



DFS60I-BDEN02500

DFS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

| Type | Part no. |
|------------------|----------|
| DFS60I-BDEN02500 | 1112118 |

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

Detailed technical data

Performance

| | |
|---|-------------------------------------|
| Pulses per revolution | 2,500 ¹⁾ |
| Measuring step | 90°, electric/pulses per revolution |
| Measuring step deviation at non binary number of lines | ± 0.008° |
| Error limits | ± 0.03° |

¹⁾ See maximum revolution range.

Interfaces

| | |
|---------------------------------------|------------------------|
| Communication interface | Incremental |
| Communication Interface detail | HTL / Push pull |
| Number of signal channels | 6-channel |
| Initialization time | 40 ms |
| Output frequency | ≤ 820 kHz |
| Load current | ≤ 30 mA |
| Operating current | 40 mA (without load) |
| Power consumption | ≤ 0.5 W (without load) |
| Load resistance | ≥ 120 Ω |

Electrical data

| | |
|------------------------------------|---|
| Connection type | Cable, 8-wire, radial, 10 m |
| Supply voltage | 10 ... 32 V |
| Reference signal, number | 1 |
| Reference signal, position | 90°, electric, logically gated with A and B |
| Reverse polarity protection | ✓ |

¹⁾ Short-circuit opposite to another channel, US or GND permissible for maximum 30 s.

²⁾ 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.

| | |
|--|--|
| Short-circuit protection of the outputs | ✓ ¹⁾ |
| MTTFd: mean time to dangerous failure | 300 years (EN ISO 13849-1) ²⁾ |

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Mechanical data

| | |
|---------------------------------------|---|
| Mechanical design | Blind hollow shaft |
| Shaft diameter | 10 mm |
| Weight | + 0.5 kg |
| Shaft material | Stainless steel V2A |
| Flange material | Stainless steel V2A |
| Housing material | Stainless steel V2A |
| Start up torque | 1 Ncm (+20 °C) |
| Operating torque | 0.5 Ncm (+20 °C) |
| Permissible movement static | ± 0.3 mm (radial) ± 0.5 mm (axial) |
| Permissible movement dynamic | ± 0.05 mm (radial) ± 0.01 mm (axial) |
| Operating speed | ≤ 6,000 min ⁻¹ ¹⁾ |
| Moment of inertia of the rotor | 40 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 61000-6-4 |
| Enclosure rating | IP67, housing side (IEC 60529) IP67, 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 | 100 g, 6 ms (EN 60068-2-27) |
| Resistance to vibration | 10 g, 10 Hz ... 2,000 Hz (EN 60068-2-6) |

¹⁾ Stationary position of the cable.

²⁾ Flexible position of the cable.

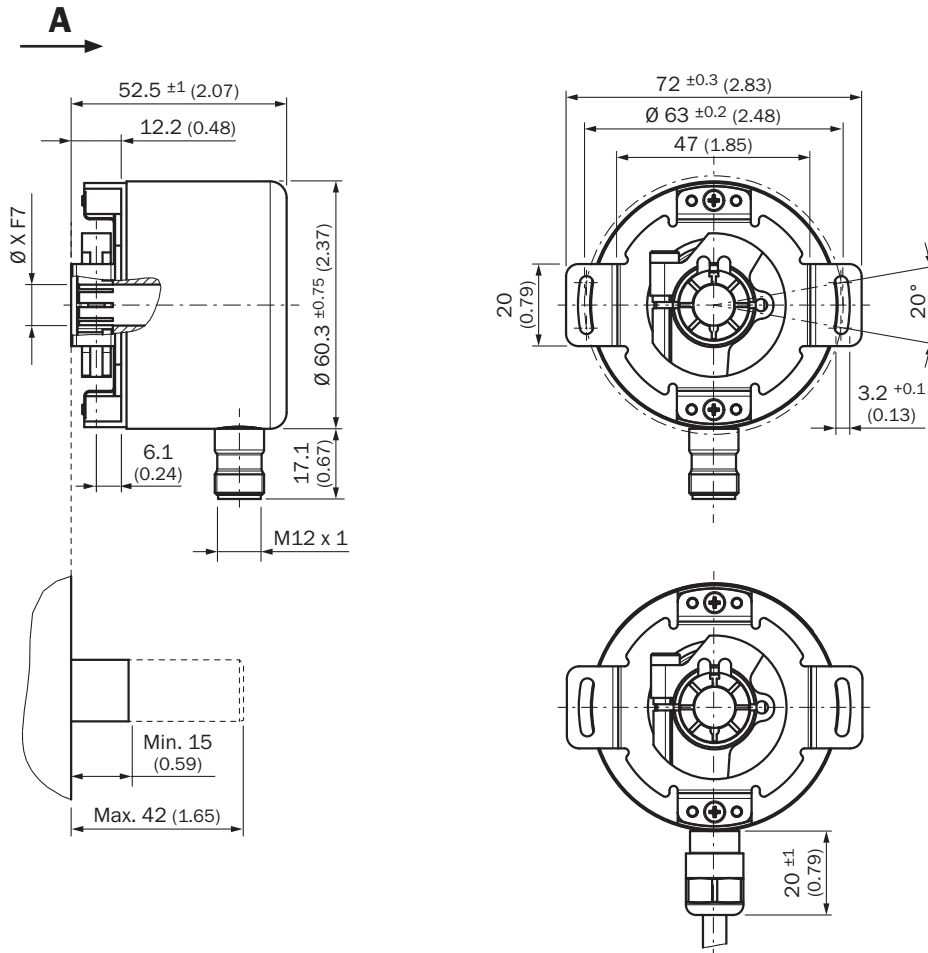
Classifications

| | |
|---------------------|----------|
| 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 |

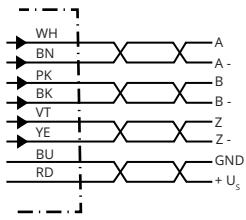
| | |
|-----------------------|----------|
| eCI@ss 8.1 | 27270501 |
| eCI@ss 9.0 | 27270501 |
| eCI@ss 10.0 | 27270501 |
| eCI@ss 11.0 | 27270501 |
| eCI@ss 12.0 | 27270501 |
| ETIM 5.0 | EC001486 |
| ETIM 6.0 | EC001486 |
| ETIM 7.0 | EC001486 |
| ETIM 8.0 | EC001486 |
| UNSPSC 16.0901 | 41112113 |

Dimensional drawing (Dimensions in mm (inch))

Blind hollow shaft



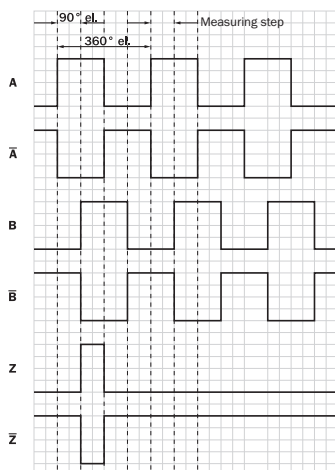
PIN assignment



| Male connector M12, 8-pin | Connector M12, 12-pin | Wire colors (cable connection) | TTL/HTL signal | Sin/Cos 1.0 V _{pp} | Explanation |
|---------------------------|-----------------------|--------------------------------|---------------------|-----------------------------|---|
| 1 | 7 | Brown | \bar{A} | COS- | Signal wire |
| 2 | 6 | White | A | COS+ | Signal wire |
| 3 | 9 | Black | \bar{B} | SIN- | Signal wire |
| 4 | 8 | Pink | B | SIN+ | Signal wire |
| 5 | 4 | Yellow | \bar{Z} | \bar{Z} | Signal wire |
| 6 | 11 | Purple | Z | Z | Signal wire |
| 7 | 12 | Blue | GND | GND | Ground connection |
| 8 | 5 | Red | +U _S | +U _S | Supply voltage |
| - | 2 | - | N.c. | N.c. | Not assigned |
| - | 3 | - | N.c. | N.c. | Not assigned |
| - | 1 | - | N.c. | N.c. | Not assigned |
| - | 10 ¹⁾ | - | O-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. |

Diagrams

Signal outputs



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




Maximum revolution range



| Supply voltage | Output |
|-----------------|--------|
| 4,5 V ... 5,5 V | TTL |
| 10 V ... 32 V | TTL |
| 10 V ... 32 V | HTL |

Recommended accessories

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

| | Brief description | Type | Part no. |
|---|--|---------------|----------|
| Flanges | | | |
|  | Standard stator coupling | BEF-DS00XFX | 2056812 |
| Plug connectors and cables | | | |
|  | Head A: male connector, M12, 8-pin, straight, A-coded Cable: Incremental, shielded | STE-1208-GA01 | 6044892 |
|  | Head A: male connector, M23, 12-pin, straight Cable: HIPERFACE®, SSI, Incremental, shielded | STE-2312-G01 | 2077273 |

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Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

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