INCREMENTAL ENCODERS



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Illustration may differ

Ordering information

Туре	Part no.
DFS60B-T8AA10000	1084647

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



Detailed technical data

Safety-related parameters

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

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

Interfaces

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.

Communication interface	Incremental
Communication Interface detail	TTL / RS-422
Number of signal channels	6-channel
Initialization time	40 ms
Output frequency	≤ 600 kHz
Load current	≤ 30 mA
Operating current	40 mA (without load)
Electronics	
Connection type	Male connector, M23, 12-pin, radial
Supply voltage	4.5 5.5 V
Reference signal, number	1
Reference signal, position	90°, electric, logically gated with A and B
Short-circuit protection of the outputs	✓ ¹⁾

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

Mechanics

Mechanical design	Through hollow shaft
Mechanical design	I nrough hollow shart

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

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Shaft diameter	15 mm
Weight	+ 0.2 kg
Shaft material	Plastic
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

 $^{\rm 1)}$ 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 61000-6-3
Enclosure rating	IP65, 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.

²⁾ Stationary position of the cable.

³⁾ Flexible position of the cable.

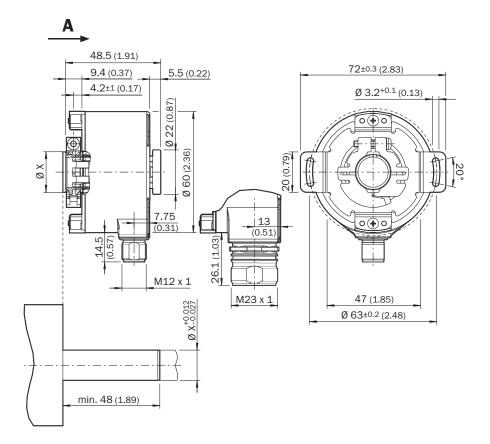
Classifications

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

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ETIM 6.0	EC001486
ETIM 7.0	EC001486
ETIM 8.0	EC001486
UNSPSC 16.0901	41112113

Dimensional drawing (Dimensions in mm (inch))



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 _{PP}	Explanation
1	6	Brown	- _A	COS-	Signal wire
2	5	White	A	COS+	Signal wire
3	1	Black	Б	SIN-	Signal wire

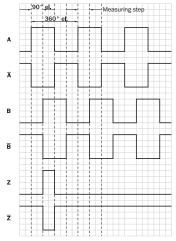
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5 4 6 3 7 2	8 4 3 10	Pink Yellow Purple Blue	B Tz Z	SIN+ ⁻ z Z	Signal wire Signal wire Signal wire
6 3 7 2	3	Purple	Z		-
7				Z	Signal wire
	10	Blue			J
8			GND	GND	Ground connection
	12	Red	+U _S	+U _S	Supply voltage
- 9	9	-	N.c.	N.c.	Not assigned
- 2	2	-	N.c.	N.c.	Not assigned
- 1	11	-	N.c.	N.c.	Not assigned
- ;	7 1)	Orange	0-SET ¹⁾	N.c.	Set zero pulse
Screen S	Screen	Screen	Screen	Screen	Screen connected to housing on encoder side. Connected to ground on control side.

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

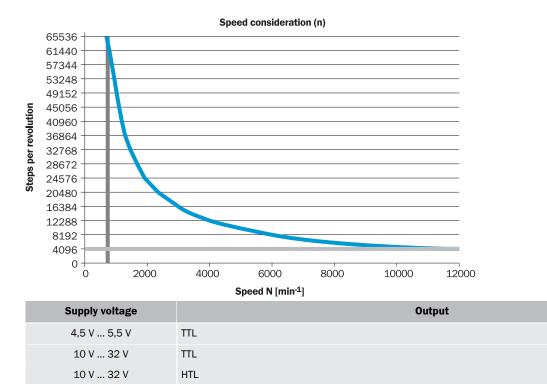
Signal outputs



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

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Maximum revolution range



Recommended accessories

Other models and accessories -> www.sick.com/DFS60

	Brief description	Туре	Part no.
Flanges			
Ŵ	Description: Standard stator coupling	BEF-DS00XFX	2056812
Other mountin	ng accessories		
	 Description: Clamping ring for metal hollow shaft⁵ Details: Metal 	BEF-KR-M	2064709

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