Dx50
Mid Range Distance Sensors

Distance measurement – reliable, precise and versatile

SICK
Sensor Intelligence.

The Dx50 product family sets new standards with HDDM technology.

SICK's many years of experience and the constant advances in distance sensor technology are reflected in the innovative HDDM (high definition distance measurement) products. HDDM is an innovative evaluation method for time-of-flight sensors. This technology enables the Dx50's high level of precision, best ambient light immunity and high measurement rate at a perfect price/performance ratio. Time-of-flight measurement allows the Dx50 product family to achieve ranges of up to 50 m with millimeter precision.

HDDM
high definition distance measurement

+ High performance
+ High precision
+ Maximum ambient light immunity
+ Maximum reliability
+ Excellent price/performance ratio

+

+ Widest temperature range
+ Intuitive operation
+ Robust metal housing
+ Multiple performance levels, making it easy to accommodate future changes
+ Wide range of accessories

The advantages of new HDDM technology make the Dx50 product family extremely versatile.

Range up to 50 m
Ranges of up to 50 m combined with a high-visibility laser spot mean that the list of possible applications is virtually endless.

Wide range of temperatures from –30 to +65 °C
Indoors and outdoors, summer and winter – The wide range of operating temperatures make the Dx50 product family versatile.

Maximum ambient light immunity
The Dx50 distance sensors are immune to ambient light, ensuring error-free operation and reliable measurement of distances, both indoors and outdoors.
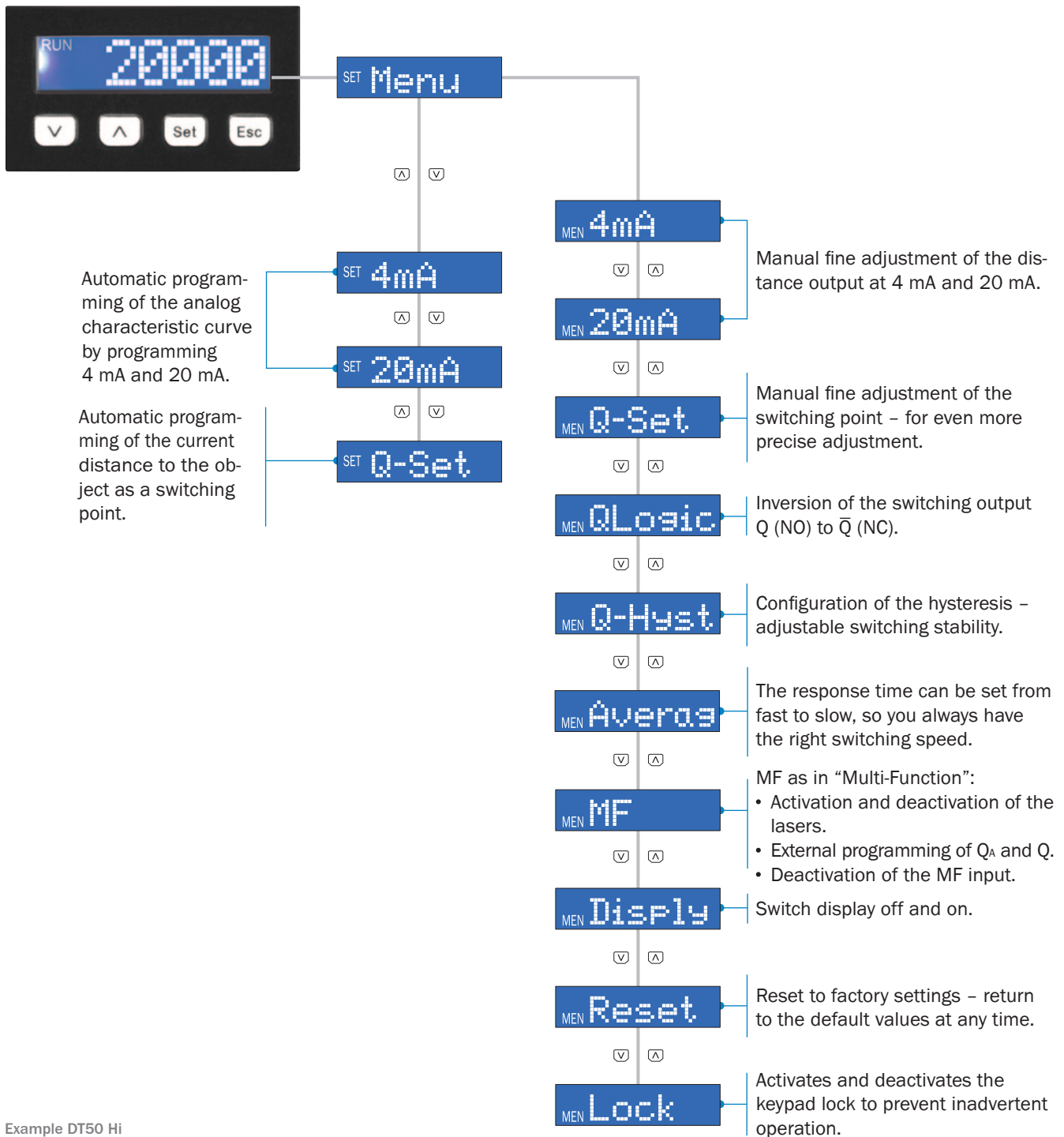
Intuitive operation
The simple and consistent operating concept of the Dx50 distance sensors helps you reach your target at the speed of light.
See the example on page 4.
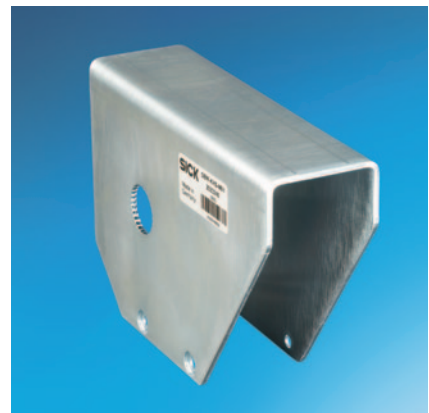
Wide range of accessories
Versatile connector technology, mounting brackets customized for the specific industry, and a variety of protective devices round off the offering.

Varied product range with an intuitive operating concept – the ideal combination for a wide range of applications.

## Consistent operating concept for the entire product family

RUN 20.000

[V] [∧] [Set] [Esc]

SET **Menu**

[∧] [V]

MEN **4mA**

[V] [∧]

MEN **20mA**

Manual fine adjustment of the distance output at 4 mA and 20 mA.

SET **4mA**

Automatic programming of the analog characteristic curve by programming 4 mA and 20 mA.

[∧] [V]

SET **20mA**

[∧] [V]

SET **Q-Set**

Automatic programming of the current distance to the object as a switching point.

MEN **Q-Set**

Manual fine adjustment of the switching point – for even more precise adjustment.

[V] [∧]

MEN **QLogic**

Inversion of the switching output Q (NO) to $\bar{Q}$ (NC).

[V] [∧]

MEN **Q-Hyst**

Configuration of the hysteresis – adjustable switching stability.

[V] [∧]

MEN **Averag**

The response time can be set from fast to slow, so you always have the right switching speed.

[V] [∧]

MEN **MF**

MF as in "Multi-Function":
- Activation and deactivation of the lasers.
- External programming of Q_A and Q.
- Deactivation of the MF input.

[V] [∧]

MEN **Displ**

Switch display off and on.

[V] [∧]

MEN **Reset**

Reset to factory settings – return to the default values at any time.

[V] [∧]

MEN **Lock**

Activates and deactivates the keypad lock to prevent inadvertent operation.

Example DT50 Hi

**Laser Class 1**   **Laser Class 2**

Laser classes 1 and 2
The Dx50 distance sensors emit a high-precision laser beam compliant with the harmless and eye-safe Class 1 and Class 2, which is more powerful and classified as safe, too.
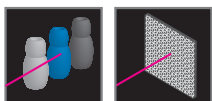
Measurement to object or reflector.
Outstanding features of the Dx50 distance sensors include minimal black/white shift when measuring to objects, impressive range when measuring to reflectors, plus reliable background suppression.

Analog (mA) 4 – 20   **Switching** 1 0 0   **Serial** 010011101
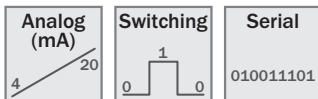
Interfaces
A variety of interfaces to fit your application requirements. The Dx50 product family provides analog, switching and serial interfaces.

Range 0.2 – 10   **Range** 0.2 – 20   **Range** 0.2 – 50
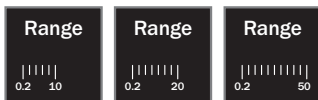
Range
The Dx50 distance sensors have maximum ranges between 10 and 50 m. Devices designed for reflector operation have the greatest ranges.

Standard   **High**

Performance (reproducibility, response time, etc.)
Overall, the measuring results of the Dx50 product family are excellent. Compared with the standard versions, the high-end versions offer even better performance.

Typical applications
Thanks to its reliability, flexibility and tough design, the Dx50 product family is suitable for a wide range of applications, e.g. in the logistics, timber and automotive industries.

HDDM
high definition distance measurement

	DT50	DT50 Hi	DS50
	The universal distance measurement solution up to 10 m	Compact size delivers exceptional performance up to 20 m	Precise detection from a distance of up to 10 m
Technical data overview			
Measuring object	Object (6 ... 90 % remission)		
Range	200 ... 10,000 mm (at 90 % remission)	200 ... 20,000 mm (at 90 % remission) 200 ... 13,000 mm (at 90 % remission)	200 ... 10,000 mm (at 90 % remission)
Response time	20 / 30 ms	15 / 30 / 80 ms	10 / 50 ms 20 / 100 ms
Repeatability	5 / 2.5 mm	3 / 2 / 1 mm	5 / 2.5 mm
Accuracy	± 10 mm	± 7 mm	± 10 mm
Interfaces	1 x 4 ... 20 mA, 1 x switching output and 1 x multi functional input 1 x 0 ... 10 V, 1 x switching output and 1 x multi functional input	1 x 4 ... 20 mA, 1 x switching output and 1 x multi functional input	2 x switching outputs and 1 x multi functional input
Laser class	Laser class 2 Laser class 1		
At a glance			
	• HDDM technology provides the best reliability, immunity to ambient light and price/performance ratio • Reliable measurement and detection up to 10 m • Wide choice of models: 4 ... 20 mA or 0 ... 10 V; PNP or NPN and laser Class 1 or 2 • High switching repeatability (± 2.5 mm) • Display with intuitive operating concept • Tough die-cast zinc metal housing • Wide operating temperature range from –30 °C to +65 °C	• HDDM technology provides the best reliability, immunity to ambient light and price/performance ratio • Most compact sensor offering up to 20 m range directly on the object • Amazing repeatability up to ± 1 mm • Very fast measurement and output rate with 500 Hz • Analog output with 4 ... 20 mA and 1 switching output • Red laser light for precise alignment • Tough metal housing with LC Display	• HDDM technology provides the best reliability, immunity to ambient light and price/performance ratio • Reliable detection up to 10 m • High switching repeatability (± 2.5 mm) • Two discrete outputs with up to 50 Hz switching frequency • Three switching modes: "Distance to Object," "Window" or "Object Between Sensor and Background" – detect any object • Immune to cross talk for use with multiple sensors • Superior background suppression
Detailed information	from page 8	from page 12	from page 16

DL50	DL50 Hi
Looking ahead – up to 50 m on reflector	**Large positioning performance. Small housing.**
Reflector (Diamond Grade)	
200 ... 50,000 mm (on reflector)	200 ... 50,000 mm (on reflector)
15 / 30 ms	10 / 40 / 160 ms
3 / 2 mm	0.5 / 0.3 / 0.25 mm
± 7 mm	± 3 mm
1 x 4 ... 20 mA, 1 x switching output and 1 x multi functional input	1 x RS-422, 1 x switching output and 1 x multi functional input/output
Laser class 1	
• HDDM technology provides the best reliability, immunity to ambient light and price/performance ratio • Up to 50 m range on diamond grade reflector • Very good repeatability for positioning tasks – up to ± 2 mm • Fast measurement and output rate with 250 Hz • Analog output with 4 ... 20 mA and 1 switching output • Red laser light for precise alignment • Wide operating temperature range from –30 °C to +65 °C	• HDDM technology provides the best reliability, immunity to ambient light and price/performance ratio • Up to 50 m range on diamond grade reflector • Worlds smallest sensor for high precision positioning • Highest repeatability in its class, with ≤ ± 0.5 mm • Fast RS-422 output rate – measurement value every 2.5 ms • Immune to cross talk for use with multiple sensors • Superior background suppression
from page 20	from page 24

The universal distance measurement solution up to 10 m

Product description

The DT50 is the entry-level model in the Dx50 product family. With a measurement range up to 10 m from the target, the sensor offers a solution for various applications. Analog and switching outputs ensure it is easy to integrate.

At a glance

- HDDM technology provides the best reliability, immunity to ambient light and price/performance ratio
- Reliable measurement and detection up to 10 m
- Wide choice of models: 4 ... 20 mA or 0 ... 10 V; PNP or NPN and laser Class 1 or 2.
- High switching repeatability (± 2.5 mm)
- Display with intuitive operating concept
- Tough die-cast zinc metal housing
- Wide operating temperature range from –30 °C to +65 °C

Your benefits

- Wide measurement range allows easy and fast integration in any production environment
- Intuitive setup via display or remote teach reduces installation time and costs
- Widest temperature range allows for outdoor use without additional cooling or heating accessories
- Immune to any type of ambient light – allows for use in optically challenging environments
- Increased process stability is achieved thanks to the small black/white shift
- Metal housing withstands harsh environments, saving replacement costs
- Low investment costs and high performance guarantee quick return on investment
- Dx50 family is based on a common platform, which offers multiple performance levels, making it easy to accommodate future changes

Laser class 1   Laser class 2

CE ⬦III **CDRH**

Additional information

Detailed technical data

Features

Measuring range 90 % remission	200 … 10,000 mm
Resolution	1 mm
Repeatability 6 … 90 % remission [1]	5 / 2.5 mm [2]
Accuracy 90 % remission	± 10 mm
Response time	20 / 30 ms [2]
Output rate	4 ms
Typ. light spot size (distance)	15 mm x 15 mm (10 m)
Additional features	• Set moving averaging: Fast/Slow • Switching mode: Distance to object (DtO) • Teach-in of switching output • Set switching output • Set hysteresis • Invertible switching output • Teach-in of analog output • Set analog output • Invertible analog output • Multi functional input: laser off, external teach, not active • Switch off display • Reset to factory default • Lock user interface

[1] Equivalent to 1 σ.
[2] Dependent on the set averaging: Fast/Slow.

Interfaces

Outputs	See type-specific data
Resolution analog outputs	16 bit
Switching hysterisis	10 … 1,000 mm
Inputs	See type-specific data

Mechanics/electronics

Supply voltage V_s [3]	DC 10 … 30 V [4]
Ripple [5]	≤ 5 V_{SS}
Power consumption [6]	≤ 2.1 W
Initialization time	≤ 250 ms
Warm up time	≤ 15 min
Typ. weight without cable	200 g
Housing material	Zinc-die cast (ZNAL4CU1)/Acrylic glass (PMMA)
Connection type	Connector M12, 5-pin
Indication	LC display 2 x LED

[3] Limit values, reverse-polarity protected, operation in short circuit protected network, max. 8 A.

[4] For DT50-_ _ _ _ 4: V_s > 15 V.

[5] May not exceed or fall short of V_s tolerances.

[6] Without load.

Ambient data

Enclosure rating	IP 65
Protection class	III
Ambient temperature	Operation: –30 ... +65 °C
	Storage: –40 ... +75 °C
Max. rel. humidity (not condensing)	≤ 95 %
Typ. ambient light safety	40 klx
Vibration resistance	EN 60068-2-6/-2-64
Shock resistance	EN 60068-2-27/-2-29
Average service life laser (MTTF at 25 °C)	100,000 h

Ordering information

Light source	Measuring range (90/18/6 %)	Switching outputs (max. output current) [1]	Multi functional inputs [2]	Analog outputs (max./min. load)	Model name	Part No.
Laser, red, Class 2 (EN 60825-1) [3]	200 ... 10,000 / 6,500 / 4,000 mm	1 x PNP (100 mA) [5]	1 x PNP [7]	1 x 4 ... 20 mA (≤ 300 Ω)	DT50-P1113	1044369
				1 x 0 ... 10 V (≥ 5 kΩ)	DT50-P1114	1047581
		1 x NPN (100 mA) [6]	1 x NPN [8]	1 x 4 ... 20 mA (≤ 300 Ω)	DT50-N1113	1047396
				1 x 0 ... 10 V (≥ 5 kΩ)	DT50-N1114	1047582
Laser, red, Class 1 (EN 60825-1) [4]	200 ... 10,000 / 5,000 / 2,500 mm	1 x PNP (100 mA) [5]	1 x PNP [7]	1 x 4 ... 20 mA (≤ 300 Ω)	DT50-P1123	1047118
				1 x 0 ... 10 V (≥ 5 kΩ)	DT50-P1124	1047616
		1 x NPN (100 mA) [6]	1 x NPN [8]	1 x 4 ... 20 mA (≤ 300 Ω)	DT50-N1123	1047397
				1 x 0 ... 10 V (≥ 5 kΩ)	DT50-N1124	1047617

[1] Output Q short-circuit protected.

[2] Response time ≤ 15 ms.

[3] Wavelength: 658 nm; max. output: 180 mW; pulse length: 5 ns; pulse repetition rate: 1/200.

[4] Wavelength: 658 nm; max. output: 120 mW; pulse length: 2.5 ns; pulse repetition rate: 1/400.

[5] PNP: High = V_s –(< 2.5 V); Low = 0 V.

[6] NPN: High = < 2.5 V; Low = V_s.

[7] PNP: High = V_s, Low = ≤ 2.5 V.

[8] NPN: High = ≤ 2.5 V, Low = V_s.

Dimensional drawing

All dimensions in mm (inch)
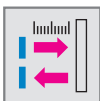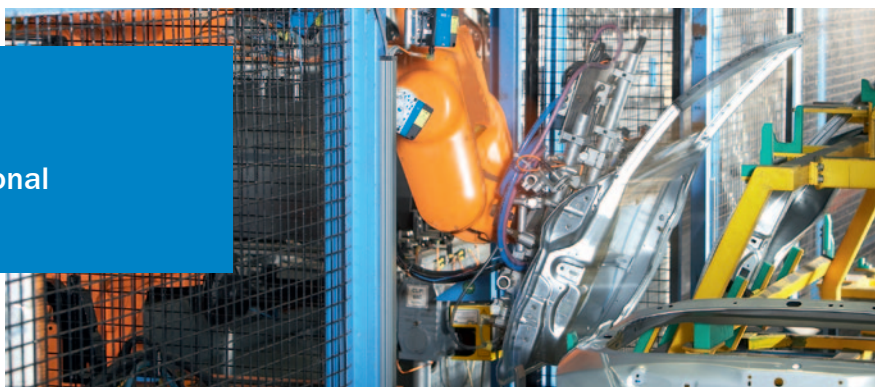
① Optical axis sender
② Optical axis receiver
③ Mounting holes
④ Reference surface = 0 mm
⑤ Status indicator switching output (orange)
⑥ Status indicator power on (green)
⑦ Operating keys and display

Connection type and diagram

Connector
M12, 5-pin

brn	1	L+
blk	4	Q
blu	3	M
wht	2	Q$_A$
gra	5	MF

Compact size delivers exceptional performance up to 20 m

Laser class 1   Laser class 2

CE ◇III CDRH
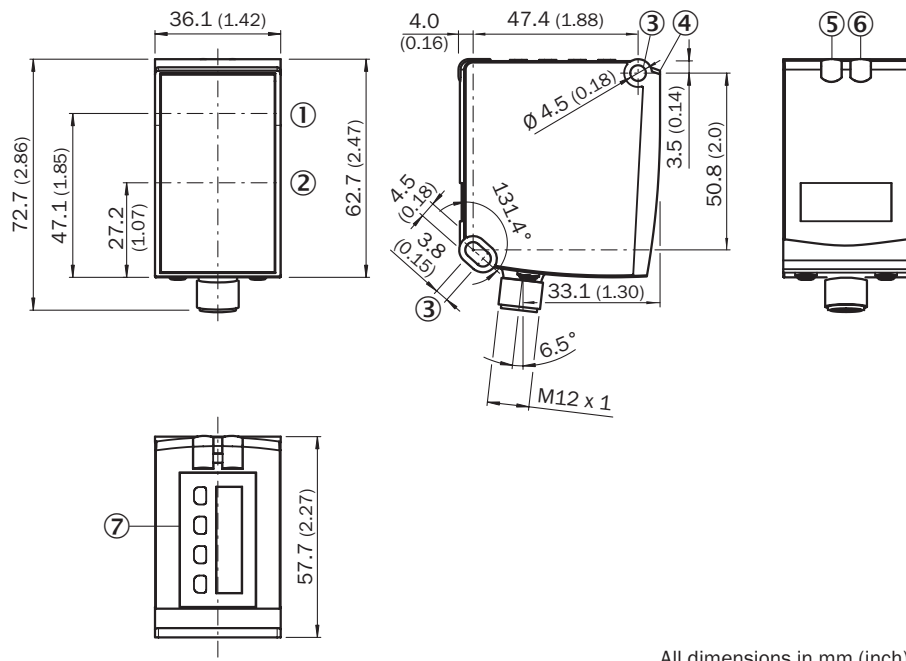
Product description

The compact DT50 Hi distance sensor offers superior precision. Compared to the DT50, the Hi version offers significantly better precision. Additionally, the measurement range of this more powerful variant is twice as long.

At a glance

- HDDM technology provides the best reliability, immunity to ambient light and price/performance ratio
- Most compact sensor offering up to 20 m range directly on the object
- Amazing repeatability up to ± 1 mm
- Very fast measurement and output rate with 500 Hz
- Analog output with 4 ... 20 mA and 1 switching output
- Red laser light for precise alignment
- Tough metal housing with LC Display

Your benefits

- Improved production quality based on high precision and small black/white shift of the measurement
- The fast measurement frequency increases the production throughput
- Thanks to its compact housing size, the DT50 Hi offers precise measurement in applications with limited space
- Red light and an optional alignment bracket reduces installation time
- Intuitive setup via display or remote teach reduces installation time and costs
- Immune to any type of ambient light – allows for use in optically challenging environments
- Widest temperature range allows for outdoor use without additional cooling or heating accessories
- Metal housing withstands harsh environments, saving replacement costs

Additional information

Detailed technical data

Features

Measuring range 90 % remission	See type-specific data
Resolution	1 mm
Repeatability 6 … 90 % remission [1]	3 / 2 / 1 mm [2]
Accuracy 90 % remission	± 7 mm
Response time	15 / 30 / 80 ms [2]
Output rate	2 ms
Typ. light spot size (distance)	15 mm x 15 mm (10 m)
Additional features	• Set moving averaging: Fast/Medium/Slow • Switching mode: Distance to object (DtO) • Teach-in of switching output • Set switching output • Set hysteresis • Invertible switching output • Teach-in of analog output • Set analog output • Invertible analog output • Multi functional input: laser off, external teach, not active • Switch off display • Reset to factory default • Lock user interface

[1] Equivalent to 1 σ.

[2] Dependent on the set averaging: Fast / Medium / Slow.

Interfaces

Outputs	See type-specific data
Analog outputs (max. load)	1 x 4 … 20 mA (≤ 300 Ω)
Resolution analog outputs	16 bit
Switching hysterisis	10 … 1,000 mm
Inputs	See type-specific data

Mechanics/electronics

Supply voltage V_s [3]	DC 10 … 30 V
Ripple [4]	≤ 5 V_{ss}
Power consumption [5]	≤ 2.1 W
Initialization time	≤ 250 ms
Warm up time	≤ 15 min
Typ. weight without cable	200 g
Housing material	Zinc-die cast (ZNAL4CU1)/Acrylic glass (PMMA)
Connection type	Connector M12, 5-pin
Indication	LC display 2 x LED

[3] Limit values, reverse-polarity protected, operation in short circuit protected network, max. 8 A.

[4] May not exceed or fall short of V_s tolerances.

[5] Without load.

Ambient data

Enclosure rating	IP 65
Protection class	III
Ambient temperature	Operation: –30 ... +65 °C
	Storage: –40 ... +75 °C
Max. rel. humidity (not condensing)	≤ 95 %
Typ. ambient light safety	40 klx
Vibration resistance	EN 60068-2-6/-2-64
Shock resistance	EN 60068-2-27/-2-29
Average service life laser (MTTF at 25 °C)	100,000 h

Ordering information

Light source	Measuring range (90/18/6 %)	Switching outputs (max. output current) [1]	Multi functional inputs [2]	Model name	Part No.
Laser, red, Class 2 (EN 60825-1) [3]	200 ... 20,000 / 8,500 / 5,000 mm	1 x PNP (100 mA) [5]	1 x PNP [7]	DT50-P2113	1047314
		1 x NPN (100 mA) [6]	1 x NPN [8]	DT50-N2113	1047398
Laser, red, Class 1 (EN 60825-1) [4]	200 ... 13,000 / 5,800 / 3,400 mm^2	1 x PNP (100 mA) [5]	1 x PNP [7]	DT50-P2123	1047399
		1 x NPN (100 mA) [6]	1 x NPN [8]	DT50-N2123	1047400

[1] Output Q short-circuit protected.

[2] Response time ≤ 15 ms.

[3] Wavelength: 658 nm; max. output: 180 mW; pulse length: 5 ns; pulse repetition rate: 1/200.

[4] Wavelength: 658 nm; max. output: 120 mW; pulse length: 2.5 ns; pulse repetition rate: 1/400.

[5] PNP: High = V_S –(< 2.5 V); Low = 0 V.

[6] NPN: High = < 2.5 V; Low = V_S.

[7] PNP: High = V_S, Low = ≤ 2.5 V.

[8] NPN: High = ≤ 2.5 V, Low = V_S.

Dimensional drawing

All dimensions in mm (inch)

① Optical axis sender
② Optical axis receiver
③ Mounting holes
④ Reference surface = 0 mm
⑤ Status indicator switching output (orange)
⑥ Status indicator power on (green)
⑦ Operating keys and display

Connection type and diagram

Connector
M12, 5-pin

Wire	Pin	Signal
brn	1	L+
blk	4	Q
blu	3	M
wht	2	Q_A
gra	5	MF

Precise detection from a distance of up to 10 m

Laser class 1   Laser class 2

CE ◇III CDRH

Additional information
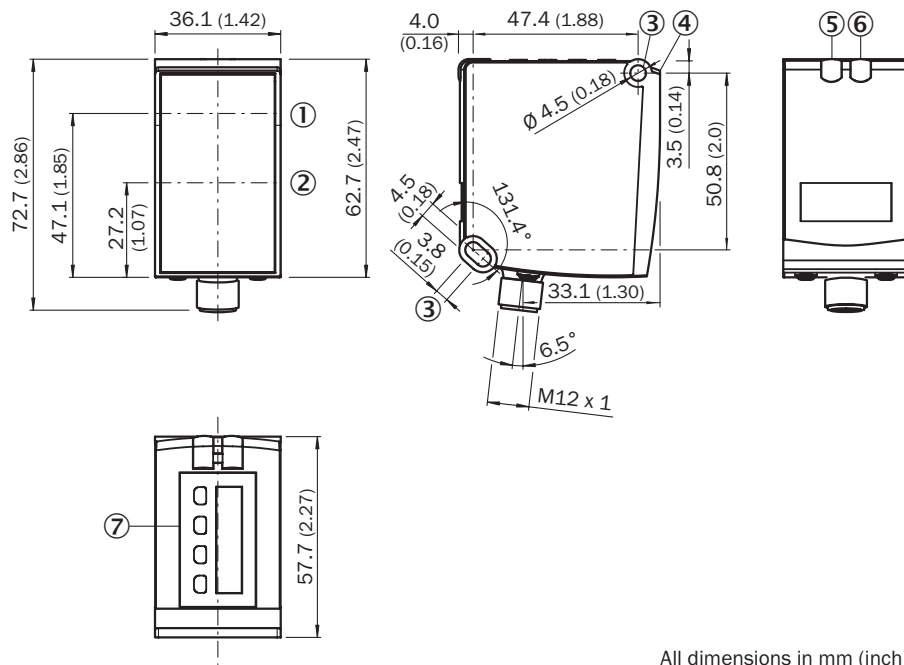
Product description

The DS50 is a time-of-flight sensor that offers two switching outputs. With a range of up to 10 m, it allows reliable detection at a safe distance. Based on three different switching modes (Distance to Object, Window or Object Between Sensor and Background), any material can easily be detected with the DS50.

At a glance

- HDDM technology provides the best reliability, immunity to ambient light and price/performance ratio
- Reliable detection up to 10 m
- High switching repeatability (± 2.5 mm)
- Two discrete outputs with up to 50 Hz switching frequency
- Three switching modes: "Distance to Object", "Window" or "Object Between Sensor and Background" – detect any object
- Immune to cross talk for use with multiple sensors
- Superior background suppression

Your benefits

- Precise detection at a safe distance reduces scrap and increases through-put
- Immune to any type of ambient light – allows for use in optically challenging environments
- Widest temperature range allows for outdoor use without additional cooling or heating
- Intuitive setup via display or remote teach reduces installation time and costs
- Red light and an optional alignment bracket reduces installation time
- Metal housing withstands harsh environments, saving replacement costs
- Dx50 family is based on a common platform, which offers multiple performance levels, making it easy to accommodate future changes
- Low investment costs and high performance guarantee short return on investment

Detailed technical data

Features

Measuring range 90 % remission	200 ... 10,000 mm
Measuring range 18 % remission	200 ... 6,000 mm
Measuring range 6 % remission	200 ... 4,000 mm
Resolution [1]	1 mm
Repeatability 6 ... 90 % remission [2]	5 / 2.5 mm [3]
Accuracy 90 % remission [1]	± 10 mm
Typ. light spot size (distance)	15 mm x 15 mm (10 m)
Additional features	• Set moving averaging: Fast/Slow • Switching mode: Distance to object (DtO), switching window (Wnd), Object between sensor and background (ObSB) • Teach-in of switching output • Set switching output • Set hysteresis • Invertible switching output • Multi functional input: laser off, external teach, not active • Unique measurement value • No cross talk • Switch off display • Reset to factory default • Lock user interface

[1] Related to distance value on the display.
[2] Equivalent to 1 σ.
[3] Dependent on the set averaging: Fast/Slow.

Interfaces

Outputs	See type-specific data
Switching hysterisis	1 ... 9,999 mm
Inputs	See type-specific data

Mechanics/electronics

Supply voltage V$_s$ [4]	DC 10 ... 30 V
Ripple [5]	≤ 5 V$_{SS}$
Power consumption [6]	≤ 1.85 W
Initialization time	≤ 350 ms
Warm up time	≤ 15 min
Typ. weight without cable	200 g
Housing material	Zinc-die cast (ZNAL4CU1)/Acrylic glass (PMMA)
Connection type	Connector M12, 5-pin
Indication	LC display 2 x LED

[4] Limit values, reverse-polarity protected, operation in short circuit protected network, max. 8 A.
[5] May not exceed or fall short of V$_s$ tolerances.
[6] Without load.

Ambient data

Enclosure rating	IP 65
Protection class	III
Ambient temperature	Operation: –30 ... +65 °C
	Storage: –40 ... +75 °C
Max. rel. humidity (not condensing)	≤ 95 %
Typ. ambient light safety	40 klx
Vibration resistance	EN 60068-2-6 / -2-64
Shock resistance	EN 60068-2-27 / -2-29
Average service life laser (MTTF at 25 °C)	100,000 h

Ordering information

Measuring range (90/18/6 %)	Switching outputs (max. output current) [1]	Multi functional inputs [2]	Light source	Switching frequency	Response time	Model name	Part No.
200 ... 10,000 / 6,000 / 4,000 mm	2 x PNP (100 mA) [4]	1 x PNP [6]	Laser, red, Class 1 (EN 60825-1) [8]	25 / 5 Hz [3]	20 / 100 ms [3]	DS50-P1122	1047405
			Laser, red, Class 2 (EN 60825-1) [9]	50 / 10 Hz [3]	10 / 50 ms [3]	DS50-P1112	1047402
	2 x NPN (100 mA) [5]	1 x NPN [7]	Laser, red, Class 1 (EN 60825-1) [8]	25 / 5 Hz [3]	20 / 100 ms [3]	DS50-N1122	1047406
			Laser, red, Class 2 (EN 60825-1) [9]	50 / 10 Hz [3]	10 / 50 ms [3]	DS50-N1112	1047404

[1] Output Q short-circuit protected.

[2] Response time ≤ 60 ms.

[3] Dependent on the set averaging: Fast / Slow.

[4] PNP: High = V_s –(< 2.5 V); Low = 0 V.

[5] NPN: High = < 2.5 V; Low = V_s.

[6] PNP: High = V_s, Low = ≤ 2.5 V.

[7] NPN: High = ≤ 2.5 V, Low = V_s.

[8] Wavelength: 658 nm; max. output: 120 mW; pulse duration: 5 ns; pulse repetition rate: 1/400.

[9] Wavelength: 658 nm; max. output: 180 mW; pulse duration: 5 ns; pulse repetition rate: 1/200.

Dimensional drawing

All dimensions in mm (inch)

① Optical axis sender
② Optical axis receiver
③ Mounting holes
④ Reference surface = 0 mm
⑤ Status indicator switching output Q_1 (orange)
⑥ Status indicator switching output Q_2 (orange)
⑦ Operating keys and display

Connection type and diagram

**Connector
M12, 5-pin**

brn	1	L+
blk	4	Q_1
blu	3	M
wht	2	Q_2
gra	5	MF

Looking ahead – up to 50 m on reflector

Laser class 1

CE ⬦III⬦ **CDRH**

Product description

The DL50 is the ideal solution for positioning tasks. Using a switching and an analog output, distance control can be easily implemented. Apart from a measurement range of 50 m, the sensor also offers a high level of precision.

At a glance

- HDDM technology provides the best reliability, immunity to ambient light and price/performance ratio
- Up to 50 m range on diamond grade reflector
- Very good repeatability for positioning tasks – up to ± 2 mm
- Fast measurement and output rate with 250 Hz
- Analog output with 4 ... 20 mA and 1 switching output
- Red laser light for precise alignment
- Wide operating temperature range from –30 °C to +65 °C

Your benefits

- A wide measurement range, analog and switching output create an easy, fast and flexible solution for any positioning task
- Red light and an optional alignment bracket reduces installation time
- Intuitive setup via display or remote teach reduces installation time and costs
- Widest temperature range allows for outdoor use without additional cooling or heating accessories
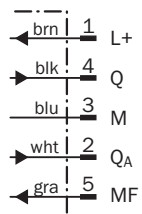- Immune to any type of ambient light – allows for use in optically challenging environments
- Metal housing withstands harsh environments, saving replacement costs
- Low investment costs and high performance guarantee quick return on investment
- Dx50 family is based on a common platform, which offers multiple performance levels, making it easy to accommodate future changes

Detailed technical data

Features

Measuring range (reflector type)	200 ... 50,000 mm (Diamond Grade)
Resolution	1 mm
Repeatability (on reflector type) [1]	3 / 2 mm [2]
Accuracy (on reflector type)	± 7 mm
Response time	15 / 30 ms [2]
Output rate	4 ms
Typ. light spot size (distance)	15 mm x 15 mm (10 m)
Additional features	• Set moving averaging: Fast/Slow • Switching mode: Distance to object (DtO) • Teach-in of switching output • Set switching output • Set hysteresis • Invertible switching output • Teach-in of analog output • Set analog output • Invertible analog output • Multi functional input: laser off, external teach, not active • Switch off display • Reset to factory default • Lock user interface

[1] Equivalent to 1 σ.

[2] Dependent on the set averaging: Fast/Slow.

Interfaces

Outputs	See type-specific data
Analog outputs (max. load)	1 x 4 ... 20 mA (≤ 300 Ω)
Resolution analog outputs	16 bit
Switching hysterisis	10 ... 1,000 mm
Inputs	See type-specific data

Mechanics/electronics

Supply voltage V_s [3]	DC 10 ... 30 V
Ripple [4]	≤ 5 V_{ss}
Power consumption [5]	≤ 2.1 W
Initialization time	≤ 250 ms
Warm up time	≤ 15 min
Typ. weight without cable	200 g
Housing material	Zinc-die cast (ZNAL4CU1)/Acrylic glass (PMMA)
Connection type	Connector M12, 5-pin
Indication	LC display 2 x LED

[3] Limit values, reverse-polarity protected, operation in short circuit protected network, max. 8 A.

[4] May not exceed or fall short of V_s tolerances.

[5] Without load.

Ambient data

Enclosure rating	IP 65
Protection class	III
Ambient temperature	Operation: –30 ... +65 °C
	Storage: –40 ... +75 °C
Max. rel. humidity (not condensing)	≤ 95 %
Typ. ambient light safety	40 klx
Vibration resistance	EN 60068-2-6/-2-64
Shock resistance	EN 60068-2-27/-2-29
Average service life laser (MTTF at 25 °C)	100,000 h

Ordering information

Light source	Measuring range (on Diamond Grade)	Switching outputs (max. output current) [1]	Multi functional inputs [2]	Analog outputs (max./min. load)	Model name	Part No.
Laser, red, Class 1 (EN 60825-1) [3]	200 ... 50,000 mm	1 x PNP (100 mA) [4]	1 x PNP [6]	1 x 4 ... 20 mA (≤ 300 Ω)	DL50-P1123	1047361
		1 x NPN (100 mA) [5]	1 x NPN [7]	1 x 4 ... 20 mA (≤ 300 Ω)	DL50-N1123	1047401

[1] Output Q short-circuit protected.

[2] Response time ≤ 15 ms.

[3] Wavelength: 658 nm; max. output: 120 mW; pulse length: 2.5 ns; pulse repetition rate: 1/400.

[4] PNP: High = V_s –(< 2.5 V); Low = 0 V.

[5] NPN: High = < 2.5 V; Low = V_s.

[6] PNP: High = V_s, Low = ≤ 2.5 V.

[7] NPN: High = ≤ 2.5 V, Low = V_s.

Dimensional drawing

All dimensions in mm (inch)

① Optical axis sender
② Optical axis receiver
③ Mounting holes
④ Reference surface = 0 mm
⑤ Status indicator switching output (orange)
⑥ Status indicator power on (green)
⑦ Operating keys and display

Connection type and diagram

Connector
M12, 5-pin

brn	1	L+
blk	4	Q
blu	3	M
wht	2	Q_A
gra	5	MF

Large positioning performance. Small housing.

Photo: VisiStore, Stuttgart

Laser class 1 **RS422**

CE ⟨III⟩ **CDRH**
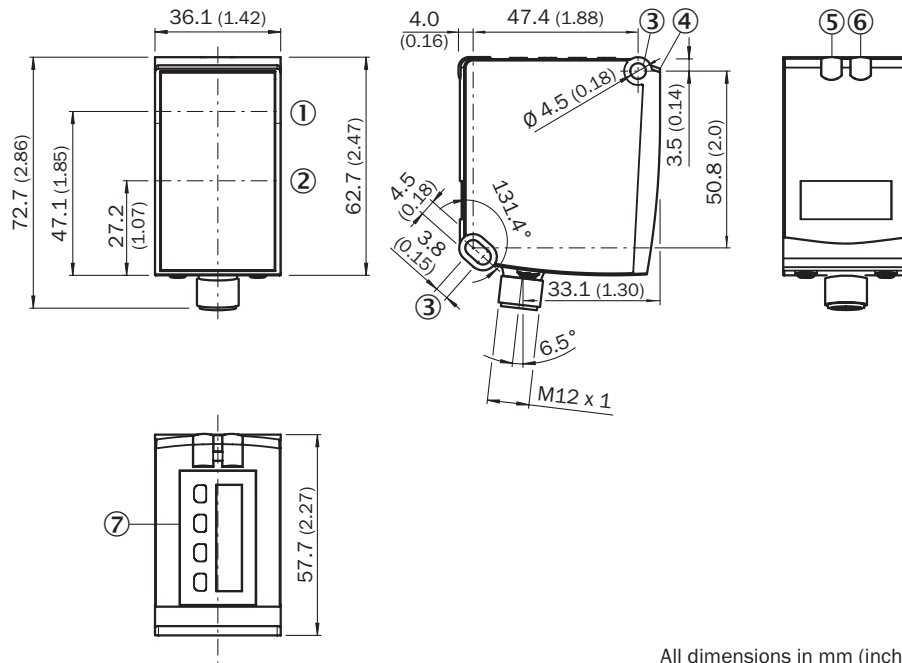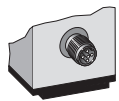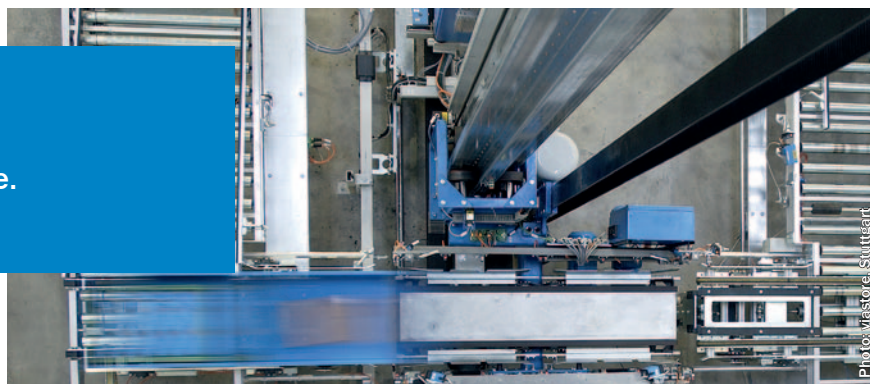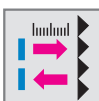
Product description

The DL50 Hi is the world's smallest sensor for high-precision positioning. Due to its reflector-based measurement, incredibly high repeatability is achieved. In order to avoid any loss of precision, the data is provided via serial interface.

At a glance

- HDDM technology provides the best reliability, immunity to ambient light and price/performance ratio
- Up to 50 m range on diamond grade reflector
- Worlds smallest sensor for high precision positioning
- Highest repeatability in its class, with ≤ ± 0.5 mm
- Fast RS-422 output rate – measurement value every 2.5 ms
- Immune to cross talk for use with multiple sensors
- Superior background suppression

Your benefits

- Precise positioning enables greater speed and accuracy, which increases throughput
- Highest performance at reasonable investment costs guarantee a short return on investment
- Immune to any type of ambient light - allows for use in optically challenging environments
- Widest temperature range allows for outdoor use without additional cooling or heating accessories
- Intuitive setup via display or remote teach reduces installation time and costs
- Red light and an optional alignment bracket reduces installation time
- Metal housing withstands harsh environments , saving replacement costs
- Worlds smallest sensor for high precision positioning for use in applications with limited space

Additional information

Detailed technical data

Features

Measuring range (reflector type)	200 ... 50,000 mm (Diamond Grade)
Resolution	0.1 mm
Typ. repeatability [1]	0.5 / 0.3 / 0.25 mm [2]
Accuracy	± 3 mm [3]
Response time	10 / 40 / 160 ms [2]
Output rate	2.5 ms [4]
Typ. light spot size (distance)	15 mm x 15 mm (10 m)
Additional features	• Set moving averaging: Fast/Medium/Slow • Switching mode: Distance to object (DtO) • Teach-in of switching points • Set switching outputs • Set hysteresis • Invertible switching output • Multi functional input: laser off, external teach, switching output 2, not active • Serial data output: continuous, on request • Set baud rate: 19,200, 38,400, 57,600, 115,200 bps • Set parity check: none; even; odd • Unique measurement value • No cross talk • Switch off display • Reset to factory default • Lock user interface

[1] Equivalent to 1 σ.

[2] Dependent on the set averaging: Fast/Medium/Slow.

[3] May reach up to ± 5 mm at limiting measuring range.

[4] For baud rate 115,200 bps.

Interfaces

Outputs	See type-specific data
Switching hysterisis	1 ... 1,000 mm
Inputs	See type-specific data
Data interface	RS-422

Mechanics/electronics

Supply voltage V_s [5]	DC 10 ... 30 V
Ripple [6]	≤ 5 V_{SS}
Power consumption [7]	≤ 2.1 W
Initialization time	≤ 250 ms
Warm up time	≤ 15 min
Typ. weight without cable	200 g
Housing material	Zinc-die cast (ZNAL4CU1)/Acrylic glass (PMMA)
Connection type	Connector M12, 8-pin
Indication	LC display 2 x LED

[5] Limit values, reverse-polarity protected, operation in short circuit protected network, max. 8 A.

[6] May not exceed or fall short of V_s tolerances.

[7] Without load.

Ambient data

Enclosure rating	IP 65
Protection class	III
Ambient temperature	Operation: −30 ... +65 °C
	Storage: −40 ... +75 °C
Max. rel. humidity (not condensing)	≤ 95 %
Typ. ambient light safety	40 klx
Vibration resistance	EN 60068-2-6/-2-64
Shock resistance	EN 60068-2-27/-2-29
Average service life laser (MTTF at 25 °C)	100,000 h

Ordering information

Light source	Measuring range (on Diamond Grade)	Switching outputs (max. output current) [3]	Multi functional inputs [4]	Data interface	Model name	Part No.
Laser, red, Class 1 (EN 60825-1) [5]	200 ... 50,000 mm	2 x/1 x PNP (100 mA) [6] [7]	−/1 x PNP [6] [9]	RS-422	DL50-P2225	1048418
		2 x /1 x NPN (100 mA) [6] [8]	−/1 x NPN [6] [10]	RS-422	DL50-N2225	1048419

[3] Output Q short-circuit protected.

[4] Response time ≤ 60 ms.

[5] Wavelength: 658 nm; max. output: 80 mW; pulse length: 2.5 ns; pulse repetition rate: 1/240.

[6] Dependent on the set function MF: switching output 2 / laser off, external teach.

[7] PNP: High = V_S −(< 2.5 V); Low = 0 V.

[8] NPN: High = < 2.5 V; Low = V_S.

[9] PNP: High = V_S, Low = ≤ 2.5 V.

[10] NPN: High = ≤ 2.5 V, Low = V_S.
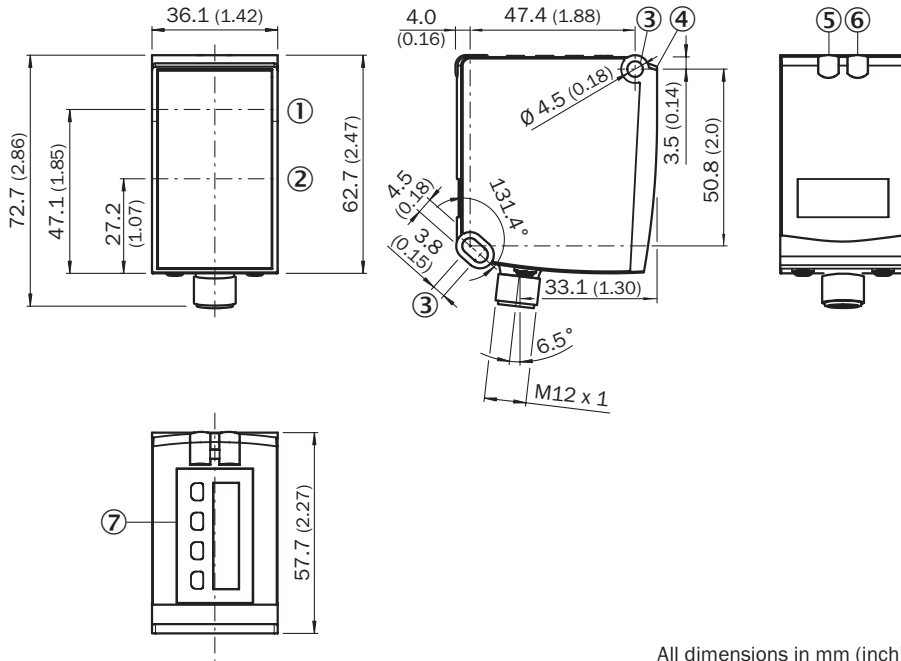
Dimensional drawing

All dimensions in mm (inch)

① Optical axis sender
② Optical axis receiver
③ Mounting holes
④ Reference surface = 0 mm
⑤ Status indicator switching output Q_1 (orange)
⑥ Status indicator switching output Q_2 (orange)
⑦ Operating keys and display

Connection type and diagram

Connector
M12, 8-pin

brn	2	L+
blu	7	M
wht	1	Q_1
gra	5	TX–
pnk	6	TX+
grn	3	RX–
yel	4	RX+
red	8	Q_2/MF
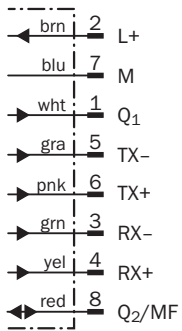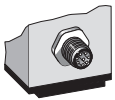
Cables and connectors

Connectors M12, 5-pin

Connector type	Enclosure rating	Cable alignment	Sheath material	Cable length	Model name	Part No.
Female connector	IP 68	Straight	PVC	2 m	DOL-1205-G02M	6008899
				5 m	DOL-1205-G05M	6009868
				10 m	DOL-1205-G10M	6010544
				15 m	DOL-1205-G15M	6029215
			PUR halogen-free	2 m	DOL-1205-G02MC	6025906
				5 m	DOL-1205-G05MC	6025907
				10 m	DOL-1205-G10MC	6025908
		Angled	PVC	2 m	DOL-1205-W02M	6008900
				5 m	DOL-1205-W05M	6009869
				10 m	DOL-1205-W10M	6010542
			PUR halogen-free	2 m	DOL-1205-W02MC	6025909
				5 m	DOL-1205-W05MC	6025910
				10 m	DOL-1205-W10MC	6025911
	IP 67 IP 68 IP 69K	Straight	Shielded, PUR	5 m	DOL-1205-G05MAC	6036384
				10 m	DOL-1205-G10MAC	6036385
				20 m	DOL-1205-G20MAC	6036386
	IP 67	Straight	–	–	DOS-1205-G	6009719
		Angled	–	–	DOS-1205-W	6009720
Male connector	IP 67	Straight	–	–	STE-1205-G	6022083
		Angled	–	–	STE-1205-W	6022082

DOL-1205-G02M **DOL-1205-G10M**
DOL-1205-G05M **DOL-1205-G15M**

DOL-1205-G02MC **DOL-1205-G05MAC**
DOL-1205-G05MC **DOL-1205-G10MAC**
DOL-1205-G10MC **DOL-1205-G20MAC**
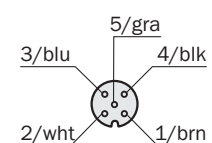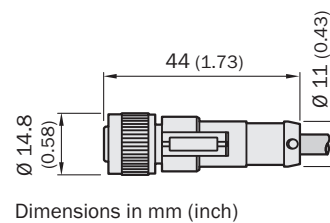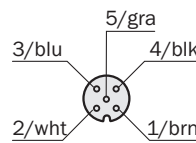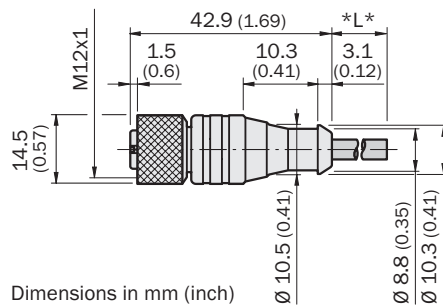
Dimensions in mm (inch)

Dimensions in mm (inch)

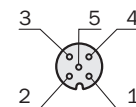**DOL-1205-W02M**
DOL-1205-W05M   **DOL-1205-W10M**

26.5 (1.04)
12 (0.47)
M12x1
1.5 (0.06)
14.5 (0.57)
12 (0.47)
31 (1.22)
L
max. Ø 6 (0.24)
Ø 8.8 (0.35)
Ø 10.5 (0.41)

5/gra
3/blu   4/blk
2/wht   1/brn
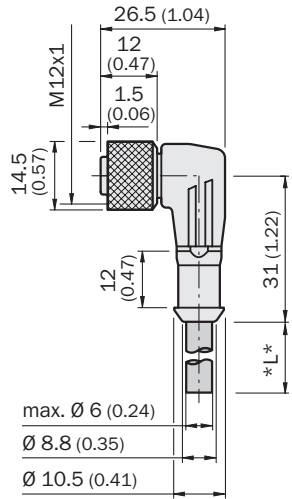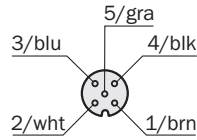
Dimensions in mm (inch)

DOL-1205-W02MC
DOL-1205-W05MC   **DOL-1205-W10MC**
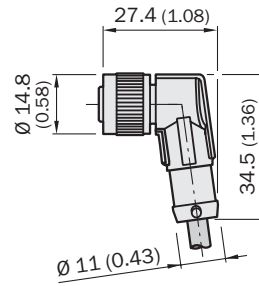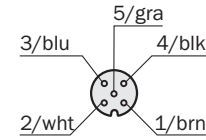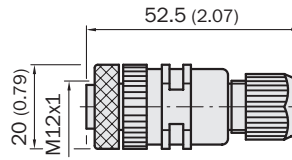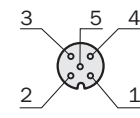
27.4 (1.08)
Ø 14.8 (0.58)
34.5 (1.36)
Ø 11 (0.43)

5/gra
3/blu   4/blk
2/wht   1/brn

Dimensions in mm (inch)

DOS-1205-G

52.5 (2.07)
20 (0.79)
M12x1

3   5   4
2   1

cable diameter
3 to 6.5 mm
(0.12 to 0.26)

Dimensions in mm (inch)

DOS-1205-W

35 (1.38)
20 (0.79)
M12x1
27.5 (1.08)
37.5 (1.48)

3   5   4
2   1

cable diameter
3 to 6.5 mm
(0.12 to 0.26)

Dimensions in mm (inch)

STE-1205-G

M12x1 (0.47x0.04)
20 (0.79)
58 (2.28)

4   5   3
1   2

cable diameter
3 to 6.5 mm

Dimensions in mm (inch)

STE-1205-W

M12x1 (0.47x0.04)
20 (0.79)
40 (1.57)

4   5   3
1   2
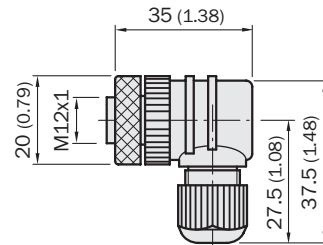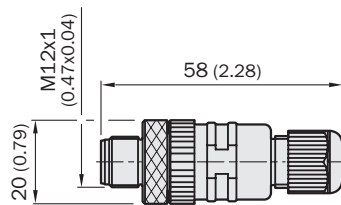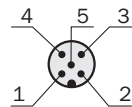
cable diameter
3 to 6.5 mm
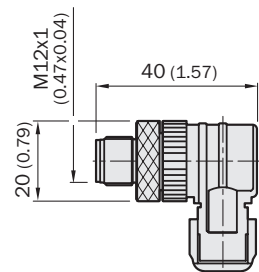
Dimensions in mm (inch)
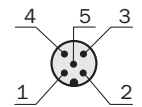
Connectors M12, 8-pin

Connector type	Enclosure rating	Cable alignment	Sheath material	Cable length	Model name	Part No.
Female connector	IP 67	Straight	Shielded, PVC	2 m	DOL-1208-G02MA	6020633
				5 m	DOL-1208-G05MA	6020993
				10 m	DOL-1208-G10MA	6022152
				15 m	DOL-1208-G15MA	6022153
				30 m	DOL-1208-G30MA	6022242
		Angled	Shielded, PVC	2 m	DOL-1208-W02MA	6020992
				5 m	DOL-1208-W05MA	6021033
		Straight	CuZn, shielded	–	DOS-1208-GA	6028369
Male connector	IP 67	Straight	CuZn, shielded	–	STE-1208-GA	6028370

DOL-1208-G02MA
DOL-1208-G05MA
DOL-1208-G10MA
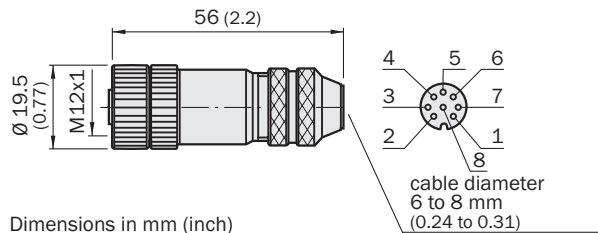**DOL-1208-G15MA**
DOL-1208-G30MA
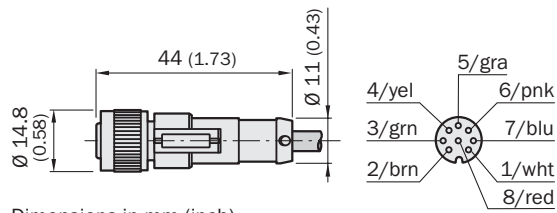
Dimensions in mm (inch)
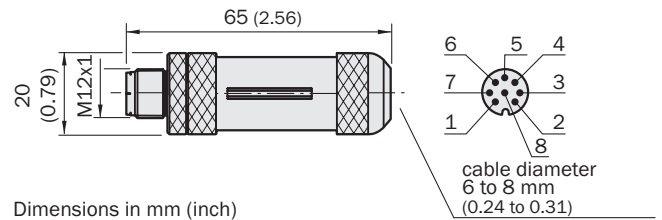
DOL-1208-W02MA
DOL-1208-W05MA
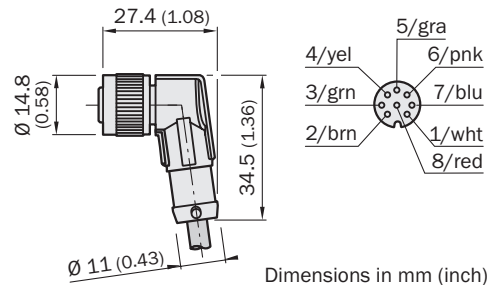
Dimensions in mm (inch)

DOS-1208-GA

Dimensions in mm (inch)

STE-1208-GA

Dimensions in mm (inch)

Mounting systems

| Mounting type	Description	Model name	Part No.
Mounting bracket	Dx50 mounting bracket	BEF-WN-DX50	2048370
	Mounting bracket for weather-protection hood	BEF-WN-OBW	2023251
Clamping and alignment bracket	Dx50 alignment bracket, zinc plated steel	BEF-AH-DX50	2048397
Universal bar clamp system	Plate N for universal bar clamp, stainless steel	BEF-KHS-N03N	2051619
	Plate N for universal bar clamp	BEF-KHS-N03	2051609
	Universal bar clamp	BEF-KHS-KH1	2022726
	Mounting rod straight	BEF-MS12G-A	4056054
		BEF-MS12G-B	4056055
	Mounting rod L-shaped	BEF-MS12L-A	4056052
		BEF-MS12L-B	4056053
	Mounting rod Z-shaped	BEF-MS12Z-A	4056056
		BEF-MS12Z-B	4056057
	Rod mounting clamp	BEF-RMC-D12	5321878

BEF-WN-DX50
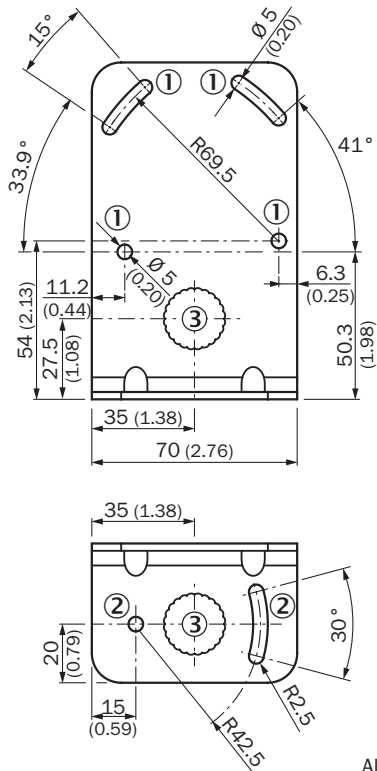
BEF-WN-OBW

All dimensions in mm (inch)
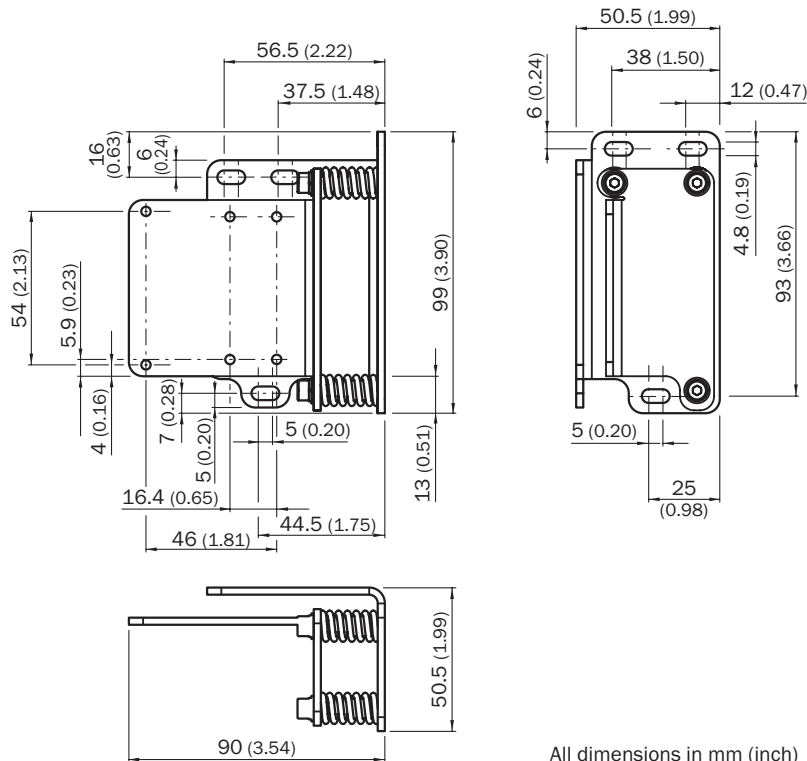
① Mounting hole sensor
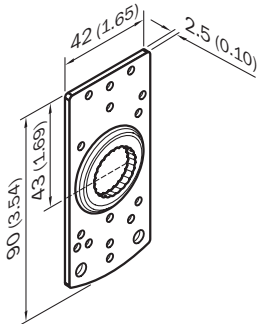② Mounting hole bracket
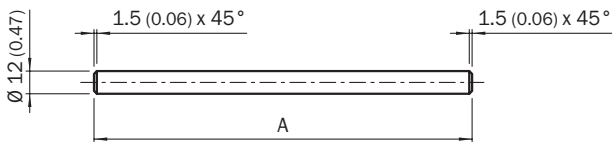③ Universal bar clamp mounting
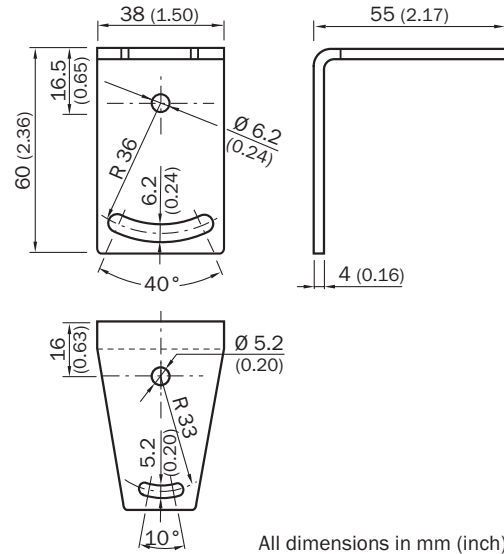
All dimensions in mm (inch)

BEF-AH-DX50

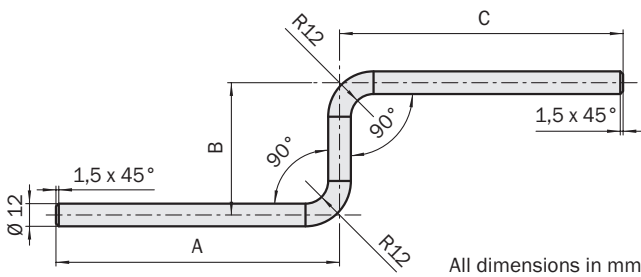All dimensions in mm (inch)

BEF-KHS-N03N
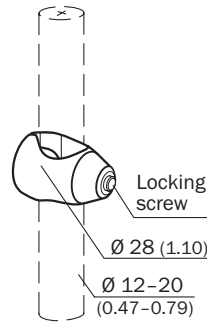## BEF-KHS-N03

All dimensions in mm (inch)

BEF-KHS-KH1

Locking screw

Ø 28 (1.10)

Ø 12–20 (0.47–0.79)

All dimensions in mm (inch)

BEF-MS12G-A
BEF-MS12G-B

Ø 12 (0.47)

1.5 (0.06) x 45°

1.5 (0.06) x 45°

A

All dimensions in mm (inch)

BEF-MS12L-A
BEF-MS12L-B

1.5 (0.06) x 45°

Ø 12 (0.47)

1.5 (0.06) x 45°

90°

B

A

R12 (0.47)

All dimensions in mm (inch)

BEF-MS12Z-A
BEF-MS12Z-B

R12

C

90°

1,5 x 45°

B

90°

Ø 12

1,5 x 45°

A

R12

All dimensions in mm

BEF-RMC-D12

Ø 12

12,2

7

26,4

20

37

30
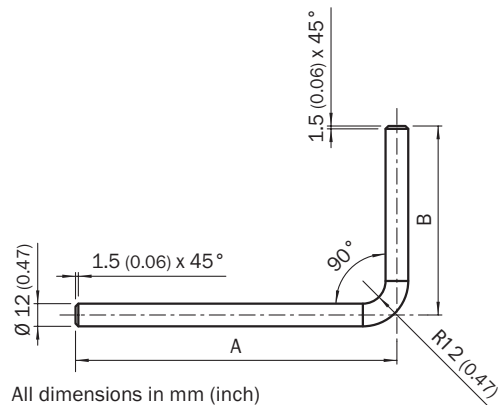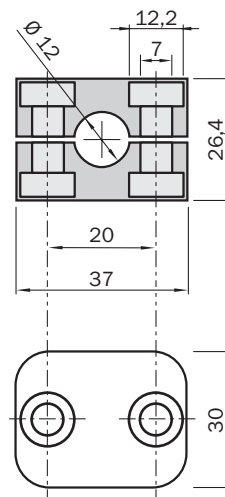
All dimensions in mm

Weather protection

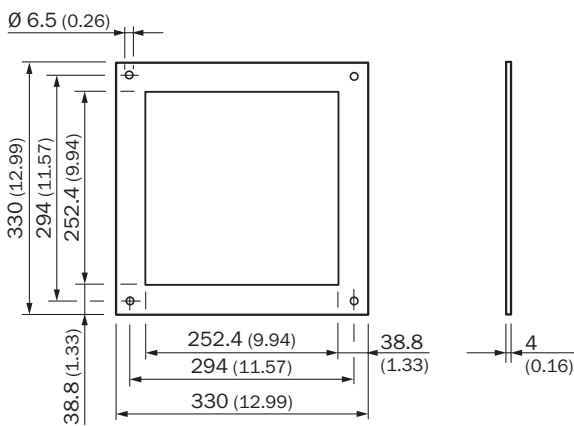| Description	Model name	Part No.
Weather protection hood	OBW-KHS-M02	2050205

OBW-KHS-M02
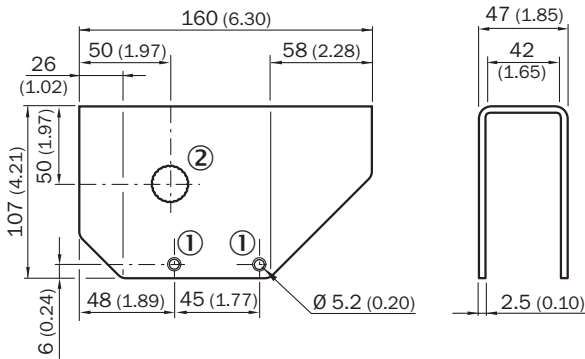
All dimensions in mm (inch)

① Mouting hole sensor (included in scope of supply)
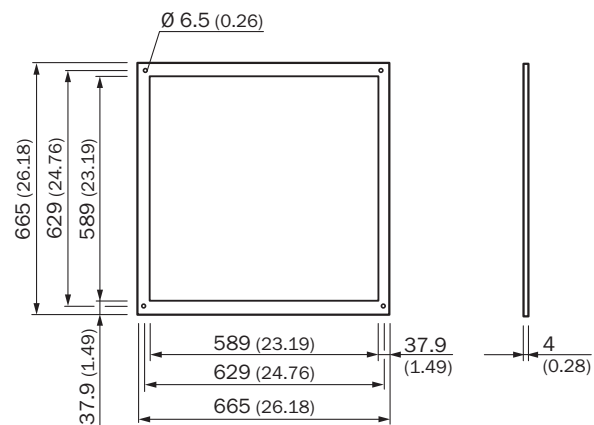② Universal bar clamp mounting

Reflectors

Dimensions (L x W)	Model name	Part No.
Pre-mounted 330 mm x 330 mm	PL240DG	1017910
Pre-mounted 665 mm x 665 mm	PL560DG	1016806
Pre-mounted with heating 330 mm x 330 mm	PL240DG-H	1022926
Pre-mounted with heating 665 mm x 665 mm	PL560DG-H	1023888
Diamond Grade reflector foil, adjusted to customer requirements	REF-DG-K	4019634
Diamond Grade reflector foil, 749 mm x 914 mm	REF-DG	5320565

PL240DG

All dimensions in mm (inch)

PL560DG

All dimensions in mm (inch)

PL240DG-H

All dimensions in mm (inch)

PL560DG-H

All dimensions in mm (inch)

REF-DG-K
REF-DG

REF-DG-K:
Size adjusted to customer requirements, max. cut 74.9 cm x 91.4 cm.

Protective devices

Description	Model name	Part No.
Front protection cover	LPC-DX50	2049269
Display protection cover with window	–	2058007

LPC-DX50

All dimensions in mm (inch)

① Snap-fit
② Protective glass (PMMA)

Display protection cover

All dimensions in mm (inch)

① Catch display protection cover
② Snap-fit
③ Viewing window

Cooling accessories

Description	Model name	Part No.
Cooling plate	BEF-KP-DX50/DT20	2055755
Front heat protection cover	–	2057137

BEF-KP-DX50/DT20

Front heat protection cover

All dimensions in mm (inch)

① Mounting hole front heat protection cover
② Protective glass

All dimensions in mm (inch)

① Mounting hole sensor
② Hose nozzle R1/4"

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