

Contrast sensors are high-resolution diffuse sensors that distinguish objects based on their gray values.

Color, brightness and reflectivity have a strong effect on the measurement result.

The measuring distance should be kept constant when gray values differ only slightly. The resolution of the sensor decreases with increasing sensing distance.

Multiple series with various light types and functions are available for the multitude of uses for sensors.

Applications

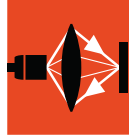
- Sensing markings on packaging material
- Synchronizing cutting or separating processes
- Checking for adhesive, ink and color
- Position checking of printing templates
- Sensing objects based on contrast



Photoelectric Sensors with Special Properties

Contrast sensors BKT

Product overview



Photoelectric Sensors

Photoelectric Sensors

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

Type

■ Ordering code

■ Part number



Contrast sensors

Type	Sensing distance	Light type			Output			Switching type		Switching frequency	U _s	Connection					Page
		White light	Red, green and blue light	Laser light	PNP transistor	NPN transistor	Analog output	Light switching	Dark switching			10...30 V DC	M8 plug, 4-pin	M12 plug, 4-pin	M12 plug, 5-pin	Cable	
BKT000A	BKT 6K-001-P-S75	40...150 mm		■	■			■	■	1 kHz	■	■					297
BKT0008	BKT 6K-001-N-S75	40...150 mm		■		■		■	■	1 kHz	■	■					297
BKT0009	BKT 6K-001-P-02	40...150 mm		■	■			■	■	1 kHz	■					■	297
BKT0007	BKT 6K-001-N-02	40...150 mm		■		■		■	■	1 kHz	■					■	297
BKT000H	BKT 18KF-001-P-S4	10 mm	■			■		■	■	5 kHz	■			■			299
BKT000F	BKT 18KF-001-P-02	10 mm	■			■		■	■	5 kHz	■					■	299
BKT000Y	BKT 21M-002-P-S4	19 mm	■			■		■	■	5 kHz	■			■			301
BKT000W	BKT 21M-002-N-S4	19 mm	■				■	■	■	5 kHz	■			■			301
BKT0001	BKT 67M-001-U-S92	9 mm*	■		■	■	■	■	■	15 kHz	■					■	303
BKT0002	BKT 67M-002-U-S92	9 mm*	■		■	■	■	■	■	15 kHz	■					■	303
BKT0003	BKT 67M-003-U-S92	9 mm*	■		■	■	■	■	■	25 kHz	■					■	303
BKT0004	BKT 67M-004-U-S92	9 mm*	■		■	■	■	■	■	25 kHz	■					■	303
BKT0005	BKT 67M-005-U-S92	9 mm*	■		■	■	■	■	■	30 kHz	■					■	303
BKT0006	BKT 67M-006-U-S92	9 mm*	■		■	■	■	■	■	30 kHz	■					■	303

*Longer sensing distances using interchangeable optics

Photoelectric Sensors with Special Properties

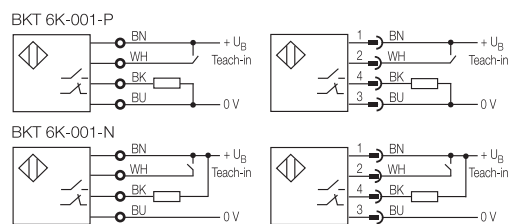
Laser contrast sensor BKT 6K

Laser Contrast Sensor

The laser contrast sensor **BKT 6K** is designed to reliably detect small areas of contrast variances. Even the narrowest lines can be detected reliably in the optimum working range of 70...100 mm. Larger areas are capable of being detected outside this range.

Programming the sensor is easy using its teach-in button or a control line.

Wiring diagrams



Recommended accessories (please order separately)

Description	Ordering code
Mounting bracket	BAM00UH



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 376.

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.

Suitable connectors (please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M8, 4-pin	Straight	PUR	Black	2 m	BCC02N2
M8, 4-pin	Straight	PVC	Gray	2 m	BCC02PL
M8, 4-pin	Angled	PUR	Black	2 m	BCC02NC
M8, 4-pin	Angled	PVC	Gray	2 m	BCC02PZ

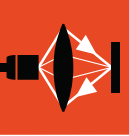
Connectors without LED are suitable for PNP and NPN sensors.

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**.



Photoelectric Sensors with Special Properties

Laser contrast sensor BKT 6K



Photoelectric Sensors

Photoelectric Sensors

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

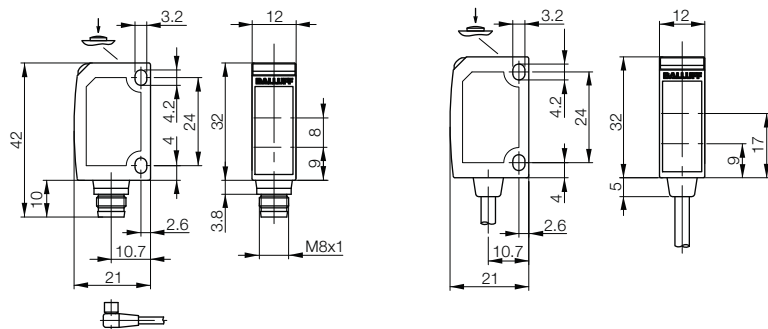
Photoelectric Distance Sensors

for Analog Distance Measurement

Accessories for Photoelectric Sensors

Series	BKT 6K		BKT 6K	
Working distance	40...150 mm*		40...150 mm*	
PNP NC/NO	Ordering code	BKT000A	BKT0009	
	Part number	BKT 6K-001-P-S75	BKT 6K-001-P-02	
NPN NC/NO	Ordering code	BKT0008	BKT0007	
	Part number	BKT 6K-001-N-S75	BKT 6K-001-N-02	
Supply voltage U_s	10...30 V DC		10...30 V DC	
No-load supply current I_0 max.	≤ 25 mA		≤ 25 mA	
Output current	100 mA		100 mA	
Switching type	Light/dark switching (selectable)		Light/dark switching (selectable)	
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	Teach-in		Teach-in	
Emitter, light type	Laser, red light		Laser, red light	
Wavelength	650 Nm		650 Nm	
Laser class	2		2	
Light spot diameter	0.7 mm at the focus (85 mm \pm 15 mm)		0.7 mm at the focus (85 mm \pm 15 mm)	
Output function indicator	Yellow LED		Yellow LED	
Stability indicator	Green LED		Green LED	
Response time	0.5 ms		0.5 ms	
Switching frequency	1 kHz		1 kHz	
Degree of protection as per IEC 60529	IP 67		IP 67	
Ambient temperature T_a	$-20...+60$ °C		$-20...+60$ °C	
Permissible ambient light	EN 60947-5-2		EN 60947-5-2	
Material	Housing	Impact-resistant ABS	Impact-resistant ABS	
	Optical surface	PMMA	PMMA	
Connection	M8 connector, 4-pin		2 m PVC cable, 4x0.14 mm ²	

*Optimum working range for small markings:
70...100 mm.



Photoelectric Sensors with Special Properties

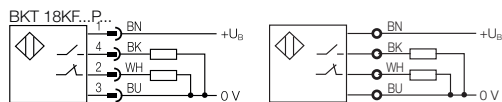
Contrast sensor BKT 18KF

White Light Contrast Sensor

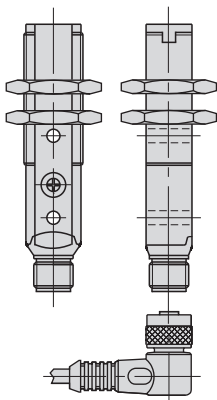
The contrast sensor **BKT 18KF** operates with white light and draws attention with its ability to be configured simply at just the press of a button. It detects colored markings as well as gray levels on various surfaces. In the standard setting the sensor operates using dark switching.

Precise configuration is available for slight contrast differences. The switching type can also be selected in this setting.

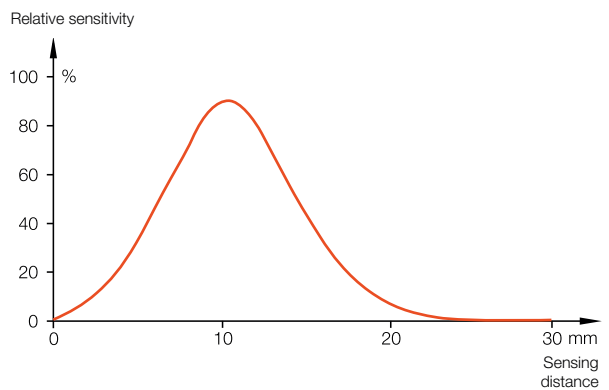
Wiring diagrams



Connector orientation



Function diagram



Recommended accessories (please order separately)

Description	Ordering code
① Mounting bracket	BAM00RY
② Mounting clamp	BAM00T3



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 376.

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.

Suitable connectors (please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Black	2 m	BCC032F
M12, 4-pin	Straight	PVC	Gray	2 m	BCC0367
M12, 4-pin	Angled	PUR	Black	2 m	BCC032Y
M12, 4-pin	Angled	PVC	Gray	2 m	BCC036N

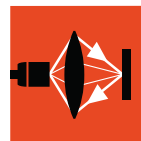


Connectors without LED are suitable for PNP and NPN sensors.

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.

Photoelectric Sensors with Special Properties

Contrast sensor BKT 18KF



Photoelectric
Sensors

Photoelectric
Sensors

Photoelectric
Sensors with
Special Proper-
ties

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

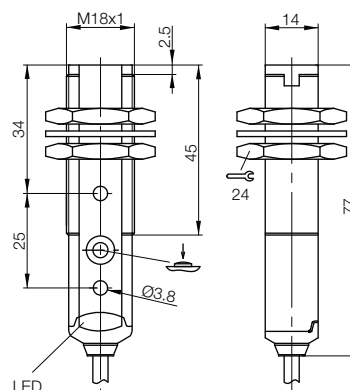
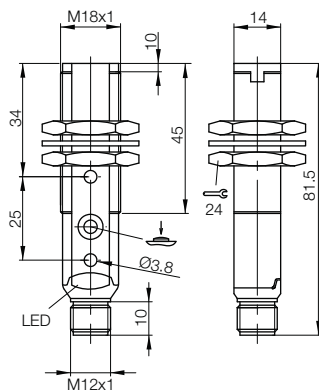
Plastic
Fiber Optics BFO

Glass Fiber
Optics BFO

Photoelectric
Distance
Sensors
for Analog
Distance
Measurement

Accessories for
Photoelectric
Sensors

Series	BKT		BKT	
Working distance	10 mm±2 mm		10 mm±2 mm	
PNP NC/NO	Ordering code		BKT000H	
	Part number		BKT 18KF-001-P-S4	
	Part number		BKT 18KF-001-P-02	
Supply voltage U _S	10...30 V DC		10...30 V DC	
No-load supply current I ₀ max.	≤ 25 mA		≤ 25 mA	
Output current	100 mA		100 mA	
Switching type	Light and dark switching		Light and dark switching	
Polarity reversal/short-circuit protected	Yes/Yes		Yes/Yes	
Settings	Teach-in		Teach-in	
Emitter, light type	LED, white light		LED, white light	
Wavelength	400...700 nm		400...700 nm	
Light spot diameter	ca. 4.5 mm 10 mm		ca. 4.5 mm 10 mm	
Output function indicator	Yellow LED		Yellow LED	
Power/error indicator	Green/red LED		Green/red LED	
Response time	100 μs		100 μs	
Switching frequency	5 kHz		5 kHz	
Degree of protection as per IEC 60529	IP 67		IP 67	
Ambient temperature T _a	-25...+55 °C		-25...+55 °C	
Permissible ambient light	EN 60947-5-2		EN 60947-5-2	
Material	Housing	PBT	Housing	PBT
	Optical surface	PMMA	Optical surface	PMMA
Connection	M12 connector, 4-pin		2 m PVC cable, 4×0.14 mm ²	



Photoelectric Sensors with Special Properties

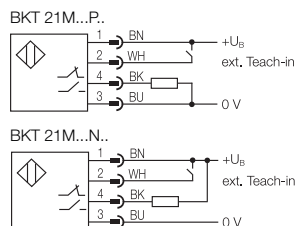
Contrast sensors BKT 21M

White Light Contrast Sensor

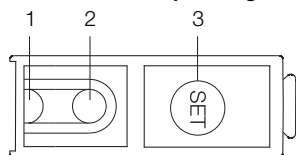
The **BKT 21M** contrast sensor uses white light and can be programmed at the push of a button. It detects colored markings as well as gray levels on various surfaces. In its standard setting the sensor is dark switching (markings with less light intensity are detected as the background).

Precise configuration is available for slight contrast differences. The switching type can also be selected in this setting.

Wiring diagrams

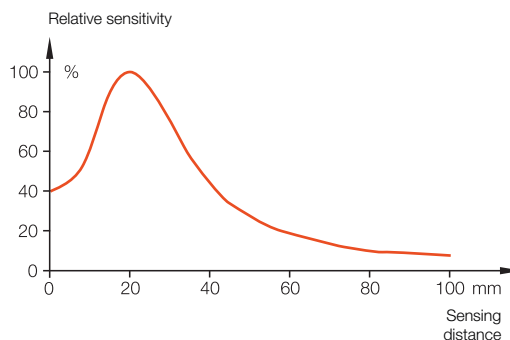


Indicators and operating elements



- 1 Output function indicator (yellow)
- 2 Power-/error indicator (green/red)
- 3 SET- button

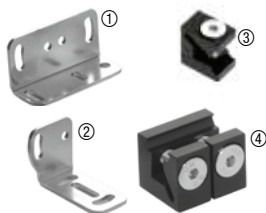
Function diagram



Recommended accessories

(please order separately)

Description	Ordering code
① Mounting bracket	BAM00T9
② Mounting bracket	BAM00TA
③ Clamping holders	BAM00TF
④ Clamping holders	BAM00TH



Suitable connectors

(please order separately)



Size	Design	Cable material	Color	Length	Ordering code
M12, 4-pin	Straight	PUR	Black	2 m	BCC032F
M12, 4-pin	Straight	PVC	Gray	2 m	BCC0367
M12, 4-pin	Angled	PUR	Black	2 m	BCC032Y
M12, 4-pin	Angled	PVC	Gray	2 m	BCC036N

Connectors without LED are suitable for PNP and NPN sensors.

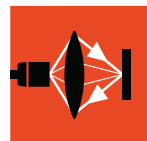
You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 376.

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.

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.

Photoelectric Sensors with Special Properties

Contrast sensors BKT 21M



Photoelectric
Sensors

Photoelectric
Sensors

Photoelectric
Sensors with
Special Proper-
ties

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

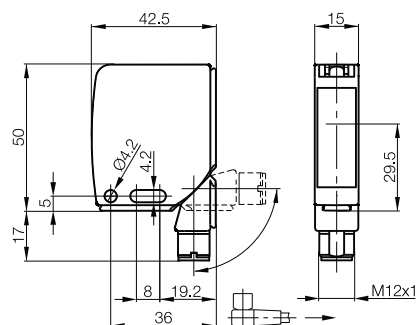
Plastic
Fiber Optics BFO

Glass Fiber
Optics BFO

Photoelectric
Distance
Sensors
for Analog
Distance
Measurement

Accessories for
Photoelectric
Sensors

Series			BKT
Working distance			19 mm±2 mm
PNP	NC/NO	Ordering code	BKT000Y
		Part number	BKT 21M-002-P-S4
NPN	NC/NO	Ordering code	BKT000W
		Part number	BKT 21M-002-N-S4
Supply voltage U_S			10...30 V DC
No-load supply current I_0 max.			≤ 30 mA
Output current			100 mA
Switching type			Light/dark switching (adjustable in precise mode)
Polarity reversal/short-circuit protected			Yes/Yes
Settings			Teach-in
Emitter, light type			LED, white light
Wavelength			400...700 nm
Light spot diameter			ca. 3.5 mm 19 mm
Output function indicator			Yellow LED
Power/error indicator			Green/red LED
Response time			0.1 ms
Switching frequency			5 kHz
Time function			20 ms off-delay
Degree of protection as per IEC 60529			IP 67
Ambient temperature T_a			-25...+55 °C
Permissible ambient light			EN 60947-5-2
Material	Housing		GD-Zn/Al
	Optical surface		Glass
Connection			M12 connector, 4-pin



Specially designed for print mark detection

- Three models for any application complexity
- Red, green or blue light emission for unique color identification
- Rugged aluminum housing
- Greatest freedom in equipment design with optional front or bottom light exit



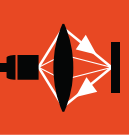
Series		
Working distance		
PNP and NPN transistor (selectable)	Ordering code	
Vertical light spot	Part number	
PNP and NPN transistor (selectable)	Ordering code	
Horizontal light spot	Part number	
Supply voltage U_s		
No-load supply current I_0 max.		
Output current		
Switching type		
Analog output		
Polarity reversal/short-circuit protected		
Settings		
Additional function		
Emitter, light type		
Wavelength		
Light spot diameter		
Output function indicator		
Power/error indicator		
Time function display		
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		

*Longer sensing distance using interchangeable optics



Photoelectric Sensors with Special Properties

Contrast sensors BKT 67M



Photoelectric Sensors

Photoelectric Sensors

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

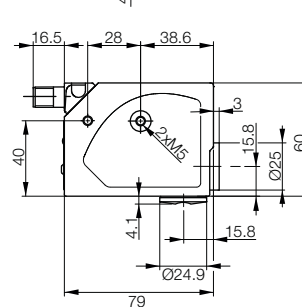
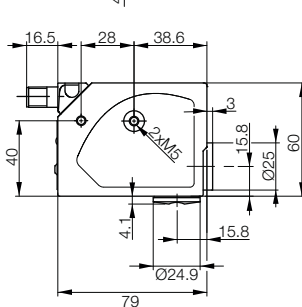
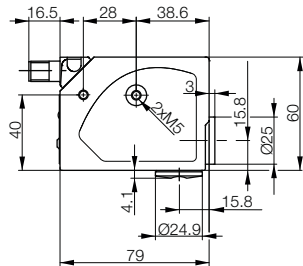
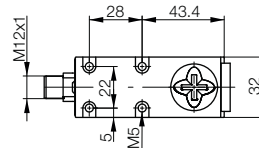
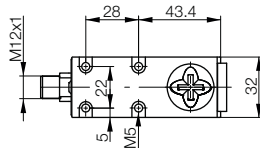
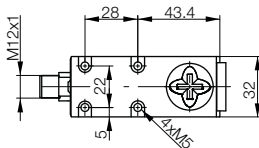
Glass Fiber Optics BFO

Photoelectric Distance Sensors for Analog Distance Measurement

Accessories for Photoelectric Sensors



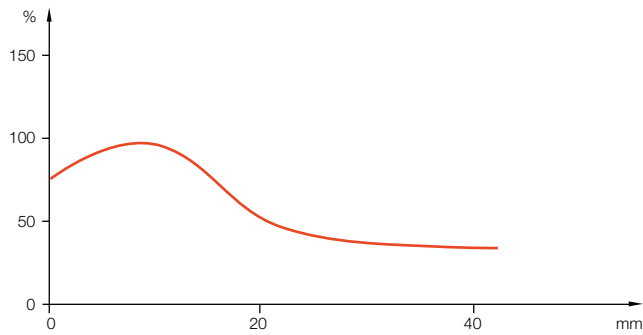
BKT 9 mm* ± 3 mm BKT0001	BKT 9 mm* ± 3 mm BKT0003	BKT 9 mm* ± 3 mm BKT0005
BKT 67M-001-U-S92	BKT 67M-003-U-S92	BKT 67M-005-U-S92
BKT0002	BKT0004	BKT0006
BKT 67M-002-U-S92	BKT 67M-004-U-S92	BKT 67M-006-U-S92
10...30 V DC	10...30 V DC	10...30 V DC
≤ 50 mA	≤ 85 mA	≤ 35 mA
100 mA	100 mA	100 mA
Light/Dark (automatic)	Light/Dark (automatic)	Light/Dark (automatic)
1...3 V	1...3 V	1...3 V
Yes/Yes	Yes/Yes	Yes/Yes
Teach-in button	3 teach-in buttons	3 teach-in buttons
	Segment display	4-digit display
Red, green and blue light	Red, green and blue light	Red, green and blue light
630 nm/520 nm/465 nm	630 nm/520 nm/465 nm	630 nm/520 nm/465 nm
1.5x5 mm	1.5x5 mm	1.5x5 mm
Yellow LED	Yellow LED	Yellow LED
Green LED	Green LED	Green LED
	Orange LED	
33 μs	25 μs	17 μs
15 kHz	20 kHz	30 kHz
	20 ms (can be activated)	
IP 67	IP 67	IP 67
-10...+55 °C	-10...+55 °C	-10...+55 °C
EN 60947-5-2	EN 60947-5-2	EN 60947-5-2
Al	Al	Al
PMMA	PMMA	PMMA
M12 connector, 5-pin	M12 connector, 5-pin	M12 connector, 5-pin



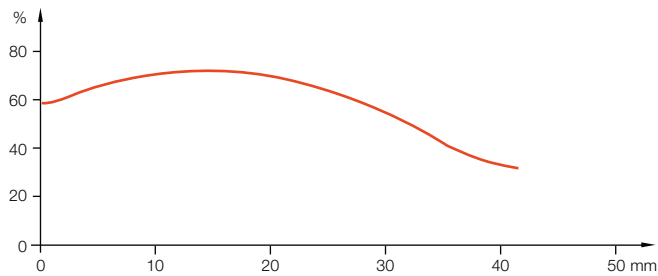
Photoelectric Sensors with Special Properties

Contrast sensors BKT 67M Function diagrams

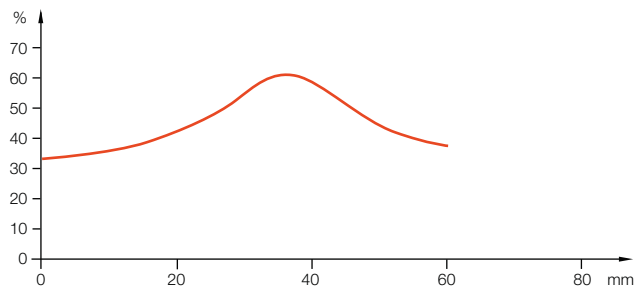
**BKT 67M with BKT M-PK-2 (standard lens)
BKT M-PK-4**



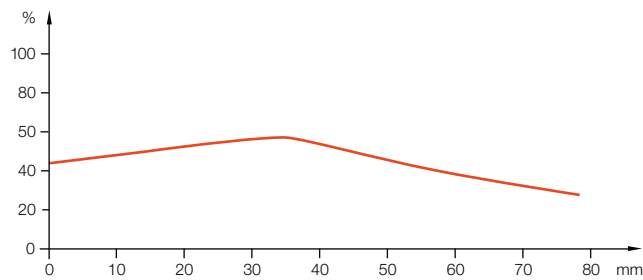
BKT 67M with BKT M-PK-1



BKT 67M with BKT M-PK-3



BKT 67M with BKT M-PK-5

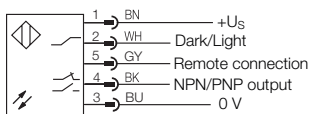


Photoelectric Sensors with Special Properties

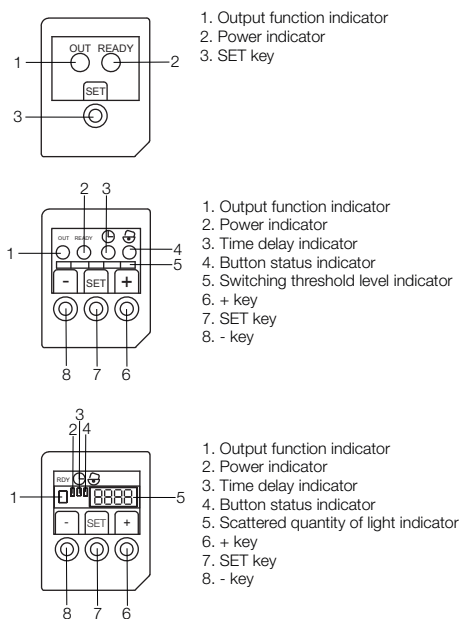
Contrast sensors BKT 67M

Connection, accessories

Wiring diagram



Indicators and operating elements



Recommended accessories (please order separately)

Description	Focal length/focus	Ordering code
① Lens	18 mm	BAM0120
② Lens	9 mm	BAM0121
③ Lens	28 mm	BAM0122
④ Lens	50 mm	BAM00P3
⑤ Intermediate ring		BAM00P2



You can find special accessories for diffuse sensors, such as **reflectors, apertures, lenses, filters and deflection heads**, in this catalog starting on page 376.

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.

Suitable connectors (please order separately)

Size	Design	Cable material	Color	Length	Ordering code
M12, 5-pin	Straight	PUR	Black	5 m	BCC098C
M12, 5-pin	Angled	PUR	Black	5 m	BCC08FC

Connectors without LED are suitable for PNP and NPN sensors.



Photoelectric Sensors

Photoelectric Sensors

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

Photoelectric Distance Sensors for Analog Distance Measurement

Photoelectric Distance Sensors for Analog Distance Measurement

Accessories for Photoelectric Sensors