



DFS60B-S4PZ00S93

DFS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

| Type | Part no. |
|------------------|----------|
| DFS60B-S4PZ00S93 | 1086449 |

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

Detailed technical data

Features

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

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 ¹⁾ 30 ms |
| Output frequency | ≤ 600 kHz |
| Load current | ≤ 30 mA |
| Power consumption | ≤ 0.7 W (without load) |

¹⁾ With mechanical zero pulse width.

Electrical data

| | |
|--|--|
| 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)} |
| MTTFd: mean time to dangerous failure | 300 years (EN ISO 13849-1) ³⁾ |

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.

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 | 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 | 80 N (radial) 40 N (axial) |
| Operating speed | $\leq 9,000 \text{ min}^{-1}$ ¹⁾ |
| Moment of inertia of the rotor | 6.2 gcm ² |
| Bearing lifetime | 3.6 x 10 ¹⁰ revolutions |
| Angular acceleration | $\leq 500,000 \text{ rad/s}^2$ |

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) |
| 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.

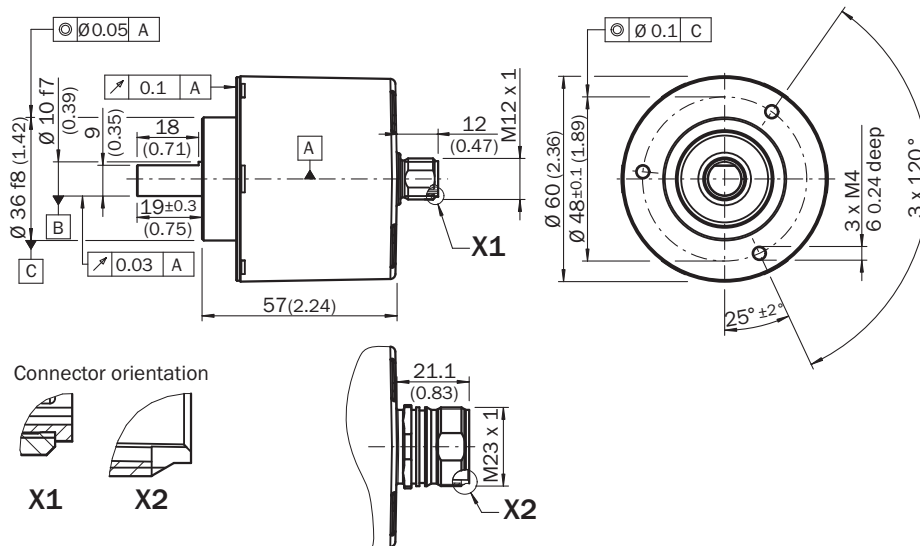
³⁾ Flexible position of the cable.

Classifications

| | |
|-----------------------|----------|
| 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 |
| eCl@ss 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 (Dimensions in mm (inch))

Face mount flange, M12 and M23 axial male connector



General tolerances according to DIN ISO 2768-mk

PIN assignment

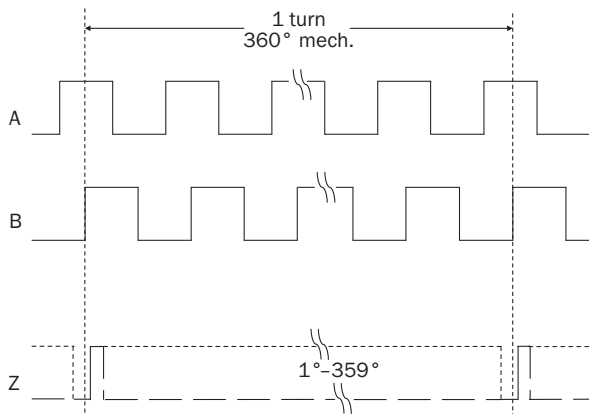
| Pin, 12-pin, M23 connector | TTL/HTL signal | Explanation |
|----------------------------|----------------|---|
| 1 | B | Signal cable |
| 2 | Sense+ | Internal connection to +Us |
| 3 | Z | Signal cable |
| 4 | Z | Signal cable |
| 5 | A | Signal cable |
| 6 | A | Signal cable |
| 7 | N.C. | Not assigned |
| 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

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 |

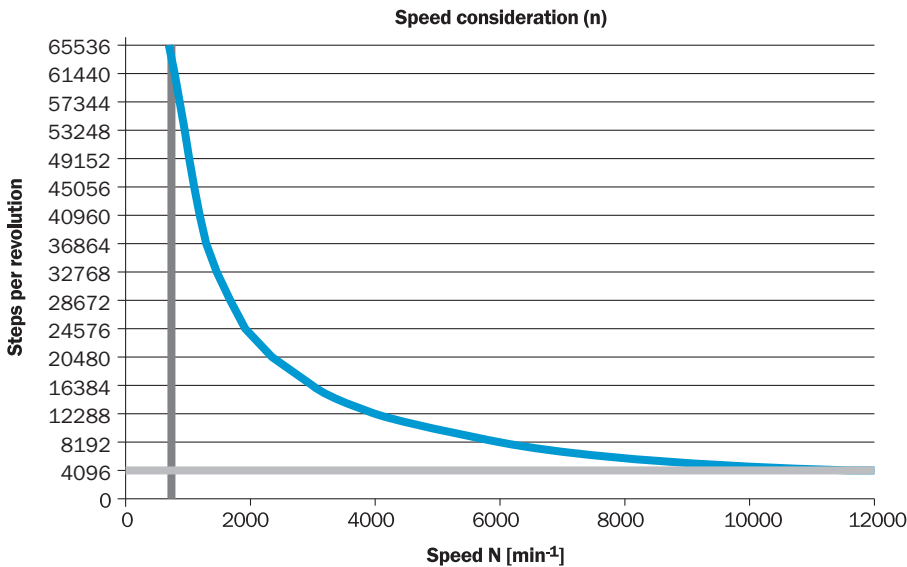
Electrical zero pulse width can be configured to 90°, 180°, or 270°. Width of the zero pulse in relation to a pulse period.



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

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

Maximum revolution range



SICK AT A GLANCE

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