



## MWS120-1CA11Q00050

MWS120

MEASURING WHEEL ENCODERS

**SICK**  
Sensor Intelligence.



Illustration may differ

## Ordering information

Type	part no.
MWS120-1CA11Q00050	1122671

**Included in delivery:** DBS60E-S4AQ00050 (1), BEF-MWS120-ARM (1), BEF-MR10200APN (1)Other models and accessories → [www.sick.com/MWS120](http://www.sick.com/MWS120)

## Detailed technical data

## Safety-related parameters

<b>MTTF<sub>D</sub> (mean time to dangerous failure)</b>	500 years (EN ISO 13849-1) <sup>1)</sup> <sup>2)</sup>
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<sup>1)</sup> This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of components, average ambient temperature 40 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

<sup>2)</sup> Value refers to the mounted encoder.

## Performance

<b>Pulses per revolution</b>	50
<b>Measuring increment (resolution in mm/pulse)</b>	0.25 <sup>1)</sup> 2)
<b>Repeatability</b>	< 0.1 mm <sup>3)</sup>

<sup>1)</sup> Calculation example: Circumference of wheel / pulses per revolution = 200 mm / 16384 pulses per revolution = 0,012mm/pulse.

<sup>2)</sup> Value based on measuring wheel circumference. The measuring wheel circumference depends on manufacturing tolerances, wear and tear, the selected spring tensioning force, and the behavior of the measurement wheel surface at different temperatures and on different measurement surfaces. To obtain the most accurate measurement results, we recommend performing a reference run for positioning tasks so that application-specific measuring wheel characteristics can be taken into account.

<sup>3)</sup> Value is based on the mechanics. Backlash of the measuring wheel mechanics, is at a minimum. This enables a precise and repeatable measurement results.

## Interfaces

<b>Communication interface</b>	Incremental
<b>Communication Interface detail</b>	TTL / RS-422
<b>Number of signal channels</b>	6-channel

## Electrical data

<b>Connection type</b>	Cable, 8-wire, with male connector, M23, 12-pin, universal, 0.5 m
<b>Supply voltage</b>	4.5 V ... 5.5 V
<b>Reverse polarity protection</b>	✓
<b>Short-circuit protection of the outputs</b>	✓ <sup>1)</sup>

<sup>1)</sup> Short-circuit opposite to another channel or GND permissible for max. 60 s. No protection signal against Us.

## Mechanical data

<b>Measuring wheel circumference</b>	200 mm <sup>1)</sup>
<b>Measuring wheel surface</b>	Studded polyurethane surface
<b>Mounting</b>	Measuring wheel mounted at the rear
<b>Spring arm mechanism material</b>	
Spring element	Stainless steel
Measuring wheel, spring arm	Aluminum
<b>Start up torque</b>	+ 1.2 Ncm (at 20 °C)
<b>Operating torque</b>	1.1 Ncm (at 20 °C)
<b>Bearing lifetime</b>	3.6 x 10 <sup>9</sup> revolutions
<b>Minimum spring tension force</b>	4 N <sup>2) 3)</sup>
<b>Max. permissible working area for the spring (continuous operation)</b>	± 10 mm
<b>Service life of spring element</b>	> 1.5 million cycles
<b>Mounting position relative to the measuring object</b>	Preferably from above, from below possible <sup>4)</sup>
<b>Mounted encoder</b>	DBS60 Core, DBS60E-S4AQ00050, 1122670
<b>Mounted mechanic</b>	BEF-MWS120-ARM, 2118239
<b>Attached measuring wheel</b>	BEF-MR10200APN, 4084739

<sup>1)</sup> The surface of a measuring wheel is subject to wear. This depends on contact pressure, acceleration behavior in the application, traversing speed, measurement surface, mechanical alignment of the measuring wheel, temperature, and ambient conditions. We recommend you regularly check the condition of the measuring wheel and replace as required.

<sup>2)</sup> The right spring tension force for the application shall keep the slippage at a minimum in the application working conditions and measuring surface, without damaging the measuring surface.

<sup>3)</sup> The clamping force can be set in 6 fixed increments of 4 N. 4 N corresponds to one increment.

<sup>4)</sup> When mounted from below, the encoder weight during spring pretensioning must be taken into account.

## Ambient data

<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-3
<b>Operating temperature range</b>	-20 °C ... +80 °C <sup>1)</sup>
<b>Storage temperature range</b>	-40 °C ... +100 °C <sup>1)</sup>

<sup>1)</sup> This value reflects the smallest temperature value of the installed products. For more information, please look at the individual data sheets.

## Certificates

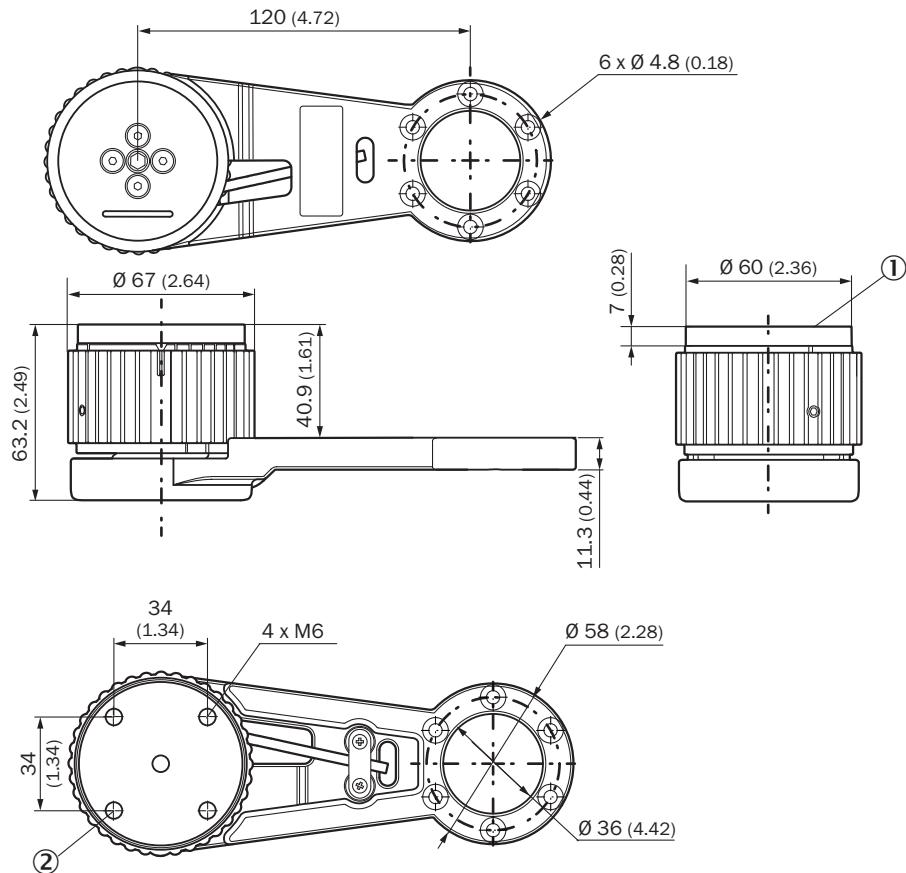
<b>EU declaration of conformity</b>	✓
<b>UK declaration of conformity</b>	✓
<b>ACMA declaration of conformity</b>	✓
<b>Moroccan declaration of conformity</b>	✓
<b>China-RoHS</b>	✓

## Classifications

<b>ECLASS 5.0</b>	27270501
<b>ECLASS 5.1.4</b>	27270501
<b>ECLASS 6.0</b>	27270590
<b>ECLASS 6.2</b>	27270590

<b>ECLASS 7.0</b>	27270501
<b>ECLASS 8.0</b>	27270501
<b>ECLASS 8.1</b>	27270501
<b>ECLASS 9.0</b>	27270501
<b>ECLASS 10.0</b>	27270790
<b>ECLASS 11.0</b>	27270707
<b>ECLASS 12.0</b>	27270504
<b>ETIM 5.0</b>	EC001486
<b>ETIM 6.0</b>	EC001486
<b>ETIM 7.0</b>	EC001486
<b>ETIM 8.0</b>	EC001486
<b>UNSPSC 16.0901</b>	41112113

## Dimensional drawing

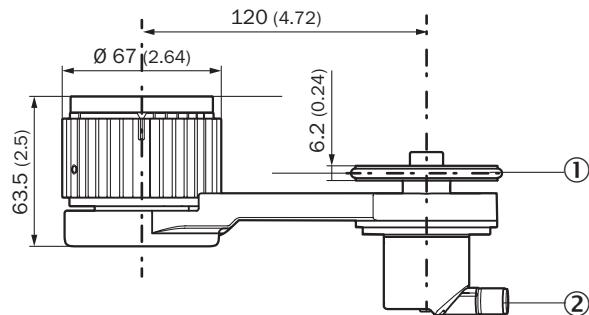


Dimensions in mm (inch)

① Adapter plate

② Holes of the adapter plate, maximum thread depth 6 mm

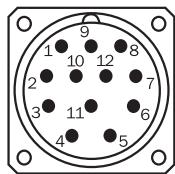
### Dimensional drawing



Dimensions in mm (inch)

- ① The measuring wheel circumference and surface depend on the installed measuring wheel.
- ② Please refer to the dimensional drawings in the respective data sheet for the installed encoder.

### PIN assignment



view of M23 male device connector on cable / housing

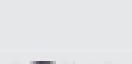
## Recommended accessories

Other models and accessories → [www.sick.com/MWS120](http://www.sick.com/MWS120)

	<b>Brief description</b>	<b>Type</b>	<b>part no.</b>
measuring wheels and measuring wheel mechanics			
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 200 mm</li> </ul>	BEF-MR010020R	2055224
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 300 mm</li> </ul>	BEF-MR010030R	2049278
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 500 mm</li> </ul>	BEF-MR010050R	2055227
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 500 mm</li> </ul>	BEF-MR10500AK	4084733
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 200 mm</li> </ul>	BEF-MR10200AK	4084737
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 200 mm</li> </ul>	BEF-MR10200AP	4084738
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 200 mm</li> </ul>	BEF-MR10200APG	4084740
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> </ul>	BEF-MR10200APN	4084739

	<b>Brief description</b>	<b>Type</b>	<b>part no.</b>
	<ul style="list-style-type: none"><li><b>Description:</b> Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 200 mm</li></ul>		
	<ul style="list-style-type: none"><li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li><li><b>Product family:</b> Measuring wheels</li><li><b>Description:</b> Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 500 mm</li></ul>	BEF-MR10500AP	4084734
	<ul style="list-style-type: none"><li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li><li><b>Product family:</b> Measuring wheels</li><li><b>Description:</b> Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 500 mm</li></ul>	BEF-MR10500APG	4084736
	<ul style="list-style-type: none"><li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li><li><b>Product family:</b> Measuring wheels</li><li><b>Description:</b> Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 500 mm</li></ul>	BEF-MR10500APN	4084735
	<ul style="list-style-type: none"><li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li><li><b>Product family:</b> Measuring wheel mechanics</li><li><b>Description:</b> Spring arm for linear measurement with contact, spring contact pressure manually adjustable without tools in 6 increments of 4 N from 0 ... 24 N, can be combined with separately available encoders and measuring wheels.</li><li><b>Items supplied:</b> MWS120 spring arm (part number: 2118239), 3 pcs. M4 x 16 cylinder head screws for adapter or encoder mounting</li><li><b>Suitable for:</b> MWS120, direct mounting Ø 60 mm face mount flange encoder with mechanical shaft design "S4" = Ø 10 mm, DBS60, DFS60, AFS60 AFM60. Ø 36 mm encoders such as AHS/</li></ul>	BEF-MWS120-ARM	2118239

	<b>Brief description</b>	<b>Type</b>	<b>part no.</b>
	AHM36 can be mounted with an adapter flange (part no.: 2072298), MWS120 mounting bracket (part number: 2113284)		
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Mounting bracket for MWS120 measuring wheel system and SPEETEC 1D laser surface motion sensors</li> <li><b>Suitable for:</b> MWS120, NCV50 (in conjunction with BEF-WN-NCV50 mounting bracket part no.: 2117456)</li> </ul>	BEF-WF-MWS-NCV	2113284
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 300 mm</li> </ul>	BEF-MR10300AK	2115703
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 300 mm</li> </ul>	BEF-MR10300AP	2118512
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 300 mm</li> </ul>	BEF-MR10300APG	2118496
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product family:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 300 mm</li> </ul>	BEF-MR10300APN	2118494

	Brief description	Type	part no.
connectors and cables			
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Flying leads</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> SSI, Incremental, HIPERFACE®</li><li>• <b>Items supplied:</b> By the meter</li><li>• <b>Cable:</b> 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> SSI, shielded, Incremental, HIPERFACE®</li></ul>	LTG-2308-MWENC	6027529
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Flying leads</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> SSI, Incremental</li><li>• <b>Items supplied:</b> By the meter</li><li>• <b>Cable:</b> 11-wire, PUR</li><li>• <b>Description:</b> SSI, shielded, Incremental</li></ul>	LTG-2411-MW	6027530
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Flying leads</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> SSI, Incremental</li><li>• <b>Items supplied:</b> By the meter</li><li>• <b>Cable:</b> 12-wire, PUR, halogen-free</li><li>• <b>Description:</b> SSI, shielded, Incremental</li></ul>	LTG-2512-MW	6027531
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Flying leads</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> SSI, TTL, HTL, Incremental</li><li>• <b>Items supplied:</b> By the meter</li><li>• <b>Cable:</b> 12-wire, UV and saltwater-resistant, PUR, halogen-free</li><li>• <b>Description:</b> SSI, shielded, TTL, HTL, Incremental</li></ul>	LTG-2612-MW	6028516
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental</li><li>• <b>Cable:</b> 2 m, 11-wire, PUR</li><li>• <b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G02MLA3	2030682
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental</li><li>• <b>Cable:</b> 7 m, 11-wire, PUR</li><li>• <b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G07MLA3	2030685
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental</li><li>• <b>Cable:</b> 10 m, 11-wire, PUR</li><li>• <b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G10MLA3	2030688
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental</li><li>• <b>Cable:</b> 15 m, 11-wire, PUR</li><li>• <b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G15MLA3	2030692
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental</li><li>• <b>Cable:</b> 20 m, 11-wire, PUR</li><li>• <b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G20MLA3	2030695
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental</li><li>• <b>Cable:</b> 25 m, 11-wire, PUR</li><li>• <b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G25MLA3	2030699
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental</li><li>• <b>Cable:</b> 30 m, 11-wire, PUR</li><li>• <b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G30MLA3	2030702
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li>• <b>Connection type head B:</b> Flying leads</li><li>• <b>Signal type:</b> Incremental</li><li>• <b>Cable:</b> 1.5 m, 12-wire, PUR, halogen-free</li></ul>	DOL-2312-G1M5MLA3	2029212

	<b>Brief description</b>	<b>Type</b>	<b>part no.</b>
	<ul style="list-style-type: none"> <li><b>Description:</b> Incremental, shielded</li> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental</li> <li><b>Cable:</b> 3 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shielded</li> </ul>	DOL-2312-G03MMA3	2029213
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental</li> <li><b>Cable:</b> 5 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shielded</li> </ul>	DOL-2312-G05MMA3	2029214
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight, A-coded</li> <li><b>Signal type:</b> HIPERFACE®, SSI, Incremental</li> <li><b>Description:</b> HIPERFACE®, shieldedSSIIncremental</li> <li><b>Connection systems:</b> Solder connection</li> </ul>	DOS-2312-G	6027538
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental</li> <li><b>Cable:</b> 10 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shielded</li> </ul>	DOL-2312-G10MMA3	2029215
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental</li> <li><b>Cable:</b> 20 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shielded</li> </ul>	DOL-2312-G20MMA3	2029216
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental</li> <li><b>Cable:</b> 30 m, 12-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shielded</li> </ul>	DOL-2312-G30MMA3	2029217
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Male connector, M23, 12-pin, straight, A-coded</li> <li><b>Signal type:</b> HIPERFACE®, SSI, Incremental</li> <li><b>Description:</b> HIPERFACE®, shieldedSSIIncremental</li> <li><b>Connection systems:</b> Solder connection</li> </ul>	STE-2312-G01	2077273

## 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."**

## WORLDWIDE PRESENCE:

Contacts and other locations [www.sick.com](http://www.sick.com)