



DFS60B-S4PZ00S93

DFS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.



Ordering information

Type	part no.
DFS60B-S4PZ00S93	1086449

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

Illustration may differ



Detailed technical data

Features

Special device	✓
Specialty	Plug, M23, 12-pin, axial, customer-specific pin assignment Pulses per revolution: preprogrammed to 2500 Electrical interface: preprogrammed to HTL
Standard reference device	DFS60B-S4PB10000, 1056523

Safety-related parameters

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

Pulses per revolution	2,500 ¹⁾
Measuring step	90°, electric/pulses per revolution
Measuring step deviation at non binary number of lines	± 0.01°
Error limits	± 0.05°

¹⁾ Programmable up to 10,000 pulses per revolution.

Interfaces

Communication interface	Incremental
Communication Interface detail	TTL / HTL
Factory setting	Factory setting output level HTL
Number of signal channels	6-channel
Programmable/configurable	✓
Initialization time	32 ms, 30 ms ¹⁾
Output frequency	≤ 600 kHz

¹⁾ With mechanical zero pulse width.

Load current	≤ 30 mA
Power consumption	≤ 0.7 W (without load)

1) With mechanical zero pulse width.

Electronics

Connection type	Male connector, M23, 12-pin, axial, Customer-specific pin assignment
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⁾

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

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

Mechanics

Mechanical design	Solid shaft, face mount flange
Shaft diameter	10 mmWith flat
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	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 (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)

1) With mating connector fitted.

2) Stationary position of the cable.

3) Flexible position of the cable.

Resistance to vibration	30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)
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- 1) With mating connector fitted.
- 2) Stationary position of the cable.
- 3) Flexible position of the cable.

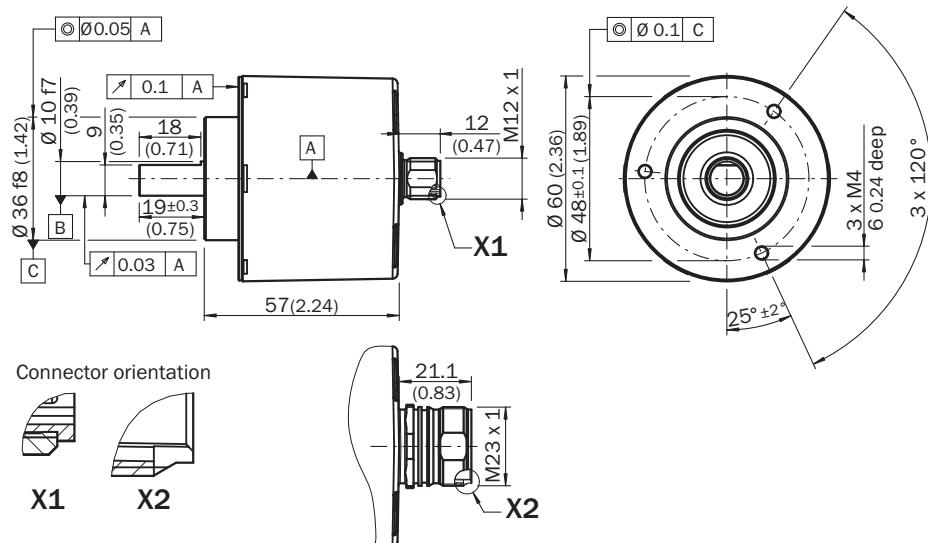
Certificates

EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China-RoHS	✓
cULus certificate	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

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

Dimensional drawing Face mount flange, M12 and M23 axial male connector



Dimensions in mm (inch)

General tolerances according to DIN ISO 2768-mk

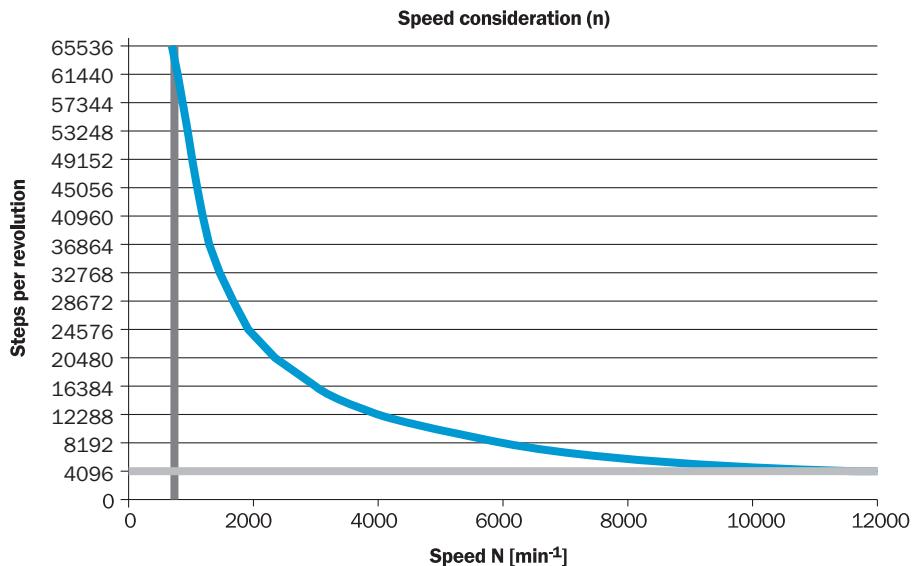
PIN assignment

Pin, 12-pin, M23 connector	TTI/HTL signal	Explanation
1 B	Signal cable	
2 Sense+	Internal connection to +Us	
3 Z	Signal cable	
4 Z	Signal cable	
5 A	Signal cable	
6 A	Signal cable	
7 N.C.	Not assigned	
8 B	Signal cable	
9 N.C.	Not assigned	
10 GND	Ground connection of the encoder	
11 Sense-	Internal connection to GND	
12 +Us	Supply voltage (volt-free to housing)	
Shield	Shield	Shield connected to housing on side of encoder. Connected to ground on side of control.

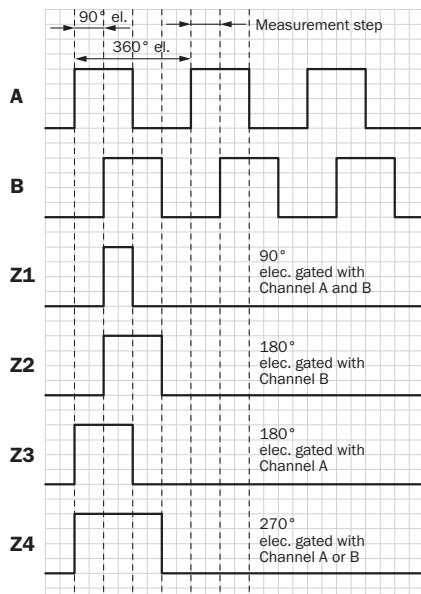


View of the connector M23 fitted to the encoder body

maximum revolution range



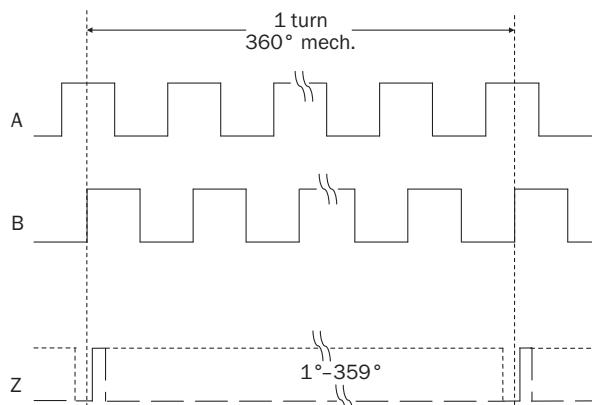
Diagrams Electrical zero pulse width can be configured to 90°, 180°, or 270°. Width of the zero pulse in relation to a pulse period.



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

Supply voltage	Output
4.5 V ... 32 V	TTL/HTL programmable

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



Supply voltage	Output
4,5 V ... 32 V	TTL/HTL programmable

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."

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