJA-FP-CTL front attachment is additionally required)
2970493	TM-CJA-FP-CTL	Front attachment for CTL, CSL

Calibration		
2970253	TM-CERT-CTL	Certificate of calibration
2970324	TM-HTCERT-CTL	Certificate of calibration for CTLaser M1-/M2-/M3-/M5-/G-sensors

Interfaces		
2970728	TM-USBK-CTL	USB-Interface-bard, cable with Micro-USB plug and adapter for USB-C- and USB-A, CompactConnect software (as download link), Quick reference, second cable gland for controller
2970246	TM-RS232K-CTL	RS232 interface, computer cable, CompactConnect software, second cable gland for controller
2970338	TM-RS485USBK-CTL	RS485-USB-adapter, incl. PC cable, CompactConnect software and CTmulti, second cable gland for use with interface board TM-RS485B-CTL
2970248	TM-RS485B-CTL	RS485 interface board incl. second cable gland
2970249	TM-CANK-CTL	CAN-Bus interface; protocol: CANopen Presets: module address20 (14H), 250 kBaud, 0-60 °C
2970250	TM-PFBDPK-CTL	Profibus-DPV1 interface with plug-in connection
2970251	TM-ETHNK-CTL	Ethernet-Kit: interface board, external Ethernet adapter, CompactConnect software, second cable gland
2970252	TM-RI-CTL	Relay interface: two electrically isolated relays, 60 VDC/ 42 VAC _{eff} , 0.4 A

Sensor cables and high temperature cables for CTLaser		
2970374	TM-CONK-CTL	Connector-Kit for cables with connector
4800254.003	TM-CB3C-CTL	Sensor cable with connector (3 m)
4800254.003H	TM-CB3HC-CTL	High-temperature sensor cable (up to 180 °C) with connector (3 m)
4800254.008	TM-CB8C-CTL	Sensor cable with connector (8 m)
4800254.008H	TM-CB8HC-CTL	High-temperature sensor cable (up to 180 °C) with connector (8 m)
4800254.015	TM-CB15C-CTL	Sensor cable with connector (15 m)
4800254.015H	TM-CB15HC-CTL	High-temperature sensor cable (up to 180 °C) with connector (15 m)

CTRatio		
Art. No.	Model	
2970348	TM-FB-CTR	Mounting bracket, stainless steel, adjustable in one axis
2970395	TM-AP-CTR	Air purge collar, stainless steel
2970373	TM-RM-CTR	Furnace wall mount
2970351	TM-CERT-CTR	Certificate of calibration



thermoMETER CT

Non-contact IR temperature sensor for common applications

- Measuring range from -50 °C to 975 °C
- One of the smallest 22:1 infrared sensors worldwide
- Up to 180 °C ambient temperature without cooling
- Separate controller with programming keys and backlit display
- Selectable and scalable analog output, optional digital interfaces
- Exchangeable sensors
- Best price sensor

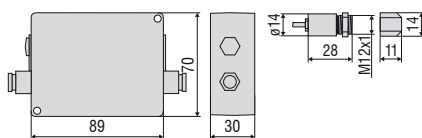
Optical specifications thermoMETER CT
□ =smallest spot size / focal point (mm)

Standard Focus																
SF02	2:1	5	53.8	102.5	151.3	200	251.3	302.5	353.8	405						
	distance in mm	0	100	200	300	400	500	600	700	800						
SF15	15:1	6.5	10.3	14.1	17.9	21.7	25.4	30.9	37.1	43.3	49.5	55.8	62	68.2	74.4	80.7
	distance in mm	0	75	150	225	300	375	450	525	600	675	750	825	900	975	1050
SF22	22:1	6.5	10.9	15.2	19.5	23.9	28.3	32.6	37	41.3	45.7	50				
	distance in mm	0	110	220	330	440	550	660	770	880	990	1100				
Close Focus (with optionally available CF lens)																
CF02	2:1	5	3.9	2.8	2.5	4.8	6.4	8	11.3	14.6						
	distance in mm	0	10	20	23	30	35	40	50	60						
CF15	15:1	6.5	3.7	0.8	4.4	8.1	11.8	15.4	19.1	22.7						
CF22	22:1	7	3.8	0.6	4.4	8.2	12	15.8	19.6	23.4						
	distance in mm	0	5	10	15	20	25	30	35	40						

Model		CT-SF02-C3	CT-SF15-C3	CT-SF22-C3
Optical resolution		2:1	15:1	22:1
Temperature range ¹⁾		-50 °C to 600 °C	-50 °C to 600 °C	-50 °C to 975 °C
Spectral range		8 to 14 μm		
System accuracy ²⁾		± 1 % or ± 1 °C		
Repeatability ²⁾		±0.5 % or ±0.5 °C		
Temperature resolution		0.1 °C		
Response time		150 ms (95 %)		
Emissivity/gain ¹⁾		0.100 to 1.100		
Transmissivity/gain ¹⁾		0.100 to 1.100		
Signal processing ¹⁾		peak hold, valley hold, average; extended hold function with threshold and hysteresis		
Certificate of calibration		optional		
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K		
	channel 2	sensor temperature (-20 to 180 °C as 0 to 5 V or 0 to 10 V), alarm output		
Outputs/analog	optional	relays: 2 x 60 VDC/42 VAC; 0.4 A; electrically isolated		
Outputs/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet		
Output impedances	current output	mA max. 500 Ω (with 8 to 36 VDC)		
	voltage output	min. 100 kΩ load impedance, thermocouple 20 Ω		
Inputs		programmable functional inputs for external emissivity adjustment ambient temperature compensation, trigger (reset of hold functions)		
Cable length		1 m, 3 m (standard), 8 m, 15 m		
Power supply		8 to 36 VDC; max. 100 mA		
Protection class		IP65 (NEMA-4)		
Ambient temperature	sensor	-20 °C to 130 °C	-20 °C to 180 °C	
	controller	0 °C to 85 °C		
Storage temperature	sensor	-40 °C to 130 °C	-40 °C to 180 °C	
	controller	-40 °C to 85 °C		
Relative humidity		10 to 95 %, non-condensing		
Vibration	sensor	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis		
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis		
Weight		sensor: 40 g; controller: 420 g		

¹⁾ adjustable via programming keys or software

²⁾ ambient temperature 23 ±5 °C; whichever is greater



Product identification

CT-	SF02-	C3
		Cable length [1 m / 3 m (standard) / 8 m / 15 m]
		Focus [SF02 / SF15 / SF22]
		thermoMETER CT

Accessories page 40 - 43

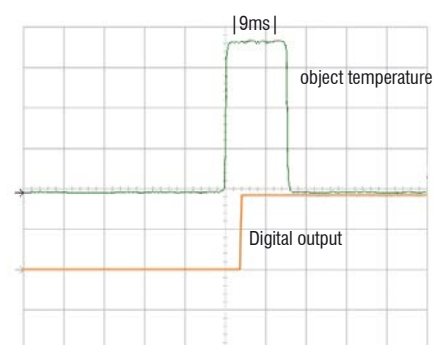
- Ancillary CF lens
- Protective window
- Mounting bracket / mounting bolt
- Air purge collar
- Right angle mirror
- Rail mount adapter for controller
- Massive housing
- Protective tube
- Laser sighting aid
- Digital-interface kits
- Accessories kit for use in Ex areas
- Certificate of calibration



thermoMETER CTfast

IR temperature sensor with extremely short response time

- Measuring range from -50 °C to 975 °C
- One of the smallest infrared sensors worldwide with extremely short response times from 3 ms (50 % signal) to 6ms (90 % signal)
- Up to 120 °C ambient temperature without cooling
- Fast and scalable analog output with intelligent real-time data processing
- Separate controller with programming keys and backlit display



Switching output with a threshold of 50 % of the signal (SF15 model)

Optical specifications thermoMETER CTfast

□ = smallest spot size / focal point (mm)

Standard Focus

SF15	15:1	6.5	11.6	16.6	21.7	26.7	35	43.3	51.6	59.9			
SF25	25:1	6.5	7.3	8	12	16	20	24	28	32	36	40	44
distance in mm		0	100	200	300	400	500	600	700	800	900	1000	1100

Close Focus (with optionally available CF lens)

CF15	15:1	7	3.9	0.8	4.7	8.6	12.5	16.4	20.3	24.2			
distance in mm		0	5	10	15	20	25	30	35	40			
CF25	25:1	6.5	3.5	0.5	4	7.5	11	15.4	19.8	24.1	28.5		
distance in mm		0	4	8	12	16	20	25	30	35	40		

Model	CTF-SF15-C3	CTF-SF25-C3
Optical resolution	15:1	25:1
Temperature range ¹⁾	-50 °C to 975 °C	
Spectral range	8 to 14 µm	
System accuracy ²⁾	± 1 % or ± 2 °C	
Repeatability ²⁾	± 0.75 % or ± 0.75 °C	
Temperature resolution ^{3), 4)}	0.2 °C	0.4 °C
Response time ⁵⁾	9 ms (90 %) at analog output 4 ms (50 %) at digital output	6 ms (90 %) at analog output; 3 ms (50 %) at digital output
Emissivity/gain ¹⁾	0.100 to 1.100	
Transmissivity/gain ¹⁾	0.100 to 1.100	
Signal processing ¹⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis	
Certificate of calibration	optional	
Outputs/analog	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K	
Alarm output	open collector (24 V / 50 A)	
Outputs/digital	standard: 0/10 V (10 mA); optional: relays 2 x 60 VDC/42 VAC; 0.4 A; electrically isolated	
Digital Interface	optional USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet	
Output impedances	current output mA max. 500 Ω (with 8 to 36 VDC)	
	voltage output min. 100 kΩ load impedance, thermocouple 20 Ω	
Inputs	programmable functional inputs for external emissivity adjustment ambient temperature compensation, trigger (reset of hold functions)	
Cable length	1 m, 3 m (standard), 8 m, 15 m	
Power supply	8 to 36 VDC; max. 100 mA	
Protection class	IP65 (NEMA-4)	
Ambient temperature	sensor: -20 °C to 120 °C; controller: 0 °C to 85 °C	
Storage temperature	sensor: -40 °C to 120 °C; controller: -40 °C to 85 °C	
Relative humidity	10 to 95 %, non-condensing	
Vibration	sensor	IEC 68-2-6: 3 G, 11-200 Hz, any axis
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis
Weight	sensor: 40 g; controller: 420 g	

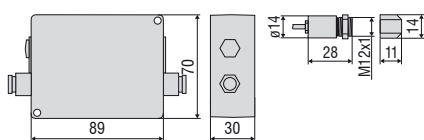
¹⁾ adjustable via programming keys or software

²⁾ ambient temperature 23 ± 5 °C; whichever is greater with dynamic noise compression

³⁾ temperature of the object ≥ 20 °C

⁴⁾ with dynamic adaption at low signal levels

⁵⁾ with time constant of 100 ms with adaptive averaging T_{0.95} 25 °C



Product identification

CTF-	SF15-	C3
		Cable length [1 m / 3 m (standard) / 8 m / 15 m]
		Focus [SF15 / SF25]
		thermoMETER CTfast

Accessories page 40 - 43

- Ancillary CF lens
- Protective window
- Mounting bracket / mounting bolt
- Air purge collar
- Right angle mirror
- Rail mount adapter for controller
- Massive housing
- Protective tube
- Laser sighting aid
- Digital-interface kits
- Certificate of calibration



thermoMETER CThot

Housed IR temperature sensor for harsh ambient conditions

- Measuring range from -40 °C to 975 °C
- Up to 250 °C ambient temperature without cooling
- Pressure-resistant sensor head up to 10 bar (autoclave applications)
- Integrated high temperature cable
- For a number of applications in dryers, kilns, heat treatment in the processing of metals, plastics, textiles and in the semiconductor industry
- Narrow-focused lenses enable diagonal alignment to the target (avoids influence by material thickness)
- Selectable and scalable analog output, optional digital interfaces

Optical specifications thermoMETER CThot

□ = smallest spot size / focal point (mm)

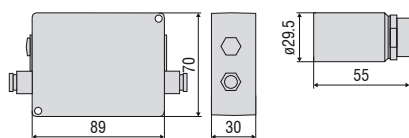
Standard Focus											
SF02	2:1	5	53.8	102.5	151.3	200	251.3	302.5	353.8	405	
SF10	10:1	6.5	14.9	23.3	31.6	40	51.6	63.3	74.9	86.5	
distance in mm		0	100	200	300	400	500	600	700	800	
Close Focus (integrated CF lens)											
CF10	10:1	6.5	4.8	3	9.3	17.3	25.2	33.1	41	48.9	56.8
distance in mm		0	15	30	50	75	100	125	150	175	200

Note: Do not use any external CF lens!

Model	CTH-SF02-C3H	CTH-SF10-C3H
Optical resolution	2:1	10:1
Temperature range ¹⁾	-40 to 975 °C	
Spectral range	8 to 14 µm	
System accuracy ²⁾	± 1 % or ± 1.5 °C	
Repeatability ²⁾	± 0.5 % or ± 0.5 °C	
Temperature resolution	0.25 °C	
Response time	100 ms	
Emissivity/gain ¹⁾	0.100 to 1.100	
Transmissivity/gain ¹⁾	0.100 to 1.100	
Signal processing ¹⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis	
Certificate of calibration	optional	
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K
	channel 2	sensor temperature (-20 to 250 °C as 0 to 5 V or 0 to 10 V), alarm output
Outputs/analog	optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated
Ausgänge/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet
Output impedances	current output	mA max. 500 Ω (with 5 to 36 VDC)
	voltage output	min. 100 kΩ load impedance, thermocouple 20 Ω
Inputs	programmable functional inputs for external emissivity adjustment ambient temperature compensation, trigger (reset of hold functions)	
Cable length	3 m (standard), 8 m, 15 m	
Power supply	8 to 36 VDC; max. 100 mA	
Protection class	IP65 (NEMA-4)	
Ambient temperature	sensor: -20 °C to 250 °C; controller: 0 °C to 85 °C	
Storage temperature	sensor: -40 °C to 250 °C; controller: -40 °C to 85 °C	
Relative humidity	10 to 95 %, non-condensing	
Vibration	sensor	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis
Weight	sensor: 40 g (without massive housing), 200 g (with solid case); controller: 420 g	

¹⁾ adjustable via programming keys or software

²⁾ ambient temperature 23 ± 5 °C and object temperatures ≥ 20 °C; whichever is greater



Product identification

CTH-	SF02-	C3H
		Length high temperature cable [3 m (standard) / 8 m / 15 m]
		Focus [SF02 / SF10 / CF10]
		thermoMETER CThot

Accessories page 40 - 43

- Rail mount adapter for controller
- Digital-interface kits
- Certificate of calibration



thermoMETER CTM1/M2

Miniaturized temperature sensor with 1.0 and 1.6 μm measuring wavelength

- Measuring range from 250 °C to 2200 °C
- Up to 125 °C ambient temperature without cooling
- For metal processing such as welding, soldering, forming, sintering and for measurements of metal oxides and ceramics
- Extended compensation for measuring errors using short measuring wavelength (e.g. with emissivity changes or misadjustment)
- High compatibility with electromagnetic fields e.g. with induction welding
- Compact sensor for installation in confined spaces
- Selectable and scalable analog output, optional digital interfaces

Optical specifications thermoMETER CTM1/M2

□ = smallest spot size / focal point (mm)

Standard Focus										
1SF40/2SF40	40:1	6.5	10.7	14.9	19.1	23.3	27.4	31.6	35.8	40
1SF75/2SF75	75:1	6.5	8.4	10.2	12.1	13.9	15.8	17.6	19.5	21.3
distance in mm		0	200	400	600	800	1000	1200	1400	1600
Close Focus (integrated CF lens)										
1CF40/2CF40	40:1	6.5	4.4	2.7	6	10.2	14.4	18.6	22.8	27
1CF75/2CF75	75:1	6.5	3.8	1.5	4.4	8	11.7	15.3	19	22.6
distance in mm		0	60	110	150	200	250	300	350	400

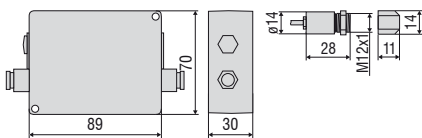
Model	CTM-1SF40-C3	CTM-1SF75-C3	CTM-1SF75H1-C3	CTM-2SF40-C3	CTM-2SF75-C3	CTM-2SF75H1-C3
Optical resolution	40:1	75:1		40:1	75:1	
Temperature range ¹⁾	485 to 1050 °C	650 to 1800 °C	800 to 2200 °C	250 to 800 °C	385 to 1600 °C	490 to 2000 °C
Spectral range	1.0 μm			1.6 μm		
System accuracy ^{2), 3)}	±(0.3 % of reading + 2 °C)					
Repeatability ²⁾	±(0.1 % of reading + 1 °C)					
Temperature resolution	0.1 °C					
Response time ⁴⁾	1 ms (90 %)					
Emissivity/gain ¹⁾	0.100 to 1.100					
Transmissivity/gain ¹⁾	0.100 to 1.100					
Signal processing ¹⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis					
Certificate of calibration	optional					
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K				
Outputs/analog	optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated				
Alarm output		open collector (24 V / 50 A)				
Outputs/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet				
Output	current output	mA max. 500 Ω (with 8 to 36 VDC)				
impedances	voltage output	min. 100 kΩ load impedance, thermocouple 20 Ω				
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)				
Cable length		3 m (standard), 8 m, 15 m				
Power supply		8 to 36 VDC; max. 100 mA				
Protection class		IP65 (NEMA-4)				
Ambient temperature	sensor	-20 °C to 100 °C			-20 °C to 125 °C	
	controller	0 °C to 85 °C				
Storage temperature	sensor	-40 °C to 100 °C			-40 °C to 125 °C	
	controller	-40 °C to 85 °C				
Relative humidity		10 to 95 %, non-condensing				
Vibration	sensor	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis				
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis				
Weight		sensor: 40 g; controller: 420 g				

¹⁾ adjustable via programming keys or software

²⁾ ambient temperature: 23 ± 5 °C

³⁾ ε=1, response time 1 s

⁴⁾ with dynamic adaption at low signal levels



Product identification

CTM-	1	SF40-	C3
Cable length [3 m (standard) / 8 m / 15 m]			
Focus [SF40 / SF75 / CF40 / CF75]			
Spectral range [1=1 µm / 2=1.6 µm]			
thermoMETER CTM			

Accessories page 40 - 43

- Protective window
- Mounting bracket / mounting bolt
- Air purge collar
- Right angle mirror
- Rail mount adapter for controller
- Massive housing
- Protective tube
- Laser sighting aid
- Digital-interface kits
- Certificate of calibration



thermoMETER CTM3

Miniaturized temperature sensor with $2.3\ \mu\text{m}$ measuring wavelength for measurements from $50\ ^\circ\text{C}$

- Measuring range from $50\ ^\circ\text{C}$ to $1800\ ^\circ\text{C}$
- Up to $85\ ^\circ\text{C}$ ambient temperature without cooling
- For metal and composite processing
- Extended compensation for measuring errors using short measuring wavelength (e.g. with emissivity changes or misadjustment)
- High compatibility with electromagnetic fields e.g. with induction welding
- Compact sensor for installation in confined spaces
- Selectable and scalable analog output, optional digital interfaces

Optical specifications thermoMETER CTM3

□ = smallest spot size / focal point (mm)

Standard Focus

3SF22	22:1	6.5	14.4	22.3	30.2	38.1	46	55.1	65.4	75.7	
3SF33	33:1	6.5	11.8	17	22.3	27.5	32.8	38	43.3	48.5	
3SF75H1/H2/H3	75:1	6.5	8.4	10.2	12.1	13.9	15.8	17.6	19.5	21.3	
distance in mm		0	200	400	600	800	1000	1200	1400	1600	

Close Focus (integrated CF lens)

3CF22	22:1	6.5	6	5.4	5	9.2	14.4	19.6	24.9	30.1	35.3
3CF33	33:1	6.5	5.4	4.2	3.4	7	11.5	16	20.5	25	29.5
distance in mm		0	40	80	110	150	200	250	300	350	400

Close Focus (integrated CF lens)

3CF75H1/H2/H3	75:1	6.5	3.8	1.5	4.4	8	11.7	15.3	19	22.6	
distance in mm		0	60	110	150	200	250	300	350	400	

Model		CTM-3SF22-C3	CTM-3SF33-C3	CTM-3SF75H1-C3	CTM-3SF75H2-C3	CTM-3SF75H3-C3
Optical resolution ¹⁾		22:1	33:1	75:1	75:1	75:1
Temperature range ^{2), 3)}		50 to 400 °C	100 to 600 °C	150 to 1000 °C	200 to 1500 °C	250 to 1800 °C
Spectral range		2.3 µm				
System accuracy ^{4), 5)}		±(0.3 % of reading +2 °C)				
Repeatability ⁴⁾		±(0.1 % of reading +1 °C)				
Temperature resolution (digital)		0.1 °C				
Response time ⁶⁾		1 ms (90 %)				
Emissivity/gain ²⁾		0.100 to 1.100				
Transmissivity ²⁾		0.100 to 1.100				
Signal processing ²⁾		peak hold, valley hold, average; extended hold function with threshold and hysteresis				
Certificate of calibration		optional				
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K				
Outputs/analog	optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated				
Alarm output		open collector (24 V / 50 A)				
Outputs/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet				
Output impedances	current output	mA max. 500 Ω (with 8 to 36 VDC)				
	voltage output	min. 100 kΩ load impedance, thermocouple 20 Ω				
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)				
Cable length		3 m				
Power supply		8 to 36 VDC; max. 100 mA				
Protection class		IP65 (NEMA-4)				
Ambient temperature		sensor: -40 °C to 85 °C; controller: 0 °C to 85 °C				
Storage temperature		sensor: -40 °C to 125 °C; controller: -40 °C to 85 °C				
Relative humidity		10 to 95 %, non-condensing				
Vibration	sensor	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis				
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis				
Weight		sensor: 40 g; controller: 420 g				

¹⁾ 90 % energy

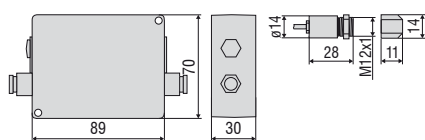
²⁾ adjustable via programming keys or software

³⁾ target temperature > sensor temperature + 25 °C

⁴⁾ ambient temperature: 23 ± 5 °C

⁵⁾ ε=1, response time 1 s

⁶⁾ with dynamic adaption at low signal levels



Product identification

CTM-	3	SF22-	C3
			Cable length [3 m]
			Focus [SF22 / SF33 / SF75 / CF22 / CF33 / CF75]
			Spectral range [2.3 µm]
thermoMETER CTM			

Accessories page 40 - 43

- Protective window
- Mounting bracket / mounting bolt
- Air purge collar
- Right angle mirror
- Rail mount adapter for controller
- Massive housing
- Protective tube
- Laser sighting aid
- Digital-interface kits
- Certificate of calibration



thermoMETER CTM-3XL

IR sensor for measurements in laser processing, laser welding and laser soldering

- Measuring range from 100 °C to 1800 °C
- Up to 85 °C ambient temperature without cooling
- Special blocking filter against laser radiation of all conventional diode, semiconductor and CO₂ lasers (from VIS to 1800 nm with 10.6 μm)
- Far Focus version for use with laser collimators
- Measuring wavelength of 2.3 μm minimizes errors due to emissivity uncertainty and misadjustment
- Sensor measures through glass lenses/sight glasses

Optical specifications thermoMETER CTM-3XL

□ = smallest spot size / focal point (mm)

Standard Focus

SF100	100:1	20	18.8	17.5	16.3	15.1	13.9	12.6	11.8	11	13.8	18	22.3	29.3	42
SF300 H1/H2/H3	300:1	20	17.8	15.6	13.3	11.1	8.9	6.7	5.2	3.7	5.9	9.1	12.3	17.7	27.4
distance in mm		0	150	300	450	600	750	900	1000	1100	1200	1350	1500	1750	2200

Close Focus

CF1-100	100:1	20	11	0.9	9.5	16.9	29.2	41.5	53.8	78.4	102.9	127.5	152.1	176.7	
distance in mm		0	40	85	120	150	200	250	300	400	500	600	700	800	

Close Focus

CF2-100	100:1	20	13.8	7.7	1.5	8.7	15.8	23	37.3	51.7	66	80.3	94.7		
CF2-300 H1/H2/H3	300:1	20	13.5	7	0.5	7.3	14.2	21	34.7	48.3	62	75.7	89.3		
CF3-100	100:1	20	15.5	11	6.5	2	7.5	13	24	35	46	57	68		
CF3-300 H1/H2/H3	300:1	20	15.2	10.4	5.5	0.7	5.9	11	21.4	31.8	42.1	52.5	62.8		
distance in mm		0	50	100	150	200	250	300	400	500	600	700	800		

Close Focus

CF4-100	100:1	20	18.3	16.6	14.8	13.1	11.4	9.7	7.9	6.2	4.5	7.2	12.7	18.1	23.6
CF4-300 H1/H2/H3	300:1	20	17.9	15.9	13.8	11.8	9.7	7.7	5.6	3.6	1.5	3.9	8.7	13.4	18.2
distance in mm		0	50	100	150	200	250	300	350	400	450	500	600	700	800

Far Focus

FF100	100:1	20	22	24	26	28	30	32	33.3	36	42.2	57.8	73.3	85	
FF300 H1/H2/H3	300:1	20	19	18	17	16	15	14	13.3	12	15.6	24.4	33.3	40	
distance in mm		0	450	900	1350	1800	2250	2700	3000	3600	4000	5000	6000	6750	

Model		CTM-3SF100XL-C3	CTM-3SF300XLH1-C3	CTM-3SF300XLH2-C3	CTM-3SF300XLH3-C3
Optical resolution ¹⁾		100:1	300:1	300:1	300:1
Temperature range ^{2), 3)}		100 to 600 °C	150 to 1000 °C	200 to 1500 °C	250 to 1800 °C
Spectral range		2.3 μm			
System accuracy ^{4), 5)}		± (0.3 % of reading +2 °C)			
Repeatability ⁴⁾		± (0.1 % of reading +1 °C)			
Temperature resolution (digital)		0.1 °C			
Response time ⁶⁾		1 ms (90 %)			
Emissivity/gain ²⁾		0.100 to 1.100			
Transmissivity ²⁾		0.100 to 1.100			
Signal processing ²⁾		peak hold, valley hold, average; extended hold function with threshold and hysteresis			
Certificate of calibration		optional			
Outputs/analog		0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K; alarm			
Outputs/analog	optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated			
Alarm output		open collector (24 V / 50 A)			
Outputs/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet			
Output impedances	current output	mA max. 500 Ω (with 8 to 36 VDC)			
	voltage output	min. 100 kΩ load impedance, thermocouple 20 Ω			
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)			
Cable length		3 m			
Power supply		8 to 36 VDC; max. 100 mA			
Protection class		IP65 (NEMA-4)			
Ambient temperature		sensor: -40 °C to 85 °C; controller: 0 °C to 85 °C			
Storage temperature		sensor: -40 °C to 125 °C; controller: -40 °C to 85 °C			
Relative humidity		10 to 95 %, non-condensing			
Vibration	sensor	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis			
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis			
Weight		sensor: 150 g; controller: 420 g			

¹⁾ 90 % energy

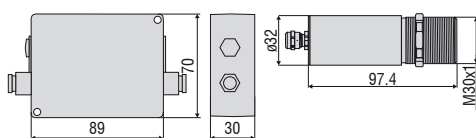
²⁾ adjustable via programming keys or software

³⁾ target temperature > sensor temperature +25 °C

⁴⁾ ambient temperature: 23 ± 5 °C

⁵⁾ ε=1, response time 1 s

⁶⁾ with dynamic adaption at low signal levels



Product identification

CTM-	3	SF100XL-	C3
Cable length [3 m]			
Focus [SF100 / SF300 / CF1 / CF2 / CF3 / CF4 / FF]			
Spectral range [2.3 µm]			
thermoMETER CTM			

Accessories page 40 - 43

- Mounting bracket
- Air purge collar
- Digital-interface kits
- Certificate of calibration



thermoMETER CTP-3

Exact temperature measurement of thin plastic film made from PE, PP, PS

- Measuring range from 50 °C to 400 °C
- Robust and applicable without cooling in ambient temperatures up to 75 °C
- Transmissivity elimination due to polymer specific absorption band
- Separate controller with easy accessible programming keys and backlit LCD
- Selectable analog outputs 0/4-20 mA, 0-5 V, 0-10 V, thermocouple type K or J
- Optional USB, RS485, RS232 interface, relay outputs (2x electrically isolated), CAN bus, Profibus DP, Ethernet

Optical specifications thermoMETER CTP-3

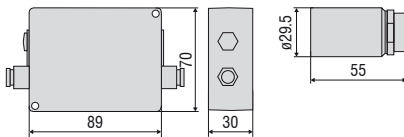
□ = smallest spot size / focal point (mm)

Standard Focus										
SF15	15:1	6.5	11.6	16.6	21.7	26.7	35	43.3	51.6	59.9
distance in mm		0	100	200	300	400	500	600	700	800

Model		CTP-3SF15-C3
Optical resolution		15:1
Temperature range ¹⁾		50 to 400 °C
Spectral range		3.43 µm
System accuracy ²⁾		±1 % or ±3 °C
Repeatability ²⁾		±1.5 °C
Temperature resolution		0.1 °C
Response time		100 ms
Emissivity/gain ¹⁾		0.100 to 1.100
Transmissivity/gain ¹⁾		0.100 to 1.100
Signal processing ¹⁾		peak hold, valley hold, average; extended hold function with threshold and hysteresis
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K
	channel 2	sensor temperature (0 to 75 °C as 0 to 5 V or 0 to 10 V), alarm
	optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated
Outputs/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet
Output impedances	current output	mA max. 500 Ω (8 to 36 VDC)
	voltage output	mV min. 100 kΩ load impedance
		thermocouple 20 Ω
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)
Cable length		3 m (standard), 8 m
Power supply		8 to 36 VDC; max. 100 mA
Protection class		IP65 (NEMA-4)
Ambient temperature		sensor: 0 °C to 75 °C; controller: 0 °C to 75 °C
Storage temperature		sensor: -40 °C to 85 °C; controller: -40 °C to 85 °C
Relative humidity		10 to 95 %, non-condensing
Vibration	sensor	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis
Weight		sensor with massive housing: 200 g; controller: 420 g

¹⁾ adjustable via programming keys or software

²⁾ ambient temperature: 23 ±5 °C; whichever is greater



Product identification

CTP-	3	SF15-	C3
			Cable length [3 m (standard) / 8 m]
			Focus [SF15]
			Spectral range [3.43 µm]
thermoMETER CTP			



thermoMETER CTP-7

Exact temperature measurement of thin plastic film made from PES, PU, PTFE, PA

- Robust and applicable without cooling in ambient temperatures up to 85 °C
- Transmissivity elimination due to polymer specific absorption band
- Separate controller with easy accessible programming keys and backlit LCD
- Selectable analog outputs 0/4-20 mA, 0-5 V, 0-10 V, thermocouple type K or J
- Optional USB, RS485, RS232 interface, relay outputs (2x electrically isolated), CAN bus, Profibus DP, Ethernet

Optical specifications thermoMETER CTP-7

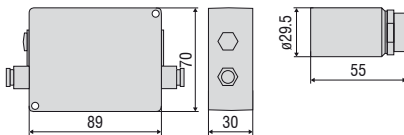
□ = smallest spot size / focal point (mm)

Standard Focus										
SF10	10:1	7	14.9	23.3	31.6	40	51.6	63.3	74.9	86.5
	distance in mm	0	100	200	300	400	500	600	700	800
Close Focus (with optionally available CF lens)										
CF10	10:1	7	5	1.2	8	16	24			
	distance in mm	0	5	10	15	20	25			

Model		CTP-7SF10-C3
Optical resolution		10:1
Temperature range ¹⁾		0 to 710 °C
Spectral range		7.9 µm
System accuracy ²⁾		±1 % or ±1.5 °C
Repeatability ²⁾		±0.5 % or ±0.5 °C
Temperature resolution		0.5 °C
Response time		150 ms
Emissivity/gain ¹⁾		0.100 or 1.100
Transmissivity/gain ¹⁾		0.100 or 1.100
Signal processing ¹⁾		peak hold, valley hold, average; extended hold function with threshold and hysteresis
Outputs/analog	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K
	channel 2	sensor temperature (-20 °C to 180 °C as 0 to 5 V or 0 to 10 V), alarm
	optional	relays: 2 x 60 VDC/42 VAC _{eff} ; 0.4 A; electrically isolated
Outputs/digital	optional	USB, RS232, RS485, Modbus RTU, Profibus DP, Ethernet
Output impedances	current output	mA max. 500 Ω (8 to 36 VDC)
	voltage output	mV min. 100 kΩ load impedance
		thermocouple 20 Ω
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)
Cable length		3 m (standard), 8 m, 15 m
Power supply		8 to 36 VDC; max. 100 mA
Protection class		IP65 (NEMA-4)
Ambient temperature		sensor: -20 °C to 85 °C; controller: 0 °C to 85 °C
Storage temperature		sensor: -40 °C to 85 °C; controller: -40 °C to 85 °C
Relative humidity		10 to 95 %, non-condensing
Vibration	sensor	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis
Weight		sensor: 200 g; controller: 420 g

¹⁾ adjustable via programming keys or software

²⁾ ambient temperature 23 ±5 °C; whichever is greater



Product identification

CTP-	7	SF10-	C3
			Cable length [3 m (standard) / 8 m / 15 m]
			Focus [SF10]
			Spectral range [7.9 µm]
thermoMETER CTP			



thermoMETER CTex

Measurement system for use in EX areas

- Low cost solution due to easy concept
- Sensor as passive element can be easily used in Ex areas
- Energy limitation via Zener barriers from STAHL

Zener barriers

The Zener double barriers from type 9002/22-032-300-111 are included in the scope of supply.

Note: The functionality and the compliance with the factory calibration are only ensured with use of the recommended Zener barriers.

Optical specifications thermoMETER CT

□ = smallest spot size / focal point (mm)

Standard Focus

SF02	2:1	5	53.8	102.5	151.3	200	251.3	302.5	353.8	405						
distance in mm		0	100	200	300	400	500	600	700	800						
SF15	15:1	6.5	10.3	14.1	17.9	21.7	25.4	30.9	37.1	43.3	49.5	55.8	62	68.2	74.4	80.7
distance in mm		0	75	150	225	300	375	450	525	600	675	750	825	900	975	1050
SF22	22:1	6.5	10.9	15.2	19.5	23.9	28.3	32.6	37	41.3	45.7	50				
distance in mm		0	110	220	330	440	550	660	770	880	990	1100				

Close Focus (with optionally available CF lens)

CF02	2:1	5	3.9	2.8	2.5	4.8	6.4	8	11.3	14.6						
distance in mm		0	10	20	23	30	35	40	50	60						
CF15	15:1	6.5	3.7	0.8	4.4	8.1	11.8	15.4	19.1	22.7						
CF22	22:1	7	3.8	0.6	4.4	8.2	12	15.8	19.6	23.4						
distance in mm		0	5	10	15	20	25	30	35	40						

Certifications	Europe (CENELEC)	for Zone 1: PTB 01 ATEX 2053 for Zone 2: PTB 01 ATEX 2054
	USA	FM Approval 3010778
	Canada	CSA 1284580 (LR 43394)
	Europe (CENELEC)	for Zone 1: E-II (1/2) G [EEx ia/ib] IIC/IIB for Zone 2: E II 3 G EEx nA II T4
Explosion protection	USA	I.S. circuits for: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G
		I.S. circuits for: Class I, Zone 0, Group IIC
		Class I, Division 2, Groups A, B, C, D
		Class I, Zone 2, Group IIC
	Canada	I.S. circuits for: Class I, Groups A, B, C, D; Class II, Groups E, F, G
		Class III
		Class I, Division 2, Groups A, B, C, D
		Class I, Zone 2, Groups IIC
Installation	in Zone 2, Division 2 and in the safe area	
Protection class	according to IEC 60529/clamping carrier IP20/housing IP40	
Ambient temperature	-20 °C to 60 °C	
Technical data	Temperature measurement thermoMETER CT - controller/sensor - see page 22-23	

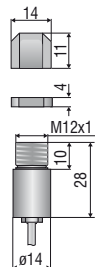
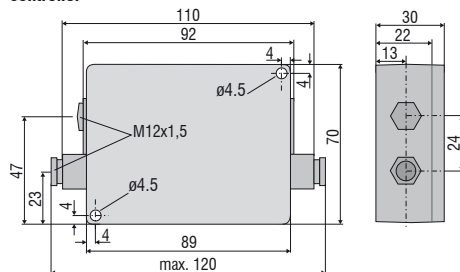
We reserve the right to make changes due to further technical developments.



- Alu housing with mounted Zener barrier (mounting rail) and CT controller
- Pre-assembled connection cable for CT controller
- Software tool for calibration of barrier resistance in the sensor code

CT / CTfast / CTM1/M2/M3

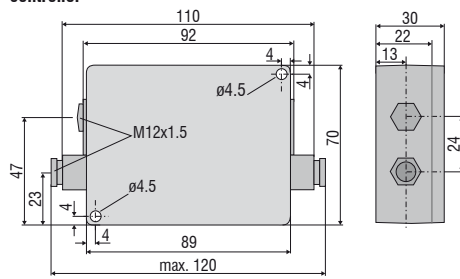
controller

ancillary CF lens
(optional)

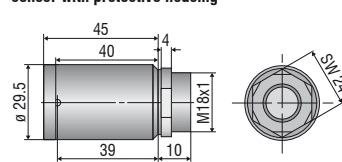
sensor

CThot / CTP-3 / CTP-7

controller

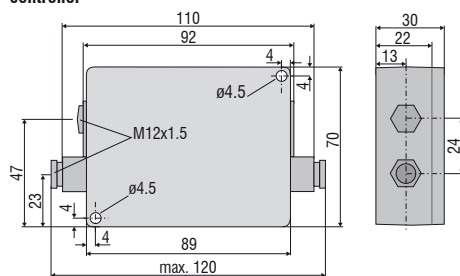


sensor with protective housing

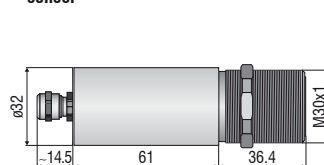


CTM3-XL

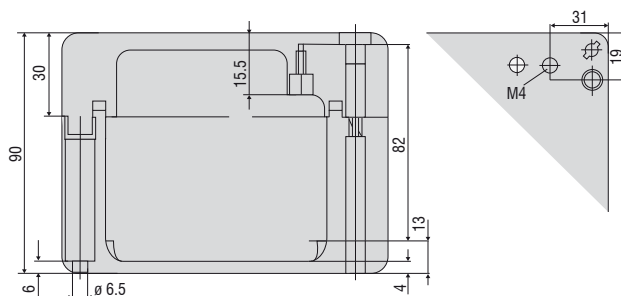
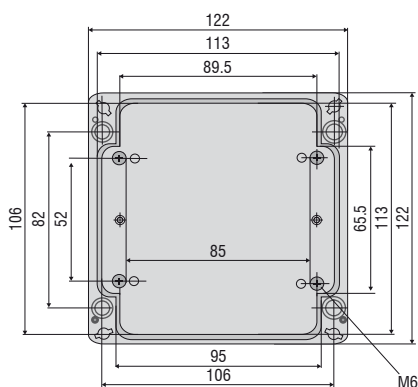
controller



sensor



CTex



Mechanical accessories		
Art. No.	Model	
2970203	TM-FB-CT	Mounting bracket, fixed
2970325	TM-FB2-CT	Mounting bracket, adjustable in one axis, for simultaneous assembly of CT sensor and laser sighting aid
2970336	TM-FBMH-CT	Mounting bracket, adjustable in one axis, for massive housing
2970204	TM-AB-CT	Mounting bracket, adjustable in 2 axes
2970205	TM-MB-CT	Mounting bolts with M12x1 thread
2970206	TM-MG-CT	Mounting fork, adjustable in 2 axes, with M12x1 fastening
2970207	TM-AP-CT	Air purge collar for sensors from 10:1 lens
2970335	TM-APS-CT	Air purge collar for sensors from 10:1 lens made from stainless steel
2970208	TM-AP2-CT	Air purge collar for sensor with 2:1 lens
2970209	TM-APL-CT	Air purge collar, laminar
2970210	TM-APLCF-CT	Air purge collar, laminar with integrated ancillary CF lens
2970357	TM-APLCFH-CT	Air purge collar, laminar with integrated ancillary CF lens for M1/M2/M3/M5 sensors
2970386	TM-APMH-CT	Air purge collar made from stainless steel for massive housing
2970463	TM-TAS-CT	Pivoted joint for CT sensors
2970211	TM-RAM-CT	Right angle mirror for measurements 90 °C to the sensor axis
2970212	TM-RAIL-CT	Rail mount adapter for CT controller
2970213	TM-COV-CT	Closed cover for controller
2970214	TM-MHS-CT	Massive housing made from stainless steel
2970215	TM-MHSF-CT	Massive housing made from stainless steel with integrated ancillary CF lens
2970358	TM-MHSFCT-CT	Massive housing made from stainless steel with integrated ancillary CF lens for M1/M2/M3/M5 sensors
2970216	TM-MHA-CT	Massive housing made from anodized aluminum
2970217	TM-MHACF-CT	Massive housing made from stainless steel with integrated ancillary CF lens
2970359	TM-MHACFH-CT	Massive housing made from anodized aluminum with integrated ancillary CF lens for M1/M2/M3/M5 sensors
2970326	TM-PA-CT	Pipe adapter for the mounting of reflection protection tubes
2970327	TM-ST20-CT	Reflection protection tube, length 20 mm
2970328	TM-ST40-CT	Reflection protection tube, length 40 mm
2970329	TM-ST88-CT	Reflection protection tube, length 88 mm
2970221	TM-LST-CT	Laser sighting aid for CT sensors incl. batteries (2xAlkaline AA)
2970300	TM-LSTOEM-CT	OEM laser sighting aid, 635 nm, 3.5 m cable, for connection to CT controller
2970300.008	TM-LSTOEM-CT(008)	OEM laser sighting aid, 635 nm, 8 m cable, for connection to CT controller

Optical accessories		
Art. No.	Model	
2970201	TM-CF-CT	Ancillary CF lens (only for SF models)
2970202	TM-PW-CT	Protective window (only for SF models)
2970297	TM-CFAG-CT	Ancillary lens with external thread
2970330	TM-CFH-CT	Ancillary lens for M1/M2/M3/M5 sensors
2970331	TM-CFHAG-CT	Ancillary lens with external thread for M1/M2/M3/M5 sensors
2970299	TM-PWAG-CT	Protective window with external thread
2970332	TM-PWH-CT	Protective window for M1/M2/M3/M5 sensors
2970333	TM-PWHAG-CT	Protective window with external thread for M1/M2/M3/M5 sensors

Interfaces		
2970729	TM-USBK-CT	USB-Interface-board, cable with Micro-USB plug and adapter for USB-C and USB-A, CompactConnect software (as download), Quick reference, second cable gland for controller
2970224	TM-RS232K-CT	RS232 interface: RS232 interface, computer cable, CompactConnect software, second cable gland for controller
2970338	TM-RS485USBK-CTL	RS485-USB-adapter, incl. PC cable, CompactConnect software and CTmulti, second cable gland for use with interface board TM-RS485B-CT
2970226	TM-RS485B-CT	RS485 interface board incl. second cable gland
2970227	TM-CANK-CT	CAN-Bus interface for thermoMETER CT/ protocol: CANopen presets: module address 20 (14H), 250 kBaud, 0-60 °C
2970228	TM-PFBDPK-CT	Profibus-DPV1 interface for thermoMETER CT with plug-in connection
2970229	TM-ETHNK-CT	Ethernet-Kit: interface board, external Ethernet adapter, CompactConnect software, second cable gland
2970230	TM-RI-CT	Relay interface: two electrically isolated relays, 60 VDC/ 42 VAC _{eff} , 0.4 A

Calibration		
2970231	TM-CERT-CT	Certificate of calibration
2970310	TM-HTCERT-CT	Certificate of calibration for CTM sensors

CTM3-XL		
2970352	TM-FBXL-CT	Mounting bracket, adjustable in one axis
2970353	TM-ABXL-CT	Mounting bracket, adjustable in 2 axes
2970354	TM-APXL-CT	Air purge collar, stainless steel
2970361	TM-XLCERT-CT	Certificate of calibration



TM-FB-CT Mounting bracket, adjustable in one axis



TM-AB-CT Mounting bracket, adjustable in two axes



TM-MB-CT mounting bolt with M12x1 thread adjustable in one axis



TM-MG-CT Mounting fork with M12x1 thread, adjustable in two axes



TM-RAIL-CT rail mount adapter for controller

TM-KF40GE-CT KF40 Flange with Ge window
TM-KF40B270-CT KF40 Flange for CTM-1,-2,-3 with B270 window

TM-CF-CT Ancillary CF lens (only for SF models)

TM-CFAG-CT Ancillary CF lens with external thread
TM-PWAG-CT Protective window with external threadTM-APL-CT Air purge collar, laminar and
TM-MG-CT Mounting forkTM-APLCF-CT
Ancillary CF lens/protective window - integrable variant
for laminar air purge collarTM-APMH-CT
Air purge collar made from stainless steel
for massive housing

TM-PA-CT Pipe adapter for reflection protection tube



TM-ST40-CT Reflection protection tube





TM-LST-CT Laser sighting aid, battery-operated
(2x Alkaline AA), for alignment of CT sensors
(dimensions identical to CT sensor)



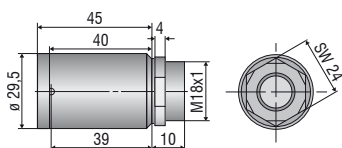
TM-FB2-CT
Mounting bracket for sensor and laser sighting aid



TM-RAM-CT
Right angle mirror



TM-MHS-CT Massive housing, stainless steel
TM-MHA-CT Massive housing, aluminum



TM-TAS-CT Pivoted joint for CT sensors



Dirt and deposit on the lens like smoke, steam and high air humidity (condensation) are avoided or reduced by using an air purge collar.

TM-AP-CT
Standard air purge collar for 10:1 / 15:1 / 22:1 lenses
TM-APS-CT
Air purge collar, stainless steel



TM-AP2-CT
Standard air purge collar for 2:1 lens



thermoMETER CSLaser

Miniature IR sensor with integrated controller and laser sighting

- Measuring range from -30 to 1600 °C, measuring fields from 0.5 mm and response times from 10 ms
- Optical resolution up to 300:1 with selectable focus settings
- Double laser sighting with 2 rays for exact measuring field marking and focusing
- Scalable 4-20 mA two-wire analog output and simultaneous alarm output
- Optional USB interface and software for programming
- Emissivity directly adjustable via rotary controller or software
- Protection against short circuit and polarity change
- Up to 85 °C ambient temperature without cooling
- Automatic laser switch-off at 50 °C
- Extensive supply voltage range: 5 - 28 VDC

Optical specifications thermoMETER CSLaser

□ = smallest spot size / focal point (mm)

Standard Focus															
2H SF	300:1	12	10.9	9.7	8.6	7.5	6.3	5.2	4.5	3.7	5.1	7.3	9.4	13	19.4
2L SF	150:1	20	18.3	16.5	14.8	13.1	11.3	9.6	8.5	7.3	9.8	13.5	17.2	23.4	34.6
distance in mm		0	150	300	450	600	750	900	1000	1100	1200	1350	1500	1750	2200
Close Focus															
2H CF2	300:1	12	8.2	4.3	0.5	4.7	8.8	13	17.2	21.3	25.5	29.7	38	46.3	54.7
2L CF2	150:1	20	13.7	7.3	1	8	15	22	29	36	43	50	64	78	92
2H CF3	300:1	12	9.2	6.4	3.5	0.7	3.9	7	10.2	13.4	16.6	19.8	26.1	32.4	38.8
2L CF3	150:1	20	15.3	10.7	6	1.3	6.6	12	17.3	22.6	27.9	33.3	43.9	54.6	65.2
2H CF4	300:1	12	10.8	9.7	8.5	7.3	6.2	5	3.8	2.7	1.5	3	6	9	12
2L CF4	150:1	20	18.1	16.2	14.3	12.4	10.6	8.7	6.8	4.9	3	5.6	10.7	15.8	20.9
distance in mm		0	50	100	150	200	250	300	350	400	450	500	600	700	800
Far Focus															
2H FF	300:1	20	12	12	12	12	12	12	12	12	14.7	21.3	28	33	
2L FF	150:1	20	20.5	21	21.5	22	22.5	23	23.3	24	28.9	41.1	53.3	62.5	
distance in mm		0	450	900	1350	1800	2250	2700	3000	3600	4000	5000	6000	6750	

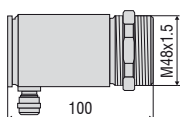
Model	CSL-SF50	CSLHS-SF50	CSLM-2LSF150	CSLM-2HSF300
Optical resolution	50:1		150:1	300:1
Temperature range ¹⁾	-30 °C to 1000 °C	-20 °C to 150 °C	250 °C to 800 °C	385 °C to 1600 °C
Spectral range	8 to 14 μm		1.6 μm	
System accuracy ³⁾	±1 % or ±1 °C		±(0.3 % of reading + 1 °C) ⁴⁾	
Repeatability ³⁾	±0.5 % or ±0.5 °C		±(0.1 % of reading + 1 °C) ⁴⁾	
Temperature resolution	0.1 °C	0.025 °C	0.1 °C	
Response time (90 % signal)	150 ms		10 ms	
Emissivity/gain ¹⁾	0.100 to 1.100			
IR window correction ²⁾	0.100 to 1.100			
Signal processing ²⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis			
Outputs/analog	4 to 20 mA			
Output/alarms	0 to 30 V / 500 mA (open collector)			
Outputs/digital (optional)	mono-/bidirectional, 9.6 kBaud, 0/3 V level, USB			
Output/impedance	max. 1000 Ω (depends on supply voltage)			
Power consumption (only laser)	45 mA at 5 V / 20 mA at 12 V / 12 mA at 24 V			
Power supply	5 to 28 VDC			
Laser	class II, (635 nm), 1 mW, ON/OFF via software			
Protection class	IP65 (NEMA-4)			
Ambient temperature	-20 °C to 85 °C (50 °C if Laser ON)			
Storage temperature	-40 °C to 85 °C			
Relative humidity	10 to 95 %, non-condensing			
Vibration	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis			
Shock	IEC 68-2-27: 50 G, 11 ms, any axis			
Weight	600 g			

¹⁾ adjustable via sensor or software

²⁾ adjustable via software

³⁾ ambient temperature 23 ± 5 °C; whichever is greater; ambient temperature ≥ 0 °C

⁴⁾ ε = 1, response time 1 s



Product identification

CSL -	SF50
Focus [SF50 / CF1 / CF2 / CF3 / CF4]	
thermoMETER CSLaser	

Product identification

CSLM -	2	H	SF300
Focus [SF300 / CF1 / CF2 / CF3 / CF4]			
Temperature range [H]			
Spectral range [1.6 µm]			
thermoMETER CSLaserM			

Optical specifications thermoMETER CSLaser CSL-SF50 und CSLHS-SF50

□ = smallest spot size / focal point (mm)

Standard Focus																
SF50 lens	50:1	20	20.5	21	21.5	22	22.5	23	23.5	24	29.5	35	46	57	68	
distance in mm		0	150	300	450	600	750	900	1050	1200	1350	1500	1800	2100	2400	
Close Focus																
CF1 lens	50:1	20	9.4	6.7	1.4	10.6	25.9	41.1	56.4	71.7	87	102.3	117.6	132.9	163.4	224.6
CF2 lens	50:1	20	15.5	14.3	12.1	8.7	3	10.7	18.3	26	33.7	41.3	49	56.7	72	102.7
CF3 lens	50:1	20	16.8	16	14.4	12	8	4	10	16	22	28	34	40	52	76
CF4 lens	50:1	20	19	18.8	18.3	17.6	16.3	15.1	13.9	12.7	11.4	10.2	9	12.2	18.7	31.6
distance in mm		0	40	50	70	100	150	200	250	300	350	400	450	500	600	800

Accessories page 54 - 55

- Mounting bracket
- Air purge collar
- Rail mount adapter for controller
- Water cooled housing
- Certificate of calibration
- USB kit (TM-USBK-CS) p.55





thermoMETER CS

Compact OEM sensor with integrated controller

- Measuring range from -40 °C to 400 °C
- Applicable in ambient temperatures up to 80 °C without cooling
- Robust, silicon-coated lens
- Integrated controller with LED alarm display and intelligent sighting aid, alarm signal, temperature-code display or self-diagnostics
- Protection against short circuit and polarity change
- Programmable controller
- Different outputs: 0-10 V or 0-5 V freely scalable, thermocouple type K, alarm output, digital output
- Optional USB interface and software for programming, direct, serial 9.6 / 115.2 kBaud interface
- Extensive supply voltage range: 5 - 30 VDC
- Best price - ideal for OEM applications
- *Please note: available from 10 pieces*

Optical specifications thermoMETER CS
 □ =smallest spot size / focal point (mm)

Standard Focus										
SF15	15:1	6.5	11.6	16.6	21.7	26.7	35	43.3	51.6	59.9
distance in mm		0	100	200	300	400	500	600	700	800
Close Focus (with optionally available CF lens)										
CF15	15:1	7	3.9	0.8	4.7	8.6	12.5	16.4	20.3	24.2
distance in mm		0	5	10	15	20	25	30	35	40

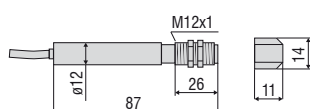
Model	CS-SF15-C1	CSTK-SF15-C1
Optical resolution	15:1	
Temperature range ¹⁾	-40 °C to 400 °C	
Spectral range	8 to 14 µm	
System accuracy ²⁾	± 1.5 % or ± 1.5 °C	
Repeatability ²⁾	± 0.75 % or ± 0.75 °C	
Temperature coefficient ³⁾	± 0.05 °C/K or ± 0.05 %/K	
Temperature resolution ⁴⁾	0.05 °C	
Response time	14 ms to 999 s (90 %), adjustable	
Emissivity/Gain	0.100 to 1.100 (adjustable via 0 to 10 VDC input or software)	
Transmissivity/gain	0.100 to 1.100 (adjustable via software)	
Signal processing ¹⁾	Peak hold, valley hold, average; extended hold function with threshold and hysteresis	
Outputs/analog	0 to 5 V or 0 to 10 V, freely scalable via software	0 to 5 V or 0 to 10 V, freely scalable via software additional thermocouple type K
Alarm output	Alarm 0-30 V / 50 mA (open collector)	
3-state alarm output	adjustable thresholds and voltage levels for: no alarm, pre-alarm, alarm	
Outputs/digital	mono-/bidirectional, 9.6 / 115.2 kBaud (adjustable via software), 0/3 V level/USB optional	
LED functions	alarm display, automatic aiming aid, self-diagnostics, temperature display (via temp. code)	
Inputs	programmable functional inputs for external emissivity adjustment, ambient temperature compensation (0 to 10 VDC), hold function or RS232 / USB (optional) communication	
Cable length	1 m (standard), 3 m, 8 m, 15 m	
Power supply	4 mA (without LED); 10 mA (5 to 30 VDC)	
Protection class	IP63 (NEMA-4)	
Ambient temperature	-20 °C to 80 °C	
Storage temperature	-40 °C to 85 °C	
Relative humidity	10 to 95 %, non-condensing	
Vibration	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis	
Shock	IEC 68-2-27: 50 G, 11 ms, any axis	
Weight	approx. 58 g	

¹⁾ Adjustable via software

²⁾ Ambient temperature: 23 ± 5 °C; whichever is greater; object temperature ≥ 0 °C

³⁾ For ambient temperatures < 18 °C and > 28 °C, whichever is greater

⁴⁾ With object temperature < 100 °C and time constant of > 0.2 s



Product identification

CS -	SF15-	C1
		Cable length [1 m (standard) / 3 m / 8 m / 15 m]
		Focus [SF]
		thermoMETER CS / CSTK

Accessories page 54 - 55

- Ancillary CF lens
- Protective window
- Mounting bracket / mounting bolt
- Air purge collar
- Right angle mirror



thermoMETER CSmicro

Miniature OEM infrared temperature sensor with controller integrated in the cable

- Measuring range from -40 °C to 1030 °C
- Applicable in ambient temperatures up to 120 °C without cooling (sensor)
- Robust, silicon-coated lens
- Integrated controller with LED alarm display and intelligent sighting aid, alarm signal, temperature-code display or self-diagnostics
- Integrated controller in the cable
- Scalable analog output and simultaneous alarm output
- Protection against short circuit and polarity change
- Programmable controller
- Optional USB interface and software for programming
- Best price - ideal for OEM applications

Optical specifications thermoMETER CSmicro

□ = smallest spot size / focal point (mm)

Standard Focus											
SF02	2:1	5	53.8	102.5	151.3	200	251.3	302.5	353.8	405	
SF15	15:1	6.5	11.6	16.6	21.7	26.7	35	43.3	51.6	59.9	
distance in mm		0	100	200	300	400	500	600	700	800	
Close Focus (with optionally available CF lens)											
CF02	2:1	7	6	5	4.1	3.1	2.5	3.3	5.4	7.5	9.5
CF15	15:1	7	3.9	0.8	4.7	8.6	10.9	12.5	16.4	20.3	24.2
distance in mm		0	5	10	15	20	23	25	30	35	40

Model	CSmi-SF02-C1	CSmi-SF15-C1	CSmiHS-SF15-C4
Optical resolution	2:1	15:1	15:1
Temperature range	-40 °C to 1030 °C ¹⁾		-20 °C to 150 °C
Spectral range	8 to 14 µm		
System accuracy	±1.0 % or ±1.0 °C ⁴⁾		
Repeatability	±0.5 % or ±0.5 °C ³⁾		±0.3 % or ±0.3 °C ⁴⁾
Temperature coefficient	± 0.05 °C/°C or ± 0.05 % °C ⁵⁾		
Temperature resolution	0.15 °C ⁶⁾		0.025 °C ⁶⁾
Response time (90 %)	14 ms (adjustable up to 999 s via optional programming adapter)		150 ms (adjustable up to 999 s via optional programming adapter)
Emissivity/Gain	0.100 to 1.100 ²⁾		0.100 to 1.100 ¹⁾
Transmissivity/gain ¹⁾	0.100 to 1.100		
Signal processing ¹⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis		
Dimensions of controller	length 35 mm; ø12 mm		
Outputs/analog	0 to 5 V or 0 to 10 V 1/10/100 mV/°C		4 to 20 mA
Max. loop resistance	-		1000 Ω ⁷⁾
Outputs/alarm	alarm (50 mA / 24 V)		0-30 V / 500 mA (open collector)
Outputs/digital (optional)	mono-/bidirectional, 9.6 kBaud, 0/3 V level, alternative USB		
Inputs	programmable functional inputs for external emissivity adjustment (0 to 5 VDC), hold function or USB communication		programmable functional input for triggered signal output or peak hold function
LED functions	alarm display, automatic aiming aid, self-diagnostics, temperature display (via temp. code)		
Cable length	1 m (standard length); 0.5 m between sensor and controller; 0.4 m between controller and terminal device		4 m (0.5 m sensor - controller); sensor incl. massive housing TM-MHS-CT (ø29.5 mm x 55 mm)
Power supply	9 mA (5 to 30 VDC)		4...20 mA (5 to 30 VDC)
Protection class	IP65 (NEMA-4) sensor head		
Ambient temperature	sensor: -20 °C to 120 °C controller: -20 °C to 80 °C		sensor -20 °C to 75 °C controller: -20 °C to 75 °C
Storage temperature	-40 °C to 85 °C (sensor and controller)		
Relative humidity	10 to 95 %, non-condensing		
Vibration	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis		
Shock	IEC 68-2-27: 50 G, 11 ms, any axis		
Weight	42 g		200 g

¹⁾ adjustable via software

²⁾ adjustable via 0 to 5 VDC input or software

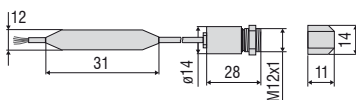
³⁾ ambient temperature 23 ± 5 °C; whichever is greater; object temperature ≥ 0 °C

⁴⁾ ambient temperature 23 ± 5 °C; whichever is greater; object temperature > 20 °C

⁵⁾ with object temperature < 100 °C; time constant from > 0.2 s

⁶⁾ with object temperature > 20 °C; time constant from > 0.2 s

⁷⁾ depends on supply voltage



Product identification

CSmi -	SF15-	C1
		Cable length [1 m (standard) other cable lengths on request]
		Focus [SF / CF]
		thermoMETER CSmicro

Accessories page 54 - 55

- Ancillary CF lens
- Protective window
- Mounting bracket / mounting bolt
- Air purge collar
- Right angle mirror
- USB kit



thermoMETER CSmicro 2W

Miniature OEM two-wire IR temperature sensor with controller integrated in the cable

- Measuring range from -40 °C to 1600 °C
- Applicable in ambient temperatures up to 180 °C without cooling (sensor)
- Robust, silicon-coated lens
- Integrated controller with LED alarm display and intelligent sighting aid, alarm signal, temperature-code display or self-diagnostics
- Integrated controller in the cable
- Scalable analog output and simultaneous alarm output
- Protection against short circuit and polarity change
- Programmable controller
- Optional USB interface and software for programming
- Best price - ideal for OEM applications

Optical specifications thermoMETER CSmicro 2W

□ = smallest spot size / focal point (mm)

Standard Focus

SF15	15:1	6.5	11.6	16.6	21.7	26.7	35	43.3	51.6	59.9
SF22	22:1	6.5	10.5	14.4	18.4	22.3	26.3	30.2	34.2	38.1
	distance in mm	0	100	200	300	400	500	600	700	800
SF40	40:1	6.5	10.7	14.9	19.1	23.3	27.4	31.6	35.8	40
SF75	75:1	6.5	8.1	9.7	11.3	12.8	14.4	16	19.8	23.5
	distance in mm	0	200	400	600	800	1000	1200	1400	1600

Close Focus (with optionally available CF lens)

CF15	15:1	7	3.9	0.8	4.7	8.6	12.5	16.4	20.3	24.2
CF22	22:1	7	3.8	0.6	4.4	8.2	12	15.8	19.6	23.4
	distance in mm	0	5	10	15	20	25	30	35	40

Close Focus (integrated CF lens in the sensor head)

CF40	40:1	6.5	4.4	2.7	6	10.2	14.4	18.6	22.8	27
CF75	75:1	6.5	3.8	1.5	4.4	8	11.7	15.3	19	22.6
	distance in mm	0	60	110	150	200	250	300	350	400

Model	CSmi2W-SF15-C1	CSmi2W-SF15H-C1	CSmi2W-SF22H-C1	CSmi2WM-2SF40-C1	CSmi2WM-2SF75-C1
Optical resolution	15:1		22:1	40:1	75:1
Temperature range	-40 °C to 1030 °C ¹⁾			250 °C to 800 °C ¹⁾	385 °C to 1600 °C ¹⁾
Spectral range	8 to 14 μm			1.6 μm	
System accuracy	±1.0 % or ±1.0 °C ³⁾			±(0.3 % of reading +2 °C) ⁴⁾	
Repeatability	±0.5 % or ±0.5 °C ³⁾			±(0.1 % of reading +1 °C) ⁴⁾	
Temperature coefficient	±0.05 °C/°C or ±0.05 % °C ⁵⁾				
Temperature resolution	0.1 °C ⁶⁾				
Response time (90 %)	30 ms	150 ms		10 ms	
Emissivity/Gain	0.100 to 1.100 ²⁾				
Transmissivity/gain ¹⁾	0.100 to 1.100				
Signal processing ¹⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis				
Dimensions of controller	length 35 mm; ø12 mm				
Outputs/analog	4 to 20 mA				
Max. loop resistance	1000 Ω ⁷⁾				
Outputs/alarm	0-30 V / 500 mA (open collector)				
Outputs/digital (optional)	mono-/bidirectional, 9.6 kBaud, 0/3 V level, alternative USB				
Inputs	programmable functional input for triggered signal output or peak hold function				
LED functions	alarm display, automatic aiming aid, self-diagnostics, temperature display (via temp. code)				
Cable length	1 m (standard length); 0.5 m between sensor and controller; 0.4 m between controller and terminal device				
Power supply	4...20 mA (5 to 30 VDC)				
Protection class	IP65 (NEMA-4) sensor head				
Ambient temperature	sensor: -20 °C to 120 °C controller: -20 °C to 75 °C	sensor: -20 °C to 180 °C controller: -20 °C to 75 °C		sensor: -20 °C to 125 °C controller: -20 °C to 75 °C	
Storage temperature	-40 °C to 85 °C (sensor and controller)				
Relative humidity	10 to 95 %, non-condensing				
Vibration	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis				
Shock	IEC 68-2-27: 50 G, 11 ms, any axis				
Weight	42 g				

¹⁾ adjustable via software

²⁾ adjustable via 0 to 5 VDC input or software

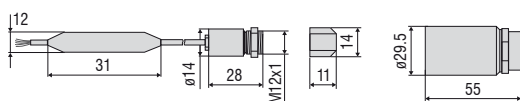
³⁾ ambient temperature 23 ±5 °C; whichever is greater; object temperature ≥ 0 °C

⁴⁾ ε = 1, response time 1 s, object temperature > 450 °C

⁵⁾ with object temperature < 100 °C; time constant from > 0.2 s

⁶⁾ with object temperature > 20 °C; time constant from > 0.2 s

⁷⁾ depends on supply voltage



Product identification

CSmi2W -	SF15-	C1
Cable length [1m (standard) / 3m / 8m / 15m]		
Focus [SF / CF]		
thermoMETER CSmi2W (TwoWire)		

Accessories page 54 - 55

- Ancillary CF lens
- Protective window
- Mounting bracket / mounting bolt
- Air purge collar
- Right angle mirror
- USB kit



thermoMETER CX

OEM temperature sensor with integrated controller

- Measuring range from -30 °C to 900 °C
- High resolution model available (CX-SF15-C8 with 0.025 °C)
- Easy two-wire installation
- Optional USB interface and software for programming
- Large supply voltage range: 5-30 VDC
- Optical resolution from 15:1, 22:1
- Simultaneous two-wire output and digital communication
- Alarm output (0-30 V / 500 mA)
- Connection dimension 1.5" for easy replacement of present sensors

Optical specifications thermoMETER CX
□ =smallest spot size / focal point (mm)

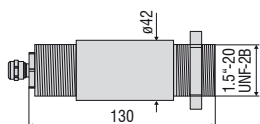
Standard Focus										
SF15	15:1	6.5	11.5	6.6	21.6	26.6	34.9	43.2	51.4	59.7
SF22	22:1	6.5	10.5	14.4	18.4	22.3	26.3	30.2	34.2	38.1
distance in mm		0	100	200	300	400	500	600	700	800
Close Focus										
CF15	15:1	7	3.9	0.8	4.7	8.6	12.5	16.4	20.3	24.2
CF22	22:1	7	3.8	0.6	4.4	8.2	12	15.8	19.6	23.4
distance in mm		0	5	10	15	20	25	30	35	40

Model	CX-SF15-C8	CX-SF22-C8
Optical resolution	15:1	22:1
Temperature range ¹⁾	-20 °C to 150 °C	-30 °C to 900 °C
Spectral range	8 to 14 μm	
System accuracy ²⁾	±1 % or ±1 °C	±1 % or ±1.4 °C
Repeatability ²⁾	±0.3 % or ±0.3 °C	±0.5 % or ±0.7 °C
Temperature resolution	0.025 °C ³⁾	0.1 °C
Response time	150 ms (95 %)	
Emissivity/gain ¹⁾	0.100 to 1.100	
Transmissivity ¹⁾	0.100 to 1.100	
Signal processing ¹⁾	peak hold, valley hold, average; extended hold function with threshold and hysteresis	
Certificate of calibration	optional	
Outputs/analog	4 to 20 mA	
Output/alarms	0 to 30 V / 500 mA (open collector)	
Outputs/digital (optional)	USB	
Output/impedance	max. 1000 Ω (depends on supply voltage)	
Cable length	8 m	
Power supply	5 to 30 VDC	
Protection class	IP65 (NEMA-4)	
Ambient temperature	-20 °C to 75 °C	
Storage temperature	-40 °C to 85 °C	
Relative humidity	10 to 95 %, non-condensing	
Vibration	IEC 68-2-6: 3 G, 11 to 200 Hz, any axis	
Shock	IEC 68-2-27: 50 G, 11 ms, any axis	
Weight	350 g	

¹⁾ adjustable via software

²⁾ ambient temperature 23 ±5 °C; whichever is greater; object temperature ≥ 0 °C;

³⁾ with object temperature < 100 °C; time constant from > 0.2 s



Product identification

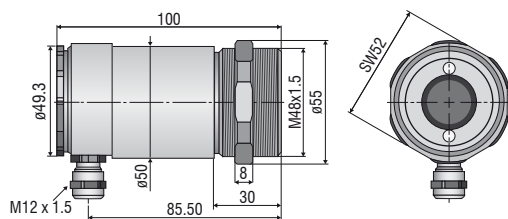
CX -	SF15-	C8
		Cable length [8 m]
		Focus [SF / CF]
thermoMETER CX		

Accessories page 54 - 55

- Ancillary CF lens
- Protective window
- Air purge collar
- USB kit

CSLaser

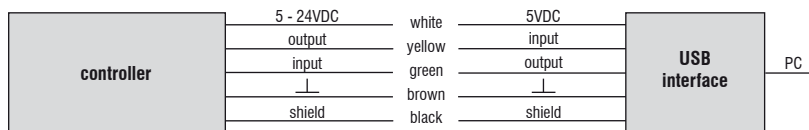
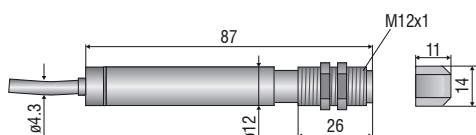
sensor



CS

sensor with integrated controller

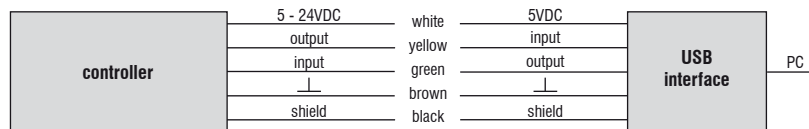
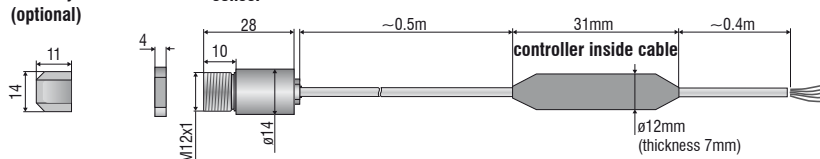
ancillary CF lens (optional)



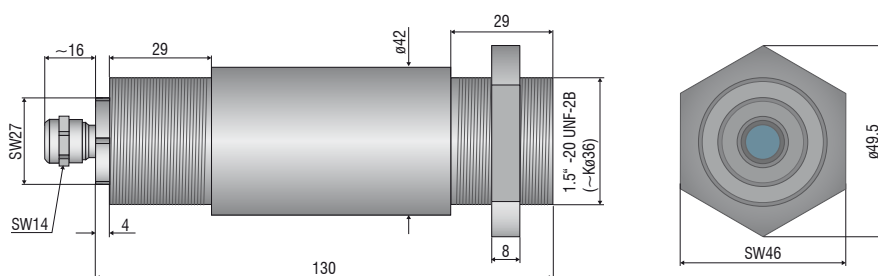
CSmicro / CSmicro 2W

ancillary CF lens (optional)

sensor



CX



Mechanical accessories CS / CSmicro / CSmicro 2W		
Art. No.	Model	
2970279	Emissivity	Mounting bracket, fixed
2970280	TM-AB-CS	Mounting bracket, adjustable
2970281	TM-MB-CS	Mounting bolts with M12x1 thread
2970282	TM-MG-CS	Mounting fork, adjustable in 2 axes, with M12x1 fastening
2970283	TM-AP-CS	Air purge collar for 10:1 sensors
2970284	TM-APL-CS	Air purge collar, laminar
2970285	TM-APLCF-CS	Air purge collar, laminar with integrated ancillary CF lens
2970286	TM-RAM-CS	Right angle mirror for measurements 90 °C to the sensor axis
2970718	TM-USBK-CS	USB kit: USB programming adapter, CompactConnect software (as download)

Optical accessories CS / CSmicro / CSmicro 2W		
2970277	TM-CF-CS	Ancillary CF lens for CS models
2970278	Aluminum	Protective window for CS models

Calibration CS / CSmicro / CSmicro 2W		
2970288	TM-CERT-CS	Certificate of calibration

Mechanical accessories CX		
Art. No.	Model	
2970307	TM-AP-CX	Air purge collar, aluminum (anodized)
2970321	TM-FB-CX	Mounting bracket, adjustable in 1 axis, stainless steel
2970322	TM-AB-CX	Mounting bracket, adjustable, in 2 axes, stainless steel

Optical accessories CX		
2970302	TM-CF-CX	Ancillary CF lens for CX models
2970303	TM-PW-CX	Protective window for CX models

Calibration CX		
2970323	TM-CERT-CX	Certificate of calibration



TM-FB-CS mounting bracket, fixed



TM-MG-CS Mounting fork with M12x1 thread, adjustable in two axes



TM-CF-CS Ancillary CF lens (only for LT models)



TM-AP-CS Air purge collar for 10:1 sensors



TM-MB-CS Mounting bolts with M12x1 thread adjustable in one axis



TM-APL-CS Air purge collar, laminar



TM-APLCF-CS Air purge collar, laminar with integrated ancillary CF lens



TM-APL-CS Air purge collar, laminar TM-MG-CS Mounting fork



TM-AP-CX Air purge collar for CX sensors



TM-CF-CX Ancillary CF lens, TM-PW-CX Protective window



TM-RAM-CS Right angle mirror

Infrared thermal imagers from Micro-Epsilon



thermoIMAGER TIM Compact thermal imaging cameras for industrial temperature monitoring

- Temperature range from -20 °C to 2450 °C
- Ideal for OEM
- Real-time thermography using license-free software
- Protective housing for harsh environments
- Special variants for the glass, metal and plastics industries