DFS60A-TDEK00001

DFS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.

Ordering information

Type	Part no.
DFS60A-TDEK00001	1078817

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

Illustration may differ

Detailed technical data

Performance

Pulses per revolution	1 [1]
Measuring step	90° electric/pulses per revolution
Measuring step deviation at non binary number of lines	± 0.04°
Error limits	± 0.03°

[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	≤ 820 kHz	
Load current	≤ 30 mA	
Power consumption	≤ 0.5 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	≤ 0.5 W (without load)
HTL/Push pull		
	Load current	≤ 30 mA
	Power consumption	≤ 0.5 W (without load)
TTL/HTL		
	Load current	≤ 30 mA
	Power consumption	≤ 0.5 W (without load)

Open Collector	
Load current	≤ 30 mA
Power consumption	≤ 0.5 W (without load)

Electrical data

Connection type	Cable, 8-wire, universal, 1.5 m [1]
Supply voltage	10 ... 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	✓ [2]
MTTFd: mean time to dangerous failure	300 years (EN ISO 13849-1) [3]

[1] The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

[2] 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.

Mechanical data

Mechanical design	Through 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 / ± 0.01 mm
Permissible shaft movement, radial static/dynamic	± 0.3 mm / ± 0.05 mm
Operating speed	≤ 6,000 min^{-1} [1]
Moment of inertia of the rotor	40 gcm²
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.

Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-4
Enclosure rating	IP65, housing side, cable connection (according to IEC 60529) 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 [1] −30 °C ... +100 °C [2]

[1] Stationary position of the cable.

[2] Flexible position of the cable.

| Storage temperature range	–40 °C ... +100 °C, without package
Resistance to shocks	100 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] Stationary position of the cable.

[2] Flexible position of the cable.

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
ECl@ss 8.1	27270501
ECl@ss 9.0	27270501
ECl@ss 10.0	27270501
ECl@ss 11.0	27270501
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
UNSPSC 16.0901	41112113

Dimensional drawing (Dimensions in mm (inch))

Through hollow shaft, cable
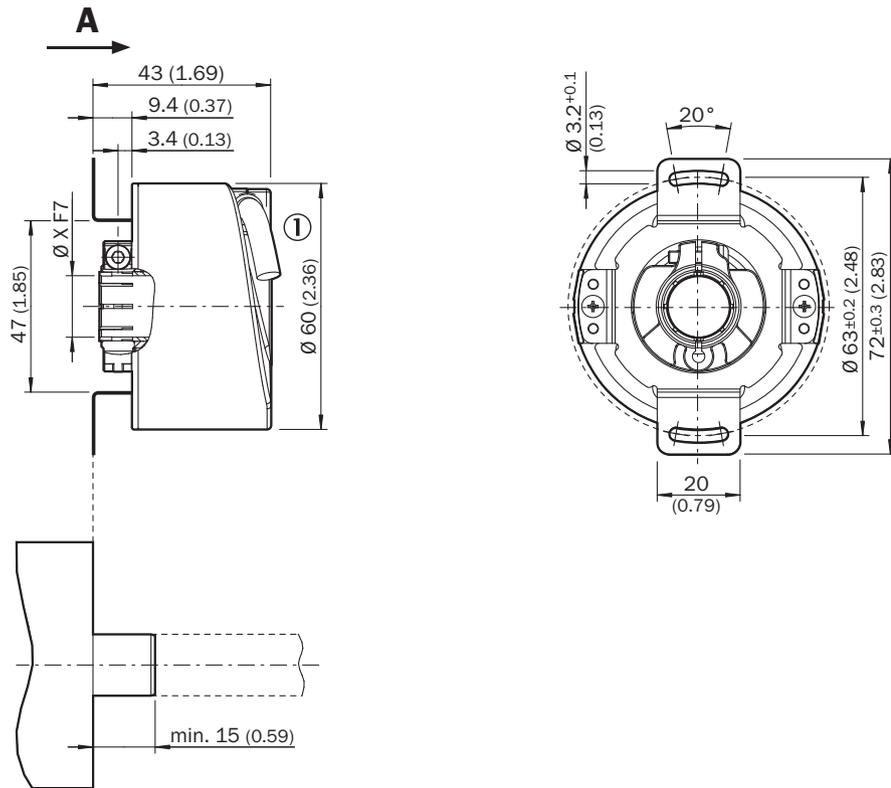
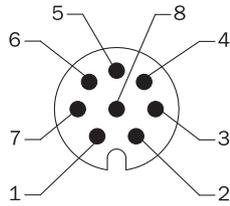General tolerances according to DIN ISO 2768-mk
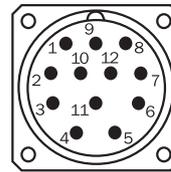① Cable diameter = 5.6 mm +/- 0.2 mm bend radius = 30 mm

PIN assignment

Cable, 8-wire

View of M12 male device connector on encoder
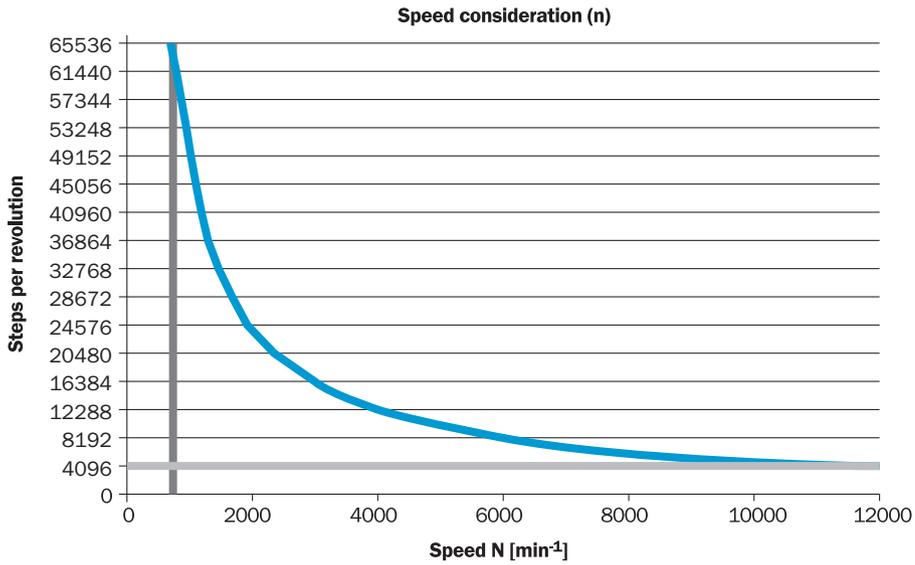
View of M23 male device connector on encoder

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	$\overline{A}$	COS−	Signal wire
2	5	White	A	COS+	Signal wire
3	1	Black	$\overline{B}$	SIN−	Signal wire
4	8	Pink	B	SIN+	Signal wire
5	4	Yellow	$\overline{Z}$	$\overline{Z}$	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]	–	0-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".
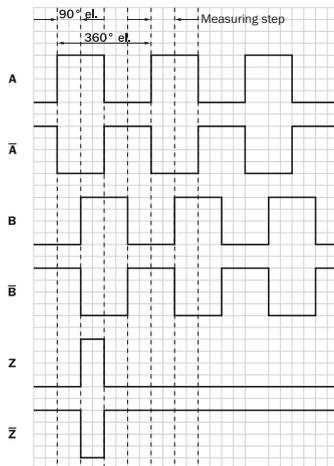
Maximum revolution range

Maximum revolution range

Speed consideration (n)

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

Signal outputs

Signal outputs

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

	Brief description	Type	Part no.
Flanges			
	Standard stator coupling	BEF-DS00XFX	2056812
Other mounting accessories			
	Clamping ring for metal hollow shaft, metal	BEF-KR-M	2064709
Plug connectors and cables			
	Head A: female connector, JST, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 5 m	DOL-0J08-G05MAA3	2046876
	Head A: female connector, JST, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 0.5 m	DOL-0J08-G0M5AA3	2046873
	Head A: female connector, JST, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 10 m	DOL-0J08-G10MAA3	2046877
	Head A: female connector, JST, 8-pin, straight Head B: Flying leads Cable: SSI, Incremental, PUR, halogen-free, shielded, 1.5 m	DOL-0J08-G1M5AA6	2048590
	Head A: female connector, JST, 8-pin, straight Head B: Flying leads Cable: SSI, Incremental, PUR, halogen-free, shielded, 3 m	DOL-0J08-G3M0AA6	2048591
	Head A: female connector, JST, 8-pin, straight Head B: male connector, M23, 12-pin, straight Cable: Incremental, PUR, halogen-free, shielded, 1 m	STL-2312-G01MAA3	2061622
	Head A: female connector, JST, 8-pin, straight Head B: male connector, M23, 12-pin, straight Cable: Incremental, PUR, halogen-free, shielded, 2 m	STL-2312-G02MAA3	2061504
	Head A: female connector, JST, 8-pin, straight Head B: male connector, M23, 12-pin, straight Cable: Incremental, PUR, halogen-free, shielded, 0.35 m	STL-2312-GM35AA3	2061621
	Head A: male connector, M12, 8-pin, straight, A-coded Head B: - Cable: Incremental, shielded	STE-1208-GA01	6044892
	Head A: male connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, shielded	STE-2312-G01	2077273
		STE-2312-GX	6028548

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."

WORLDWIDE PRESENCE:

Contacts and other locations –**www.sick.com**

SICK AG | Waldkirch | Germany | www.sick.com

SICK
Sensor Intelligence.