

# DFS60B-BDEA00S81

DFS60

INCREMENTAL ENCODERS

**SICK**  
Sensor Intelligence.

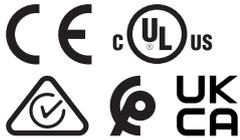


### Ordering information

Type	part no.
DFS60B-BDEA00S81	1084030

Other models and accessories → [www.sick.com/DFS60](http://www.sick.com/DFS60)

Illustration may differ



### Detailed technical data

#### Features

<b>Special device</b>	✓
<b>Specialty</b>	Blind hollow shaft: different diameters realized by using collets Shaft fixation by compression of collet from the back side of the encoder Integrated stator coupling
<b>Standard reference device</b>	DFS60B-BDEA01000, 1053126

#### Safety-related parameters

<b>MTTF<sub>D</sub> (mean time to dangerous failure)</b>	300 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>	1,000 <sup>1)</sup>
<b>Measuring step</b>	90°, electric/pulses per revolution
<b>Measuring step deviation at non binary number of lines</b>	± 0.01°
<b>Error limits</b>	± 0.05°

<sup>1)</sup> See maximum revolution range.

#### Interfaces

<b>Communication interface</b>	Incremental
<b>Communication Interface detail</b>	HTL / Push pull
<b>Number of signal channels</b>	6-channel
<b>Initialization time</b>	40 ms
<b>Output frequency</b>	≤ 600 kHz
<b>Load current</b>	≤ 30 mA
<b>Power consumption</b>	≤ 0.7 W (without load)

## Electronics

<b>Connection type</b>	Male connector, M23, 12-pin, radial
<b>Supply voltage</b>	10 ... 32 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>1)</sup>

<sup>1)</sup> Short-circuit opposite to another channel, US or GND permissible for maximum 30 s.

## Mechanics

<b>Mechanical design</b>	Blind hollow shaft
<b>Shaft diameter</b>	10 mm Front clamp
<b>Weight</b>	+ 0.26 kg
<b>Shaft material</b>	Stainless steel
<b>Flange material</b>	Stainless steel
<b>Housing material</b>	Aluminum die cast
<b>Start up torque</b>	0.8 Ncm (+20 °C)
<b>Operating torque</b>	0.6 Ncm (+20 °C)
<b>Permissible movement static</b>	± 0.3 mm (radial) ± 0.5 mm (axial)
<b>Permissible movement dynamic</b>	± 0.1 mm (radial) ± 0.2 mm (axial)
<b>Operating speed</b>	≤ 6,000 min <sup>-1</sup> <sup>1)</sup>
<b>Moment of inertia of the rotor</b>	40.2 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> Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

## Ambient data

<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-4
<b>Enclosure rating</b>	IP67, Housing side, male connector (IEC 60529) <sup>1)</sup> IP65, shaft side (IEC 60529)
<b>Permissible relative humidity</b>	90 % (Condensation not permitted)
<b>Operating temperature range</b>	-30 °C ... +85 °C <sup>2)</sup> -30 °C ... +100 °C <sup>3)</sup>
<b>Storage temperature range</b>	-40 °C ... +100 °C, without package
<b>Resistance to shocks</b>	100 g, 11 ms (EN 60068-2-27)
<b>Resistance to vibration</b>	30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)

<sup>1)</sup> With mating connector fitted.

<sup>2)</sup> Stationary position of the cable.

<sup>3)</sup> Flexible position of the cable.

## Certificates

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

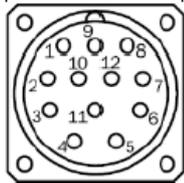
### Classifications

<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>	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



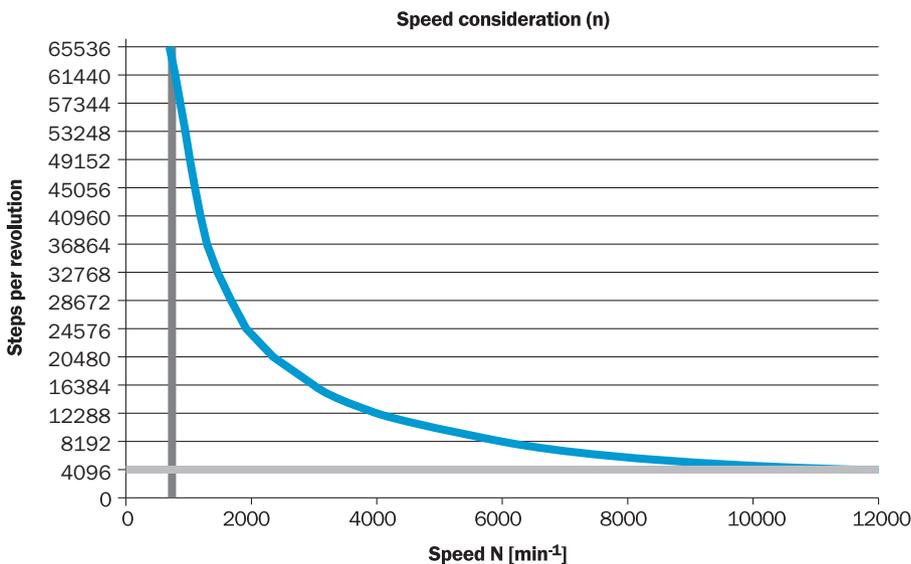
PIN assignment

PIN	Signal TTL/HTL	Explanation
1	B <sub>-</sub>	Signal line
2	N.C	Not connected
3	Z	Signal line
4	Z <sub>-</sub>	Signal line
5	A	Signal line
6	A <sub>-</sub>	Signal line
7	N.C	N.C
8	B	Signal line
9	N.C.	Not connected
10	GND	Ground connection of the encoder
11	N.C.	Not connected
12	+Us	Supply voltage potential free to housing
Shield	Shield	Screen on the encoder side connected to the housing. On the control side connected to earth.

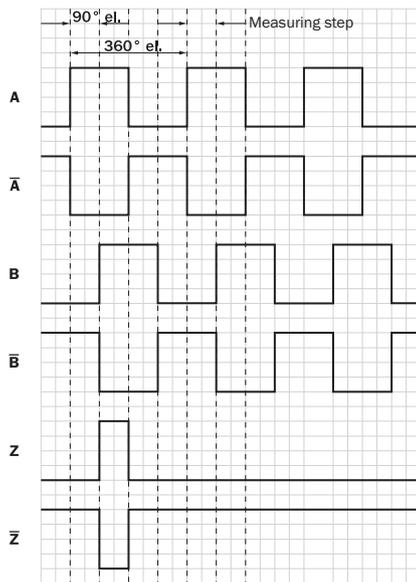


View of the connector M23 fitted to the encoder body

maximum revolution range



signal outputs



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 ... 32 V	TTL
10 V ... 32 V	HTL

### Recommended accessories

Other models and accessories → [www.sick.com/DFS60](http://www.sick.com/DFS60)

	Brief description	Type	part no.
connectors and cables			
	<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> 2 m, 11-wire, PUR</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G02MLA3	2030682
	<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> 7 m, 11-wire, PUR</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G07MLA3	2030685
	<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> 10 m, 11-wire, PUR</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G10MLA3	2030688
	<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> 15 m, 11-wire, PUR</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G15MLA3	2030692
	<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> 20 m, 11-wire, PUR</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G20MLA3	2030695
	<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>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G03MMA3	2029213
	<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> 5 m, 12-wire, PUR, halogen-free</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G05MMA3	2029214
	<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> 1.5 m, 12-wire, PUR, halogen-free</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G1M5MA3	2029212
	<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> 25 m, 11-wire, PUR</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G25MLA3	2030699
	<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> 30 m, 11-wire, PUR</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G30MLA3	2030702
	<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> </ul>	DOL-2312-G10MMA3	2029215

	Brief description	Type	part no.
	<ul style="list-style-type: none"> <li><b>Cable:</b> 10 m, 12-wire, PUR, halogen-free</li> <li><b>Application:</b> Zones with oils and lubricants</li> </ul>		
	<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> 20 m, 12-wire, PUR, halogen-free</li> <li><b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G20MMA3	2029216
	<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> 30 m, 12-wire, PUR, halogen-free</li> <li><b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2312-G30MMA3	2029217
	<ul style="list-style-type: none"> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shielded, SSI, Incremental</li> <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>Connection systems:</b> Solder connection</li> </ul>	DOS-2312-G02	2077057
	<ul style="list-style-type: none"> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shielded, SSI, Incremental</li> <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>Connection systems:</b> Solder connection</li> </ul>	DOS-2312-W01	2072580
<b>Mounting systems</b>			
	<ul style="list-style-type: none"> <li><b>Product family:</b> Stator couplings</li> <li><b>Description:</b> Standard stator coupling</li> </ul>	BEF-DS00XFX	2056812
	<ul style="list-style-type: none"> <li><b>Description:</b> Clamping ring for metal hollow shaft</li> <li><b>Material:</b> Steel</li> <li><b>Details:</b> Metal</li> </ul>	BEF-KR-M	2064709

## 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.”

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