



## Incremental encoders DFS60, Rotary

DFS60B-BDEA01024



**Model Name** > DFS60B-BDEA01024  
**Part No.** > 1050958



*Illustration may differ*

#### At a glance

- Compact installation depth
- High resolution up to 16 bits
- Optionally programmable: Output voltage, zero pulse position, zero pulse width and number of pulses
- Connection: Radial or axial cable outlet, M23 or M12 connector, axial or radial
- Electrical interfaces: 5V & 24V TTL/RS-422, 24 V HTL/push pull
- Mechanical interfaces: face mount or servo flange, blind or through hollow shaft
- Remote zero set possible

#### Your benefits

- Reduced storage costs and downtime due to customer-specific programming
- Variety of different mechanical and electrical interfaces enable the encoder to be optimally adjusted to fit the installation situation
- Excellent concentricity even at high speeds
- High resolution of up to 16 bits ensures precise measurements
- Permanent and safe operation due to a high enclosure rating, temperature resistance and a long bearing lifetime
- Programmability via the PGT-08 programming software and the PGT-10-S display programming tool allow the encoder to be adapted flexibly and quickly according to customer needs
- Programmable zero pulse position simplifies installation



#### Performance

|                        |                                                    |
|------------------------|----------------------------------------------------|
| Error limits:          | $\pm 0.05^\circ$                                   |
| Measuring step:        | $90^\circ / \text{electronically/number of lines}$ |
| Initialization time:   | 40 ms                                              |
| Pulses per revolution: | 1,024                                              |

#### Mechanical data

|                                             |                                          |
|---------------------------------------------|------------------------------------------|
| Mechanical interface:                       | Blind hollow shaft                       |
| Shaft diameter:                             | 10 mm                                    |
| Mass:                                       | 0.2 kg                                   |
| Start up torque:                            | 0.8 Ncm (20 °C)                          |
| Operating torque:                           | 0.6 Ncm (20 °C)                          |
| Permissible movement axial static/dynamic:  | $\pm 0.5 \text{ mm}, \pm 0.2 \text{ mm}$ |
| Permissible movement radial static/dynamic: | $\pm 0.3 \text{ mm}, \pm 0.1 \text{ mm}$ |
| Maximum operating speed:                    | 6,000 /min                               |

|                                 |                                    |
|---------------------------------|------------------------------------|
| Moment of inertia of the rotor: | 40 gcm <sup>2</sup>                |
| Bearing lifetime:               | 3.6 x 10 <sup>10</sup> revolutions |
| Max. angular acceleration:      | 500,000 rad/s <sup>2</sup>         |
| Shaft material:                 | Metal                              |

#### Electrical data

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|                             |                                              |
|-----------------------------|----------------------------------------------|
| Electrical interface:       | HTL/Push pull, Connector M23, 12-pin, radial |
| Connection type:            | Connector M23, 12-pin, radial                |
| Maximum output frequency:   | 600 kHz                                      |
| Reference signal, number:   | 1                                            |
| Reference signal, position: | 90 °, electronically, gated with A and B     |
| Operating voltage range:    | 10 V ... 32 V                                |
| Load current max.:          | 30 mA                                        |
| Power consumption:          | 0.5 W (without load)                         |

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.;

#### Ambient data

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|                                |                                                                            |
|--------------------------------|----------------------------------------------------------------------------|
| EMC:                           | (according to EN 61000-6-2 and EN 61000-6-3)                               |
| Working temperature range:     | -30 °C ... 100 °C                                                          |
| Storage temperature range:     | -40 °C ... 100 °C, without package                                         |
| Resistance to shocks:          | 70 g (according to EN 60068-2-27)                                          |
| Resistance to vibration:       | 30 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)                       |
| Enclosure rating:              | IP 65 (according to IEC 60529), shaft side, IP 67 (according to IEC 60529) |
| Permissible relative humidity: | 90 % (condensation of the optical scanning not permitted)                  |

<sup>1)</sup> With mating connector fitted

Dimensional drawing



PIN assignment

8-core cable

View of M12 device connector on encoder



View of M23 device connector on encoder



| PIN, 8-pin, M12 connector | PIN, 12-pin, M23 connector | Core colors of encoders with cable outlet | TTL/HTL signal  | Explanation                                                                             |
|---------------------------|----------------------------|-------------------------------------------|-----------------|-----------------------------------------------------------------------------------------|
| 1                         | 6                          | Brown                                     | A               | Signal cable                                                                            |
| 2                         | 5                          | White                                     | A               | Signal cable                                                                            |
| 3                         | 1                          | Black                                     | B               | Signal cable                                                                            |
| 4                         | 8                          | Pink                                      | B               | Signal cable                                                                            |
| 5                         | 4                          | Yellow                                    | Z               | Signal cable                                                                            |
| 6                         | 3                          | Lilac                                     | Z               | Signal cable                                                                            |
| 7                         | 10                         | Blue                                      | GND             | Ground connection of the encoder                                                        |
| 8                         | 12                         | Red                                       | +U <sub>s</sub> | Supply voltage (volt-free to housing)                                                   |
| -                         | 9                          | -                                         | N.C.            | Not assigned                                                                            |
| -                         | 2                          | -                                         | N.C.            | Not assigned                                                                            |
| -                         | 11                         | -                                         | N.C.            | Not assigned                                                                            |
| -                         | 7 <sup>a</sup>             | -                                         | SET             | Zero pulse teach                                                                        |
| Shield                    | Shield                     | Shield                                    | Shield          | Shield connected to housing on side of encoder. Connected to ground on side of control. |

<sup>a</sup> Only at 4.5 ... 32 V, TTL/HTL programmable

The SET input serves to carry out the zero pulse teach function. If the SET input is applied to U<sub>s</sub> for longer than 250 ms, after it has been open for at least 1,000 ms or applied to GND, the current shaft position is assigned the zero pulse signal "Z".

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Drehzahlbetrachtung



**Australia**

Phone +61 3 9457 0600  
1800 334 802 – tollfree  
E-Mail sales@sick.com.au

**Belgium/Luxembourg**

Phone +32 (0)2 466 55 66  
E-Mail info@sick.be

**Brasil**

Phone +55 11 3215-4900  
E-Mail sac@sick.com.br

**Canada**

Phone +1 905 771 14 44  
E-Mail information@sick.com

**Ceská Republika**

Phone +420 2 57 91 18 50  
E-Mail sick@sick.cz

**China**

Phone +86 4000 121 000  
E-Mail info.china@sick.net.cn  
Phone +852-2153 6300  
E-Mail ghk@sick.com.hk

**Danmark**

Phone +45 45 82 64 00  
E-Mail sick@sick.dk

**Deutschland**

Phone +49 211 5301-301  
E-Mail kundenservice@sick.de

**España**

Phone +34 93 480 31 00  
E-Mail info@sick.es

**France**

Phone +33 1 64 62 35 00  
E-Mail info@sick.fr

**Great Britain**

Phone +44 (0)1727 831121  
E-Mail info@sick.co.uk

**India**

Phone +91-22-4033 8333  
E-Mail info@sick-india.com

**Israel**

Phone +972-4-6801000  
E-Mail info@sick-sensors.com

**Italia**

Phone +39 02 27 43 41  
E-Mail info@sick.it

**Japan**

Phone +81 (0)3 3358 1341  
E-Mail support@sick.jp

**Magyarország**

Phone +36 1 371 2680  
E-Mail office@sick.hu

**Nederlands**

Phone +31 (0)30 229 25 44  
E-Mail info@sick.nl

**Norge**

Phone +47 67 81 50 00  
E-Mail austefjord@sick.no

**Österreich**

Phone +43 (0)22 36 62 28 8-0  
E-Mail office@sick.at

**Polska**

Phone +48 22 837 40 50  
E-Mail info@sick.pl

**România**

Phone +40 356 171 120  
E-Mail office@sick.ro

**Russia**

Phone +7-495-775-05-30  
E-Mail info@sick.ru

**Schweiz**

Phone +41 41 619 29 39  
E-Mail contact@sick.ch

**Singapore**

Phone +65 6744 3732  
E-Mail admin@sicksgp.com.sg

**Slovenija**

Phone +386 (0)1-47 69 990  
E-Mail office@sick.si

**South Africa**

Phone +27 11 472 3733  
E-Mail info@sickautomation.co.za

**South Korea**

Phone +82 2 786 6321/4  
E-Mail info@sickkorea.net

**Suomi**

Phone +358-9-25 15 800  
E-Mail sick@sick.fi

**Sverige**

Phone +46 10 110 10 00  
E-Mail info@sick.se

**Taiwan**

Phone +886-2-2375-6288  
E-Mail sales@sick.com.tw

**Türkiye**

Phone +90 (216) 528 50 00  
E-Mail info@sick.com.tr

**United Arab Emirates**

Phone +971 (0) 4 8865 878  
E-Mail info@sick.ae

**USA/México**

Phone +1(952) 941-6780  
1 800-325-7425 – tollfree  
E-Mail info@sickusa.com

More representatives and agencies  
at [www.sick.com](http://www.sick.com)