MICRO-EPSILON

More Precision

colorSENSOR // True Color Measuring Systems

colorSENSOR OT-3-LD

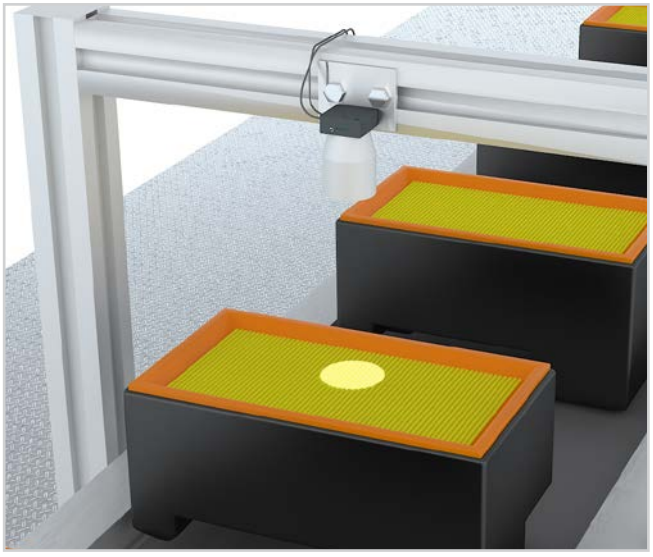
- ΔE — Repeatability in color ΔE ≤ 0.9
- Hz — Max. switching frequency 35 kHz
- INTER FACE — Interfaces: RS232 / USB
- Color memory for max. 31 colors per teach-in
- Measurement distance up to 900 mm
- Also suitable for color control of self-luminous objects

The colorSENSOR OT sensors are ideal for color determination from a large distance according to the True Color method. The OT series consists of sensor types with different working distances and spot sizes. The sensor housing of the OT3 color sensors includes the detector, the evaluation unit and the illumination so that no external controller is required.

Using a modulated white light LED, a white light spot is projected via the integrated lens onto the measuring object to be tested. Part of the light that is back scattered from the measuring object is directed onto a perceptive True Color detector element via the center of the lens, separated into long-, medium- and short-wave light components. Subsequently, it is transformed into L*a*b* color values.

A key on the sensor housing enables to teach in 31 colors/color groups. Using the separate configuration software, the sensor can be adjusted to the current measuring situation. If the sensor recognizes one of the taught colors, the color group is output via the corresponding digital switching outputs.

The OT sensor is also suitable for detecting the color of self-luminous objects. For this purpose, the internal illumination can optionally be deactivated via the software.



The True Color sensors of the OT3 series are designed for measuring tasks where a large distance from the measuring object must be maintained.

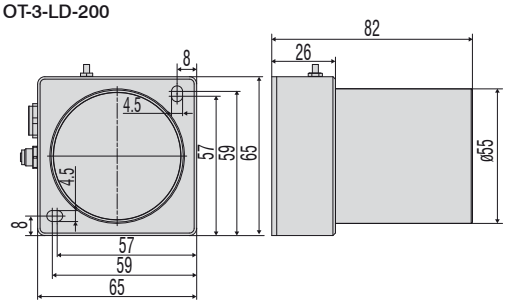
Model		OT-3-LD-200-6	OT-3-LD-200-12	OT-3-LD-200-26	OT-3-LD-500-23	OT-3-LD-500-50
Part number		10234434	10234437	10234438	10234085	10234086
Working distance	Start	100 mm	50 mm	50 mm	100 mm	100 mm
	Optimal	200 mm	200 mm	200 mm	500 mm	500 mm
	End	700 mm	500 mm	500 mm	900 mm	900 mm
Measurement spot diameter	Start	4 mm	4 mm	6 mm	6 mm	8 mm
	Optimal	6 mm	12 mm	26 mm	25 mm	58 mm
	End	28 mm	32 mm	70 mm	46 mm	105 mm
Light spot diameter	Start	4 mm	4 mm	6 mm	6 mm	8 mm
	Optimal	6 mm	12 mm	26 mm	25 mm	58 mm
	End	28 mm	32 mm	70 mm	46 mm	105 mm
Repeatability [1]		ΔE ≤ 0.9			ΔE ≤ 1.5	
Color distance		ΔE ≤ 1.8			ΔE ≤ 3.0	
Spectral range		400 ... 680 nm				
Color spaces		X/Y INT; s/i M (Lab)				
Illuminants		white light LED				
Standard observer		2°				
Tolerance model		3D (sphere; TOL); 2D (cylinder; CTO&ITO)				
Color memory		max. 31 colors in non-volatile EEPROM with parameter sets				
Measuring rate		max. 35 kHz (depending on number of colors learned and setting for averaging)				
Temperature stability		< 0.01 % FSO / K				
Light source		ultra-bright white light LED, AC/DC/PULSE modes (adjustable or OFF for self-luminous objects, switchable via software) [2]				
Permissible ambient light		max. 5,000 lx (in AC and PULSE modes)				
Synchronization		Possibility of synchronization is given				
Supply voltage		+24 VDC (± 10 %), reverse polarity protection, overload-proof				
Max. current consumption		160 mA				
Signal input		1 key and IN0 for external teaching of the color references				
Digital interface		RS232 (max. 115200 kBaud) (optional USB or Ethernet via converter)				
Switching output		OUT0 - OUT4, digital (0V/+Ub), short circuit proof, 100 mA max. switching current NPN-, PNP-capable (switchable light/dark switching)				
Digital output		none				
Connection		8-pin flange socket (Binder Series 712) (Power/PLC); 4-pin flange socket (Binder Series 707) (PC)(see accessories for connection cable)				
Mounting		with two slotted holes (8 x 4.5 mm)				
Temperature range	Storage	-20 … +85 °C				
	Operation	-20 … +55 °C				
Humidity		20 … 80 % r. H. (non-condensing)				
Protection class (DIN-EN 60529)	Optics	IP67				
	Controller	IP64				
Material		Aluminum black anodized (lens support: aluminum, naturally anodized)				
Weight		approx. 300 g			approx. 670 g	
Control and display elements		1 key for external teaching of the color references; switching state display with 5 yellow LEDs				
Features		manual adaption of illumination brightness, amplification of measurement signal and averaging; adjustable hold time of 0 ... 30 ms				

FSO = Full Scale Output

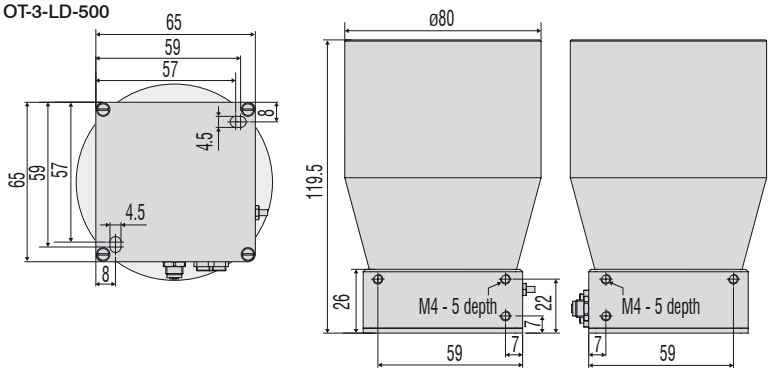
[1] Maximum color distance ΔE of 250 successive measurements of the color value of a light gray reference tile (R = 61%), measured with sensor FAR-T-A2.0-2,5-1200-67° at 1000 Hz and brightness adjustment with a white standard (R=95%)

[2] Suitable for illumination testing

OT-3-LD-200

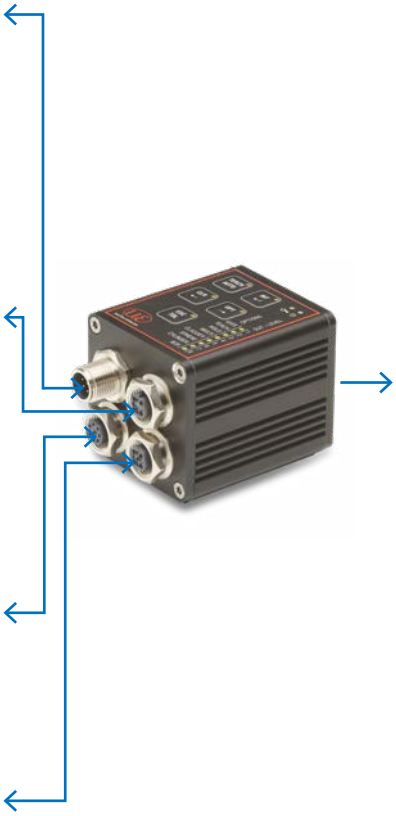


OT-3-LD-500



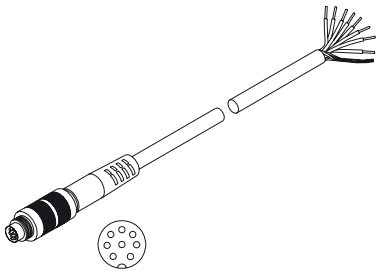
Dimensions:

Dimensions in mm, not to scale

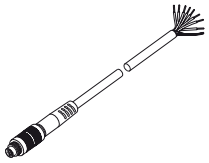
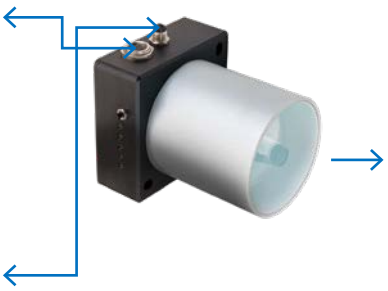
Connection cables		Mounting	Sensor	Accessories
Supply/RS232 Power supply unit PS2031 Art. no. 2420096 Connection PLC (I/O) 	Art. no. 11234717 (2 m) 11234718 (5 m) 		CSF1 CSF2 CSF3 CSF4 	White standard Art. no. 11234694 11234695 
Digital output/ Ethernet 	Art. no. 11234735 (2 m) 11234736 (5 m) 			Vacuum feed-through Art. no. 10811916 
Connection PLC (I/O) 	Art. no. 11234722 (2 m) 11234723 (5 m) 			C-mount lens Art. no. 11293186 and others 
Process interfaces (USB) 	Art. no. 11234732 (2 m) 11234733 (5 m) 	Mounting adapter Art. no. 11234713 11234762 11234763 		

Pin assignment

CAB-M12-8P-co-fm-straight; Xm-PUR; open ends
(Art.-No.: 11234717; 11234718)
Connection cable SYS; Power and PLC
(max. length 10 m, PUR sheath)

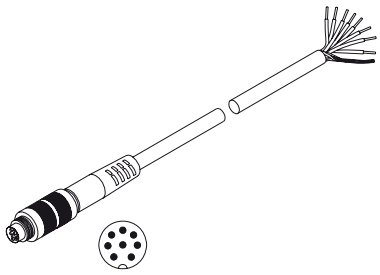


Pin	Color	CFO100/200
1	white	IN0
2	brown	+UB
3	green	TX
4	yellow	RX
5	gray	OUT0
6	pink	OUT1
7	blue	GND
8	red	OUT2

Connection cables		Mounting	Sensor	Accessories
Supply/PLC Power supply unit PS2031 Art. no. 2420096 	Art. no. 11234091 (2 m) 11234099 (5 m) 		No separate sensor or cable - integrated in sensor head	White standard Art. no. 11234694 11234695 
Digital output/ serial/Ethernet 	RS232 Art. no. 11234095 (2 m) 11234103 (5 m) USB Art. no. 11234096 (2 m) 11234104 (5 m) Ethernet Art. no. 11234910+11234735 (2.5 m) 11234910+11234736 (5.5 m)	Screw connection via integrated bore holes		

Pin assignment

CAB-M9-8P-co-straight; Xm-PUR; open ends
(Art.-No.: 11234091; 11234098)
Connection cable to power/PLC or digital I/O
(max. length 10 m, PUR sheath)



Pin	Color	OT-3-LD
1	white	GND (0V)
2	brown	+24 VDC (± 10%)
3	green	IN0
4	yellow	OUT0
5	gray	OUT1
6	pink	OUT2
7	blue	OUT3
8	red	OUT4

Customer-specific adaptations are possible for all sensors. We would be pleased to manufacture your sensor according to your specification/requirements. Please contact Micro-Epsilon Eltrotec!

Examples of customer-specific modifications:

Function
- Special types for CFS4 reflex sensor
- Special types for CFS3 transmission sensor or CFS1 angle sensor
- Special types for CFS5 receiving sensor

Optical fiber sheath
- Silicone-metal sheath
- VA stainless-steel sheath
- Metal sheath
- PVC metal sheath
- PVC special sheath
- BOA special sheath
- MA-radius-limiting special sheath

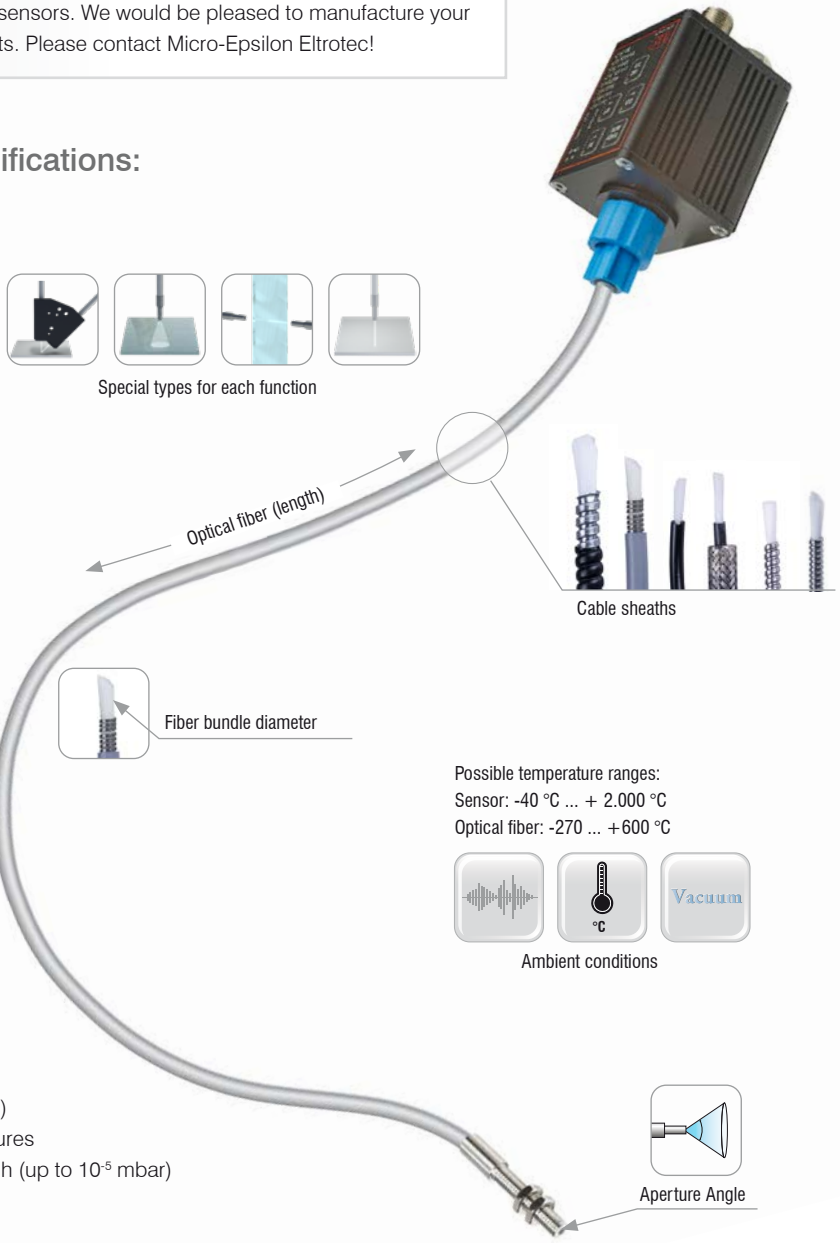
Fiber bundle diameter
- 0.6 / 1 / 1.5 / 2.5 / 3 mm

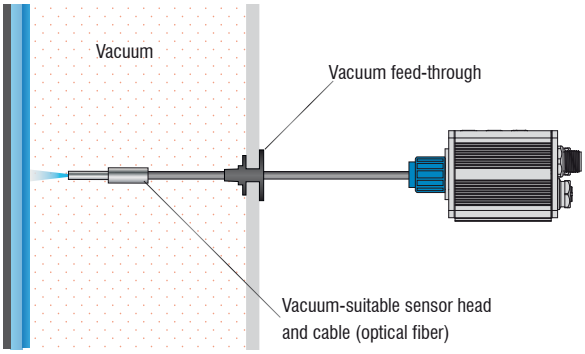
Optical fiber (length)
- Available from 300 mm
- Standard length 1,200 mm
- 600, 1,800 and 2,400 mm optionally available
- Individual length of 0.3 ... 2.4 m possible

Aperture angle
- Standard 67°
- Optional 22°

Ambient conditions
- Special versions with increased vibration resistance (VS)
- Special variants with special bonding for high temperatures
- Pressure-tight special variants with vacuum feed-through (up to 10^{-5} mbar)

Mountable lenses
- Focusing for small light spots (> 0.8 mm)
- Large object distances (= distance between sensor and measuring object) up to 200 mm
- Distances > 300 mm with C-mount lens





Vacuum suitability

The color sensors and optical fibers consist of passive components and do not give off heat. In vacuum, sensors (temperature bonding T250), optical fibers (stainless steel sheath), and the vacuum feed-through up to 10-5 mbar can be used.

Sensors and Systems from Micro-Epsilon

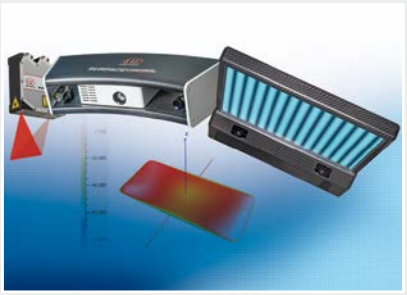
Sensors and systems for displacement, distance and position

Sensors and measurement devices for non-contact temperature measurement

Measuring and inspection systems for metal strips, plastics and rubber

Optical micrometers and fiber optics, measuring and test amplifiers

Color recognition sensors, LED analyzers and inline color spectrometers



3D measurement technology for dimensional testing and surface inspection

MICRO-EPSILON

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