

DFS60B-TJPZ00S06

DFS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.

Illustration may differ

Ordering information

| Type | Part no. |
|------------------|----------|
| DFS60B-TJPZ00S06 | 1100135 |

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-TJPK10000, 1036928 |

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) |

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 |

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.

| | |
|--|---|
| 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⁾ |

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Mechanical data

| | |
|---------------------------------------|---|
| Mechanical design | Through hollow shaft |
| Shaft diameter | 5/8" |
| 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 movement static | ± 0.3 mm (radial) ± 0.5 mm (axial) |
| Permissible movement dynamic | ± 0.1 mm (radial) ± 0.2 mm (axial) |
| Operating speed | $\leq 6,000 \text{ min}^{-1}$ ¹⁾ |
| Moment of inertia of the rotor | 40 gcm ² |
| Bearing lifetime | 3.6×10^{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 | IP65, housing side, cable connection (IEC 60529) IP65, shaft side (IEC 60529) |
| Permissible relative humidity | 90 % (Condensation not permitted) |
| Operating 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, 6 ms (EN 60068-2-27) |
| Resistance to vibration | 30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6) |

¹⁾ Stationary position of the cable.

²⁾ Flexible position of the cable.

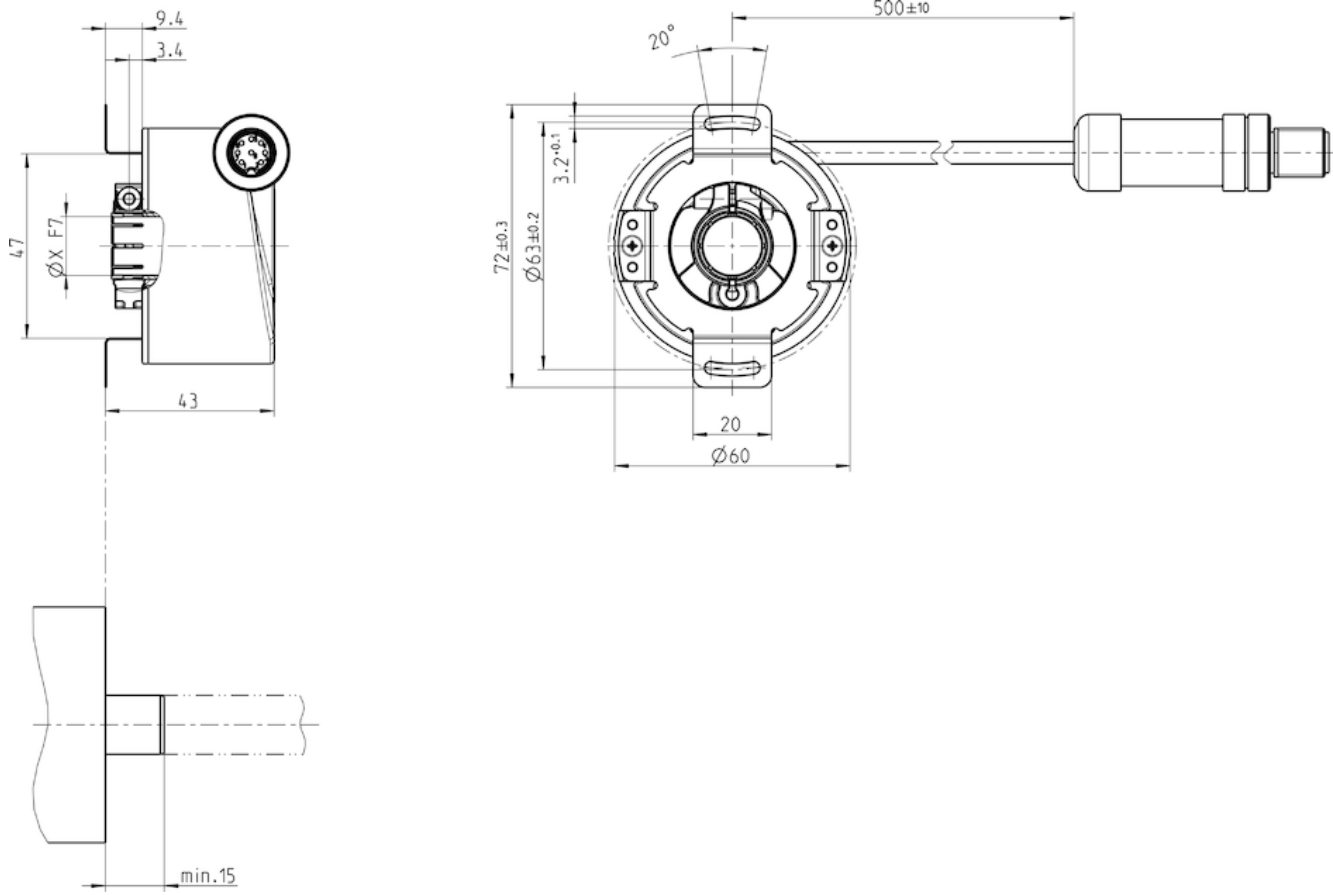
Classifications

| | |
|-------------------|----------|
| eCI@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))

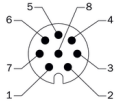




PIN assignment

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 | \bar{A} | Signal wire |
| 2 | White | A | Signal wire |
| 3 | Black | \bar{B} | Signal wire |
| 4 | Pink | B | Signal wire |
| 5 | Yellow | \bar{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 |
| - | - | 0 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 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".

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 |

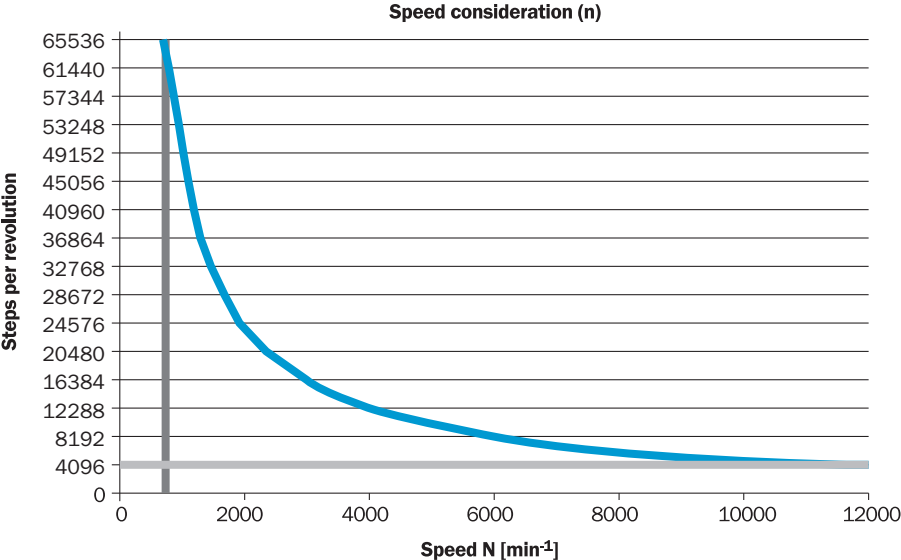
Electrical zero pulse width can be configured to 90°, 180°, or 270°. Width of the zero pulse in relation to a pulse period.



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



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