MICRO-EPSILON

More Precision

Efficient LED testing

Color | Intensity | Function | Light spectrum

LEDs and Illumination

- 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 or USB
- External trigger
- Exchangeable adapter for fiber optics
- Suitable for POF (2 m) and optical glass fiber optics up to 5 m
- Up to 20 testing points using different assembly kits

Applications:

- Testing self-luminous objects
- LED tests (binning)
- Indication tests
- Display tests
- Seven-segment display tests
- Parallel and simultaneous inspection of up to 495 channels $\leq$ 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 color-CONTROL 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.

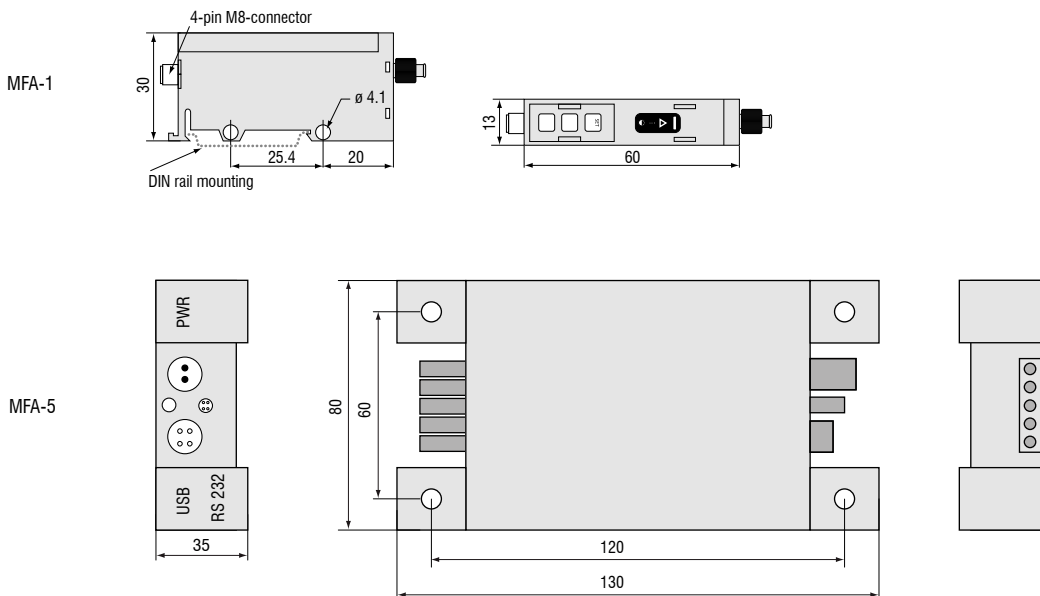| Model	MFA-1	MFA-5	MFA-5-M [1]	MFA-5-P [2]
Article number	11094302	11094050	11094051	11094052
Detection points	1	5	extension of MFA-5 by 5 each	5
Test spectrum	480 - 1000 nm	450 - 650 nm		
Supply voltage	10 ... 30 VDC	24 VDC ± 10 % residual ripple	24 VDC via MFA-5	5 VDC
Current consumption	100 mA	80 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	± 5 %	± 4 nm		
Resolution	-	9 - 81 pixels / detection point		
Data memory	EEPROM	-	-	-
Object distance	typ. 1 - 5 mm			
Optical fiber (length)	incl. POF ø 2.2 mm [3] x 1 m; max. POF 2 m / glass 5 m	incl. POF ø 2.2 mm [3] x 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	≤ 5 Hz	≤ 1 Hz (100 detection points ≤ 1 s)		
Operating temperature	0 ... +60 °C	0 ... +50 °C		
Humidity	20% to 80% rel. humidity (non-condensing)			
Protection class	IP65	IP50	IP50	IP0

[1] Modular expansion to 10/15/20 measuring positions
[2] Modular expandable to 495 channels (99 pieces in series connection)
[3] Reduction to ø 1.0 mm is possible with reducing adapter

Dimensions:
Dimensions in mm, not to scale

MFA-1

MFA-5

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 6 mm	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 2.2/1 mm POF; 2 pc.	colorCONTROL MFA for use of POF-1 mm
10813842	POF-1mm fiber optics	colorCONTROL MFA in connection with the reducing adapter 2.2/1 mm POF
11253906	Guide sleeve 1 mm	POF-1 mm
10824431	Guide sleeve 1 mm x 50 mm	POF-1 mm
11234517	Cutting knife for POF fiber optics	POF optical fiber
11234305	CAB-M8-4P-fm-co-straight; 2m-PUR; open ends	colorCONTROL MFA-1 (power and PLC)
11234306	CAB-M8-4P-co-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)

colorSENSOR Accessory

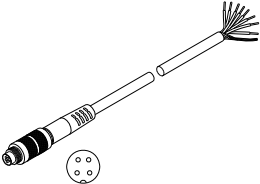| Art. No.	Description	suitable for:
11234717	CAB-M12-8P-co-fm-straight; 2m-PUR; open ends	colorSENSOR CFO (SYS; power and PLC)
11234718	CAB-M12-8P-co-straight; 5m-PUR; open ends	colorSENSOR CFO (SYS; power and PLC)
11234722	CAB-M12-8P-co-straight; 2m-PUR; open ends	colorSENSOR CFO200 (digital I/O; PLC)
11234723	CAB-M12-8P-co-straight; 5m-PUR; open ends	colorSENSOR CFO200 (digital I/O; PLC)
11234735	CAB-M12-4P-St-ge; 2m-PUR-Cat5e; RJ45-Eth	colorSENSOR CFO (Ethernet)
11234736	CAB-M12-4P-St-ge; 2m-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
11234694	White standard 30 mm zenith	colorSENSOR and colorCONTROL
11234695	White standard 30 mm zenith calibrated	colorSENSOR and colorCONTROL
2420065	PS2030 power supply 24V/24W/ 1A; 2m-PVC; terminal-2P-co-fm-straight	Power supply of all sensors with 24 VDC

colorCONTROL ACS accessories

Art. No.	Description	suitable for:
11234694	White standard 30 mm zenith	colorSENSOR and colorCONTROL
11234695	White standard 30 mm zenith	colorSENSOR and colorCONTROL
11234696	White standard 5x5cm Zenith	colorSENSOR and colorCONTROL
11234697	White standard 5x5cm Zenith calibrated	colorSENSOR and colorCONTROL
11234222	CAB-M9-4P-co-straight; 2m-PUR; open ends	colorCONTROL ACS7000 (power)
11234225	CAB-M9-4P-co-straight; 5m-PUR; open ends	colorCONTROL ACS7000 (power)
11234091	CAB-M9-8P-co-straight; 2m-PUR; open ends	colorCONTROL ACS7000 (digital I/O, Sync.)
11234099	CAB-M9-8P-co-straight; 5m-PUR; open ends	colorCONTROL ACS7000 (digital I/O, Sync.)
11234223	CAB-M9-7P-co-straight; 2m-PUR; open ends	colorCONTROL ACS7000 (Color Out)
11234226	CAB-M9-7P-co-straight; 5m-PUR; open ends	colorCONTROL ACS7000 (Color Out)
11294232	CAB-RJ45-Eth; 2m-PVC-Cat5e; RJ45-Eth	colorCONTROL ACS7000 (Ether-net/-CAT)
11293257	CAB-RJ45-Eth; 5m-PVC-Cat5e; RJ45-Eth	colorCONTROL ACS7000 (Ether-net/-CAT)
11294277	CAB-RJ45-Eth-Cross; 3m-PVC-Cat5e; RJ45-Eth	colorCONTROL ACS7000 (Ether-net/-CAT)
11293258	CAB-RJ45-Eth-Cross; 5m-PVC-Cat5e; RJ45-Eth	colorCONTROL ACS7000 (Ether-net/-CAT)
11234224	CAB-M9-5P-co-straight; 2m-PVC-RS422; open ends	colorCONTROL ACS7000 (RS422)
11234227	CAB-M9-5P-co-straight; 5m-PVC-RS422; open ends	colorCONTROL ACS7000 (RS422)
11234230	CAB-M9-5P-co-straight; 2m-PVC-RS422; Sub-D-15P-co-straight	colorCONTROL ACS7000 (IF2008)
11234231	CAB-M9-5P-co-straight; 5m-PVC-RS422; Sub-D-15P-co-straight	colorCONTROL ACS7000 (IF2008)
2213017	IF2008 Interface card RS422 / PCI-card	colorCONTROL ACS7000 (RS422/PC)
2213025	IF2001/USB 1-channel RS422/USB converter	colorCONTROL ACS7000
10824338	FCS-ACS1-30/0 tactile adapter	FCS-X-ACS1-30/0-50-XXXX
10824424	FCS-ACS adapter TT-TR	all ACS sensor heads (connection illumination into receiving fibers)
10824804	FCS-ACS3 90° attachment	FCS-X-ACS3 TT and TR
10824414	FCS-ACS3-200 mounting rail	FCS-X-ACS3
10824423	FCS-ACS3 mounting adapter 50 mm	FCS-ACS3-200 mounting rail
10824422	FCS-ACS3 mounting adapter 150 mm	FCS-ACS3-200 mounting rail
10824708	FCS-ACS1/ILD1420 adapter plate angled	FCS-X-ACS1 distance readjustment with ILD1420
10824709	FCS-ACS2/ILD1420 adapter plate angled	FCS-X-ACS2 distance readjustment with ILD1420
10824710	FCS-ACS2/ILD1420 adapter plate angled	FCS-X-ACS2 distance readjustment with ILD1420
2420065	PS2030 power supply 24V/24W/ 1A; 2m-PVC; terminal-2P-co-fm-straight	CAB-M9-4P-co-straight; Xm-PUR; open ends (power)

Pin assignment

CAB-M9-4P-co-straight; Xm-PUR; open ends
(art.no.: 11234222; 11234225)
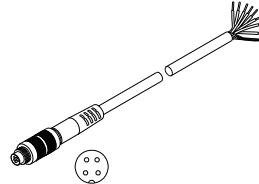Connection cable Power
(max. length 10 m, PUR sheath)

Pin	Color	ACS7000
1	white	n. c.
2	brown	+24V DC (±15%)
3	black	n. c.
4	blue	GND (0V)

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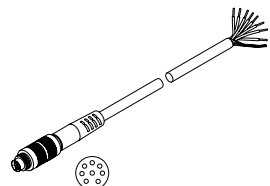(max. length. 5 m, PUR sheath)

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

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)

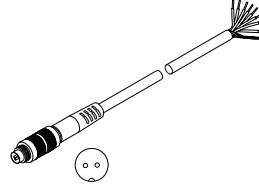| Pin	Color	CFO100/200
1	white	IN0
2	brown	+UB
3	green	TX
4	yellow	RX
5	gray	OUT0
6	pink	OUT1
7	blue	GND
8	red	OUT2

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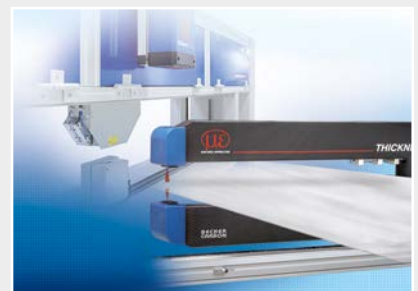

2D/3D profile sensors (laser scanner)

Optical micrometers, fiber optic sensors and fiber optics

Color recognition sensors, LED analyzers and color inline spectrometer

Measurement and inspection systems