MICRO-EPSILON

More Precision.

thermoMETER
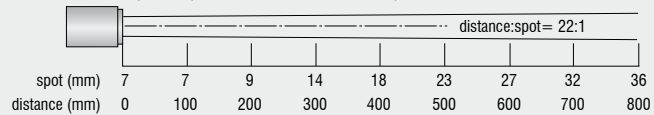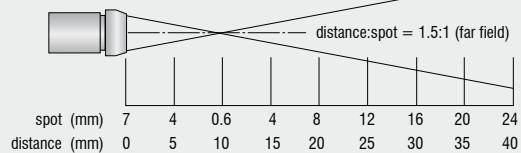Non-contact temperature sensors

thermoMETER lenses

There are several different lenses available for the various series. The lenses are differentiated by the ratio of the distance of the measuring object to the diameter of the measuring spot.

SF Lenses (Standard Focus Lenses) have an almost linear ratio while the CF Lenses (Close Focus Lenses) have a smaller measuring spot in distances close to the sensor. The diagrams show examples of the optical parameters for the CT series.

22:1 Standard Optics (SF = Standard Focus)

distance:spot= 22:1

spot (mm)	7	7	9	14	18	23	27	32	36
distance (mm)	0	100	200	300	400	500	600	700	800

22:1 CF Optics (CF = Close Focus)

distance:spot = 1.5:1 (far field)

spot (mm)	7	4	0.6	4	8	12	16	20	24
distance (mm)	0	5	10	15	20	25	30	35	40

thermoIMAGER - process IR imager

The thermoIMAGER TIM is a full radiometric thermographic camera which shows thermal images and profiles of the object target area. Powered from just one cable via USB 2.0, the system is really plug and play. Data is streamed from the camera into the analysis software via the USB cable. The analysis software is provided with every camera and enables the user to capture real time, thermographic images of the object at 100Hz. The measurement ranges of -20...100°C, 0...250°C and optional 120...900°C are selectable from the camera software. The thermoIMAGER uses an uncooled micro bolometer Focal Plane Array (FPA) with 160x120 pixels and a pixel size of 35x35μm. Lenses of 31° or 9° allow temperature measurements at a variety of object distances: close focus, standard focus and far field focus.
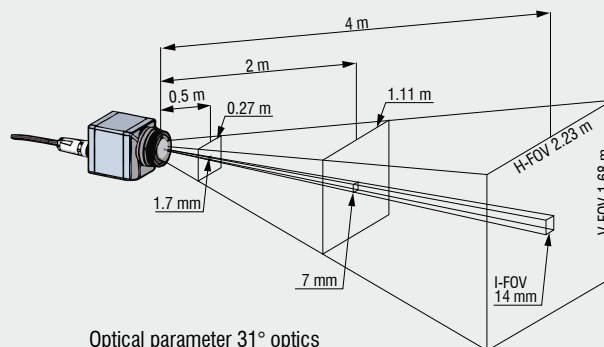
Optical parameter 31° optics

thermoMETER at a glance

thermoIMAGER TIM
Measuring ranges from -20 ... 900 °C

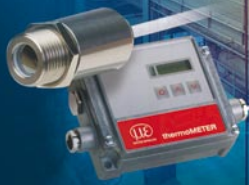## IR process imager for industrial applications

thermoMETER CT laser -
Precise infrared sensor with laser aiming
Measuring ranges from -50 to 1800°C

High-Performance infrared temperature sensor with double laser aiming

thermoMETER CT -
For general purpose applications
Measuring ranges from -50 to 1800°C

Infrared sensor for general purpose applications

thermoMETER CS -
For OEM applications
Measuring ranges from -30 to 900°C

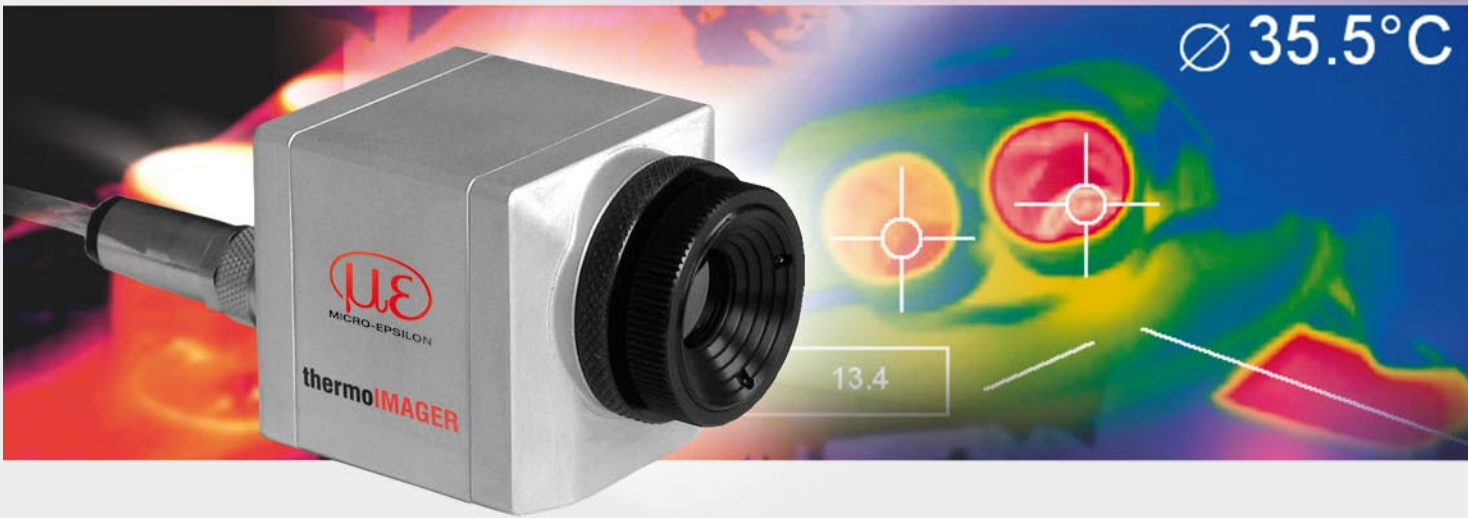## Compact infrared temperature sensor for OEM applications

thermoMETER Handhelds
Measuring range from -35 to 900°C

For handheld applications, inspections and maintenance

Plug&Play thermal imager

Powered from just one USB cable, the system is really plug and play. Data is streamed from the camera into the software via USB 2.0. The analysis software is provided with every camera and enables the user to capture real time, thermographic images of the object at 100Hz. The software will store the data to a file, which allows playback at user defined speeds, e.g. in slow motion, frame by frame if required. This means the imaged can be viewed either whilst connected to the camera, or at a later date without the camera being connected – ideal for R&D applications, fault diagnostics or condition monitoring. Additionally the software can be used as a runtime software. The software enables the user, for example, to set up an alarm if certain process temperature limits are exceeded. A Process Interface analogue input (PIF in) allows the user to remotely adjust the emissivity of the target material or to trigger the camera for data capture.

## The right optics for many applications

- Standard-, tele- and wide angle lens for different applications
- High quality germanium lenses and a special antireflective coating
- Factory calibrated lenses allowing an easy exchange by the user

thermoIMAGER TIM

Very compact thermal imager with USB interface

➔ Measuring range from -20°C to 900°C

➔ Excellent thermal sensitivity of 0.08K

➔ Exchangeable lenses with 9°FOV and 31°FOV

➔ Real time video capture, with 100Hz frame rate and slow motion playback

➔ Power supply and operation via USB 2.0 interface

➔ Extremely lightweight (250g) and rugged (IP65)

➔ Very compact 45x45x62mm

➔ Analogue input and output, trigger interface
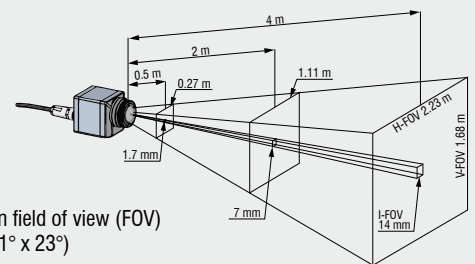
Dependence between field of view (FOV) and distance (lens 31° x 23°)

Objective 30° x 23° wide angle; focal distance 10 mm; min distance 0.02m

Distance	m	0.02	0.1	0.3	0.5	1.2	2	4	6	10	30	100
HFOV	m	0.006	0.01	0.16	0.27	0.67	1.11	2.3	3.4	5.6	16.8	56
VFOV	m	0.004	0.04	0.12	0.21	0.50	0.84	1.7	2.5	4.2	12.6	42
IFOV	mm	0.03	0.30	1.00	1.70	4.20	7	14	21	35	105	350

Objective 9° x 7° wide angle; focal distance 35.5 mm; min distance 0.3m

Distance	m	0.02	0.1	0.3	0.5	1.2	2	4	6	10	30	100
HFOV	m	-	-	0.04	0.07	0.18	0.31	0.60	1	1.60	4.80	15.80
VFOV	m	-	-	0.03	0.05	0.14	0.23	0.50	0.70	1.20	3.60	11.90
IFOV	mm	-	-	0.30	0.50	1.20	2	4	6	10	30	99

FOV = Field of view; HFOV = Horizontal field of view; VFOV = Vertical field of view; IFOV = Indicated field of view

Model	thermoIMAGER TIM
Optical resolution	160x120 pixel
Temperature ranges	-20°C to 100°C / 0°C to 250°C / 250°C to 900°C (optional)
Spectral range	7.5 to 13μm
System accuracy	±2% or ±2°C
Resolution (Display)	0.1°C
Lenses	31° / f = 10mm (minimum distance 50mm); 9° / f = 36mm (minimum distance 200mm)
Emissivity	0.10 to 1.00 adjustable
Thermal Sensitivity	0.08K with 31° FOV/F = 0.7 0.3K with 9° FOV/F = 1.6
Detector	Focal Plane Array (FPA) - uncooled micro bolometer 35x35μm2
Measurement modes	Flexible spot with crosshair marking, fixed measurement field with automatic display of maximum-, minimum- or average value
Colour palettes	Iron, rainbow, black-white, black-white inverted
Set up controls (via menu)	Mesurement modes, full automatic, manual, color palettes, emissivity, file management, date/time, °C/ °F, language
Outputs/digital	USB 2.0
Process interface (electrically isolated)	0-10 V output, 0-10 V input, trigger input
Cable length	1m (standard), 5m, 20m
Power supply	USB powered
Tripod mount	1/4-20 UNC
Environmental rating	IP 65
Ambient temperature	0°C to 50°C
Storage temperature	-40°C to 70°C
Relative humidity	20 to 80%, non-condensing
Vibration	2G, IEC 68-2-6
Shock	25G, IEC 68-2-29
Weight	250g; incl. lens

PC requirements: minimum 1.5GHz, 1GB RAM, Windows XP SP 2 or Vista
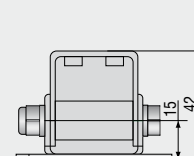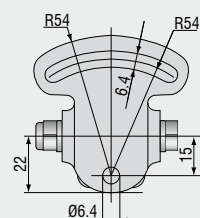
Scope of Supply

▶ TIM process camera including one selected lens
▶ Tripod mount
▶ Rugged transport case
▶ Manual
▶ USB cable
▶ Software: processing and analysing thermal images

Dimensions
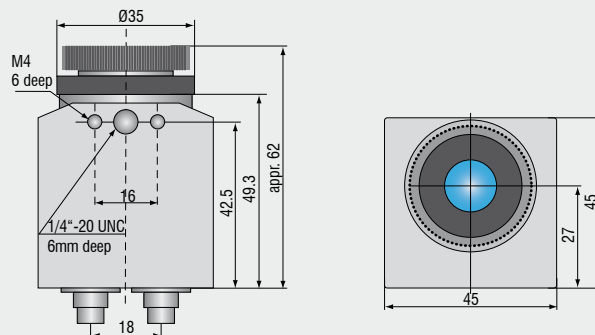
Accessories

Mounting base with protective housing

thermoMETER CTlaser

Innovative infrared temperature sensor with precise laser aiming

➔ Measuring range from -40°C to 975°C

➔ Smallest spots from 0.9mm

➔ Double laser aiming marks real spot location and spot size at any distance

➔ Optics 75:1 with selectable focus

➔ Up to 85°C ambient temperature without cooling

➔ Automatic laser switch off at 50°C

➔ Selectable analogue outputs, optional plug in digital interfaces

Optical specifications thermoMETER CTlaser

□ = smallest spot size (mm)

Standard optics																
SF 75 optics	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 optics																
CF1 optics	75:1	20	9	5	0.9	10	25	40	55	70	85	100	115	130	160	190	220
CF2 optics	75:1	20	16	14	11	8	1.9	9	16.5	24	31	38	45.5	53	68	82	97
CF3 optics	75:1	20	17	16	14	11	7	2.75	8.5	14	19.5	25.5	31	37	48	60	71
CF4 optics	75:1	20	19	18.5	18	17	15.5	14	12.5	11	9	7.5	5.9	9	15	20	26
distance in mm		0	40	50	70	100	150	200	250	300	350	400	450	500	600	700	800

Model	CTL-SF75-C3
Optical resolution	75:1
Temperature range [1]	-40°C to 975°C
Spectral range	8 to 14 μm
System accuracy [2,3]	±1% or ±1°C
Repeatability [2]	±0.5% or ±0.5°C
Temperature resolution	0.1°C
Response time (90% signal)	120ms
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/analogue	channel 1	0/4 to 20mA, 0 to 5/10 V, thermocouple J, K
	channel 2	sensor temperature (-40 to 85°C as 0 to 5V or 0 to 10V), alarm output
	optional	relay: 2 x 60VDC/ 42VAC$_{eff}$; 0.4A; optically isolated
Alarm output		open - collector (24V/ 50mA)
Outputs/digital	optional	USB, RS232, RS485, CAN, Profibus DP, Ethernet
Output impedances	current output	mA max. 500Ω (with 5 to 36VDC)
	voltage output	mV min. 100kΩ load impedance
		thermocouple 20Ω
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)
Cable length		3m (standard), 8m, 15m
Power supply		8 to 36VDC; max. 160mA
Laser		class II (635nm), 1mW, ON/OFF via controller or software

Environmental rating		IP 65 (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 200Hz, any axis
Shock	sensor	IEC 68-2-27: 50 G, 11ms, any axis
Weight		sensor: 600g; controller: 420g

[1] adjustable via controller or software
[2] ambient temperature: 23 ±5°C; whichever is greater
[3] temperature of the object >0°C

Accessories page 16 - 17
▶ Mounting bracket
▶ Air purge collar
▶ Rail mount adapter for controller
▶ Water cooled housing
▶ Interface kit
▶ Software CompactConnect
▶ Certificate of calibration

LASER RADIATION
DO NOT STARE IN THE BEAM
CLASS 2 LASER
EN60825-1:2002
P≤1mW; λ=630-650nm

thermoMETER CTlaserFAST

High speed temperature sensor with precise laser aiming

→ Measuring range from -40°C to 975°C

→ From 9ms exposure time for fast moving objects

→ Smallest spots up from 0.9mm - also with low target temperatures

→ Double laser aiming marks real spot location and spot size at any distance

→ Optics 50:1 with selectable focus

→ Up to 85°C ambient temperature without cooling

→ Automatic laser switch off at 50°C

→ Selectable analogue outputs, optional plug in digital interfaces

Optical specifications thermoMETER CTlaserFAST

□ = smallest spot size (mm)

Standard optics																
SF50 optics	**50:1**	20	20.5	21	21.5	22	22.5	23	23.5	24	29.5	35	48	57	68	
distance in mm		0	150	300	450	600	750	900	1050	1200	1350	1500	1800	2100	2400	
Close Focus optics																
CF1 optics	**50:1**	20	10	8.5	1.4	11	26	41	57	72	60	103	118	133	164	194	225
CF2 optics	**50:1**	20	15.5	15	12	9	3	11	19	26	33	42	49	57	72	88	103
CF3 optics	**50:1**	20	16.5	16	14	12	8	4	10	16	21	28	33	40	52	64	76
CF4 optics	**50:1**	20	19.5	19	18.4	18	16.5	15	14	13	11.5	10	9	12	19	25	32
distance in mm		0	40	50	70	100	150	200	250	300	350	400	450	500	600	700	800

Model	CTLF-SF50-C3
Optical resolution	50:1
Temperature range [1]	-40°C to 975°C
Spectral range	8 to 14μm
System accuracy [2,3]	±1.5% or ±1.5°C
Repeatability [2]	±1% or ±1°C
Temperature resolution	0.5°C
Response time (90% signal)	9ms
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/analogue	channel 1	0/4 to 20mA, 0 to 5/10V, thermocouple J, K
	channel 2	sensor temperature (-40 to 85°C as 0 to 5V or 0 to 10V), alarm output
	optional	relay: 2 x 60VDC/ 42VACeff; 0.4A; optically isolated
Alarm output		open - collector (24V/ 50mA)
Outputs/digital	optional	USB, RS232, RS485, CAN, Profibus DP, Ethernet
Output impedances	current output	mA max. 500Ω (with 5 to 36VDC)
	voltage output	mV min. 100kΩ load impedance
		thermocouple 20Ω
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)
Cable length		3m (standard), 8m, 15m
Power supply		8 to 36VDC; max. 160mA
Laser		class II (635nm), 1mW, ON/OFF via controller or software

Environmental rating		IP 65 (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 200Hz, any axis
Shock	sensor	IEC 68-2-27: 50 G, 11ms, any axis
Weight		sensor: 600g; controller: 420g

[1] adjustable via controller or software
[2] ambient temperature: 23 ±5°C; whichever is greater
[3] temperature of the object >0°C

Accessories page 16 - 17
▸ Mounting bracket
▸ Air purge collar
▸ Rail mount adapter for controller
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▸ Interface kit
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▸ Certificate of calibration

LASER RADIATION
DO NOT STARE IN THE BEAM
CLASS 2 LASER
EN60825-1:2002
P≤1mW; λ=630-650nm

thermoMETER CTlaserGLASS: Temperature sensor with laser aiming for glass materials

thermoMETER CTlaserGLASS

Non-contact infrared temperature sensor for glass processing

➜ Measuring range from 100°C to 1650°C

➜ Accurate glass temperature measurements on flat glass lines, container glass machines, bulb manufacturing, car glass finishing and the production of solar panels

➜ Cooling and protection accessories for harsh environmental conditions

➜ Double laser aiming marks real spot location and spot size up from 1mm at any distance

➜ Optics 70:1 and 45:1 with selectable focus, compact sensor size

➜ Up to 85°C ambient temperature without cooling and automatic laser switch off at 50°C

➜ Selectable analogue outputs, optional plug in digital interfaces

Optical specifications thermoMETER CTlaserGLASS

□ = smallest spot size (mm)

Standard Focus optics

SF45L	45:1	20	20.8	21.7	22.5	23.4	24.2	25	25.9	27	32.5	38.4	50	61.7	73.4
SF70H	70:1	20	19.6	19.3	19	18.5	18.2	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 optics

CF1L	45:1	20	9.5	7	1.6	11	26.3	41.7	57	72.6	88.2	104	119.6	135	165	196	227
CF1H	70:1	20	9	6.5	1	10	25	40	55	70	85	100	115	130	160	190	220
CF2L	45:1	20	16	14.5	12	9	3.4	11.2	19	27	35	42.5	50.3	58	73.6	89.2	105
CF2H	70:1	20	15.5	14	11	8	2.2	9.6	17	24.5	42	39.2	47	54	69	84	99
CF3L	45:1	20	17	16.2	14.5	12.3	8.4	4.5	10.7	16.8	23	29	35	41.3	53.5	65.8	78
CF3H	70:1	20	16.9	16	14	11	7.2	2.9	8.7	14.4	20	25.6	31.2	37.3	48.7	60.2	71.6
CF4L	45:1	20	19.2	19	18.6	18	17	15.6	14.5	13.4	12.3	11.1	10	13.4	20	26.7	33.4
CF4H	70:1	20	18.9	18.5	17.8	17	15.5	14	12.5	11	9.5	8	6.5	9.5	15.4	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	CTLG-SF70H-C3
Optical resolution	45:1	70:1
Temperature range [1]	100 to 1200°C	250 to 1650°C
Spectral range	5,2μm	
System accuracy [2]	±1% or ±1°C	
Repeatability [2]	±0.5% or ± 0.5°C	
Temperature resolution	0.1°C	0.2°C
Response time (90% signal)	120ms	80ms
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/analogue	channel 1	0/4 to 20mA, 0 to 5/10V, thermocouple J, K	
	channel 2	sensor temperature (-40 to 85°C as 0 to 5V or 0 to 10V), alarm output	
	optional	relay: 2 x 60VDC/ 42VACeff; 0.4A; optically isolated	
Alarm output		open - collector (24V/ 50mA)	
Outputs/digital	optional	USB, RS232, RS485, CAN, Profibus DP, Ethernet	
Output impedances	current output	mA max. 500Ω (bei 5 to 36VDC)	
	voltage output	mV min. 100kΩ load impedance	
		thermocouple 20Ω	
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)	
Cable length		3m (standard), 8m, 15m	
Power supply		8 to 36VDC; max. 160mA	
Laser		class II (635nm), 1mW, ON/OFF via controller or software	

Environmental rating		IP 65 (NEMA-4)	
Ambient temperature	sensor	-20°C to 85°C (50°C if Laser is 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 200Hz, any axis	
Shock	sensor	IEC 68-2-27: 50 G, 11 ms, any axis	
Weight		sensor: 600g; controller: 420g	

[1] adjustable via controller or software
[2] ambient temperature: 23 ±5°C; whichever is greater

Accessories page 16 - 17
- Mounting bracket
- Air purge collar
- Rail mount adapter for controller
- Water cooled housing

- Interface kit
- Software CompactConnect
- Certificate of calibration

LASER RADIATION
DO NOT STARE IN THE BEAM
CLASS 2 LASER
EN60825-1:2002
P≤1mW; λ=630-650nm

thermoMETER CT laser M1/M2

Innovative temperature sensor with laser aiming for metal processing

➔ Measuring range from 250°C to 1800°C

➔ Accurate temperature measurements of metals, secondary metal processing and ceramic materials

➔ Short measuring wave length of 1μm or 1.6μm reduces error of temperature readings on surfaces with low or unknown emissivity

➔ Double laser aiming marks real spot location at any distance

➔ Optical resolution up to 300:1 with selectable focus

➔ Up to 85°C ambient temperature without cooling and automatic laser switch off at 50°C

➔ Selectable analogue outputs, optional plug in digital interfaces

Optical specifications thermoMETER CTlaser M1/M2
□ = smallest spot size (mm)

Standard Focus optics														
1L/2L SF	150:1	20	18.3	16.5	14.8	13	11.4	9.6	8.5	7.3	9.8	13.5	17.3	23.5	34.6
1H/2H SF	300:1	20	17.8	15.5	13.2	11	8.6	6.4	4.8	3.7	5.5	8.6	11.8	17	26.6
distance in mm		0	150	300	450	600	750	900	1000	1100	1200	1350	1500	1750	2200

Close Focus optics													
1L/2L CF2	150:1	20	13.7	7.3	1	8	15	22	36	50	64	78	92
1H/2H CF2	300:1	20	13.5	7	0.45	7.3	14	21	34.5	48.2	61.8	75.4	89
1L/2L CF3	150:1	20	15.4	10.7	6	1.3	6.7	12	22.6	33.3	44	55	65
1H/2H CF3	300:1	20	15.2	10.3	5.5	0.6	5.8	11	21.2	31.5	41.8	52.1	62.4
distance in mm		0	50	100	150	200	250	300	400	500	600	700	800

Close Focus optics													
1L/2L CF4	150:1	20	18.1	16.3	14.4	12.5	10.6	8.7	6.8	4.9	3	5.6	10.7	12.8	21
1H/2H CF4	300:1	20	18	16	13.8	11.8	9.7	7.6	5.6	3.5	1.4	3.8	8.6	13.3	18
distance in mm		0	50	100	150	200	250	300	350	400	450	500	600	700	800

Far Focus optics													
1L/2L FF	150:1	20	20.5	21	21.5	22	22.5	23	23.4	24	29	41	53.4	62.5
1H/2H FF	300:1	20	19	18	17	16	15	14	13.4	12	16.5	24.4	33.4	40
distance in mm		0	450	900	1350	1800	2250	2700	3000	3600	4000	5000	6000	6750

Model	CTLM-1LSF150-C3	CTLM-1HSF300-C3	CTLM-2LSF150-C3	CTLM-2HSF300-C3
Optical resolution	150:1	300:1	150:1	300:1
Temperature range [1]	485 to 1100°C	650 to 1800°C	250 to 800°C	385 to 1600°C
Spectral range	1μm		1.6μm	
System accuracy [2]	±0.3% or ±1°C		±0.3% or ±2°C	±0.3% or ±1°C
Repeatability [2]	±0.1% or ±1°C			
Temperature resolution	0.1°C	0.2°C	0.1°C	0.2°C
Response time (90% signal) [3]	1ms			
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			

		CTLM-1LSF150-C3	CTLM-1HSF300-C3	CTLM-2LSF150-C3	CTLM-2HSF300-C3
Outputs/analogue	channel 1	0/4 to 20mA, 0 to 5/ 10V, thermocouple J, K			
	channel 2	sensor temperature (-40 to 85°C as 0 to 5V or 0 to 10V), alarm output			
	optional	relay: 2 x 60 VDC/ 42VAC$_{eff}$; 0.4A; optically isolated			
Alarm output		open-collector (24V/ 50mA)			
Outputs/digital	optional	USB, RS232, RS485, CAN, Profibus DP, Ethernet			
Output impedances	current output	mA max. 500Ω (with 5 - 36VDC)			
	voltage output	mV min. 100kΩ load impedance			
		thermocouple 20Ω			
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)			
Cable length		3m (standard), 8m, 15m			
Power supply		8 to 36VDC; max. 160mA			
Laser		class II (635nm), 1mW, ON/OFF via controller or software			

Environmental rating		IP 65 (NEMA-4)
Ambient temperature	sensor	-20°C to 85°C (50 °C if laser ON)
	controller	0°C to 65°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, 11-200Hz, any axis
Shock	sensor	IEC 68-2-27: 50 G, 11ms, any axis
Weight		sensor: 600g; controller: 420g

[1] adjustable via controller or software
[2] E=1, response time 1s; ambient temperature: 23 ±5°C
[3] with dynamic adaptation at low signal levels

Accessories page 16 - 17
▸ Mounting bracket
▸ Air purge collar
▸ Rail mount adapter for controller
▸ Water cooled housing

▸ Interface kit
▸ Software CompactConnect
▸ Certificate of calibration

LASER RADIATION
DO NOT STARE IN THE BEAM
CLASS 2 LASER
EN60825-1:2002
P≤1mW; λ=630-650nm

thermoMETER CTlaserM3

Non-contact temperature sensor with laser aiming for metals,
secondary metal processing and ceramic materials from 50°C

→ Temperature range 50°C to 600°C

→ 2.3 μm measuring wave length for precise measurement if emissivity is unknown

→ Response time 1 ms

→ Double laser aiming marks real spot location at any distance

→ Optical resolution 100:1 and 60:1 with selectable focus

→ Up to 85°C ambient temperature without cooling and automatic laser switch off at 50°C

→ Selectable analogue outputs, optional plug in digital interfaces

Optical specifications thermoMETER CTlaserM3

□ = smallest spot size (mm)

Standard Focus optics														
3L SF	60:1	20	20	20	20	20	19	19	19	18.3	19	25	30	40	53
3H SF	100:1	20	19	18	17	16	15	14	12	11	13	16	20	28	38
	distance (mm)	0	150	300	450	600	750	900	1000	1100	1200	1350	1500	1750	2200

Close Focus optics													
3H CF1	60:1	20	9.3	1.2	10.3	25.5	40.5	56	71	102	132	162	192	223
3L CF1	100:1	20	9	0.7	9.6	24.4	39.2	54	69	99	128	158	187	217
	distance (mm)	0	40	70	100	150	200	250	300	400	500	600	700	800

Close Focus optics												
3H CF2	60:1	20	14.2	8.4	2.5	10	17.5	25	40	55	70	85	100
3L CF2	100:1	20	14	7.7	1.5	8.7	16	23	38	52	66	81	95
3H CF3	60:1	20	16	11.7	7.6	3.4	9.3	15.1	27	39	51	62	74
3L CF3	100:1	20	15.5	11	6.5	2	7.5	13	24	35	46	57	68
	distance (mm)	0	50	100	150	200	250	300	400	500	600	700	800

Close Focus optics														
3H CF4	60:1	20	18.7	17.3	15.9	14.5	13.1	11.7	10.3	9	7.5	10.6	17	23	29
3L CF4	100:1	20	18.3	16.6	14.9	13.2	11.4	9.7	8	6.3	4.5	7.3	13	19	24
	distance (mm)	0	50	100	150	200	250	300	350	400	450	500	600	700	800

Model	CTLM-3LSF60-C3	CTLM-3HSF100-C3
Optical resolution	60:1	100:1
Temperature range [1,2]	50 to 375°C	100 to 600°C
Spectral range	2.3 μm	
System accuracy [3]	±0.3 % or ±2 °C	
Repeatability [3]	±0.1 % or ±1 °C	
Temperature resolution (digital)	0.1 K	
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/analogue — channel 1	0/4 to 20mA, 0 to 5/ 10V, thermocouple J, K	
Outputs/analogue — channel 2	sensor temperature (-40 to 85°C as 0 to 5 V or 0 to 10 V), alarm output	
Outputs/analogue (option)	relay: 2 x 60 VDC / 42 VAC; 0.4 A; optically isolated	
Alarm output	open-collector (24 V / 50 mA)	
Outputs/digital — option	USB, RS232, RS485, CAN, Profibus DP, Ethernet	
Output impedances — current output	mA max. 500Ω (with 5 - 36VDC)	
Output impedances — voltage output	mV min. 100kΩ load impedance; thermocouple 20Ω	
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 (635nm), 1mW, ON/OFF via controller or software	

Environmental rating	IP 65 (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, 11-200Hz, 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] E=1, response time 1s; ambient temperature: 23 ±5°C
[4] with dynamic adaptation at low signal levels

Accessories page 16 - 17
▶ Mounting bracket
▶ Air purge collar
▶ Rail mount adapter for controller
▶ Water cooled housing
▶ Interface kit
▶ Software CompactConnect
▶ Certificate of calibration
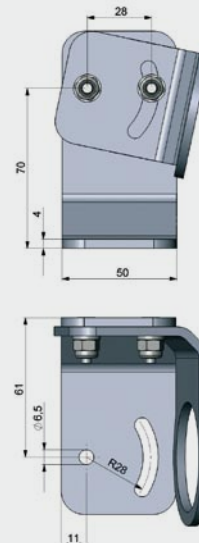
LASER RADIATION
DO NOT STARE IN THE BEAM
CLASS 2 LASER
EN60825-1:2002
P≤1mW; λ=630-650nm
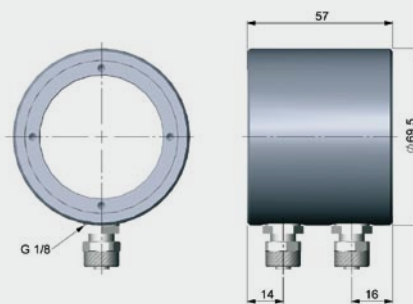
CTLaser / CTlaserGLASS / CTlaserM1/M2 / CTlaserM3

Controller

Sensor
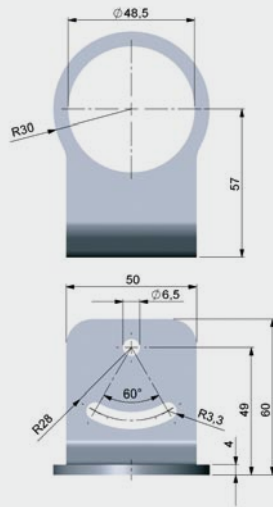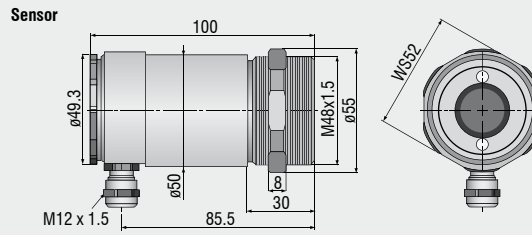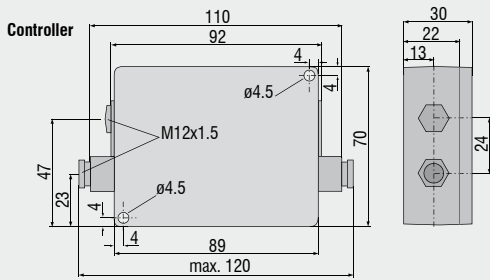
TM-FB-CTL Mounting bracket (fixed)

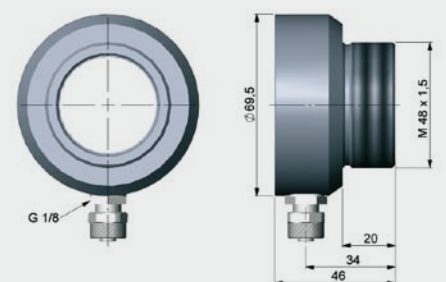TM-AB-CTLMounting bracket (adjustable)

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

TM-W-CTL Water cooled housing

TM-AP-CTL 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
2970240	TM-W-CTL	Water cooled housing, stainless steel, for ambient temperatures up to 175°C
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)

Calibration

2970253	TM-CERT-CTL	Certificate of calibration
2970324	TM-HTCERT-CTL	Certificate of calibration for CTlaser M1-/M2-/M3-/G-

Interfaces

2970245	TM-USBK-CTL	USB interface kit incl. computer cable, software CompactConnect
2970246	TM-RS232K-CTL	RS232 interface kit incl. computer cable, software CompactConnect
2970247	TM-RS485K-CTL	RS485 interface kit incl. RS485-USB-adapter, RS485 board, software CTmulti
2970248	TM-RS485B-CTL	RS485 interface board
2970249	TM-CANK-CTL	CAN-Bus interface for optris CT/ protocol: CANopen Presettings: module address 20 (14H), 250kBaud, 0-60°C
2970250	TM-PFBDPK-CTL	Profibus-DPv1 interface for CT selectable with DIN M12 or SUB-D connection
2970251	TM-ETHNK-CTL	Ethernet-Kit: interface board, external Ethernet adapter, software CompactConnect
2970252	TM-RI-CTL	Relay interface: Two optically isolated relays, 60VDC/ 42VACRMS, 0.4A
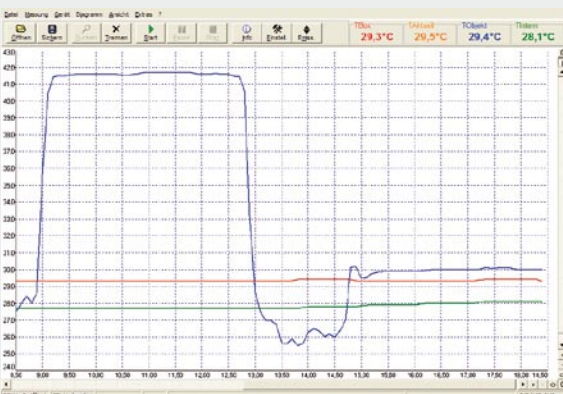
Software CompactConnect
- Graphic display and recording of temperature trends
- Remote control of outputs, easy sensor calibration
- Adjustment of signal processing functions
- Setup of output parameters and functional inputs

System requirements
- Windows XP, Windows 2000
- USB 2.0
- Hard disc min. 30 MByte
- min. 128 MByte RAM
- CD-ROM drive

thermoMETER CT

Precise non contact temperature sensor

→ Measuring range from -40 to 900°C

→ One of the smallest 22:1 infrared sensors worldwide

→ Rugged and usable up to 180°C ambient temperature without cooling

→ Separate controller with easy accessible programming keys and LCD backlit display

→ Selectable analogue outputs, optional plug in digital interfaces

→ Best price

Optical specifications thermoMETER CT

□ = smallest spot size (mm)

Standard Focus optics										
SF02	2:1	5	50	100	150	200	250	300	350	400
SF15	15:1	7	8	13	20	27	33	40	47	53
SF22	22:1	7	7	9	14	18	23	27	32	36
distance in mm		0	100	200	300	400	500	600	700	800
Close Focus optics (CF lense optional available)										
CF02	2:1	7	5.6	4.3	3	2.5	2.4	3	4.7	6.3
CF15	15:1	7	5	0.8	5	11	16	21	27	32
CF22	22:1	7	4	0.6	4	8	12	16	20	24
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]	-40°C to 600°C	-40°C to 600°C	-40°C to 900°C
Spectral range	8 to 14μm		
System accuracy [2]	±1% or ±1°C		
Repeatability [2]	±0.5% or ±0.5°C		
Temperature resolution	0.1°C		
Response time	150ms (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/analogue	channel 1	0/4 to 20mA, 0 to 5/10V, thermocouple J, K
	channel 2	sensor temperature (-20 to 180°C as 0 to 5V or 0 to 10V), alarm output
	optional	relay: 2 x 60VDC/ 42VACeff; 0.4A; optically isolated
Outputs/digital	optional	USB, RS232, RS485, CAN, Profibus DP, Ethernet
Output impedances	current output	mA max. 500Ω (with 8 to 36VDC)
	voltage output	mV min. 100kΩ load impedance
		thermocouple 20Ω
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)
Cable length		1m , 3m (standard), 8m, 15m
Power supply		8 to 36VDC; max. 100mA

Environmental rating		IP 65 (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 - 95%, non condensing	
Vibration	sensor	IEC 68-2-6: 3 G, 11 to 200Hz, any axis	
Shock	sensor	IEC 68-2-27: 50 G, 11ms, any axis	
Weight		sensor: 40g; controller: 420g	

[1] adjustable via controller or software
[2] ambient temperature 23 ±5°C; whichever is greater

Accessories page 32 - 35
- CF lense
- Protective window
- Mounting bracket / Mounting bolt
- Air purge collar
- Right angle mirror
- Rail mount adapter for controller
- Massive housing
- Protective tube
- Laser sighting tool
- Digital-Interface kit
- Accessory-Kit for use of the CT in hazardous locations
- Software CompactConnect
- Certificate of calibration

thermoMETER CTfast

Extreme fast non-contact temperature sensor

➔ Measuring range from -50 to 975°C

➔ One of the smallest infrared sensors worldwide with exposure times
between 3ms (50% signal) and 9ms (90% signal)

➔ Continuous process monitoring with an unchoppered sensor system.
Note: Conventional fast pyroelectrical infrared sensors with mechanical chopper see
processes only part of the time

➔ Easy to assemble in multiple arrays for line scanning of small and fast objects (hot
spot detection) using a bus communication

➔ Rugged up to 130°C ambient temperature without cooling

➔ Fast analogue output with intelligent real time data processing

Optical specifications thermoMETER CTfast

□ = smallest spot size (mm)

Standard Focus optics

SF10	10:1	7	10	20	30	40	50	60	70	80
distance in mm		0	100	200	300	400	500	600	700	800

Close Focus optics

CF10	10:1	7	5	1.2	8	18	24
distance in mm		0	5	10	15	20	25

Model	CTF-SF10-C3
Optical resolution	10:1
Temperature range [1]	-50°C to 975°C
Spectral range	8 to 14μm
System accuracy [2]	±1% or ±2°C
Repeatability [2]	±0.75% or ±0.75°C
Temperature resolution [3]	0.5°C
Response time	4ms (50%)
Response time	9ms (90%) at analogue output 4ms (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/analogue		0/4 to 20mA; 0 to 5/10V; thermocouple J, K
Alarm output		open-collector (24V/ 50mA)
Outputs/digital	standard	0/10V (10mA)
	optional	optional: relay: 2 x 60VDC/ 42V AC; 0.4 mA; optically isolated
Digitales Interface	optional	USB, RS232, RS485, CAN, Profibus DP, Ethernet
Output impedances	current output	mA max. 500Ω (8 to 36VDC)
	voltage output	mV min. 100kΩ load impedance
		thermocouple 20Ω
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)
Cable length		1m, 3m (standard), 8m, 15m
Power supply		8 to 36VDC; max. 100mA

Environmental rating		IP 65 (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 to 200Hz, any axis
Shock	sensor	IEC 68-2-27: 50 G, 11ms, any axis
Weight		sensor: 40g; controller: 420g

[1] adjustable via programming keys or software
[2] ambient temperature 23 ±5°C; whichever is greater with dynamic noise compression
[3] at object temperature ≥20°C

Accessories page 32 - 35

- ▶ CF lense
- ▶ Protective window
- ▶ Mounting bracket / Mounting bolt
- ▶ Air purge collar
- ▶ Right angle mirror
- ▶ Rail mount adapter for controller
- ▶ Massive housing
- ▶ Protective tube
- ▶ Laser sighting tool
- ▶ Digital-Interface kit
- ▶ Software CompactConnect
- ▶ Certificate of calibration

thermoMETER CThot

Precise non contact temperature measurement under rough environmental conditions

➔ Measuring range from -40°C to 975°C

➔ Environmental temperatures up to 250°C without any need of cooling

➔ Integrated high temperature cable

➔ A varity of applications in dryers, ovens, heat treatment lines in the metal and glass industry, paper, plastic and textile manufacturing and semiconductor processing

➔ Narrow beam optics allows oblique aiming to avoid material thickness dependent temperature readings

➔ Selectable analogue outputs, optional plug in digital interfaces

Optical specifications thermoMETER CThot

□ = smallest spot size (mm)

Standard Focus optics										
SF02	2:1	5	50	100	150	200	250	300	350	400
SF10	10:1	7	10	20	30	40	50	60	70	80
distance in mm		0	100	200	300	400	500	600	700	800

Model	CTH-SF02-C3H	CTH-SF10-C3H
Optical resolution	2:1	10:1
Temperature range [1]	-40 to 975°C	
Spectral range	8 to 14μm	
System accuracy [2]	±1% or ±1.5°C	
Repeatability [2]	±0.5% or ±0.5°C	
Temperature resolution	0.25°C	
Response time	100ms	
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/analogue	channel 1	0/4 to 20mA, 0 to 5/10V, thermocouple J, K	
	channel 2	sensor temperature (-40 to 250°C as 0 to 5V or 0 to 10V), alarm output	
	optional	relay: 2 x 60V DC/ 42VACeff; 0.4A; optically isolated	
Outputs/digital	optional	USB, RS232, RS485, CAN, Profibus DP, Ethernet	
Output impedances	current output	mA max. 500Ω (5 to 36VDC)	
	voltage output	mV min. 100kΩ load impedance	
		thermocouple 20Ω	
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)	
Cable length		3m (standard), 8m, 15m	
Power supply		8 to 36VDC; max. 100mA	

Environmental rating		IP 65 (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 200Hz, any axis	
Shock	sensor	IEC 68-2-27: 50 G, 11ms, any axis	
Weight		sensor: 40g (without massive housing); controller: 420g	

[1] adjustable via programming keys or software
[2] ambient temperature: 23±5°C; whichever is greater; at object temperatures ≥20°C

thermoMETER CTM1/M2

Innovative temperature sensor for metall processing

→ Measuring range from 250° to 1600°C

→ 1.0μm and 1.6μm wave length range for measurements of metals, of secondary metal processing, metal oxides and ceramic materials

→ Short measuring wave length reduces error of temperature readings on surfaces with low or unknown emissivity

→ Up to 100°C ambient temperature without cooling

→ Very small sensor fits everywhere

→ Selectable analogue outputs, optional plug in digital interfaces

Optical specifications thermoMETER CTM1/M2

□ = smallest spot size (mm)

Standard Focus optics											
1SF40/2SF40	40:1	7	7	10	15	20	25	30	35	40	
1SF75/2SF75	75:1	7	7	7	8	11	14	17	20	23	
	distance in mm	0	200	400	600	800	1000	1200	1400	1600	

Close Focus optics											
1CF40/2CF40	40:1	6.5	5.5	4.4	3.5	5.7	7.8	11.4	15	18.5	22.1
1CF75/2CF75	75:1	6.5	5	3.2	1.8	3.6	5.4	8.4	11.3	14.3	17.3
	distance in mm	0	50	100	140	170	200	250	300	350	400

Model	CTM-1SF40-C3	CTM-1SF75-C3	CTM-2SF40-C3	CTM-2SF75 -C3
Optical resolution	40:1	75:1	40:1	75:1
Temperature range [1]	485 to 1050°C	650 to 1800°C	250 to 800°C	385 to 1600°C
Spectral range	$1.0\mu m$		$1.6\mu m$	
System accuracy [2,3]	$\pm(0.3\%$ of reading $+2°C)$			
Repeatability [2]	$\pm(0.1\%$ of reading$+1°C)$			
Temperature resolution	0.1°C			
Response time [4]	1ms (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/analogue	channel 1	0/4 to 20mA, 0 to 5/10V, thermocouple J, K
	channel 2	sensor temperature (-20 to 100°C as 0 to 5V or 0 to 10V), alarm output
	optional	relay: 2 x 60V DC/ 42V ACeff; 0.4A; optically isolated
Outputs/digital	optional	USB, RS232, RS485, CAN, Profibus DP, Ethernet
Output impedances	current output	mA max. 500Ω (8 to 36VDC)
	voltage output	mV min.100kΩ load impedance
		thermocouple 20Ω
Inputs		programmable functional inputs for external emissivity adjustment, ambient temperature compensation, trigger (reset of hold functions)
Cable length		3m (standard), 8m, 15m
Power supply		8 to 36VDC; max. 100mA

Environmental rating		IP 65 (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 200Hz, any axis	
Shock	sensor	IEC 68-2-27: 50 G, 11ms, any axis	
Weight		sensor: 40g; controller: 420g	

[1] adjustable via programming keys or software
[2] ambient temperature 23 $\pm$5°C
[3] E=1, response time 1s
[4] with dynamic adaption at low signal levels

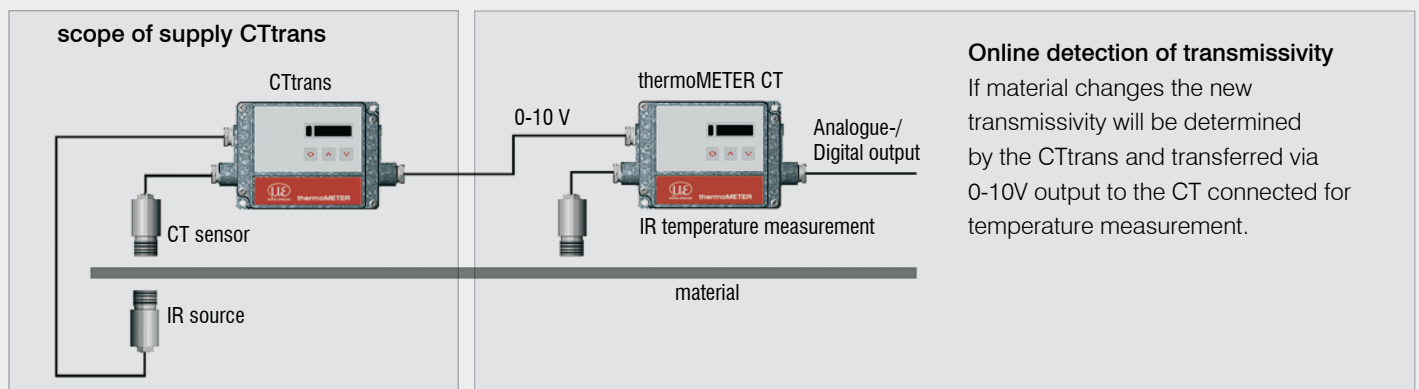## Accessories page 32 - 35

- ▶ CF lense
- ▶ Protective window
- ▶ Mounting bracket / Mounting bolt
- ▶ Air purge collar
- ▶ Right angle mirror
- ▶ Rail mount adapter for controller
- ▶ Massive housing
- ▶ Protective tube
- ▶ Laser sighting tool
- ▶ Digital-Interface kit
- ▶ Software CompactConnect
- ▶ Certificate of calibration

thermoMETER CTM3

NEW: Miniaturized infrared thermometer with 2.3μm wave length
for measurements from 50°C

➔ Measuring range from 50°C to 600°C

➔ Up to 100°C ambient temperature without cooling

➔ For measurements of metals, secondary metal processing, metal oxides and ceramic materials

➔ Short wave length range of 2.3μm to reduce error of reading with measurements on materials with unknown emissivity

➔ High electromagnetic compatiblity, neccessary for e.g. induction welding

➔ Very small sensor fits everywhere

➔ Selectable analogue outputs, optional plug in digital interfaces

Optical specifications thermoMETER CTM3

□ = smallest spot size (mm)

Standard Focus optics										
3SF22	22:1	7	9	18	27	36	45	55	64	73
3SF33	33:1	7	7	12	18	24	30	36	42	48
	distance in mm	0	200	400	600	800	1000	1200	1400	1600
Close Focus optics										
3CF22	22:1	6.5	6	5.5	5	9.2	14.5	19.7	24.9	30.1	35.4
3CF33	33:1	6.5	5.4	4.2	3.4	6.9	11.4	15.9	20.4	24.8	29.3
	distance in mm	0	40	80	110	150	200	250	300	350	400

Model	CTM-3SF22-C3	CTM-3SF33-C3
Optical resolution [1]	22:1	33:1
Temperature range [2,3]	50 to 375°C	100 to 600°C
Spectral range	2.3 μm	
System accuracy [4,5]	±(0.3 % +2 °C)	
Repeatability [4]	±(0.1 % +1 °C)	
Temperature resolution (digital)	0.1 K	
Response time [6]	1 ms (90 %)	
Emissivity/gain [2]	0.100 to 1.100	
Transmissivity/gain [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/analogue	channel 1	0/4 to 20 mA, 0 to 5/10 V, thermocouple J, K	
	channel 2	sensor temperature (-20 to 100 °C as 0 to 5 V or 0 to 10 V), alarm output	
Outputs/analogue	optional	relay: 2 x 60 VDC/42 VAC$_{eff}$; 0,4 A; optically isolated	
Alarm output		open-collector (24 V / 50 mA)	
Outputs/digital	optional	USB, RS232, RS485, CAN, Profibus DP, Ethernet	
Output impedances	current output	relay max. 500 Ω (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 (standard), 8 m, 15 m	
Power supply		8 to 36 VDC; max. 100 mA	

Environmental rating	IP 65 (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] E=1, response time 1 s
[6] with dynamic adaption at low signal levels

Accessories page 32 - 35
▸ Protective window
▸ Mounting bracket / Mounting bolt
▸ Air purge collar
▸ Right angle mirror
▸ Rail mount adapter for controller
▸ Massive housing
▸ Protective tube
▸ Laser sighting tool
▸ Digital-Interface kit
▸ Software CompactConnect
▸ Certificate of calibration

thermoMETER CTtrans

Mobile measuring system for thermal material analysis

➜ Combination of miniaturized infrared radiator and CT - infrared sensor

➜ Different modes for evaluation of the material parameters transmissivity, emissivity and reflection

➜ 0-10V - output allows transmission of the determined emissivity to a CT sensor

➜ Infrared temperature measurement with automatic material detection

➜ Available as a mobile system (with carrying case) or for fixed installations

➜ High life span of the infrared source (40.000h operating time)

scope of supply CTtrans

CTtrans

0-10 V

thermoMETER CT

Analogue-/
Digital output

CT sensor

IR temperature measurement

IR source

material

Online detection of transmissivity

If material changes the new transmissivity will be determined by the CTtrans and transferred via 0-10V output to the CT connected for temperature measurement.

Model	CTT-SF15-C3
Spectral range	8 to 14μm
Repeatability [1]	±1%
Probe size	>7mm
Emissivity	10 to 100%
Transmissivity/gain	0 to 100%
Reflexion	0 to 100%
Measurement cycle	0.1 to 99s
Recommended distance (IR source - sensor)	30 to 60mm

Outputs/analogue		0/4 to 20mA, 0 to 5/10V
Output/digital		3.3V/ 30mA
Relay output	optional	2 x 60VDC/ 42VACeff; 0.4A; optically isolated
Outputs/digital	optional	USB, RS232, RS485 (optional)
Output impedances	current output	mA max. 500W (with 8 to 36VDC)
	voltage output	mV min. 100kW load impedance
		thermocouple 20W
Input/digital		calibration input
Cable length		3m (standard)
Power supply		10 to 24VDC; max. 150mA

Environmental rating		IP 65 (NEMA-4)
Ambient temperature	sensor	-20°C to 100°C
	IR source	-20°C to 100°C
Storage temperature	sensor	-40°C to 120°C
	IR source	-40°C to 120°C
Relative humidity		10 to 95%, non condensing
Vibration		IEC 68-2-6: 3 G, 11 to 200Hz, any axis
Shock		IEC 68-2-27: 50 G, 11ms, any axis
Weight		sensor: 40g; IR source: 40g; controller: 450g

[1] ambient temperature: 23 ±5°C

Scope of supply
▸ CT 15:1 sensor
▸ IR source
▸ CTtrans controller
▸ Power supply (AA-batteries)
▸ Adjustment board
▸ Manual
▸ Case

thermoMETER CTex

Accessory kit for the use in hazardous locations

➔ Cost saving solution by simple concept

➔ Sensor as simple electrical device enables installations in hazardous locations

➔ Energy limitation with appropriate zener barriers (STAHL)

Zener barriers

Double zener barriers (type 9002/22-032-300-111) can be included in the scope of supply if required.

NOTE: The functionality and correct reading of the CT sensor
can only be guaranteed, if the recommended barriers are used.

Technical data (zener barriers)[1] type 9002/22-032-300-111		
Approvals	Europa (CENELEC)	for zone 1: PTB 01 ATEX 2053
		for zone 2: PTB 01 ATEX 2054
	USA	FM Approval 3010778
	Canada	CSA 1284580 (LR 43394)
Explosion protection	Europa (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
	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 safe area	
Environmental rating	acc. to IEC 60529/terminal IP 20/housing IP 40	
Ambient temperature	-20°C to 60°C	
Technical data of controller and sensor - page 10		

[1] Declaration of company R. STAHL AG
Modifications reserved

hazardous area

housing CA-215 aluminum

safe area

mounting rail

TP+ (yellow)   3
TP+ (green)   4
9002/22-032-300-111
zener barrier
1
2

PT1000 (white)   3
PT1000 (brown)   4
9002/22-032-300-111
zener barrier
1
2

R1
R2
C1 C2

shield

shielded cable type FEP TD 833CF, max. 15m

/PA   /PA   /PA

TP+ (yellow)
TP+ (green)
PT1000 (white)
PT1000 (brown)

CT controller

shield
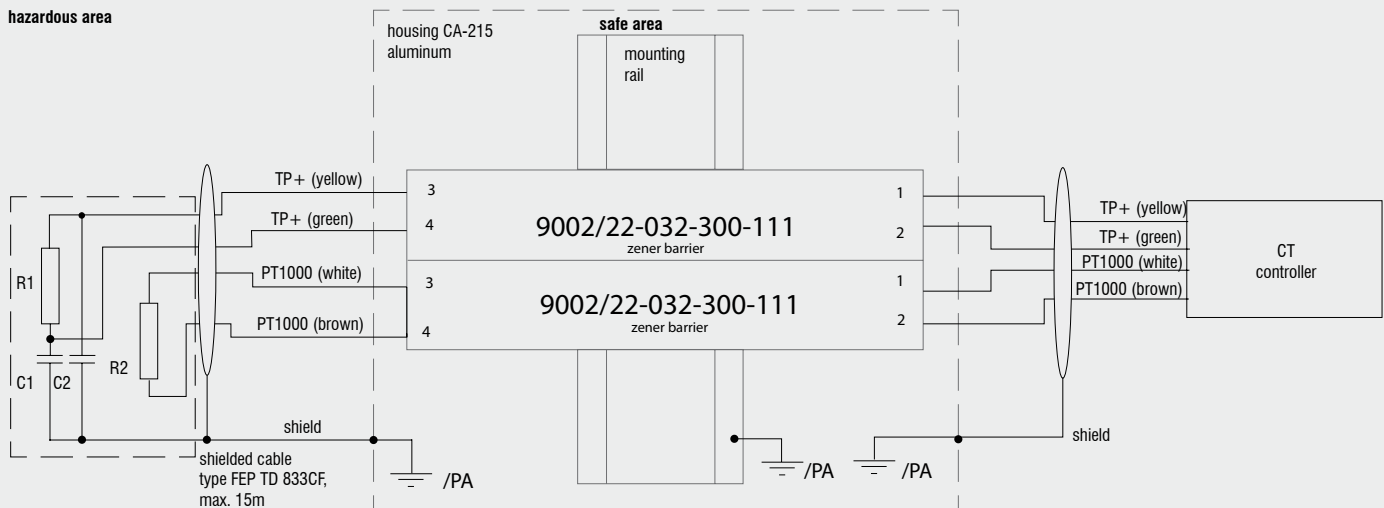
Sensor: "simple electrical device" (according to EN 50014)

PA-terminals of the barriers must be grounded.

Scope of supply
‣ aluminum housing with mounting appliance for two zener barriers and CT controller
‣ pre-assembled cable for CT controller
‣ CD with software tool for calibrating the barrier resistance into the head code

CT / CTfast / CTM1/M2 / CTM3
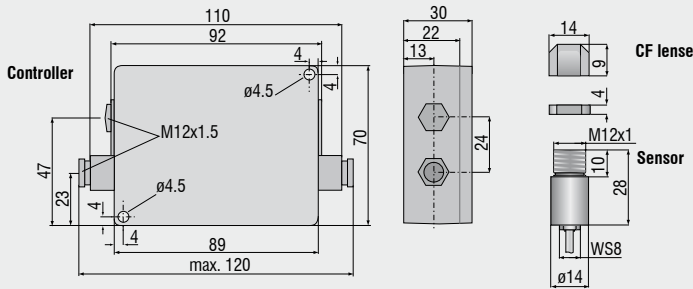
CThot
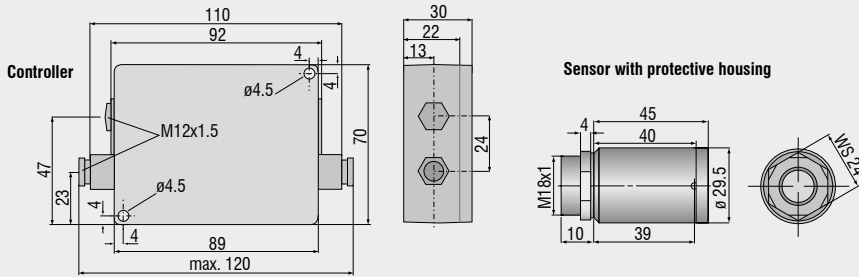
CTex
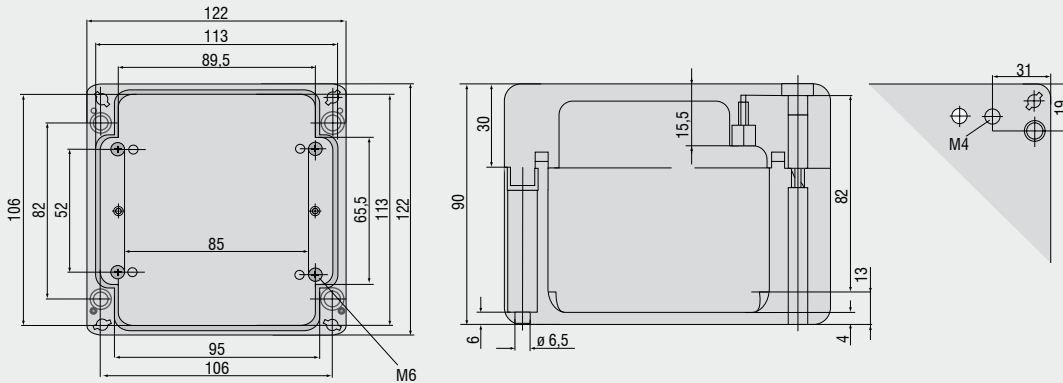
Software CompactConnect
- Graphic display and recording of temperature trends
- Remote control of outputs, easy sensor calibration
- Adjustment of signal processing functions
- Setup of output parameters and functional inputs

System requirements
- Windows XP, Windows 2000
- USB 2.0
- Hard disc min. 30 MByte
- min. 128 MByte RAM
- CD-ROM drive

Accessories

Optical accessoires

Art. No.	Model	
2970201	TM-CF-CT	CF-Lens (LT sensors only)
2970202	TM-PW-CT	Protective window (LT sensors only)

Interfaces

Art. No.	Model	
2970223	TM-USBK-CT	USB interface kit incl. computer cable, software CompactConnect
2970224	TM-RS232K-CT	RS232 interface kit incl. computer cable, software CompactConnect
2970225	TM-RS485K-CT	RS485 interface kit incl. RS485-USB-adapter, RS485 board, software multi
2970227	TM-CANK-CT	CAN-Bus interface for optris CT/ protocol: CANopen Presettings: module address 20 (14H), 250kBaud, 0-60°C
2970228	TM-PFBDPK-CT	Profibus-DPv1 interface for CT selectable with DIN M12 or SUB-D connection
2970229	TM-ETHNK-CT	Profibus-DPv1 interface for CT selectable with DIN M12 or SUB-D connection
2970230	TM-RI-CT	Relay interface: Two optically isolated relays, 60VDC/ 42VACRMS, 0,4A

Calibration

Art. No.	Model	
2970231	TM-CERT-CT	Certificate of calibration acc. ISO9001: testing procedure with defined ambient temperatures, target dimensions and distances; Test temperatures 20°C/ 100°C/ 500°C
2970310	TM-HTCERT-CT	Certificate of calibration for CTM sensors

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-tool
2970204	TM-AB-CT	Mounting bracket, adjustable
2970205	TM-MB-CT	Mounting bolt with M12x1 thread
2970206	TM-MG-CT	Mounting fork, adjustable in 2 axes, with thread M12x1
2970207	TM-AP-CT	Air purge collar from 10:1 optics
2970208	TM-AP2-CT	Air purge collar for 2:1 optic
2970209	TM-APL-CT	Air purge collar, laminar
2970210	TM-APLCF-CT	Air purge collar, laminar, mit integrierter CF-Lens
2970211	TM-RAM-CT	Right angle mirror for 90°C measurements
2970212	TM-RAIL-CT	Rail mount adapter for CT controller
2970213	TM-COV-CT	Closed cover for controller
2970214	TM-MHS-CT	Massive housing, compact, stainless steel
2970215	TM-MHS-CF-CT	Massive housing, compact, stainless steel with integrated CF-Lens
2970216	TM-MHA-CT	Massive housing, compact, anodized aluminium
2970217	TM-MHA-CF-CT	Massive housing, compact, anodized aluminium with integrated CF-Lens
2970218	TM-MHB-CT	Massive housing, compact, brass
2970219	TM-MHB-CF-CT	Massive housing, compact, brass with integrated CF-Lens
2970220	TM-PT-CT	Protective tube, lang, brass
2970221	TM-LST-CT	Laser sighting tool for CT sensors incl. batteries (2xalkaline cells AA)
2970300	TM-LSTOEM-CT	OEM Laser pointing device, 635 nm, rotation symmetrical, 3,5 m cable
2970222	TM-EX-CT	CTex-Kit: Accessory-Kit for use of the CT in hazardous locations according zone 1: PTB 01 ATEX 2053/ E II (1/2) G [EEx ia/ib] IIC/IIB, preassembled Ex-box without zener barriers, combinable with all standard CT LT sensors (except CTfast)

TM-AB-CT Mounting bracket, adjustable

TM-MG-CT Mounting fork, adjustable in two axes

TM-MB-CT Mounting bolt with M12x1 thread adjustable

TM-MG-CT Mounting fork witth M 12x1 thread adjustable in two axes
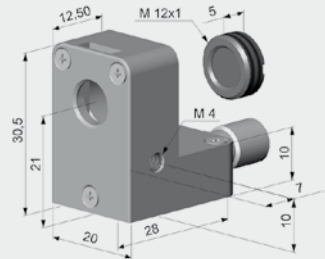
TM-APLCF-CT
CF lense/ protective window - integral option for air purge collar
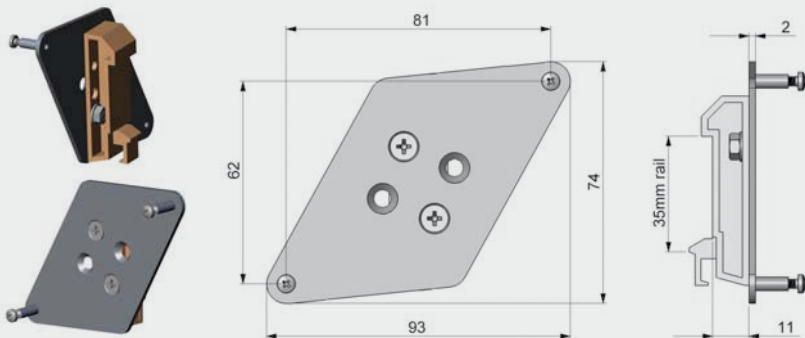
TM-RAIL-CT Rail mount adapter for electronic box

TM-LST-CT Laser-Sighting tool
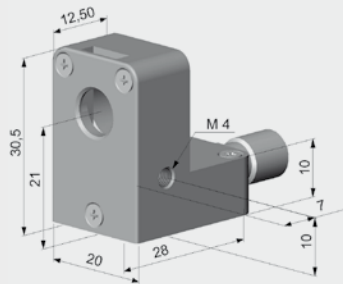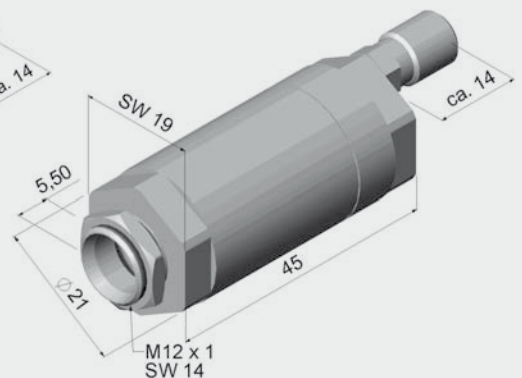

TM-APL-CT Air purge collar

TM-RAM-CT Right angle mirror
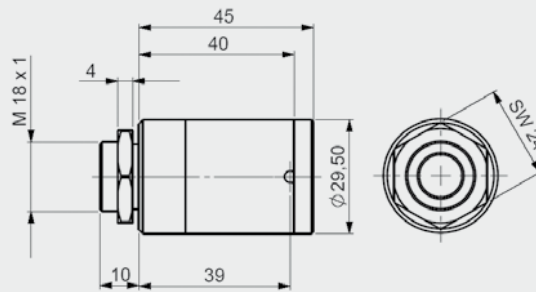
TM-MHS-CT Massive housing, compact, stainless steel, aluminium or brass

The lens must be kept clean at all times from dust, smoke, fumes and other contaminants in order to avoid reading errors. These effects can be reduced by using an air purge collar.
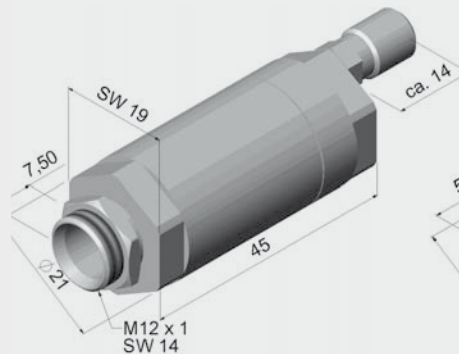
TM-AP-CT Standard air purge collar for 10:1 / 15:1 / 22:1 optics

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

thermoMETER CS

Compact low cost temperature sensor for OEM

→ Measuring range from -20 to 350°C

→ Rugged coated silicon optics

→ Integrated controller with LED alarm indication and smart electronic sighting support

→ Up to 75°C ambient temperature without cooling

→ Short circuit and reverse polarity protection

→ Programmable controller

→ Selectable analogue outputs, optional plug in digital interfaces

→ Wide power range: 5 - 7, 12 - 28V DC

Optical specifications thermoMETER CS

□ = smallest spot size (mm)

Standard Focus optics

SF10	10:1	7	10	20	30	40	50	60	70	80
distance in mm		0	100	200	300	400	500	600	700	800

Close Focus optics

CF10	10:1	7	5	1.2	8	16	24
distance in mm		0	5	10	15	20	25

Model	CS-SF10-C1
Optical resolution	10:1
Temperature range [1]	-20 to 350°C
Spectral range	8 to 14μm
System accuracy [2]	±1.5% or ±1.5°C
Repeatability [2]	±0.75% or ±0.75°C
Temperature resolution [3]	0.2°C
Response time	30ms to 999s (90%), adjustable
Emissivity/gain	0.100 to 1.100 (adjustable via 0 to 5V DC input or software)
Transmissivity/gain [1]	0.100 to 1.100
Signal processing [1]	peak hold, valley hold, average
Certificate of calibration	optional

Outputs/analogue	0 to 5V or 0 to 10V 1/10/100 mV/ °C
Outputs/digital optional	USB or Alarm
Inputs	programmable functional input for external emissivity/ambient temperature adjustment (0 to 5VDC), hold function or RS232 / USB (optional) communication
Cable length	1m (standard), 3m, 8m, 15m
Power supply	15mA (5 to 7VDC), 9mA (12 to 28VDC)

Environmental rating	IP 65 (NEMA-4)
Ambient temperature	-20°C to 75°C
Storage temperature	-20°C to 85°C
Relative humidity	10 to 95%, non condensing
Vibration	IEC 68-2-6: 3 G, 11 to 200Hz, any axis
Shock	IEC 68-2-27: 50 G, 11ms, any axis
Weight	58g

[1] adjustable via software
[2] ambient temperature: 23 ±5°C; whichever is greater; object temperature ≥0°C
[3] temperature of the object <100°C and time constant >0.2s

Accessories page 42 - 43

thermoMETER CSmicro

Low cost micro size infrared thermometer

➔ Measuring range from -20 to 350°C

➔ Rugged coated silicon optics

➔ Up to 120°C ambient temperature without cooling

➔ Micro electronics integrated into the cable

➔ Motorsport version with max. temperature range -20 to 1000°C

➔ Scalable analogue output: 0 - 10V or 0 - 5V and simultaneous alarm output

➔ Short circuit and reverse polarity protection

➔ Programmable controller

➔ Optional USB programming interface and software

Optical specifications thermoMETER CSmicro
□ = smallest spot size (mm)

Standard Focus optics									
SF10	**10:1**	7	10	20	30	40	50	60	70	80
distance in mm		0	100	200	300	400	500	600	700	800
Close Focus optics									
CF10	**10:1**	7	5	1.2	8	16	24			
distance in mm		0	5	10	15	20	25			

Model	CSmi-SF10-C1
Optical resolution	10:1
Temperature range [1]	-20°C to 350°C
Spectral range	8 to 14μm
System accuracy [2]	±1.5% or ±1.5°C
Repeatability [2]	±0.75% or ±0.75°C
Temperature resolution [3]	0.2°C
Response time (adjustable)	30ms to 999s (90%)
Emissivity/gain (adjustable via 0 - 5VDC input or software)	0.100 to 1.100
Transmissivity/gain [1]	0.100 to 1.100
Signal processing [1]	MAX-/MIN-hold, average
Dimensions controller length	70mm
Dimensions controller diameter	12mm
Certificate of calibration	optional

Outputs/analogue	0 - 5V or 0 - 10V
	1/10/100mV/ °C
optional	4 to 20 mA
Outputs/digital optional	USB or Alarm (50mA/ 24V)
Inputs	programmable functional input for external emissivity adjustment (0 - 5VDC), hold function or RS232 / USB (optional) communication
Cable length	1m (standard)
	0.5m between sensor and controller
	0.4m between controller and terminal
Power supply	15mA (5 to 7VDC), 9mA (12 to 28VDC)

Environmental rating	IP 65 (NEMA-4)
Ambient temperature sensor	-20°C to 120°C
Ambient temperature controller	-20°C to 75°C
Storage temperature	-20 - 85°C (sensor and controller)
Relative humidity	10 - 95%, non condensing
Vibration	IEC 68-2-6: 3 G, 11-200Hz, any axis
Shock	IEC 68-2-27: 50 G, 11ms, any axis
Weight	sensor: 42g

[1] adjustable via software
[2] at ambient temperature 23±5°C; object temperature >0°C; whichever is greater
[3] at object temperature >20°C and time constant >0.2s

Accessories page 42 - 43
▸ CF lense
▸ Protective window
▸ Mounting bracket / Mounting bolt
▸ Air purge collar
▸ Right angle mirror
▸ Software CompactConnect
▸ USB Kit

thermoMETER CX: Two wire temperature sensor for rugged industrial applications

thermoMETER CX

OEM temperature sensor with integrated controller

➜ Easy two wire installation

➜ Wide measurement range of -30°C to 900°C

➜ Optional USB programming interface and software

➜ Wide power range: 5-30V DC

➜ Optical resolution of 22:1

➜ Simultaneous two wire output and digital communication

➜ Alarm output (0-30V/ 500mA)

Optical specifications thermoMETER CX

□ = smallest spot size (mm)

Standard Focus optics									
SF15	**15:1**	7	8	13	20	27	33	40	47	53
SF22	**22:1**	7	7	9	14	18	23	27	32	36
distance in mm		0	100	200	300	400	500	600	700	800
Close Focus optics									
CF15	**15:1**	7	5	0.8	5	11	16	21	27	32
CF22	**22:1**	7	4	0.6	4	8	12	16	20	24
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]	-30°C to 150°C	-30°C to 900°C
Spectral range	8 to 14μm	
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	150ms (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	

Output /analogue	4 to 20mA	
Alarm output	0 to 30V/ 500mA (open collector)	
Outputs/digital (optional)	USB	
Loop impedance	max. 1000Ω (depends on supply voltage)	
Cable length	8m	
Power supply	5 to 30V DC	

Environmental rating	IP 65 (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 200Hz, any axis	
Shock	IEC 68-2-27: 50 G, 11ms, any axis	
Weight	350g	

[1] adjustable via software
[2] object temperature >0°C; at ambient temperature 23±5°C; whichever is greater
[3] at object temperature <100°C and time constant >0.2s

Accessories page 42 - 43
▸ CF lense
▸ Protective window
▸ Air purge collar
▸ Software CompactConnect
▸ USB Kit

CS

sensor with integrated controller   **CF lense**
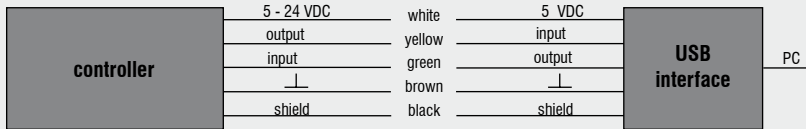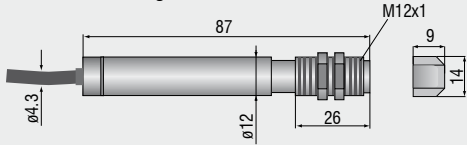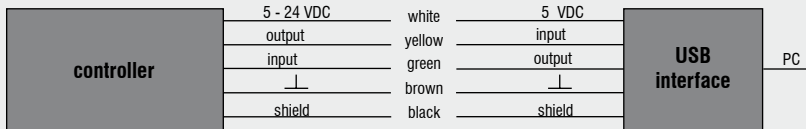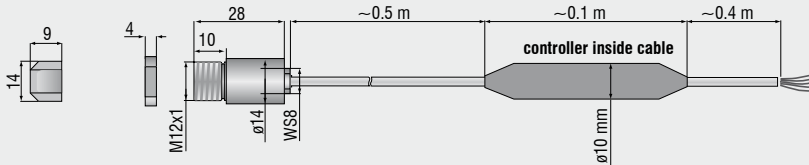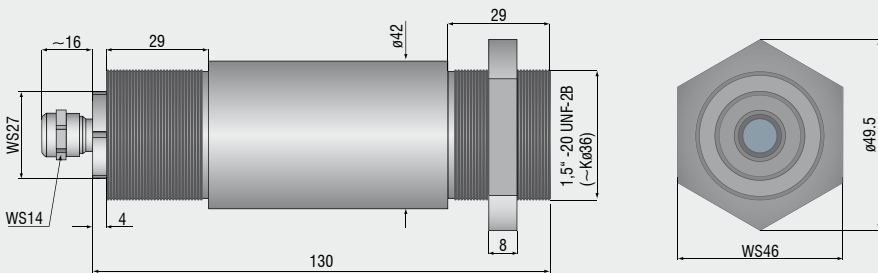
87   M12x1   9

ø4.3   ø12   26   14

controller		5 - 24 VDC	white	5 VDC		USB interface	PC
		output	yellow	input			
		input	green	output			
		⊥	brown	⊥			
		shield	black	shield			

CSmicro

CF lense   **sensor**

9   4   28   ~0.5 m   ~0.1 m   ~0.4 m

14   10

M12x1   ø14   WS8   **controller inside cable**   ø10 mm

controller		5 - 24 VDC	white	5 VDC		USB interface	PC
		output	yellow	input			
		input	green	output			
		⊥	brown	⊥			
		shield	black	shield			

CX

~16   29   ø42   29

WS27

1.5" -20 UNF-2B
(~Kø36)

WS14   4   8

130

ø49.5

WS46

Software CompactConnect

- Graphic display and recording of temperature trends
- Remote control of outputs, easy sensor calibration
- Adjustment of signal processing functions
- Setup of output parameters and functional inputs

System requirements

- Windows XP, Windows 2000
- USB 2.0
- Hard disc min. 30 MByte
- min. 128 MByte RAM
- CD-ROM drive

Mechanical accessories CS

Art. No.	Model	
2970279	TM-FB-CS	Mounting bracket, fixed
2970280	TM-AB-CS	Mounting bracket, adjustable
2970281	TM-MB-CS	Mounting bolt with M12x1 thread
2970282	TM-MG-CS	Mounting fork, adjustable in 2 axes, with thread M12x1
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, integrated CF-lens
2970286	TM-RAM-CS	Right angle mirror for 90°C measurements
2970287	TM-USBK-CS	USB interface kit incl. software Compact-Connect

Optical accessories CS

2970277	TM-CF-CS	CF-Lens for CS series
2970278	TM-PW-CS	Protective window for CS series

Calibration CS

2970288	TM-CERT-CS	Certificate of calibration at 23 °C, 110 °C

Mechanical accessories CX

Art. No	Model	
2970307	TM-AP-CX	Air purge collar, aluminium (anodized)
2970321	TM-FB-CX	Mounting bracket, adjustable in one axis, stainless steel
2970322	TM-AB-CX	Mounting bracket, adjustable in two axes, stainless steel
2970311	TM-USBK-CX	USB-Kit: USB programming adapter, Software CompactConnect

Optical accessories CX

2970302	TM-CF-CX	CF-lens for thermoMETER CX
2970303	TM-PW-CX	Protective window for thermoMETER CX

Calibration CX

2970323	TM-CERT-CX	Certificate of calibration at 23 °C, 110 °C, 510 °C
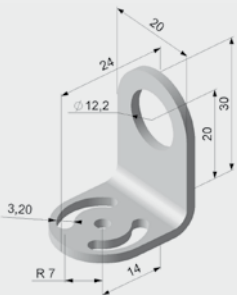
TM-AB-CS Mounting bracket, adjustable
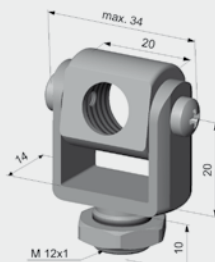
TM-MG-CS Mounting fork with M 12x1 thread adjustable in two axes
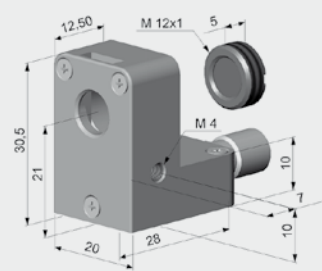
TM-APLCF-CS Air purge collar, laminar, integrated CF-lens
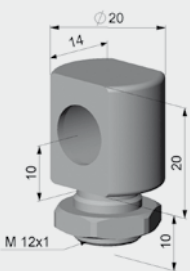
TM-AB-CS Mounting bolt with M12x1 thread adjustable
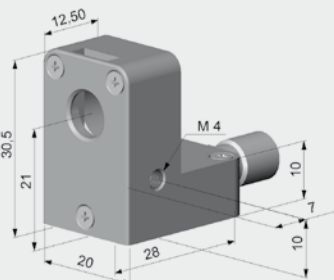
TM-APL-CS Air purge collar
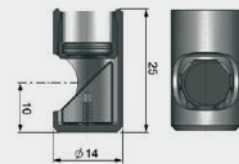
TM-RAM-CS Right angle mirror
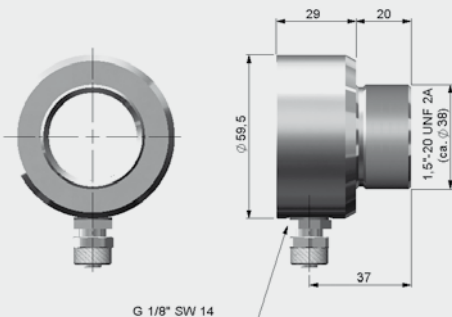
TM-AP-CX Air purge collar CX sensors
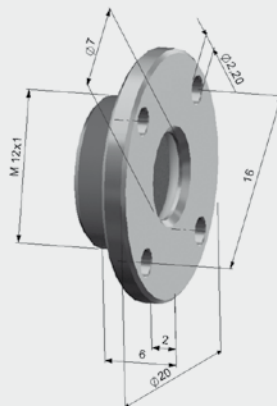
TM-CF-CX CF-Lens
TM-PW-CX Protective window

thermoMETER LS Infrared thermometer with crosshair laser sighting

➔ Measuring range from -35° to +900°C

➔ The new performance standard with spot sizes as small as 1mm

➔ Crosshair laser sighting marks the actual spot size at any distance

➔ Optical resolution 75:1

➔ Thermocouple input

➔ USB interface and graphic software with oscilloscope function

➔ Multi function flip display
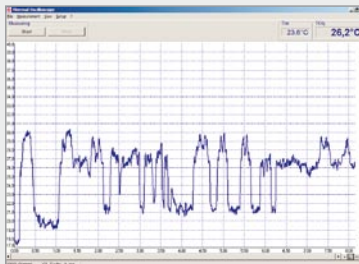
Optical specifications thermoMETER LS
□ = smallest spot size (mm)

Standard Focus optics	75:1	20	16	40	70	100	130
distance in mm		0	1200	2000	3000	4000	5000
Close Focus optics	CF 75:1	17	1	123	262		
distance in mm		0	62	500	1000		

Flip display for multi purposes:
Measurement of smallest objects (1mm) on a circuit
board - data transfer via USB to a common PC

Model	thermoMETER LS
Optical resolution	75:1
Temperature range	-35 to 900°C
Spectral response	8 to 14μm
Temperature coefficient	±0.05°C or ±0.05%[1]
System accuracy	±0.75°C or ±0.75% of reading [1]
Response time (95%)	150ms
Repeatability	±0.5°C or ±0.5% of reading [1]
Switchable to focus	1mm @ 62mm (90%)
Smallest spot	1mm
Laser class II	standard focus: patented crosshair laser (crosshair size = IR spot size@any distance) close focus: two point laser (laser dot size = IR spot size@focus distance)
Emissivity/gain	0.100 to 1.100 (adjustable)
Configurations	MAX/MIN/HOLD/DIF/AVG/°C/°F
Alarm functions	audible and visible HIGH/LOW alarm
Display	LC flip display (horizontal and vertical viewing directions controlled by position sensor)
Display LCD backlight	green and alarm colors (red, blue)
Bar graph display	auto scaling
Ambient temperature	0 to 50°C
Storage temperature	-30 to 65°C
Relative humidity	10 - 95% (non condensing)
Weight	420g
EMV	89/336/EWG
Vibration/Shock	IEC 68-2-6: 3 G, 11-200Hz, any axis IEC 68-2-27: 50 G, 11ms duration, any axis
Temperature range t/c probe input	-35 to 900°C (-30 to 1650°F)
Accuracy t/c probe input	±0.75°C or ±1% of reading [1]
Interface, data output	USB
Data memory	100 measurement protocols with time stamps, customizable 4 digit location and material names
Software	CompactConnect oscilloscope software with 20 readings per second
Power	battery 2xAA Alkaline or via USB
Battery life time	5h with laser on and 50% backlight use 10h with laser on and w/o backlight 25h w/o laser and backlight
Tripod mount	1/4-20 UNC
Option	certificate of calibration

[1] whichever is greater; at ambient temperatures 23 ±5°C; 20 to 900°C range

Scope of supply
▸ thermoMETER LS
▸ USB cable and software
▸ t/c type K insertion probe
▸ carrying case
▸ padded pouch
▸ wrist strap
▸ manual
▸ cells

Software IRConnect
- Data logging
- Display and recording of temperature graphs
- Modifications of handheld settings

System requirements
- Windows XP, Windows 2000
- USB 2.0
- Hard disc min. 30 MByte
- min. 128 MByte RAM
- CD-ROM drive

thermoMETER MS Intelligent universal infrared thermometer

➔ Temperature ranges from -32 up to 760°C

➔ Precision optics for accurate non-contact temperature measurement

➔ Exact measurement of objects as small as 13mm in any distance less than 140mm

➔ Optical resolutions up to 40:1

➔ Laser sighting with narrow beam aiming for accurate readings

➔ Adjustable acoustic HIGH-/LOW-alarm

➔ USB interface, thermocouple input type K, software optrisconnect

➔ Fast 0.3 second scanning of cold and hot spots

➔ Laser sighting with narrow beam aiming for accurate readings

➔ Extremely lightweight

Optical specifications thermoMETER MS

□ = smallest spot size (mm)

MS / MS Plus	20:1	13	20	37	50
	distance in mm	140	300	700	1000
MS Pro	40:1	13	15	22	27
	distance in mm	140	400	800	1000

Model	MS	MS Plus	MS Pro
Optical resolution	20:1, 13mm spot size up to 140mm		40:1, 50mm @ 2000mm
Temperature range	-32°C to 420°C	-32°C to 530°C	-32°C to 760°C
Spectral range	8 - 14µm		
System accuracy	±1% or ±1°C from 0°C to 420°C	±1% or ±1°C from 0°C to 530°C ±1°C ±0.07°C/°C from 0°C to -32°C	±0.75% or ±0.75°C from 0°C to 760°C
Repeatability	±0.5% or ±0.7°C from 0°C to 420°C	±0.5% or ±0.7°C from 0°C to 530°C ±0.7°C or ±0.05°C/°C from 0°C to -32°C	±0.75% or ±0.75°C from 0°C to 760°C ±0.75°C or ±0.07°C/°C from 0°C to -32°C
Temperature resolution	0.2°C	0.1°C	
Response time	300ms (95%)		
Ambient temperature	0°C to 50°C		
Storage temperature	-20°C to 60°C without battery		
Emissivity	fixed: 0.95	0.100 – 1.000 adjustable	0.100 - 1.500 adjustable
Configurations	Min/Max/Hold/°C/°F	Min/Max/Hold/°C/°F/Offset	
Alarm functions	-	Visual and acoustic HIGH-/LOW-alarm	
PC Interface, Software, Thermocouple Input	-	-	USB interface, IRConnect software, thermocouple element type K
Laser	<1mW laser class IIa, laser beam with 9mm offset		
Weight/Dimensions	150g; 190 x 38 x 45mm		180g; 190 x 38 x 45mm
Battery	9V alkaline battery		
Battery life	20h with laser and backlight on 50% 40h with laser and backlight off		
Relative humidity	10 – 95% RH non condensing, at <30°C ambient temperature		
Standard accessories	-	soft pouch, wrist strap	
Optional	certificate of calibration		

Software IRConnect
(included with MS Pro series)
- Data logging
- Display and recording of temperature graphs
- Modifications of handheld settings

System requirements
- Windows XP, Windows 2000
- USB 2.0
- Hard disc min. 30 MByte
- min. 128 MByte RAM
- CD-ROM drive

Sensors and measuring systems from Micro-Epsilon

Sensors and systems for displacement, position and dimension

Eddy current displacement sensors

Optical and laser sensors

Capactive sensors

Linear inductive sensors

Draw wire displacement sensors

Laser micrometer

2D/3D profile sensors (laser scanner)

Image processing

Sensors and systems for non-contact temperature measurement

IR handheld

Stationary IR sensors

Turn key systems for quality inspection

of plastics and film

of tires and rubber

of endless band material

of automotive components

of glass

MICRO-EPSILON