

DFS60B-S4PZ00S04

DFS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.

Illustration may differ

Ordering information

Type	Part no.
DFS60B-S4PZ00S04	1100134

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

Detailed technical data

Features

Special device	✓
Specialty	Cable, universal, 0.5 m with M12 5-pin, customized label
Standard reference device	DFS60B-S4PK10000, 1036722

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
Programmable/configurable	✓
Initialization time	32 ms ¹⁾ 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)
HTL/Push pull	

¹⁾ With mechanical zero pulse width.

	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⁾ With mechanical zero pulse width.

Electrical data

Connection type	Cable, 8-wire, with male connector, M12, 5-pin, universal, 0.5 m ¹⁾
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	✓ ^{2) 3)}
MTTFd: mean time to dangerous failure	300 years (EN ISO 13849-1) ⁴⁾

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

²⁾ Programming TTL with ≥ 5.5 V: short-circuit opposite to another channel or GND permissible for maximum 30 s.

³⁾ Programming HTL or TTL with < 5.5 V: short-circuit opposite to another channel, US or GND permissible 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

Mechanical design	Solid shaft, face mount flange
Shaft diameter	10 mm
Shaft length	19 mm
Weight	+ 0.3 kg
Shaft material	Stainless steel
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)
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
Angular acceleration	≤ 500,000 rad/s ²

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	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.

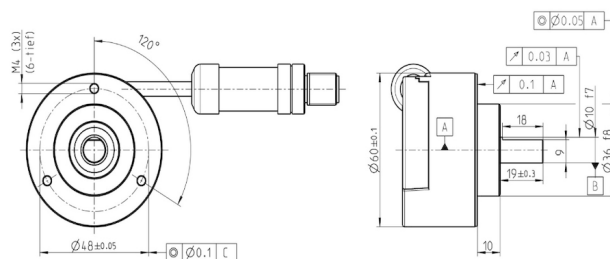
²⁾ Stationary position of the cable.

³⁾ Flexible position of the cable.

Classifications

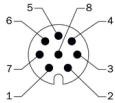
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ECl@ss 8.0	27270501
ECl@ss 8.1	27270501
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ECl@ss 10.0	27270501
ECl@ss 11.0	27270501
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
UNSPSC 16.0901	41112113

Dimensional drawing (Dimensions in mm (inch))



PIN assignment

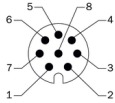
Cable, 8-wire
View of M12 male device connector on encoder



PIN, 8-pin, M12 male connector	Color of the wires for encoders with cable outlet	TTL/HTL signal	Explanation
1	Brown	$\overline{A}$	Signal wire
2	White	A	Signal wire
3	Black	$\overline{B}$	Signal wire
4	Pink	B	Signal wire
5	Yellow	$\overline{Z}$	Signal wire
6	Violet	Z	Signal wire
7	Blue	GND	Ground connection of the encoder
8	Red	$+U_s$	Supply voltage (volt-free to housing)
-	-	n.c.	Not assigned
-	-	n.c.	Not assigned
-	-	n.c.	Not assigned
-	-	O-SET ¹⁾	Set zero pulse ¹⁾
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 O-SET function on PIN 7 on M23 male connector. The O-SET input is used to set the zero pulse on the current shaft position. If the O-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".

Cable, 8-wire
View of M12 male device connector on encoder



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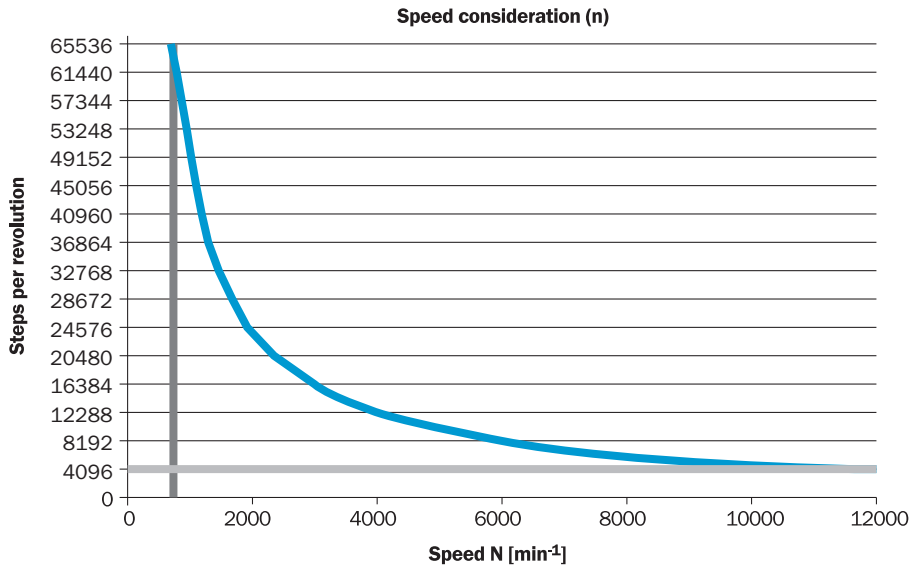
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Type label



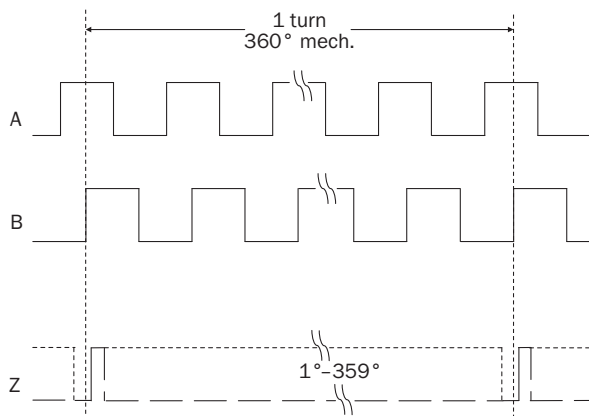
Maximum revolution range

Maximum revolution range

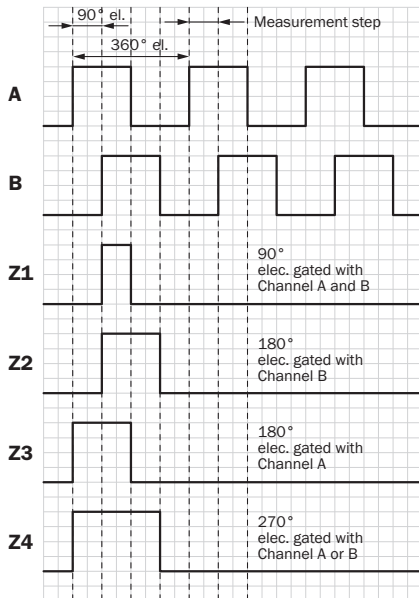


Diagrams

Mechanical zero pulse width 1° to 359° programmable. Width of the zero pulse in relation to a mechanical revolution of the shaft.



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.

SICK AT A GLANCE

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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.”

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