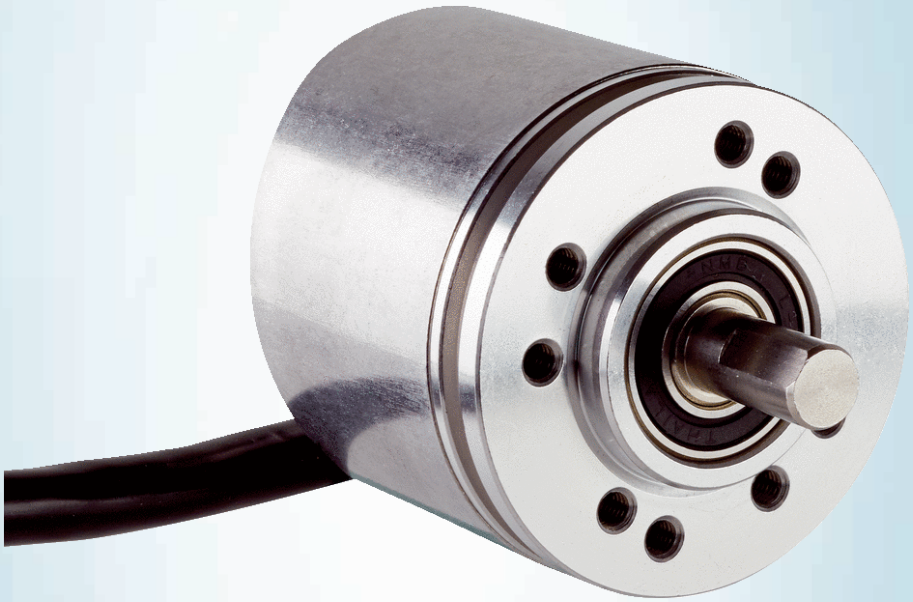
Data sheet



# DBS36E-S3GK02048

## DBS36/50

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.

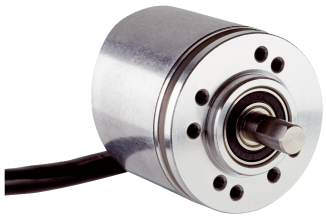


Illustration may differ

## Ordering information

| Type | part no. |
|---|---|
| DBS36E-S3GK02048 | 1077496 |

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

## Detailed technical data

### Safety-related parameters

| | |
|---|---|
| **$MTTF_D$ (mean time to dangerous failure)** | 600 years (EN ISO 13849-1) [1] |

[1] 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.

### 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** | 3 channel |
| **Initialization time** | < 3 ms |
| **Output frequency** | ≤ 300 kHz |
| **Load current** | ≤ 30 mA |
| **Power consumption** | ≤ 0.5 W (without load) |

### Electronics

| | |
|---|---|
| **Connection type** | Cable, 5-wire, universal, 1.5 m |
| **Supply voltage** | 7 ... 27 V |
| **Reference signal, number** | 1 |
| **Reference signal, position** | 90°, electric, logically gated with A and B |
| **Reverse polarity protection** | ✓ |

## Mechanics

| | |
|---|---|
| **Mechanical design** | Solid shaft, face mount flange |
| **Shaft diameter** | 6 mmWith flat |
| **Shaft length** | 12 mm |
| **Weight** | + 150 g (with connecting cable) |
| **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 shaft loading** | 40 N (radial) [1]<br>20 N (axial) |
| **Operating speed** | 6,000 $min^{-1}$ [2] |
| **Maximum operating speed** | ≤ 8,000 $min^{-1}$ [3] |
| **Moment of inertia of the rotor** | 0.6 $gcm^2$ |
| **Bearing lifetime** | 2 x 10^9 revolutions |
| **Angular acceleration** | ≤ 500,000 $rad/s^2$ |

[1] Higher values are possible using limited bearing life.
[2] Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.
[3] 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 ... +70 °C |
| **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

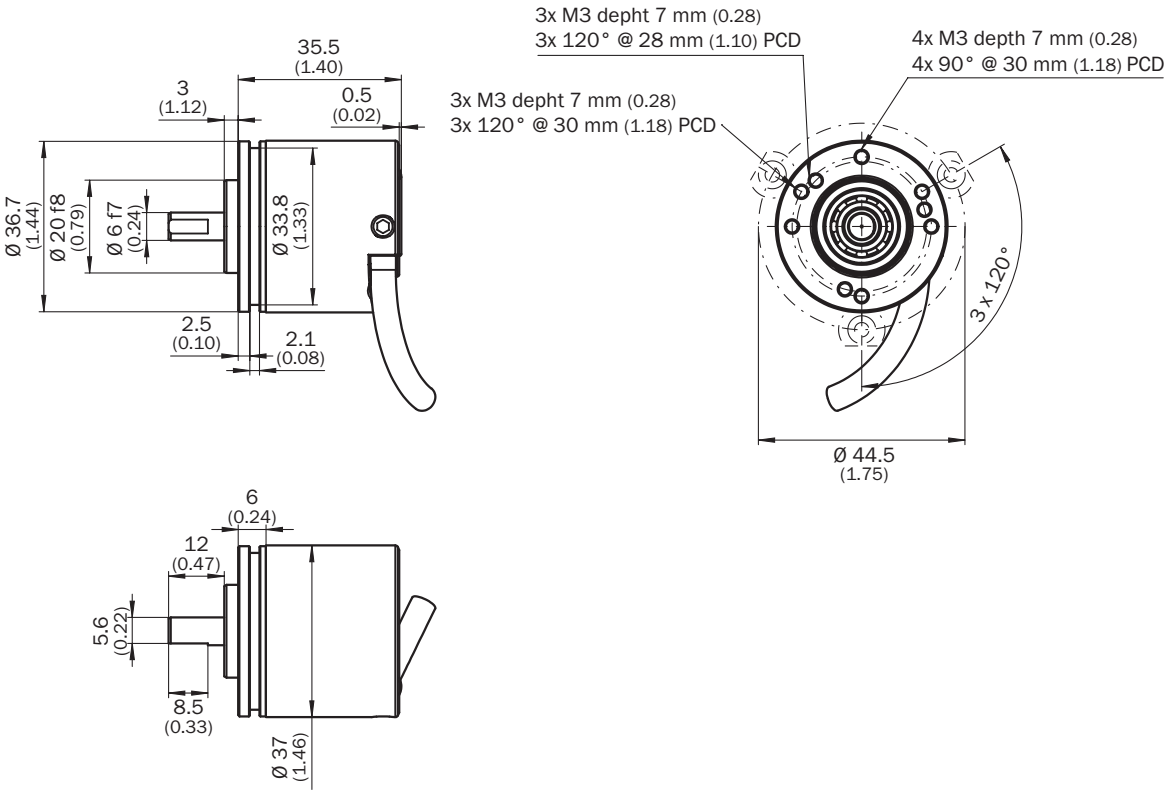
| | |
|---|---|
| **ECLASS 5.0** | 27270501 |
| **ECLASS 5.1.4** | 27270501 |
| **ECLASS 6.0** | 27270590 |
| **ECLASS 6.2** | 27270590 |
| **ECLASS 7.0** | 27270501 |
| **ECLASS 8.0** | 27270501 |
| **ECLASS 8.1** | 27270501 |
| **ECLASS 9.0** | 27270501 |
| **ECLASS 10.0** | 27270501 |
| **ECLASS 11.0** | 27270501 |
| **ECLASS 12.0** | 27270501 |

| | |
|---|---|
| **ETIM 5.0** | EC001486 |
| **ETIM 6.0** | EC001486 |
| **ETIM 7.0** | EC001486 |
| **ETIM 8.0** | EC001486 |
| **UNSPSC 16.0901** | 41112113 |

## Certificates

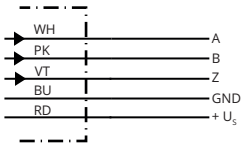
| | |
|---|---|
| **EU declaration of conformity** | ✓ |
| **UK declaration of conformity** | ✓ |
| **ACMA declaration of conformity** | ✓ |
| **China-RoHS** | ✓ |
| **cRUus certificate** | ✓ |

## Dimensional drawing Solid shaft, face mount flange, shaft 6 mm x 12 mm, type 0 flange design hole pattern



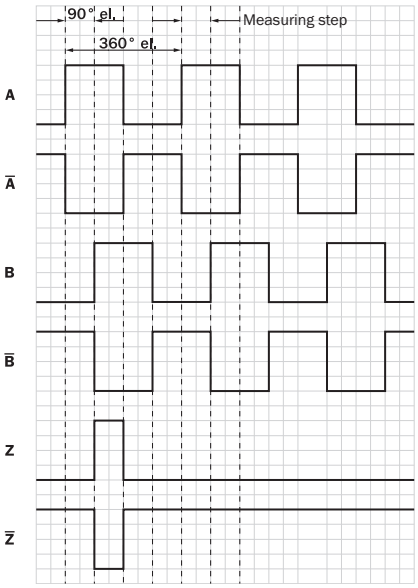

Dimensions in mm (inch)

## PIN assignment




| Wire colors (cable connection) | Male connector M12, 8-pin | Male connector M23, 12-pin | SignalOpen Collector3 channel | Explanation |
|---|---|---|---|---|
| White | 2 | 5 | A | Signal wire |
| Pink | 4 | 8 | B | Signal wire |
| Purple | 6 | 3 | Z | Signal wire |
| Blue | 7 | 10 | GND | Ground connection |
| Red | 8 | 12 | $+U_s$ | Supply voltage |

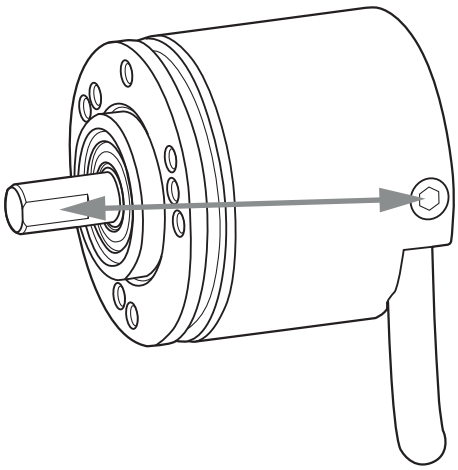
## Diagrams Signal outputs for electrical interfaces TTL and HTL




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 |

## Operation note Zero pulse explanation



## Recommended accessories

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

| | Brief description | Type | part no. |
|---|---|---|---|
| connectors and cables | | | |
|  | • **Connection type head A:** Flying leads<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, Incremental, HIPERFACE®<br>• **Items supplied:** By the meter<br>• **Cable:** 8-wire, PUR, halogen-free<br>• **Description:** SSI, shielded, Incremental, HIPERFACE® | LTG-2308-MWENC | 6027529 |
|  | • **Connection type head A:** Flying leads<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, Incremental<br>• **Items supplied:** By the meter<br>• **Cable:** 11-wire, PUR<br>• **Description:** SSI, shielded, Incremental | LTG-2411-MW | 6027530 |
|  | • **Connection type head A:** Flying leads<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, Incremental<br>• **Items supplied:** By the meter<br>• **Cable:** 12-wire, PUR, halogen-free<br>• **Description:** SSI, shielded, Incremental | LTG-2512-MW | 6027531 |
|  | • **Connection type head A:** Flying leads<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, TTL, HTL, Incremental<br>• **Items supplied:** By the meter<br>• **Cable:** 12-wire, UV and saltwater-resistant, PUR, halogen-free<br>• **Description:** SSI, shielded, TTL, HTL, Incremental | LTG-2612-MW | 6028516 |
|  | • **Connection type head A:** Male connector, M12, 5-pin, straight, A-coded<br>• **Description:** Unshielded<br>• **Connection systems:** Screw-type terminals<br>• **Permitted cross-section:** ≤ 0.75 mm²<br>• **Note:** For field bus technology | STE-1205-G | 6022083 |
|  | • **Connection type head A:** Male connector, M12, 5-pin, straight, B-coded<br>• **Signal type:** PROFIBUS DP<br>• **Description:** PROFIBUS DP, shielded<br>• **Connection systems:** Screw-type terminals<br>• **Permitted cross-section:** ≤ 0.75 mm² | STE-1205-GQ | 6021354 |
|  | • **Connection type head A:** Male connector, M12, 5-pin, straight, A-coded<br>• **Description:** Unshielded<br>• **Connection systems:** Spring-cage connection<br>• **Permitted cross-section:** 0.14 mm² ... 0.5 mm²<br>• **Note:** Test voltage 1.25 kV eff/60 s, insulation group C to VDE 0110 | STE-1205-GFE | 6044999 |
|  | • **Connection type head A:** Male connector, M12, 5-pin, angled, A-coded<br>• **Description:** Unshielded<br>• **Connection systems:** Screw-type terminals<br>• **Permitted cross-section:** ≤ 0.75 mm²<br>• **Note:** For field bus technology | STE-1205-W | 6022082 |
|  | • **Connection type head A:** Male connector, M12, 5-pin, straight, A-coded<br>• **Signal type:** CANopen, DeviceNet™<br>• **Description:** CANopen, shieldedDeviceNet™<br>• **Connection systems:** Screw-type terminals<br>• **Permitted cross-section:** ≤ 0.75 mm² | STE-1205-GA | 6027533 |
|  | • **Connection type head A:** Male connector, M12, 5-pin, angled, B-coded<br>• **Signal type:** PROFIBUS DP<br>• **Description:** PROFIBUS DP, shielded<br>• **Connection systems:** Spring-cage connection<br>• **Permitted cross-section:** 0.14 mm² ... 0.5 mm² | STE-1205-WQ | 6041428 |

| | Brief description | Type | part no. |
|---|---|---|---|
| Mounting systems | | | |
|  | • **Description:** Flange adapter, adapts face mount flange with 20 mm centering collar to 33 mm servo flange<br>• **Material:** Aluminum<br>• **Details:** Aluminum | BEF-FA-020-033 | 2066312 |

| | Brief description | Type | part no. |
|---|---|---|---|
| measuring wheels and measuring wheel mechanics | | | |
|  | • **Product segment:** Measuring wheels and measuring wheel mechanics<br>• **Product family:** Measuring wheels<br>• **Description:** Aluminium measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 200 mm | BEF-MR006020R | 2055222 |
|  | • **Product segment:** Measuring wheels and measuring wheel mechanics<br>• **Product family:** Measuring wheels<br>• **Description:** Measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 300 mm | BEF-MR006030R | 2055634 |
|  | • **Product segment:** Measuring wheels and measuring wheel mechanics<br>• **Product family:** Measuring wheels<br>• **Description:** Aluminium measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 500 mm | BEF-MR006050R | 2055225 |
|  | • **Product segment:** Measuring wheels and measuring wheel mechanics<br>• **Product family:** Measuring wheels<br>• **Description:** Aluminum measuring wheel with cross-knurled surface for 6 mm solid shaft, circumference 200 mm | BEF-MR06200AK | 4084745 |
|  | • **Product segment:** Measuring wheels and measuring wheel mechanics<br>• **Product family:** Measuring wheels<br>• **Description:** Aluminum measuring wheel with smooth polyurethane surface for 6 mm solid shaft, circumference 200 mm | BEF-MR06200AP | 4084746 |
|  | • **Product segment:** Measuring wheels and measuring wheel mechanics<br>• **Product family:** Measuring wheels<br>• **Description:** Aluminum measuring wheel with ridged polyurethane surface for 6 mm solid shaft, circumference 200 mm | BEF-MR06200APG | 4084748 |
|  | • **Product segment:** Measuring wheels and measuring wheel mechanics<br>• **Product family:** Measuring wheels<br>• **Description:** Aluminum measuring wheel with studded polyurethane surface for 6 mm solid shaft, circumference 200 mm | BEF-MR06200APN | 4084747 |
| | • **Product segment:** Measuring wheels and measuring wheel mechanics<br>• **Product family:** Measuring wheel mechanics<br>• **Description:** O-ring for measuring wheels (circumference 200 mm) | BEF-OR-053-040 | 2064061 |
| | • **Product segment:** Measuring wheels and measuring wheel mechanics<br>• **Product family:** Measuring wheel mechanics<br>• **Description:** O-ring for measuring wheels (circumference 300 mm) | BEF-OR-083-050 | 2064076 |

| | Brief description | Type | part no. |
|---|---|---|---|
| | • **Items supplied:** 2x O-ring | | |
| | • **Product segment:** Measuring wheels and measuring wheel mechanics<br>• **Product family:** Measuring wheel mechanics<br>• **Description:** O-ring for measuring wheels (circumference 500 mm) | BEF-OR-145-050 | 2064074 |
| shaft adaptation | | | |
|  | • **Product segment:** Shaft adaptation<br>• **Product:** Shaft couplings<br>• **Description:** Bellows coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular +/- 4°; max. speed 10,000 rpm, –30 °C to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub | KUP-0606-B | 5312981 |
|  | • **Product segment:** Shaft adaptation<br>• **Product:** Shaft couplings<br>• **Description:** Cross-slotted coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial ± 0.3 mm, axial ± 0.2 mm, angle ± 3°; max. speed 10,000 rpm, –10° to +80 °C, max. torque 80 Ncm; material: fiber-glass reinforced polyamide, aluminum hub | KUP-0606-S | 2056406 |
|  | • **Product segment:** Shaft adaptation<br>• **Product:** Shaft couplings<br>• **Description:** 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 |
|  | • **Product segment:** Shaft adaptation<br>• **Product:** Shaft couplings<br>• **Description:** Bellows coupling, shaft diameter 6 mm / 10 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular +/- 4°; max. speed 10,000 rpm, –30 °C to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub | KUP-0610-B | 5312982 |
|  | • **Product segment:** Shaft adaptation<br>• **Product:** Shaft couplings<br>• **Description:** Double loop coupling, shaft diameter 6 mm / 10 mm, max. shaft offset: radially +/- 2,5 mm, axially +/-3 mm, angle +/- 10 degrees;max. speed 3.000 rpm, –30 to +80 degrees Celsius, torsional spring stiffness of 25 Nm/rad | KUP-0610-D | 5326697 |
|  | • **Product segment:** Shaft adaptation<br>• **Product:** Shaft couplings<br>• **Description:** Spring washer coupling, shaft diameter 6 mm / 10 mm, Maximum shaft offset: radial +/- 0.3 mm, axial +/- 0.4 mm, angular +/- 2.5°; max. speed 12,000 rpm, –10° to +80 °C, max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin | KUP-0610-F | 5312985 |
|  | • **Product segment:** Shaft adaptation<br>• **Product:** Shaft couplings<br>• **Description:** Bar coupling, shaft diameter 6 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-0610-S | 2056407 |
|  | • **Product segment:** Shaft adaptation<br>• **Product:** Shaft couplings<br>• **Description:** Claw coupling, shaft diameter 6 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-0610-J | 2127056 |

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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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**For us, that is “Sensor Intelligence.”**

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