

# **DBS60E-TEFN01024**

DBS60

**INCREMENTAL ENCODERS** 





## Ordering information

Туре	Part no.
DBS60E-TEFN01024	1125526

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





### Detailed technical data

#### Performance

Pulses per revolution	1,024
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 <sup>1)</sup>
Number of signal channels	6-channel
Initialization time	< 5 ms <sup>2)</sup>
Output frequency	+ 300 kHz <sup>3)</sup>
Load current	≤ 30 mA, per channel
Power consumption	≤ 0.5 W (without load)

 $<sup>^{1)}</sup>$  Output level depends on the supply voltage.

### Electrical data

Connection type	Cable, 8-wire, universal, 10 m <sup>1)</sup>		
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	<b>✓</b> <sup>2)</sup>		
MTTFd: mean time to dangerous failure	500 years (EN ISO 13849-1) 3)		

<sup>1)</sup> The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

 $<sup>^{\</sup>rm 2)}\,{\rm Valid}$  signals can be read once this time has elapsed.

 $<sup>^{3)}</sup>$  Up to 450 kHz on request.

 $<sup>^{2)}\,\</sup>mbox{Short-circuit}$  opposite to another channel, US or GND permissable for maximum 30 s.

<sup>3)</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.

### 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 <sup>1)</sup>		
Shaft material	Stainless steel		
Flange material	Aluminum		
Housing material	Aluminum		
Material, cable	PVC		
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 <sup>-1 3)</sup>		
Maximum operating speed	9,000 min <sup>-1</sup> <sup>4)</sup>		
Moment of inertia of the rotor	50 gcm <sup>2</sup>		
Bearing lifetime	3.6 x 10 <sup>9</sup> revolutions		
Angular acceleration	≤ 500,000 rad/s²		

 $<sup>^{1)}</sup>$  Based on encoder with male connector or cable with male connector.

### Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3
Enclosure rating	IP65, housing side (IEC 60529) 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 $^{1)}$
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)

 $<sup>^{1)}</sup>$  These values relate to all mechanical versions including recommended accessories unless otherwise noted.

## Classifications

ECLASS 5.0	27270501
ECLASS 5.1.4	27270501
ECLASS 6.0	27270590
ECLASS 6.2	27270590
ECLASS 7.0	27270501
ECLASS 8.0	27270501

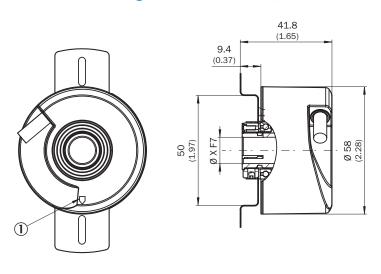
 $<sup>^{2)}\,\</sup>mathrm{Not}$  apllicable for stator coupling type C and K.

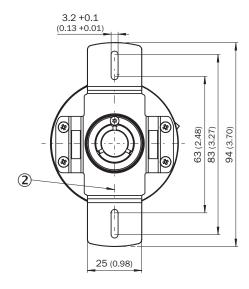
 $<sup>^{3)}</sup>$  Allow for self-heating of 2.6 K per 1,000 rpm when designing the operating temperature range.

<sup>&</sup>lt;sup>4)</sup> 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.

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))





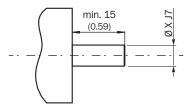
- XF7 values see shaft diameter table for through hollow shaft, clamping at the front
- ① Zero pulse mark on housing
- ② Zero pulse mark on flange under stator coupling

Type Through hollow shaft with front clamping	Shaft diameter XF7
DBS60x-TAxxxxxxxx DBS60x-T1xxxxxxxxx	6 mm
DBS60x-TBxxxxxxxx DBS60x-T2xxxxxxxxx	8 mm
DBS60x-TCxxxxxxxx DBS60x-T3xxxxxxxxx	3/8"
DBS60x-TDxxxxxxxx DBS60x-T4xxxxxxxx	10 mm
DBS60x-TExxxxxxxx DBS60x-T5xxxxxxxxx	12 mm
DBS60x-TFxxxxxxxx DBS60x-T6xxxxxxxxx	1/2"
DBS60x-TGxxxxxxxx DBS60x-T7xxxxxxxxx	14 mm

Type Through hollow shaft with front clamping	Shaft diameter XF7
DBS60x-THxxxxxxxx DBS60x-T8xxxxxxxxx	15 mm
DBS60x-TJxxxxxxxxx	5/8"

## Attachment specifications

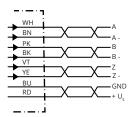
Through hollow shaft with front clamping



## Customer side

Type Through hollow shaft with front clamping	Shaft diameter xj7
DBS60x-TAxxxxxxxx DBS60x-T1xxxxxxxxx	6 mm
DBS60x-TBxxxxxxxx DBS60x-T2xxxxxxxx	8 mm
DBS60x-TCxxxxxxxx DBS60x-T3xxxxxxxxx	3/8"
DBS60x-TDxxxxxxxx DBS60x-T4xxxxxxxx	10 mm
DBS60x-TExxxxxxxx DBS60x-T5xxxxxxxxx	12 mm
DBS60x-TFxxxxxxxx DBS60x-T6xxxxxxxxx	1/2"
DBS60x-TGxxxxxxxx DBS60x-T7xxxxxxxxx	14 mm
DBS60x-THxxxxxxxx DBS60x-T8xxxxxxxxx	15 mm
DBS60x-TJxxxxxxxxx	5/8"

## PIN assignment



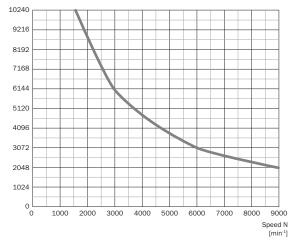
## DBS60E-TEFN01024 | DBS60

INCREMENTAL ENCODERS

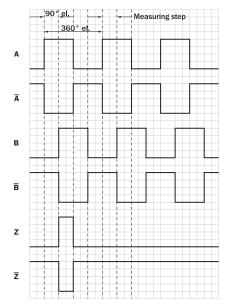
Wire colors (ca- ble connection)	Male connector M12, 8-pin	Male connec- tor M23, 12-pin	TTL/HTL 6- channel signal	Explanation
Brown	1	6	A-	Signal wire
White	2	5	A	Signal wire
Black	3	1	B-	Signal wire
Pink	4	8	В	Signal wire
Yellow	5	4	Z-	Signal wire
Purple	6	3	Z	Signal wire
Blue	7	10	GND	Ground connection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

## Diagrams





Signal outputs for electrical interfaces TTL and HTL

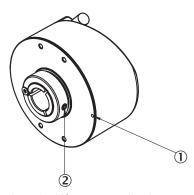


Cw with view on the encoder shaft in direction "A", compare dimensional drawing.

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

## Operation note

Hollow shaft



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

- ① 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				
-91	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 ø 12 mm. Operating speed max. 6,000 rpm^-1, axial shaft load 100 N, radial shaft load 100 N, bearing service life 3.6 x 10^9 revolutions, fastening screws included	BEF-FA-B12-010	2042728	
Others				
	Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, Incremental, HIPERFACE® Cable: 8-wire, PUR, halogen-free Description: SSI, Incremental, HIPERFACE®, shielded Items supplied: By the meter	LTG-2308-MWENC	6027529	
/	<ul> <li>Connection type head A: Flying leads</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, Incremental</li> <li>Cable: 11-wire, PUR</li> <li>Description: SSI, Incremental, shielded</li> <li>Items supplied: By the meter</li> </ul>	LTG-2411-MW	6027530	
	<ul> <li>Connection type head A: Flying leads</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, Incremental</li> <li>Cable: 12-wire, PUR, halogen-free</li> <li>Description: SSI, Incremental, shielded</li> <li>Items supplied: By the meter</li> </ul>	LTG-2512-MW	6027531	
	<ul> <li>Connection type head A: Flying leads</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, TTL, HTL, Incremental</li> <li>Cable: 12-wire, UV and saltwater-resistant, PUR, halogen-free</li> <li>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</li> <li>Items supplied: By the meter</li> </ul>	LTG-2612-MW	6028516	
	<ul> <li>Connection type head A: Male connector, M23, 12-pin, straight, A-coded</li> <li>Signal type: HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li>Description: HIPERFACE<sup>®</sup>, SSI, Incremental, shielded, Head A: male connector, M23, 12-pin, straight, for cable diameter 5.5 mm 10.5 mm Head B: - Operating temperature: -40 °C +125 °C</li> <li>Connection systems: Solder connection</li> </ul>	STE-2312-G01	2077273	
	<ul> <li>Connection type head A: Male connector, M23, 12-pin, straight, A-coded</li> <li>Signal type: HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li>Description: HIPERFACE<sup>®</sup>, SSI, Incremental, shielded, M23 female connector with central fixing ( for cabinet bushing )</li> <li>Connection systems: Solder connection</li> </ul>	STE-2312-GX	6028548	
	<ul> <li>Connection type head A: Male connector, M12, 8-pin, straight, A-coded</li> <li>Signal type: Incremental</li> <li>Cable: CAT5, CAT5e</li> <li>Description: Incremental, shielded, Head A: male connector, M12, 8-pin, straight, A coded, shielded, for cable diameter 4 mm 8 mm Head B: - Operating temperature: -40 °C +85 °C</li> <li>Connection systems: IDC quick connection</li> <li>Permitted cross-section: 0.14 mm² 0.34 mm²</li> </ul>	STE-1208-GA01	6044892	

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