



## Incremental encoders DBS60 Core, Rotary

DBS60E-S4FK02000



**Model Name** > [DBS60E-S4FK02000](#)  
**Part No.** > [1070747](#)



*Illustration may differ*

**At a glance**

- Face mount flange, servo flange, blind and through hollow shaft
- Housing unit: Ø58 mm; compact mounting depth, large bearing distance
- Flange and stator couplings enable diverse mounting options
- Resolution: up to 5,000 pulses
- Cable outlet, radial M23 or M12 connector
- TTL/RS-422 and HTL/push-pull, universal TTL/HTL interface with 4.5 V DC to 30 V DC
- Hollow shafts: metal up to Ø5/8", insulated up to Ø15 mm; front and rear clamping

**Your benefits**

- Diverse installation options due to different flange and shaft versions
- The universal cable outlet and radial connector allow use in tight spaces and makes flexible cable routing possible
- Compact housing dimensions save valuable space. The optional hollow shaft clamp on the back facilitates mounting.
- Protection of the encoder against high shaft temperatures and currents through optional isolated shafts
- Flanges and stator couplings with different mounting holes allow diverse mounting options with one encoder version
- Rugged design with large bearing distance allows high shaft loads and a longer service life
- The TTL/HTL combination interface enables less product variety and reduces storage costs



**Performance**

Error limits:	Measuring step deviation x 3
Measuring step deviation:	± 18 °/impulses per revolution
Measuring step:	90 °/electronically/pulses per revolution
Initialization time:	< 5 ms <sup>1)</sup>
Pulses per revolution:	2,000 <sup>2)</sup>
Duty cycle:	≤ 0.5 ± 5 %

<sup>1)</sup> Valid signals can be read once this time has elapsed <sup>2)</sup> Available pulses per revolution see type code

**Mechanical data**

Mechanical interface:	Solid shaft, Face mount flange
Shaft diameter:	10 mm x 19 mm <sup>1)</sup>

Mass:	0.3 kg <sup>2)</sup>
Start up torque:	1.2 Ncm (+20 °C)
Operating torque:	1.1 Ncm (+20 °C)
Maximum operating speed:	9,000 /min <sup>3)</sup>
Moment of inertia of the rotor:	33 gcm <sup>2</sup>
Bearing lifetime:	3.6 x 10 <sup>9</sup> revolutions
Max. angular acceleration:	500,000 rad/s <sup>2</sup>
Permissible shaft loading radial/axial::	100 N (radial), 50 N (axial) <sup>4) 5)</sup>
Shaft material:	Stainless steel
Operating speed:	6,000 /min <sup>6)</sup>
Flange material:	Aluminum
Housing material:	Aluminum
Material, cable:	PVC

1) Others on request <sup>2)</sup> For an encoder with connector outlet or cable with connector outlet <sup>3)</sup> Maximum speed where no mechanical damage on the encoder will happen. Reduced life time and lower signal quality possible. Note max. output frequency. <sup>4) 5)</sup> Higher values are possible using limited bearing life <sup>6)</sup> Self warming of 3.2 K per 1000 revolutions/min when applying note working temperature range

### Electrical data

Electrical interface::	4.5 V ... 30 V, TTL/HTL universal <sup>1) 2)</sup>
Electrical connection:	Cable, 8-wire, universal, 1.5 m <sup>3)</sup>
Output current:	≤ 30 mA, per channel
Maximum output frequency:	300 kHz <sup>4)</sup>
Reference signal, number:	1
Reference signal, position:	90 °, electronically, gated with A and B
MTTFd: mean time to dangerous failure:	500 a (EN ISO 13849-1) <sup>5)</sup>
Power consumption max. without load:	≤ 0.5 W
Short-circuit protection of the outputs:	1 <sup>6)</sup>
Reverse polarity protection:	1

1) With 6-channels unless noted <sup>2)</sup> Output level depends on supply voltage <sup>3)</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>4)</sup> Up to 450 kHz on request <sup>5)</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

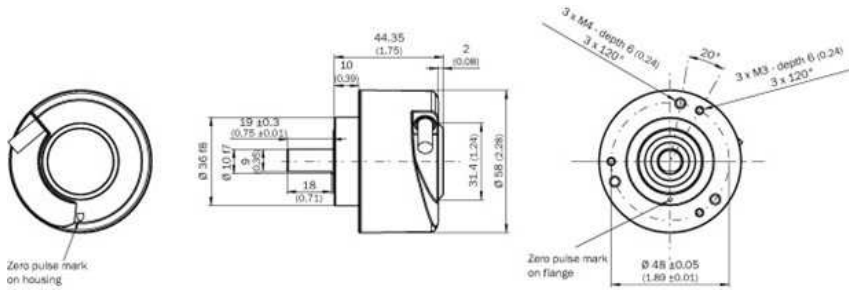
electronic failures are considered hazardous. For more information, see document no. 8015532. <sup>6)</sup> Short-circuit opposite to another channel, US or GND permissible for maximum 30 s

### Ambient data

EMC:	(according to EN 61000-6-2 and EN 61000-6-3)
Working temperature range:	-30 °C ... +100 °C, at maximum 3000 pulses per revolution, -30 °C ... +85 °C, at more than 3000 pulses per revolution
Storage temperature range:	-40 °C ... +100 °C, without package
Resistance to shocks:	250 g, 3 ms (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), housing side <sup>2)</sup>
Permissible relative humidity:	90 % (condensation of the optical scanning not permitted)

1) These values relate to all mechanical versions including recommended accessories unless otherwise noted. 2) With mating connector fitted

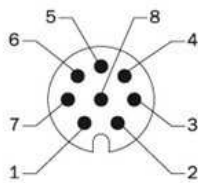
## Dimensional drawing



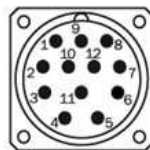
## PIN assignment

### 8-core cable

View of M12 device connector on cable

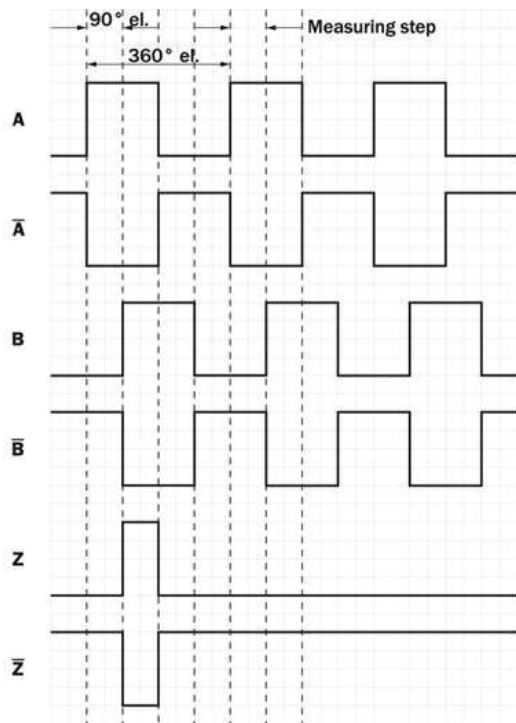


View of M23 device connector on cable

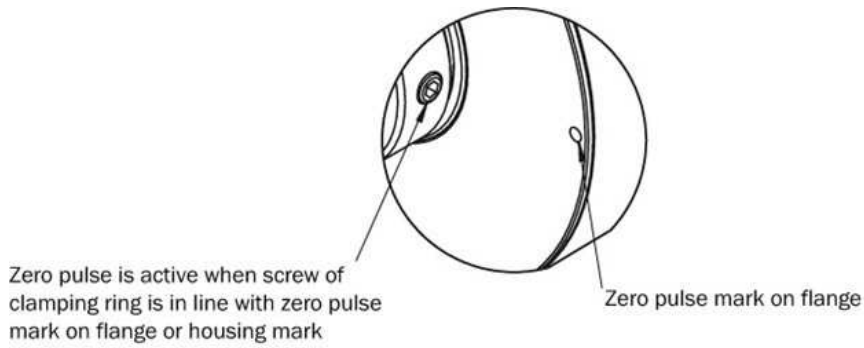


Colour of wires	Pin 12-pole in M12	Pin 12-pole in M23	Signal OC	Signal TTL; HTL	Explanation
Brown	1	6	Not connected	A-	Signal line
White	2	5	A	A	Signal line
Black	3	1	Not connected	B-	Signal line
Pink	4	8	B	B	Signal line
Yellow	5	4	Not connected	Z-	Signal line
Lilac	6	3	Z	Z	Signal line
Blue	7	10	GND	GND	Ground connection of the Encoder
Red	8	12	+Us	+Us	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 (Screen connected to Encoder housing)

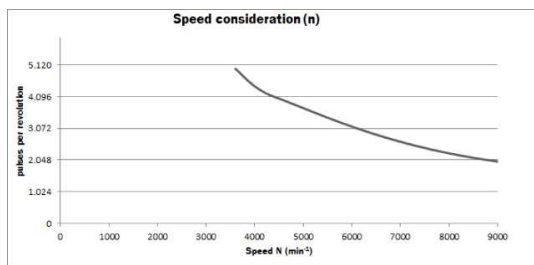
## Signalausgänge



## Zero pulse explanation



## 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)