

Photoelectric Sensors with Special Properties

Color sensors BFS

Applications

Color sensors open up a wide range of various applications, such as in the packaging industry, robotics, automation, quality assurance or in the process industry.

Automated processes can be simplified and accelerated using the versatile color sensors for detecting color nuances in carpets and textiles or for color markings on packagings or labels.

The **BFS 26K** and **BFS 27K** series of color sensors operate using pulsed white light, making them particularly insensitive to ambient light. The light reflected back from the object is received and processed by three different receivers (red, green, blue).

The various light spot geometry configurations of the respective sensors (round, rectangular or square) can reliably detect even the smallest color markings.

Numerous special functions such as color scanning, pulse expansion and blanking input provide additional application flexibility.

Features

- Microcontroller-based
- Pulsed white light
- Various light spot geometries
- 3 different colors can be identified at the same time
- 5-stage adjustable color tolerance

The **BFS 27K** with a clearly organized operating panel and large display enables various colors and the selection of all functions to be taught in easily using teach-in.

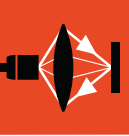
Modes C (color type) and C+I (color type + intensity) as well as 10 tolerance levels can be set separately for all 3 channels. Pulse extension of 0...40 ms can also be selected and is applied to all channels. Balluff Sensorware allows the set functions to be visualized over the RS485 interface.

- Display
- Autocollimation
- Versions with high switching frequency or for dark colors
- Color type or color type + intensity operating modes
- Serial RS485 interface



Photoelectric Sensors with Special Properties

Color sensors BFS Product overview



Photoelectric Sensors

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Photoelectric Sensors with Special Properties

Analog Fork Sensors BGL_C

Optical Window Sensors BOW

Light Grids BLG

Color Sensors BFS

Contrast Sensors BKT

Luminescence Sensors BLT

Optical Fiber Base Units BFB/ BOS

Plastic Fiber Optics BFO

Glass Fiber Optics BFO

Photoelectric Distance Sensors for Analog Distance Measurement

Accessories for Photoelectric Sensors

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Type

Sensing distance/ Range Light type Output U_s Connection Page

■ Ordering code

■ Part number

True color sensor		Sensing distance/ Range	Light type	Output				U _s			Connection			Page
Ordering code	Part number			3×PNP transistor	3×Push-pull	IO-Link	RS 232 interface	12...28 V DC	18...30 V DC	24 V	M12 plug, 8-pin	M12 plug, 5-pin	Cable	
 True color sensor														
BFS000L	BFS 33M-GSS-F01-PU-02	400 mm	■	■	■			■			■		■	291
 Color sensors														
BFS0001	BFS 26K-PS-L01-S115	12...32 mm	■	■			■			■			■	293
BFS0002	BFS 26K-PS-L02-S115-C	15...30 mm	■	■			■			■			■	293
BFS0003	BFS 26K-PS-L03-S115-C	18...22 mm	■	■			■			■			■	293
BFS000F	BFS 26K-GI-L04-S92	12...32 mm	■		■			■			■			293



For distinguishing between the smallest of color nuances at the highest level

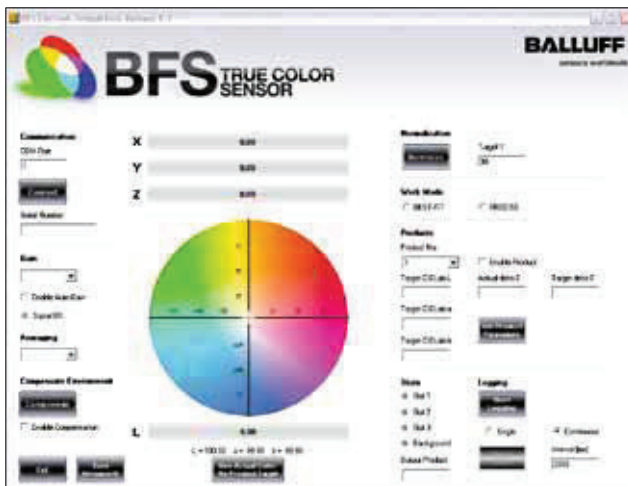
The True Color sensor BFS 33M is in a completely different league to conventional RGB sensors. Thanks to its high resolution, it not only detects colors but can also reliably distinguish between nuances. The True Color sensor thus detects, for instance minimal color deviations in injection molded parts. And it can also tell if a metal enters production polished or unpolished. Faded colors or poor print quality are detected in an instant and separated. It thus opens up completely new dimensions in quality control. The sensor uses three digital outputs and a serial interface to perform evaluations. The lab color space values are transmitted directly via this interface.

Features

- Detection of and distinguishing between a random number of colors
- Reliably distinguishes between the smallest of color nuances
- Large sensing distance up to 400 mm
- Simple configuration and visualization using software
- Robust metal housing

Industries

- Automotive industry
- Plastics processing
- Packaging industry
- Handling and assembly
- Printing industry
- Wood processing



+ Recommended accessories
(please order separately)

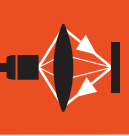
Description	Ordering code
① Optical fiber M4 (coaxial), 2 m long	BFO00C9
② Optics (short-range), 7 mm, screwed onto M4 optical fiber	BAM00NT
③ Optical fiber M6 (coaxial), 1 m long	BFO00FP
④ Optical fiber M6 (coaxial), 2 m long	BFO00C4
⑤ Optical fiber M6 (coaxial), 5 m long	BFO00FN
⑥ Optics (adjustable), 200 mm sensing distance, screwed onto M6 optical fiber	BAM01U2
⑦ Optics (long-range), 400 mm sensing distance, screwed onto M6 optical fiber	BAM01PA
⑧ Interface cable (shielded)	BCC0ARP
⑨ RS232/USB interface converter	BAE009A



More mechanical accessories: You can find a large selection of mounting components of all types, such as clamping holders, mounting brackets and the Balluff mounting system BMS, in our **Accessories Line** catalog.

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True Color sensor BFS 33M



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Optical Window Sensors BOW

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Luminescence Sensors BLT

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Plastic Fiber Optics BFO

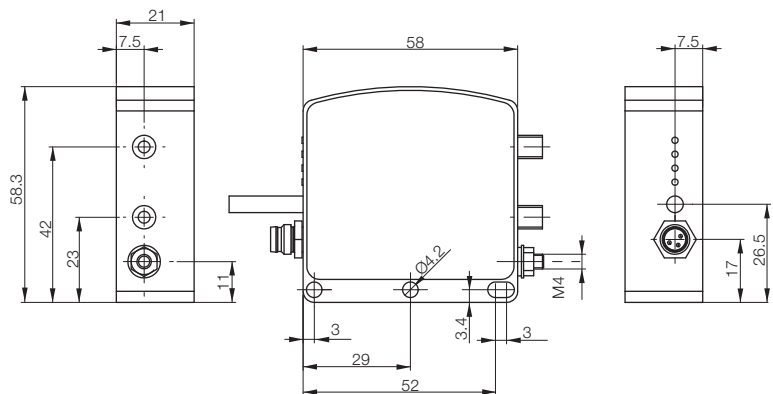
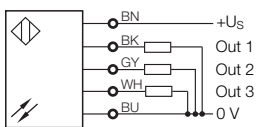
Glass Fiber Optics BFO

Photoelectric Distance Sensors for Analog Distance Measurement

Accessories for Photoelectric Sensors

Series	BFS 33M
Working range	400 mm (with long-range optics)
3× Push-pull	Ordering code BFS000L
RS 232 interface	Part number BFS 33M-GSS-F01-PU-02
Supply voltage U_S	24 V DC $\pm 10\%$
No-load supply current I_0 max.	40 mA
Output current	30 mA
Polarity reversal/short-circuit protected	Yes/Yes
Settings	via software
Emitter, light type	LED, white light
Color space	CIE Lab
Light spot diameter	Depends on the fiber optics
Color resolution tolerance	Adjustable (software)
Resolution	8 amplifier stages of 12 bits each
Color resolution	< 0.5 dE
Repeat accuracy	< 1 dE
Ready indicator	Green LED
Output function indicator	3× Yellow LED (binary encoding)
Response time	0.33 ms
Switching frequency	1.5 kHz
Degree of protection as per IEC 60529	IP 54
Ambient temperature T_a	+10...+55 °C
Permissible ambient light	EN 60947-5-2
Housing material	Al coated
Connection	2 m PUR cable, 5×0.25 mm ²

Wiring diagram

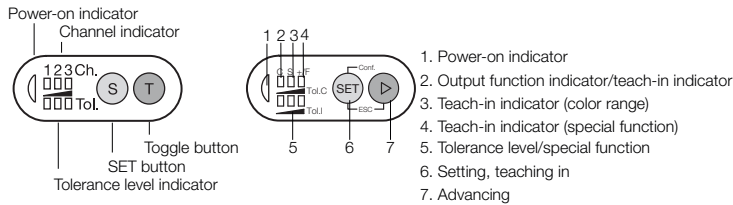


Photoelectric Sensors with Special Properties

Color sensors BFS 26K

Color Sensors

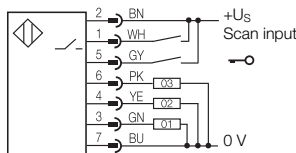
Indicators and operating elements



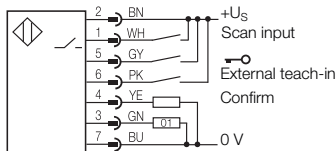
Wiring diagrams

BFS 26K-PS...

Two modes are available.
1. Normal mode "factory setting"

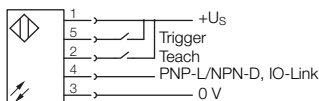


2. External teach-in setting using "special functions"

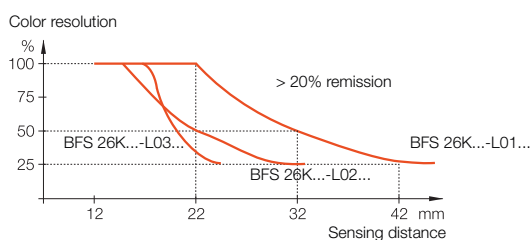


Disabling input:
> 12 V = Buttons locked,
< 3 V = Buttons not locked

BFS 26K-GI...



Color resolution/sensing distance diagram



Recommended accessories
(please order separately)

Description	Ordering code
Mounting bracket	BAM00TK



More mechanical accessories: You can find a large selection of mounting components of all types, such as clamping holders, mounting brackets and the Balluff mounting system BMS, in our **Accessories Line** catalog.

Series	
Light spot diameter	
Diffuse mode working range	
Retroreflective working range	
3x PNP	Ordering code
	Part number
1x Push-pull, IO-Link	Ordering code
	Part number
Supply voltage U_S	
No-load supply current I_0 max.	
Output current	
Switching type	
Polarity reversal/short-circuit protected	
Settings	
Emitter, light type	
Light spot geometry	
Sensing distance tolerance	
Color resolution tolerance	
Ready indicator	
Output function indicator Ch. 1...Ch. 3	
Output function indicator Tol. 1...Tol. 5	
Stand-by delay	
Response time	
Switching frequency	
Time function	
Degree of protection as per IEC 60529	
Ambient temperature T_a	
Permissible ambient light	
Material	Housing
	Optical surface
Connection	

Suitable connectors
(please order separately)



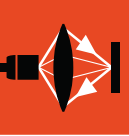
Size	Design	Cable material	Color	Length	Ordering code
M12, 8-pin	Straight	PUR	Black	5 m	BCC0995
M12, 8-pin	Angled	PUR	Black	5 m	BCC06K5

Connectors without LED are suitable for PNP and NPN sensors.

More electrical accessories: You can find a large selection of plug connectors and connector cables in a wide variety of cable materials, colors and lengths in our **Industrial Networking and Connectivity catalog**.

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Photoelectric Distance Sensors for Analog Distance Measurement

Accessories for Photoelectric Sensors

BFS 26K	BFS 26K	BFS 26K	BFS 26K
Ø 4 mm at 22 mm sensing distance	2x2 mm at 22 mm sensing distance	5x1 mm at 22 mm sensing distance	Ø 4 mm at 22 mm sensing distance
12...32 mm	15...30 mm	18...22 mm	12...32 mm
50...200 mm			
BFS0001	BFS0002	BFS0003	BFS000F
BFS 26K-PS-L01-S115	BFS 26K-PS-L02-S115-C	BFS 26K-PS-L03-S115-C	BFS 26K-GI-L04-S92
12...28 V DC	12...28 V DC	12...28 V DC	18...30 V DC
≤ 40 mA	≤ 40 mA	≤ 40 mA	≤ 40 mA
100 mA	100 mA	100 mA	100 mA
Light switching	Light switching	Light switching	Light/dark switching (selectable)
Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Teach-in	Teach-in	Teach-in	Teach-in
Pulsed white light	Pulsed white light	Pulsed white light	Pulsed white light
Round	Square	Rectangular	Round
±6 mm at Tol.3	±5 mm at Tol.3	±2 mm at Tol.3	±6 mm at Tol C3 and Tol I2
Adjustable in 5 levels	Adjustable in 5 levels	Adjustable in 5 levels	
Green LED	Green LED	Green LED	
3xYellow LED	3xYellow LED	3xYellow LED	
3xRed LED	3xRed LED	3xRed LED	
300 ms	300 ms	300 ms	300 ms
1 ms	1 ms	1 ms	
500 Hz	500 Hz	500 Hz	500 Hz (SIO mode)
50 ms release delay selectable	50 ms release delay selectable	50 ms release delay selectable	50 ms release delay selectable
IP 67	IP 67	IP 67	IP 67
-10...+55 °C	-10...+55 °C	-10...+55 °C	-10...+55 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Impact-resistant ABS	Impact-resistant ABS	Impact-resistant ABS	Impact-resistant ABS
PMMA	PMMA	PMMA	PMMA
M12 connector, 8-pin	M12 connector, 8-pin	M12 connector, 8-pin	M12 connector, 5-pin

