SICK.COM

DATA SHEET

WT-M10L-241612D0A00ZWZZZZZZZZZ1

W10
Photoelectric sensors

SICK Sensor Intelligence

Illustration may differ

PHOTOELECTRIC SENSORS

WT-M10L-241612D0A00ZWZ

ORDERING INFORMATION

Type	part no.
WTM10L-241612D0A00ZWZZZZZZZZZ1	1133544

Further device versions and accessories at www.sick.com/W10

DETAILED TECHNICAL DATA

FEATURES

Functional principle	Photoelectric proximity sensor
Functional principle detail	Background suppression, Foreground suppression, MultiMode
MultiMode	Background suppression Foreground suppression Single value teach-in Two Value Teach-in Manual teach-in ApplicationSelect (Mode 1 - Speed, Mode 2 - Standard, Mode 3 - Precision) Measurement
Sensing range	
Sensing range min.	25 mm (Mode 1 - Speed) 25 mm (Mode 2 - Standard) 25 mm (Mode 3 - Precision)
Sensing range max.	220 mm (Mode 1 - Speed) 300 mm (Mode 2 - Standard) 400 mm (Mode 3 - Precision)
Adjustable switching threshold for background suppression	25 mm ... 220 mm (Mode 1 - Speed) 25 mm ... 300 mm (Mode 2 - Standard) 25 mm ... 400 mm (Mode 3 - Precision)
Reference object	Object with 90% remission factor (complies with standard white according to DIN 5033)
Minimum distance between set sensing range and background (black 6% / white 90%)	2 mm, at a distance of 150 mm (Mode 1 - Speed) 4 mm, At 210 mm distance (Mode 2 - Standard) 10 mm, at a distance of 300 mm (Mode 3 - Precision)
Recommended sensing range for the best performance	50 mm ... 150 mm (Mode 1 - Speed) 50 mm ... 210 mm (Mode 2 - Standard)

[1] 90% remission factor.

[2] Equivalent to 1 σ.

[3] Observe min. warm-up time of 15 minutes.

[4] Do not intentionally look into the laser beam. Never point the laser beam at people's eyes.

	50 mm ... 300 mm (Mode 3 - Precision)
Distance value	
Measuring range	25 mm ... 400 mm
Repeatability	< 0.5 % [1) 2) 3)]
Accuracy	< 3 % [1)]
Distance value output	Via IO-Link + display
Resolution	1 mm
Emitted beam	
Light source	Laser
Type of light	Visible red light
Shape of light spot	Point-shaped
Light spot size (distance)	Ø 0.2 mm (150 mm)
Maximum dispersion of the emitted beam around the standardized transmission axis (squint angle)	< +/- 1.0° (at T_U = +23 °C)
Key laser figures	
Normative reference	IEC 60825-1 / CDRH 21 CFR 1040.10 & 1040.11, EN 60825-1:2014, IEC 60825-1:2014 (except for tolerances according to Laser Notice No. 56 dated May 8, 2019)
Laser class	1 [4)]
Wave length	655 nm
Pulse duration	4 µs
Maximum pulse power	< 2.5 mW
Average service life	50,000 h at T_U = +25 °C
Smallest detectable object (MDO) typ.	0.2 mm, at a distance of 150 mm Object with 90% remission factor (complies with standard white according to DIN 5033)
Adjustment	
Touch display	For setting the sensing range and configuring the sensor parameters
IO-Link	For configuring the sensor parameters and Smart Task functions
Display	
Display	Display of mode, display of output states, display of the distance value, display of the set value
LED green	Operating indicator Static on: power on Flashing: IO-Link mode
LED yellow	Status of received light beam Static on: object present Static off: object not present
Special features	MultiMode
Special applications	Detecting small objects, Detection of objects moving at high speeds, Detecting flat objects, Detecting uneven, shiny objects, Detection of poorly remitting and tilted objects
Items supplied	Fastening nut (1x)

1) 90% remission factor.

2) Equivalent to 1 σ.

3) Observe min. warm-up time of 15 minutes.

4) Do not intentionally look into the laser beam. Never point the laser beam at people's eyes.

SAFETY-RELATED PARAMETERS

$MTTF_D$	473 years
DC_{avg}	0 %
T_M (mission time)	10 years

COMMUNICATION INTERFACE

IO-Link	✓ , IO-Link V1.1
Data transmission rate	COM2 (38,4 kBaud)
Cycle time	3.4 ms
Process data length	32 Bit
Process data structure	Bit 0 = switching signal Q_{L1} Bit 1 = switching signal Q_{L2} Bit 2 ... 5 = Qint.1 ... Qint.4 Bit 6 = Operating status of the sensor Bit 7 ... 15 = Empty Bit 16 ... 31 = Distance to object
VendorID	26
DeviceID HEX	0x80032D
DeviceID DEC	8389421
Compatible master port type	A
SIO mode support	Yes

ELECTRONICS

Supply voltage U_B	10 V DC ... 30 V DC [1]
Ripple	≤ 5 V_{pp}
Usage category	DC-12 (According to EN 60947-5-2) DC-13 (According to EN 60947-5-2)
Current consumption	≤ 25 mA, without load. At U_B = 24 V
Protection class	III
Digital output	
Number	2
Type	Push-pull: PNP/NPN, Individually adjustable
Switching mode	Light/dark switching
Output characteristic	Individually adjustable
Signal voltage PNP HIGH/LOW	Approx. U_B-2.0 V / 0 V
Signal voltage NPN HIGH/LOW	Approx. U_B-1.0 V / < 2.5 V
Output current $I_{max.}$	≤ 100 mA
Circuit protection outputs	Reverse polarity protected Overcurrent protected Short-circuit protected
Response time	1.8 ms (Mode 1 - Speed) [2] 5 ms (Mode 2 - Standard) [2] 15 ms (Mode 3 - Precision) [2]
Repeatability (response time)	< 0,5 %
Switching frequency	275 Hz (Mode 1 - Speed) [3] 100 Hz (Mode 2 - Standard) [3] 30 Hz (Mode 3 - Precision) [3]
Pin/Wire assignment	
BN 1	+ (L+)
WH 2	$\bar{Q}_{L1}$/MF Digital output, dark switching, object present → output $\bar{Q}$L1 LOW (background suppression) Digital output, light switching, object present → output QL1 LOW (foreground suppression) The pin 2 function of the sensor can be configured Additional possible settings via IO-Link
BU 3	- (M)
BK 4	QL1/C Digital output, light switching, object present → output QL1 HIGH (background suppression) Digital output, dark switching, object present → output $\bar{Q}$L1 HIGH (foreground suppression) IO-Link communication C

[1] Limit values.

[2] Signal transit time with resistive load in switching mode.

[3] With light/dark ratio 1:1.

	The pin 4 function of the sensor can be configured Additional possible settings via IO-Link

[1] Limit values.

[2] Signal transit time with resistive load in switching mode.

[3] With light/dark ratio 1:1.

MECHANICS

Housing	Hybrid
Dimensions (W x H x D)	18 mm x 57 mm x 42.2 mm
Connection	Male connector M12, 4-pin
Material	
Housing	Metal, Stainless steel V4A (1.4404, 316L)
Front screen	Plastic, PMMA
Display cover	Plastic, PMMA
LED	Plastic, ABS
Male connector	Metal, Stainless steel V4A (1.4404, 316L)
Weight	Approx. 100 g
Maximum tightening torque of the fixing screws	0.56 Nm
Max. tightening torque of the M18 fixing nuts	2 Nm

AMBIENT DATA

Enclosure rating	IP67 (EN 60529) IP69 (Replaces IP69K with ISO 20653: 2013-03)
Ambient operating temperature	–10 °C ... +55 °C
Ambient temperature, storage	–40 °C ... +75 °C
Warm-up time	Observe min. warm-up time of 15 minutes [1]
Typ. Ambient light immunity	Artificial light: ≤ 15,000 lx Sunlight: ≤ 15,000 lx
Air humidity	35 % ... 95 %, relative humidity (no condensation)
Electromagnetic compatibility (EMC)	EN 60947-5-2, The sensor complies with the Radio Safety Requirements (EMC) for the industrial sector (Radio Safety Class A). It may cause radio interference if used in a residential area.

[1] During the device warm-up phase, the measured values are subject to increased scatter (temperature drift).

SMART TASK

Smart Task name	Base logics
Logic function	Direct AND OR Window Hysteresis
Timer function	Deactivated Switch-on delay Off delay ON and OFF delay Impulse (one shot)
Inverter	Yes
Switching signal	
Switching signal Q_{L1}	Switching output
Switching signal $\bar{Q}_{L1}$	Switching output

DIAGNOSIS

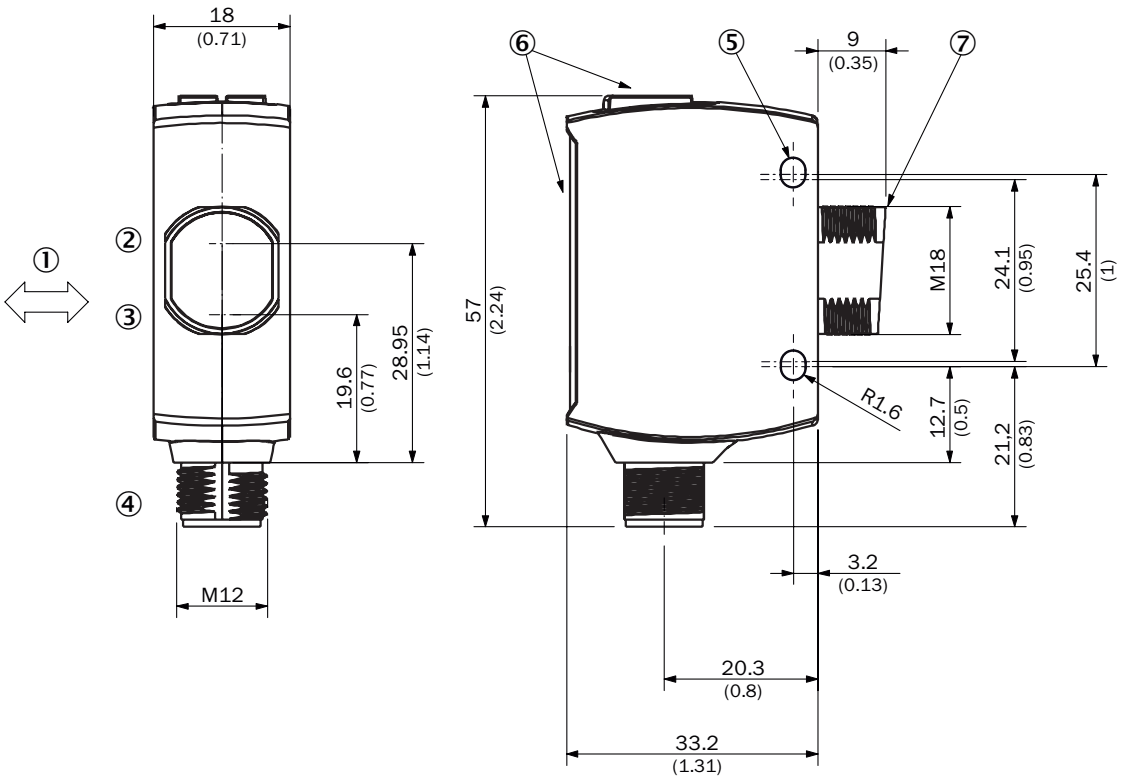
Device temperature	
Measuring range	Very cold, cold, moderate, warm, hot

Device status	Yes
Detailed device status	Yes
Operating hour counter	Yes
Operating hours counter with reset function	Yes

CERTIFICATES

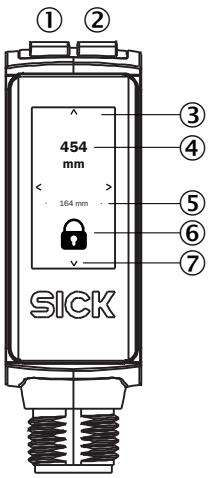
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
China Compulsory Product Certification (CCC) exempt	✓
cULus certificate	✓
IO-Link certificate	✓
Laser safety (IEC 60825-1) certificate	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

DIMENSIONAL DRAWING



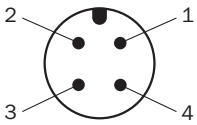
Dimensions in mm (inch)
① Standard direction of the material being detected
② Center of optical axis, receiver
③ Center of optical axis, sender
④ Connection
⑤ Mounting hole, Ø 3.2 mm
⑥ display and adjustment elements
⑦ zero point measurement range

DISPLAY AND ADJUSTMENT ELEMENTS

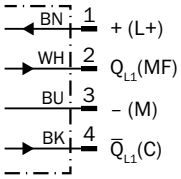


① LED green
② LED yellow
③ touch display
④ Current distance
⑤ Distance of last good teach-in
⑥ Lock/unlock status indicator
⑦ Display navigation arrows

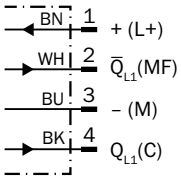
CONNECTION TYPE M12 MALE CONNECTOR, 4-PIN



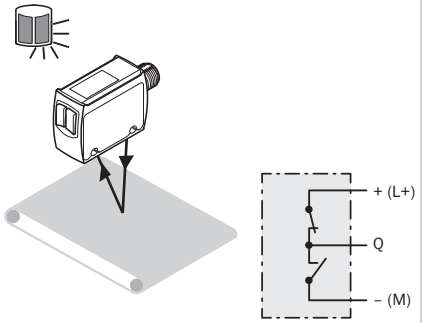
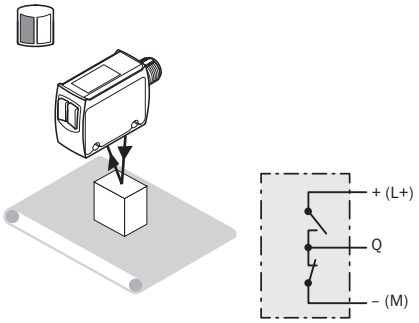
CONNECTION DIAGRAM CD-562 (FOREGROUND SUPPRESSION)



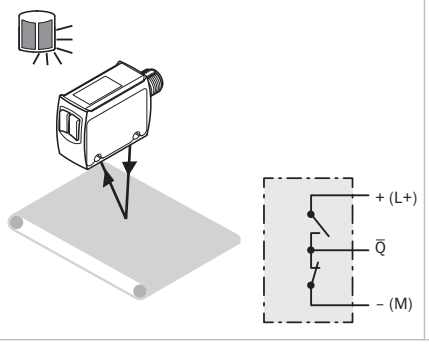
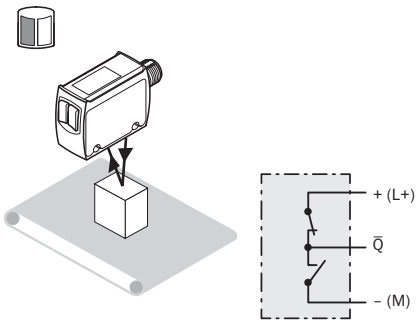
CONNECTION DIAGRAM CD-561 (BACKGROUND SUPPRESSION)



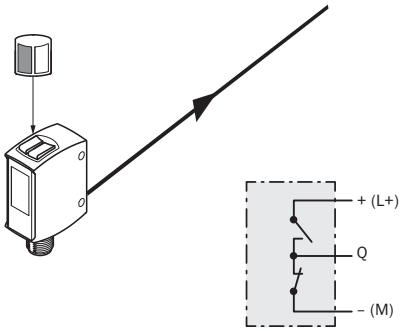
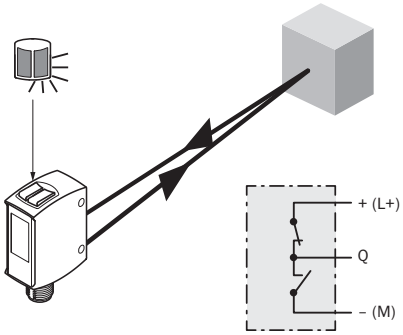
TRUTH TABLE PUSH-PULL: PNP/NPN - LIGHT SWITCHING Q (FOREGROUND SUPPRESSION)

	Light switching Q (normally closed (upper switch), normally open (lower switch))	
	Object not present ➜ Output HIGH	Object present ➜ Output LOW
Light receive	✓	✗
Light receive indicator	☀	✗
Load resistance to L+	✗	⚠
Load resistance to M	⚠	✗
		

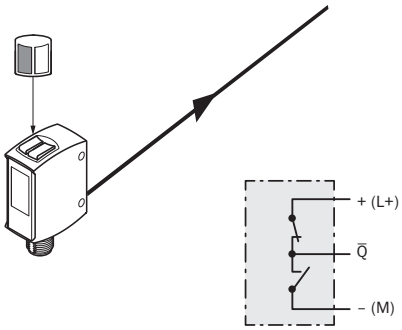
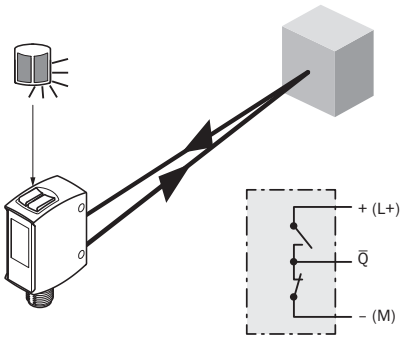
TRUTH TABLE PUSH-PULL: PNP/NPN - DARK SWITCHING Q̄ (FOREGROUND SUPPRESSION)

	Dark switching Q̄ (normally open (upper switch), normally closed (lower switch))	
	Object not present ➜ Output LOW	Object present ➜ Output HIGH
Light receive	✓	✗
Light receive indicator	☀	✗
Load resistance to L+	⚠	✗
Load resistance to M	✗	⚠
		

TRUTH TABLE PUSH-PULL: PNP/NPN - LIGHT SWITCHING Q (BACKGROUND SUPPRESSION)

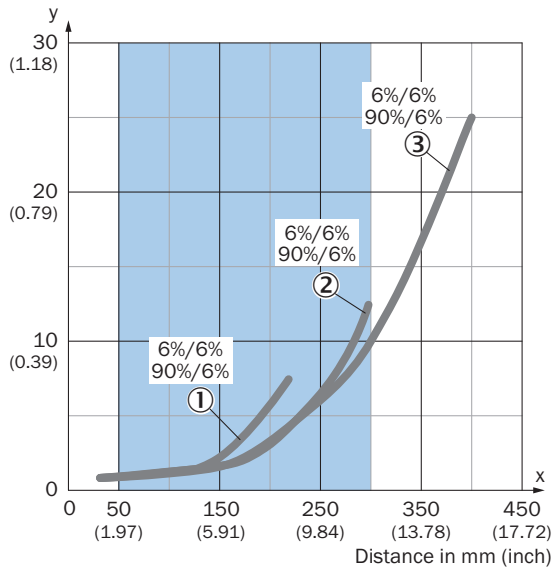
	Light switching Q (normally open (upper switch), normally closed (lower switch))	
	Object not present ➜ Output LOW	Object present ➜ Output HIGH
Light receive	⊗	✓
Light receive indicator	⊗	☀
Load resistance to L+	⚡	⊗
Load resistance to M	⊗	⚡
		

TRUTH TABLE PUSH-PULL: PNP/NPN - DARK SWITCHING Q̄ (BACKGROUND SUPPRESSION)

	Dark switching Q̄ (normally closed (upper switch), normally open (lower switch))	
	Object not present ➜ Output HIGH	Object present ➜ Output LOW
Light receive	⊗	✓
Light receive indicator	⊗	☀
Load resistance to L+	⊗	⚡
Load resistance to M	⚡	⊗
		

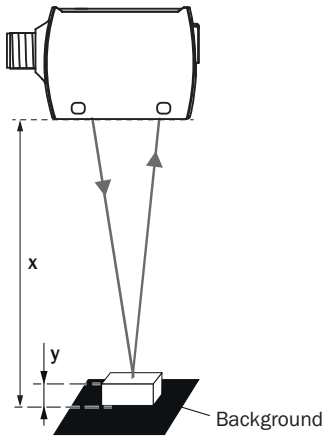
CHARACTERISTIC CURVE (FOREGROUND SUPPRESSION)

Minimum object height in mm (inch)



Recommended sensing range for the best performance

Example:
Reliable detection of the object

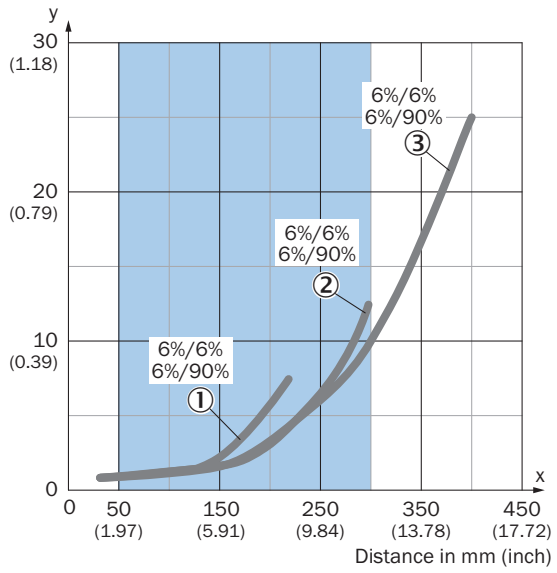


Black background (6 % remission factor)
Distance of sensor to background x = 300 mm
Required minimum object height y = 10 mm
For all objects regardless of their colors

① Black object, 6% remission factor, Mode 1 - Speed
② Black object, 6% remission factor, Mode 2 - Standard
③ Black object, 6% remission factor, Mode 3 - Precision

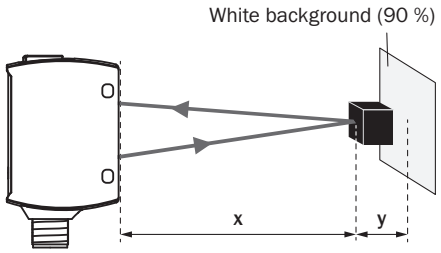
CHARACTERISTIC CURVE (BACKGROUND SUPPRESSION)

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



Recommended sensing range for the best performance

Example:
Safe suppression of the background

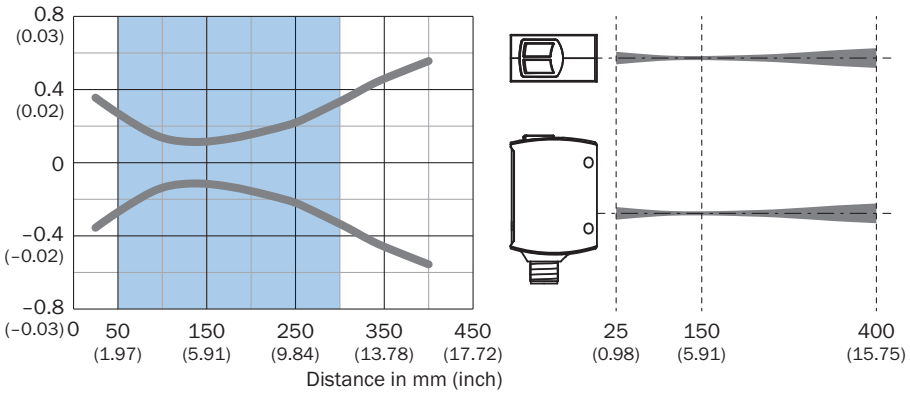


Black object (6 % remission)
Set sensing range x = 300 mm
Needed minimum distance to white background y = 10 mm

① Black object, 6% remission factor, Mode 1 - Speed
② Black object, 6% remission factor, Mode 2 - Standard
③ Black object, 6% remission factor, Mode 3 - Precision

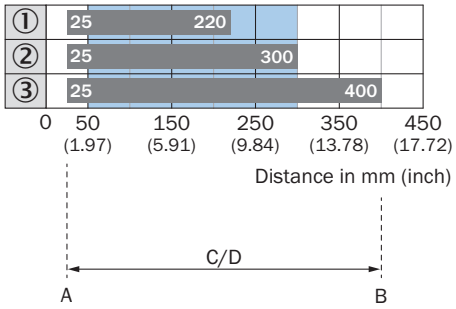
LIGHT SPOT SIZE

Dimensions in mm (inch)



Recommended sensing range for the best performance

SENSING RANGE DIAGRAM



Recommended sensing range for the best performance

1	Black object, 6% remission factor, Mode 1 - Speed
2	Black object, 6% remission factor, Mode 2 - Standard
3	Black object, 6% remission factor, Mode 3 - Precision
A	Sensing range min. in mm
B	Sensing range max. in mm
C	Field of view
D	Adjustable switching threshold for background suppression

Further information as well as suitable accessories, example applications and downloads such as CAD dimensional models, operating instructions and software can be found at www.sick.com/1133544

SICK AG
WALDKIRCH
GERMANY
SICK.COM

SICK AT A GLANCE

SICK is a leading global technology company for intelligent sensors and integrated solutions in industrial automation. Our technologies set benchmarks, making your industrial processes more efficient, safer and more sustainable – both in logistics and manufacturing operations.

SICK combines sensor intelligence with industry expertise and certified consulting services. We provide the ideal foundation for scalable as well as tailor-made automation solutions and create added value along the entire value chain. Our close partnerships with our customers are more than just a promise: Together, we optimize productivity, improve quality, protect health and safety, and help build a sustainable future. All with empathy and trust.

Since 1946, we have been developing innovative technologies with passion and a pioneering spirit. With a global network in around 40 countries, SICK has a global presence and is always close by. The company's headquarters are located in Waldkirch near Freiburg, Germany. Our customers benefit from our understanding of both local and global requirements, which enables us to deliver tailor-made solutions

SICK

Sensor Intelligence