



DATA SHEET

WTM10L-241611D0A00ZVZZZZZZZZZZ1

W10
Photoelectric sensors

SICK Sensor Intelligence



Illustration may differ

PHOTOELECTRIC SENSORS

WT-
M10L-241611D0A00ZVZZ

ORDERING INFORMATION

Type	part no.
WTM10L-241611D0A00ZVZZZZZZZZ1	1133547

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.	300 mm (Mode 1 - Speed) 500 mm (Mode 2 - Standard) 700 mm (Mode 3 - Precision)
Adjustable switching threshold for background suppression	25 mm ... 300 mm (Mode 1 - Speed) 25 mm ... 500 mm (Mode 2 - Standard) 25 mm ... 700 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%)	6 mm, at a distance of 250 mm (Mode 1 - Speed) 8 mm, at a distance of 400 mm (Mode 2 - Standard) 10 mm, at a distance of 500 mm (Mode 3 - Precision)
Recommended sensing range for the best performance	50 mm ... 250 mm (Mode 1 - Speed) 50 mm ... 400 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 ... 500 mm (Mode 3 - Precision)
Distance value	Measuring range	25 mm ... 700 mm
	Repeatability	< 0.5 % ^{1) 2) 3)}
	Accuracy	< 4 % 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 0.4 mm (250 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.		0.6 mm, at a distance of 250 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

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	0x80032E
	DeviceID DEC	8389422
	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	Q̄ _{L1} /MF Digital output, dark switching, object present → output Q̄L1 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 Q̄L1 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	Rectangular
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

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: ≤ 10,000 lx Sunlight: ≤ 10,000 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 _{Li}	Switching output
Switching signal Q̄ _{Li}	Switching output

DIAGNOSIS

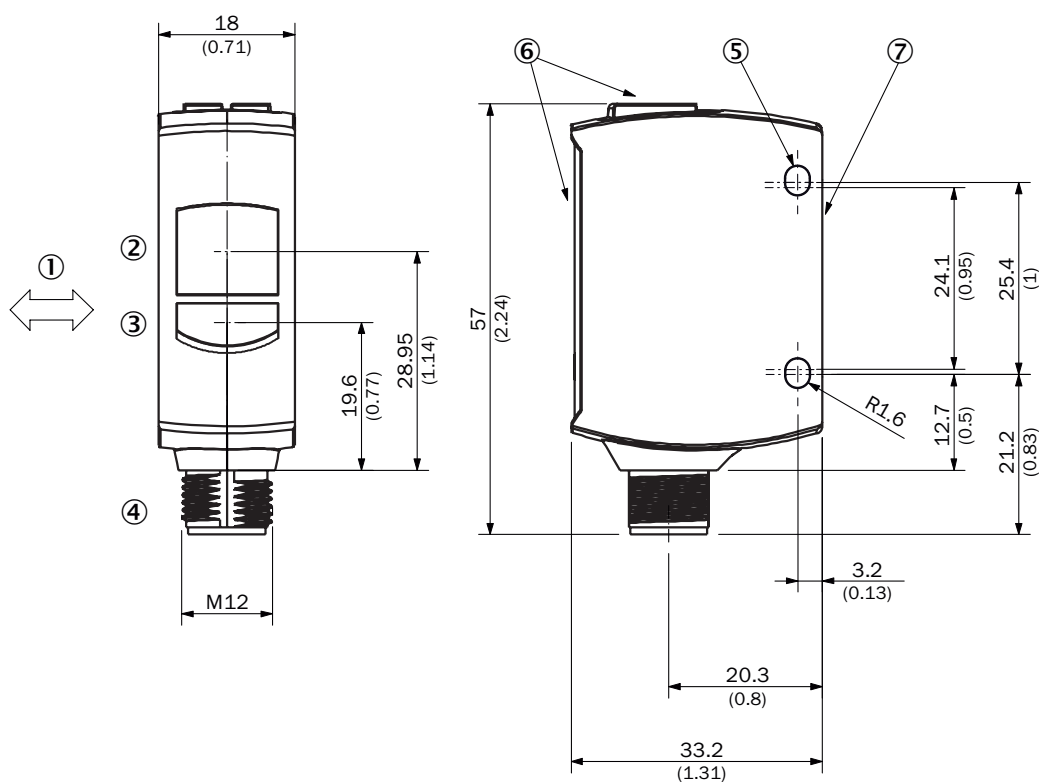
Device temperature	
Measuring range	Very cold, cold, moderate, warm, hot
Device status	Yes

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)	✓

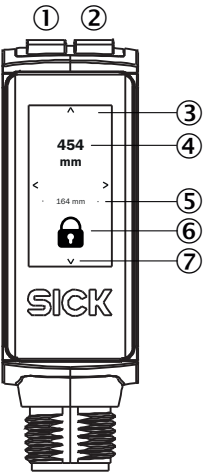
DIMENSIONAL DRAWING



Dimensions in mm (inch)

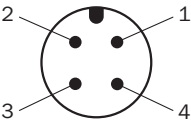
- ① Standard direction of the material being detected
- ② Center of optical axis, receiver
- ③ Center of optical axis, sender
- ④ Connection
- ⑤ Mounting hole, Ø 3.2 mm
- ⑥ display and adjustment elements
- ⑦ zero point measurement range

DISPLAY AND ADJUSTMENT ELEMENTS

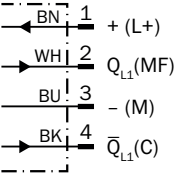


- ① LED green
- ② LED yellow
- ③ touch display
- ④ Current distance
- ⑤ Distance of last good teach-in
- ⑥ Lock/unlock status indicator
- ⑦ Display navigation arrows

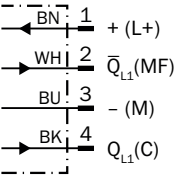
CONNECTION TYPE M12 MALE CONNECTOR, 4-PIN



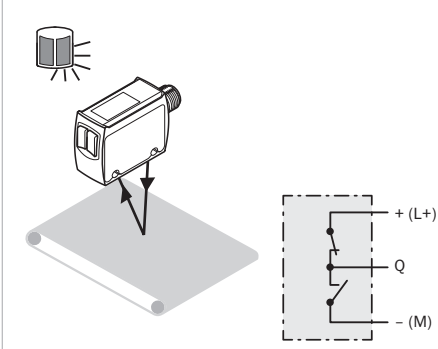
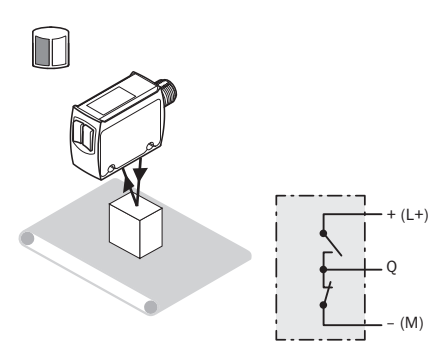
CONNECTION DIAGRAM CD-562 (FOREGROUND SUPPRESSION)



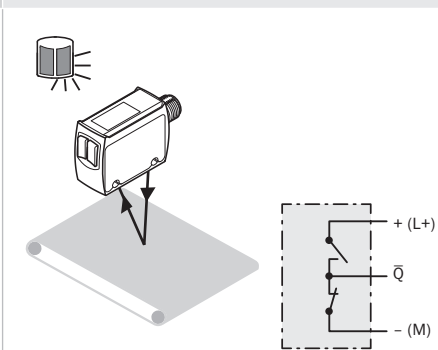
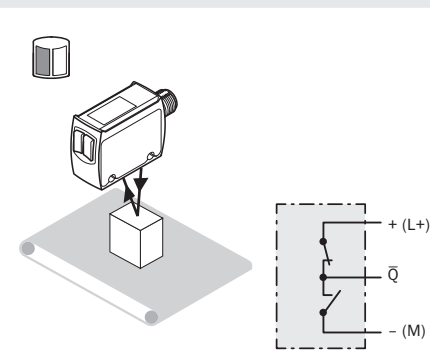
CONNECTION DIAGRAM CD-561 (BACKGROUND SUPPRESSION)



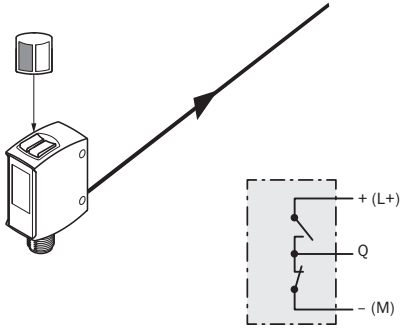
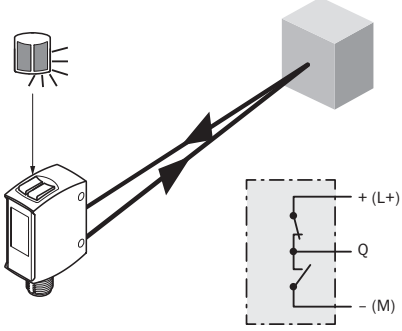
TRUTH TABLE PUSH-PULL: PNP/NPN - LIGHT SWITCHING Q (FOREGROUND SUPPRESSION)

	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	⚡	✗
		

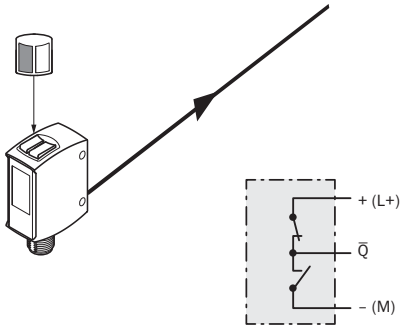
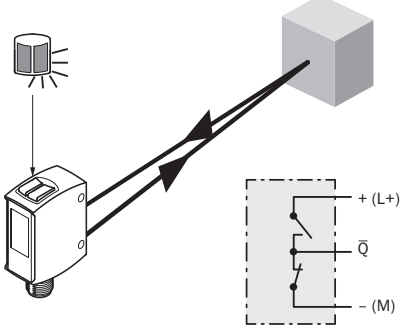
TRUTH TABLE PUSH-PULL: PNP/NPN - DARK SWITCHING $\bar{Q}$ (FOREGROUND SUPPRESSION)

	Dark switching $\bar{Q}$ (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	✗	⚡
		

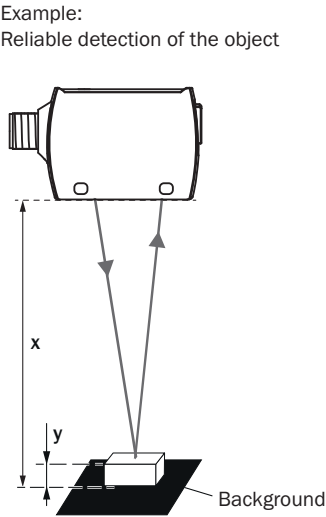
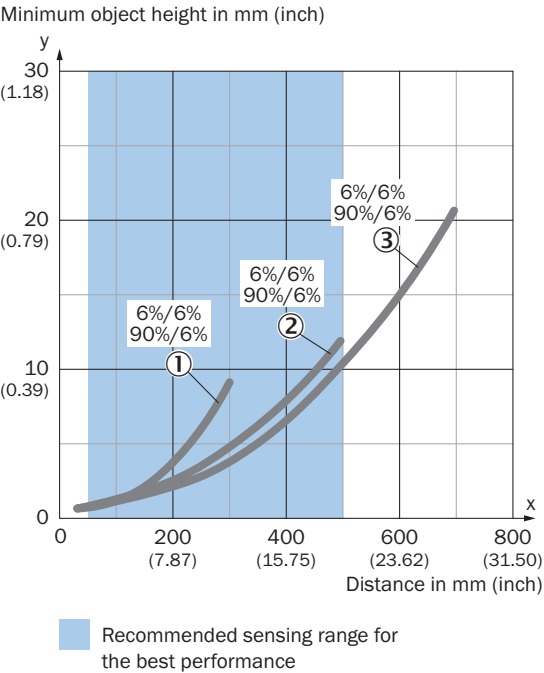
TRUTH TABLE PUSH-PULL: PNP/NPN - LIGHT SWITCHING Q (BACKGROUND SUPPRESSION)

	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 $\bar{Q}$ (BACKGROUND SUPPRESSION)

	Dark switching $\bar{Q}$ (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	⚡	✗
		

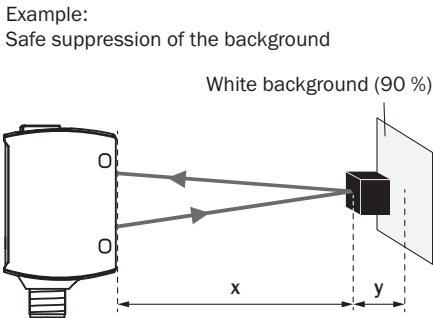
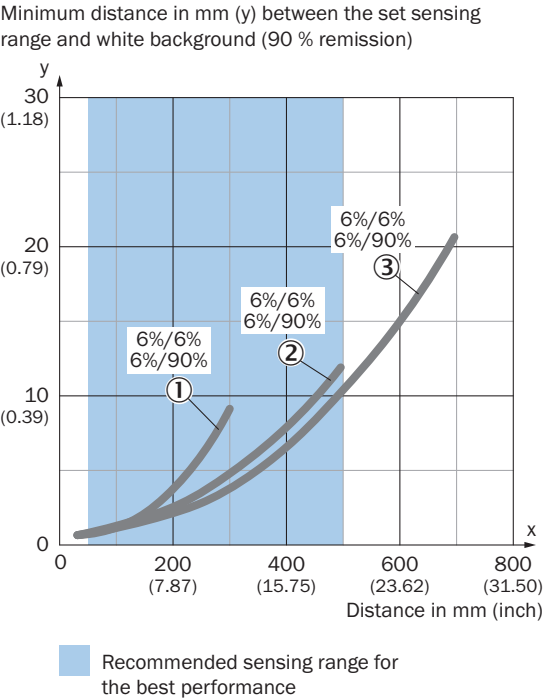
CHARACTERISTIC CURVE FOREGROUND SUPPRESSION



Black background (6 % remission factor)
Distance of sensor to background $x = 500\text{ mm}$
Required minimum object height $y = 10\text{ mm}$
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

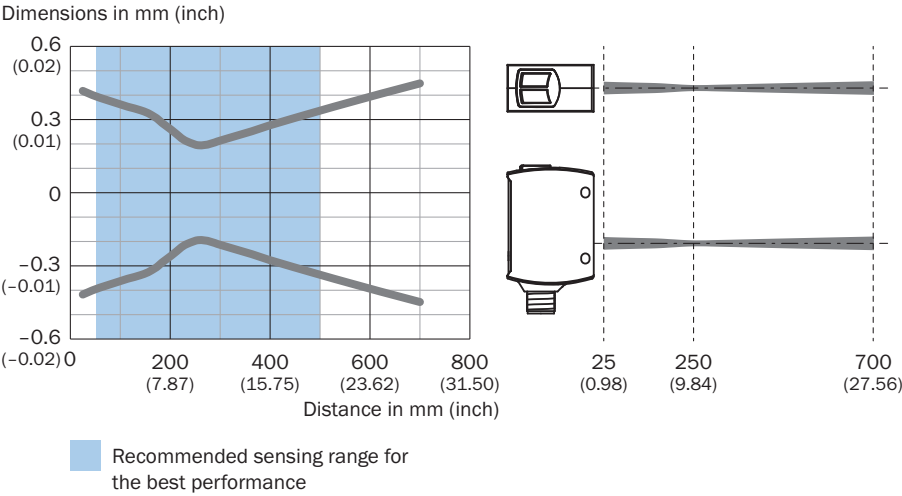
CHARACTERISTIC CURVE BACKGROUND SUPPRESSION



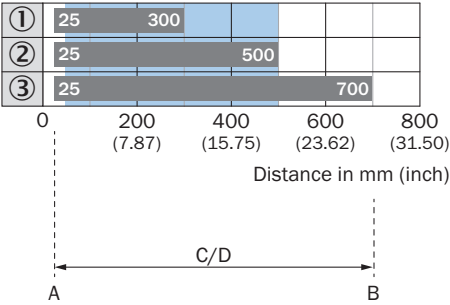
Black object (6 % remission)
Set sensing range $x = 500\text{ mm}$
Needed minimum distance to white background $y = 10\text{ mm}$

- 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 BACKGROUND SUPPRESSION



SENSING RANGE DIAGRAM BACKGROUND SUPPRESSION



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/1133547

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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

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