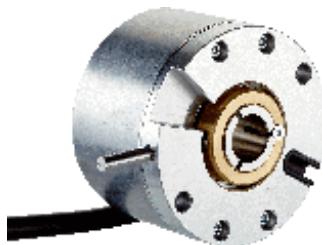


## DBS60E-BJAKC1024

DBS60

INCREMENTAL ENCODERS

**SICK**  
Sensor Intelligence.



## Ordering information

Type	part no.
DBS60E-BJAKC1024	On request

Other models and accessories → [www.sick.com/DBS60](http://www.sick.com/DBS60)

Illustration may differ

## 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>
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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.

## Performance

<b>Pulses per revolution</b>	1,024
<b>Measuring step</b>	≤ 90°, electric/pulses per revolution
<b>Measuring step deviation</b>	± 18° / pulses per revolution
<b>Error limits</b>	Measuring step deviation x 3
<b>Duty cycle</b>	≤ 0.5 ± 5 %

## Interfaces

<b>Communication interface</b>	Incremental
<b>Communication Interface detail</b>	TTL / RS-422
<b>Number of signal channels</b>	6-channel
<b>Initialization time</b>	< 5 ms <sup>1)</sup>
<b>Output frequency</b>	+ 300 kHz <sup>2)</sup>
<b>Load current</b>	≤ 30 mA, per channel
<b>Operating current</b>	≤ 50 mA (without load)

<sup>1)</sup> Valid signals can be read once this time has elapsed.

<sup>2)</sup> Up to 450 kHz on request.

## Electronics

<b>Connection type</b>	Cable, 8-wire, universal, 1.5 m <sup>1)</sup>
<b>Supply voltage</b>	4.5 ... 5.5 V
<b>Reference signal, number</b>	1
<b>Reference signal, position</b>	90°, electric, logically gated with A and B
<b>Reverse polarity protection</b>	✓
<b>Short-circuit protection of the outputs</b>	✓ <sup>2)</sup>

<sup>1)</sup> The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

<sup>2)</sup> Short-circuit opposite to another channel or GND permissible for max. 60 s. No protection signal against U<sub>S</sub>.

## Mechanics

<b>Mechanical design</b>	Blind hollow shaft
<b>Shaft diameter</b>	5/8"Front clamp
<b>Flange type / stator coupling</b>	Axial and radial register pin mounting, for 4 mm register pin
<b>Weight</b>	+ 0.25 kg <sup>1)</sup>
<b>Shaft material</b>	Stainless steel
<b>Flange material</b>	Aluminum
<b>Housing material</b>	Aluminum
<b>Material, cable</b>	PVC
<b>Start up torque</b>	+ 0.5 Ncm (+20 °C)
<b>Operating torque</b>	0.4 Ncm (+20 °C)
<b>Permissible movement static</b>	± 0.3 mm (radial) ± 0.5 mm (axial) <sup>2)</sup>
<b>Permissible movement dynamic</b>	± 0.1 mm (radial) ± 0.2 mm (axial) <sup>2)</sup>
<b>Operating speed</b>	6,000 min <sup>-1</sup> <sup>3)</sup>
<b>Maximum operating speed</b>	9,000 min <sup>-1</sup> <sup>4)</sup>
<b>Moment of inertia of the rotor</b>	50 gcm <sup>2</sup>
<b>Bearing lifetime</b>	3.6 x 10 <sup>9</sup> revolutions
<b>Angular acceleration</b>	≤ 500,000 rad/s <sup>2</sup>

<sup>1)</sup> Based on encoder with male connector or cable with male connector.

<sup>2)</sup> Not applicable for stator coupling type C and K.

<sup>3)</sup> Allow for self-heating of 2.6 K per 1,000 rpm when designing the operating temperature range.

<sup>4)</sup> Maximum speed which does not cause mechanical damage to the encoder. Impact on the service life and signal quality is possible. Please note the maximum output frequency.

## Ambient data

<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-3
<b>Enclosure rating</b>	IP67, housing side (IEC 60529) IP65, shaft side (IEC 60529)
<b>Permissible relative humidity</b>	90 % (Condensation not permitted)
<b>Operating temperature range</b>	-20 °C ... +85 °C <sup>1)</sup>
<b>Storage temperature range</b>	-40 °C ... +100 °C, without package
<b>Resistance to shocks</b>	250 g, 3 ms (EN 60068-2-27)
<b>Resistance to vibration</b>	30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)

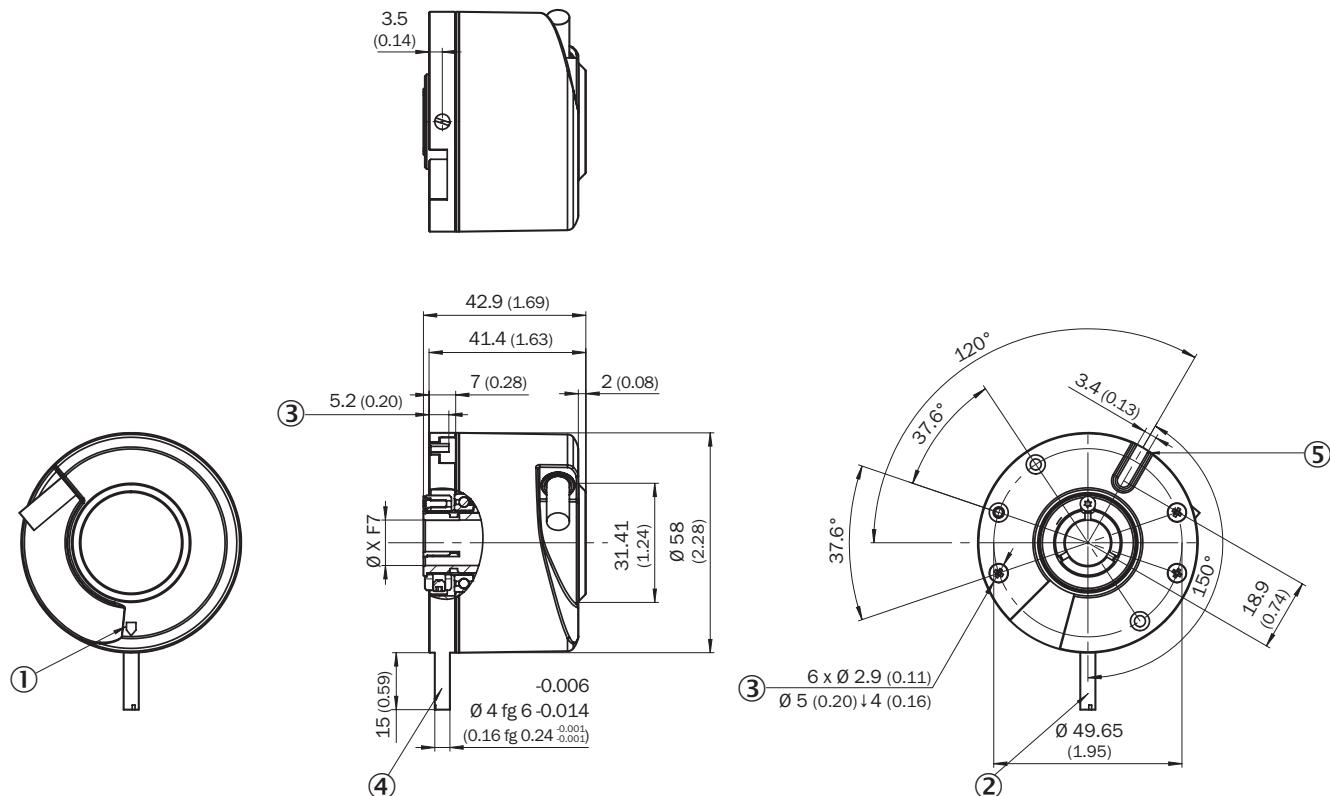
<sup>1)</sup> These values relate to all mechanical versions including recommended accessories unless otherwise noted.

## 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>	27270501
<b>ECLASS 11.0</b>	27270501
<b>ECLASS 12.0</b>	27270501
<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)

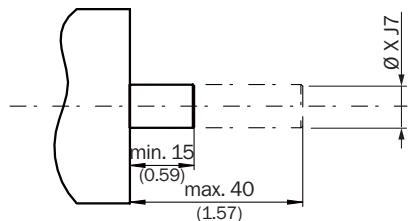
XF7 values see shaft diameter table for blind hollow shaft

- ① Zero pulse mark on housing
- ② register pin is the zero pulse mark
- ③ depth
- ④ register pin can be removed
- ⑤ rubber insert, material: NBR

Type	Blind hollow shaft	Shaft diameter XF7
DBS60x-BAxxxxxxx	DBS60x-B1xxxxxxx	6 mm
DBS60x-BBxxxxxx	DBS60x-B2xxxxxxx	8 mm
DBS60x-BCxxxxxx	DBS60x-B3xxxxxxx	3/8"

Type	Blind hollow shaft	Shaft diameter XF7
DBS60x-BDxxxxxxxxDBS60x-B4xxxxxxxx		10 mm
DBS60x-BExxxxxxxxxDBS60x-B5xxxxxxxx		12 mm
DBS60x-BFxxxxxxxxxDBS60x-B6xxxxxxxx		1/2"
DBS60x-BGxxxxxxxxDBS60x-B7xxxxxxxx		14 mm
DBS60x-BHxxxxxxxxDBS60x-B8xxxxxxxx		15 mm
DBS60x-BJxxxxxxxx		5/8"
-		

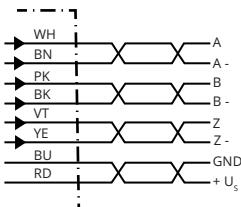
### Attachment specifications Blind hollow shaft



customer side

Type	Blind hollow shaft	Shaft diameter xj7
DBS60x-BAxxxxxxxxDBS60x-B1xxxxxxxx		6 mm
DBS60x-BBxxxxxxxxDBS60x-B2xxxxxxxx		8 mm
DBS60x-BCxxxxxxxxDBS60x-B3xxxxxxxx		3/8"
DBS60x-BDxxxxxxxxDBS60x-B4xxxxxxxx		10 mm
DBS60x-BExxxxxxxxxDBS60x-B5xxxxxxxx		12 mm
DBS60x-BFxxxxxxxxxDBS60x-B6xxxxxxxx		1/2"
DBS60x-BGxxxxxxxxDBS60x-B7xxxxxxxx		14 mm
DBS60x-BHxxxxxxxxDBS60x-B8xxxxxxxx		15 mm
DBS60x-BJxxxxxxxx		5/8"
-		

### PIN assignment

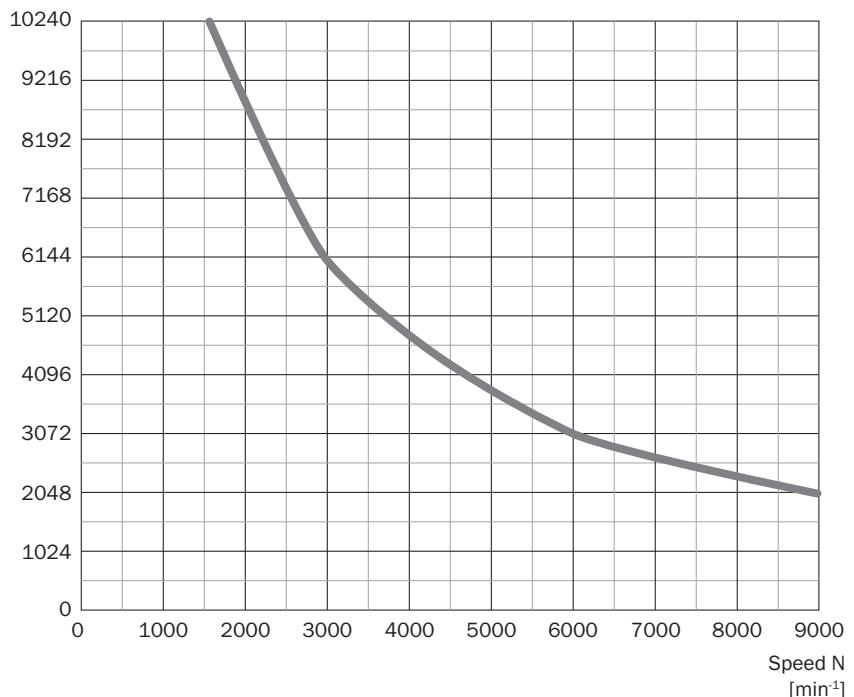


Wire colors (cable connection)	Male connector M12, 8-pin	Male connector M23, 12-pin	TTL/HTL 6-channel signal	Explanation
Brown	1	6	A-	Signal wire
White	2	5	A	Signal wire
Black	3	1	B-	Signal wire

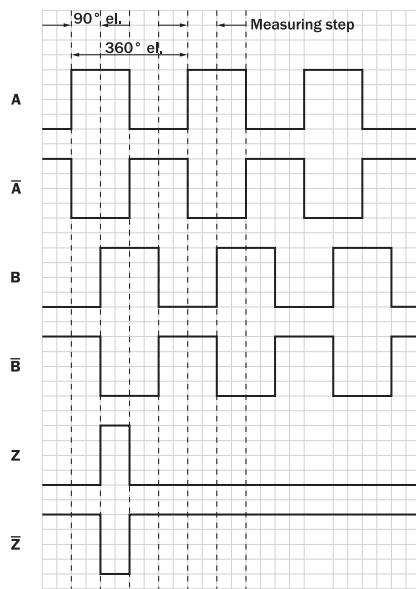
Wire colors (cable connection)	Male connector M12, 8-pin	Male connector M23, 12-pin	TTL/HTL 6-channel signal	Explanation
Pink	4	8	B	Signal wire
Yellow	5	4	Z-	Signal wire
Purple	6	3	Z	Signal wire
Blue	7	10	GND	Ground connection
Red	8	12	+U <sub>s</sub>	Supply voltage
-	-	9	Not assigned	Not assigned
-	-	2	Not assigned	Not assigned
-	-	11	Not assigned	Not assigned
-	-	7	Not assigned	Not assigned
Screen	Screen	Screen	Screen	Screen connected to encoder housing

## Diagrams

Pulses per revolution



## Diagrams Signal outputs for electrical interfaces TTL and HTL



Cw with view on the encoder shaft in direction "A", compare dimensional drawing.

Supply voltage	Output
4,5 V ... 5,5 V	TTL
10 V ... 30 V	TTL
10 V ... 27 V	HTL
4,5 V ... 30 V	TTL/HTL universal
4,5 V ... 30 V	TTL

## Recommended accessories

Other models and accessories → [www.sick.com/DBS60](http://www.sick.com/DBS60)

	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> Male connector, M23, 12-pin, straight, A-coded</li> <li><b>Signal type:</b> HIPERFACE®, SSI, Incremental</li> <li><b>Description:</b> HIPERFACE®, shielded SSI Incremental</li> <li><b>Connection systems:</b> Solder connection</li> </ul>	STE-2312-G01	2077273
	<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®, shielded SSI Incremental</li> <li><b>Connection systems:</b> Solder connection</li> </ul>	STE-2312-GX	6028548
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Male connector, M12, 8-pin, straight, A-coded</li> <li><b>Signal type:</b> Incremental</li> <li><b>Cable:</b> CAT5, CAT5e</li> <li><b>Description:</b> Incremental, shielded</li> <li><b>Connection systems:</b> IDC quick connection</li> <li><b>Permitted cross-section:</b> 0.14 mm² ... 0.34 mm²</li> </ul>	STE-1208-GA01	6044892
Mounting systems			
	<ul style="list-style-type: none"> <li><b>Description:</b> Bearing bracket for hollow shaft encoders, fastening screws included. The Bearing Block is intended for very large radial and axial shaft loads. Particularly for application on: Belt pulleys, Chain pinions, Friction wheels. It is designed this way to enable fitting of encoder with blind hollow shaft with Ø 12 mm. Operating speed max. 6,000 rpm^-1, axial shaft load 100 N, radial shaft load 100 N, bearing service life <math>3.6 \times 10^9</math> revolutions</li> <li><b>Items supplied:</b> Fastening screws included</li> </ul>	BEF-FA-B12-010	2042728

	Brief description	Type	part no.
shaft adaptation			
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet metal for hollow shaft, shaft diameter 11 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-011-M	2094671
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 15 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-015-P	2076233
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 14 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-014-P	2076232
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 12 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-012-P	2076231
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 10 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-010-P	2076230
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 8 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-008-P	2076229
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 6 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-006-P	2076228
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 1/2" (12.7 mm), outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-12Z-P	2076227
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 3/8" (9.525 mm), outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-38Z-P	2076226
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet metal for hollow shaft, shaft diameter 1/2" (12.7 mm), outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-12Z-M	2076225
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet metal for hollow shaft, shaft diameter 3/8" (9.525 mm), outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-38Z-M	2076224
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet metal for hollow shaft, shaft diameter 15 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-015-M	2076223
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet metal for hollow shaft, shaft diameter 14 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-014-M	2076222
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet metal for hollow shaft, shaft diameter 12 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-012-M	2076221
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet metal for hollow shaft, shaft diameter 10 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-010-M	2076220
	<ul style="list-style-type: none"><li><b>Product segment:</b> Shaft adaptation</li><li><b>Product:</b> Collets</li><li><b>Description:</b> Collet metal for hollow shaft, shaft diameter 8 mm, outer diameter 5/8" (15.875 mm)</li></ul>	SPZ-58Z-008-M	2076219



## 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.

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