



## Incremental encoders DFS60, Rotary

DFS60A-S4EM16384



**Model Name** > DFS60A-S4EM16384  
**Part No.** > 1037624



*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**

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|                        |                                       |
|------------------------|---------------------------------------|
| Error limits:          | ± 0.03 °                              |
| Measuring step:        | 90 ° / electronically/number of lines |
| Initialization time:   | 40 ms                                 |
| Pulses per revolution: | 16,384                                |

**Mechanical data**

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|                                 |                                    |
|---------------------------------|------------------------------------|
| Mechanical interface:           | Solid shaft, Face mount flange     |
| Shaft diameter:                 | 10 mm x 19 mm                      |
| Mass:                           | 0.3 kg                             |
| Start up torque:                | 0.5 Ncm (+20 °C)                   |
| Operating torque:               | 0.3 Ncm (+20 °C)                   |
| Maximum operating speed:        | 10,000 /min                        |
| Moment of inertia of the rotor: | 6.2 gcm <sup>2</sup>               |
| Bearing lifetime:               | 3.6 x 10 <sup>10</sup> revolutions |

|   |                             |
|---|-----------------------------|
| Max. angular acceleration:              | 500,000 rad/s <sup>2</sup>  |
| Permissible shaft loading radial/axial: | 40 N (axial), 80 N (radial) |

### Electrical data

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|  |  |
|--|--|
| Electrical interface:                  | 10 V ... 32 V, HTL/Push pull, Cable, 8-pin, universal, 5 m |
| Connection type:                       | Cable, 8-wire, universal, 5 m <sup>1)</sup>                |
| Maximum output frequency:              | 820 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)                                       |
| MTTFd: mean time to dangerous failure: | 300 a (EN ISO 13849-1) <sup>2)</sup>                       |

<sup>1)</sup> The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it <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

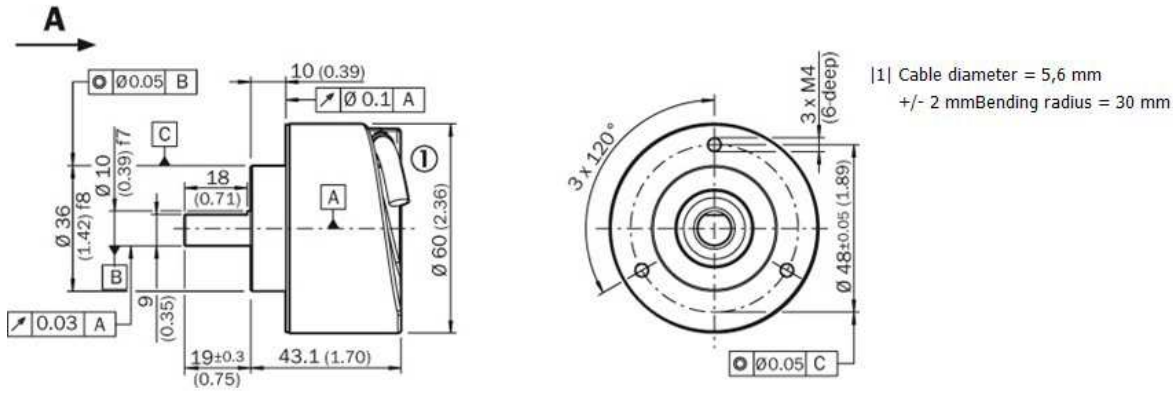
electronic failures are considered hazardous. For more information, see document no. 8015532.

### Ambient data

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|                                |  |
|--------------------------------|--|
| EMC:                           | (according to EN 61000-6-2 and EN 61000-6-4)   |
| Working temperature range:     | -30 °C ... +100 °C   |
| Storage temperature range:     | -40 °C ... +100 °C, without package  |
| Resistance to shocks:          | 60 g (according to EN 60068-2-27)  |
| Resistance to vibration:       | 20 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), housing side |
| Permissible relative humidity: | 90 % (condensation of the optical scanning not permitted)                                |

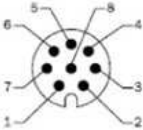
## Dimensional drawing



## 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 was 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 33 48 02 – 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 marketing@sick.com.br

**Canada**

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

**Česká 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 info@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 +972-4-6881000  
E-Mail info@sick-sensors.com

**Italia**

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

**Japan**

Phone +81 (0)3 5309 2112  
E-Mail support@sick.jp

**Magyarország**

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

**Nederland**

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

**Norge**

Phone +47 67 81 50 00  
E-Mail sick@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 sales.gsg@sick.com

**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 88 65 878  
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)