Model Number

ML100-8-H-100/95/127/162

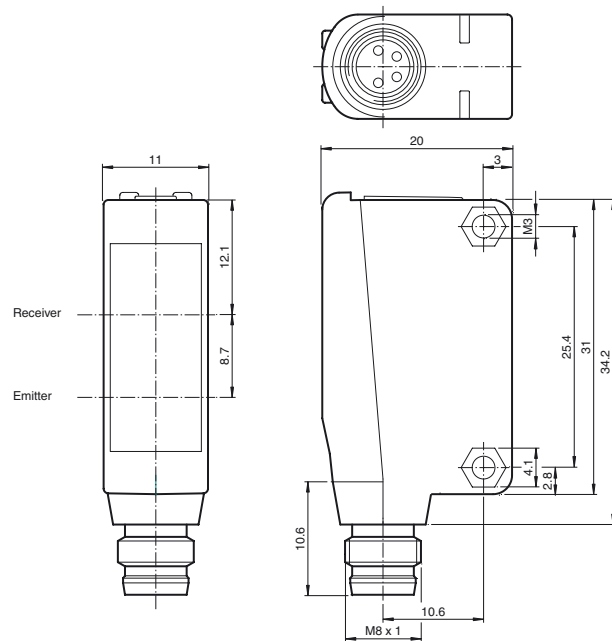Background suppression sensor
with 4-pin, M8 x 1 connector

Features

- Diffuse mode sensor with multiple light spots

- Specially designed for detecting critical objects such as PCBs

- Miniature design

- Detects objects in front of a close background through precise background suppression

- Can be adapted to the application in question thanks to the adjustable detection range

- Precision object detection, almost irrespective of the color

- Not sensitive to ambient light, even with switched energy saving lamps
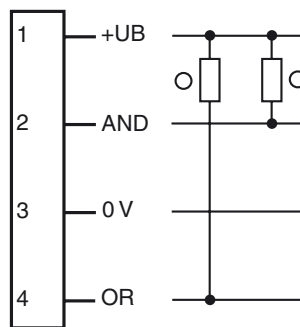
Product information

The ML100 series is characterized by its miniature housing with integral, all-metal threaded bushings. All versions are equipped with a visible red transmitter LED. This greatly simplifies installation and commissioning. The switching states are easily visible from all directions thanks to the highly visible LEDs.

Dimensions

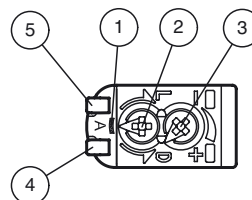## Electrical connection

○ = Light on
● = Dark on

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	Alignment Mode	
2	Light-Dark-switching	
3	Sensitivity adjuster	
4	Signal display	yellow
5	Operating display	green

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

Pepperl+Fuchs Group
www.pepperl-fuchs.com
USA: +1 330 486 0001
fa-info@us.pepperl-fuchs.com
Germany: +49 621 776 4411
fa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091
fa-info@sg.pepperl-fuchs.com

PEPPERL+FUCHS
SENSING YOUR NEEDS

1

Technical data

General specifications

Detection range	20 ... 100 mm
Detection range min.	10 ... 25 mm
Detection range max.	25 ... 100 mm
Adjustment range	25 ... 100 mm
Reference target	standard white, 100 mm x 100 mm
Light source	LED
Light type	modulated visible red light
Polarization filter	no
Black/White difference (6 %/90 %)	< 20 %
Diameter of the light spot	3 light spots, spotsize 4 mm at a distance of 50 mm, spots are 8 mm apart; spotsize 2.5 mm at a distance of 80 mm, spots are 12 mm apart; spotsize 4 mm at a distance of 100 mm, spots are 15 mm apart (outer spot to outer spot)
Optical face	frontal
Ambient light limit	EN 60947-5-2:2007+A1:2012

Functional safety related parameters

$MTTF_d$	1100 a
Mission Time (T_M)	20 a
Diagnostic Coverage (DC)	0 %

Indicators/operating means

Operation indicator	LED green: power on
Function indicator	LED yellow: lights when object is detected , flashes when in adjustment mode
Control elements	Sensing range adjuster
Control elements	Light-on/dark-on changeover switch

Electrical specifications

Operating voltage	U_B	10 ... 30 V DC
Ripple		max. 10 %
No-load supply current	I_0	< 15 mA

Output

Switching type		The switching type of the sensor is adjustable. The default setting is: light on
Signal output		2 NPN outputs, independent short-circuit protected , reverse polarity protected , open collector transistor
Switching voltage		max. 30 V DC
Switching current		max. 100 mA , resistive load
Voltage drop	U_d	≤ 1.5 V DC
Switching frequency	f	500 Hz
Response time		1 ms

Ambient conditions

Ambient temperature	-30 ... 60 °C (-22 ... 140 °F)
Storage temperature	-40 ... 70 °C (-40 ... 158 °F)

Mechanical specifications

Degree of protection	IP67
Connection	connector M8 x 1 , 4-pin
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Mass	approx. 10 g
Tightening torque, fastening screws	0.6 Nm

Compliance with standards and directives

Directive conformity	
EMC Directive 2004/108/EC	EN 60947-5-2:2007+A1:2012
Standard conformity	
Standards	UL 60947-5-2

Approvals and certificates

UL approval	cULus Listed, Class 2 Power Source or listed Power Supply with a limited voltage output with (maybe integrated) fuse (max. 3.3 A according UL248), Type 1 enclosure
CCC approval	CCC approval / marking not required for products rated ≤36 V

Accessories

OMH-ML100-01
Mounting aid for ML100 series, Mounting bracket

OMH-ML100-03
Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

OMH-ML100-04
Mounting aid for ML100 series, Mounting bracket

OMH-ML100-05
Mounting aid for ML100 series, Mounting bracket

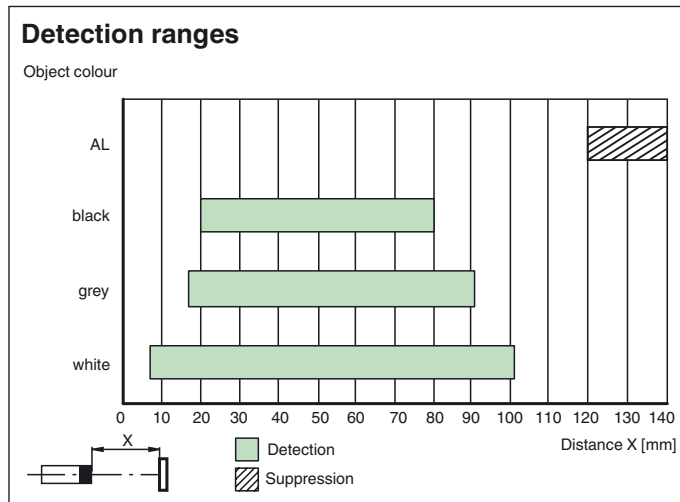**V31-GM-2M-PUR**
Female cordset, M8, 4-pin, PUR cable

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

OMH-ML100-08
Mounting aid for ML100 series, Snap-in

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

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

PEPPERL+FUCHS
SENSING YOUR NEEDS

Detection ranges

Object colour

Configuration Information

Setting mode (A-Mode):

A-Mode is an additional switch position that is integrated into the light ON/dark ON switch. A-Mode is located between position L and position D. A-Mode is a help mode which enables you to detect whether all three light spots are directed onto the object.

If A-Mode is selected, the yellow signal indicator LED flashes; the number of times that the LED flashes equates to the number of detected light spots.

The following scenarios exist:
- No flashing/LED off: No light spots detected
- Fast flashing (8 Hz): One light spot detected
- Slow flashing (4 Hz): Two light spots detected
- Static illumination/LED on: Three light spots detected

As soon as you exit A-Mode, the yellow LEDs light up in the standard manner again.

Switching output AND and OR

The sensor has three light spots, which the sensor evaluates individually. This permits a logical linking of the light spots.
The logical linking of the light spots is available at the switching output as OR (Pin 4/BK) and AND (Pin 2/WH).
Switching outputs:
If at least one of the three light spots provides an adequate receiving light strength from the detected object, the switching output switches to OR.
If all the light spots provide an adequate receiving light strength from the detected object, the switching output switches to AND.

Logical Linking	1. Light spot	2. Light spot	3. Light spot	Switching output
OR	0	0	0	0
	1	0	0	1
	0	1	0	1
	0	0	1	1
	1	1	0	1
	0	1	1	1
	1	1	1	1
AND	0	0	0	0
	1	0	0	0
	0	1	0	0
	0	0	1	0
	1	1	0	0
	0	1	1	0
	1	1	1	1

PEPPERL+FUCHS
SENSING YOUR NEEDS