



# More Precision

color**SENSOR** // Color Sensors, LED Analyzers





- Color sensor for large distances and mat surfaces
- 31 colors can be saved
- Focused illumination for rapidly changing object distances
- Color and gray scale evaluation
- PC programming via RS232

#### Features:

- White light LED ring, focused, covered with clear glass
- Object distance, typically 10 mm - 400 mm
- Focused white light operation enables large dynamic range
- Color memory: 31 colors per Teach-in and software
- RS232 interface (optional USB adapter)
- Switchable brightness readjustment
- Max. switching frequency: 30 kHz
- Different evaluation algorithms can be activated, e.g. „BEST HIT“ mode
- Switching state display via 5 yellow LEDs
- Switchable averaging
- Color control of self-luminous objects

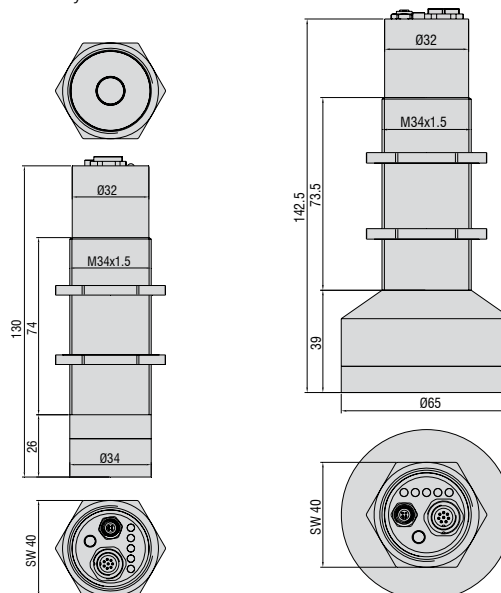
#### Application examples:

- Color recognition of mat surfaces at a distance of up to 400 mm
- Detection of color rings
- Color mark recognition in printing industry
- Packaging control
- Color sorting tasks
- Color control of self-luminous objects (LEDs, displays, etc.)
- Illumination recognition as per color and intensity

colorSENSOR OT color sensors are fixed lens sensors with True-Color detection. The sensor automatically illuminates the surface with white light and records the reflected color values. Aside from the optics, the models are almost identical. The illumination can be disabled by software. OT sensors are then suitable for the color detection of self-luminous sources.

#### Dimensions:

Dimensions in mm, not to scale



OT-3-MA-30-8/OT-3-MA-30-16  
OT-3-MA-50-12.5/OT-3-MA-50-25

OT-3-MA-80-36

Model	OT-3-MA-30-8	OT-3-MA-30-16	OT-3-MA-50-12.5	OT-3-MA-50-25	OT-3-MA-80-36
Article number	10234067	10234068	10234069	10234070	10234071
Object distance	typ. 10 mm - 100 mm ideal distance 30 mm		typ. 20 mm - 120 mm ideal distance 50 mm		typ. 40 mm - 150 mm ideal distance 80 mm
Light spot	Ø 5 - 16 mm	Ø 10 - 31 mm	Ø 4 - 24 mm	Ø 8 - 48 mm	Ø 30 - 48 mm
Light spot diameter	Ø 8 mm with 30 mm	Ø 16 mm with 30 mm	Ø 12.5 mm with 50 mm	Ø 25 mm with 50 mm	Ø 36 mm with 80 mm
Repeatability <sup>1)</sup>	$\Delta E \leq 0.9$				
Color distance	$\Delta E \leq 1.8$				
Color spaces	X/Y INT; s/l M (Lab)				
Averaging	over a maximum of 32,768 values				
Size of color memory	max. 31 colors in non-volatile EEPROM with parameter sets				
Switching frequency	max. 30 kHz (depending on number of colors learned and setting for averaging)				
Temperature drift X, Y	< 0.01% / K				
Light source	8x white light LEDs, AC/DC operation <sup>2)</sup> (adjustable or OFF for self-luminous objects, switchable via software)				12x white light LEDs, AC/DC operation <sup>2)</sup> (adjustable or OFF for self-luminous objects, switchable via software)
Type of illumination	focused				
Effect from illumination	Large dynamic range for mat/dark surfaces				
Ambient light	up to 5000 Lux (AC mode)				
Alternating light operation	AC: typ. 10 kHz to 40 kHz (depending on amplification level AMP1 to AMP8) DC: switchable by PC software				
Power supply	+24 VDC ( $\pm 10\%$ ), reverse polarity protection, overload-proof				
Power consumption	typ. 320 mA				
Max. switching current	100 mA, short circuit proof				
TEACH key/inputs	1 key and IN0 for external teaching of the color references				
Outputs	OUT 0 - OUT 4, digital (0 V/+Ub), short circuit proof, 100 mA max. switching current npn/pnp capable (switchable light/dark switching)				
Switching state display	visualization with 5 yellow LEDs				
Interface	RS232 (optional USB)				
Type of connector	power/PLC: 8-pole flange socket; (Binder series 712) PC: 4-pole flange socket (Binder series 712)				
Connection cable	power/PLC: art.no. 11234091 / PC: art.no. 11234095 (RS232); 11234096 (USB)				
Receiver	3-color filter detector (XYZ TRUE COLOR Detector, color filter curve according to CIE1931)				
Software	colorCONTROL S				
Pulse extension	adjustable from 0 ms to 100 ms				
Signal amplification	8 stages (AMP1 - AMP8), adjustable				
Housing material	Aluminum, anodized black				
Operating temperature	-20 ... +55 °C				
Storage temperature	-20 ... +85 °C				
Protection class	IP67 (lens), IP64 (electronics)				
EMC test according to	DIN EN60947-5-2				

<sup>1)</sup> maximum color distance  $\Delta E$  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<sup>2)</sup> at 1000 Hz and brightness adjustment with a white standard ( $R = 95\%$ )

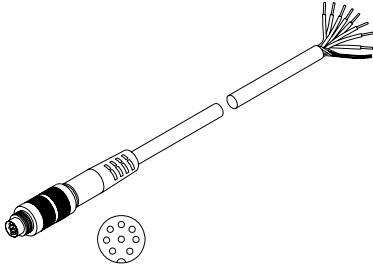
<sup>2)</sup> suitable for illumination testing

colorSENSOR Accessory		
Art. No.	Description	suitable for:
11234717	CAB-M12-8P-co-fm-straight; 2m-PUR; open ends	colorSENSOR CFO (SYS; power and PLC)
11234718	CAB-M12-8P-co-fm-straight; 5m-PUR; open ends	colorSENSOR CFO (SYS; power and PLC)
11234722	CAB-M12-8P-co-straight; 2m-PUR; open ends	colorSENSOR CFO200 (digital I/O; PLC)
11234723	CAB-M12-8P-co-straight; 5m-PUR; open ends	colorSENSOR CFO200 (digital I/O; PLC)
11234735	CAB-M12-4P-co-straight; 2m-PUR-Cat5e; RJ45-Eth	colorSENSOR CFO (Ethernet)
11234736	CAB-M12-4P-co-straight; 5m-PUR-Cat5e; RJ45-Eth	colorSENSOR CFO (Ethernet)
11234713	CFO mounting adapter	colorSENSOR CFO
11234762	CFO DIN rail mounting kit	colorSENSOR CFO
11234763	CFO DIN rail mounting adapter	colorSENSOR CFO
11234091	CAB-M9-8P-co-straight; 2m-PUR; open ends	colorSENSOR LT and OT series (power und PLC)
11234099	CAB-M9-8P-co-straight; 5m-PUR; open ends	colorSENSOR LT and OT series (power und PLC)
11234093	CAB-M9-4P-co-straight; 2m-PVC; RS232	colorSENSOR LT-2-DU (RS232)
11234101	CAB-M9-4P-co-straight; 5m-PVC; RS232	colorSENSOR LT-2-DU (RS232)
11234094	CAB-M9-4P-co-straight; 2m-PVC; USB	colorSENSOR LT-2-DU (USB)
11234102	CAB-M9-4P-co-straight; 5m-PVC; USB	colorSENSOR LT-2-DU (USB)
11234095	CAB-M5-4P-co-straight; 2m-PUR; RS232	colorSENSOR OT-3 Serie (RS232)
11234103	CAB-M5-4P-co-straight; 5m-PUR; RS232	colorSENSOR OT-3 series (RS232)
11234096	CAB-M5-4P-co-straight; 2m-PVC; USB	incl. RS232/USB converter suitable for: colorSENSOR OT-3 series (USB)
11234104	CAB-M5-4P-co-straight; 5m-PVC; USB	incl. RS232/USB converter suitable for: colorSENSOR OT-3 series (USB)
11234368	CAB-M5-4P-co-straight; 2m-PVC; RJ45-fm-Eth	incl. RS232/Ethernet converter suitable for: colorSENSOR OT-3 series (Ethernet)
11234694	White standard 30mm zenith	colorSENSOR and colorCONTROL
11234695	White standard 30mm zenith calibrated	colorSENSOR and colorCONTROL
11233482	White reference module	colorSENSOR LT-2-DU
2420065	PS2030 power supply 24 V / 24 W / 1A; 2m-PVC; terminal-2P-co-fm-straight	Power supply of all sensors with 24 VDC

colorCONTROL MFA Accessory		
Art. No.	Description	suitable for:
10814105	POF-2.2mm fiber optics	colorCONTROL MFA
11251112	Fiber-optic thread fitting; M4	POF-2,2
11251113	Mountable lens 6mm	Fiber-optic thread fitting; M4
11253931	Fiber-optic thread fitting; 3mm lens; M4	POF-2,2
11254108	Fiber-optic thread fitting; 90° lens; M5	POF-2,2
11253959	Reducing adapter 2.2/1mm POF; 2 pc.	colorCONTROL MFA for use of POF-1mm
10813842	POF-1mm fiber optics	colorCONTROL MFA in connection with the reducing adapter 2.2/1mm POF
11253906	End sleeve 1mm	POF-1mm
10824431	End sleeve 1mm x 50mm	POF-1mm
11234305	CAB-M8-4P-co-fm-straight; 2m-PUR; open ends	colorCONTROL MFA-1 (power and PLC)
11234306	CAB-M8-4P-co-fm-straight; 5m-PUR; open ends	colorCONTROL MFA-1 (power and PLC)
11294205	CAB-M9-2P-co-fm-straight; 2m-PUR; open ends	colorCONTROL MFA-5 (power)
11294206	CAB-M9-2P-co-fm-straight; 5m-PUR; open ends	colorCONTROL MFA-5 (power)
11234094	CAB-M9-4P-co-straight; 2m-PVC; USB	colorCONTROL MFA-5 (USB)
11234102	CAB-M9-4P-co-straight; 5m-PVC; USB	colorCONTROL MFA-5 (USB)
11234095	CAB-M5-4P-co-straight; 2m-PUR; RS232	colorCONTROL MFA-5 (RS232)
11234103	CAB-M5-4P-co-straight; 5m-PUR; RS232	colorCONTROL MFA-5 (RS232)
11294243	Assembly kit MFA-10	colorCONTROL MFA-5 + MFA-5-M
11294244	Assembly kit MFA-15	colorCONTROL MFA-5 + 2 x MFA-5-M
11294245	Assembly kit MFA-20	colorCONTROL MFA-5 + 3 x MFA-5-M
11294203	CAB-socket board-6P-co-fm-straight; 2m-PVC; 2P-open ends	colorCONTROL MFA-5-P (power)
11294054	CAB-socket board-6P-co-fm-straight; 1m-PVC; USB	colorCONTROL MFA-5-P (USB and power)
11294204	CAB-socket board-4P-co-fm-straight; 2.5m-PVC; RS232	colorCONTROL MFA-5-P (RS232)

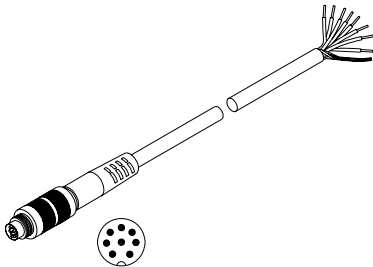
## Pin assignment

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



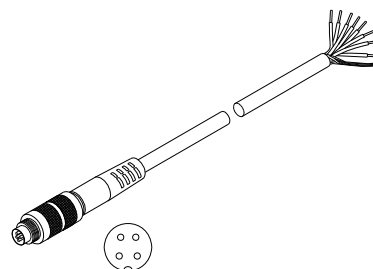
Pin	Color	CFO100/200
1	white	IN0
2	brown	+UB
3	green	TX
4	yellow	RX
5	gray	OUT0
6	pink	OUT1
7	blue	GND
8	red	OUT2

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



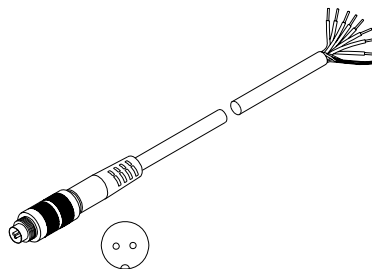
Pin	Color	LT-2-DU SB1	LT-2-DU SB2	OT-3-XX
1	white	OUT 0 / OUT A 0	OUT1	GND (0V)
2	brown	OUT 1 / OUT A 1	OUT2	+24 VDC ( $\pm 10\%$ )
3	green	IN1	OUT3	IN0
4	yellow	IN0	OUT4	OUT0
5	gray	CLK (OUT K)	OUT5	OUT1
6	pink	OUT 2 / OUT A 2	OUT6	OUT2
7	blue	GND (0V)	OUT7	OUT3
8	red	+24 VDC ( $\pm 10\%$ )	OUT0	OUT4

**CAB-M8-4P-fm-co-straight; Xm-PUR; open ends**  
(art.no.: 11234305; 11234306)  
Connection cable to Power/PLC  
(max. length 5m, PUR sheath)



Pin	Color	MFA-1
1	brown	+ 24 VDC
2	white	External Teach
3	blue	GND
4	black	NPN/PNP

**CAB-M9-2P-co-fm-Straight; Xm-PUR; open ends**  
(Art.-No.: 11294205; 11294206)  
Connection cable Power  
(max. length 10m, PUR sheath)



Pin	Color	MFA-5
1	white	+24 VDC
2	brown	GND

## High performance sensors made by Micro-Epsilon



Sensors and systems for displacement and position



Sensors and measurement devices for non-contact temperature measurement



2D/3D profile sensors (laser scanner)



Optical micrometers, fiber optic sensors and fiber optics



Color recognition sensors, LED analyzers and color inline spectrometer



Measurement and inspection systems