

# DFS60B-BEWA00512

DFS60

**INCREMENTAL ENCODERS** 





# Ordering information

Туре	Part no.
DFS60B-BEWA00512	1084645

Other models and accessories → www.sick.com/DFS60

Illustration may differ



#### Detailed technical data

#### Performance

Pulses per revolution	512 <sup>1)</sup>
Measuring step	90°, electric/pulses per revolution
Measuring step deviation at binary number of lines	± 0.008°
Error limits	± 0.05°

 $<sup>^{1)}</sup>$  See maximum revolution range.

#### Interfaces

Communication interface	Incremental
Communication Interface detail	HTL / Push pull
Number of signal channels	6-channel
0-set function via hardware pin	✓
0-SET function	H-active, L = $0 - 3$ V, H = $4.0 - U_s$ V $^{(1)}$
Initialization time	30 ms
Output frequency	≤ 600 kHz
Load current	≤ 30 mA
Power consumption	≤ 0.7 W (without load)

 $<sup>^{1)}</sup>$  Only with devices with M23 connector in connection with electrical interfaces M, U, V and W.

#### Electrical data

Connection type	Male connector, M23, 12-pin, radial
Supply voltage	4.5 32 V
Reference signal, number	1
Reference signal, position	90°, electric, logically gated with A and B
Reverse polarity protection	✓
Short-circuit protection of the outputs	<b>✓</b> <sup>1)</sup>

 $<sup>^{1)}\,\</sup>mbox{Short-circuit}$  opposite to another channel, US or GND permissable for maximum 30 s.

<sup>&</sup>lt;sup>2)</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.

MTTFd: mean time to dangerous failure

300 years (EN ISO 13849-1)  $^{2)}$ 

#### Mechanical data

Mechanical design	Blind hollow shaft
Shaft diameter	12 mm
Weight	+ 0.2 kg
Shaft material	Stainless steel
Flange material	Aluminum
Housing material	Aluminum die cast
Start up torque	0.8 Ncm (+20 °C)
Operating torque	0.6 Ncm (+20 °C)
Permissible movement static	± 0.3 mm (radial) ± 0.5 mm (axial)
Permissible movement dynamic	± 0.1 mm (radial) ± 0.2 mm (axial)
Operating speed	≤ 6,000 min <sup>-1 1)</sup>
Moment of inertia of the rotor	40 gcm <sup>2</sup>
Bearing lifetime	3.6 x 10^10 revolutions
Angular acceleration	≤ 500,000 rad/s²

 $<sup>^{1)}</sup>$  Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

#### Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3
Enclosure rating	IP67, Housing side, male connector (IEC 60529) <sup>1)</sup> IP65, shaft side (IEC 60529)
Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	-40 °C +100 °C <sup>2)</sup> -30 °C +100 °C <sup>3)</sup>
Storage temperature range	-40 °C +100 °C, without package
Resistance to shocks	70 g, 6 ms (EN 60068-2-27)
Resistance to vibration	30 g, 10 Hz 2,000 Hz (EN 60068-2-6)

 $<sup>^{1)}</sup>$  With mating connector fitted.

#### Classifications

eCl@ss 5.0	27270501
eCl@ss 5.1.4	27270501
eCl@ss 6.0	27270590
eCl@ss 6.2	27270590
eCl@ss 7.0	27270501
eCl@ss 8.0	27270501

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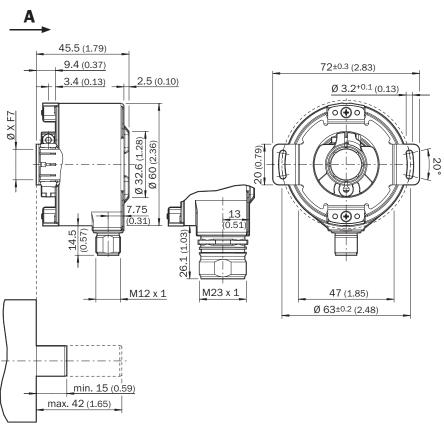
 $<sup>^{2)}</sup>$  Stationary position of the cable.

 $<sup>^{</sup>m 3)}$  Flexible position of the cable.

eCl@ss 8.1	27270501
eCl@ss 9.0	27270501
eCl@ss 10.0	27270501
eCl@ss 11.0	27270501
eCl@ss 12.0	27270501
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
ETIM 8.0	EC001486
UNSPSC 16.0901	41112113

# Dimensional drawing (Dimensions in mm (inch))

Blind hollow shaft, radial male connector M12 and M23



General tolerances according to DIN ISO 2768-mk

Type Blind hollow shaft	Shaft diameter XF7	Shaft diameter xj7
DFS60x-BAxxxxxxxx	6 mm	Provided by customer
DFS60x-BBxxxxxxxxx	8 mm	
DFS60x-BCxxxxxxxx	3/8"	
DFS60x-BDxxxxxxxxx	10 mm	
DFS60x-BExxxxxxxx	12 mm	

Type Blind hollow shaft	Shaft diameter XF7	Shaft diameter xj7
DFS60x-BFxxxxxxxxx	1/2"	
DFS60x-BGxxxxxxxxx	14 mm	
DFS60x-BHxxxxxxxxx	15 mm	
DFS60x-BJxxxxxxxxx	5/8"	

# PIN assignment



View of M23 male device connector on encoder

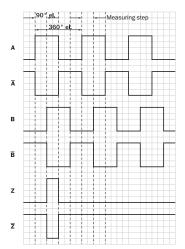
PIN Male connector M12, 8-pin	PIN Male connec- tor M23, 12-pin	Wire colors (ca- ble connection)	TTL/HTL signal	Sin/Cos 1.0 V <sub>PP</sub>	Explanation
1	6	Brown	_A	COS-	Signal wire
2	5	White	A	COS+	Signal wire
3	1	Black	В	SIN-	Signal wire
4	8	Pink	В	SIN+	Signal wire
5	4	Yellow	_z	_Z	Signal wire
6	3	Purple	Z	Z	Signal wire
7	10	Blue	GND	GND	Ground connection
8	12	Red	+U <sub>S</sub>	+U <sub>S</sub>	Supply voltage
-	9	-	N.c.	N.c.	Not assigned
-	2	-	N.c.	N.c.	Not assigned
-	11	-	N.c.	N.c.	Not assigned
-	7 1)	Orange	0-SET <sup>1)</sup>	N.c.	Set zero pulse
Screen	Screen	Screen	Screen	Screen	Screen connected to housing on encoder side. Connected to ground on control side.

1)

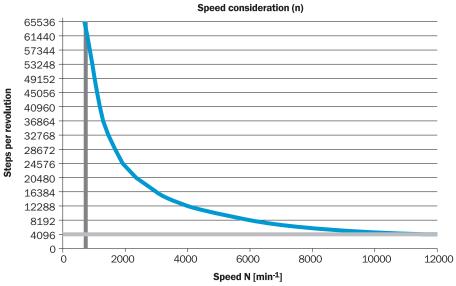
For electrical interfaces only: M, U, V, W with 0-SET function on PIN 7 on M23 plug. The 0-SET input is used to set the zero pulse to the current shaft position. If the 0-SET input is applied to US for longer than 250 ms after it has previously been open or applied to GND for at least 1,000 ms, the current shaft position is assigned zero pulse signal "Z".

# **Diagrams**

### Signal outputs



CW with view on the encoder shaft in direction "A", compare dimensional drawing. Maximum revolution range



Supply voltage	Output
4,5 V 5,5 V	πι
10 V 32 V	πι
10 V 32 V	HTL

### Recommended accessories

Other models and accessories → www.sick.com/DFS60

	Brief description	Туре	Part no.
langes			
	Standard stator coupling	BEF-DS00XFX	2056812
Other moun	ting accessories		
91	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., fastening screws included	BEF-FA-B12-010	2042728
	Clamping ring for metal hollow shaft's, metal	BEF-KR-M	2064709
lug connec	tors and cables		
->	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 2 m	DOL-2312-G02MLD1	2062202
-	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 3 m	DOL-2312- G03MMD1	2062243
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 5 m	DOL-2312- G05MMD1	2062244
-	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 7 m	DOL-2312-G07MLD1	2062203
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 10 m	DOL-2312-G10MLD1	2062204
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 10 m	DOL-2312- G10MMD1	2062245
-	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 15 m	DOL-2312-G15MLD1	206220
-	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 1.5 m	DOL-2312- G1M5MD1	206224
-	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 20 m	DOL-2312-G20MLD1	206220
-	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 20 m	DOL-2312- G20MMD1	206224
-	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 25 m	DOL-2312-G25MLD1	206220
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 30 m	DOL-2312-G30MLD1	2062208
-	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 30 m	DOL-2312- G30MMD1	206224

# **DFS60B-BEWA00512 | DFS60**

**INCREMENTAL ENCODERS** 

	Brief description	Туре	Part no.
	Head A: female connector, M23, 12-pin, straight Cable: HIPERFACE <sup>®</sup> , SSI, Incremental, shielded	DOS-2312-G02	2077057
(A)	Head A: female connector, M23, 12-pin, angled Cable: HIPERFACE <sup>®</sup> , SSI, Incremental, shielded	DOS-2312-W01	2072580

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