Detailed technical data

Features

	Visible red light	Infrared light
Sensor principle	Photoelectric proximity sensor	
Detection principle	Background suppression	
Dimensions (W x H x D)	20 mm x 55.7 mm x 42 mm	
Housing design (light emission)	Rectangular	
Sensing range max.	10 mm ... 1,000 mm [1] (depending on type)	10 mm ... 1,500 mm [1]
Type of light	Visible red light	Infrared light
Light source [2]	PinPoint LED	LED
Light spot size (distance)	Ø 6 mm (500 mm) Ø 3 mm (200 mm) (depending on type)	Ø 12 mm (800 mm)
Wave length	635 nm	850 nm
Adjustment	BluePilot: Teach-Turn adjustment with sensing range indicator, IO-Link	
Pin 2 configuration	External input, Teach-in, switching signal	

[1] Object with 90 % reflectance (referred to standard white, DIN 5033).

[2] Average service life: 100,000 h at T_U = +25 °C.

Smart Task

Smart Task name	Base logics
Logic function	Direct AND OR Window Hysteresis
Timer function	Deactivated On delay Off delay ON and OFF delay Impulse (one shot)
Inverter	Yes
Switching frequency	SIO Direct: 1000 Hz [1] SIO Logic: 800 Hz [2] IOL: 650 Hz [3]
Response time	SIO Direct: 500 µs [1] SIO Logic: 600 µs [2] IOL: 750 µs [3]
Repeat accuracy	SIO Direct: 150 µs [1] SIO Logic: 300 µs [2] IOL: 400 µs [3]
Switching signal Q_{L1}	Switching output
Switching signal Q_{L2}	Switching output

[1] SIO Direct: sensor operation in standard I/O mode without IO-Link communication and without using internal sensor logic or time parameters (set to "direct"/"deactivated").

[2] SIO Logic: Sensor operation in standard I/O mode without IO-Link communication. Sensor-internal logic or timing parameters plus Automation Functions used.

[3] IOL: Sensor operation with full IO-Link communication and usage of logic, timing and Automation Function parameters.

Mechanics/electronics

	Visible red light	Infrared light
Supply voltage [1]	10 V DC … 30 V DC	
Ripple	≤ 5 V_{pp}	
Power consumption	≤ 30 mA [2] < 50 mA [3]	
Output type	PUSH/PULL, PNP, NPN	
Output function	Complementary, Pin 2: NPN normally open (light switching), PNP normally closed (dark switching), Pin 4: NPN normally closed (dark switching), PNP normally open (light switching), IO-Link	
Switching mode	Light/dark switching	
Signal voltage PNP HIGH/LOW	Approx. V_S – 2.5 V / 0 V	
Signal voltage NPN HIGH/LOW	Approx. VS / < 2.5 V	
Output current $I_{max.}$	≤ 100 mA	
Response time [4]	≤ 500 µs	
Switching frequency [5]	1,000 Hz	
Connection type	Cable, 2 m [6] Male connector, M12 Cable with male connector, M12, 270 mm [6] (depending on type)	
Circuit protection	A [7], B [8], C [9], D [10]	
Protection class	III	
Weight		
Cable	100 g	
Male connector M12, 4-pin	50 g	
Cable with M12 male connector, 4-pin	70 g	
Housing material	Plastic, VISTAL®	
Optics material	Plastic, PMMA	
Enclosure rating	IP66, IP67	
Ambient operating temperature	–40 °C … +60 °C	
Ambient storage temperature	–40 °C … +75 °C	

[1] Limit values.
[2] 16 V DC … 30 V DC, without load.
[3] 10 V DC … 16 V DC, without load.
[4] Signal transit time with resistive load in switching mode. Different values possible in COM2 mode.
[5] With light/dark ratio 1:1 in switching mode. Different values possible in IO-Link mode.
[6] Do not bend below 0 °C.
[7] A = V_S connections reverse-polarity protected.
[8] B = inputs and output reverse-polarity protected.
[9] C = interference suppression.
[10] D = outputs overcurrent and short-circuit protected.

Communication interface

	Visible red light	Infrared light
Communication interface	IO-Link V1.1	
Mode	COM2 (38,4 kBaud)	
Cycle time	2.3 ms	
Process data length	16 Bit	
Process data structure	Bit 0 = switching signal Q_{L1} Bit 1 = switching signal Q_{L2} Bit 2 … 15 = empty	
VendorID	26	

Ordering information

Visible red light

- **Detection principle:** Background suppression
- **Switching mode:** Light/dark switching
- **Adjustment:** BluePilot: Teach-Turn adjustment with sensing range indicator, IO-Link

Sensing range max. [1]	Light spot size (distance)	Output type	Connection	DeviceID	Connection diagram	Type	Part no.
10 mm … 1,000 mm	Ø 6 mm (500 mm)	PUSH/PULL, PNP, NPN	Cable, 2 m, PVC	8388956 dez / 0x80015C	cd-389	WTB16P-1H161120A00	1218816
			Male connector M12, 4-pin	8388956 dez / 0x80015C	cd-390	WTB16P-24161120A00	1218626
			Cable with M12 male connector, 4-pin, 270 mm, PVC	8388956 dez / 0x80015C	cd-390	WTB16P-34161120A00	1218817
10 mm … 500 mm	Ø 3 mm (200 mm)	PUSH/PULL, PNP, NPN	Cable, 2 m, PVC	8388957 dez / 0x80015D	cd-389	WTB16P-1H161220A00	1218820
			Male connector M12, 4-pin	8388957 dez / 0x80015D	cd-390	WTB16P-24161220A00	1218698
			Cable with M12 male connector, 4-pin, 270 mm, PVC	8388957 dez / 0x80015D	cd-390	WTB16P-34161220A00	1218821

[1] Object with 90 % reflectance (referred to standard white, DIN 5033).

Infrared light

- **Detection principle:** Background suppression
- **Switching mode:** Light/dark switching
- **Adjustment:** BluePilot: Teach-Turn adjustment with sensing range indicator, IO-Link

Sensing range max. [1]	Light spot size (distance)	Output type	Connection	DeviceID	Connection diagram	Type	Part no.
10 mm … 1,500 mm	Ø 12 mm (800 mm)	PUSH/PULL, PNP, NPN	Cable, 2 m, PVC	8389011 dez / 0x800193	cd-389	WTB16I-1H161120A00	1218818
			Male connector M12, 4-pin	8389011 dez / 0x800193	cd-390	WTB16I-24161120A00	1218669
			Cable with M12 male connector, 4-pin, 270 mm, PVC	8389011 dez / 0x800193	cd-390	WTB16I-34161120A00	1218819

[1] Object with 90 % reflectance (referred to standard white, DIN 5033).

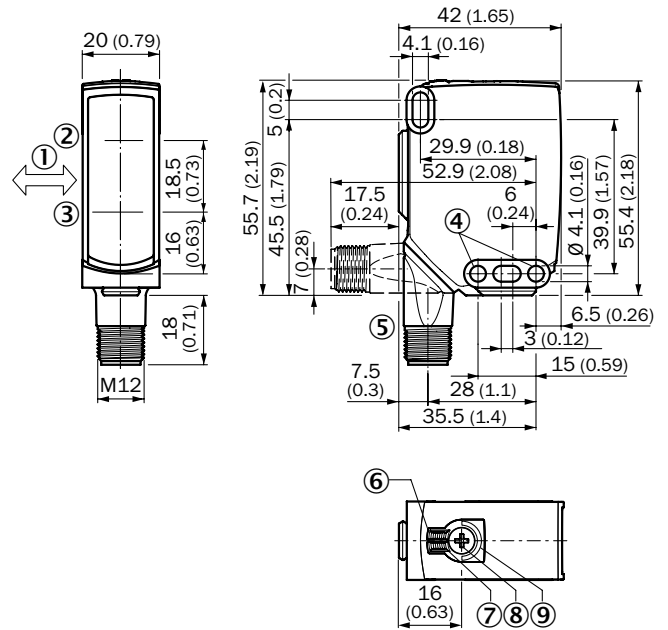## Dimensional drawings (Dimensions in mm (inch))

WTB16, cable
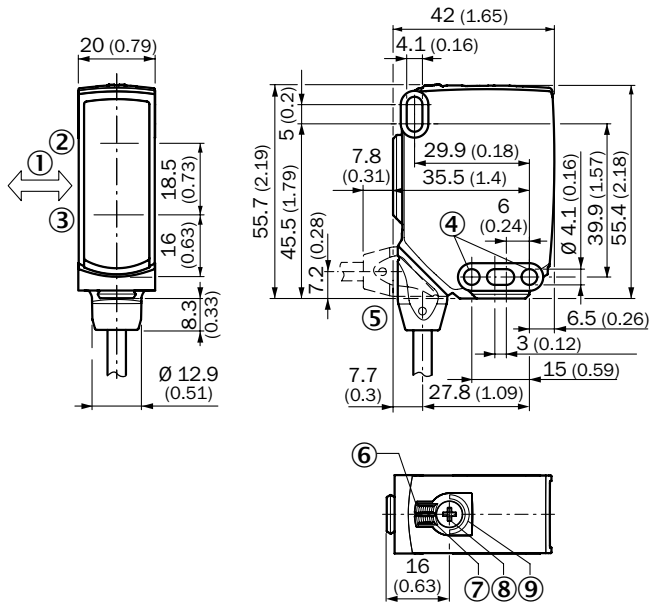
① Standard direction of the material being detected
② Center of optical axis, sender
③ Center of optical axis, receiver
④ Mounting hole, Ø 4.1 mm
⑤ Connection
⑥ LED indicator green: power
⑦ LED indicator yellow: Status of received light beam
⑧ Teach-Turn adjustment of sensing range
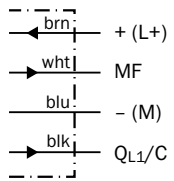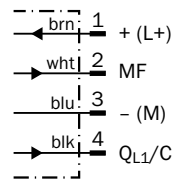⑨ BluePilot blue: sensing range indicator

WTB16, connector

① Standard direction of the material being detected
② Center of optical axis, sender
③ Center of optical axis, receiver
④ Mounting hole, Ø 4.1 mm
⑤ Connection
⑥ LED indicator green: power
⑦ LED indicator yellow: Status of received light beam
⑧ Teach-Turn adjustment of sensing range
⑨ BluePilot blue: sensing range indicator

Connection diagram

Cd-389

brn — + (L+)
wht — MF
blu — – (M)
blk — Q_{L1}/C

Default: MF = $\overline{Q}$
Q_{L1}/C = Q

Cd-390

brn 1 — + (L+)
wht 2 — MF
blu 3 — – (M)
blk 4 — Q_{L1}/C

Default: MF = $\overline{Q}$
Q_{L1}/C = Q

Characteristic curves

WTB16P-xxxxx1xx

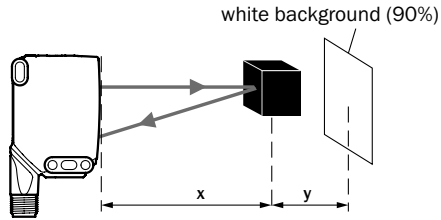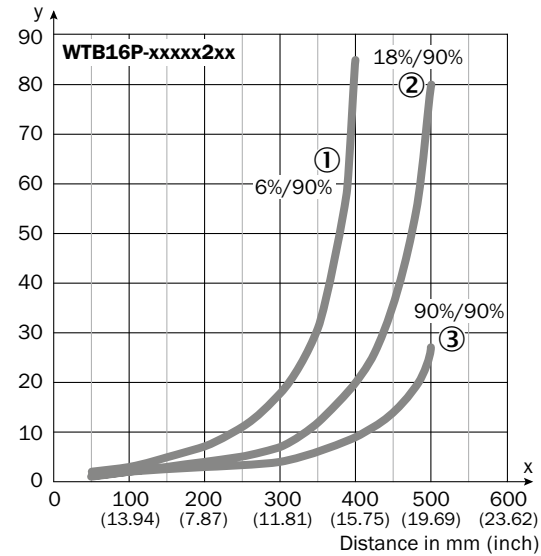Minimum distance in mm (y) between the set sensing
range and background (white, 90%)

① Sensing range on black, 6% remission
② Sensing range on gray, 18 % remission
③ Sensing range on white, 90% remission
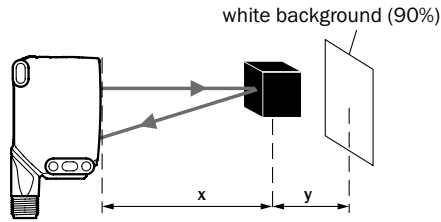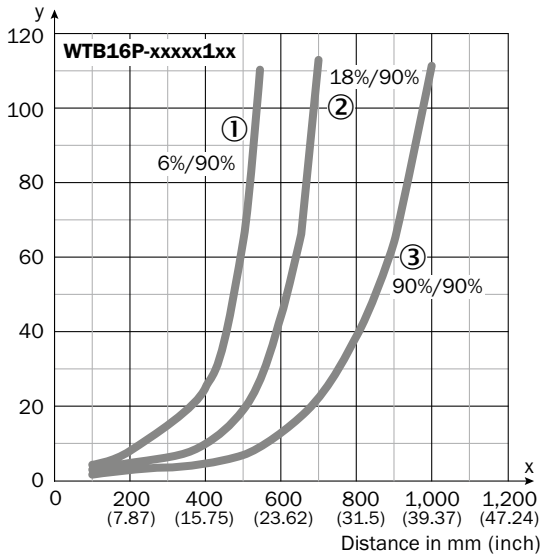
Example:
Sensing range on black, 6%,
x = 400 mm, y = 25 mm

WTB16P-xxxxx2xx

Minimum distance in mm (y) between the set sensing
range and background (white, 90%)

① Sensing range on black, 6% remission
② Sensing range on gray, 18 % remission
③ Sensing range on white, 90% remission

Example:
Sensing range on black, 6%,
x = 250 mm, y = 11 mm

WTB16I-xxxxx1xx

Minimum distance in mm (y) between the set sensing range and background (white, 90%)

white background (90%)
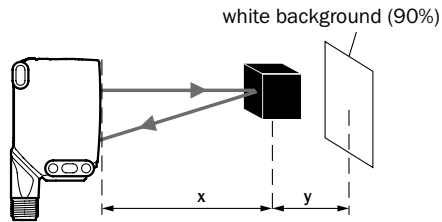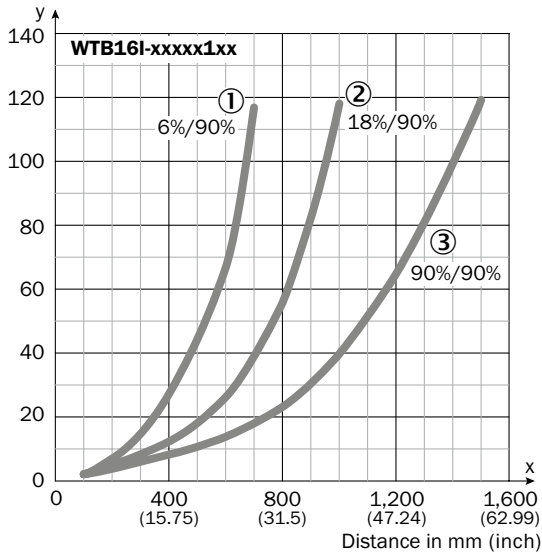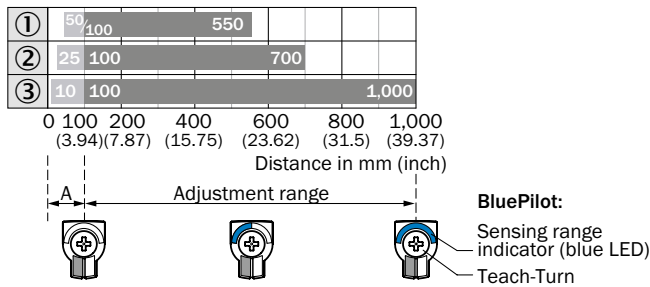
Example:
Sensing range on black, 6%,
x = 600 mm, y = 70 mm

① Sensing range on black, 6% remission
② Sensing range on gray, 18 % remission
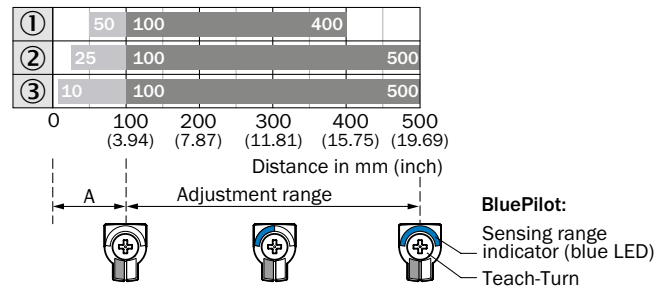③ Sensing range on white, 90% remission

Bar diagrams

WTB16P-xxxxx1xx

A = Detection distance (depending on object remission)

① Sensing range on black, 6% remission
② Sensing range on gray, 18 % remission
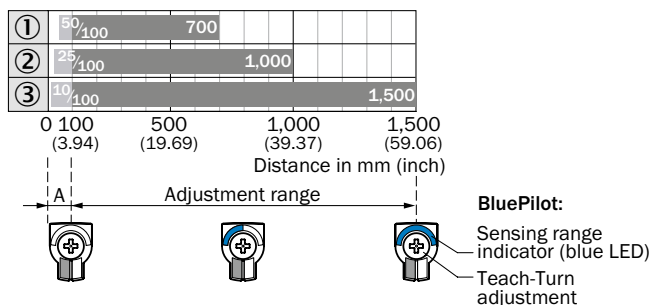③ Sensing range on white, 90% remission

WTB16P-xxxxx2xx

A = Detection distance (depending on object remission)

① Sensing range on black, 6% remission
② Sensing range on gray, 18 % remission
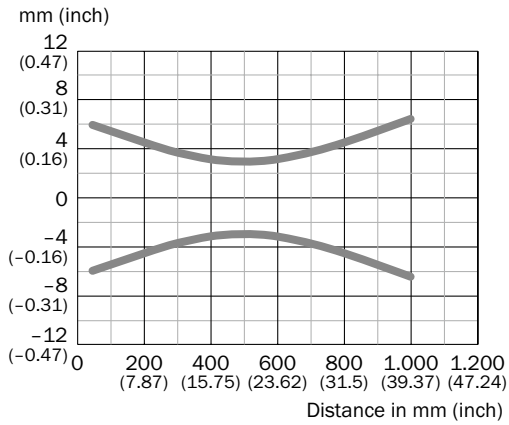③ Sensing range on white, 90% remission

WTB16I-xxxxx1xx
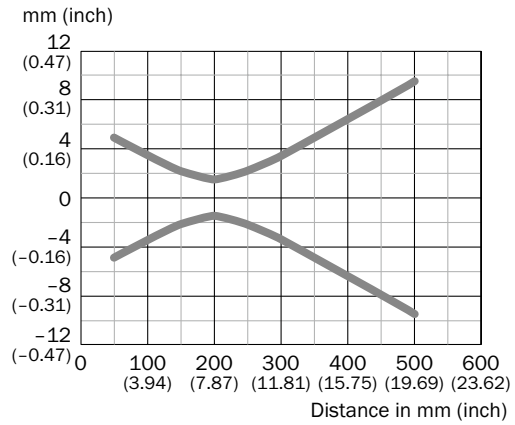

A = Detection distance (depending on object remission)

① Sensing range on black, 6% remission
② Sensing range on gray, 18 % remission
③ Sensing range on white, 90% remission

Light spot diameter

WTB16P-xxxxx1xx

mm (inch)

Distance in mm (inch)

WTB16P-xxxxx2xx

mm (inch)

Distance in mm (inch)

WTB16I-xxxxx1xx

mm (inch)

Distance in mm (inch)