



DFS60B-BDEA02500

DFS60

INCREMENTAL ENCODERS





Ordering information

Туре	part no.
DFS60B-BDEA02500	1038084

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

Illustration may differ



Detailed technical data

Safety-related parameters

MTTF _D (mean time to dangerous failure)	300 years (EN ISO 13849-1) 1)
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¹⁾ 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

Pulses per revolution	2,500 ¹⁾
Measuring step	90°, electric/pulses per revolution
Measuring step deviation at non binary number of lines	± 0.01°
Error limits	± 0.05°

¹⁾ See maximum revolution range.

Interfaces

Communication interface	Incremental
Communication Interface detail	HTL / Push pull
Number of signal channels	6-channel
Initialization time	40 ms
Output frequency	≤ 600 kHz
Load current	≤ 30 mA
Power consumption	≤ 0.5 W (without load)

Electronics

Connection type	Male connector, M23, 12-pin, radial
Supply voltage	10 32 V
Reference signal, number	1
Reference signal, position	90°, electric, logically gated with A and B
Reverse polarity protection	√

 $^{^{1)}}$ Short-circuit opposite to another channel, US or GND permissable for maximum 30 s.

Short-circuit protection of the outputs

1 1)

Mechanics

Mechanical design	Blind hollow shaft
Shaft diameter	10 mmFront clamp
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 ^{-1 1)}
Moment of inertia of the rotor	40 gcm ²
Bearing lifetime	3.6 x 10^10 revolutions
Angular acceleration	≤ 500,000 rad/s²
Angular acceleration	≤ 500,000 rad/s²

 $^{^{1)}}$ 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 61000-6-4
Enclosure rating	IP67, Housing side, male connector (IEC 60529) ¹⁾ IP65, shaft side (IEC 60529)
Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	-40 °C +100 °C ²⁾ -30 °C +100 °C ³⁾
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)

 $^{^{1)}}$ With mating connector fitted.

Certificates

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

 $^{^{1)}}$ Short-circuit opposite to another channel, US or GND permissable for maximum 30 s.

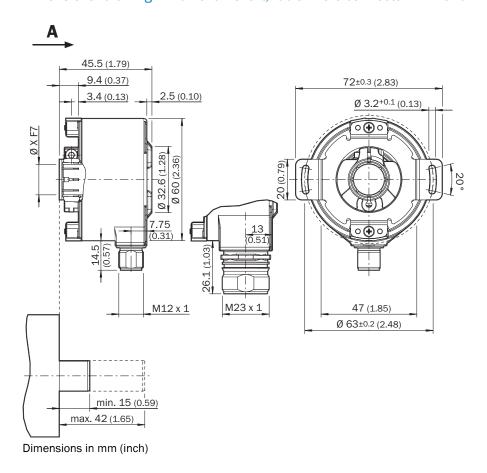
²⁾ Stationary position of the cable.

 $^{^{}m 3)}$ Flexible position of the cable.

Classifications

ECLASS 5.0	27270501
ECLASS 5.1.4	27270501
ECLASS 6.0	27270590
ECLASS 6.2	27270590
ECLASS 7.0	27270501
ECLASS 8.0	27270501
ECLASS 8.1	27270501
ECLASS 9.0	27270501
ECLASS 10.0	27270501
ECLASS 11.0	27270501
ECLASS 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 Blind hollow shaft, radial male connector M12 and M23



General tolerances according to DIN ISO 2768-mk

TypeBlind hollow shaft	Shaft diameter XF7	Shaft diameter xj7
DFS60x-BAxxxxxxxx	6 mm	Provided by customer
DFS60x-BBxxxxxxxx	8 mm	
DFS60x-BCxxxxxxxx	3/8"	
DFS60x-BDxxxxxxxxx	10 mm	
DFS60x-BExxxxxxxx	12 mm	
DFS60x-BFxxxxxxxxx	1/2"	
DFS60x-BGxxxxxxxx	14 mm	
DFS60x-BHxxxxxxxxx	15 mm	
DFS60x-BJxxxxxxxx	5/8″	

PIN assignment

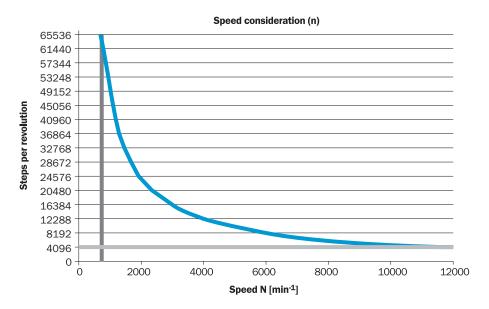


view of M23 male device connector on encoder

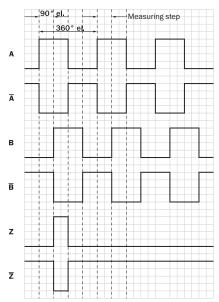
PINMale connector M12, 8-pin	PINMale connector M23, 12-pin	Wire colors (ca- ble connection)	TTL/HTL signal	Sin/Cos 1.0 V _{PP}	Explanation
1	6	Brown	_A	COS-	Signal wire
2	5	White	Α	COS+	Signal wire
3	1	Black	_B	SIN-	Signal wire
4	8	Pink	В	SIN+	Signal wire
5	4	Yellow	_Z	_Z	Signal wire
6	3	Purple	Z	Z	Signal wire
7	10	Blue	GND	GND	Ground connection
8	12	Red	+U _S	+U _S	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 1)	N.c.	Set zero pulse ¹⁾
Screen	Screen	Screen	Screen	Screen	Screen connect- ed to housing on encoder side. Con- nected 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".

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	ΠL
10 V 32 V	ΠL
10 V 32 V	HTL

Recommended accessories

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

	Brief description	Туре	part no.			
Mounting systems						
	Product family: Stator couplings Description: Standard stator coupling	BEF-DS00XFX	2056812			
	 Description: Clamping ring for metal hollow shaft Material: Steel Details: Metal 	BEF-KR-M	2064709			

	Brief description	Туре	part no.
connectors an	nd cables		
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 2 m, 11-wire, PUR Description: Incremental, shielded 	DOL-2312-G02MLA3	2030682
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 7 m, 11-wire, PUR Description: Incremental, shielded 	DOL-2312-G07MLA3	2030685
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 10 m, 11-wire, PUR Description: Incremental, shielded 	DOL-2312-G10MLA3	2030688
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 15 m, 11-wire, PUR Description: Incremental, shielded 	DOL-2312-G15MLA3	2030692
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 20 m, 11-wire, PUR Description: Incremental, shielded 	DOL-2312-G20MLA3	2030695
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 25 m, 11-wire, PUR Description: Incremental, shielded 	DOL-2312-G25MLA3	2030699
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 30 m, 11-wire, PUR Description: Incremental, shielded 	DOL-2312-G30MLA3	2030702
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 1.5 m, 12-wire, PUR, halogen-free Description: Incremental, shielded 	DOL-2312- G1M5MA3	2029212
-	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 3 m, 12-wire, PUR, halogen-free Description: Incremental, shielded 	DOL-2312- GO3MMA3	2029213
-	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 5 m, 12-wire, PUR, halogen-free Description: Incremental, shielded 	DOL-2312- G05MMA3	2029214
-	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 10 m, 12-wire, PUR, halogen-free Description: Incremental, shielded 	DOL-2312- G10MMA3	2029215
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 20 m, 12-wire, PUR, halogen-free Description: Incremental, shielded 	DOL-2312- G20MMA3	2029216
-	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 30 m, 12-wire, PUR, halogen-free 	DOL-2312- G30MMA3	2029217

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	Brief description	Туре	part no.
	Description: Incremental, shielded		
	Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE [®] , SSI, Incremental Description: HIPERFACE [®] , shieldedSSIIncremental Connection systems: Solder connection	DOS-2312-G02	2077057
(H=0)	Connection type head A: Female connector, M23, 12-pin, angled, A-coded Signal type: HIPERFACE [®] , SSI, Incremental Description: HIPERFACE [®] , shieldedSSIIncremental Connection systems: Solder connection	DOS-2312-W01	2072580

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