

Model Number

OQT150-R101-2EP-IO-V31-L

Triangulation sensor (SbR)
with 4-pin, M8 x 1 connector

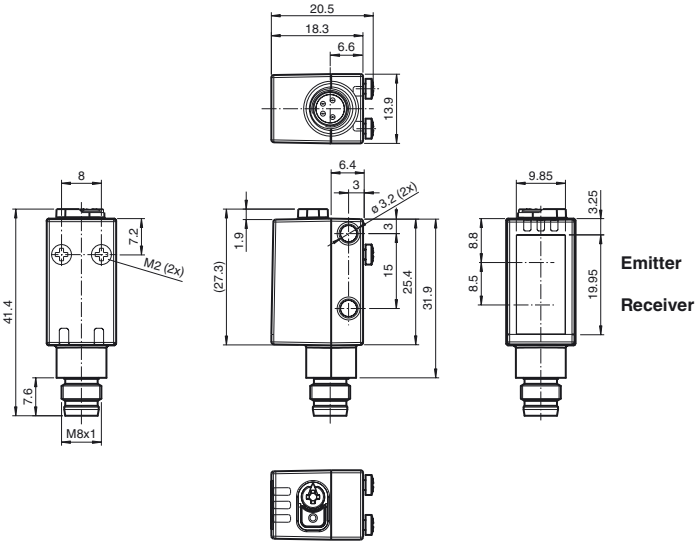
Features

- Miniature design with versatile mounting options
- Multi Pixel Technology (MPT) - flexibility and adaptability
- Reduction of device variety - several switch points within one sensor
- 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

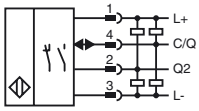
Product information

The R101 series 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 tasks.
The entire series enables sensors to communicate via IO-Link.
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



Electrical connection



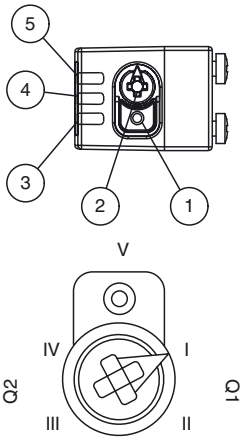
Pinout



Wire colors in accordance with EN 60947-5-2

1	BN	(brown)
2	WH	(white)
3	BU	(blue)
4	BK	(black)

Indicators/operating means



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

Release date: 2016-06-09 15:21 Date of issue: 2016-08-02 267075-100168_eng.xml

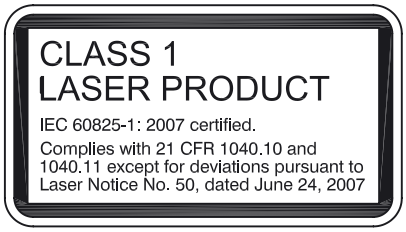
Technical data

General specifications		
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 50-250 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
Angle of divergence		approx. 1 °
Ambient light limit		EN 60947-5-2 : 30000 Lux
Functional safety related parameters		
$MTTF_d$		560 a
Mission Time (T_M)		20 a
Diagnostic Coverage (DC)		0 %
Indicators/operating means		
Operation indicator		LED green: constantly on - power on flashing (4Hz) - short circuit flashing with short break (1 Hz) - IO-Link mode
Function indicator		LED yellow: constantly on - switch output active constantly off - switch output inactive
Control elements		Teach-In key
Control elements		5-step rotary switch for operating modes selection
Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC
Ripple		max. 10 %
No-load supply current	I_0	< 20 mA at 24 V supply voltage
Protection class		III
Interface		
Interface type		IO-Link (via C/Q = pin 4)
Device profile		Smart Sensor
Transfer rate		COM 2 (38.4 kBaud)
IO-Link Revision		1.1
Min. cycle time		2.3 ms
Process data witdh		Process data input 2 Bit Process data output 2 Bit
SIO mode support		yes
Device ID		0x110802 (1116162)
Compatible master port type		A
Output		
Switching type		The default setting is: C/Q - Pin4: NPN normally open, PNP normally closed, IO-Link Q2 - Pin2: NPN normally open, PNP normally closed
Signal output		2 push-pull (4 in 1)outputs, 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	217 Hz
Response time		2.3 ms
Ambient conditions		
Ambient temperature		-40 ... 60 °C (-40 ... 140 °F)
Storage temperature		-40 ... 70 °C (-40 ... 158 °F)
Mechanical specifications		
Degree of protection		IP67 / IP69 / IP69K
Connection		M8 x 1 connector, 4-pin
Material		
Housing		PC (Polycarbonate)
Optical face		PMMA
Mass		approx. 10 g
Compliance with standards and directives		

Laserlabel







Accessories

V31-GM-2M-PUR
Female cordset, M8, 4-pin, PUR cable

V31-WM-2M-PUR
Female cordset, M8, 4-pin, PUR cable

IO-Link-Master02-USB
IO-Link master, supply via USB port or separate power supply, LED indicators, M12 plug for sensor connection

Other suitable accessories can be found at www.pepperl-fuchs.com

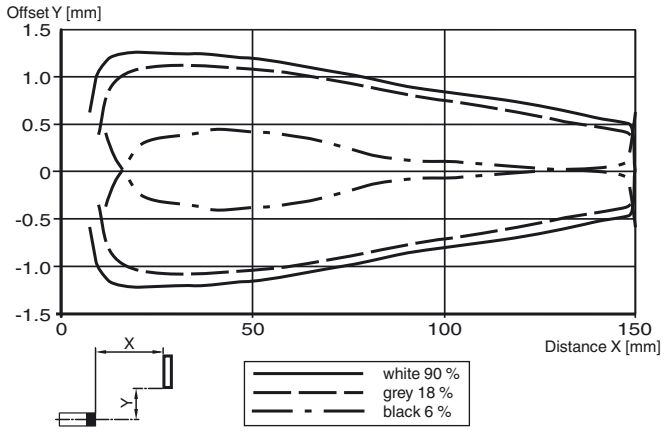
Release date: 2016-06-09 15:21 Date of issue: 2016-08-02 267075-100168_eng.xml

Directive conformity	
EMC Directive 2004/108/EC	EN 60947-5-2:2007+A1:2012
Standard conformity	
Product standard	EN 60947-5-2:2007+A1:2012 IEC 60947-5-2:2007 + A1:2012
Standards	UL 60947-5-2: 2014 IEC 61131-9:2013 IEC 60825-1:2007 EN 60825-1:2007 EN 61131-9:2013

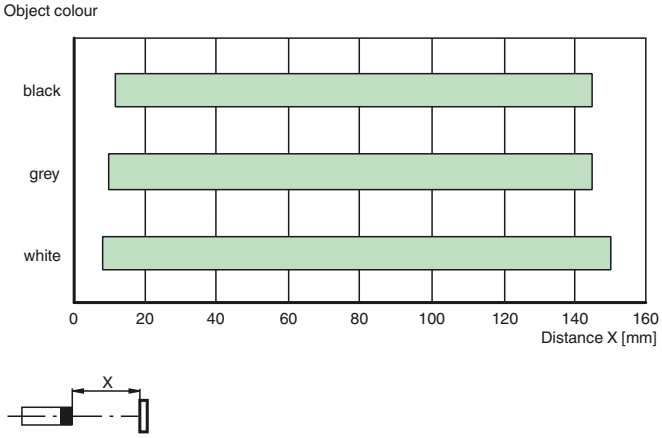
Approvals and certificates	
UL approval	E87056 , cULus Listed , class 2 power supply , type rating 1
FDA approval	IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

Curves/Diagrams

Characteristic response curve



Detection ranges

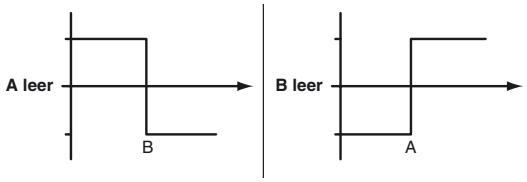


Preferences

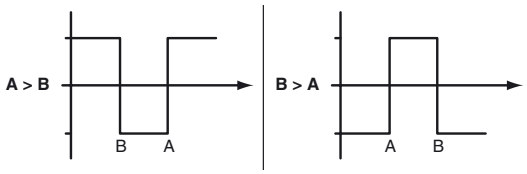
Teach-In:

You can use the rotary switch to select the relevant switching threshold A and/or B for teaching in for switch signal **Q1 or Q2**.
The yellow LEDs indicate the current state of the selected output.
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:

Release date: 2016-06-09 15:21 Date of issue: 2016-08-02 267075-100168_eng.xml



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:

- 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 via IO-Link interface

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



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

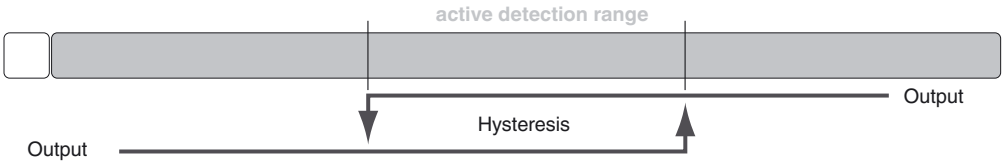
Release date: 2016-06-09 15:21 Date of issue: 2016-08-02 267075-100168_eng.xml

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**.

Release date: 2016-06-09 15:21 Date of issue: 2016-08-02 267075-100168_eng.xml