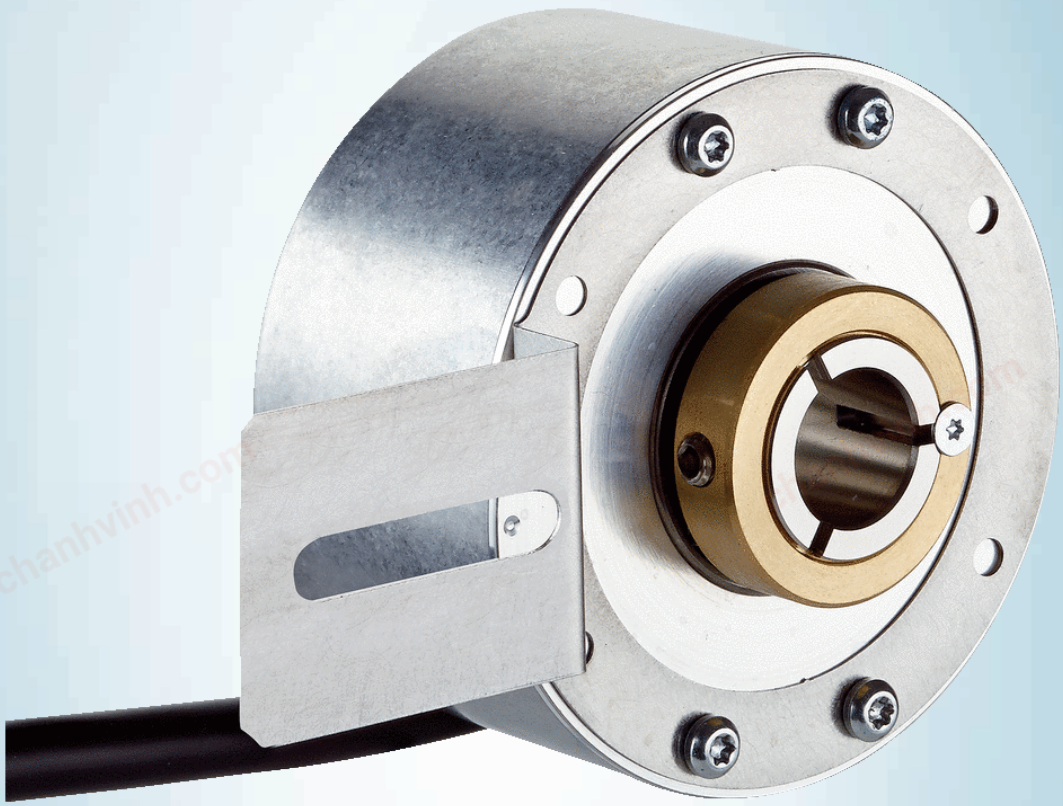
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Product data sheet



# DBS60E-BDEJD1024

## DBS60

INCREMENTAL ENCODERS

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Sensor Intelligence.

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# DBS60E-BDEJD1024 | DBS60

INCREMENTAL ENCODERS

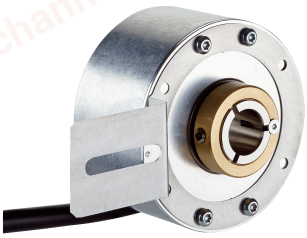


Illustration may differ

## Ordering information

| Type | Part no. |
|---|---|
| DBS60E-BDEJD1024 | 1106344 |

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** | HTL / Push pull |
| **Number of signal channels** | 6-channel |
| **Initialization time** | < 5 ms [1] |
| **Output frequency** | + 300 kHz [2] |
| **Load current** | ≤ 30 mA, per channel |
| **Power consumption** | ≤ 1 W (without load) |

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

[2] Up to 450 kHz on request.

### Electrical data

| | |
|---|---|
| **Connection type** | Cable, 8-wire, universal, 0.5 m [1] |
| **Supply voltage** | 10 ... 27 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** | ✓ [2] |
| **MTTFd: mean time to dangerous failure** | 500 years (EN ISO 13849-1) [3] |

[1] The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

[2] Short-circuit opposite to another channel, US or GND permissable 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.

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## Mechanical data

| | |
|---|---|
| **Mechanical design** | Blind hollow shaft |
| **Shaft diameter** | 10 mm |
| **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 |
| **Material, cable** | PVC |
| **Start up torque** | + 0.5 Ncm (+20 °C) |
| **Operating torque** | 0.4 Ncm (+20 °C) |
| **Permissible movement static** | ± 0.3 mm (radial)<br>± 0.5 mm (axial) [2] |
| **Permissible movement dynamic** | ± 0.1 mm (radial)<br>± 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 apllicable 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** | IP67, housing side (IEC 60529)<br>IP65, shaft side (IEC 60529) |
| **Permissible relative humidity** | 90 % (Condensation not permitted) |
| **Operating temperature range** | –20 °C ... +85 °C [1] |
| **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) |

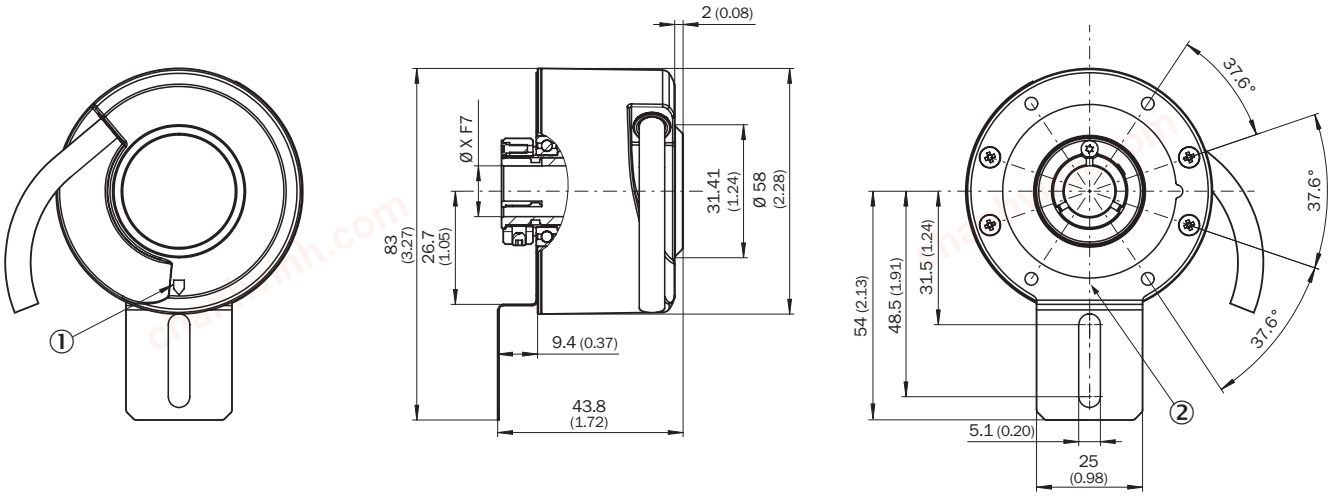
[1] These values relate to all mechanical versions including recommended accessories unless otherwise noted.

## 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))




XF7 values see shaft diameter table for blind hollow shaft
① Zero pulse mark on housing
② Zero pulse mark on flange under stator coupling

| Type<br>Blind hollow shaft | Shaft diameter XF7 |
|---|---|
| DBS60x-BAxxxxxxxx<br>DBS60x-B1xxxxxxxx | 6 mm |
| DBS60x-BBxxxxxxxx<br>DBS60x-B2xxxxxxxx | 8 mm |
| DBS60x-BCxxxxxxxx<br>DBS60x-B3xxxxxxxx | 3/8″ |
| DBS60x-BDxxxxxxxx<br>DBS60x-B4xxxxxxxx | 10 mm |
| DBS60x-BExxxxxxxx<br>DBS60x-B5xxxxxxxx | 12 mm |
| DBS60x-BFxxxxxxxx<br>DBS60x-B6xxxxxxxx | 1/2″ |
| DBS60x-BGxxxxxxxx<br>DBS60x-B7xxxxxxxx | 14 mm |
| DBS60x-BHxxxxxxxx<br>DBS60x-B8xxxxxxxx | 15 mm |

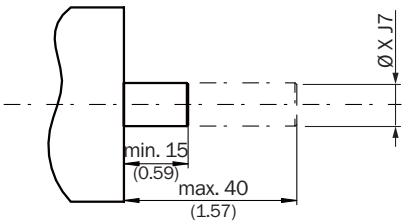
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| Type<br>Blind hollow shaft | Shaft diameter XF7 |
|---|---|
| DBS60x-BJxxxxxxxx | 5/8″ |

## Attachment specifications

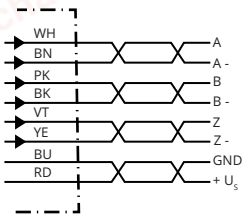
Blind hollow shaft




Customer side

| Type<br>Blind hollow shaft | Shaft diameter xj7 |
|---|---|
| DBS60x-BAxxxxxxxx<br>DBS60x-B1xxxxxxxx | 6 mm |
| DBS60x-BBxxxxxxxx<br>DBS60x-B2xxxxxxxx | 8 mm |
| DBS60x-BCxxxxxxxx<br>DBS60x-B3xxxxxxxx | 3/8″ |
| DBS60x-BDxxxxxxxx<br>DBS60x-B4xxxxxxxx | 10 mm |
| DBS60x-BExxxxxxxx<br>DBS60x-B5xxxxxxxx | 12 mm |
| DBS60x-BFxxxxxxxx<br>DBS60x-B6xxxxxxxx | 1/2″ |
| DBS60x-BGxxxxxxxx<br>DBS60x-B7xxxxxxxx | 14 mm |
| DBS60x-BHxxxxxxxx<br>DBS60x-B8xxxxxxxx | 15 mm |
| DBS60x-BJxxxxxxxx | 5/8″ |

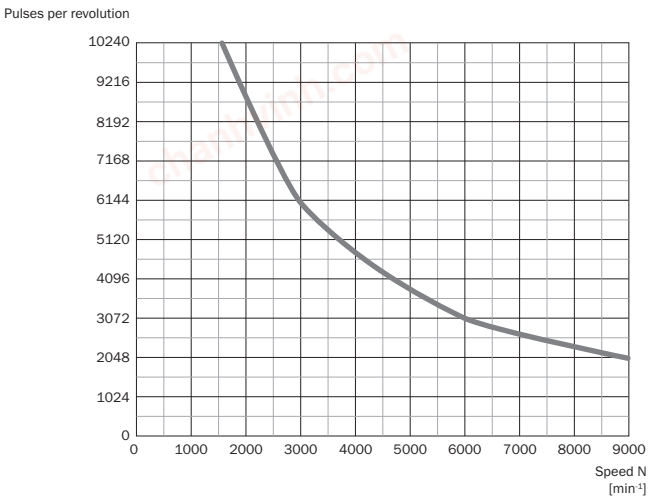
## PIN assignment




| 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 |

| Wire colors (cable connection) | Male connector M12, 8-pin | Male connector M23, 12-pin | TTL/HTL 6-channel signal | Explanation |
|---|---|---|---|---|
| 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 |

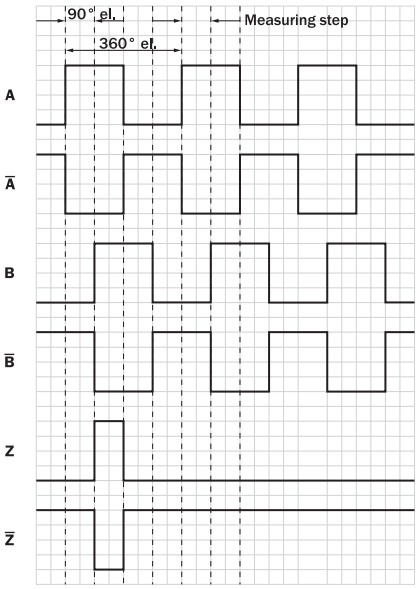
## Diagrams



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Signal outputs for electrical interfaces TTL and HTL

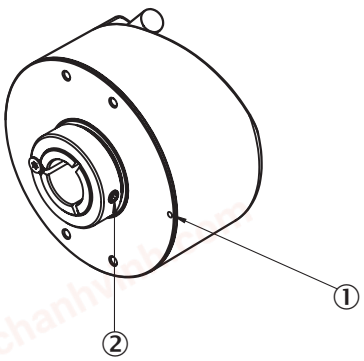



Cw with view on the encoder shaft in direction "A", compare dimensional drawing.

| 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



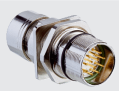

Attention! If stator coupling is mounted, the zero pulse mark can be hidden by the stator coupling
① Zero pulse mark on flange
② Zero pulse is active when screw of clamping is inline with zero pulse mark on flange or housing mark

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## Recommended accessories

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

| | Brief description | Type | Part no. |
|---|---|---|---|
| Plug connectors and cables | | | |
|  | Head A: cable<br>Head B: Flying leads<br>Cable: SSI, Incremental, HIPERFACE®, PUR, halogen-free, shielded | LTG-2308-MWENC | 6027529 |
|  | Head A: cable<br>Head B: Flying leads<br>Cable: SSI, Incremental, PUR, shielded | LTG-2411-MW | 6027530 |
|  | Head A: cable<br>Head B: Flying leads<br>Cable: SSI, Incremental, PUR, halogen-free, shielded | LTG-2512-MW | 6027531 |
|  | Head A: cable<br>Head B: Flying leads<br>Cable: SSI, TTL, HTL, Incremental, PUR, halogen-free, shielded | LTG-2612-MW | 6028516 |
|  | Head A: male connector, M12, 8-pin, straight, A-coded<br>Cable: Incremental, shielded | STE-1208-GA01 | 6044892 |
|  | Head A: male connector, M23, 12-pin, straight<br>Cable: HIPERFACE®, SSI, Incremental, shielded | STE-2312-G01 | 2077273 |
|  | | STE-2312-GX | 6028548 |

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