



# DBS36E-BBAQ02048

DBS36/50

INCREMENTAL ENCODERS

**SICK**  
Sensor Intelligence.

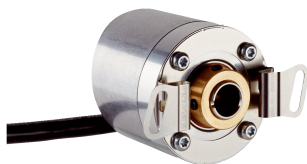


Illustration may differ



### Ordering information

Type	Part no.
DBS36E-BBAQ02048	1127601

Other models and accessories → [www.sick.com/DBS36\\_50](http://www.sick.com/DBS36_50)

### Detailed technical data

#### Safety-related parameters

<b>MTTF<sub>D</sub> (mean time to dangerous failure)</b>	600 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>	2,048
<b>Measuring step</b>	90°, electric/pulses per revolution
<b>Measuring step deviation</b>	± 18° / pulses per revolution
<b>Error limits</b>	± 54° / pulses per revolution
<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>	< 3 ms
<b>Output frequency</b>	≤ 300 kHz
<b>Load current</b>	≤ 30 mA
<b>Operating current</b>	≤ 50 mA (without load)

#### Electrical data

<b>Connection type</b>	Cable, 8-wire, with male connector, M23, 12-pin, universal, 0.5 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>Short-circuit protection of the outputs</b>	✓ <sup>2)</sup>

<sup>1)</sup> M23 male connector for central mounting.

<sup>2)</sup> The short-circuit rating is only given if Us and GND are connected correctly.

## Mechanical data

<b>Mechanical design</b>	Blind hollow shaft
<b>Shaft diameter</b>	8 mm <sup>1)</sup>
<b>Weight</b>	+ 150 g (with connecting cable)
<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>	≤ 8,000 min <sup>-1</sup> <sup>4)</sup>
<b>Moment of inertia of the rotor</b>	0.8 gcm <sup>2</sup>
<b>Bearing lifetime</b>	2 x 10 <sup>9</sup> revolutions
<b>Angular acceleration</b>	≤ 500,000 rad/s <sup>2</sup>

<sup>1)</sup> Order collets for 5 mm, 6 mm and 1/4" mm separately as accessories.

<sup>2)</sup> Higher values are possible using limited bearing life.

<sup>3)</sup> Allow for self-heating of 4.7 K per 1,000 rpm when designing the operating temperature range.

<sup>4)</sup> No permanent operation. Decreasing signal quality.

## Ambient data

<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-3 (class A)
<b>Enclosure rating</b>	IP65
<b>Permissible relative humidity</b>	90 % (Condensation not permitted)
<b>Operating temperature range</b>	-20 °C ... +85 °C, -35 °C ... +95 °C on request
<b>Storage temperature range</b>	-40 °C ... +100 °C, without package
<b>Resistance to shocks</b>	100 g, 6 ms (EN 60068-2-27)
<b>Resistance to vibration</b>	20 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)

## 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))

Blind hollow shaft, cable

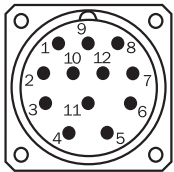


### Attachment specifications



	Encoder	
6 mm	DBS36E-BA	2056390 Premounted
5 mm	DBS36E-BB	2066991
6 mm		2056390
1/4"		On request
8 mm		Not required

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
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

### Diagrams

Signal outputs for electrical interfaces TTL and HTL



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









① Interfaces G, P, R only for channels A, B, Z.

Supply voltage	Output
4.5 V...5.5 V	TTL/RS422
7 V...30 V	TTL/RS422
7 V...30 V	HTL/Push Pull
7 V...27 V	HTL/push pull, 3 channel
4.5 V...5.5 V	Open Collector NPN, 3 channel
4.5 V...30 V	Open Collector NPN, 3 channel

### Recommended accessories

Other models and accessories → [www.sick.com/DBS36\\_50](http://www.sick.com/DBS36_50)

	Brief description	Type	Part no.
<b>Other mounting accessories</b>			
	Two-sided stator coupling, screw hole diameter 42 to 46 mm, slot width 3.2 mm	BEF-DS-DBS36	2066301
<b>Others</b>			
	<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, Incremental, HIPERFACE®, shielded</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, Incremental, shielded</li> </ul>	LTG-2411-MW	6027530

	Brief description	Type	Part no.
	<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, Incremental, shielded</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, TTL, HTL, Incremental, shielded, Head A: cable Head B: cable Cable: suitable for drag chain, PUR, halogen-free, shielded, UV and saltwater resistant, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 2 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</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, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</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, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</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, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</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, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</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, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</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, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</li> </ul>	DOL-2312-G25MLA3	2030699

	Brief description	Type	Part no.
	<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, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</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> <li>• <b>Description:</b> Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: Cable Cable: incremental, suitable for drag chain, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</li> </ul>	DOL-2312-G1M5MA3	2029212
	<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> 3 m, 12-wire, PUR, halogen-free</li> <li>• <b>Description:</b> Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: Cable Cable: incremental, suitable for drag chain, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</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, Head A: female connector, M23, 12-pin, straight Head B: Cable Cable: incremental, suitable for drag chain, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</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</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, Head A: female connector, M23, 12-pin, straight Head B: Cable Cable: incremental, suitable for drag chain, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</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, Head A: Female connector, M23, 12-pin, straight Head B: Cable Cable: Incremental, suitable for drag chain, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</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, Head A: female connector, M23, 12-pin, straight Head B: Cable Cable: incremental, suitable for drag chain, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm<sup>2</sup> + 2 x 0.5 mm<sup>2</sup> + 1 x 0.14 mm<sup>2</sup>, Ø 7.8 mm</li> </ul>	DOL-2312-G30MMA3	2029217
	<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<sup>®</sup>, SSI, Incremental</li> <li>• <b>Description:</b> HIPERFACE<sup>®</sup>, SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: - Operating temperature: -40 °C ... +125 °C</li> <li>• <b>Connection systems:</b> Solder connection</li> </ul>	DOS-2312-G02	2077057
	<ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, angled, A-coded</li> <li>• <b>Signal type:</b> HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li>• <b>Description:</b> HIPERFACE<sup>®</sup>, SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, angled, shielded, for cable diameter 4.2 mm ... 6.6 mm Head B: - Operating temperature: -20 °C ... +130 °C</li> <li>• <b>Connection systems:</b> Solder connection</li> </ul>	DOS-2312-W01	2072580



## 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.

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For us, that is “Sensor Intelligence.”

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