

# DBS50E-SKRJ00360

DBS36/50

INCREMENTAL ENCODERS

**SICK**  
Sensor Intelligence.

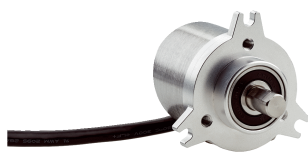


Illustration may differ

### Ordering information

| Type             | Part no. |
|------------------|----------|
| DBS50E-SKRJ00360 | 1109457  |

Other models and accessories → [www.sick.com/DBS36\\_50](http://www.sick.com/DBS36_50)



### Detailed technical data

#### Performance

|                                 |                                    |
|---------------------------------|------------------------------------|
| <b>Pulses per revolution</b>    | 360                                |
| <b>Measuring step</b>           | 90° electric/pulses per revolution |
| <b>Measuring step deviation</b> | ± 18° / pulses per revolution      |
| <b>Error limits</b>             | ± 54° / pulses per revolution      |
| <b>Duty cycle</b>               | ≤ 0.5 ± 5 %                        |

#### Interfaces

|                                       |                        |
|---------------------------------------|------------------------|
| <b>Communication interface</b>        | Incremental            |
| <b>Communication Interface detail</b> | Open Collector         |
| <b>Number of signal channels</b>      | 3 channel              |
| <b>Initialization time</b>            | < 3 ms                 |
| <b>Output frequency</b>               | ≤ 300 kHz              |
| <b>Load current</b>                   | ≤ 30 mA                |
| <b>Power consumption</b>              | < 0.5 W (without load) |

#### Electrical data

|  |   |
|--|---|
| <b>Connection type</b>                         | Cable, 5-wire, universal, 0.5 m             |
| <b>Supply voltage</b>                          | 4.5 ... 30 V                                |
| <b>Reference signal, number</b>                | 1   |
| <b>Reference signal, position</b>              | 90°, electric, logically gated with A and B |
| <b>Reverse polarity protection</b>             | ✓   |
| <b>Short-circuit protection of the outputs</b> | ✓ <sup>1)</sup>                             |
| <b>MTTFd: mean time to dangerous failure</b>   | 600 years (EN ISO 13849-1) <sup>2)</sup>    |

<sup>1)</sup> The short-circuit rating is only given if Us and GND are connected correctly.

<sup>2)</sup> 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

|                          |                                     |
|--------------------------|-------------------------------------|
| <b>Mechanical design</b> | Solid shaft, face mount flange 3xM4 |
| <b>Shaft diameter</b>    | 8 mm                                |

<sup>1)</sup> Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

<sup>2)</sup> No permanent operation. Decreasing signal quality.

|                                       |                                       |
|---------------------------------------|---------------------------------------|
| <b>Shaft length</b>                   | 13 mm                                 |
| <b>Weight</b>                         | + 180 g (with connecting cable)       |
| <b>Shaft material</b>                 | Stainless steel                       |
| <b>Flange material</b>                | Aluminum                              |
| <b>Housing material</b>               | Aluminum                              |
| <b>Material, cable</b>                | PVC                                   |
| <b>Start up torque</b>                | + 0.9 Ncm (+20 °C)                    |
| <b>Operating torque</b>               | 0.6 Ncm (+20 °C)                      |
| <b>Permissible shaft load</b>         | 30 N (axial)<br>50 N (radial)         |
| <b>Operating speed</b>                | 6,000 min <sup>-1</sup> <sup>1)</sup> |
| <b>Maximum operating speed</b>        | 8,000 min <sup>-1</sup> <sup>2)</sup> |
| <b>Moment of inertia of the rotor</b> | 0.65 gcm <sup>2</sup>                 |
| <b>Bearing lifetime</b>               | 2 x 10 <sup>9</sup> revolutions       |
| <b>Angular acceleration</b>           | ≤ 500,000 rad/s <sup>2</sup>          |

<sup>1)</sup> Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

<sup>2)</sup> No permanent operation. Decreasing signal quality.

#### Ambient data

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

#### Classifications

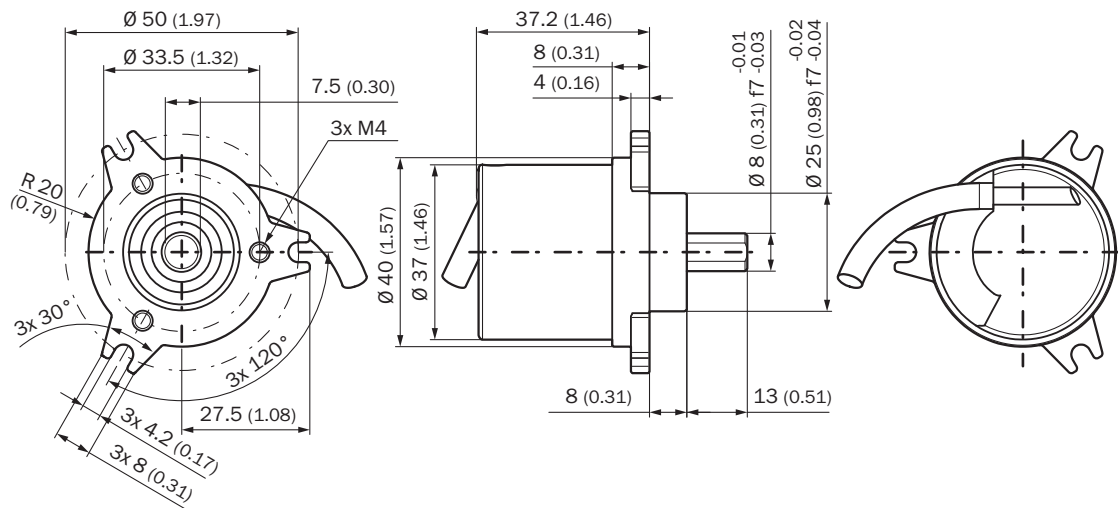
|                     |          |
|---------------------|----------|
| <b>eCl@ss 5.0</b>   | 27270501 |
| <b>eCl@ss 5.1.4</b> | 27270501 |
| <b>eCl@ss 6.0</b>   | 27270590 |
| <b>eCl@ss 6.2</b>   | 27270590 |
| <b>eCl@ss 7.0</b>   | 27270501 |
| <b>eCl@ss 8.0</b>   | 27270501 |
| <b>eCl@ss 8.1</b>   | 27270501 |
| <b>eCl@ss 9.0</b>   | 27270501 |
| <b>eCl@ss 10.0</b>  | 27270501 |
| <b>eCl@ss 11.0</b>  | 27270501 |
| <b>eCl@ss 12.0</b>  | 27270501 |
| <b>ETIM 5.0</b>     | EC001486 |
| <b>ETIM 6.0</b>     | EC001486 |
| <b>ETIM 7.0</b>     | EC001486 |
| <b>ETIM 8.0</b>     | EC001486 |

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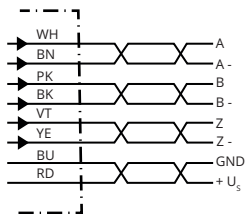
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### Dimensional drawing (Dimensions in mm (inch))

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                         | +Us                      | 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.

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](http://www.sick.com/DBS36_50)

|   | Brief description   | Type               | Part no. |
|---|---|--------------------|----------|
| <b>Flanges</b>  |   |                    |          |
|  | 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  |

|   | Brief description  | Type           | Part no. |
|---|--|----------------|----------|
| <b>Other mounting accessories</b>   |  |                |          |
|    | 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  |
| <b>Plug connectors and cables</b>   |  |                |          |
|    | 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  |
| <b>Shaft adaptation</b>   |  |                |          |
|  | 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  |

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

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SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

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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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