


ONLINE DATA SHEET
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# Incremental encoders
# DFS60, Rotary

DFS60E-BHAK00500



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# DFS60, Rotary

**Model Name** > DFS60E-BHAK00500
**Part No.** > 1036694



*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: | ± 0.3 ° |
| Measuring step: | 90 °/electronically/number of lines |
| Initialization time: | 40 ms |
| Pulses per revolution: | 500 |

## Mechanical data

| | |
|---|---|
| Mechanical interface: | Blind hollow shaft |
| Shaft diameter: | 15 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: | ± 0.5 mm, ± 0.2 mm |
| Permissible movement radial static/dynamic: | ± 0.3 mm, ± 0.1 mm |
| Maximum operating speed: | 6,000 /min |


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| | |
|---|---|
| Moment of inertia of the rotor: | 40 gcm² |
| Bearing lifetime: | 3.6 x 10^10 revolutions |
| Max. angular acceleration: | 500,000 rad/s² |
| Shaft material: | Metal |

## Electrical data

| | |
|---|---|
| Electrical interface: | 4.5 V ... 5.5 V, TTL/RS422, Cable, 8-pin, universal, 1.5 m |
| Connection type: | Cable, 8-wire, universal, 1.5 m [1)] |
| 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: | 300 a (EN ISO 13849-1) [2)] |

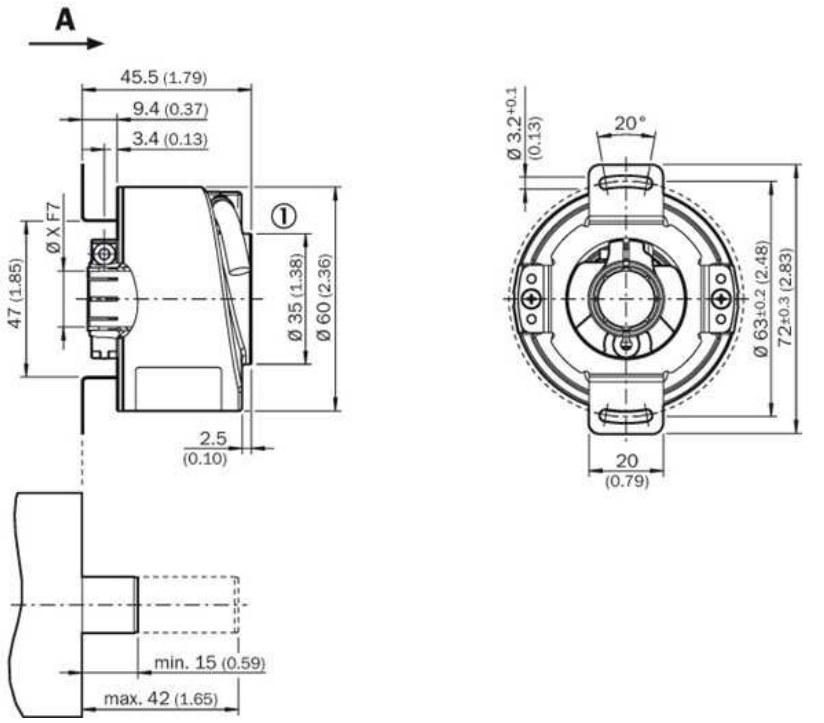
[1)] The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it [2)] This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load 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

| | |
|---|---|
| EMC: | (according to EN 61000-6-2 and EN 61000-6-3) |
| Working temperature range: | 0 °C ... +85 °C |
| Storage temperature range: | -40 °C ... +100 °C, without package |
| Resistance to shocks: | 50 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) |


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## Dimensional drawing

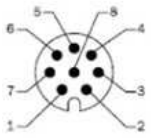



|1| Cable diameter = 5,6 mm
+/- 2 mmBending radius = 30 mm

## 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 | $\overline{A}$ | Signal cable |
| 2 | 5 | White | A | Signal cable |
| 3 | 1 | Black | $\overline{B}$ | Signal cable |
| 4 | 8 | Pink | B | Signal cable |
| 5 | 4 | Yellow | $\overline{Z}$ | Signal cable |
| 6 | 3 | Lilac | Z | Signal cable |
| 7 | 10 | Blue | GND | Ground connection of the encoder |
| 8 | 12 | Red | $+U_s$ | Supply voltage (volt-free to housing) |
| – | 9 | – | N.C. | Not assigned |
| – | 2 | – | N.C. | Not assigned |
| – | 11 | – | N.C. | Not assigned |
| – | 7 [1] | – | SET | Zero pulse teach |
| Shield | Shield | Shield | Shield | Shield connected to housing on side of encoder. Connected to ground on side of control. |

[1] Only at 4.5 ... 32 V, TTL/HTL programmable

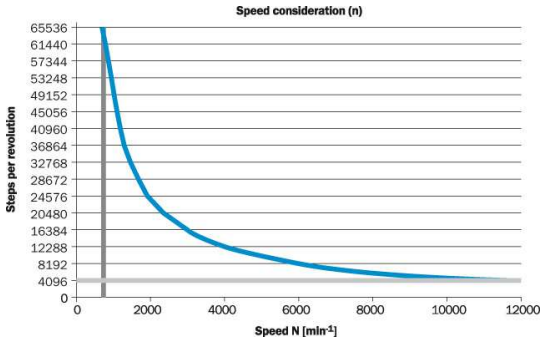
The SET input serves to carry out the zero pulse teach function. If the SET input is applied to $U_s$ for longer than 250 ms, after it has was open for at least 1,000 ms or applied to GND, the current shaft position is assigned the zero pulse signal "Z".


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## Signalausgänge

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## Drehzahlbetrachtung





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A4 4c int43

**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**



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