

INCREMENTAL ENCODERS



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Ordering information

Туре	Part no.
DBS60E-TEFA00360	1122998

Other models and accessories -> www.sick.com/DBS60



Detailed technical data

Performance

Pulses per revolution	360	
Measuring step	≤ 90°, electric/pulses per revolution	
Measuring step deviation	± 18° / pulses per revolution	
Error limits	Measuring step deviation x 3	
Duty cycle	≤ 0.5 ± 5 %	
Interfaces		
Communication interface	Incremental	
Communication Interface detail	TTL / HTL ¹⁾	
Number of signal channels	6-channel	

Output frequency	+ 300 kHz ³⁾
Load current	≤ 30 mA, per channel
Power consumption	\leq 0.5 W (without load)

¹⁾ Output level depends on the supply voltage.

 $^{\rm 2)}$ Valid signals can be read once this time has elapsed.

 $^{\rm (3)}$ Up to 450 kHz on request.

Electrical data

Connection type	Male connector, M23, 12-pin, radial
Supply voltage	4.5 30 V
Reference signal, number	1
Reference signal, position	90°, electric, logically gated with A and B
Reverse polarity protection	✓
Short-circuit protection of the outputs	✓ ¹⁾

 $^{\rm 1)}$ Short-circuit opposite to another channel, US or GND permissable for maximum 30 s.

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.

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MTTFd: mean time to dangerous failure
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500 years (EN ISO 13849-1) $^{2)}$

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Mechanical data

Mechanical design	Through hollow shaft, Front clamp		
Shaft diameter	12 mm		
Flange type / stator coupling	2-sided stator coupling, slot, screw hole circle 63–83 mm		
Weight	+ 0.25 kg ¹⁾		
Shaft material	Stainless steel		
Flange material	Aluminum		
Housing material	Aluminum		
Start up torque	+ 0.5 Ncm (+20 °C)		
Operating torque	0.4 Ncm (+20 °C)		
Permissible movement static	\pm 0.3 mm (radial) \pm 0.5 mm (axial) ²⁾		
Permissible movement dynamic	\pm 0.1 mm (radial) \pm 0.2 mm (axial) ²⁾		
Operating speed	6,000 min ^{-1 3)}		
Maximum operating speed	9,000 min ^{-1 4)}		
Moment of inertia of the rotor	50 gcm ²		
Bearing lifetime	3.6 x 10 ⁹ revolutions		
Angular acceleration	≤ 500,000 rad/s²		

¹⁾ Based on encoder with male connector or cable with male connector.

 $^{2)}$ Not apllicable for stator coupling type C and K.

 $^{\rm 3)}$ Allow for self-heating of 2.6 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.

Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3
Enclosure rating	IP65, housing side (IEC 60529) ¹⁾ IP65, shaft side (IEC 60529)
Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	-30 °C +100 °C, at maximum 3,000 pulses per revolution 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.

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

Classifications

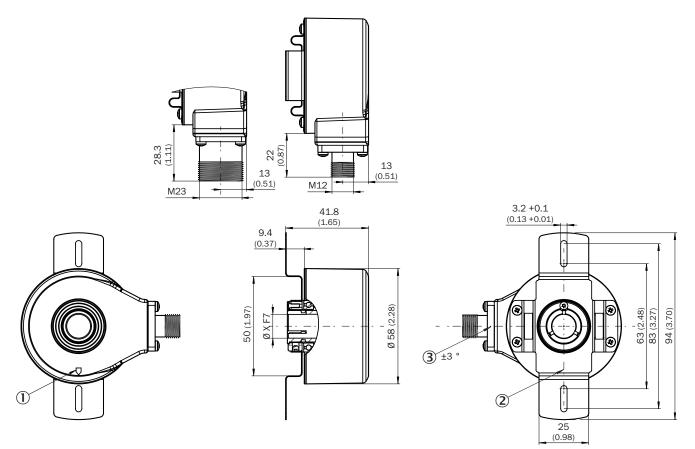
eCl@ss 5.0	27270501
eCl@ss 5.1.4	27270501

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eCl@ss 6.0	27270590
eCl@ss 6.2	27270590
eCl@ss 7.0	27270501
eCl@ss 8.0	27270501
eCl@ss 8.1	27270501
eCl@ss 9.0	27270501
eCl@ss 10.0	27270501
eCl@ss 11.0	27270501
eCl@ss 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))

Through hollow shaft clamping at the front, male connector, 2-sided stator coupling, slot, screw hole circle 63-83 mm



① Zero pulse mark on housing

② Zero pulse mark on flange under stator coupling

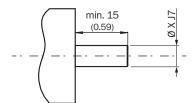
③ Male connector tolerance in relation to hole pattern

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Type Through hollow shaft with front clamping	Shaft diameter XF7
DBS60x-TAxxxxxxxx DBS60x-T1xxxxxxxx	6 mm
DBS60x-TBxxxxxxxx DBS60x-T2xxxxxxxxx	8 mm
DBS60x-TCxxxxxxxx DBS60x-T3xxxxxxxx	3/8″
DBS60x-TDxxxxxxx DBS60x-T4xxxxxxxx	10 mm
DBS60x-TExxxxxxxx DBS60x-T5xxxxxxxx	12 mm
DBS60x-TFxxxxxxxx DBS60x-T6xxxxxxxx	1/2"
DBS60x-TGxxxxxxxx DBS60x-T7xxxxxxxx	14 mm
DBS60x-THxxxxxxx DBS60x-T8xxxxxxxx	15 mm
DBS60x-TJxxxxxxxx	5/8"

Attachment specifications

Through hollow shaft with front clamping



Customer side

Type Through hollow shaft with front clamping	Shaft diameter xj7
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DBS60x-TJxxxxxxxx	5/8″

PIN assignment

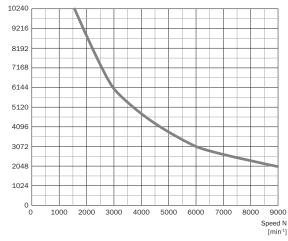


View of M23 male device connector on cable / housing

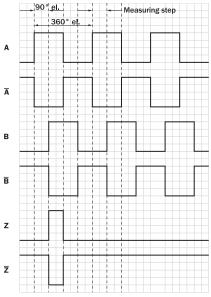
Wire colors (ca- ble connection)	Male connec- tor M12, 8-pin	Male connec- tor M23, 12-pin	TTL/HTL 6- channel signal	Explanation
Brown	1	6	A-	Signal wire
White	2	5	A	Signal wire
Black	3	1	В-	Signal wire
Pink	4	8	В	Signal wire
Yellow	5	4	Z-	Signal wire
Purple	6	3	Z	Signal wire
Blue	7	10	GND	Ground connection
Red	8	12	+U _s	Supply voltage
-	-	9	Not assigned	Not assigned
-	-	2	Not assigned	Not assigned
-	-	11	Not assigned	Not assigned
-	-	7	Not assigned	Not assigned
Screen	Screen	Screen	Screen	Screen connected to en- coder housing

Diagrams

Pulses per revolution



Signal outputs for electrical interfaces TTL and HTL



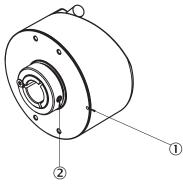
Cw with view on the encoder shaft in direction "A", compare dimensional drawing.

Supply voltage	Output
4,5 V 5,5 V	TTL
10 V 30 V	TTL
10 V 27 V	HTL
4,5 V 30 V	TTL/HTL universal
4,5 V 30 V	TTL

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Operation note

Hollow shaft



Attention! If stator coupling is mounted, the zero pulse mark can be hidden by the stator coupling Zero pulse mark on flange

② Zero pulse is active when screw of clamping is inline with zero pulse mark on flange or housing mark

Recommended accessories

Other models and accessories -> www.sick.com/DBS60

	Brief description	Туре	Part no.		
Other mounting accessories					
	Bearing bracket for hollow shaft encoders, fastening screws included the Bearing Block is intended for very large radial and axial shaft loads. Particularly for application on: Belt pulleys, Chain pinions, Friction wheels. It is designed this way to enable fitting of encoder with blind hollow shaft with ϕ 12 mm., fastening screws included	BEF-FA-B12-010	2042728		
Plug connectors and cables					
	Head A: cable Head B: Flying leads Cable: SSI, Incremental, HIPERFACE [®] , PUR, halogen-free, shielded	LTG-2308-MWENC	6027529		
	Head A: cable Head B: Flying leads Cable: SSI, Incremental, PUR, shielded	LTG-2411-MW	6027530		
/	Head A: cable Head B: Flying leads Cable: SSI, Incremental, PUR, halogen-free, shielded	LTG-2512-MW	6027531		
	Head A: cable Head B: Flying leads Cable: SSI, TTL, HTL, Incremental, PUR, halogen-free, shielded	LTG-2612-MW	6028516		
1	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 2 m	DOL-2312-G02MLA3	2030682		
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 7 m	DOL-2312-G07MLA3	2030685		
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 10 m	DOL-2312-G10MLA3	2030688		

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	Brief description	Туре	Part no.
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 15 m	DOL-2312-G15MLA3	2030692
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 20 m	DOL-2312-G20MLA3	2030695
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 25 m	DOL-2312-G25MLA3	2030699
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 30 m	DOL-2312-G30MLA3	2030702
	Head A: female connector, M23, 12-pin, straight Cable: HIPERFACE [®] , SSI, Incremental, shielded	DOS-2312-G02	2077057
(H ¹)	Head A: female connector, M23, 12-pin, angled Cable: HIPERFACE [®] , SSI, Incremental, shielded	DOS-2312-W01	2072580

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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