



# More Precision

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





- Multipoint color recognition system
- Optionally with up to 495 channels
- Color inspection in HSI and RGB color spaces
- Color differentiation/intensity tests/function tests

#### Features:

- Versatile coupling possibilities for fiber optics
- Individual configuration of fiber optics
- Each measuring position is freely configurable in terms of color, intensity and function
- Integration into testing process
- Good/bad evaluation
- Output of HSI, RGB and XY values via RS232, USB and Ethernet
- External trigger
- Exchangeable adapter for fiber optics
- Suitable for POF (2 m) and optical glass fiber optics up to 5m
- Up to 20 testing points using different assembly kits

#### Applications:

- Testing self-luminous objects
- LED tests (binning)
- Indication tests
- Display tests
- Display tests with 7 segments
- Parallel and simultaneous inspection of up to 100 colors  $\leq 1$ s
- Front panel tests
- With external illumination, multipoint color testing is possible

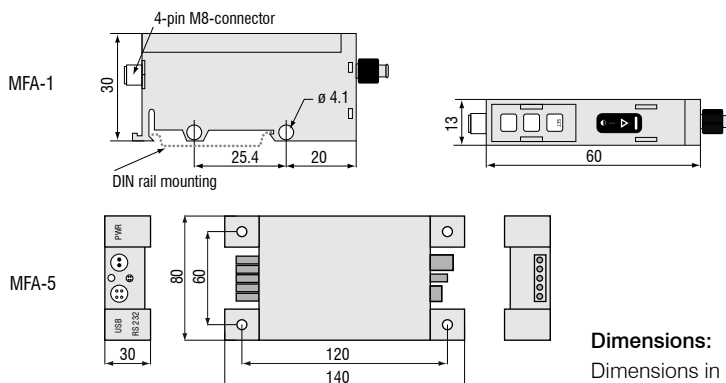
#### Function:

The information about color, intensity and light are directly transmitted from the measuring object to the MFA sensor via single fiber bundles and evaluated at up to 20 points at the same time.

The inspection of inaccessible specimens and/or specimens situated far apart from one another can easily be achieved using the MFA series, as optical fibers transmit the information to the evaluation unit.

Using the colorCONTROL MFA-5-M expansion module, the colorCONTROL MFA-5 can be extended by 5 testing points to 20 testing points. Additionally, one of the assembly kits is required depending on the construction depths (see accessories). For example: 20 testing points require: 1x colorCONTROL MFA-5 + 3x colorCONTROL MFA-5-M + 1x assembly kit MFA-20.

The colorCONTROL MFA-5-P board model is delivered without protection housing and can be interconnected with other MFA-5-P sensors. Here it is possible to switch up to 99 MFA-5-P sensors in series and to test 495 channels simultaneously.



#### Dimensions:

Dimensions in mm, not to scale

Model	MFA-1	MFA-5	MFA-5-M <sup>1</sup>	MFA-5-P
Article number	11094302	11094050	11094051	11094052
Detection points	1	5	extension of MFA-5 by 5 each	5
Test spectrum	480 - 1000 nm		450 - 650 nm	
Supply voltage	10 - 30 VDC	24 VDC $\pm$ 10 % residual ripple	24 VDC via MFA-5	5 VDC
Current consumption	100 mA	80 mA - 320 mA	160 - 320 mA	80 mA
Interface	-	RS232, USB, Daisy Chain	Daisy Chain	RS232, USB, Daisy Chain
Inputs	1 external teach input	-	-	-
Outputs	1 switching output NPN/PNP	-	-	-
	-	-	-	-
	-	-	-	-
Photo receiver	1 x b/w photodiode		5x True Color photo chip	
Accuracy	$\pm$ 5 %		$\pm$ 4 nm	
Resolution	-		9 - 81 pixels / detection point	
Data memory	EEPROM	-	-	-
Object distance			typ. 1 - 5 mm	
Optical fiber (length)	incl. POF 1 m; max. POF 2 m / glass 5 m		incl. POF 0.5 m; max. POF 2 m / glass 5 m	
Color space	-		HSI, RGB, XY + color temperature in K	
Dynamic range			200 lx - 4000 lx	
Testing frequency	$\leq$ 5 Hz		$\leq$ 1 Hz (100 detection points $\leq$ 1 s)	
Operating temperature	0 ... +60 °C		0 ... +50 °C	
Humidity			20 % to 80 % rel. humidity (non-condensing)	
Protection class	IP65	IP50	IP50	IP0

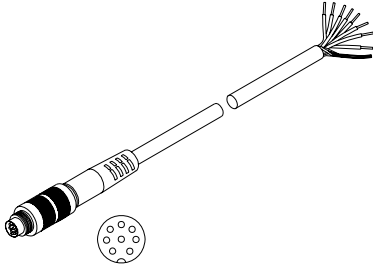
<sup>1)</sup> Modular expansion to 10/15/20 measuring positions

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)

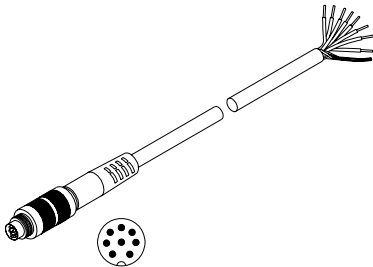
## Pin assignment

**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)



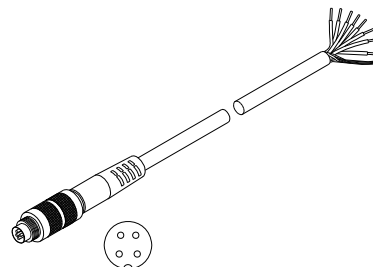
Pin	Color	CFO100/200
1	white	IN0
2	brown	+UB
3	green	TX
4	yellow	RX
5	gray	OUT0
6	pink	OUT1
7	blue	GND
8	red	OUT2

**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)



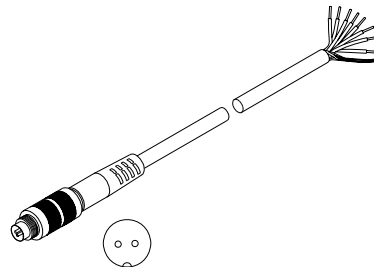
Pin	Color	LT-2-DU SB1	LT-2-DU SB2	OT-3-XX
1	white	OUT 0 / OUT A 0	OUT1	GND (0V)
2	brown	OUT 1 / OUT A 1	OUT2	+24 VDC ( $\pm 10\%$ )
3	green	IN1	OUT3	IN0
4	yellow	IN0	OUT4	OUT0
5	gray	CLK (OUT K)	OUT5	OUT1
6	pink	OUT 2 / OUT A 2	OUT6	OUT2
7	blue	GND (0V)	OUT7	OUT3
8	red	+24 VDC ( $\pm 10\%$ )	OUT0	OUT4

**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