Data sheet

DL1000-S11110

Dx1000

TIME-OF-FLIGHT SENSORS

SICK
Sensor Intelligence.

Ordering information

Type	part no.
DL1000-S11110	1100075

Other models and accessories ➜ 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
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)]

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) Measuring laser.

	570 mm x 140 mm (at 200 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
Average laser service life (at 25 °C)	100,000 h [11]
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.
[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] Measuring laser.

Interfaces

Ethernet	✓ , TCP/IP
Function	Parameterization, Measurement data output (not real-time capable; transmission characteristics depend on external network)
Data transmission rate	10/100 MBit/s
Serial	✓ , RS-422
Remark	Switchable to SSI
SSI	✓
Remark	Switchable to RS-422
Function	Output of measurement data
EtherNet/IP™	✓
Function	Parameterization, Measurement data output (distance output value, device status, signal level)
Inputs/outputs	
In1/Q1	Digital input, digital output (Switchable)
QA/Q2	Analog output, digital output (Switchable)
Digital input	Internal pull-down circuit

[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.

	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	0 ... 2 [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	> 30 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	1,000 g

Ambient data

Ambient temperature, operation	–40 °C ... +55 °C [1)] –40 °C ... +95 °C, operation with cooling case
Ambient temperature, storage	–40 °C ... +75 °C
Max. rel. humidity (not condensing)	≤ 95 %
Effect of air pressure	0.3 ppm/hPa

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

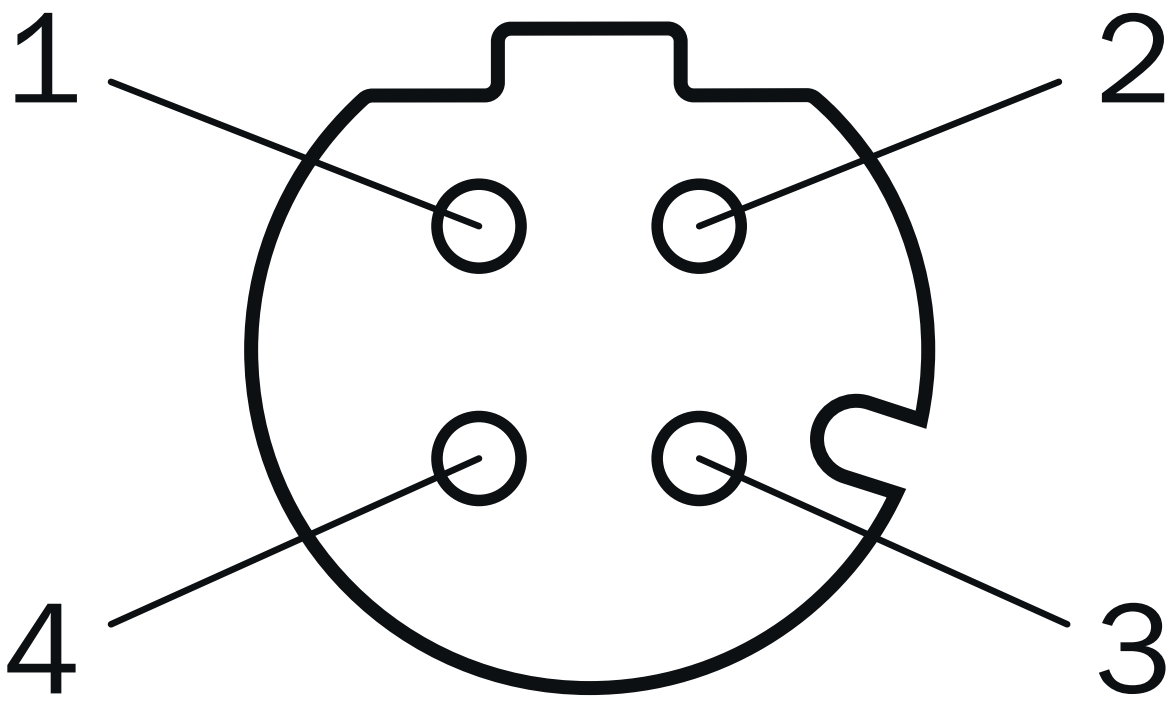
Effect of air temperature	–1 ppm/K
Temperature drift	Typ. 0.25 mm/K
Typ. Ambient light immunity	≤ 100,000 lx
Mechanical load	Shock: 30 g / 6 ms according to DIN EN 60068-2-27 (Ea), 6 axes Continuous shock: 25 g / 6 ms according to DIN EN 60068-2-27 (fatigue), 500 shocks, 6 axes

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

Classifications

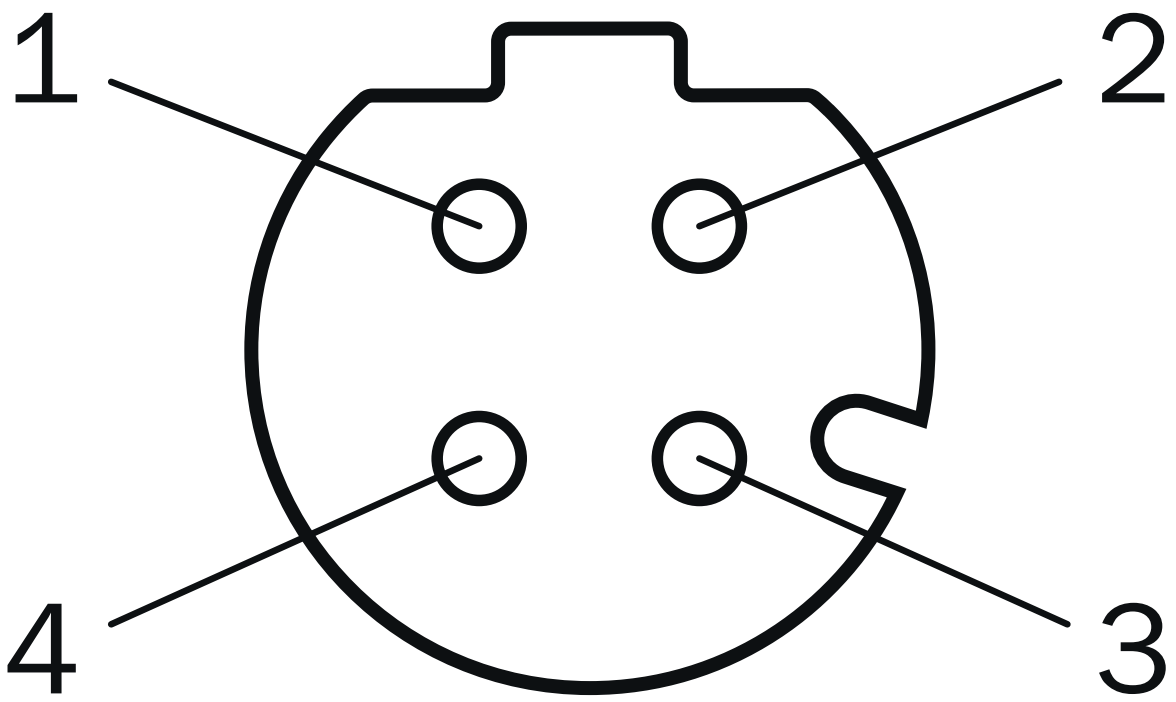
ECLASS 5.0	27270801
ECLASS 5.1.4	27270801
ECLASS 6.0	27270801
ECLASS 6.2	27270801
ECLASS 7.0	27270801
ECLASS 8.0	27270801
ECLASS 8.1	27270801
ECLASS 9.0	27270801
ECLASS 10.0	27270801
ECLASS 11.0	27270801
ECLASS 12.0	27270916
ETIM 5.0	EC001825
ETIM 6.0	EC001825
ETIM 7.0	EC001825
ETIM 8.0	EC001825
UNSPSC 16.0901	41111613

PIN assignment Connection 2: Ethernet/IP (port 1)



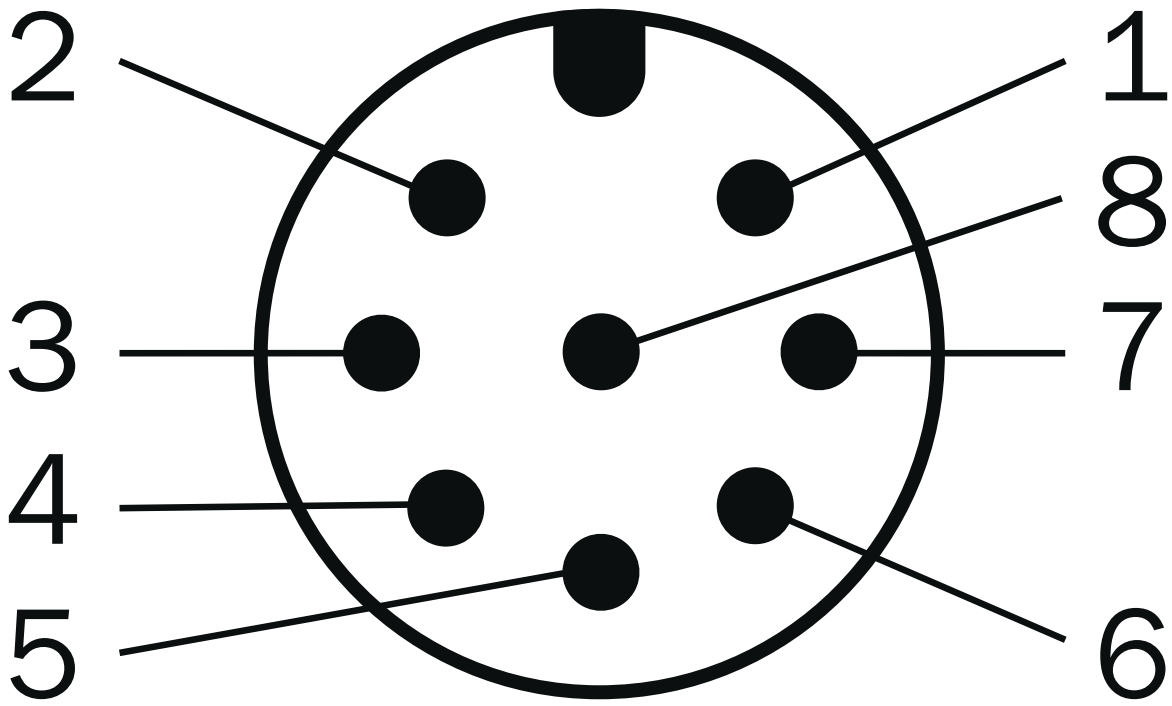
M12 female connector, 4-pin, D-coded
① TX+
② RX+
③ TX-
④ RX-

PIN assignment Connection 3: Ethernet/IP (port 2)



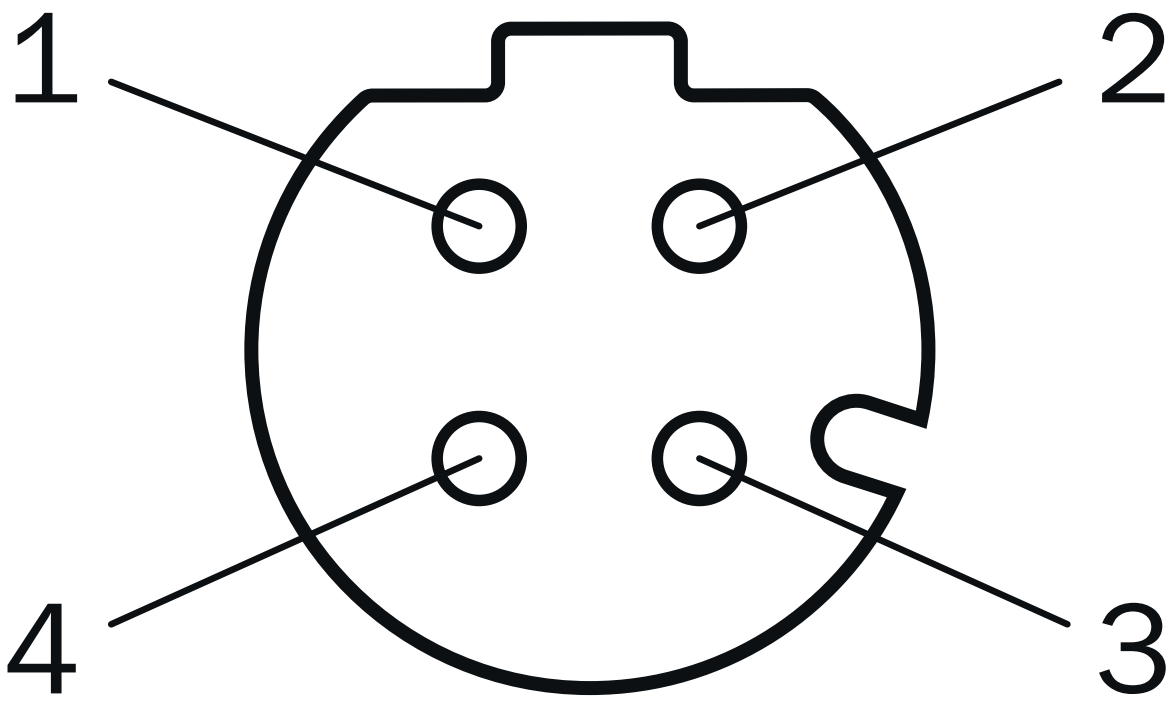
M12 female connector, 4-pin, D-coded
① TX+
② RX+
③ TX-
④ RX-

PIN assignment Connection 1: power, RS-422/SSI, Q1/In1, Q2/QA



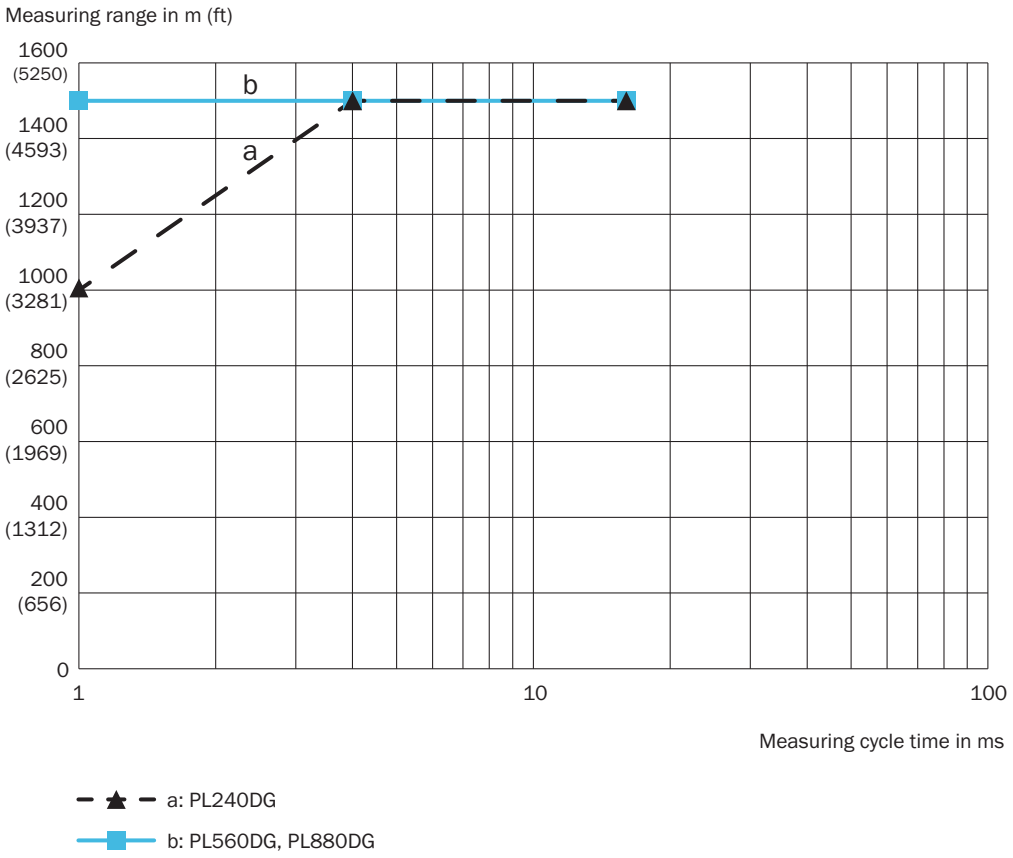
Connector M12, 8-pin, A-coded
① Q1/In1
② L+
③ RX-/CLK-
④ RX+/CLK+
⑤ TX-/Data-
⑥ TX+/Data+
⑦ M
⑧ Q_2/Q_A

PIN assignment Connection 4: Ethernet

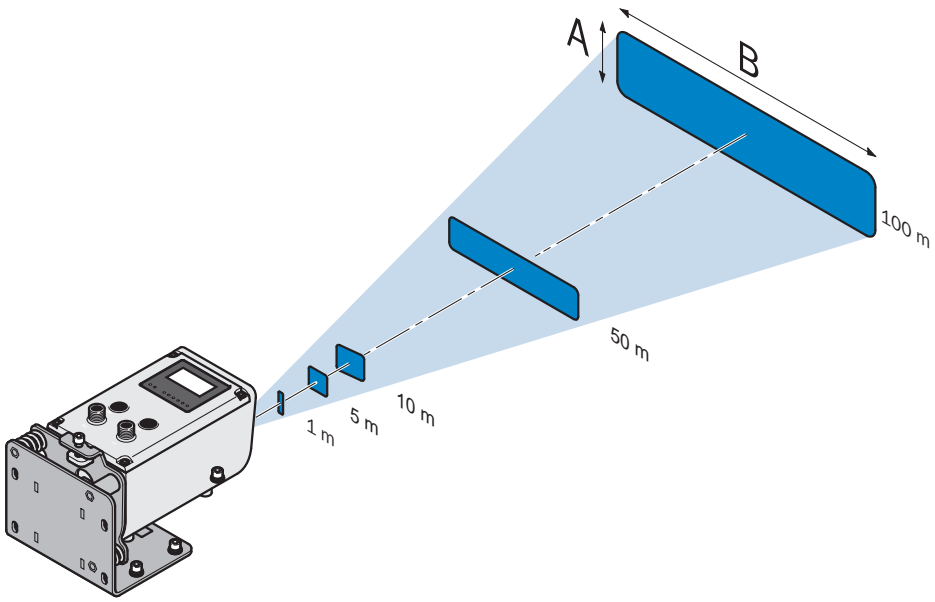


M12 female connector, 4-pin, D-coded
① TX+
② RX+
③ TX-
④ RX-

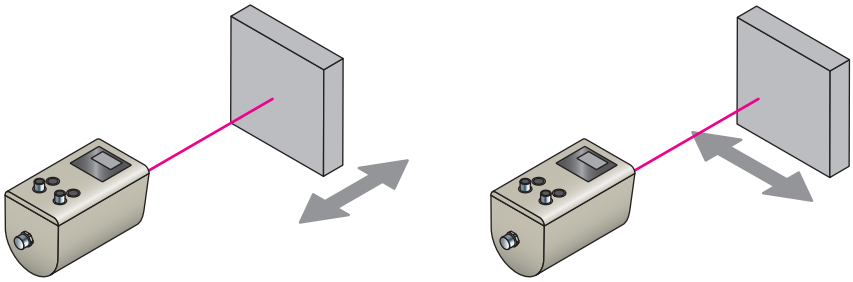
Working range diagram DL1000 measuring range based on measurement cycle time and reflector type



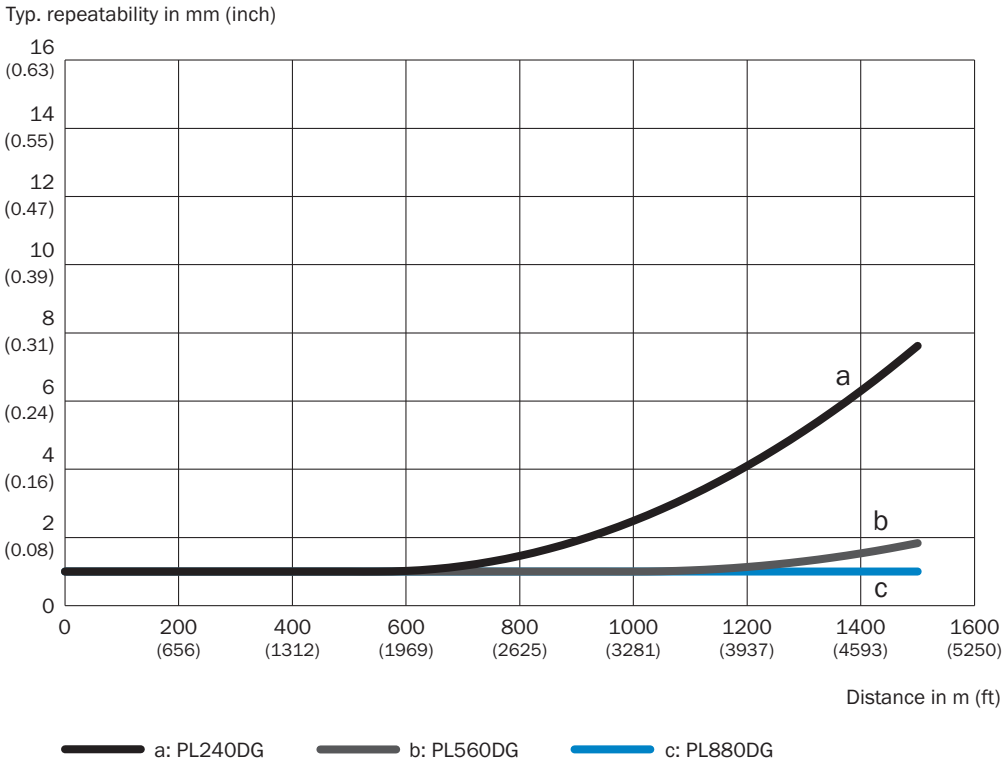
Light spot size



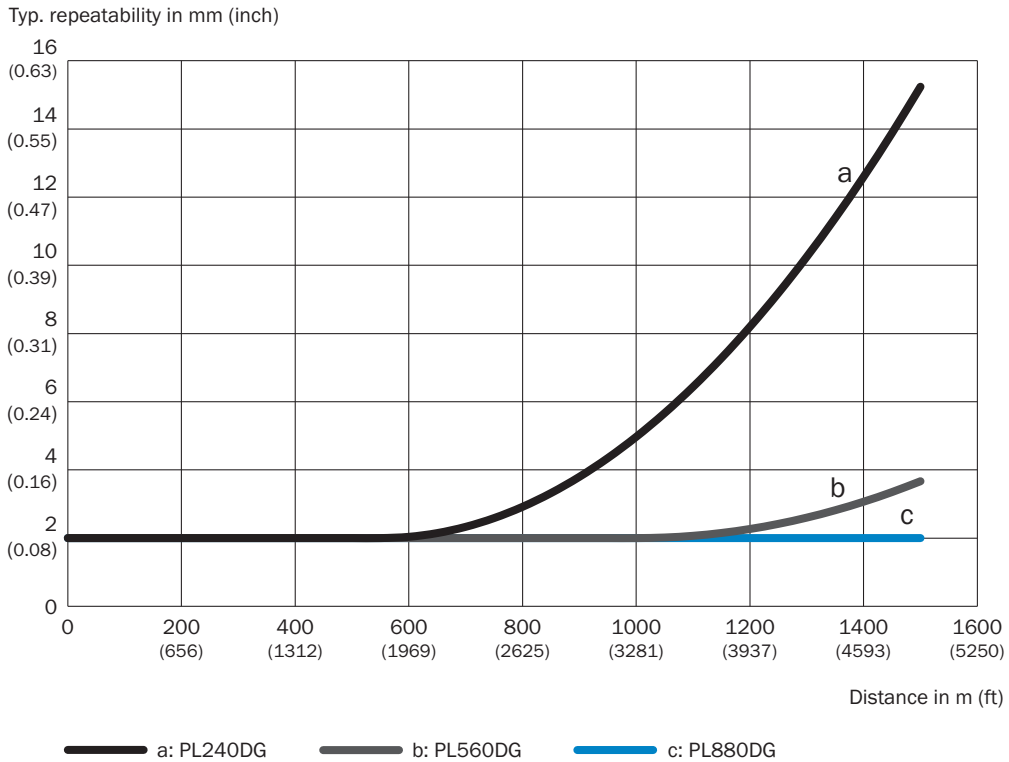
Functional principle



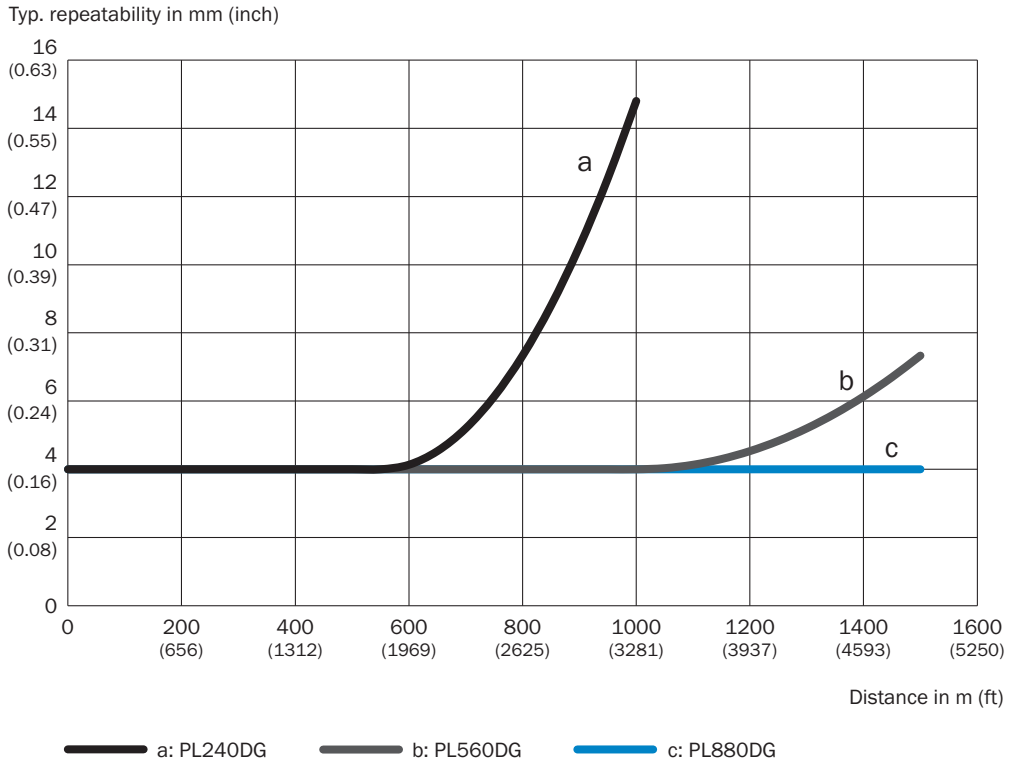
Repeatability DL1000 for various reflector types, with 16 ms measurement cycle time



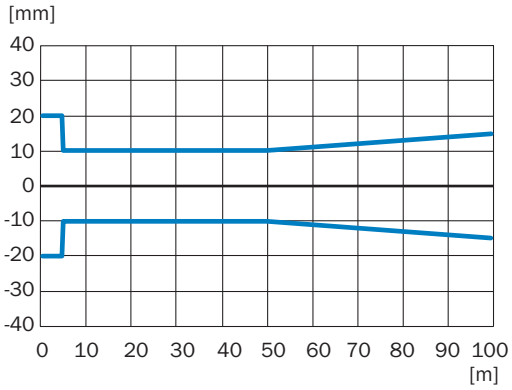
Repeatability DL1000 for various reflector types, with 4 ms measurement cycle time



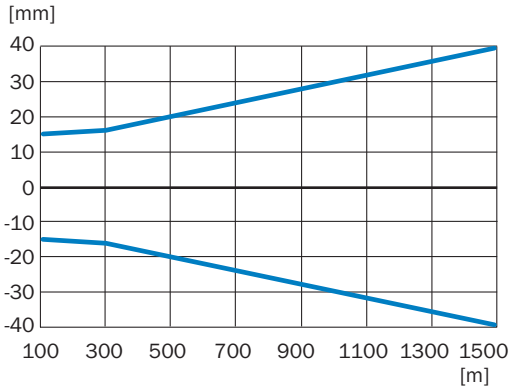
Repeatability DL1000 for various reflector types, with 1 ms measurement cycle time



Measurement accuracy Typically DL1000, x-axis: Distance, y-axis: Typical measurement accuracy



Measurement accuracy Typically DL1000, x-axis: Distance, y-axis: Typical measurement accuracy



Recommended accessories

Other models and accessories ➜ www.sick.com/Dx1000

	Brief description	Type	part no.
device protection and care			
	• **Description:** Can be opened upward without tools. Conductor for connections on the back. Due to space constraints, connecting cables with 90° angled, pre-assembled male connectors/female connectors are required. • **Items supplied:** Weatherproof housing (BEF-AH-DX1000, tube for weatherproof housing and rain cover for protective housing are not included with delivery)	Weather-proof housing	2087690
connectors and cables			
	• **Connection type head A:** Female connector, M12, 8-pin, angled • **Connection type head B:** Flying leads • **Signal type:** RS-422, SSI • **Cable:** 10 m, 8-wire, PUR, halogen-free • **Description:** RS-422, shielded, SSI	YG2A68-100XXXXLECX	6051482

	Brief description	Type	part no.
Mounting systems			
	• **Description:** Alignment bracket for mounting and precise alignment of the sensor in a horizontal and vertical direction • **Material:** Stainless steel • **Details:** Stainless steel • **Items supplied:** Mounting hardware included	BEF-AH-DX1000	2080392
reflectors and optics			
	Strich		On request

SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

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