

DFS60B-BDMA10000

DFS60

INCREMENTAL ENCODERS





Ordering information

Туре	Part no.
DFS60B-BDMA10000	1062736

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

Illustration may differ



Detailed technical data

Performance

Pulses per revolution	10,000 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	TTL / HTL
Factory setting	Factory setting: output level TTL
Number of signal channels	6-channel
0-set function via hardware pin	✓
0-SET function	H-active, L = 0 - 3 V, H = $4.0 - U_s V^{(1)}$
Programmable/configurable	√
Initialization time	$32 \text{ ms}^{2)}$ 30 ms
Output frequency	≤ 600 kHz
Load current	≤ 30 mA
Power consumption	≤ 0.7 W (without load)
4.5 V 5.5 V, TTL/RS-422	
Load current	≤ 30 mA
4.5 V 5.5 V, Open Collector	
Load current	≤ 30 mA
TTL/RS-422	
Load current	≤ 30 mA
Power consumption	≤ 0.7 W (without load)
Load current	

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

²⁾ With mechanical zero pulse width.

HTL/Push pull	
Load current	≤ 30 mA
Power consumption	≤ 0.7 W (without load)
TTL/HTL	
Load current	≤ 30 mA
Power consumption	≤ 0.7 W (without load)
Open Collector	
Load current	≤ 30 mA
Power consumption	≤ 0.7 W (without load)

 $^{^{1)}}$ 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	✓ ^{1) 2)}
MTTFd: mean time to dangerous failure	300 years (EN ISO 13849-1) 3)

 $^{^{1)}}$ Programming TTL with \geq 5.5 V: short-circuit opposite to another channel or GND permissable for maximum 30 s.

Mechanical data

Mechanical design	Blind hollow shaft
Shaft diameter	10 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 shaft movement, axial static/dynamic	± 0.5 mm / ± 0.2 mm
Permissible shaft movement, radial static/dynamic	± 0.3 mm / ± 0.1 mm
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

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

 $^{^{2)}}$ With mechanical zero pulse width.

 $^{^{2)}}$ Programming HTL or TTL with < 5.5 V: short-circuit opposite to another channel, US or GND permissable for maximum 30 s.

³⁾ 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.

Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3
Enclosure rating	IP67, Housing side, male connector (according to IEC 60529) $^{1)}$ IP65, shaft side (according to IEC 60529)
Permissible relative humidity	90 % (condensation of the optical scanning 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 (according to EN 60068-2-27)
Resistance to vibration	30 g, 10 Hz 2,000 Hz (according to EN 60068-2-6)

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

Classifications

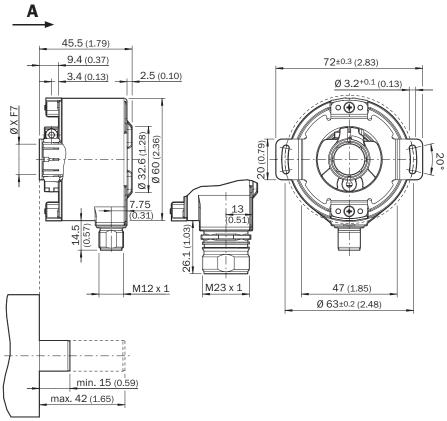
ECI@ss 5.0	27270501
ECI@ss 5.1.4	27270501
ECI@ss 6.0	27270590
ECI@ss 6.2	27270590
ECI@ss 7.0	27270501
ECI@ss 8.0	27270501
ECI@ss 8.1	27270501
ECI@ss 9.0	27270501
ECI@ss 10.0	27270501
ECI@ss 11.0	27270501
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
UNSPSC 16.0901	41112113

²⁾ Stationary position of the cable.

³⁾ Flexible position of the cable.

Dimensional drawing (Dimensions in mm (inch))

Blind hollow shaft, radial male connector M12 and M23



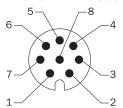
General tolerances according to DIN ISO 2768-mk

Type Blind hollow shaft	Shaft diameter XF7	Shaft diameter xj7
DFS60x-BAxxxxxxxx	6 mm	Provided by customer
DFS60x-BBxxxxxxxx	8 mm	
DFS60x-BCxxxxxxxx	3/8"	
DFS60x-BDxxxxxxxx	10 mm	
DFS60x-BExxxxxxxx	12 mm	
DFS60x-BFxxxxxxxxx	1/2"	
DFS60x-BGxxxxxxxx	14 mm	
DFS60x-BHxxxxxxxxx	15 mm	
DFS60x-BJxxxxxxxxx	5/8"	

PIN assignment

Cable, 8-wire

View of M12 male device connector on encoder



View of M23 male device connector on encoder

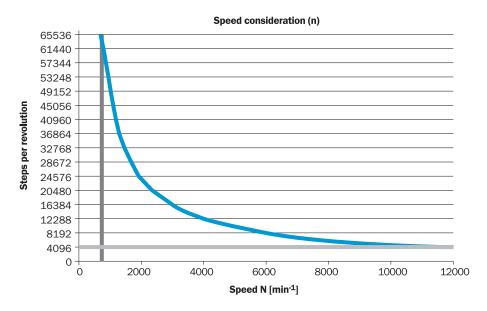


PIN, 8-pin, M12 male connector	PIN, 12-pin, M23 male connector	Color of the wires for encoders with cable outlet	TTL/HTL signal	Sin/cos 1.0 V _{ss}	Explanation
1	6	Brown	_A	COS-	Signal wire
2	5	White	A	COS+	Signal wire
3	1	Black	_В	SIN-	Signal wire
4	8	Pink	В	SIN+	Signal wire
5	4	Yellow	_z	_Z	Signal wire
6	3	Violet	Z	Z	Signal wire
7	10	Blue	GND	GND	Ground connection of the encoder
8	12	Red	+U _s	+U _s	Supply voltage (volt-free to housing)
-	9	-	n.c.	n.c.	Not assigned
-	2	-	n.c.	n.c.	Not assigned
-	11	-	n.c.	n.c.	Not assigned
-	7 1)	-	O-SET 1)	n.c.	Set zero pulse 1)
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 male connector. The 0-SET input is used to set the zero pulse on the current shaft position. If the 0-SET input is connected to U_S for longer than 250 ms after it had previously been unassigned for at least 1,000 ms or had been connected to the GND, the current position of the shaft is assigned to the zero pulse signal "Z".

Maximum revolution range

Maximum revolution range



Recommended accessories

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

	Brief description	Туре	Part no.	
Flanges				
	Standard stator coupling	BEF-DS00XFX	2056812	
Other mounti	ng accessories			
	Clamping ring for metal hollow shaft, metal	BEF-KR-M	2064709	
Programming	and configuration tools			
1	USB programming unit, for programmable SICK encoders AFS60, AFM60, DFS60, VFS60, DFV60 and wire draw encoders with programmable encoders	PGT-08-S	1036616	
V R A	Programming unit display for programmable SICK DFS60, DFV60, AFS/AFM60, AHS/AHM36 encoders, and wire draw encoder with DFS60, AFS/AFM60 and AHS/AHM36. Compact dimensions, low weight, and intuitive operation.	PGT-10-Pro	1072254	
Plug connectors 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	

	Brief description	Туре	Part no.
	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	2062205
-	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 1.5 m	DOL-2312- G1M5MD1	2062240
-3	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 20 m	DOL-2312-G20MLD1	2062206
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 20 m	DOL-2312- G20MMD1	2062246
-	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 25 m	DOL-2312-G25MLD1	2062207
	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	2062247
	Head A: female connector, M23, 12-pin, straight Head B: male connector, D-Sub, 9-pin, straight Cable: Incremental, shielded, 0.5 m Programming adapter cable for programming tool PGT-10-Pro and PGT-08-S	DSL-3D08-G0M5AC3	2046580
	Head A: female connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE [®] , SSI, Incremental, shielded	DOS-2312-G02	2077057
	Head A: female connector, M23, 12-pin, angled Head B: - Cable: HIPERFACE [®] , SSI, Incremental, shielded	DOS-2312-W01	2072580

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