

DBS60B-S4HA00S88

DBS60

INCREMENTAL ENCODERS



Illustration may differ

Ordering information

Туре	Part no.
DBS60B-S4HA00S88	1094443

Other models and accessories → www.sick.com/DBS60



Detailed technical data

Features

Special device	J.
Specialty	Shaft 10 x 19 mm round Face mount flange with M3 & M4 Plug, M23, 12-pin, radial, customer-specific pin assignment
Standard reference device	DBS60E-S4HA10000

Safety-related parameters

MTTF _D (mean time to dangerous failure)	500 years (EN ISO 13849-1) 1)
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¹⁾ 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.

Performance

Pulses per revolution	10,000
Measuring step	≤ 90°, electric/pulses per revolution
Measuring step deviation	± 36° / pulses per revolution
Error limits	Measuring step deviation x 3
Duty cycle	≤ 0.5 ± 10 %

Interfaces

Communication interface	Incremental
Communication Interface detail	TTL / RS-422
Number of signal channels	6-channel
Initialization time	< 5 ms ¹⁾
Output frequency	+ 300 kHz ²⁾
Load current	≤ 30 mA, per channel
Power consumption	≤ 1 W (without load)

 $^{^{1)}}$ Valid signals can be read once this time has elapsed.

Electronics

Connection type	Male connector, M23, 12-pin, radial, Customer-specific pin assignment
Supply voltage	4.5 30 V

 $^{^{1)}}$ Short-circuit opposite to another channel or GND permissible for max. 60 s. No protection signal against U_S.

 $^{^{2)}}$ Up to 450 kHz on request.

Reference signal, number	1
Reference signal, position	$90^{\circ},$ electric, logically gated with A and B
Reverse polarity protection	1
Short-circuit protection of the outputs	✓ ¹)

 $^{^{1)}}$ Short-circuit opposite to another channel or GND permissible for max. 60 s. No protection signal against U_S.

Mechanics

Mechanical design	Special version
Mechanical type detail	Solid shaft, face mount flange, 10 mm x 19 mm, round
Flange type / stator coupling	Flange with 3 x M3 and 3 x M4
Weight	+ 0.3 kg ¹⁾
Shaft material	Stainless steel
Flange material	Aluminum
Housing material	Aluminum
Start up torque	+ 1.2 Ncm (+20 °C)
Operating torque	1.1 Ncm (+20 °C)
Permissible shaft loading	100 N (radial) ²⁾ 50 N (axial) ²⁾
Operating speed	6,000 min ^{-1 3)}
Maximum operating speed	9,000 min ⁻¹ ⁴⁾
Moment of inertia of the rotor	33 gcm ²
Bearing lifetime	3.6 x 10 ⁹ revolutions
Angular acceleration	$\leq 500,000 \text{ rad/s}^2$

 $^{^{1)}}$ Based on encoder with male connector or cable with male connector.

Ambient data

ЕМС	According to EN 61000-6-2 and EN 61000-6-3
Enclosure rating	IP67, housing side (IEC 60529) ¹⁾ IP65, shaft side (IEC 60529)
Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	-20 °C +85 °C ²⁾
Storage temperature range	-40 °C +100 °C, without package
Resistance to shocks	250 g, 3 ms (EN 60068-2-27)
Resistance to vibration	30 g, 10 Hz 2,000 Hz (EN 60068-2-6)

¹⁾ With mating connector fitted.

Classifications

ECLASS 5.0	27270501
ECLASS 5.1.4	27270501

 $^{^{2)}}$ Higher values are possible using limited bearing life.

 $^{^{3)}}$ Allow for self-heating of 3.2 K per 1,000 rpm when designing the operating temperature range.

⁴⁾ Maximum speed which does not cause mechanical damage to the encoder. Impact on the service life and signal quality is possible. Please note the maximum output frequency.

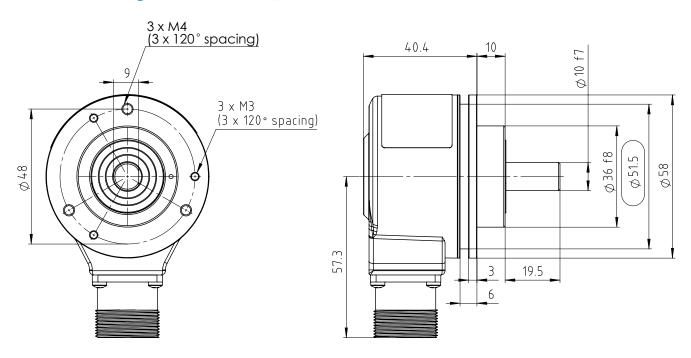
²⁾ These values relate to all mechanical versions including recommended accessories unless otherwise noted.

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INCREMENTAL ENCODERS

TOURS 0.0	07070500
ECLASS 6.0	27270590
ECLASS 6.2	27270590
ECLASS 7.0	27270501
ECLASS 8.0	27270501
ECLASS 8.1	27270501
ECLASS 9.0	27270501
ECLASS 10.0	27270501
ECLASS 11.0	27270501
ECLASS 12.0	27270501
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
ETIM 8.0	EC001486
UNSPSC 16.0901	41112113

Dimensional drawing (Dimensions in mm (inch))



PIN assignment

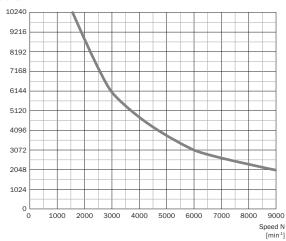
View of M23 device connector on cab



Pin, 12-pin, M23		
connector	TTI/HTL signal	Explanation
1	A	Signal cable
2	· A	Signal cable
3	N.C.	Not assigned
4	В	Signal cable
5	•в	Signal cable
6	N.C.	Not assigned
7	Z	Signal cable
8	· Z	Signal cable
9	N.C.	Not assigned
10	N.C.	Not assigned
11	+U _S	Supply voltage (volt-free to housing)
12	GND	Ground connection of the encoder
Shield	Shield	Shield connected to housing on side of encoder. Connected to ground on side of control.

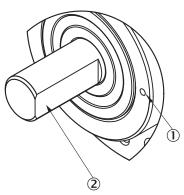
Diagrams

Pulses per revolution



Operation note

Solid shaft, face mount flange



- ① Zero pulse mark on flange
- ② Zero pulse active when the surface of the shaft shows the zero pulse mark on the flange

Recommended accessories

Other models and accessories → www.sick.com/DBS60

	Brief description	Туре	Part no.
Others			
	Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE [®] , SSI, Incremental Description: HIPERFACE [®] , SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm 10.5 mm Head B: - Operating temperature: -40 °C +125 °C Connection systems: Solder connection	DOS-2312-G02	2077057
	 Connection type head A: Female connector, M23, 12-pin, angled, A-coded Signal type: HIPERFACE[®], SSI, Incremental Description: HIPERFACE[®], SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, angled, shielded, for cable diameter 4.2 mm 6.6 mm Head B: - Operating temperature: -20 °C +130 °C Connection systems: Solder connection 	DOS-2312-W01	2072580
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 2 m, 11-wire, PUR Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm 	DOL-2312-G02MLA3	2030682
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 7 m, 11-wire, PUR Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm 	DOL-2312-G07MLA3	2030685
~	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 10 m, 11-wire, PUR Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm 	DOL-2312-G10MLA3	2030688
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 15 m, 11-wire, PUR Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm 	DOL-2312-G15MLA3	2030692
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 20 m, 11-wire, PUR Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm 	DOL-2312-G20MLA3	2030695

	Brief description	Туре	Part no.
->	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 25 m, 11-wire, PUR Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm 	DOL-2312-G25MLA3	2030699
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Signal type: Incremental Cable: 30 m, 11-wire, PUR Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm 	DOL-2312-G30MLA3	2030702
4	 Product family: Brackets Description: Mounting bracket for encoder with spigot 36 mm for face mount flange Items supplied: Mounting kit included 	BEF-WF-36	2029164
	 Product family: Brackets Description: Mounting angle spring-loaded, for flange with centerring collar 36 mm, working temperature range -40° +120°C Details: Aluminum 	BEF-WF36F	4084775
	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Bellows coupling, shaft diameter 6 mm / 10 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular +/- 4°; max. speed 10,000 rpm, -30 °C to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub 	KUP-0610-B	5312982
	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Double loop coupling, shaft diameter 6 mm / 10 mm, max. shaft offset: radially +/- 2,5 mm, axially +/-3 mm, angle +/- 10 degrees;max. speed 3.000 rpm, - 30 to +80 degrees Celsius, torsional spring stiffness of 25 Nm/rad 	KUP-0610-D	5326697
	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Spring washer coupling, shaft diameter 6 mm / 10 mm, Maximum shaft offset: radial +/- 0.3 mm, axial +/- 0.4 mm, angular +/- 2.5°; max. speed 12,000 rpm, -10° to +80 °C, max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin 	KUP-0610-F	5312985
0	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Bar coupling, shaft diameter 6 mm / 10 mm, max. shaft offset: radial ± 0,3 mm, axial ± 0,3 mm, angular ± 3°; max. speed 10.000 rpm, -10° to +80 °C, max. torque: 80 Ncm, material: fiber-glass reinforced polyamide, aluminum hub 	KUP-0610-S	2056407
10	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Double loop coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radially +/- 0,25 mm, axially +/-0,4 mm, angle +/- 4 degrees;max. speed 10.000 rpm, -30 to +120 degrees Celsius, torsional spring stiffness of 150 Nm/rad 	KUP-0810-D	5326704
0	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Bar coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radial ± 0,3 mm, axial ± 0,3 mm, angular ± 3°; max. speed 10.000 rpm, -10° to +80 °C, max. torque: 80 Ncm, material: fiber-glass reinforced polyamide, aluminum hub 	KUP-0810-S	5314178
	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Bellows coupling, shaft diameter 10 mm/10 mm; maximum shaft offset: radial +/- 0.25 mm, axial +/- 0.4 mm, angular +/- 4°; max. revolutions 10,000 rpm, -30° to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum clamping hubs 	KUP-1010-B	5312983

	Brief description	Туре	Part no.
10	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Double loop coupling, shaft diameter 10 mm / 10 mm, Maximum shaft offset: radial +/- 2.5 mm, axial +/- 3 mm, angular +/- 10°; max. speed 3,000 rpm, - 30° to +80°C, max. torque 1.5 Nm; material: polyurethane, galvanized steel flange 	KUP-1010-D	5326703
	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset, radial ± 0.3 mm, axial ± 0.4 mm, angle ± 2.5°, torsion spring stiffness 30 Nm/rad; material: aluminum flange, glass-fiber reinforced polyamide membrane and hardened steel coupling pin 	KUP-1010-F	5312986
0	 Product family: Flanges and nozzles Description: Flange adapter, adaptation of face mount flange with 36 mm centering hub to 50 mm servo flange, aluminum, including 3 flat head screws M4 x 10 Material: Aluminum Details: Aluminum Items supplied: Including 3 countersunk screws M3 x 10 	BEF-FA-036-050	2029160
	 Product family: Flanges and nozzles Description: Flange adapter, adaptation of face mount flange with 36 mm centering hub to 60 mm square mounting plate, aluminum, including 3 flat head screws M4 x 8 Material: Aluminum Details: Aluminum Items supplied: Including 3 countersunk screws M4 x 8 	BEF-FA-036-060REC	2029162
	 Product family: Flanges and nozzles Description: Flange adapter, adaptation of face mount flange with 36 mm centering hub to 58 mm square mounting plate with shock absorbers, aluminum Material: Aluminum Details: Aluminum 	BEF-FA-036-060RSA	2029163
	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Bar coupling, shaft diameter 10 mm / 10 mm; maximum shaft offset: radial ± 9.3 mm, axial ± 0.2 mm, angular ± 3°; speed 10,000 rpm, -10° to +80° Celsius, max. torque 80 Ncm; material: glass fiber-reinforced polyamide, aluminum hub 	KUP-1010-S	2056408
	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Spring coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset: radial ± 1.5 mm, axial ± 1.0 mm, angular ± 5°, max. speed 3,000 rpm, -30° to +120°Celsius, nominal torque 150 Ncm, rotational angle at half nominal torque, direction of rotation right viewed on driving shaft 40°, left viewed on driving shaft 60°, material: spring steel 1.0600 nickel plated, zinc die cast hubs 	KUP-1010-W	5319914
	 Product segment: Shaft adaptation Product family: Shaft couplings Description: 10 mm / 12 mm; maximum shaft offset: radial +/- 0.25 mm, axial +/- 0.4 mm, angular +/- 4°; max. revolutions 10,000 rpm, -30° to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum clamping hubs 	KUP-1012-B	5312984
	 Product family: Flanges and nozzles Description: Flange adapter, adaptation of face mount flange with 36 mm centering hub to 63 mm square mounting plate, aluminum, including 3 flat head screws M4 x 10 Material: Aluminum Details: Aluminum Items supplied: Including 3 countersunk screws M3 x 10 	BEF-FA-036-063REC	2034225
9.00	 Product segment: Measuring wheels and measuring wheel mechanics Product family: Measuring wheel mechanics Description: SICK modular measuring wheel system for face mount flange encoder with S4 mechanical design (10 mm x 19 mm solid shaft), e.g., DFS60-S4: with 0-ring measuring wheel, circumference 200 mm Suitable for: Face mount flange encoder DFS60, DBS60, AFM60, AFS60, mechanical design S4 (solid shaft 10 mm x 19 mm) 	BEF-MRS-10-U	2085714

Brief description	Туре	Part no.
 Product segment: Measuring wheels and measuring wheel mechanics Product family: Measuring wheels Description: Aluminium measuring wheel with 0-ring (NBR70) for 10 mm solid shaft, circumference 200 mm 	BEF-MR010020R	2055224
 Product segment: Measuring wheels and measuring wheel mechanics Product family: Measuring wheels Description: Aluminium measuring wheel with 0-ring (NBR70) for 10 mm solid shaft, circumference 300 mm 	BEF-MR010030R	2049278
 Product segment: Measuring wheels and measuring wheel mechanics Product family: Measuring wheels Description: Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 500 mm 	BEF-MR010050R	2055227
 Product segment: Measuring wheels and measuring wheel mechanics Product family: Measuring wheels Description: Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 200 mm 	BEF-MR10200AK	4084737
 Product segment: Measuring wheels and measuring wheel mechanics Product family: Measuring wheels Description: Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 200 mm 	BEF-MR10200AP	4084738
 Product segment: Measuring wheels and measuring wheel mechanics Product family: Measuring wheels Description: Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 200 mm 	BEF-MR10200APG	4084740
BEF-MR10200APN	BEF-MR10200APN	4084739
 Product segment: Measuring wheels and measuring wheel mechanics Product family: Measuring wheels Description: Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 500 mm 	BEF-MR10500AK	4084733
 Product segment: Measuring wheels and measuring wheel mechanics Product family: Measuring wheels Description: Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 500 mm 	BEF-MR10500AP	4084734
 Product segment: Measuring wheels and measuring wheel mechanics Product family: Measuring wheels Description: Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 500 mm 	BEF-MR10500APG	4084736
 Product segment: Measuring wheels and measuring wheel mechanics Product family: Measuring wheels Description: Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 500 mm 	BEF-MR10500APN	4084735
BEF-0R-053-040	BEF-0R-053-040	2064061
BEF-0R-083-050	BEF-OR-083-050	2064076
BEF-0R-145-050	BEF-0R-145-050	2064074
 Product family: Assembly accessories Description: Bearing block for servo and face mount flange encoder. The heavy-duty bearing block is used to absorb very large radial and axial shaft loads. Particularly when using belt pulleys, chain sprockets, friction wheels. Operating speed max. 4,000 rpm^-1, axial shaft load 150 N, radial shaft load 250 N, bearing service life 3.6 x 10^9 revolutions 	BEF-FA-LB1210	2044591
 Product family: Assembly accessories Description: Flange adapter (adapts size 60 face mount flange encoder to bearing block with part. no. 2044591) 	BEF-FA-036-050-019	2063378

	Brief description	Туре	Part no.
	Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, Incremental, HIPERFACE® Items supplied: By the meter Cable: 8-wire, PUR, halogen-free Description: SSI, Incremental, HIPERFACE®, shielded	LTG-2308-MWENC	6027529
\	 Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, Incremental Items supplied: By the meter Cable: 11-wire, PUR Description: SSI, Incremental, shielded 	LTG-2411-MW	6027530
\	 Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, Incremental Items supplied: By the meter Cable: 12-wire, PUR, halogen-free Description: SSI, Incremental, shielded 	LTG-2512-MW	6027531
	 Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, TTL, HTL, Incremental Items supplied: By the meter Cable: 12-wire, UV and saltwater-resistant, PUR, halogen-free Description: SSI, TTL, HTL, Incremental, shielded, Head A: cable Head B: cable Cable: suitable for drag chain, PUR, halogen-free, shielded, UV and saltwater resistant, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 2 x 0.14 mm², Ø 7.8 mm 	LTG-2612-MW	6028516
	 Product family: Flanges and nozzles Description: Flange adapter, adaptation of face mount flange with 36 mm centering hub to 100 mm servo flange with 60 mm centering hub, aluminum Material: Aluminum Details: Aluminum 	BEF-FA-036-100	2029161
	BEF-MK-LB	BEF-MK-LB	5320872
	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Claw coupling, shaft diameter 8 mm / 10 mm, damping element 80 shore blue, maximum shaft offset: radial ± 0.22 mm, axial ± 1 mm angular ± 1.3°, max. speed 19,000 rpm, angle of twist max. 10°, -30 °C to +80 °C, max. torque 800 Ncm, tightening torque of screws: ISO 4029 150 Ncm, material: aluminum flange, damping element: polyurethane 	KUP-0810-J	2128267
E.	 Product segment: Shaft adaptation Product family: Shaft couplings Description: Claw coupling, shaft diameter 10 mm / 10 mm, damping element 80 shore blue, maximum shaft offset: radial ± 0.22 mm, axial ± 1 mm angular ± 1.3°, max. speed 19,000 rpm, angle of twist max. 10°, -30 °C to +80 °C, max. torque 800 Ncm, tightening torque of screws: ISO 4029 150 Ncm, material: aluminum flange, damping element: polyurethane 	KUP-1010-J	2127054

SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is "Sensor Intelligence."

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