

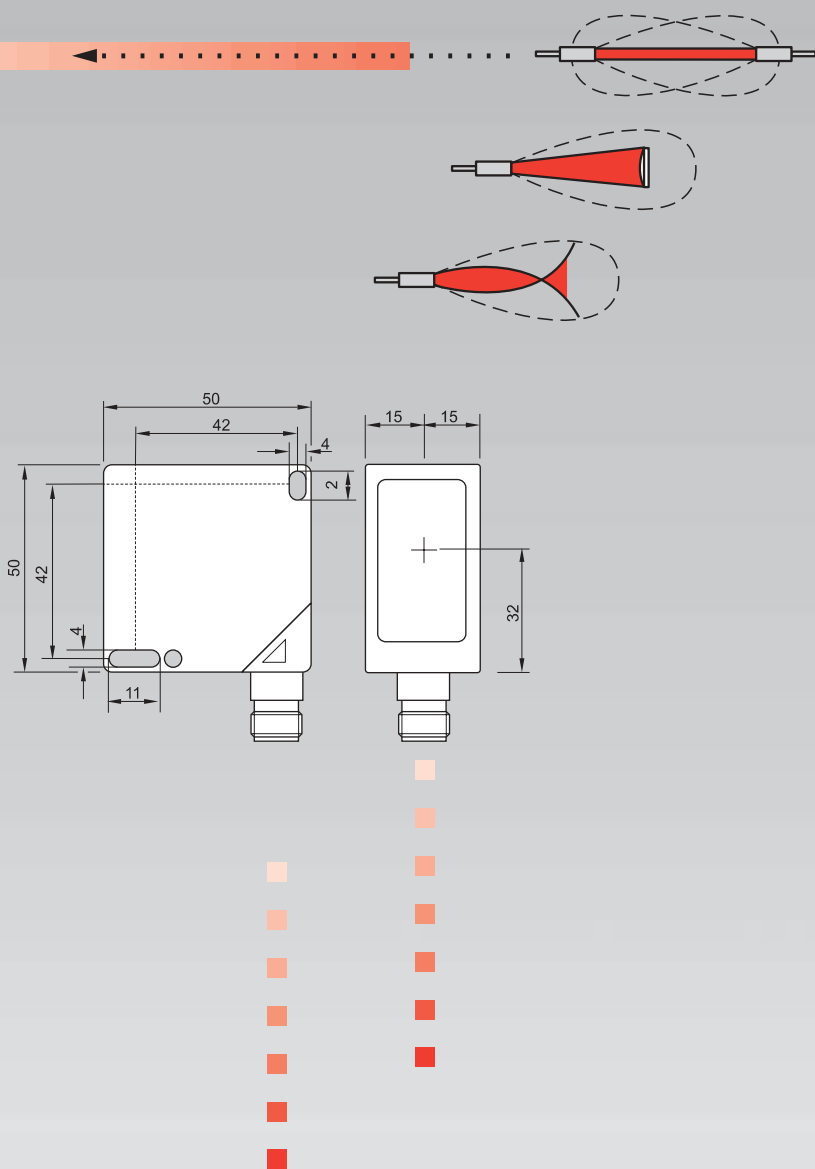
Full Color

Photoelectric Sensors

Full Color Introduction & Contents

Photoelectric

2



Full Color Detection Photoelectric Sensors

True color recognition sensors “read” colors by emitting white light, analyzing three beams of reflected colored light (red, blue, green), then measuring the level of light reflected back on each wavelength. The level of reflected light is compared to the value stored in the sensor’s memory. If the value is within its tolerance limits, recognition of that value triggers the output. Typical uses of true color recognition sensors include sorting by product color, or exactly matching a memorized color to that of a passing target.

- 2.180** BFS 26K
- 2.181** BFS 27K *NEW*



- Contents
- Selection Guide
- Applications
 - Tubular
 - Block
 - Laser
 - Distance (Analog)
 - Slot & Angle
 - Fiber Optics
- Full Color Detection**
 - Contrast (Color Mark) Detection
 - Luminescence Detection
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 - Optical Windows
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Photoelectric Sensors

BFS 26K Color Sensor

Full Color

BFS 26K Color Sensors

The BFS 26K uses pulsed white light, making it insensitive to ambient light. The light reflected from the object is registered by three different receivers (red, green, blue) and then evaluated.

The various light spot geometries of the individual sensors (round, square or rectangle) allow even the smallest color markings to be detected. With dimensions of just 50x50x17 mm, as well as a rotatable connector, the BFS 26K fits into tight spots and can be easily programmed using a control line or a 2-button teach-in procedure.

The 3 channels with electronic output can be calibrated using five tolerance levels.

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

Features

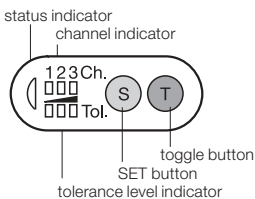
- Microprocessor controlled
- Pulsed white light
- Various light spot geometries
- Teach-in and programming
- M12 connector rotatable 270°
- 3 different colors can be distinguished at the same time
- 5-stage adjustable color tolerance
- 3 yellow LEDs for switching state indication
- 3 red LEDs for indicating tolerance level

Applications

Color sensors are used throughout the fields of robotics, automation, quality assurance and in production processes.

- Quality assurance checking
- Selecting parts by color
- Detecting different colored cables and wires

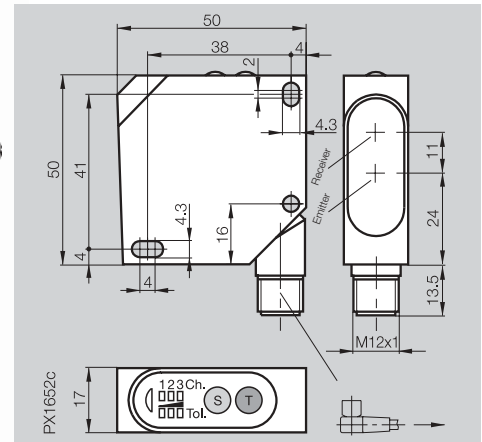
Indicators and Controls



Series	BFS 26K
Type	Color Sensor



BFS 26K Full Color
Plastic



Full Color Sensor

3 x PNP Light-on, 20...35 mm Diffuse (50...200 mm Retroreflective)
3 x PNP Light-on, 15...30 mm Diffuse
3 x PNP Light-on, 18...22 mm Diffuse

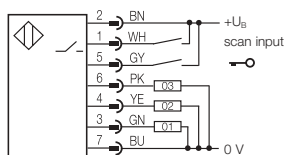
BFS 26K-PS-L01-S115
BFS 26K-PS-L02-S115
BFS 26K-PS-L03-S115

Supply Voltage U_B	
Ripple	
Voltage Drop U_d at I_o	
Rated Output Current I_o	
Current Consumption I_o (No Load)	
Utilization Category (IEC 60-947-4-1) Output Duty Cycle	
Emitter Light Source	
Light Spot Dimensions	BFS 26K-PS-L01-.... BFS 26K-PS-L02-.... BFS 26K-PS-L03-....
Sensing Range Tolerance	BFS 26K-PS-L01-.... BFS 26K-PS-L02-.... BFS 26K-PS-L03-....
Ambient Light Immunity (EN 60947-5-2)	
LED's	Output LED's Channel 1, 2, 3 Output LED's Tol 1, 2, 3, 4, 5 Supply Voltage Indication
Switching Frequency f	
Response Time (On/Off Delay)	
Power-up Delay	
Other Functions	External synchronization input Key lock Timing Functions Tolerance Levels
Ambient Temperature range T_a	
Electrical Shock Protection	
Degree of Protection per IEC 60529	
Short Circuit Protection	
Overload Protection	
Housing Material	
Sensing Face Material	
Emitter Life	
Connection	
Recommended Connector	
Weight	

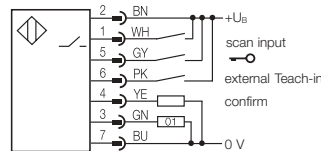
12...28 Vdc
≤ 10%
≤ 2.4 V
100 mA
≤ 40 mA @ 24 Vdc
DC 13
White Light LED 400...700 nm
4 mm @ 22 mm (Round Light Spot)
2x2 mm @ 22 mm (Square Light Spot)
5x1 mm @ 22 mm (Rectangular Light Spot)
±6 mm @ Tolerance 3
±5 mm @ Tolerance 3
±2 mm @ Tolerance 3
10000 Lux
3 x Yellow LED's
3 x Red LED's
Green LED
500 Hz
1 ms
300 ms
Remote Sensor sync input
Tamper Proof setting
50 ms
5 Levels (from TOL1 to TOL5)
-10°C to +55°C
Class 2
IP 67
Yes
Yes
Impact Resistant ABS
PMMA
Average 100,000 hr with $T_a=+25^\circ\text{C}$
M12 8-pin Connector
C04 AET-00-PB-050M
40 g

Wiring Diagrams

1. Normal mode "factory setting"

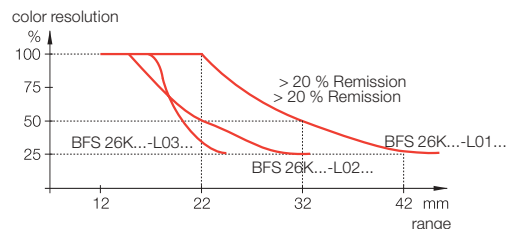


2. External Teach-in setting using "special functions"



Disabling input:
> 12 V = buttons disabled
< 3 V = buttons not disabled

Color resolution/range diagram



BFS 27K Advanced Full Color Photoelectric Sensor

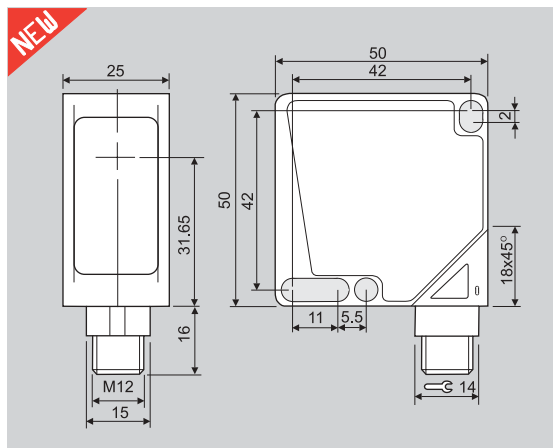
The BFS 27K advanced full color photoelectric sensor uses a pulsed white LED light source and the latest full color receivers for the broadest detection of colors, and is insensitive to ambient light conditions. The reflected light is registered by three different receivers (red, green, blue), and then evaluated for the correct level of Chromaticity, or Chromaticity + Intensity, using three channels. The BFS 27K can detect up to three different colors at a time. It has ten tolerance levels, making it ideal for situations where colors are critical. The 50x50x25 mm dimensions make installation simple, even in tight locations.

The BFS 27K simplifies set-up and use with a 4-digit display and a simple two-button set-up procedure. Complete remote control is available on the RS485 serial interface versions. Other advanced features include programmable, pulse stretcher time delay up to 40ms for fast targets, key lock to prevent tampering, and a synchronization input or blanking feature that allows extensive application flexibility and a RGB (Red, Blue, and Green) value via RS485 offering millions of color combinations and color processing possibilities.

Features

- 3 channel color sensor with C (Chromaticity) or C+I (Chromaticity and Intensity) functions
- RGB value via RS485 offers millions of color combinations
- Wide spectrum white light LED emission improves color detection
- 3 independent NPN or PNP outputs
- RS485 interface used for:
 - remote set-up
 - teaching color
 - changing tolerance and timer settings
 - chromacity or chromacity and intensity settings
 - RGB output information

Series	BFS 27K Full Color
Type	Plastic



Full Color Sensor (Bright Colors)

3 x PNP Light-on, 5...45 mm	①
3 x NPN Light-on, 5...45 mm	②

Full Color Sensor (Dark Colors and Subtle Contrast changes)

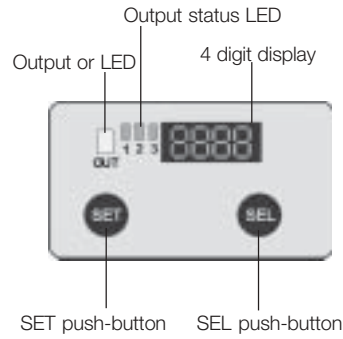
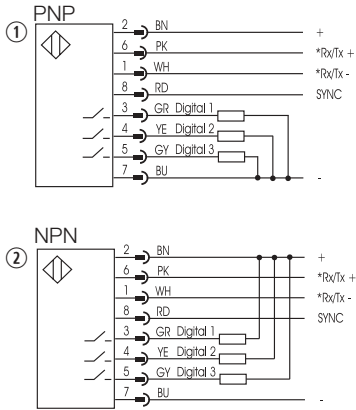
3xPNP, RS485 Remote Set-up+RGB Output, Light-on, 5...45 mm	①
3xNPN,RS485 Remote Set-up+RGB Output, Light-on, 5...45 mm	②

BFS 27K-PS-L01-S115
BFS 27K-NS-L01-S115
BFS 27K-PSR-L02-S115
BFS 27K-NSR-L02-S115

Supply Voltage U_B	10...30 Vdc
Ripple	≤ 10%
Voltage Drop U_d at I_d	≤ 2 V
Rated Output Current I_d	100 mA
Current Consumption I_o (No Load)	≤ 60 mA @ 24 Vdc
Utilization Category (IEC 60-947-4-1) Output Duty Cycle	DC 13
Emitter Light Source	White Light LED 400...700 nm
Light Spot Dimensions	4 mm @ 20 mm
Ambient Light Immunity (EN 60947-5-2)	10000 Lux
Display/ LED's	Output LED's Output, OR Function LED Display
Switching Frequency f	Bright Colors Dark Colors
Response Time (On/Off Delay)	Bright Colors Dark Colors
External synchronization input	Remote Sensor sync input
Key lock	Tamper Proof setting
Timing Functions	5, 10, 20, 30, 40 ms
Tolerance Levels	10 Levels (from TOL0 to TOL9) Chromaticity (C) or Chromaticity + Intensity (C+I)
Ambient Temperature range T_a	-10° C to +55° C
Electrical Shock Protection	Class 2
Degree of Protection per IEC 60529	IP 67
Short Circuit Protection	Yes
Overload Protection	Yes
Housing Material	ABS
Sensing Face Material	Glass
Emitter Life	Average 100,000 hr with $T_a=+25^{\circ}C$
Connection	M12 8-Pin Connector
Recommended Connector	C04 AET-00-PB-050M
Weight	100 g

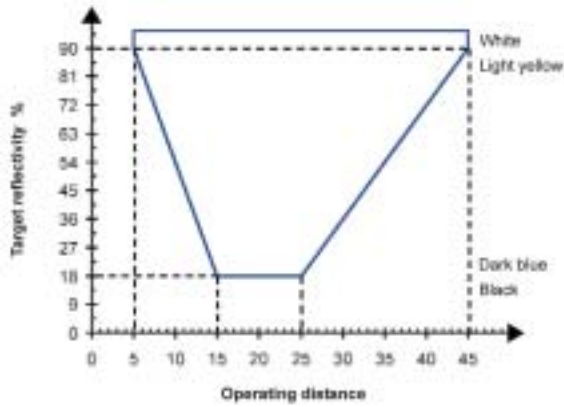
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Wiring Diagrams (C04 AET-00-PB-050M Connector Cable)

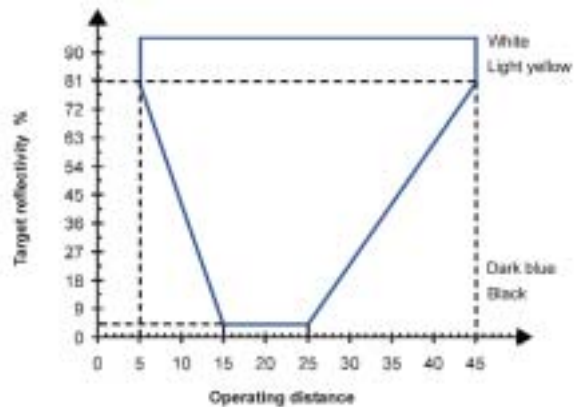


Detection Diagrams BFS 27K

Operating Distance According to Target Reflectivity Percentage



BFS 27K_S-L01-S115



BFS 27K_SR-L02-S115