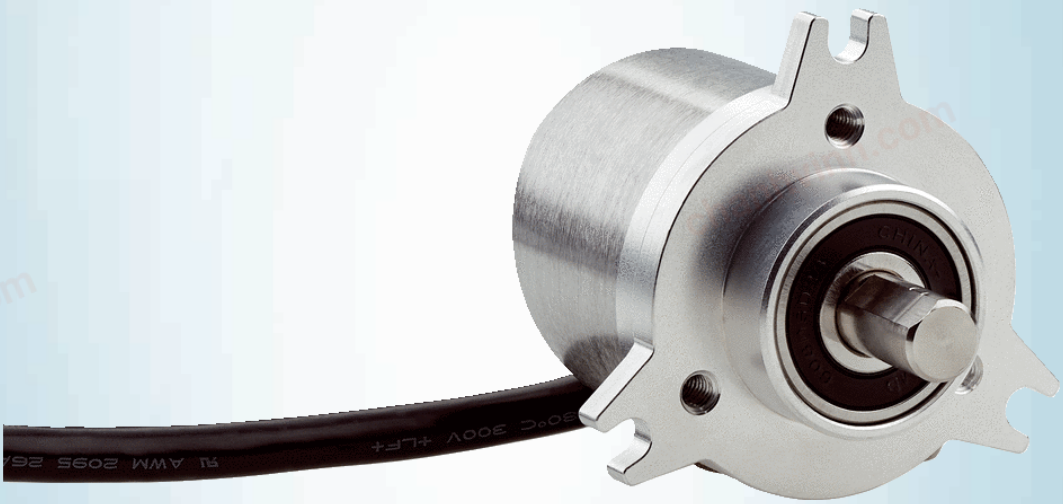
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Product data sheet



# DBS50E-SKEJ02048

## DBS36/50

INCREMENTAL ENCODERS

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# DBS50E-SKEJ02048 | DBS36/50

INCREMENTAL ENCODERS

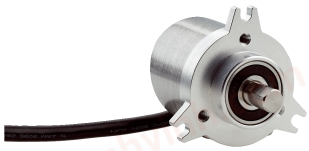


Illustration may differ

## Ordering information

| Type | Part no. |
|---|---|
| DBS50E-SKEJ02048 | 1109501 |

Other models and accessories → www.sick.com/DBS36_50

## Detailed technical data

### Performance

| | |
|---|---|
| **Pulses per revolution** | 2,048 |
| **Measuring step** | 90° electric/pulses per revolution |
| **Measuring step deviation** | ± 18° / pulses per revolution |
| **Error limits** | ± 54° / pulses per revolution |
| **Duty cycle** | ≤ 0.5 ± 5 % |

### Interfaces

| | |
|---|---|
| **Communication interface** | Incremental |
| **Communication Interface detail** | HTL / Push pull |
| **Number of signal channels** | 6-channel |
| **Initialization time** | < 3 ms |
| **Output frequency** | ≤ 300 kHz |
| **Load current** | ≤ 30 mA |
| **Power consumption** | < 0.5 W (without load) |

### Electrical data

| | |
|---|---|
| **Connection type** | Cable, 8-wire, universal, 0.5 m |
| **Supply voltage** | 7 ... 30 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] |
| **MTTFd: mean time to dangerous failure** | 600 years (EN ISO 13849-1) [2] |

[1] The short-circuit rating is only given if Us and GND are connected correctly.

[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.

### Mechanical data

| | |
|---|---|
| **Mechanical design** | Solid shaft, face mount flange 3xM4 |
| **Shaft diameter** | 8 mm |

[1] Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

[2] No permanent operation. Decreasing signal quality.

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| | |
|---|---|
| **Shaft length** | 13 mm |
| **Weight** | + 180 g (with connecting cable) |
| **Shaft material** | Stainless steel |
| **Flange material** | Aluminum |
| **Housing material** | Aluminum |
| **Material, cable** | PVC |
| **Start up torque** | + 0.9 Ncm (+20 °C) |
| **Operating torque** | 0.6 Ncm (+20 °C) |
| **Permissible shaft load** | 30 N (axial)<br>50 N (radial) |
| **Operating speed** | 6,000 $min^{-1}$ [1] |
| **Maximum operating speed** | 8,000 $min^{-1}$ [2] |
| **Moment of inertia of the rotor** | 0.65 $gcm^2$ |
| **Bearing lifetime** | 2 x 10^9 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.
[2] No permanent operation. Decreasing signal quality.

## Ambient data

| | |
|---|---|
| **EMC** | According to EN 61000-6-2 and EN 61000-6-3 (class A) |
| **Enclosure rating** | IP65 |
| **Permissible relative humidity** | 90 % (Condensation not permitted) |
| **Operating temperature range** | –20 °C ... +85 °C, –35 °C ... +95 °C on request |
| **Storage temperature range** | –40 °C ... +100 °C, without package |
| **Resistance to shocks** | 100 g, 6 ms (EN 60068-2-27) |
| **Resistance to vibration** | 20 g, 10 Hz ... 2,000 Hz (EN 60068-2-6) |

## 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 |

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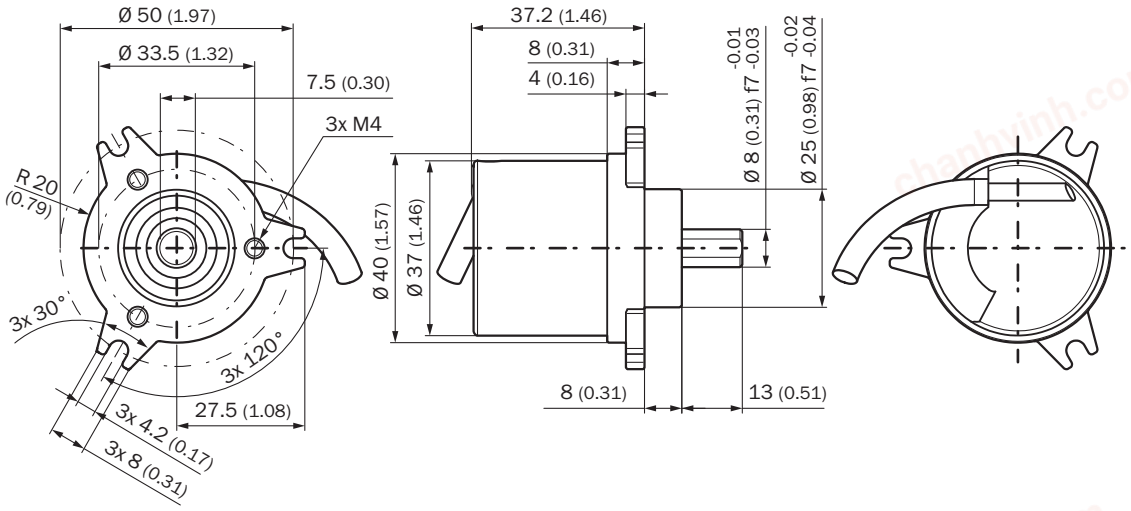
# DBS50E-SKEJ02048 | DBS36/50

INCREMENTAL ENCODERS

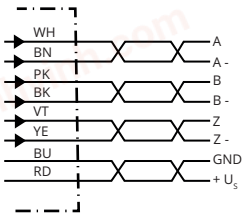
| | |
|---|---|
| **UNSPSC 16.0901** | 41112113 |

## Dimensional drawing (Dimensions in mm (inch))

Face mount flange 3xM4




## PIN assignment



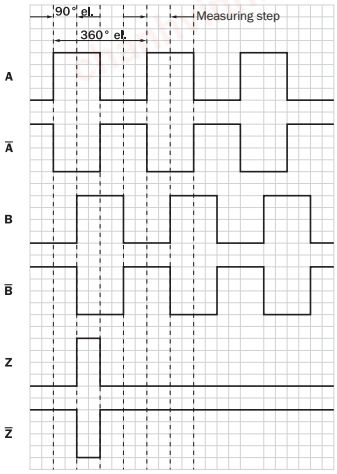

| Wire colors (cable connection) | Male connector M12, 8-pin | Male connector M23, 12-pin | TTL/HTL 6-channel signal | Explanation |
|---|---|---|---|---|
| Brown | 1 | 6 | A- | Signal wire |
| White | 2 | 5 | A | Signal wire |
| Black | 3 | 1 | B- | Signal wire |
| Pink | 4 | 8 | B | Signal wire |
| 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 |

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## Diagrams

Signal outputs for electrical interfaces TTL and HTL




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

① Interfaces G, P, R only for channels A, B, Z.

| Supply voltage | Output |
|---|---|
| 4.5 V...5.5 V | TTL/RS422 |
| 7 V...30 V | TTL/RS422 |
| 7 V...30 V | HTL/Push Pull |
| 7 V...27 V | HTL/push pull, 3 channel |
| 4.5 V...5.5 V | Open Collector NPN, 3 channel |
| 4.5 V...30 V | Open Collector NPN, 3 channel |

## Recommended accessories

Other models and accessories ➜ www.sick.com/DBS36_50

| | Brief description | Type | Part no. |
|---|---|---|---|
| Flanges | | | |
|  | Flange adapter, adaption of 25 mm spigot face mount flange to 60s face mount flange with 36 mm centering collar, Aluminum | BEF-FA-025-036 | 2034226 |
|  | Flange adapter, adaption of 25 mm spigot face mount flange to 50 mm servo flange, Aluminum | BEF-FA-025-050 | 2032622 |
|  | Flange adapter, adaption of 25 mm spigot face mount flange to 60 mm square installation plate, Aluminum | BEF-FA-025-060RCA | 2032623 |
|  | Flange adapter, adaption of 25 mm spigot face mount flange to 60 mm square installation plate with shock-absorber, Aluminum | BEF-FA-025-060RSA | 2032624 |
|  | Flange adapter, adapts face mount flange with 25 mm centering collar to 63 mm square mounting plate, Aluminum | BEF-FA-025-063-REC | 2033631 |

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| | Brief description | Type | Part no. |
|---|---|---|---|
| **Other mounting accessories** | | | |
|  | Aluminum measuring wheel with cross-knurled surface for 8 mm solid shaft, circumference 200 mm | BEF-MR08200AK | 4084741 |
|  | Aluminum measuring wheel with smooth polyurethane surface for 8 mm solid shaft, circumference 200 mm | BEF-MR08200AP | 4084742 |
| | Aluminum measuring wheel, ground PUR ring covering for greater circumference accuracy, spare parts package consisting of 10 measuring wheels, circumference 200 mm +/-0.2 mm; for shaft with Ø 8 mm | BEF-MR08200APA | 2109902 |
|  | Aluminum measuring wheel with ridged polyurethane surface for 8 mm solid shaft, circumference 200 mm | BEF-MR08200APG | 4084744 |
|  | Aluminum measuring wheel with studded polyurethane surface for 8 mm solid shaft, circumference 200 mm | BEF-MR08200APN | 4084743 |
| **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 |
| **Shaft adaptation** | | | |
|  | Bar coupling, shaft diameter 6 mm /8 mm, maximum shaft offset radial ± 0.3 mm, axial ± 0.2 mm, angle ± 3°, max. speed 10,000 rpm, torsion spring rigidity 38 Nm/wheel; material: fiber-glass reinforced polyamide, aluminum hub | KUP-0608-S | 5314179 |
| | Bar coupling, shaft diameter 8 mm /8 mm, maximum shaft offset radial ± 0.3 mm, axial ± 0.2 mm, angle ± 3°; max. speed 10,000 rpm, torsion spring rigidity 38 Nm/wheel; material: fiber-glass reinforced polyamide, aluminum hub | KUP-0808-S | 5314177 |
|  | Double loop coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radially +/- 0,25 mm, axially +/-0,4 mm, angle +/- 4 degrees;max. speed 10.000 rpm, –30 to +120 degrees Celsius, torsional spring stiffness of 150 Nm/rad | KUP-0810-D | 5326704 |
| | Claw coupling, shaft diameter 8 mm / 10 mm, damping element 80 shore blue, maximum shaft offset: radial ± 0.22 mm, axial ± 1 mm angular ± 1.3°, max. speed 19,000 rpm, angle of twist max. 10°, –30 °C to +80 °C, max. torque 800 Ncm, tightening torque of screws: ISO 4029 150 Ncm, material: aluminum flange, damping element: polyurethane | KUP-0810-J | 2128267 |

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| | Brief description | Type | Part no. |
|---|---|---|---|
|  | Bar coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radial ± 0,3 mm, axial ± 0,3 mm, angular ± 3°; max. speed 10.000 rpm, –10° to +80 °C, max. torque: 80 Ncm, material: fiber-glass reinforced polyamide, aluminum hub | KUP-0810-S | 5314178 |

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