SICK.COM

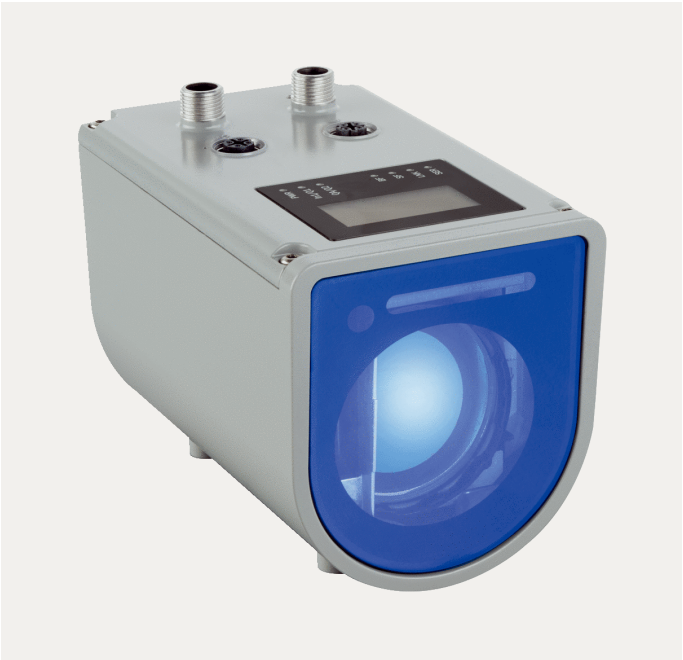


DATA SHEET

DT1000-S11102

Dx1000
Time-of-flight sensors

SICK Sensor Intelligence



TIME-OF-FLIGHT SENSORS

DT1000-S11102

ORDERING INFORMATION

Type	part no.
DT1000-S11102	1075437

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

DETAILED TECHNICAL DATA

FEATURES

Measurement principle	HDDM+
Measuring range	0.2 m ... 155 m, 6% remission factor [1) 2) 3)] 0.2 m ... 460 m, 90% remission factor [1) 2) 3)]
Target	Natural objects
Resolution	1 µm ... 100,000 µm, adjustable [4)]
Repeatability	≥ 1 mm, See repeatability characteristic lines [1) 5) 6) 7)]
Measurement accuracy	Typ. ± 15 mm [8) 9)]
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 remission and measuring cycle time.

4) Data interface resolution.

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

6) 6% ... 90% remission factor.

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

8) See measurement accuracy diagram.

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

10) Depending on interface used.

11) See light spot size diagram.

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

13) Measuring laser.

14) For object temperatures > +1,200 °C, the use of the additional filter is required for high-temperature applications. The additional filter reduces the measuring range limit by approx. 25%.

	64 ms 128 ms
Output time	≥ 1 ms [10]
Emitted beam	
Typ. light spot size (distance)	5 mm x 20 mm (at 1 m) [11] 20 mm x 20 mm (at 5 m) [11] 35 mm x 25 mm (at 10 m) [11] 150 mm x 50 mm (at 50 m) [11] 290 mm x 80 mm (at 100 m) [11] 570 mm x 140 mm (at 200 m) [11]
Key laser figures	
Normative reference	IEC 60825-1:2014, EN 60825-1:2014
Laser class	1 [12]
Average laser service life (at 25 °C)	100,000 h [13]
Filter	Rain and snow filter Fog filter Moving average distance value Kalman filter Moving average speed value
Max. object temperature	+1,400 °C [14]
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 remission and measuring cycle time.

[4] Data interface resolution.

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

[6] 6% ... 90% remission factor.

[7] Dependent on selected filter settings and measuring cycle time.

[8] See measurement accuracy diagram.

[9] At T = +23 °C and after 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
PROFIBUS DP	✓
Function	Parameterization, output of measurement data

[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.

Data transmission rate	9.6 kBaud ... 12 MBaud, Automatic detection
Serial	✓ , RS-422
Remark	Switchable to SSI
Function	Parameterization, output of measurement data
SSI	✓
Remark	Switchable to RS-422
Function	Output of measurement data
Inputs/outputs	
In1/Q1	Digital input, digital output (Switchable)
QA/Q2	Analog output, digital output (Switchable)
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	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

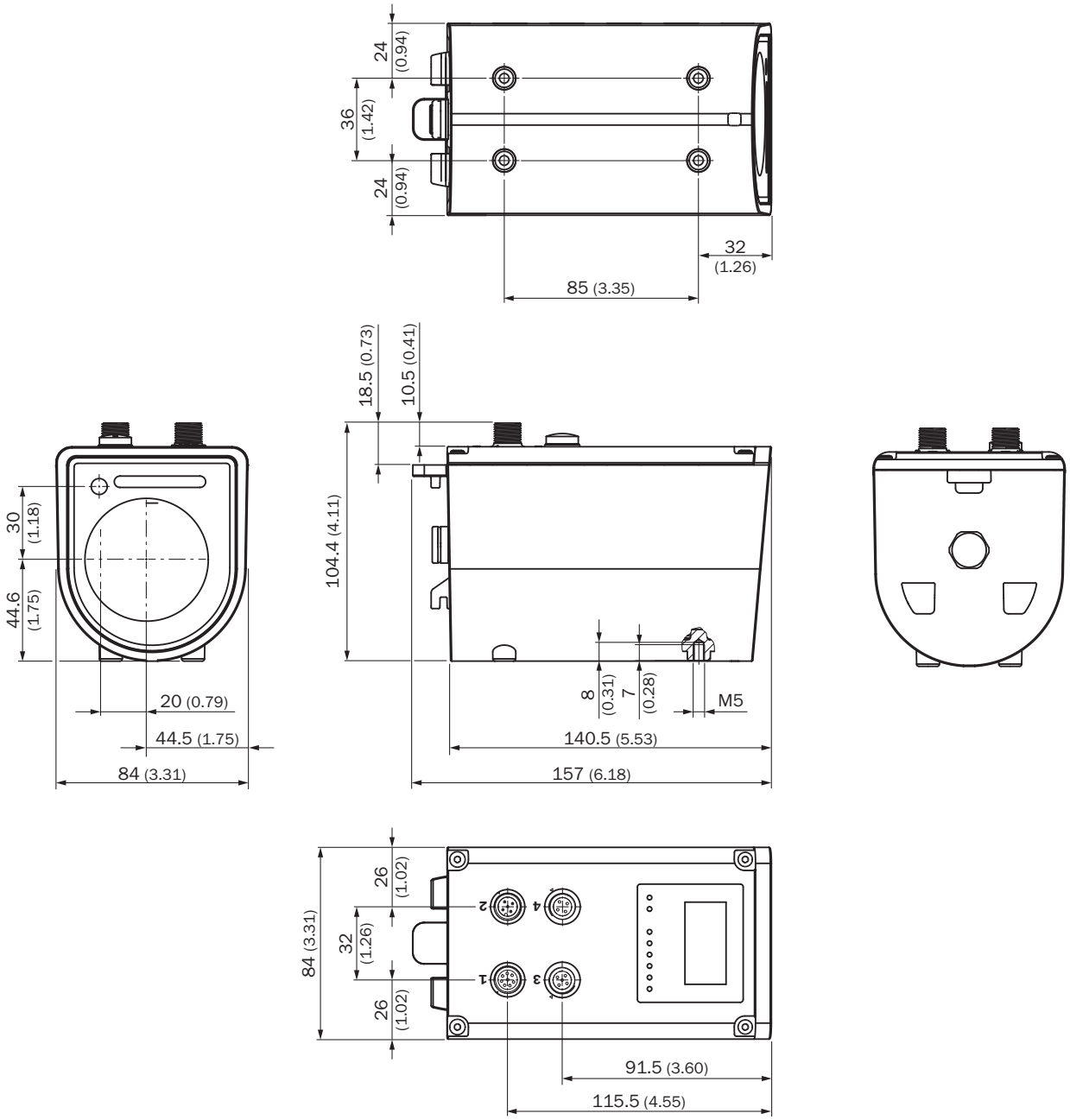
Ambient temperature, operation	–40 °C ... +55 °C [1] –40 °C ... +95 °C, operation with cooling case
Ambient temperature, storage	–40 °C ... +75 °C
Max. rel. humidity (not condensing)	≤ 95 %
Effect of air pressure	0.3 ppm/hPa
Effect of air temperature	–1 ppm/K
Temperature drift	Typ. 0.25 mm/K
Typ. Ambient 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

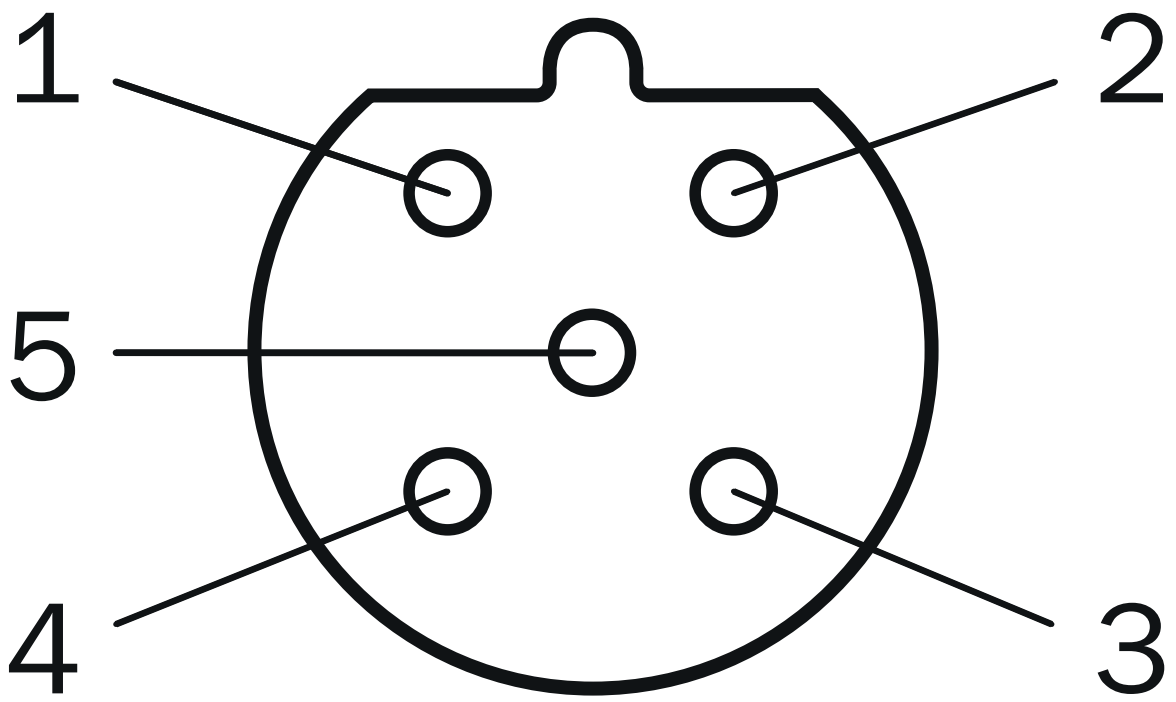
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
cULus certificate	✓
Profibus certificate	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

DIMENSIONAL DRAWING



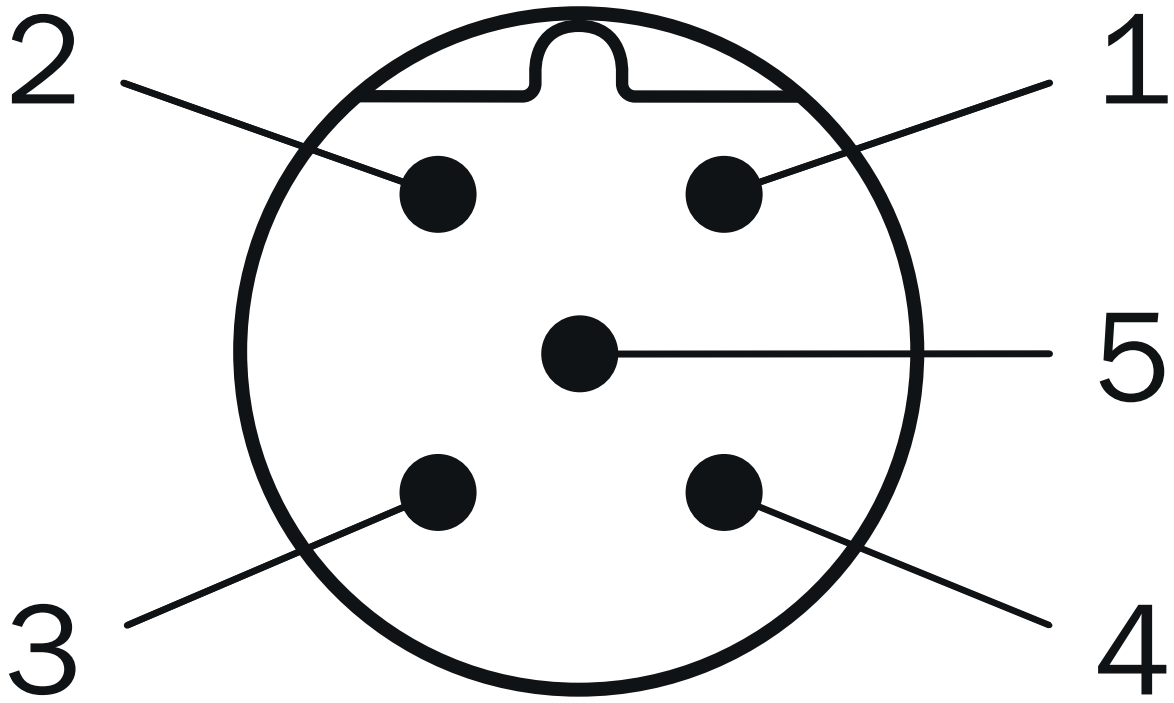
Dimensions in mm (inch)

PIN ASSIGNMENT CONNECTION 3: PROFIBUS OUT



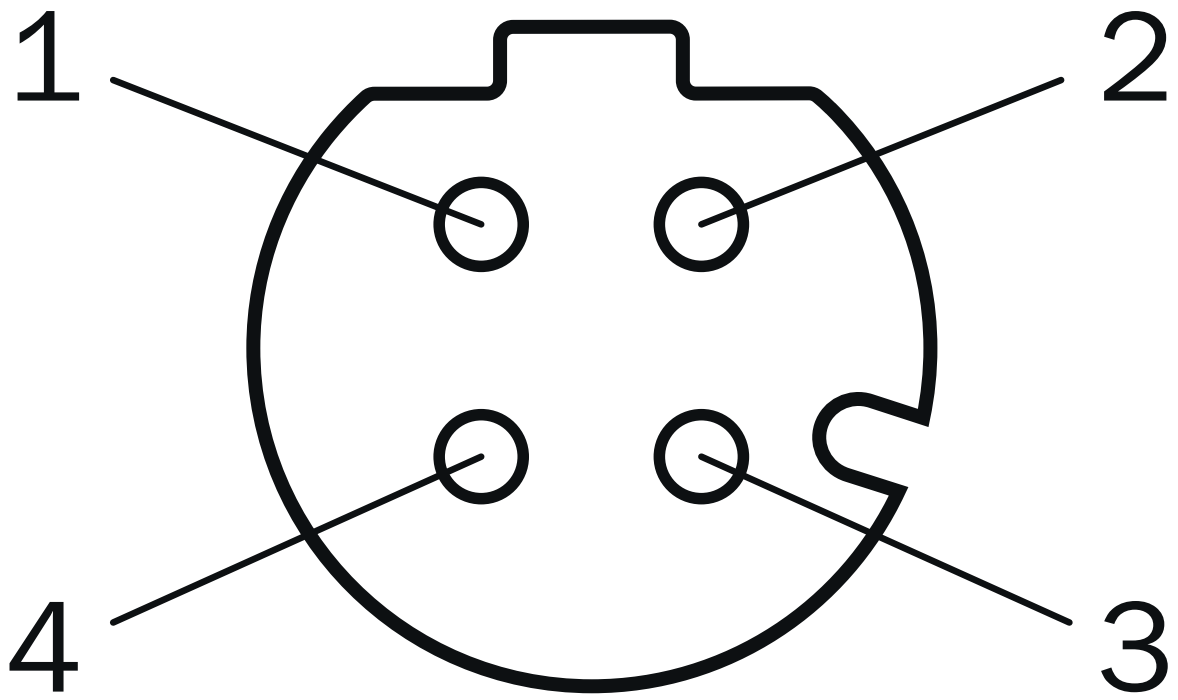
Female connector M12, 5-pin, B-coded
① +5 V
② A
③ GND
④ B
⑤ nc

PIN ASSIGNMENT CONNECTION 2: PROFIBUS IN



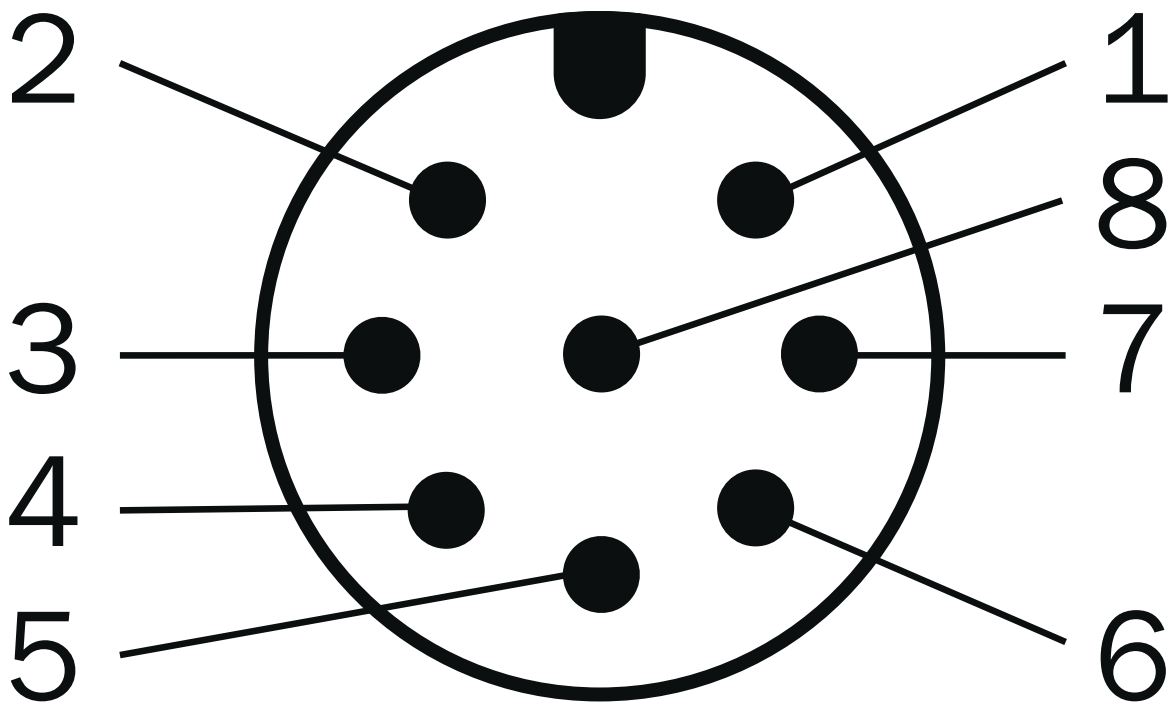
Connector M12, 5-pin, B-coded, BUS IN
① nc
② A
③ nc
④ B
⑤ nc

PIN ASSIGNMENT CONNECTION 4: ETHERNET



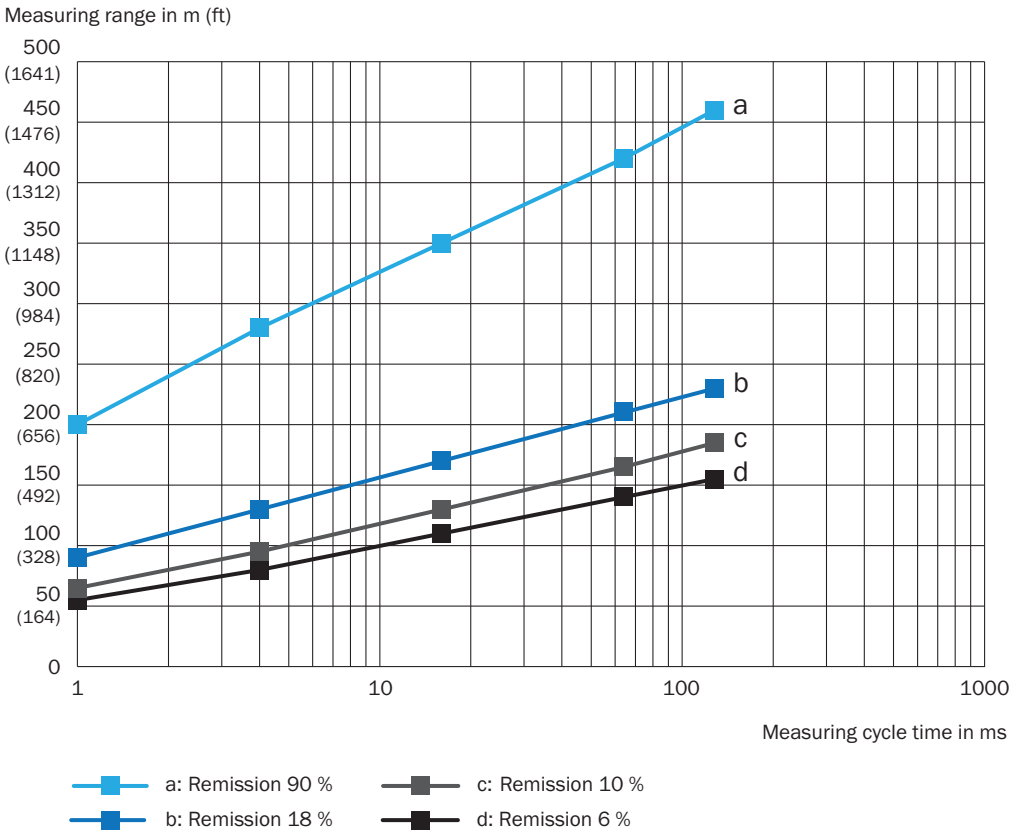
M12 female connector, 4-pin, D-coded
① TX+
② RX+
③ TX-
④ RX-

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

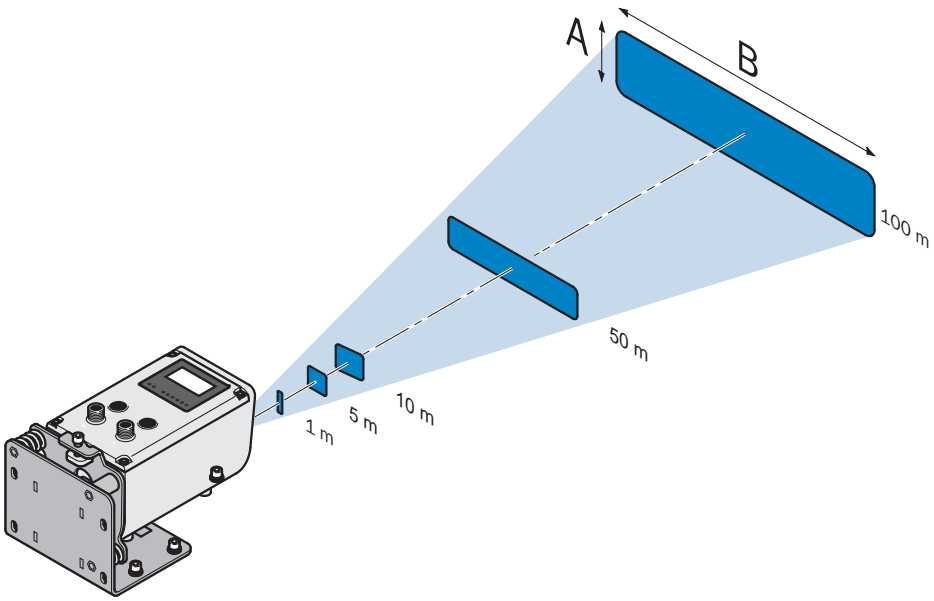


Connector M12, 8-pin, A-coded
① Q1/In1
② L+
③ RX-/CLK-
④ RX+/CLK+
⑤ TX-/Data-
⑥ TX+/Data+
⑦ M
⑧ Q_2/Q_A

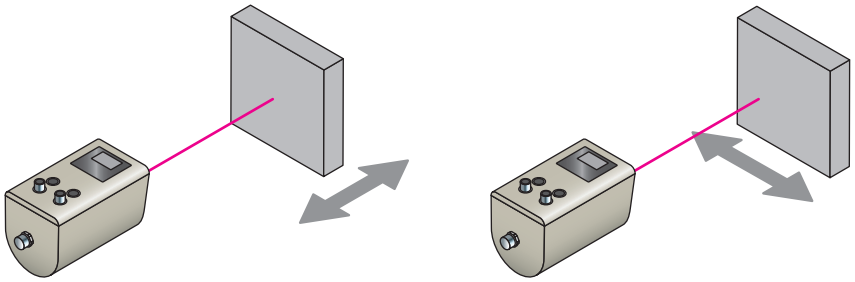
WORKING RANGE DIAGRAM DT1000 MEASURING RANGE BASED ON MEASUREMENT CYCLE TIME AND OBJECT REMISSION



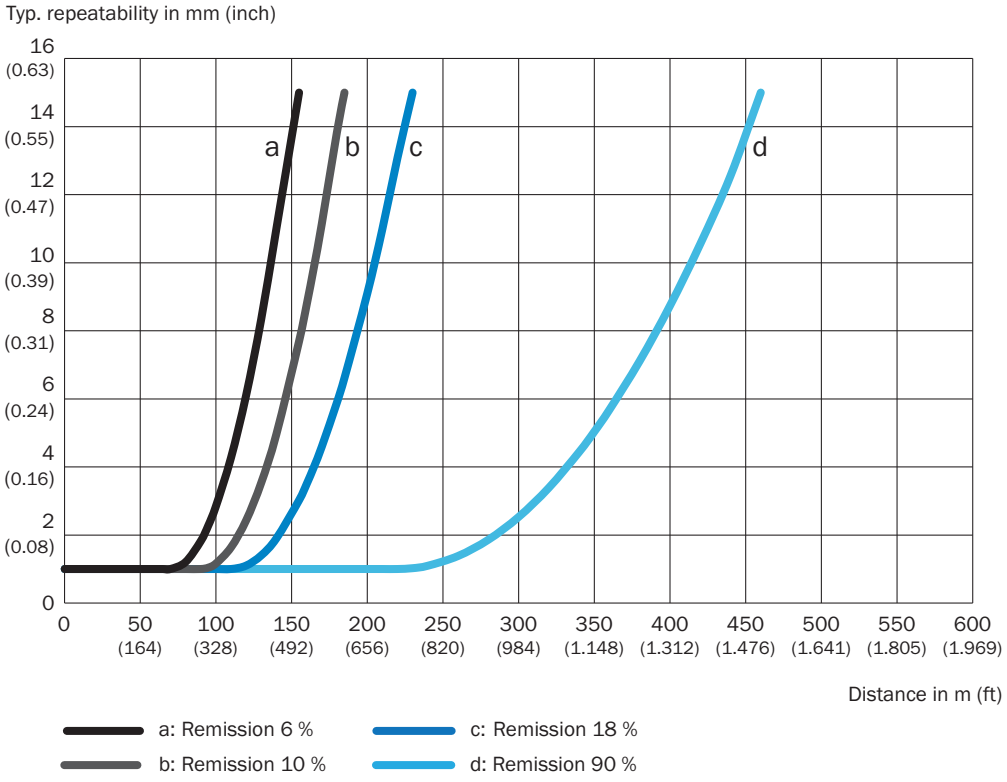
LIGHT SPOT SIZE



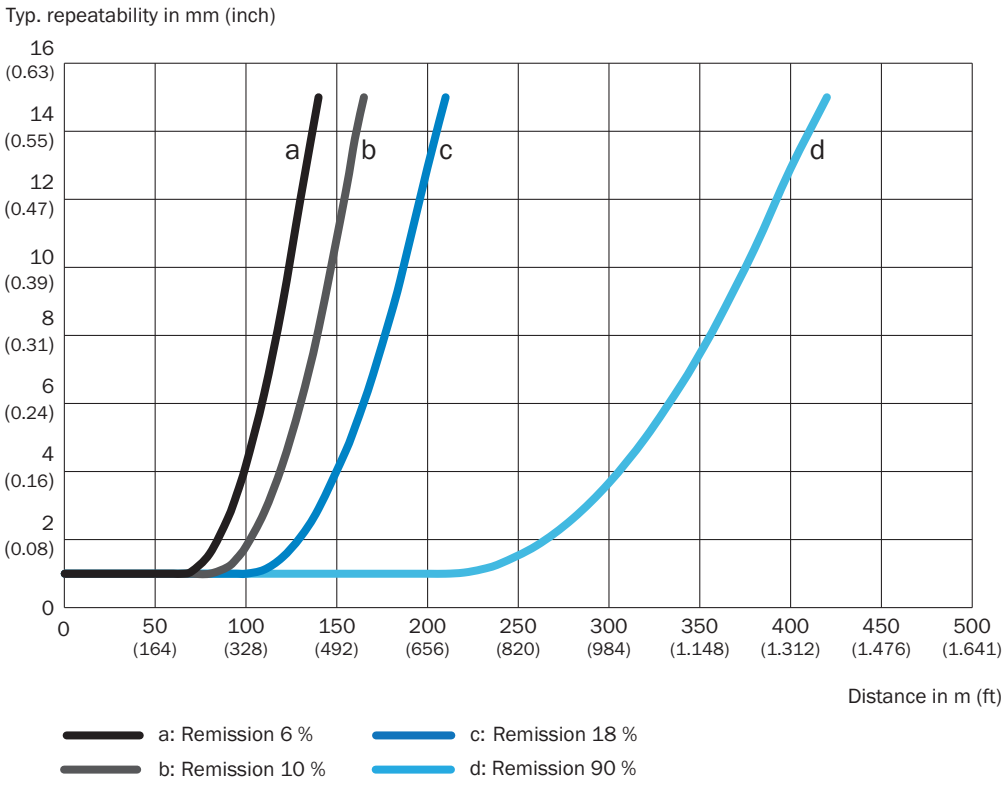
FUNCTIONAL PRINCIPLE



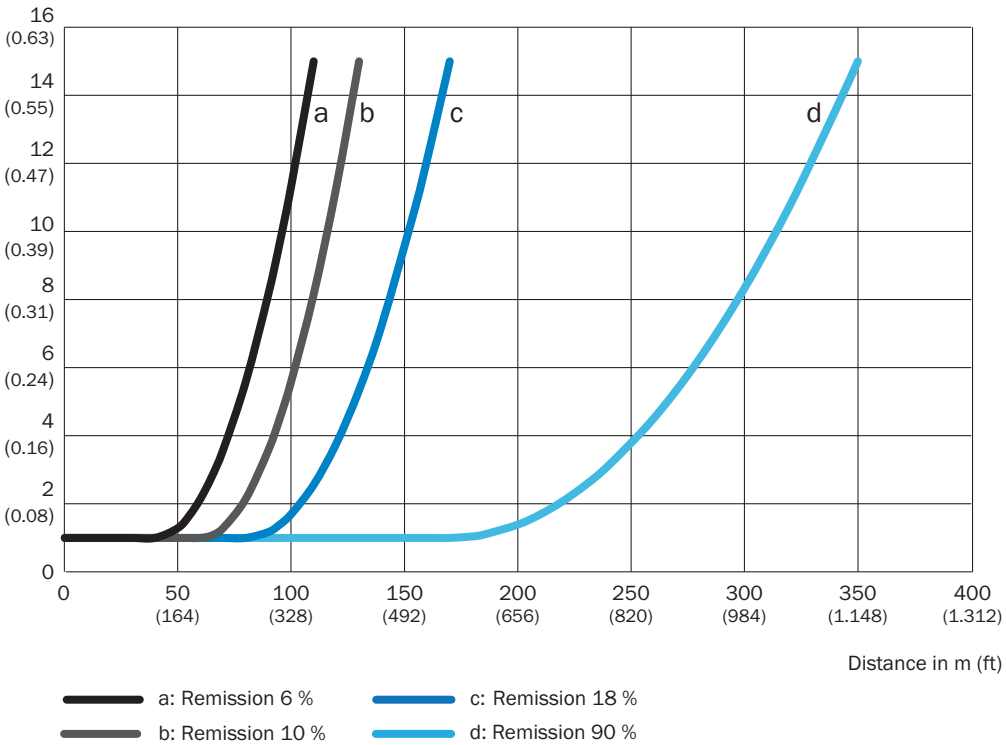
REPEATABILITY DT1000, WITH 128 MS MEASUREMENT CYCLE TIME



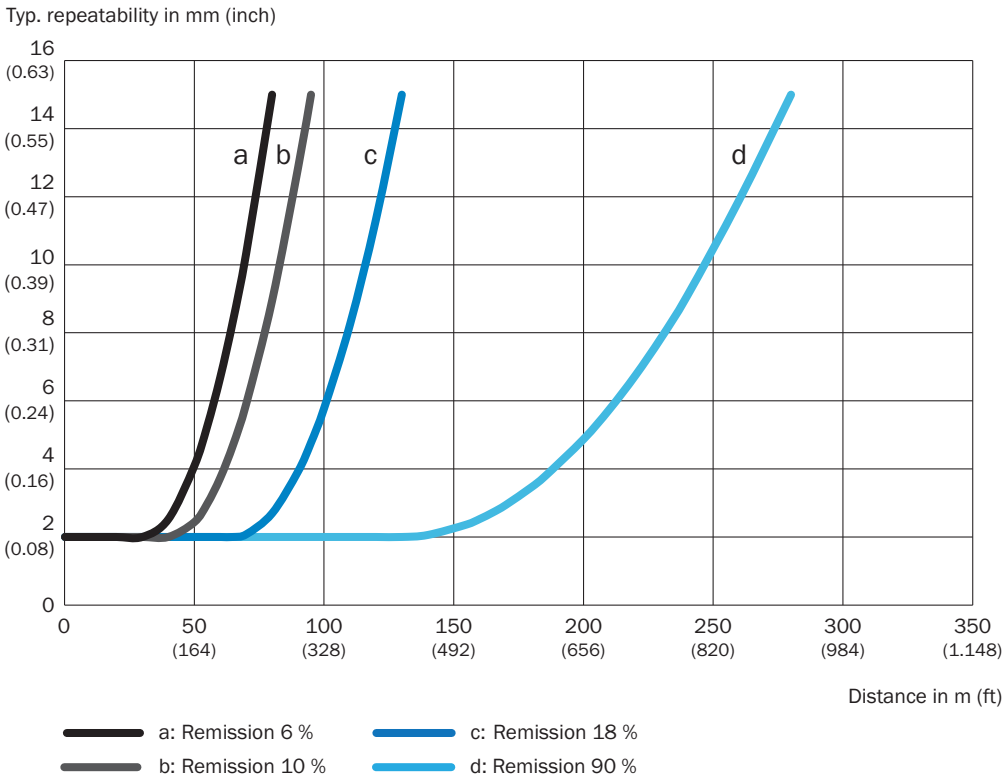
REPEATABILITY DT1000, WITH 64 MS MEASUREMENT CYCLE TIME



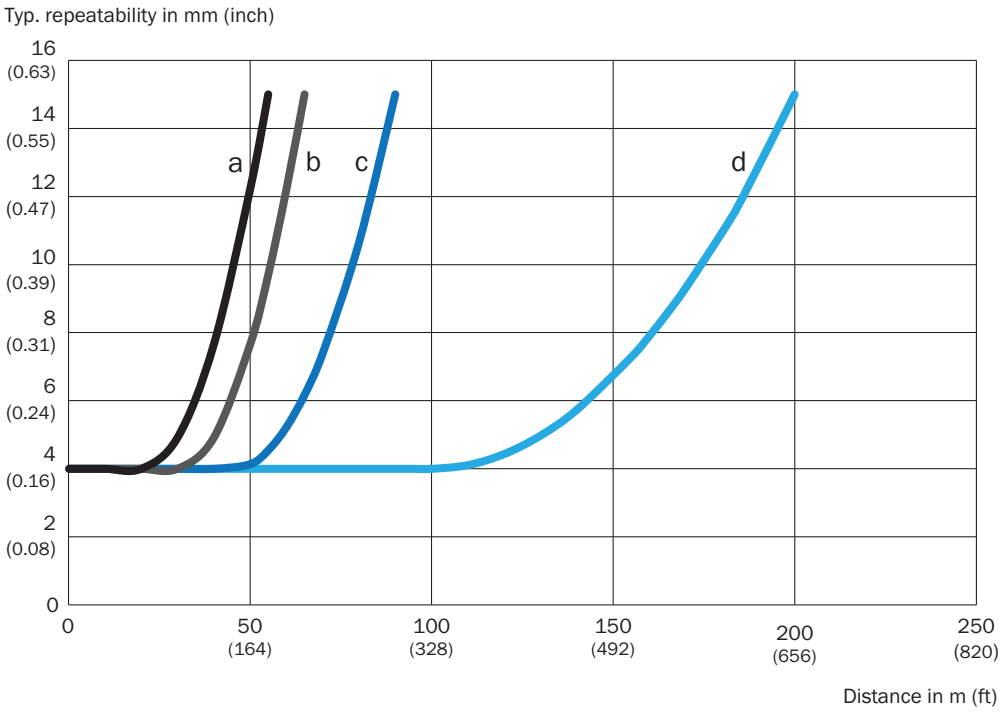
REPEATABILITY DT1000, WITH 16 MS MEASUREMENT CYCLE TIME



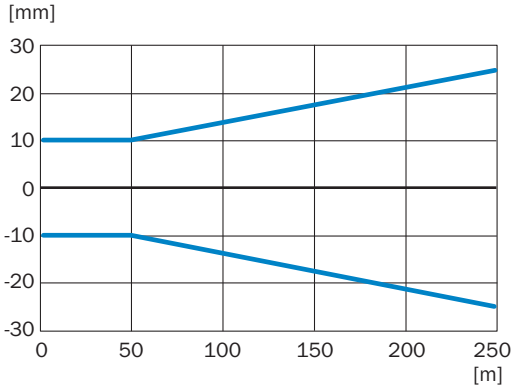
REPEATABILITY DT1000, WITH 4 MS MEASUREMENT CYCLE TIME



REPEATABILITY DT1000, WITH 1 MS MEASUREMENT CYCLE TIME



MEASUREMENT ACCURACY TYPICALLY DT1000, 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/1075437

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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

SICK

Sensor Intelligence