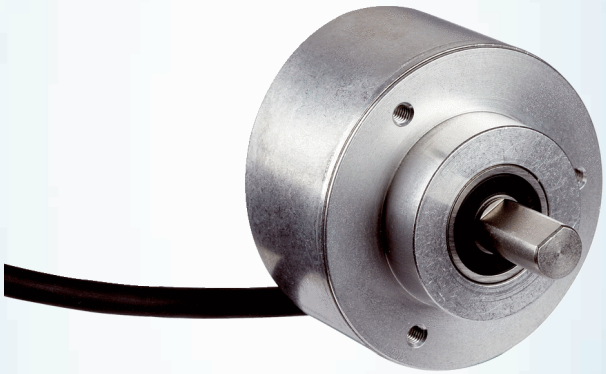
Online data sheet



DFS60B-S4PM10000

DFS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.

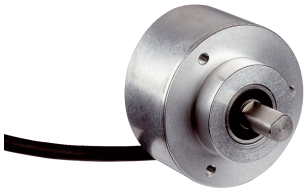


Illustration may differ

Ordering information

Type	Part no.
DFS60B-S4PM10000	1036724

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

Detailed technical data

Performance

Pulses per revolution	10,000 [1] 10,000
Measuring step	90° / electronically/ppr
Measuring step deviation at non binary number of lines	± 0.01°
Error limits	± 0.05°
Initialization time	32 ms [2] 30 ms

[1], see maximum revolution range.
[2] With mechanical zero pulse width.

Electrical data

Electrical interface	4.5 V ... 32 V, TTL/HTL programmable
Initialisation time after power on	32 ms [1] 30 ms
Connection type	Cable, 8-wire, universal, 5 m
Power consumption max. without load	0.7 W (without load)
Load current max.	≤ 30 mA
Maximum output frequency	600 kHz
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] [3]
MTTFd: mean time to dangerous failure	300 years (EN ISO 13849-1) [4]

[1] With mechanical zero pulse width.
[2] Programming TTL with ≥ 5,5 V: short-circuit opposite to another channel or GND permissable for maximum 30 s.
[3] Programming HTL or TTL with < 5,5 V: short-circuit opposite to another channel, US or GND permissable for maximum 30 s.
[4] 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

Shaft diameter	10 mm x 19 mm

[1] Take into account self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

Mass	0.3 kg
Flange material	Aluminum
Housing material	Aluminum die cast
Start up torque	0.5 Ncm (+20 °C)
Operating torque	0.3 Ncm (+20 °C)
Permissible shaft loading radial/axial	80 N (radial) 40 N (axial)
Maximum operating speed	9,000 min^{-1} [1]
Moment of inertia of the rotor	6.2 gcm^2
Bearing lifetime	3.6 x 10^10 revolutions
Max. angular acceleration	≤ 500,000 rad/s^2

[1] Take into account 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 (according to IEC 60529) IP65, shaft side (according to IEC 60529)
Permissible relative humidity	90 % (condensation of the optical scanning not permitted)
Working temperature range	–40 °C ... +100 °C [1] –30 °C ... +100 °C [2]
Storage temperature range	–40 °C ... +100 °C, without package
Resistance to shocks	70 g (according to EN 60068-2-27)
Resistance to vibration	30 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)

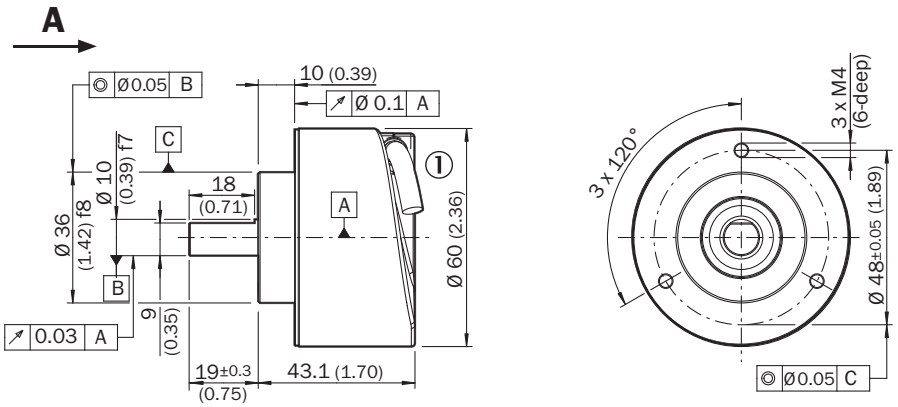
[1] Stationary position of the cable.
[2] Flexible position of the cable.

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
ETIM 5.0	EC001486
ETIM 6.0	EC001486
UNSPSC 16.0901	41112113

Dimensional drawing (Dimensions in mm (inch))

Face mount flange, cable outlet

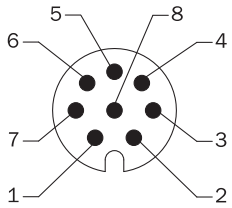


General tolerances according to DIN ISO 2768-mk
① Cable diameter = 5.6 mm +/- 0.2 mm bend radius = 30 mm

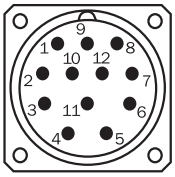
PIN assignment

Cable, 8-wire

View of M12 male device connector on encoder



View of M23 male device connector on encoder

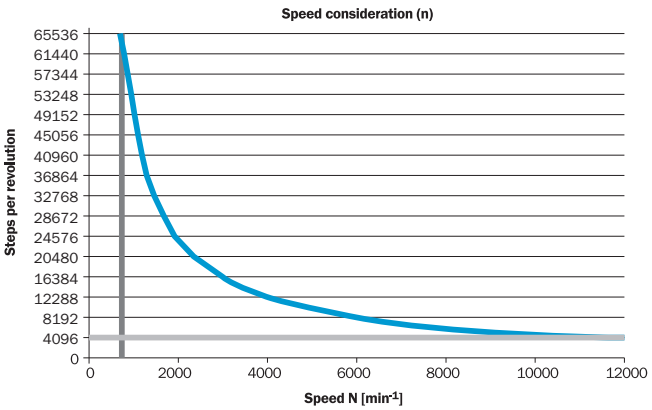


PIN, 8-pin, M12 male connector	PIN, 12-pin, M23 male connector	Color of the wires for encoders with cable outlet	TTL/HTL signal	Sin/cos 1.0 V_{ss}	Explanation
1	6	Brown	$\overline{A}$	COS–	Signal wire
2	5	White	A	COS+	Signal wire
3	1	Black	$\overline{B}$	SIN–	Signal wire
4	8	Pink	B	SIN+	Signal wire
5	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.

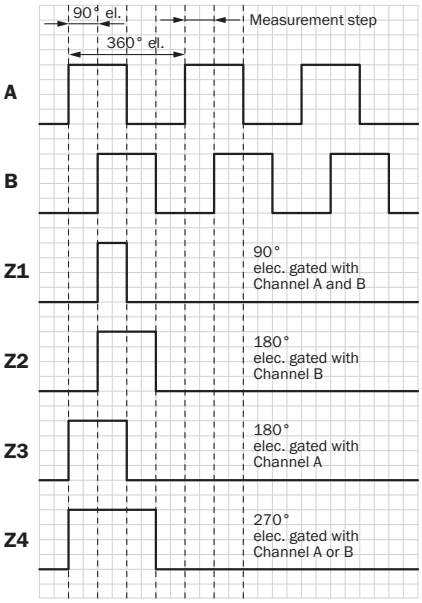
[1)] For electrical interfaces only: M, U, V, W with 0-SET function on PIN 7 on M23 male connector. The 0-SET input is used to set the zero pulse on the current shaft position. If the 0-SET input is connected to U_S for longer than 250 ms after it had previously been unassigned for at least 1,000 ms or had been connected to the GND, the current position of the shaft is assigned to the zero pulse signal “Z”.

Diagram

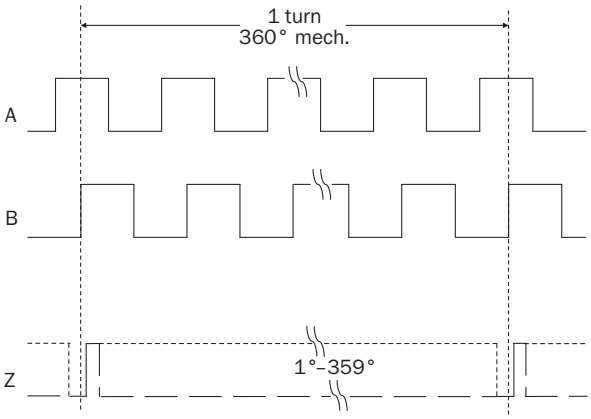
Maximum revolution range



Electrical zero pulse width can be configured to 90°, 180°, or 270°. Width of the zero pulse in relation to a pulse period.



Cw with view on the encoder shaft in direction "A", compare dimensional drawing.
Mechanical zero pulse width 1° to 359° programmable. Width of the zero pulse in relation to a mechanical revolution of the shaft.



Recommended accessories

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

	Brief description	Type	Part no.
Plug connectors and cables			
	Head A: cable Head B: cable Cable: SSI, drag chain use, PUR, halogen-free, shielded	LTG-2308-MWENC	6027529
	Head A: cable Head B: cable Cable: SSI, PUR, shielded	LTG-2411-MW	6027530
	Head A: cable Head B: cable	LTG-2512-MW	6027531

	Brief description	Type	Part no.
	Cable: SSI, drag chain use, PUR, halogen-free, shielded	LTG-2612-MW	6028516
	Head A: female connector, JST, 8-pin, straight Head B: cable Cable: Incremental, drag chain use, PUR, halogen-free, shielded, 3 m	DOL-0J08-G03MAA3	2046875
	Head A: female connector, JST, 8-pin, straight Head B: cable Cable: Incremental, SSI, drag chain use, PUR, halogen-free, shielded, 5 m	DOL-0J08-G05MAA3	2046876
	Head A: female connector, JST, 8-pin, straight Head B: cable Cable: Incremental, SSI, drag chain use, PUR, halogen-free, shielded, 0.5 m	DOL-0J08-G0M5AA3	2046873
	Head A: female connector, JST, 8-pin, straight Head B: cable Cable: Incremental, SSI, drag chain use, PUR, halogen-free, shielded, 10 m	DOL-0J08-G10MAA3	2046877
	Head A: female connector, JST, 8-pin, straight Head B: cable Cable: Incremental, drag chain use, PUR, halogen-free, shielded, 1.5 m	DOL-0J08-G1M5AA3	2046874
Programming and configuration tools			
	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

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