



## Incremental encoders DBS50 Core

DBS50E-S5AP01024



**Model Name** > **DBS50E-S5AP01024**  
**Part No.** > **1068460**



*Illustration may differ*

**At a glance**

- Connection with universal cable outlet
- Face mount flange with 8 mm solid shaft
- Face mount flange with 2 mounting hole patterns and servo groove
- "Compact housing diameter of 37 mm, flange diameter: 50 mm"
- Various electrical interfaces: TTL/RS-422, HTL/push pull and Open Collector NPN
- Available PPR from 10 up to 2,500
- Working temperature range: -20 °C ... +85 °C
- Enclosure rating: IP 65

**Your benefits**

- The universal cable outlet allows use in tight spaces and makes flexible cable routing possible
- Face mount flange with various mounting hole patterns for easy device replacement without changing the application
- Face mount flange with servo groove makes mounting with servo clamps possible
- The high flexibility of the encoders' mechanical interface and the available accessories make it possible to use one design in many applications
- The compact housing diameter saves valuable space



**Performance**

|                           |                                 |
|---------------------------|---------------------------------|
| Error limits:             | ± 54 ° (/pulses per revolution) |
| Measuring step deviation: | ± 18 ° /impulses per revolution |
| Measuring step:           | 90 ° /electronically/pulses     |
| Initialization time:      | < 3 ms                          |
| Pulses per revolution:    | 1,024                           |
| Duty cycle:               | ≤ 0.5 ± 5 %                     |

**Mechanical data**

|                                 |                                 |
|---------------------------------|---------------------------------|
| Mechanical interface:           | Solid shaft, Face mount flange  |
| Shaft diameter:                 | 8 mm x 15.5 m                   |
| Mass:                           | 180 g                           |
| Start up torque:                | 0.9 Ncm (+20 °C)                |
| Operating torque:               | 0.6 Ncm (+20 °C)                |
| Maximum operating speed:        | 8,000 U/min <sup>1)</sup>       |
| Moment of inertia of the rotor: | 0.65 gcm <sup>2</sup>           |
| Bearing lifetime:               | 2 x 10 <sup>9</sup> revolutions |

|   |                             |
|---|-----------------------------|
| Max. angular acceleration:              | 500,000 rad/s <sup>2</sup>  |
| Permissible shaft loading radial/axial: | 30 N (axial), 50 N (radial) |
| Shaft material:                         | Stainless steel             |
| Operating speed:                        | 6,000 /min <sup>2)</sup>    |
| Flange material:                        | Aluminum                    |
| Housing material:                       | Aluminum                    |
| Material, cable:                        | PVC                         |

<sup>1)</sup> No permanent operation. Decreasing signal quality. <sup>2)</sup> Self warming of 3.3 K per 1000 revolutions/min when applying note working temperature range

### Electrical data

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|  |  |
|--|--|
| Electrical interface:                    | 4.5 V ... 5.5 V, TTL/RS422                             |
| Electrical connection:                   | Cable, 8-pin with male connector M12, universal, 0.5 m |
| Operating power consumption (no load):   | 50 mA  |
| Maximum output frequency:                | 300 kHz  |
| Reference signal, number:                | 1  |
| Reference signal, position:              | 90 °, electronically, gated with A and B               |
| Operating voltage range:                 | 4.5 V ... 5.5 V  |
| Load current max.:                       | 30 mA  |
| MTTFd: mean time to dangerous failure:   | 600 a (EN ISO 13849-1) <sup>1)</sup>                   |
| Power consumption max. without load:     | Without load   |
| Short-circuit protection of the outputs: | 1 <sup>2)</sup>  |
| Reverse polarity protection:             | 0  |

<sup>1)</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. <sup>2)</sup> The short-circuit rating is only given if Us and GND are connected correctly.

### Ambient data

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|                                |   |
|--------------------------------|---|
| EMC:                           | (according to EN 61000-6-2 and EN 61000-6-4 (class A))    |
| Working temperature range:     | -20 °C ... +85 °C   |
| Storage temperature range:     | -40 °C ... +100 °C, without package                       |
| Resistance to shocks:          | 100 g (EN 60068-2-27)                                     |
| Resistance to vibration:       | 20 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)                   |
| Enclosure rating:              | IP 65   |
| Permissible relative humidity: | 90 % (condensation of the optical scanning not permitted) |

## Dimensional drawing



## PIN assignment

### 8-core cable

View of M12 device connector on cable



View of M23 device connector on cable



| PIN, 8-pole in M12 | PIN, 12-pole in M23 | Color of wires | Signal OC       | Signal TTL, HTL | Explanation                         |
|--------------------|---------------------|----------------|-----------------|-----------------|-------------------------------------|
| 1                  | 6                   | Brown          | Not connected   | $\bar{A}$       | Signal line                         |
| 2                  | 5                   | White          | A               | A               | Signal line                         |
| 3                  | 1                   | Black          | Not connected   | $\bar{B}$       | Signal line                         |
| 4                  | 8                   | Pink           | B               | B               | Signal line                         |
| 5                  | 4                   | Yellow         | Not connected   | $\bar{Z}$       | Signal line                         |
| 6                  | 3                   | Lilac          | Z               | Z               | Signal line                         |
| 7                  | 10                  | Blue           | GND             | GND             | Ground connection of the encoder    |
| 8                  | 12                  | Red            | +U <sub>v</sub> | +U <sub>v</sub> | Supply voltage                      |
| -                  | 9                   | -              | Not connected   | Not connected   | Not connected                       |
| -                  | 2                   | -              | Not connected   | Not connected   | Not connected                       |
| -                  | 11                  | -              | Not connected   | Not connected   | Not connected                       |
| -                  | 7                   | -              | Not connected   | Not connected   | Not connected                       |
| Screen             | Screen              | Screen         | Screen          | Screen          | Screen connected to encoder housing |

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