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DATA SHEET

DL1000-S11101

Dx1000
Time-of-flight sensors

SICK
Sensor Intelligence



TIME-OF-FLIGHT SENSORS

DL1000-S11101

ORDERING INFORMATION

Type	part no.
DL1000-S11101	1075438

Further device versions and accessories at www.sick.com/Dx1000

DETAILED TECHNICAL DATA

FEATURES

Measurement principle	HDDM+
Measuring range	0.2 m ... 1,500 m, on “diamond grade” reflective tape [1) 2) 3)]
Target	Reflector
Resolution	1 µm ... 100,000 µm, adjustable [4)]
Repeatability	≥ 1 mm, See repeatability characteristic lines [1) 5) 6) 7)]
Measurement accuracy	Typ. ± 15 mm, See measurement accuracy diagram [8)]
Response time	3 ms ... 384 ms [7)]
Measurement cycle time	1 ms 4 ms 16 ms

1) With max. ambient light 100 kLux sunlight.

2) See measuring range diagram.

3) Dependent on reflector size and measuring cycle time.

4) Data interface resolution.

5) Statistical error 1 σ, environmental conditions constant, min. warm-up time > about 15 min.

6) On “diamond grade” reflective tape.

7) Dependent on selected filter settings and measuring cycle time.

8) At T = +23 °C and after warm-up time > about 15 min.

9) Depending on interface used.

10) See light spot size diagram.

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

12) Measuring laser.

Output time	≥ 1 ms [9]
Emitted beam	
Typ. light spot size (distance)	5 mm x 20 mm (at 1 m) [10] 20 mm x 20 mm (at 5 m) [10] 35 mm x 25 mm (at 10 m) [10] 150 mm x 50 mm (at 50 m) [10] 290 mm x 80 mm (at 100 m) [10] 4,200 mm x 920 mm (≥ 1,500 mm) [10]
Key laser figures	
Normative reference	IEC 60825-1:2014, EN 60825-1:2014
Laser class	1 [11]
Average laser service life (at 25 °C)	100,000 h [12]
Filter	Rain and snow filter Fog filter Moving average distance value Kalman filter Moving average speed value
Additional function	Selection of relevant distance and signal level range Selection of first or last echo in selected distance and signal level range
Max. movement speed	128 m/s
Safety-related parameters	
$MTTF_D$	101 years
DC_{avg}	0%

[1] With max. ambient light 100 kLux sunlight.

[2] See measuring range diagram.

[3] Dependent on reflector size and measuring cycle time.

[4] Data interface resolution.

[5] Statistical error 1 σ, environmental conditions constant, min. warm-up time > about 15 min.

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INTERFACES

Ethernet	✓, TCP/IP
Function	Parameterization, output of measurement data
Data transmission rate	10/100 MBit/s
Serial	✓, RS-422
Remark	Switchable to SSI
Function	Parameterization, output of measurement data
SSI	✓
Remark	Switchable to RS-422

[1] Short-circuit protected, switching voltage U_V - 4 V.

[2] Internal pull-down switching, switching voltage HIGH: min. 13 V ... max. supply voltage, switching voltage LOW: max. 5 V.

[3] Max. load = (U_V - 7 V) / 21.5 mA.

Function	Output of measurement data
Inputs/outputs	
In1/Q1	Digital input, digital output (Switchable)
QA/Q2	Analog output, digital output (Switchable)
Q_3	Digital Output
Q_4	Digital Output
In_2	Digital input
Digital input	Internal pull-down circuit HIGH switching voltage: min. 13 V ... max. supply voltage LOW switching voltage: max. 5 V Switching functions: deactivate measuring laser, activate alignment laser, preset
Digital output	
Number	2 ... 4 [1) 2)]
Type	Push-pull: PNP/NPN
Maximum output current I_A	≤ 100 mA
Analog output	
Number	1
Type	Current output
Current	4 mA ... 20 mA [3)]
Resolution	16 bit

1) Short-circuit protected, switching voltage U_V - 4 V.

2) Internal pull-down switching, switching voltage HIGH: min. 13 V ... max. supply voltage, switching voltage LOW: max. 5 V.

3) Max. load = (U_V - 7 V) / 21.5 mA.

ELECTRONICS

Supply voltage U_B	DC 18 V ... 30 V, reverse polarity protected
Power consumption	≤ 22 W, With heating switched off [1)] ≤ 35 W, With heating switched on [1)]
Ripple	≤ 5 V_{pp} [2)]
Initialization time	> 15 s
Display	Graphical, resistive touch display, status LEDs
Enclosure rating	IP65 [3)] IP67 [3)]
Protection class	III (EN 61140)
Connection type	Round connector M12 x 1

1) With external load.

2) May not fall short of or exceed V_S tolerances.

3) When plugged in with a suitable mating connector.

MECHANICS

Dimensions (W x H x D)	84 mm x 104.4 mm x 140.5 mm
Housing material	Metal (Aluminum alloy (AlSi12))
Window material	Glass
Weight	980 g

AMBIENT DATA

Ambient temperature, operation	–40 °C ... +55 °C [1)] –40 °C ... +95 °C, operation with cooling case

1) At a temperature of –40 °C, a warm-up time of typ. 20 minutes is required (when supply voltage V_S = 24 V).

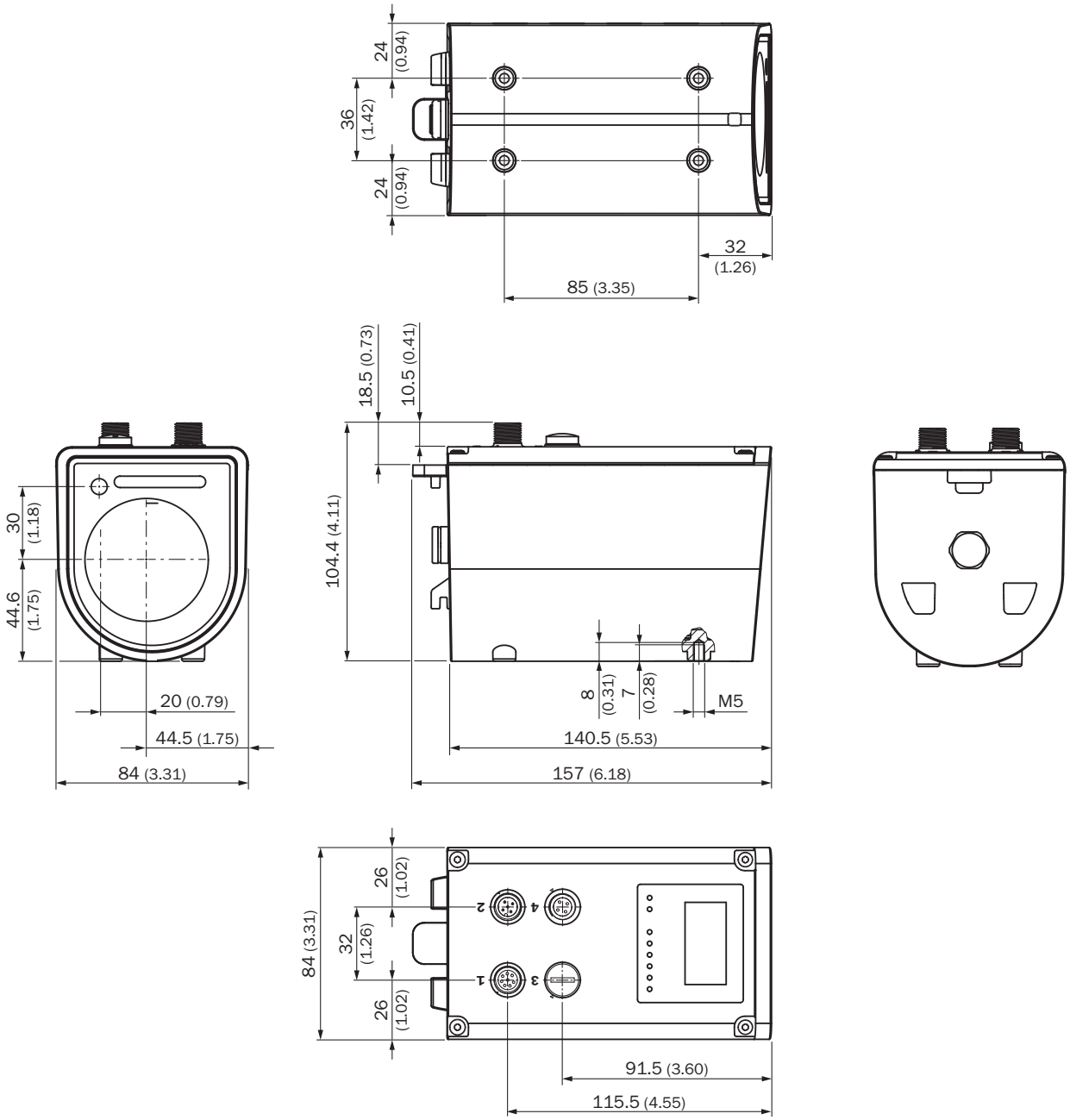
Ambient temperature, storage	–40 °C ... +75 °C
Max. rel. humidity (not condensing)	≤ 95 %
Effect of air pressure	0.3 ppm/hPa
Effect of air temperature	–1 ppm/K
Temperature drift	Typ. 0.25 mm/K
Typ. Ambient light immunity	≤ 100,000 lx
Mechanical load	Shock: 30 g / 6 ms according to DIN EN 60068-2-27 (Ea), 6 axes Continuous shock: 25 g / 6 ms according to DIN EN 60068-2-27 (fatigue), 500 shocks, 6 axes

[1] At a temperature of –40 °C, a warm-up time of typ. 20 minutes is required (when supply voltage V_s = 24 V).

CERTIFICATES

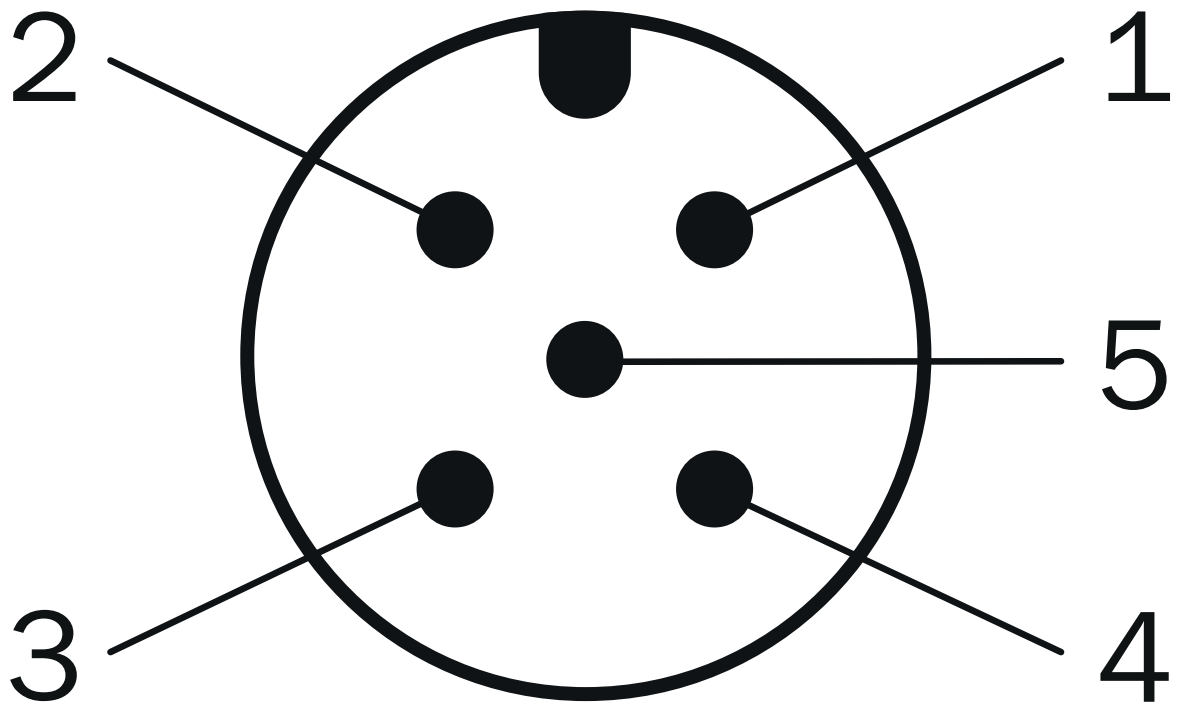
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
cULus certificate	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

DIMENSIONAL DRAWING



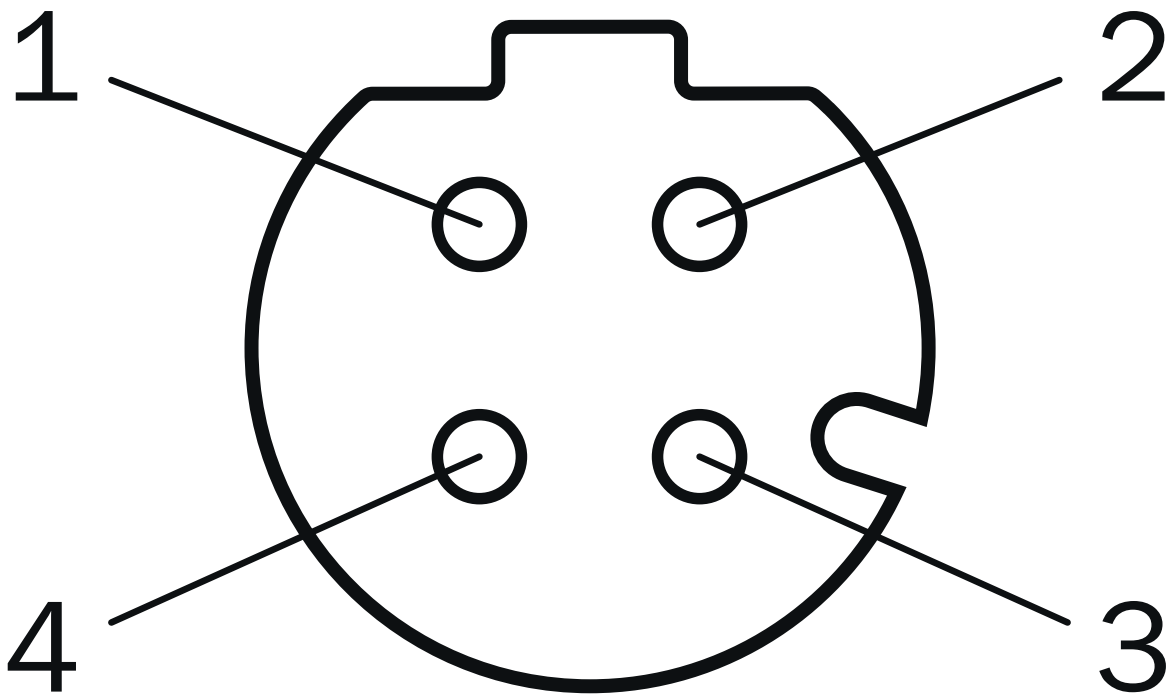
Dimensions in mm (inch)

CONNECTION TYPE CONNECTION 2: AUXILIARY



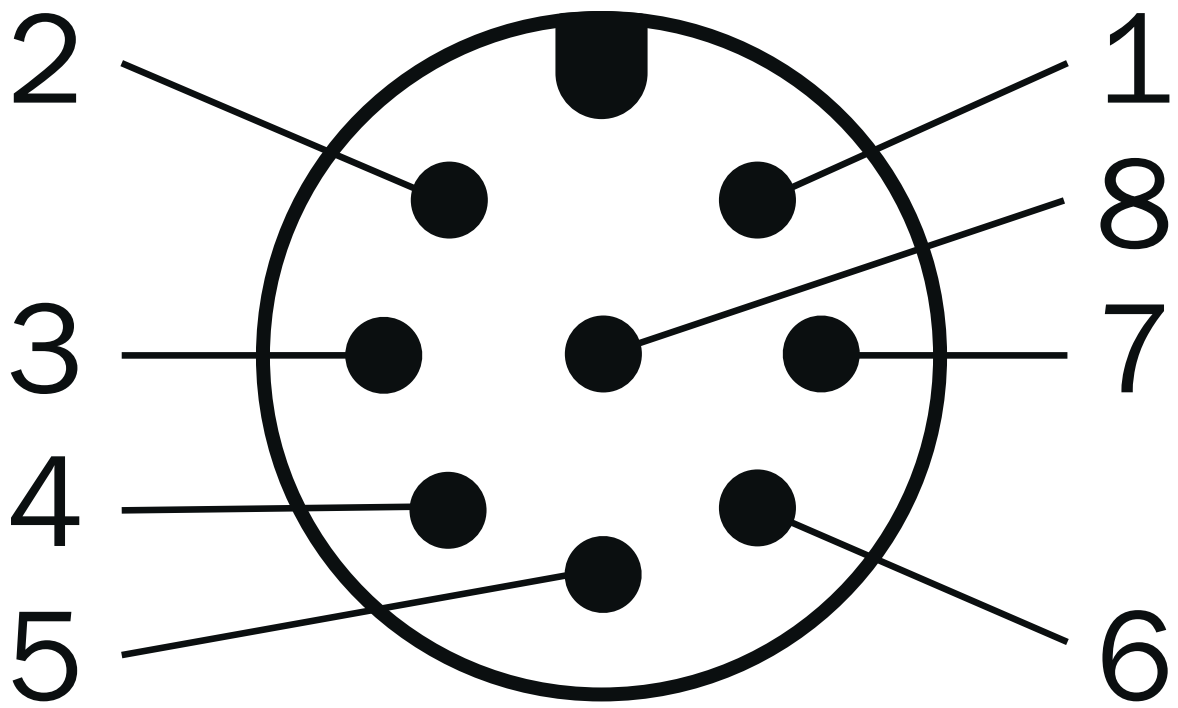
Connector M12, 5-pin, A-coded
① nc
② Q_3
③ nc
④ Q_4
⑤ In_2

PIN ASSIGNMENT CONNECTION 4: ETHERNET



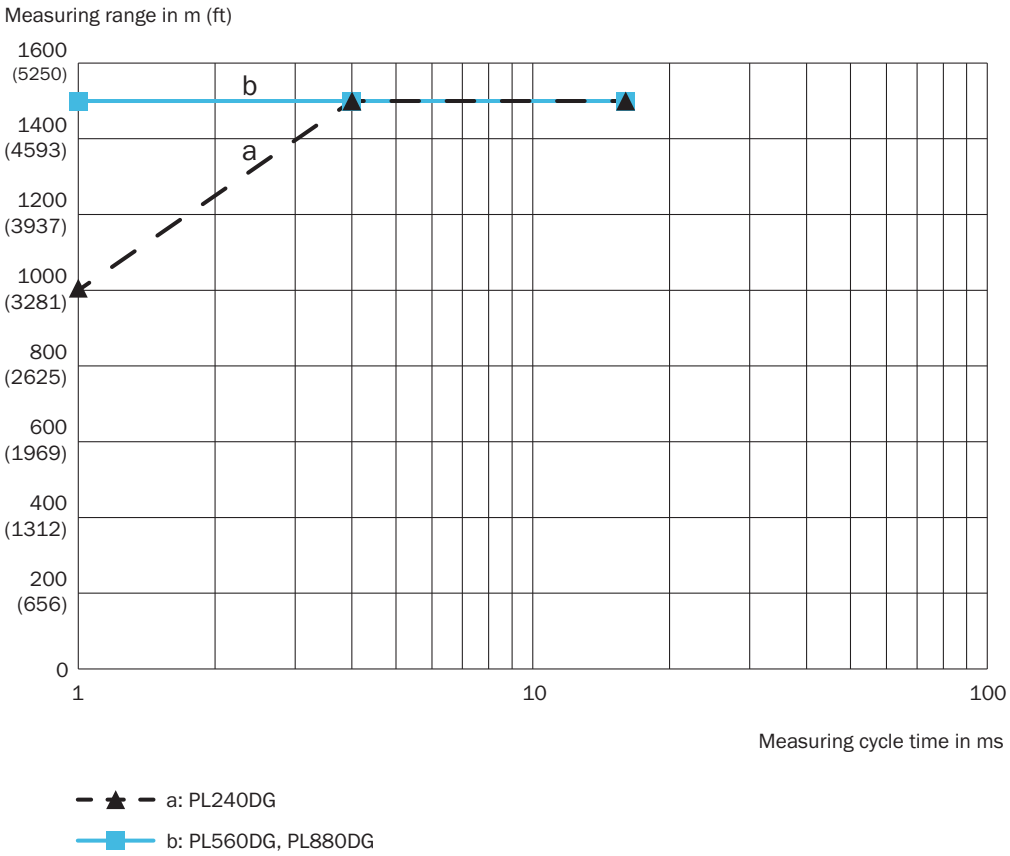
M12 female connector, 4-pin, D-coded
① TX+
② RX+
③ TX-
④ RX-

PIN ASSIGNMENT CONNECTION 1: POWER, RS-422/SSI, Q1/IN1, Q2/QA

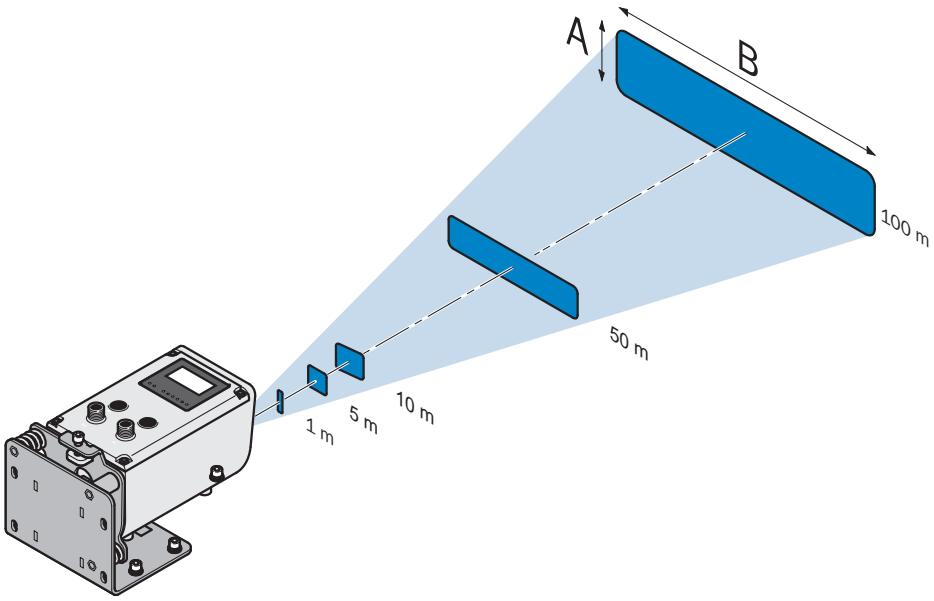


Connector M12, 8-pin, A-coded
① Q1/In1
② L+
③ RX-/CLK-
④ RX+/CLK+
⑤ TX-/Data-
⑥ TX+/Data+
⑦ M
⑧ Q_2/Q_A

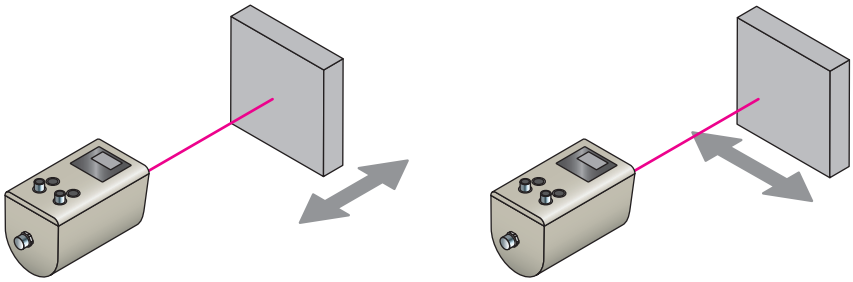
WORKING RANGE DIAGRAM DL1000 MEASURING RANGE BASED ON MEASUREMENT CYCLE TIME AND REFLECTOR TYPE



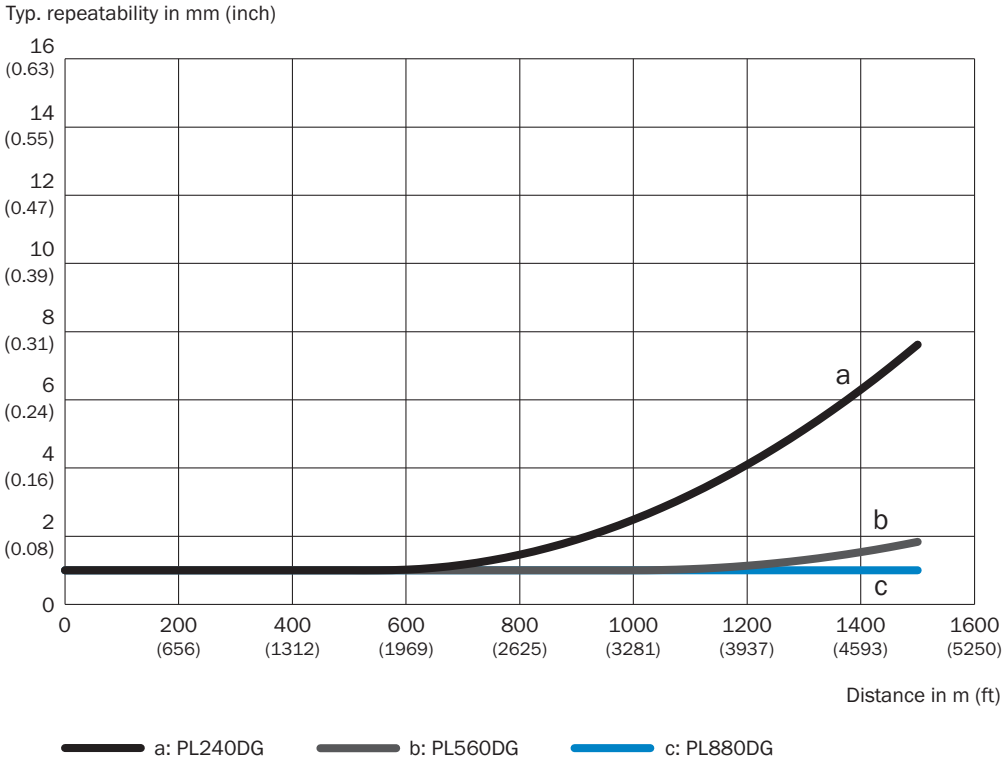
LIGHT SPOT SIZE



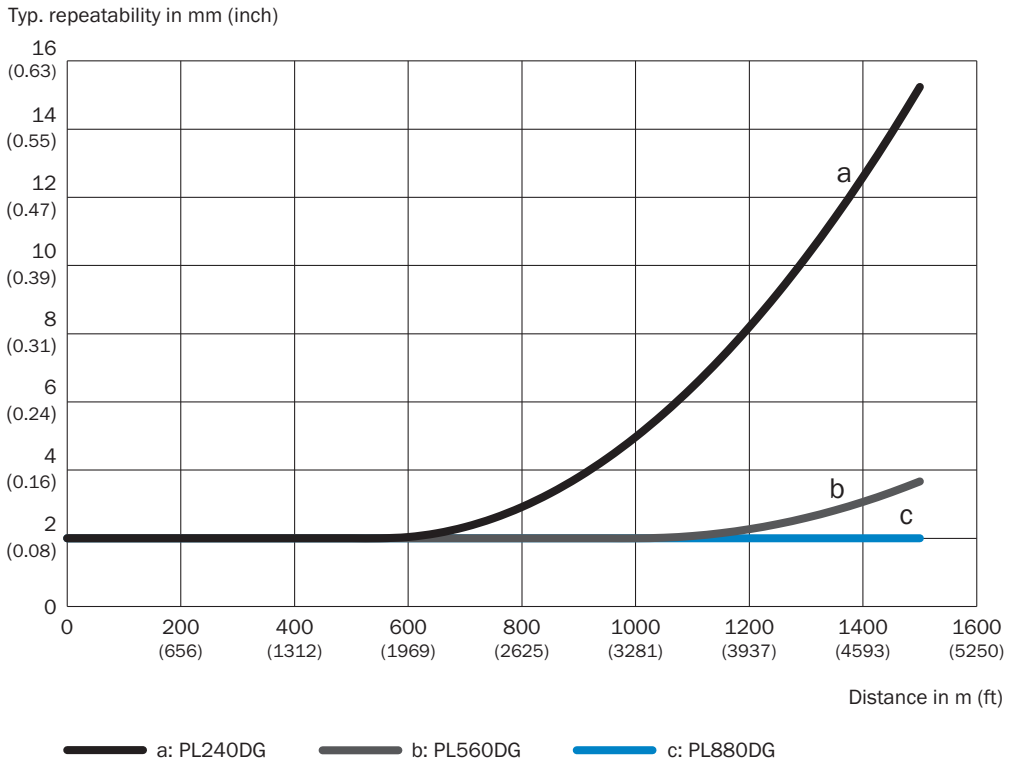
FUNCTIONAL PRINCIPLE



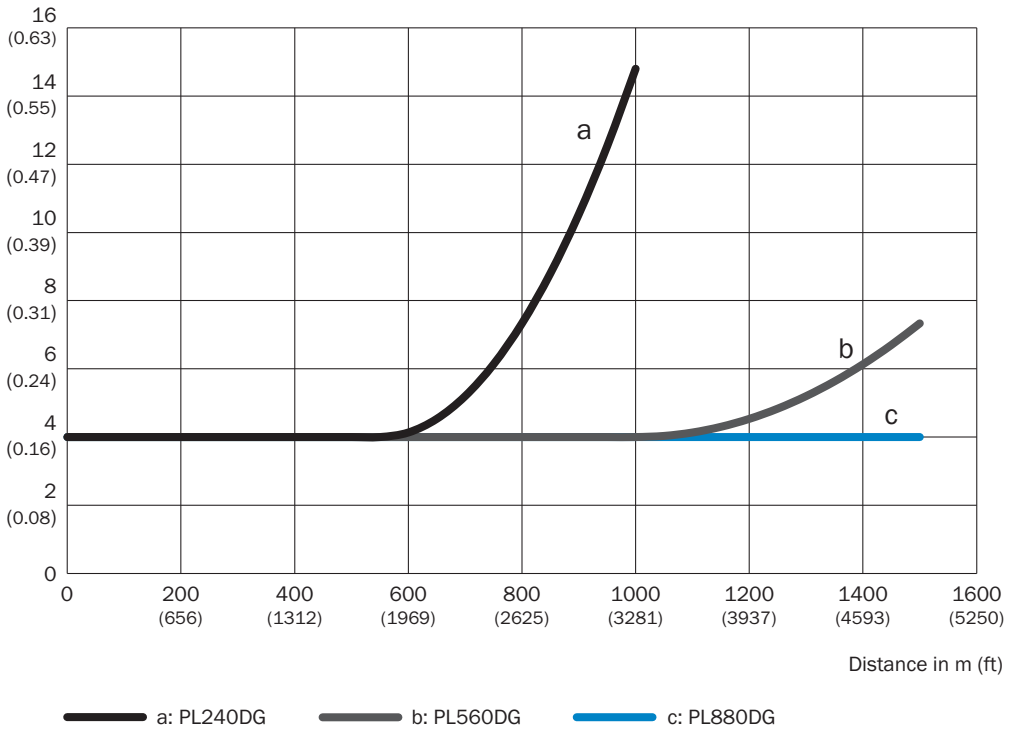
REPEATABILITY DL1000 FOR VARIOUS REFLECTOR TYPES, WITH 16 MS MEASUREMENT CYCLE TIME



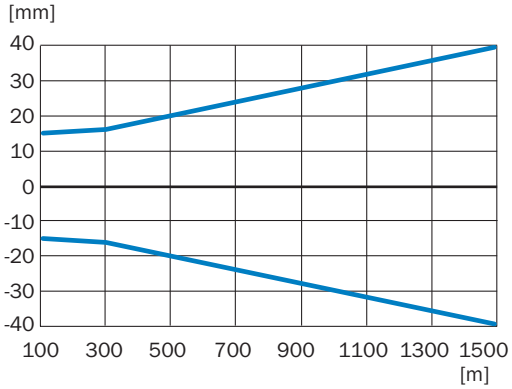
REPEATABILITY DL1000 FOR VARIOUS REFLECTOR TYPES, WITH 4 MS MEASUREMENT CYCLE TIME



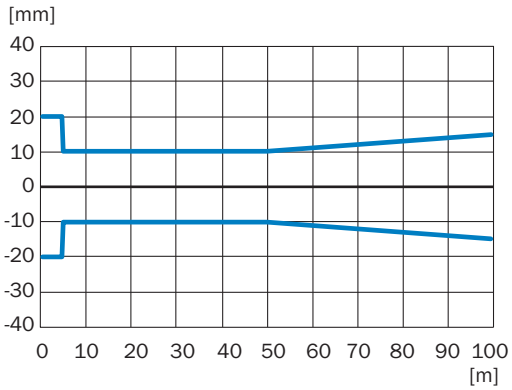
REPEATABILITY DL1000 FOR VARIOUS REFLECTOR TYPES, WITH 1 MS MEASUREMENT CYCLE TIME



MEASUREMENT ACCURACY TYPICALLY DL1000, X-AXIS: DISTANCE, Y-AXIS: TYPICAL MEASUREMENT ACCURACY



MEASUREMENT ACCURACY TYPICALLY DL1000, X-AXIS: DISTANCE, Y-AXIS: TYPICAL MEASUREMENT ACCURACY



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/1075438

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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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