



DBS60E-TJAAD1024

DBS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

| Type | Part no. |
|------------------|----------|
| DBS60E-TJAAD1024 | 1084022 |

Other models and accessories → www.sick.com/DBS60

Detailed technical data

Performance

| | |
|---------------------------------|---------------------------------------|
| Pulses per revolution | 1,024 |
| Measuring step | ≤ 90°, electric/pulses per revolution |
| Measuring step deviation | ± 18° / pulses per revolution |
| Error limits | Measuring step deviation x 3 |
| Duty cycle | ≤ 0.5 ± 5 % |

Interfaces

| | |
|---------------------------------------|-------------------------|
| Communication interface | Incremental |
| Communication Interface detail | TTL / RS-422 |
| Number of signal channels | 6-channel |
| Initialization time | < 5 ms ¹⁾ |
| Output frequency | + 300 kHz ²⁾ |
| Load current | ≤ 30 mA, per channel |
| Operating current | ≤ 50 mA (without load) |

¹⁾ Valid signals can be read once this time has elapsed.

²⁾ Up to 450 kHz on request.

Electrical data

| | |
|--|---|
| Connection type | Male connector, M23, 12-pin, radial |
| Supply voltage | 4.5 ... 5.5 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⁾ |

¹⁾ Short-circuit opposite to another channel or GND permissible for max. 60 s. No protection signal against U_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.

| | |
|--|--|
| MTTFd: mean time to dangerous failure | 500 years (EN ISO 13849-1) ²⁾ |
|--|--|

¹⁾ Short-circuit opposite to another channel or GND permissible for max. 60 s. No protection signal against U_S.

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Mechanical data

| | |
|---------------------------------------|--|
| Mechanical design | Through hollow shaft, Front clamp |
| Shaft diameter | 5/8" |
| Flange type / stator coupling | 1-sided stator coupling, slot, screw hole circle radius 31.5–48.5 mm |
| Weight | + 0.25 kg ¹⁾ |
| Shaft material | Stainless steel |
| Flange material | Aluminum |
| Housing material | Aluminum |
| Start up torque | + 0.5 Ncm (+20 °C) |
| Operating torque | 0.4 Ncm (+20 °C) |
| Permissible movement static | ± 0.3 mm (radial) ± 0.5 mm (axial) ²⁾ |
| Permissible movement dynamic | ± 0.1 mm (radial) ± 0.2 mm (axial) ²⁾ |
| Operating speed | 6,000 min ⁻¹ ³⁾ |
| Maximum operating speed | 9,000 min ⁻¹ ⁴⁾ |
| Moment of inertia of the rotor | 50 gcm ² |
| Bearing lifetime | 3.6 x 10 ⁹ revolutions |
| Angular acceleration | ≤ 500,000 rad/s ² |

¹⁾ Based on encoder with male connector or cable with male connector.

²⁾ Not applicable for stator coupling type C and K.

³⁾ Allow for self-heating of 2.6 K per 1,000 rpm when designing the operating temperature range.

⁴⁾ Maximum speed which does not cause mechanical damage to the encoder. Impact on the service life and signal quality is possible. Please note the maximum output frequency.

Ambient data

| | |
|--------------------------------------|--|
| EMC | According to EN 61000-6-2 and EN 61000-6-3 |
| Enclosure rating | IP65, housing side (IEC 60529) ¹⁾ IP65, shaft side (IEC 60529) |
| Permissible relative humidity | 90 % (Condensation not permitted) |
| Operating temperature range | -20 °C ... +85 °C ²⁾ |
| Storage temperature range | -40 °C ... +100 °C, without package |
| Resistance to shocks | 250 g, 3 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⁾ These values relate to all mechanical versions including recommended accessories unless otherwise noted.

Classifications

| | |
|---------------------|----------|
| eCI@ss 5.0 | 27270501 |
| eCI@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))



XF7 values see shaft diameter table for through hollow shaft, clamping at the front

- ① Zero pulse mark on housing
- ② Zero pulse mark on flange under stator coupling
- ③ Male connector tolerance in relation to hole pattern

| Type Through hollow shaft with front clamping | Shaft diameter XF7 |
|---|--------------------|
| DBS60x-TAxxxxxxx DBS60x-T1xxxxxxx | 6 mm |
| DBS60x-TBxxxxxxx DBS60x-T2xxxxxxx | 8 mm |
| DBS60x-TCxxxxxxx DBS60x-T3xxxxxxx | 3/8" |
| DBS60x-TDxxxxxxx DBS60x-T4xxxxxxx | 10 mm |
| DBS60x-TExxxxxxx DBS60x-T5xxxxxxx | 12 mm |
| DBS60x-TFxxxxxxx DBS60x-T6xxxxxxx | 1/2" |
| DBS60x-TGxxxxxxx DBS60x-T7xxxxxxx | 14 mm |
| DBS60x-THxxxxxxx DBS60x-T8xxxxxxx | 15 mm |
| DBS60x-TJxxxxxxx | 5/8" |

Attachment specifications

Through hollow shaft with front clamping



Customer side

| Type Through hollow shaft with front clamping | Shaft diameter xj7 |
|---|--------------------|
| DBS60x-TAxxxxxxx DBS60x-T1xxxxxxx | 6 mm |
| DBS60x-TBxxxxxxx DBS60x-T2xxxxxxx | 8 mm |
| DBS60x-TCxxxxxxx DBS60x-T3xxxxxxx | 3/8" |
| DBS60x-TDxxxxxxx DBS60x-T4xxxxxxx | 10 mm |
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| DBS60x-TGxxxxxxx DBS60x-T7xxxxxxx | 14 mm |
| DBS60x-THxxxxxxx DBS60x-T8xxxxxxx | 15 mm |

| Type Through hollow shaft with front clamping | Shaft diameter xj7 |
|---|--------------------|
| DBS60x-TJxxxxxxx | 5/8" |

PIN assignment



View of M23 male device connector on cable / housing

| Wire colors (cable connection) | Male connector M12, 8-pin | Male connector M23, 12-pin | TTL/HTL 6-channel signal | Explanation |
|--------------------------------|---------------------------|----------------------------|--------------------------|-------------------------------------|
| Brown | 1 | 6 | A- | Signal wire |
| White | 2 | 5 | A | Signal wire |
| Black | 3 | 1 | B- | Signal wire |
| Pink | 4 | 8 | B | Signal wire |
| Yellow | 5 | 4 | Z- | Signal wire |
| Purple | 6 | 3 | Z | Signal wire |
| Blue | 7 | 10 | GND | Ground connection |
| Red | 8 | 12 | +U _s | Supply voltage |
| - | - | 9 | Not assigned | Not assigned |
| - | - | 2 | Not assigned | Not assigned |
| - | - | 11 | Not assigned | Not assigned |
| - | - | 7 | Not assigned | Not assigned |
| Screen | Screen | Screen | Screen | Screen connected to encoder housing |

Diagrams



Signal outputs for electrical interfaces TTL and HTL



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

| Supply voltage | Output |
|-----------------|-------------------|
| 4,5 V ... 5,5 V | TTL |
| 10 V ... 30 V | TTL |
| 10 V ... 27 V | HTL |
| 4,5 V ... 30 V | TTL/HTL universal |
| 4,5 V ... 30 V | TTL |

Operation note

Hollow shaft



Attention! If stator coupling is mounted, the zero pulse mark can be hidden by the stator coupling











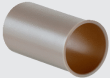

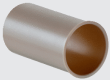

① Zero pulse mark on flange


② Zero pulse is active when screw of clamping is inline with zero pulse mark on flange or housing mark

Recommended accessories

Other models and accessories → www.sick.com/DBS60

| | Brief description | Type | Part no. |
|-----------------------------------|--|------------------|----------|
| Plug connectors and cables | | | |
| | Head A: cable Head B: Flying leads Cable: SSI, Incremental, HIPERFACE®, PUR, halogen-free, shielded | LTG-2308-MWENC | 6027529 |
| | Head A: cable Head B: Flying leads Cable: SSI, Incremental, PUR, shielded | LTG-2411-MW | 6027530 |
| | Head A: cable Head B: Flying leads Cable: SSI, Incremental, PUR, halogen-free, shielded | LTG-2512-MW | 6027531 |
| | Head A: cable Head B: Flying leads Cable: SSI, TTL, HTL, Incremental, PUR, halogen-free, shielded | LTG-2612-MW | 6028516 |
| | Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 2 m | DOL-2312-G02MLA3 | 2030682 |
| | Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 7 m | DOL-2312-G07MLA3 | 2030685 |
| | Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 10 m | DOL-2312-G10MLA3 | 2030688 |
| | Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 15 m | DOL-2312-G15MLA3 | 2030692 |
| | Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 20 m | DOL-2312-G20MLA3 | 2030695 |

| | Brief description | Type | Part no. |
|---|--|------------------|----------|
| | Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 25 m | DOL-2312-G25MLA3 | 2030699 |
| | Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 30 m | DOL-2312-G30MLA3 | 2030702 |
|  | Head A: female connector, M23, 12-pin, straight Cable: HIPERFACE [®] , SSI, Incremental, shielded | DOS-2312-G02 | 2077057 |
|  | Head A: female connector, M23, 12-pin, angled Cable: HIPERFACE [®] , SSI, Incremental, shielded | DOS-2312-W01 | 2072580 |
| Shaft adaptation | | | |
|  | Collet plastic insulated for hollow shaft, shaft diameter 6 mm, outer diameter 5/8" (15.875 mm), plastic | SPZ-58Z-006-P | 2076228 |
|  | Collet metal for hollow shaft, shaft diameter 8 mm, outer diameter 5/8" (15.875 mm), metal | SPZ-58Z-008-M | 2076219 |
|  | Collet plastic insulated for hollow shaft, shaft diameter 8 mm, outer diameter 5/8" (15.875 mm), plastic | SPZ-58Z-008-P | 2076229 |
|  | Collet metal for hollow shaft, shaft diameter 10 mm, outer diameter 5/8" (15.875 mm), metal | SPZ-58Z-010-M | 2076220 |
|  | Collet plastic insulated for hollow shaft, shaft diameter 10 mm, outer diameter 5/8" (15.875 mm), plastic | SPZ-58Z-010-P | 2076230 |
|  | Collet metal for hollow shaft, shaft diameter 11 mm, outer diameter 5/8" (15.875 mm), metal | SPZ-58Z-011-M | 2094671 |
| | Collet metal for hollow shaft, shaft diameter 12 mm, outer diameter 5/8" (15.875 mm), metal | SPZ-58Z-012-M | 2076221 |
|  | Collet plastic insulated for hollow shaft, shaft diameter 12 mm, outer diameter 5/8" (15.875 mm), plastic | SPZ-58Z-012-P | 2076231 |
|  | Collet metal for hollow shaft, shaft diameter 14 mm, outer diameter 5/8" (15.875 mm), metal | SPZ-58Z-014-M | 2076222 |
|  | Collet plastic insulated for hollow shaft, shaft diameter 14 mm, outer diameter 5/8" (15.875 mm), plastic | SPZ-58Z-014-P | 2076232 |
|  | Collet metal for hollow shaft, shaft diameter 15 mm, outer diameter 5/8" (15.875 mm), metal | SPZ-58Z-015-M | 2076223 |
|  | Collet plastic insulated for hollow shaft, shaft diameter 15 mm, outer diameter 5/8" (15.875 mm), plastic | SPZ-58Z-015-P | 2076233 |
|  | Collet metal for hollow shaft, shaft diameter 1/2" (12.7 mm), outer diameter 5/8" (15.875 mm), metal | SPZ-58Z-12Z-M | 2076225 |
| | Collet plastic insulated for hollow shaft, shaft diameter 1/2" (12.7 mm), outer diameter 5/8" (15.875 mm), plastic | SPZ-58Z-12Z-P | 2076227 |

| | Brief description | Type | Part no. |
|---|---|---------------|----------|
| | Collet metal for hollow shaft, shaft diameter 3/8" (9.525 mm), outer diameter 5/8" (15.875 mm), metal | SPZ-58Z-38Z-M | 2076224 |
|  | Collet plastic insulated for hollow shaft, shaft diameter 3/8" (9.525 mm), outer diameter 5/8" (15.875 mm), plastic | SPZ-58Z-38Z-P | 2076226 |

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