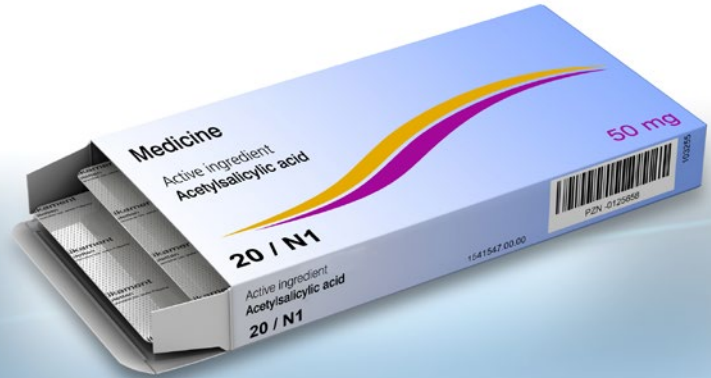


Sensor system for label detection



Each medication package must be correctly labeled. For this, it is important that the label contains serialization data, a bar code, and other required information. In addition, quality control is carried out to ensure that the label is complete and correctly positioned. Otherwise, difficulties would arise later upon distribution, because the medications are scanned in at the pharmacy and only handed out to the customer when the PC software issues a release.

Smart colorSENSOR CFO100 color measuring systems from Micro-Epsilon perform 100% quality control. They check the presence and correct position of the labels. For this purpose, the CFS4-F30/90-M sensor is mounted at a distance of 5 mm above the boxes in the labeling machine. The sensor receives the light and passes it on to the controller of the color measuring system via the optical fiber where the signal is evaluated.

The digital switching output of the controller passes the OK/NOK value directly to the machine control system. If the system detects that labels are missing or incorrectly applied, these packages are sorted out directly by machine and then relabeled.

The smart, accurate colorSENSORS from Micro-Epsilon impress with their high color accuracy and repeatability. They are ideal for 100% inline inspection of the applied labels, as they detect them precisely even at high belt speeds and enable reworking on the fly. Up to 320 colors can be taught in 254 color groups. Operation is intuitive via the web interface. The attractive sensor system for precise label detection (part number 10235596) consists of the CFO100 controller and the CFS4-F30/90 sensor. This combination impresses both by the high accuracy and the attractive price-performance ratio.

Requirements for the measurement system

- Measuring rate 1 kHz
- Repeatability $\Delta E \leq 1.0$
- Working distance 5 mm
- Min. target size: 10 mm
- Switching output with 1 kHz

Ambient conditions

- Constant ambient light
- Production environment

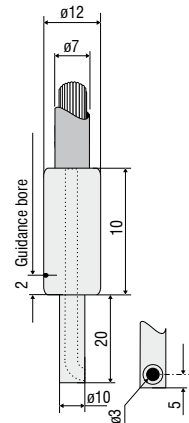
System design

- Controller: colorSENSOR CFO100
- Transmission sensor: CFS4-F30/90-M

Advantages

- Reliable detection of various labels and substrates such as transparent or metallic labels
- Multi-teach function and formation of color groups
- Modern, user-friendly web interface
- High color precision and repeatability
- Simple and fast integration of the system even in existing plants

Model	CFS4-F30/90-M	
Sensor type	Reflex sensor	
Working distance ¹⁾	5 mm	
Measurement spot diameter ¹⁾	10 mm	
Light spot diameter ¹⁾	12 mm	
Measurement geometry	0°:0°	
Min. target size (flat)	Ø 10 mm	
Minimum curvature radius of target (curved)	100 mm	
Sensitivity	Distance ^{1) 2)}	< 10.4 ΔE / mm
	Tilt angle ^{1) 2)}	< 0.3 ΔE / °
	Ambient light ^{1) 2)}	< 0.3 ΔE / 1,000 lx
Permissible ambient light ^{1) 2)}	< 40,000 lx	
Max. tilt angle ^{1) 2)}	±30°	
Connector	Integrated fiber optic cable axial with metal (M) sheath, length 1.2 m	
Mounting	FA (M18x1)	
Temperature range	Storage / operation	Sensor head: -10 ... +80 °C; Cable: -40 ... +300 °C
Air humidity	20 ... 60 % r.H. (non-condensing)	
Protection class (DIN EN 60529)	IP40	
Material	Stainless steel, fiber optic bundle with metal sheath (T)	
Weight	100 g	

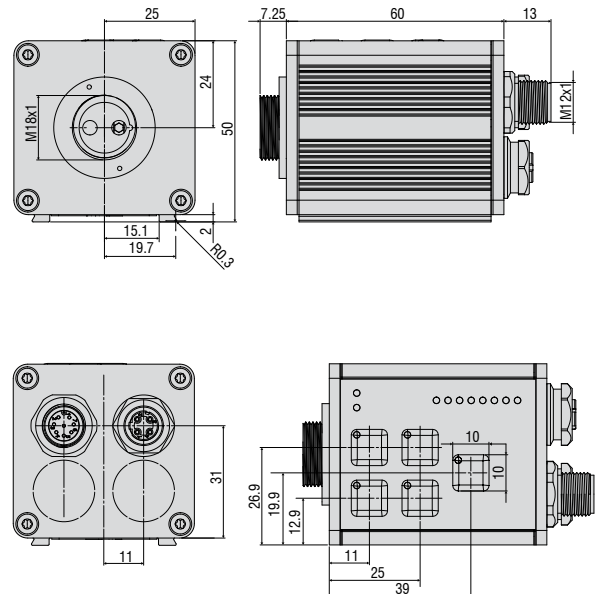


The specified data apply to a white, diffuse reflecting surface (zenith white reference)

¹⁾ In combination with colorSENSOR CFO200 and a repeatability of $\Delta E \leq 0.3$

²⁾ Valid for optimal working distance

Model	CFO100	
No. of measurement channels	1	
Repeatability ¹⁾	$\Delta E \leq 0.5$	
Color difference	$\Delta E \leq 1.0$	
Spectral range	400 ... 680 nm	
Color spaces	XYZ, xyY, L*a*b*, L*u*v*, u'v'L*	
Illuminants	D65	
Standard observer	2°	
Tolerance model	Classify; sphere (ΔE); cylinder (ΔL , Δa , Δb); box (ΔL , Δa , Δb)	
Color memory	max. 256 colors in non-volatile EEPROM with parameter sets	
Measuring rate	max. 10 kHz; standard 1 kHz (depending on the number of colors to learn and setting the averaging)	
Temperature stability	< 0.1 % FSO / K	
Light source	White light LED (425 ... 750 nm); AC operation (luminous flux at 1 kHz 130 lm); (adjustable or OFF for self-luminous switchable via software)	
Permissible ambient light	max. 5,000 lx	
Synchronization	Synchronization is possible	
Supply voltage	18 ... 28 VDC	
Maximum power consumption	500 mA	
Signal input	1 (INO), configurable via keypad or website (trigger, teach, delete, lock, calibration)	
Digital interface	RS232 (standard 9600 kBaud) ²⁾ , Ethernet	
Switching output	OUT0-OUT2 Push-Pull / NPN / PNP (color recognition, binary coding 6 color groups)	
Connector	Optical	screw-on optical fiber via FA socket M18x1, length 1.3 m, min. bending radius 18 mm
	Electrical	8-pin flange connector M12A (power/PLC); 4-pin flange socket M12D (PC/Ethernet DHCP capable) length 2 m
Mounting	DIN rail assembly/screw connection via adapter	
Temperature range	Storage	-10 ... +85 °C
	Operation	-10 ... +55 °C
Air humidity	20 ... 80 % r.H. (non-condensing)	
Shock (DIN EN 60068-2-27)	15 g / 6 ms in 3 axes in two directions, 1000 shocks each	
Vibration (DIN EN 60068-2-6)	2 g / 10 ... 500 Hz in 3 axes, 10 cycles each	
Protection class (DIN EN 60529)	IP65 (connected)	
Material	Aluminum, black anodized	
Weight	Approx. 200 g	
Control and indicator elements	Operation via keypad and web interface, visualization with 13 white LEDs	
Special features	Multi-color teach function, automatic adjustment of the illumination brightness, measurement signal amplification and averaging depending on the measurement frequency, adjustable hold time of > 30 μs	



Dimensions:

Dimensions in mm, not to scale

FSO = Full Scale Output

¹⁾ Maximum color difference ΔE of 1000 consecutive measurements of the color value of a red and a dark gray (R= 5%) reference tile, measured with sensor CFS4-A20 at 1000 Hz and brightness adjustment to white standard (R= 95%)

²⁾ Adjustable up to max. 115200 kBaud