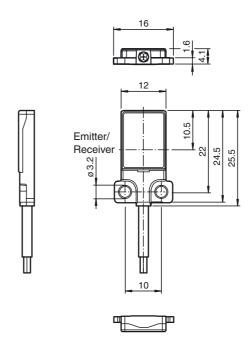## Model Number

OBE500-R3F-SE2-0,2M-V31-L

Laser thru-beam sensor

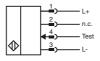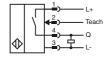with 0.2 m fixed cable and M8 plug, 4-pin

Features

- Very flat design for direct mounting without mounting bracket

- DuraBeam Laser Sensors - durable and employable like an LED

- TEACH-IN

- Detection of partially transparent objects by teach-in

- Detection of small parts or flat objects from 0.25 mm

Dimensions

Electrical connection

1		L+
2		n.c.
4		Test
3		L-

1		L+
2		Teach
4		Q
3		L-

Pinout

Wire colors in accordance with EN 60947-5-2

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

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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Technical data

System components

Emitter	OBE500-R3F-E2-0,2M-V31-L
Receiver	OBE500-R3F-E2-0,2M-V31-L

General specifications

Effective detection range	0 ... 500 mm
Threshold detection range	700 mm
Light source	LASER LIGHT
Light type	modulated visible red light , 680 nm
Laser nominal ratings	
Note	LASER LIGHT , DO NOT STARE INTO BEAM
Laser class	1
Wave length	680 nm
Beam divergence	> 5 mrad
Pulse length	approx. 3 μs
Repetition rate	approx. 16.6 kHz
max. pulse energy	8 nJ
Angle deviation	approx. 0.5 °
Object size	typ. starts from 0.5 mm ; typ. from 0.25 mm (after teach-in)
Diameter of the light spot	approx. 3 mm at a distance of 500 mm
Angle of divergence	approx. 1 °
Optical face	frontal
Ambient light limit	EN 60947-5-2 : 25000 Lux

Functional safety related parameters

$MTTF_d$	806 a
Mission Time (T_M)	20 a
Diagnostic Coverage (DC)	0 %

Indicators/operating means

Operation indicator	LED green, statically lit Power on , short-circuit : LED green flashing (approx. 4 Hz)
Function indicator	Receiver: LED yellow, lights up when light beam is free, flashes when falling short of the stability control ; OFF when light beam is interrupted

Electrical specifications

Operating voltage	U_B	12 ... 24 V
No-load supply current	I_0	Emitter: $\leq$ 10 mA Receiver: $\leq$ 8 mA
Protection class		III

Input

Test input	Test of switching function at 0 V
Switching threshold	Teach-In input

Output

Switching type		NO contact / dark on
Signal output		1 PNP output, short-circuit protected, reverse polarity protected, open collector
Switching voltage		max. 30 V DC
Switching current		max. 50 mA , resistive load
Voltage drop	U_d	$\leq$ 1.5 V DC
Switching frequency	f	approx. 2 kHz
Response time		250 μs

Directive conformity

Electromagnetic compatibility	
Directive 2014/30/EU	EN 60947-5-2:2007 EN 60947-5-2/A1:2012

Standard conformity

Standards	EN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN 60825-1:2007 UL 60947-5-2: 2014

Ambient conditions

Ambient temperature	-10 ... 60 °C (14 ... 140 °F)
Storage temperature	-20 ... 70 °C (-4 ... 158 °F)

Mechanical specifications

Degree of protection	IP67
Connection	200 mm fixed cable with 4-pin, M8x1 connector
Material	
Housing	PC (Polycarbonate) and Stainless steel
Optical face	PMMA
Cable	PUR
Mass	approx. 10 g Per sensor
Tightening torque, fastening screws	1 Nm
Cable length	200 mm

Approvals and certificates

UL approval	E87056 , cULus Recognized, Class 2 Power Source
CCC approval	CCC approval / marking not required for products rated $\leq$36 V

Laserlabel

CLASS 1 LASER PRODUCT

CLASS 1 LASER PRODUCT
IEC 60825-1: 2007 certified.
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

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Accessories

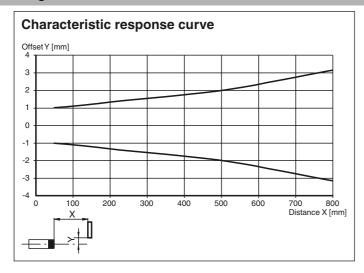**V31-GM-2M-PUR**
Female cordset, M8, 4-pin, PUR cable

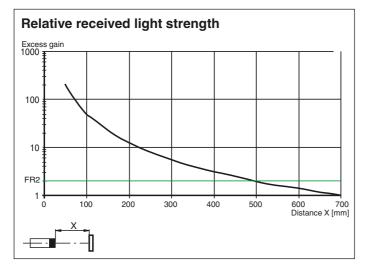**V31-WM-2M-PUR**
Female cordset, M8, 4-pin, PUR cable

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

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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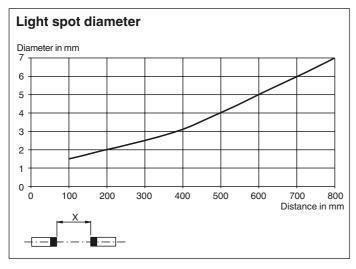| Pepperl+Fuchs Group	USA: +1 330 486 0001	Germany: +49 621 776 4411	Singapore: +65 6779 9091
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FDA approval	IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

Curves/Diagrams

Characteristic response curve

Relative received light strength
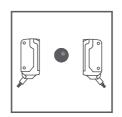

Light spot diameter

Teach-In Methods

The thru-beam sensor enables the switching points to be taught in for optimum adaptation to specific applications. This eliminates the need for additional components such as apertures.

The sensitivity of the thru-beam sensor can be adjusted using three Teach-in methods:

Position Teach

When using this Teach-in method, the following settings are made on the thru-beam sensor:
• The gain is set to an optimum value
• The signal threshold is set to a minimum

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Signal strength

Opt.

Threshold level

0

t

Recommended application:

This method enables minuscule particles in the beam path to be detected, and provides exceptional positioning accuracy.
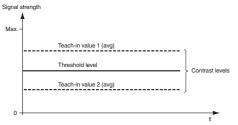
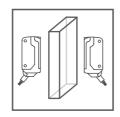Make sure that there are no objects in the beam path and that the sensor is connected to the power supply.

1. Connect the white cable on the receiver (WH/IN) to the blue cable (BU/0 V) on the receiver.
    The green and yellow LED indicators flash simultaneously at 2.5 Hz

2. Disconnect the white cable on the receiver (WH/IN) from the blue cable (BU/0 V) on the receiver.
    The green and yellow LED indicators flash alternately at 2.5 Hz

3. The end of the Teach-in process is indicated when the green LED indicator lights up sold and yellow LED blinks.

Two-Point Teach-In

When using this Teach-in method, the following settings are made on the thru-beam sensor:
*   The gain is set to an optimum value
*   The signal threshold is set in the center between the two taught signal values

Signal strength

Max.

Teach-in value 1 (avg)

Threshold level   Contrast levels
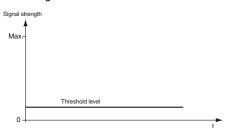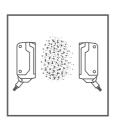
Teach-in value 2 (avg)

0

t

1. Make sure that there are no objects in the beam path and that the sensor is connected to the power supply.

2. Connect the white cable on the receiver (WH/IN) to the blue cable (BU/0 V) on the receiver.
    The green and yellow LED indicators flash simultaneously at 2.5 Hz

3. Position the object in the beam path.

4. Disconnect the white cable on the receiver (WH/IN) from the blue cable (BU/0 V) on the receiver.
    The green and yellow LED indicators flash alternately at 2.5 Hz

5. The end of the Teach-in process is indicated when the green LED indicator lights up sold.

Maximum Teach-In

When using this Teach-in method, the following settings are made on the thru-beam sensor:
*   The gain is set to a maximum
*   The signal threshold is set to a minimum

Signal strength

Max.

Threshold level

0

t

Recommended application:

Enables an object to be detected with a high excess gain. This can be useful if there is severe environmental contamination or to achieve long operating times.

Make sure that there are no objects in the beam path and that the sensor is connected to the power supply.

6. Cover the receiver or transmitter.

7. Connect the white cable on the receiver (WH/IN) to the blue cable (BU/0 V) on the receiver.
    The green and yellow LED indicators flash simultaneously at 2.5 Hz

8. Disconnect the white cable on the receiver (WH/IN) from the blue cable (BU/0 V) on the receiver.
    The green and yellow LED indicators flash alternately at 2.5 Hz

9. The end of the Teach-in process is indicated when the green LED indicator lights up sold.

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