

Triangulation sensor (SbR) OQT150-R101-EP-IO-0,3M-V3-L



- Miniature design with versatile mounting options
- Multi Pixel Technology (MPT) flexibility and adaptability
- Reduction of device variety several switch points within one
- DuraBeam Laser Sensors durable and employable like an LED
- Reliable detection of all surfaces, independent of color and structure
- IO-Link interface for service and process data

Switching diffuse mode sensor with measurement core technology, 150 mm detection range, red laser light, laser class 1, IO-Link, push-pull output, fixed cable with M8 plug











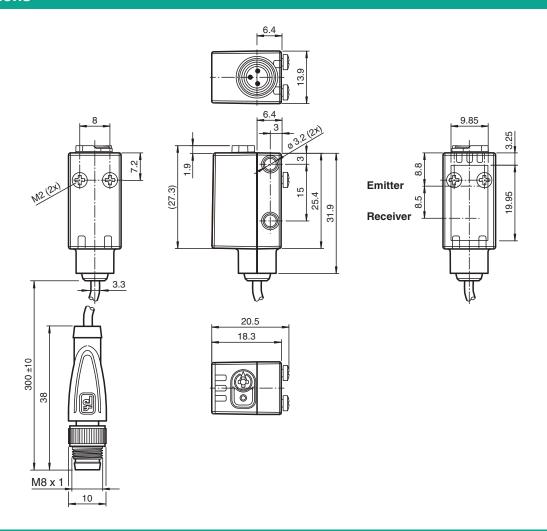
Function

The miniature optical sensors are the first devices of their kind to offer an end-to- end solution in a small single standard design — from thru-beam sensor through to a distance measurement device. As a result of this design, the sensors are able to perform practically all standard automation

The DuraBeam laser sensors are durable and can be used in the same way as a standard sensor.

The use of Multi Pixel Technology gives the standard sensors a high level of flexibility and enables them to adapt more effectively to their operating environment.

Dimensions



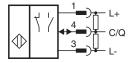
Technical Data

General specifications	
·	0. 450
Detection range	8 150 mm
Detection range min.	8 20 mm
Detection range max.	8 150 mm
Adjustment range	20 150 mm
Reference target	standard white, 100 mm x 100 mm
Light source	laser diode
Light type	modulated visible red light
Laser nominal ratings	
Note	LASER LIGHT , DO NOT STARE INTO BEAM
Laser class	1
Wave length	680 nm
Beam divergence	> 5 mrad; d63 < 1 mm in the range of 50 mm 250 mm
Pulse length	3 µs
Repetition rate	approx. 3 kHz
max. pulse energy	15.2 nJ
Black-white difference (6 %/90 %)	< 3 % at 150 mm
Diameter of the light spot	approx. 2 mm at a distance of 150 mm
Opening angle	approx. 1 °
Ambient light limit	EN 60947-5-2 : 30000 Lux
Functional safety related parameters	
MTTF _d	560 a

Operating voltage U _B 10 30 V DC Ripple max. 10 % No-load supply current Ighter of the control of the contr	Technical Data		
Disgnostic Coverage (DC) 0 %	Mission Time (T _M)		20 a
Indicators/operating means CPD	` '		
Departation indicator LED greent constantity on - power on fleashing (AHz) - short circuit flashing (AHz) - short circui	, , ,		
Control elements			constantly on - power on flashing (4Hz) - short circuit
Control elements	Function indicator		constantly on - switch output active
Departing voltage	Control elements		Teach-In key
Operating voltage U _b 10 30 V DC Ripple max. 10 % No-load supply current I _b < 20 mA at 24 V supply voltage Protection class III Interface III Interface type IO-Link (via C/Q = pin 4) IO-Link revision 1 1.1 Device profile Smart Sensor Device ID 0 x110802 (1116162) Transfer rate COM2 (38.4 kBirls) Min. cycle time 2.3 ms Process data width Process data output 2 Bit Process data width 2 yes Compatible master port type A Compatible master port type A Switching type The default setting is: Cive PinA: NPN normally open, PNP normally closed, IO-Link Signal output 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvoltage protected Switching voltage max. 30 V DC Switching voltage max. 30 V DC Switching frequency 1 max. 100 mA, resistive load Usage category DC-12 and DC-13 Voltage drop	Control elements		5-step rotary switch for operating modes selection
Ripple	Electrical specifications		
No-load supply current Protection class III Interface Interface Interface ype IO-Link (via C/Q = pin 4) IO-Link revision Interface Interface ype IO-Link revision Interface Interface ype IO-Link revision Interface Interface ype IO-Link revision Interface ype IO-Link (via C/Q = pin 4) Interface ype IO-Link revision Interface ype IO-Link (via C/Q = pin 4) Interface ype IO-Link revision Interface ype Interfa	Operating voltage	U _B	10 30 V DC
Protection class	Ripple		max. 10 %
Interface Interface type Interface Interface type IO-Link (via C/Q = pin 4) IO-Link revision IO-Link revision Device profile Smart Sensor Device ID Ox110802 (1116162) Transfer rate COM2 (38.4 kBit/s) Min. cycle time 2.3 ms Process data width Process data input 2 Bit Process data output 2 Bit SIO mode support Switching type The default setting is: C/Q - Pin4: NPN normally open, PNP normally closed, IO-Link Signal output Signal output I push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvoltage protected Switching voltage max. 30 V DC Switching current Max. 30 V DC Switching frequency DC-12 and DC-13 Voltage drop Ud ≤ 1.5 V DC Switching frequency F 217 Hz Response time 2.3 ms Conformity Communication interface IEC 61131-9 Product standard EN 60947-5-2 Laser safety EAC conformity TR CU 020/2011 UL approval EB766, occluse Listed, class 2 power supply, type rating 1 EC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions Ambient temperature -40 60 °C (-40 140 °F), fixed cable cable not appropriate for conveyor chains	No-load supply current	I_0	< 20 mA at 24 V supply voltage
Interface type	Protection class		III
Incompanies	Interface		
Device profile	Interface type		IO-Link (via C/Q = pin 4)
Device D	IO-Link revision		1.1
Transfer rate COM2 (38.4 kBit/s) Min. cycle time 2.3 ms Process data width Process data input 2 Bit SIO mode support yes Compatible master port type A Output The default setting is:	Device profile		Smart Sensor
Min. cycle time 2.3 ms Process data width Process data input 2 Bit Process data output 2 Bit Process data output 2 Bit Process data output 2 Bit SIO mode support yes Compatible master port type A Output The default setting is: C/O - Pin4; NPN normally open, PNP normally closed, IO-Link Signal output ¹ push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvoltage protected Switching voltage max. 30 V DC Switching current max. 100 mA , resistive load Usage category DC-12 and DC-13 Voltage drop U _d ≤ 1.5 V DC Switching frequency f Switching frequency f Exponse time 2.3 ms Conformity Communication interface IEC 61131-9 Product standard EN 60947-5-2 Laser safety EN 60947-5-2 Laser safety EN 60947-5-2 Laser safety EN 60825-1:2014 Approvals and certificates EN 60825-1:2007 Compiles with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions -40 60 °C (-40	Device ID		0x110802 (1116162)
Process data width Process data input 2 Bit Process data output 2 Bit 9 yes Compatible master port type A Output Switching type The default setting is:	Transfer rate		COM2 (38.4 kBit/s)
Process data output 2 Bit SIO mode support Compatible master port type A Output Switching type The default setting is: C/Q - Pin4: NPN normally open, PNP normally closed, IO-Link Signal output 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvoltage protected Switching voltage Max. 30 V DC Switching current Max. 100 mA, resistive load Usage category DC-12 and DC-13 Voltage drop Ud ≤ 1.5 V DC Switching frequency f 217 Hz Response time Communication interface IEC 61131-9 Product standard EN 60947-5-2 Laser safety EAC conformity UL approval EAC conformity UL approval EAC conformity UL approval EBC 60825-1:2014 Approvals and certificates EBC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions Ambient temperature Product stap of C-40 140 °F), fixed cable -25 60 °C (-40 140 °F), fixed cable not appropriate for conveyor chains	Min. cycle time		2.3 ms
Compatible master port type Output Switching type The default setting is: C/Q - Pin4: NPN normally open, PNP normally closed, IO-Link Signal output I push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvoltage protected wax. 30 V DC Switching outrent I max. 100 mA , resistive load Usage category DC-12 and DC-13 Voltage drop Ud ≤ 1.5 V DC Switching frequency f 217 Hz Response time Conformity Communication interface IEC 61131-9 Product standard Laser safety Approvals and certificates EAC conformity UL approval EBC 60825-1:2014 Approval EB7056 , cULus Listed , class 2 power supply , type rating 1 FDA approval Ambient conditions Ambient temperature A 0 60 °C (-40 140 °F) , fixed cable , 25 60 °C (-41 140 °F) , movable cable not appropriate for conveyor chains	Process data width		
Switching type The default setting is: C/Q - Pin4: NPN normally open, PNP normally closed, IO-Link Signal output 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvoltage protected max. 30 V DC Switching voltage max. 30 V DC Switching current Usage category DC-12 and DC-13 Voltage drop Ud ≤1.5 V DC Switching frequency f 217 Hz Response time 2.3 ms Conformity Communication interface IEC 61131-9 Product standard EN 60947-5-2 Laser safety Approvals and certificates EAC conformity TR CU 020/2011 UL approval E87056 , cULus Listed , class 2 power supply , type rating 1 FDA approval BEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions Ambient temperature The default setting is: C/Q - Pin4: NPN normally open, PNP normally closed, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvolend, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvolend, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvolend, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvolend, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvolend, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvolend, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, overvolend, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, overvolend, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, overvolend, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, IO-Link 1 push push push push push push push push	SIO mode support		yes
Switching type The default setting is: C/Q - Pin4: NPN normally open, PNP normally closed, IO-Link Signal output 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvoltage protected wax. 30 V DC wax. 100 mA , resistive load Usage category DC-12 and DC-13 Voltage drop Ud ≤ 1.5 V DC Switching frequency f 217 Hz Response time Conformity Communication interface Product standard EN 60947-5-2 Laser safety Approvals and certificates EAC conformity UL approval EBC 60825-1:2014 Approval Ambient conditions Ambient temperature The default setting is: C/Q - Pin4: NPN normally open, PNP normally closed, IO-Link 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overviews polarity protected overviews polarity polarity polarity polarity polarity polarity polarity polarity	Compatible master port type		A
C/Q - Pin4: NPN normally open, PNP normally closed, IO-Link Signal output 1 push-pull (4 in 1) output, short-circuit protected, reverse polarity protected, overvoltage protected max. 30 V DC Switching current Usage category DC-12 and DC-13 Voltage drop Voltage drop Voltage drop Switching frequency f 217 Hz Response time Conformity Communication interface Product standard EN 60947-5-2 Laser safety EAC conformity TR CU 020/2011 UL approval EFO 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions Ambient temperature C-40 60 °C (-40 140 °F), fixed cable -25 60 °C (-13 140 °F), movable cable not appropriate for conveyor chains	Output		
Switching voltage Switching current Max. 30 V DC Switching current Max. 100 mA , resistive load Usage category DC-12 and DC-13 Voltage drop Witching frequency Fesponse time Conformity Communication interface IEC 61131-9 Product standard EN 60947-5-2 Laser safety Approvals and certificates EAC conformity TR CU 020/2011 UL approval EB7056 , cULus Listed , class 2 power supply , type rating 1 IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions Ambient temperature overvoltage protected max. 30 V DC max. 100 mAx , resistive load max. 100 mA , resistive load ### C-13 under C-13 ### C-14 under C-13 ### C-15 under C-16 un	Switching type		
Switching current Usage category DC-12 and DC-13 Voltage drop Ud ≤ 1.5 V DC Switching frequency Fesponse time Conformity Communication interface Product standard EN 60947-5-2 Laser safety Approvals and certificates EAC conformity UL approval EBC 61131-9 TR CU 020/2011 UL approval EB7056 , cULus Listed , class 2 power supply , type rating 1 EDC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions Ambient temperature Approvals category DC-12 and DC-13 EBC 6131-9 EBC 61131-9 EBC 61131-9 EBC 60825-1:2014 Approval EB7056 , cULus Listed , class 2 power supply , type rating 1 EBC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions	Signal output		
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Voltage drop U _d ≤ 1.5 V DC Switching frequency f 217 Hz Response time 2.3 ms Conformity Communication interface IEC 61131-9 Product standard EN 60947-5-2 Laser safety EN 60825-1:2014 Approvals and certificates EAC conformity TR CU 020/2011 UL approval E87056 , cULus Listed , class 2 power supply , type rating 1 FDA approval IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not appropriate for conveyor chains	Switching current		max. 100 mA , resistive load
Switching frequency Response time 2.3 ms Conformity Communication interface Product standard EN 60947-5-2 Laser safety EN 60825-1:2014 Approvals and certificates EAC conformity UL approval FDA approval FDA approval BER056, cULus Listed, class 2 power supply, type rating 1 IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions Ambient temperature 40 60 °C (-40 140 °F), fixed cable -25 60 °C (-13 140 °F), movable cable not appropriate for conveyor chains	Usage category		DC-12 and DC-13
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Communication interface IEC 61131-9 Product standard EN 60947-5-2 Laser safety EN 60825-1:2014 Approvals and certificates EAC conformity TR CU 020/2011 UL approval E87056 , cULus Listed , class 2 power supply , type rating 1 FDA approval IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions Ambient temperature -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not appropriate for conveyor chains	Switching frequency	f	217 Hz
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Laser safety Approvals and certificates EAC conformity TR CU 020/2011 UL approval E87056, cULus Listed, class 2 power supply, type rating 1 FDA approval EC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions Ambient temperature -40 60 °C (-40 140 °F), fixed cable -25 60 °C (-13 140 °F), movable cable not appropriate for conveyor chains	Communication interface		IEC 61131-9
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EAC conformity TR CU 020/2011 UL approval E87056, cULus Listed, class 2 power supply, type rating 1 IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions Ambient temperature -40 60 °C (-40 140 °F), fixed cable -25 60 °C (-13 140 °F), movable cable not appropriate for conveyor chains	,		EN 60825-1:2014
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pursuant to Laser Notice No. 50, dated June 24, 2007 Ambient conditions Ambient temperature -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not appropriate for conveyor chains	UL approval		E87056, cULus Listed, class 2 power supply, type rating 1
Ambient temperature -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not appropriate for conveyor chains			IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007
-25 60 °C (-13 140 °F) , movable cable not appropriate for conveyor chains	Ambient conditions		
Storage temperature -40 70 °C (-40 158 °F)	·		-25 60 °C (-13 140 °F) , movable cable not appropriate for conveyor chains
	• •		-40 70 °C (-40 158 °F)
Mechanical specifications	Mechanical specifications		
Housing width 13.9 mm	Housing width		13.9 mm
Housing height 33.8 mm	Housing height		33.8 mm
Housing depth 18.3 mm	Housing depth		18.3 mm

Degree of protection	IP67 / IP69 / IP69K
Connection	300 mm fixed cable with M8 x 1, 3-pin connector
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Mass	approx. 17 g
Cable length	0.3 m

Connection



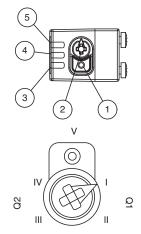
Connection Assignment



Wire colors in accordance with EN 60947-5-2

1 | BN (brown) 3 | BU (blue) 4 | BK (black)

Assembly



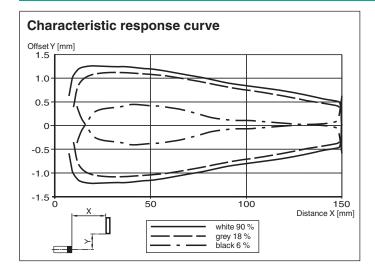
- 1 TEACH-IN button
 2 Mode rotary switch
 3 Switch output indicator Q2
 4 Switch output indicator Q1
 5 Operating indicator
- I Switch output 1 / switch point B

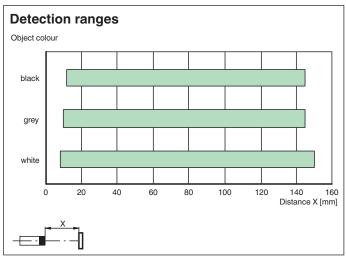
 II Switch output 1 / switch point A

 III Switch output 2 / switch point A

 IV Switch output 2 / B

 V Keylock

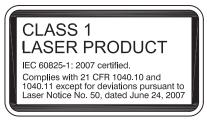




Safety Information







Acces	sories	
2	V3-GM-2M-PUR	Female cordset single-ended M8 straight A-coded, 3-pin, PUR cable grey
	OMH-R101	Mounting Clamp
	OMH-R101-Front	Mounting Clamp
	OMH-4.1	Mounting Clamp
*	OMH-ML6	Mounting bracket
	OMH-ML6-U	Mounting bracket
	OMH-ML6-Z	Mounting bracket
2	V31-GM-2M-PUR	Female cordset single-ended M8 straight A-coded, 4-pin, PUR cable grey
	V31-WM-2M-PUR	Female cordset single-ended M8 angled A-coded, 4-pin, PUR cable grey
2	V3-WM-2M-PUR	Female cordset single-ended M8 angled A-coded, 3-pin, PUR cable grey
	ICE2-8IOL-G65L-V1D	EtherNet/IP IO-Link master with 8 inputs/outputs
	ICE3-8IOL-G65L-V1D	PROFINET IO IO-Link master with 8 inputs/outputs
The state of the s	ICE1-8IOL-G30L-V1D	Ethernet IO-Link module with 8 inputs/outputs
0.10 0.10 0.10 0.10	ICE1-8IOL-G60L-V1D	Ethernet IO-Link module with 8 inputs/outputs
	ICE2-8IOL-K45P-RJ45	EtherNet/IP IO-Link master with 8 inputs/outputs, DIN rail, push-in connectors
8	ICE2-8IOL-K45S-RJ45	EtherNet/IP IO-Link master with 8 inputs/outputs, DIN rail, screw terminal
	ICE3-8IOL-K45P-RJ45	PROFINET IO IO-Link master with 8 inputs/outputs, DIN rail, push-in terminals
9	ICE3-8IOL-K45S-RJ45	PROFINET IO IO-Link master with 8 inputs/outputs, DIN rail, screw terminal
	IO-Link-Master02-USB	IO-Link master, supply via USB port or separate power supply, LED indicators, M12 plug for sensor connection

To store a threshold value, press and hold the "TI" button until the yellow and green LEDs flash in phase (approx. 1 s). Teach-In starts when the "TI" button is released.

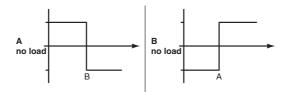
Successful Teach-In is indicated by alternating flashing (2.5 Hz) of the yellow and green LEDs.

An unsuccessful Teach-In is indicated by rapidly alternating flashing (8 Hz) of the yellow and green LEDs.

After an unsuccessful Teach-In, the sensor continues to operate with the previous valid setting after the relevant visual fault signal is issued.

Different switching modes can be defined by teaching in the relevant distance measured values for the switching thresholds A and B:

Single point mode:



Window mode:



Every taught-in switching threshold can be retaught (overwritten) by pressing the "TI" button again.

Pressing and holding the "TI" button for > 4 s completely deletes the taught-in value. The yellow and green LEDs go out simultaneously to indicate that this procedure has been completed. Successful resetting is indicated by alternating flashing (2.5 Hz) of the yellow and green LEDs.

Resetting to Factory Default Settings

Press the "TI" button for > 10 s in rotary switch position ,O' to reset to factory default settings. The yellow and green LEDs go out simultaneously to indicate the resetting.

Resetting process starts when the "TI" button is released and is indicated by the yellow LED. After the process the sensor works with factory default settings, immediately.

OMT:

- Factory default settings switch signal Q1: Switch signal active, window mode
- Factory default settings switch signal Q2: Switch signal active, window mode

OQT:

Release date: 2022-08-03 Date of issue: 2022-08-03 Filename: 267075-100172_eng.pdf

- Factory default settings switch signal Q1: Switch signal active, BGS mode (background suppression)
- Factory default settings switch signal Q2: Switch signal active, BGS mode (background suppression)

Configuration

Configuring different operating modes via the IO-Link interface

The devices are equipped with an IO-Link interface as standard for diagnostics and parameterization tasks to ensure optimum adjustment of the sensors to the relevant application. Four different operating modes can be set, among other features:

Background suppression operating mode (one switch point):

• Detection of objects irrespective of type and color in a defined detection range. Objects in the background are suppressed.



Background evaluation operating mode (one switch point):

• Detection of objects irrespective of type and color against a defined background. Reliable detection of objects at close range

Triangulation sensor (SbR)

(detection range >= 0 mm). The background serves as reference.

active detection range

Background evaluation

Single point mode operating mode (one switch point):

- Detection of objects irrespective of type and color in a defined detection range. Objects in the background are suppressed.
- The switch point corresponds exactly to the set point.



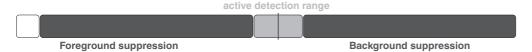
Window mode operating mode (two switch points):

- Detection of objects irrespective of type and color in a defined detection range. Reliable detection when object leaves the
 detection range.
- · Window mode with two switch points.



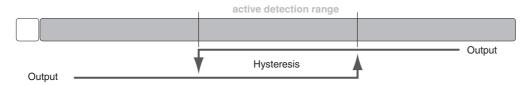
Center window mode operating mode (one switch point):

- Detection of objects irrespective of type and color in a defined detection range. Sets a defined window around a given object.
 Objects outside this window are not detected.
- · Window mode with one switch point.



Two point mode operating mode (hysteresis operating mode):

Detection of objects irrespective of type and color between a defined switch-on and switch-off point.



Inactive operating mode:

• Evaluation of switching signals is deactivated.

The associated IODD device description file can be found in the download area at www.pepperl-fuchs.com.