MICRO-EPSILON

More Precision

thermoMETER // Non-contact IR temperature sensors

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 CO_2 lasers (from VIS to 1800nm with 10.6μm)
- Far focus version for use with laser collimators
- Measuring wavelength of 2.3μm minimises errors due to emissivity uncertainty and misadjustment
- Sensor measures through glass lenses/sight glasses

Optical specifications thermoMETER CTM-3XL

☐ = smallest spot size (mm)

Standard Focus

SF100	100:1	20	19	18	17	16	15	14	12	11	13	16	20	28	38
SF300 H1/H2/H3	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 (mm)		0	150	300	450	600	750	900	1000	1100	1200	1350	1500	1750	2200

Close Focus

CF1-100	100:1	20	11	0.85	9.5	16.8	29.1	41.4	53.6	78.2	103	128	152	177
distance (mm)		0	40	85	120	150	200	250	300	400	500	600	70 0	800

Close Focus

CF2-100	100:1	20	14	7.7	1.5	8.7	16	23	38	52	66	81	95	
CF2-300 H1/H2/H3	300:1	20	13.5	7	0.5	7.3	14	21	34.5	48.2	61.8	75.4	89	
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	10.3	5.5	0.7	5.8	11	21.2	31.5	41.8	52.1	62.4	
distance (mm)		0	50	100	150	200	250	300	400	500	600	700	800	

Close Focus

CF4-100	100:1	20	18.3	16.6	14.9	13.2	11.4	9.7	8	6.3	4.5	7.3	13	19	24
CF4-300 H1/H2/H3	300:1	20	18	16	13.8	11.8	9.7	7.6	5.6	3.5	1.5	3.8	8.6	13.3	18
distance (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	33.4	36	42.5	58	73.5	85
FF300 H1/H2/H3	300:1	20	19	18	17	16	15	14	13.4	12	16.5	24.4	33.4	40
distance (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	2.3µm			
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]	1ms (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/analogue	0/4 - 20mA, 0 to 5/10V, thermocouple J, K, alarm			
Outputs/analogue optional	relay: 2 x 60VDC/42VAC$_{eff}$; 0.4A; electrically 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 8 - 36VDC)			
voltage output	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			
Power supply	8 to 36VDC; max. 100mA			
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 200Hz, any axis			
Shock sensor	IEC 68-2-27: 50 G, 11ms, any axis			
Weight	sensor: 150g; controller: 420g			

[1] 90% energy
[2] adjustable via programming keys or software
[3] target temperature > sensor temperature + 25°C
[4] at ambient temperature: 23 ±5°C
[5] ε = 1, response time 1s
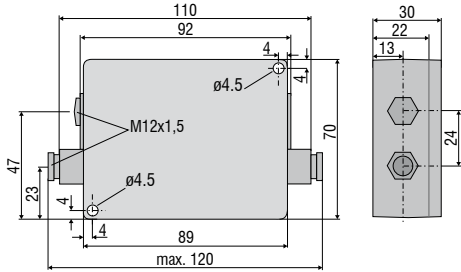[6] with dynamic adaption at low signal levels
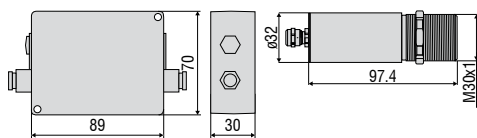
Product identification

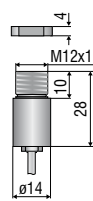| CTM-	3	SF100XL-	C3
			Cable length [3m]
		Focus [SF100 / SF300 / CF1 / CF2 / CF3 / CF4 / FF]	
	Spectral range [2.3µm]		
thermoMETER CTM			

Accessories page 40-43
▪ Mounting bracket
▪ Air purge collar
▪ Digital-interface kits
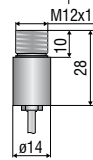▪ Certificate of calibration

CT / CTfast / CTM1/M2/M3
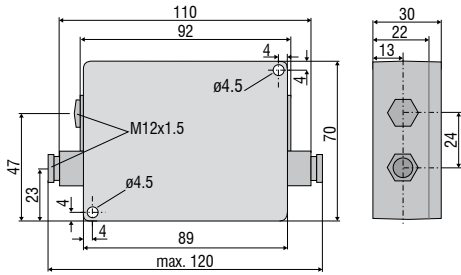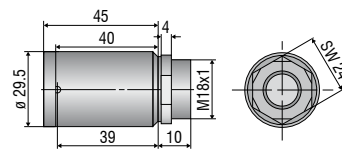
controller

ancillary CF lens (optional)
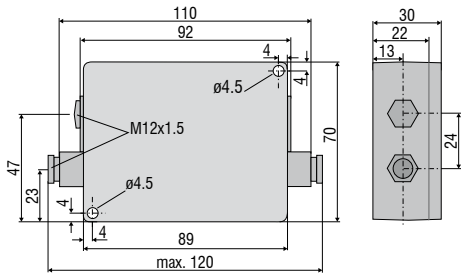
sensor

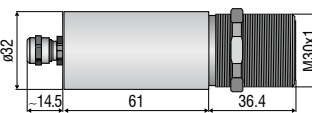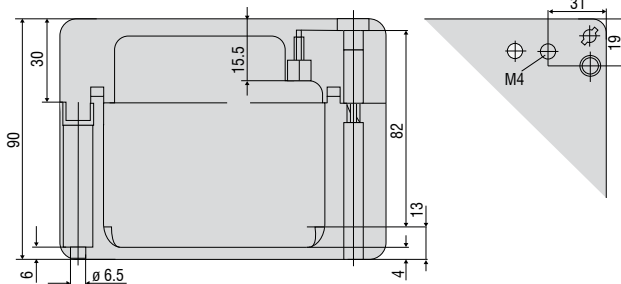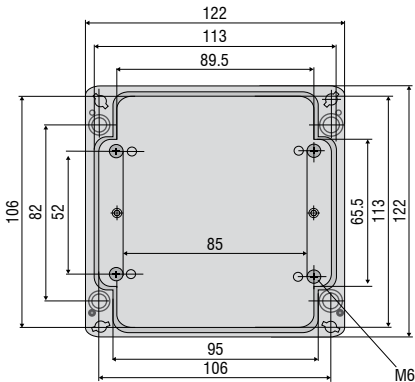## CThot / CTP-3 / CTP-7

controller
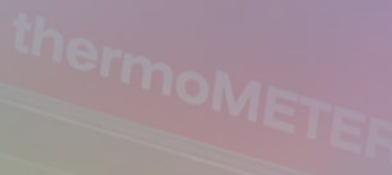
sensor with protective housing

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 fro 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
2970211	TM-RAM-CT	Right angle mirror for measurements 90° 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-MHSCF-CT	Massive housing made from stainless steel with integrated ancillary CF lens
2970358	TM-MHSCFH-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 anodised aluminium
2970217	TM-MHACF-CT	Massive housing made from anodised aluminium with integrated ancillary CF lens
2970359	TM-MHACFH-CT	Massive housing made from anodised aluminium with integrated ancillary CF lens for M1/M2/M3/M5 sensors
2970218	TM-MHB-CT	Massive housing made from brass
2970219	TM-MHBCF-CT	Massive housing made from brass with integrated ancillary CF lens
2970360	TM-MHBCFH-CT	Massive housing made from brass with integrated ancillary CF lens for M1/M2/M3/M5 sensors
2970220	TM-PT-CT	Protective tube made from brass
2970326	TM-PA-CT	Pipe adapter for the mounting of reflection protection tubes
2970327	TM-ST20-CT	Reflection protection tube; length 20mm
2970328	TM-ST40-CT	Reflection protection tube; length 40mm
2970329	TM-ST88-CT	Reflection protection tub; length 88mm
2970221	TM-LST-CT	Laser sighting aid for CT sensors incl. batteries (2xAlkaline AA)
2970300	TM-LSTOEM-CT	OEM laser sighting aid, 635nm, 3.5m cable, for connection to CT controller
2970300. 008	TM-LSTOEM-CT(008)	OEM laser sighting aid, 635nm, 8m cable, for connection to CT controller
2970222	TM-EX-CT	Accessories kit for using CT in Ex areas (Zone 1: PTB 01 ATEX 2053/ E II (1/2) G [EEx ia/ib] IIC/IIB), pre-assembled EX box, without Zener barriers, applicable in combination with CT sensors (except for CTfast)

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

Art. No.	Model	
2970223	TM-USBK-CT	USB interface kit: USB interface, USB cable, Software CompactConnect, second cable gland for controller
2970224	TM-RS232K-CT	RS232 interface: RS232 interface, computer cable, software CompactConnect, second cable gland for controller
2970338	TM-RS485USBK-CTL	RS485-USB-adapter, incl. PC cable, software CompactConnect 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 presettings: module address 20 (14H), 250kBaud, 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, software CompactConnect
2970230	TM-RI-CT	Relay interface: Two electrically isolated relays, 60VDC/ 42VAC$_{RMS}$, 0.4A

Calibration

Art. No.	Model	
2970231	TM-CERT-CT	Certificate of calibration
2970310	TM-HTCERT-CT	Certificate of calibration for CTM sensors

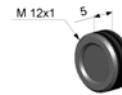## CTM3-XL

Art. No.	Model	
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

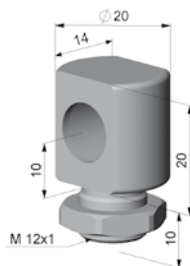TM-FB-CT Mounting bracket, adjustable in one axis
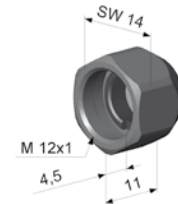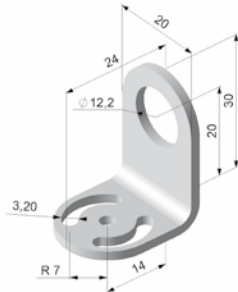
TM-CF-CT Ancillary CF lens (only for SF models)

TM-CFAG-CT Ancillary CF lens with external thread
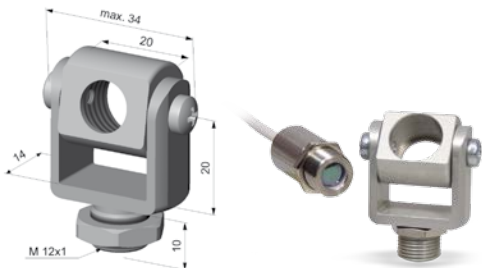TM-PWAG-CT Protective window with external thread

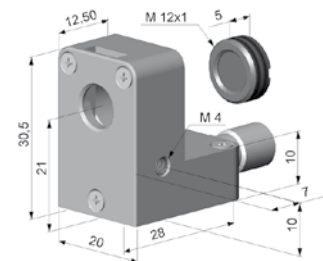TM-AB-CT Mounting bracket, adjustable in two axes

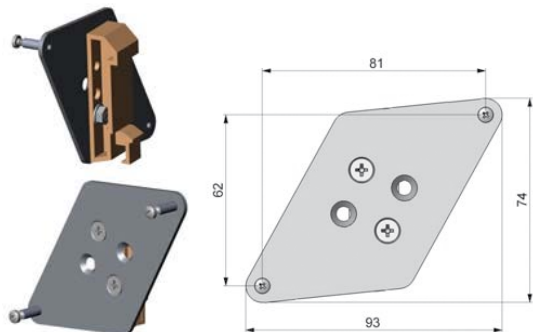TM-MB-CT Mounting bolt with M12x1 thread adjustable in one axis

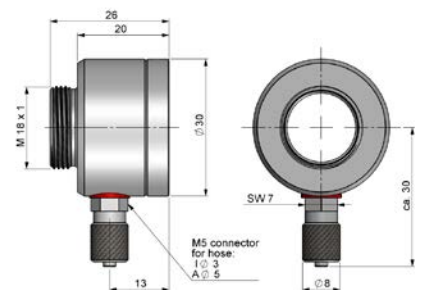TM-APL-CT Air purge collar, laminar and
TM-MG-CT Mounting fork

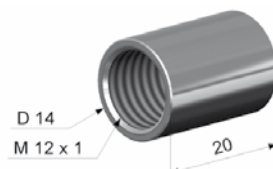TM-MG-CT Mounting fork with M12x1 thread, adjustable in two axes

TM-APLCF-CT
Ancillary CF lens/protective window - integrable variant for laminar air purge collar

TM-RAIL-CT Rail mount adapter for controller

TM-APMH-CT Air purge collar made from stainless steel for massive housing

TM-PA-CT Pipe adapter for reflection protection tube
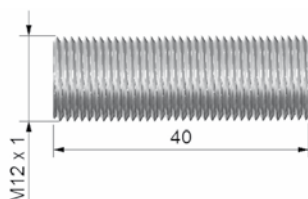
TM-ST40-CT Reflection protection tube

TM-LST-CT Laser sighting aid, battery-operated
(2x Alkaline AA), for alignment of CT sensors
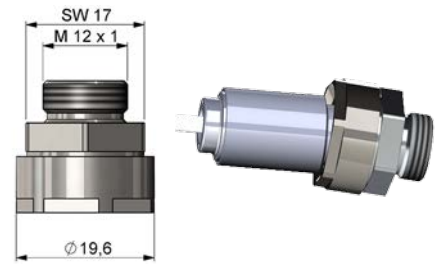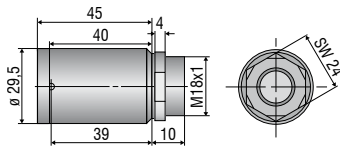(dimensions identical to CT sensor)
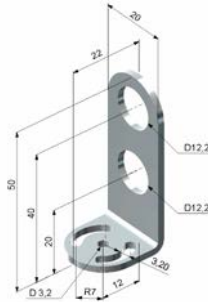
TM-FB2-CT
Mounting bracket for sensor and laser sighting aid
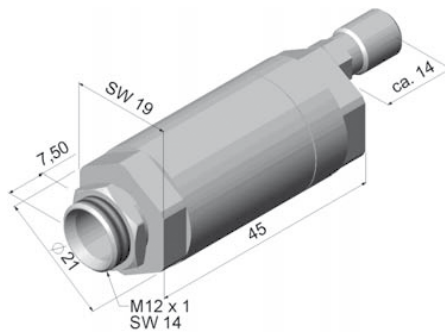
TM-RAM-CT
Right angle mirror

TM-MHS-CT Massive housing, stainless steel
TM-MHA-CT Massive housing, aluminium
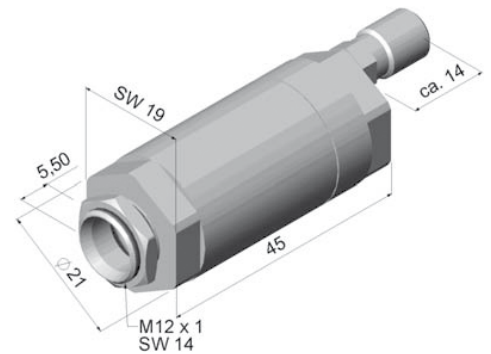TM-MHB-CT Massive housing, brass

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

Further IR temperature measurement devices from Micro-Epsilon

thermoIMAGER TIM
Compact USB thermal imaging cameras
for precise thermography

thermoMETER CTVideo/CSVideo
IR temperature sensors with
crosshair laser sighting and video output

thermoMETER Handheld
Innovative handheld pyrometer with laser
sighting for inspection and maintenance

MICRO-EPSILON