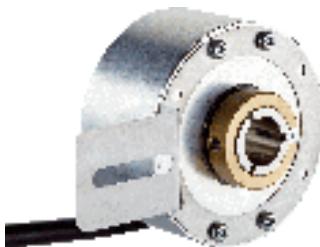


## DBS60E-TFAQD1024

DBS60

INCREMENTAL ENCODERS

**SICK**  
Sensor Intelligence.



## Ordering information

Type	part no.
DBS60E-TFAQD1024	1124410

Other models and accessories → [www.sick.com/DBS60](http://www.sick.com/DBS60)

Illustration may differ



## Detailed technical data

## Safety-related parameters

<b>MTTF<sub>D</sub> (mean time to dangerous failure)</b>	500 years (EN ISO 13849-1) <sup>1)</sup>
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<sup>1)</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.

## Performance

<b>Pulses per revolution</b>	1,024
<b>Measuring step</b>	≤ 90°, electric/pulses per revolution
<b>Measuring step deviation</b>	± 18° / pulses per revolution
<b>Error limits</b>	Measuring step deviation x 3
<b>Duty cycle</b>	≤ 0.5 ± 5 %

## Interfaces

<b>Communication interface</b>	Incremental
<b>Communication Interface detail</b>	TTL / RS-422
<b>Number of signal channels</b>	6-channel
<b>Initialization time</b>	< 5 ms <sup>1)</sup>
<b>Output frequency</b>	+ 300 kHz <sup>2)</sup>
<b>Load current</b>	≤ 30 mA, per channel
<b>Operating current</b>	≤ 50 mA (without load)

<sup>1)</sup> Valid signals can be read once this time has elapsed.

<sup>2)</sup> Up to 450 kHz on request.

## Electronics

<b>Connection type</b>	Cable, 8-wire, with male connector, M23, 12-pin, universal, 0.5 m <sup>1)</sup> 2)
<b>Supply voltage</b>	4.5 ... 5.5 V

<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>2)</sup> M23 male connector for central mounting.

<sup>3)</sup> Short-circuit opposite to another channel or GND permissible for max. 60 s. No protection signal against U<sub>S</sub>.

<b>Reference signal, number</b>	1
<b>Reference signal, position</b>	90°, electric, logically gated with A and B
<b>Reverse polarity protection</b>	✓
<b>Short-circuit protection of the outputs</b>	✓ <sup>3)</sup>

<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>2)</sup> M23 male connector for central mounting.

<sup>3)</sup> Short-circuit opposite to another channel or GND permissible for max. 60 s. No protection signal against US.

## Mechanics

<b>Mechanical design</b>	Through hollow shaft
<b>Shaft diameter</b>	1/2"Front clamp
<b>Flange type / stator coupling</b>	1-sided stator coupling, slot, screw hole circle radius 31.5–48.5 mm
<b>Weight</b>	+ 0.25 kg <sup>1)</sup>
<b>Shaft material</b>	Stainless steel
<b>Flange material</b>	Aluminum
<b>Housing material</b>	Aluminum
<b>Material, cable</b>	PVC
<b>Start up torque</b>	+ 0.5 Ncm (+20 °C)
<b>Operating torque</b>	0.4 Ncm (+20 °C)
<b>Permissible movement static</b>	± 0.3 mm (radial) ± 0.5 mm (axial) <sup>2)</sup>
<b>Permissible movement dynamic</b>	± 0.1 mm (radial) ± 0.2 mm (axial) <sup>2)</sup>
<b>Operating speed</b>	6,000 min <sup>-1</sup> <sup>3)</sup>
<b>Maximum operating speed</b>	9,000 min <sup>-1</sup> <sup>4)</sup>
<b>Moment of inertia of the rotor</b>	50 gcm <sup>2</sup>
<b>Bearing lifetime</b>	3.6 x 10 <sup>9</sup> revolutions
<b>Angular acceleration</b>	≤ 500,000 rad/s <sup>2</sup>

<sup>1)</sup> Based on encoder with male connector or cable with male connector.

<sup>2)</sup> Not applicable 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>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.

## Ambient data

<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-3
<b>Enclosure rating</b>	IP65, housing side (IEC 60529) <sup>1)</sup> IP65, shaft side (IEC 60529)
<b>Permissible relative humidity</b>	90 % (Condensation not permitted)
<b>Operating temperature range</b>	-20 °C ... +85 °C <sup>2)</sup>
<b>Storage temperature range</b>	-40 °C ... +100 °C, without package
<b>Resistance to shocks</b>	250 g, 3 ms (EN 60068-2-27)

<sup>1)</sup> With mating connector fitted.

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

<b>Resistance to vibration</b>	30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)
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<sup>1)</sup> With mating connector fitted.

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

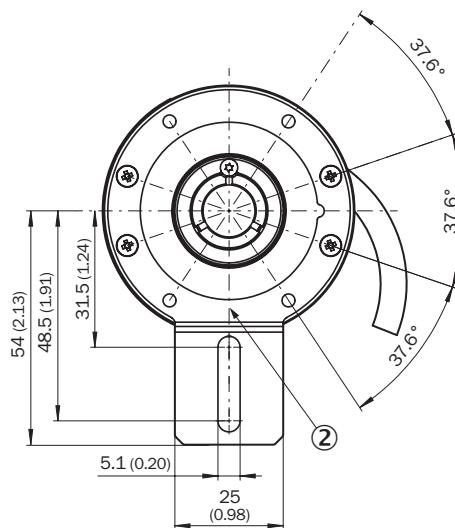
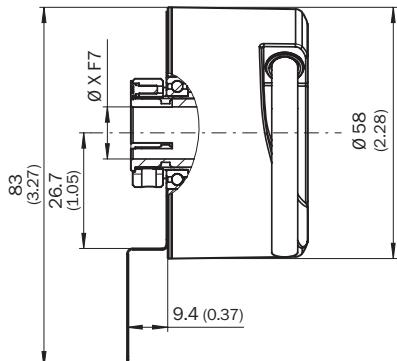
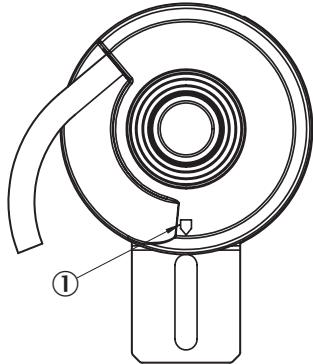
## Certificates

<b>EU declaration of conformity</b>	✓
<b>UK declaration of conformity</b>	✓
<b>ACMA declaration of conformity</b>	✓
<b>China-RoHS</b>	✓
<b>cRUs certificate</b>	✓
<b>Information according to Art. 3 of Data Act (Regulation EU 2023/2854)</b>	✓

## Classifications

<b>ECLASS 5.0</b>	27270501
<b>ECLASS 5.1.4</b>	27270501
<b>ECLASS 6.0</b>	27270590
<b>ECLASS 6.2</b>	27270590
<b>ECLASS 7.0</b>	27270501
<b>ECLASS 8.0</b>	27270501
<b>ECLASS 8.1</b>	27270501
<b>ECLASS 9.0</b>	27270501
<b>ECLASS 10.0</b>	27270501
<b>ECLASS 11.0</b>	27270501
<b>ECLASS 12.0</b>	27270501
<b>ETIM 5.0</b>	EC001486
<b>ETIM 6.0</b>	EC001486
<b>ETIM 7.0</b>	EC001486
<b>ETIM 8.0</b>	EC001486
<b>UNSPSC 16.0901</b>	41112113

## Dimensional drawing



Dimensions in mm (inch)

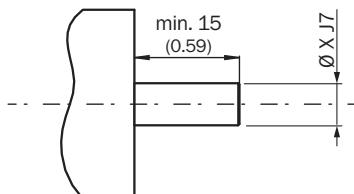
XF7 values see shaft diameter table for through hollow shaft, clamping at the front

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-TAxxxxxx	DBS60x-T1xxxxxx	6 mm
DBS60x-TBxxxxxx	DBS60x-T2xxxxxx	8 mm
DBS60x-TCxxxxxx	DBS60x-T3xxxxxx	3/8"
DBS60x-TDxxxxxx	DBS60x-T4xxxxxx	10 mm
DBS60x-TExxxxxx	DBS60x-T5xxxxxx	12 mm
DBS60x-TFxxxxxx	DBS60x-T6xxxxxx	1/2"
DBS60x-TGxxxxxx	DBS60x-T7xxxxxx	14 mm
DBS60x-THxxxxxx	DBS60x-T8xxxxxx	15 mm
DBS60x-TJxxxxxx		5/8"
		-

## Attachment specifications Through hollow shaft with front clamping

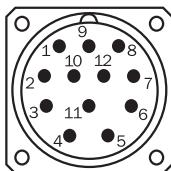


customer side

Type	Through hollow shaft with front clamping	Shaft diameter xJ7
DBS60x-TAxxxxxx	DBS60x-T1xxxxxx	6 mm
DBS60x-TBxxxxxx	DBS60x-T2xxxxxx	8 mm
DBS60x-TCxxxxxx	DBS60x-T3xxxxxx	3/8"
DBS60x-TDxxxxxx	DBS60x-T4xxxxxx	10 mm

Type	Through hollow shaft with front clamping	Shaft diameter xj7
DBS60x-TExxxxxxx	DBS60x-T5xxxxxx	12 mm
DBS60x-TFxxxxxxx	DBS60x-T6xxxxxx	1/2"
DBS60x-TGxxxxxx	DBS60x-T7xxxxxx	14 mm
DBS60x-THxxxxxx	DBS60x-T8xxxxxx	15 mm
DBS60x-TJxxxxxx		5/8"

## PIN assignment

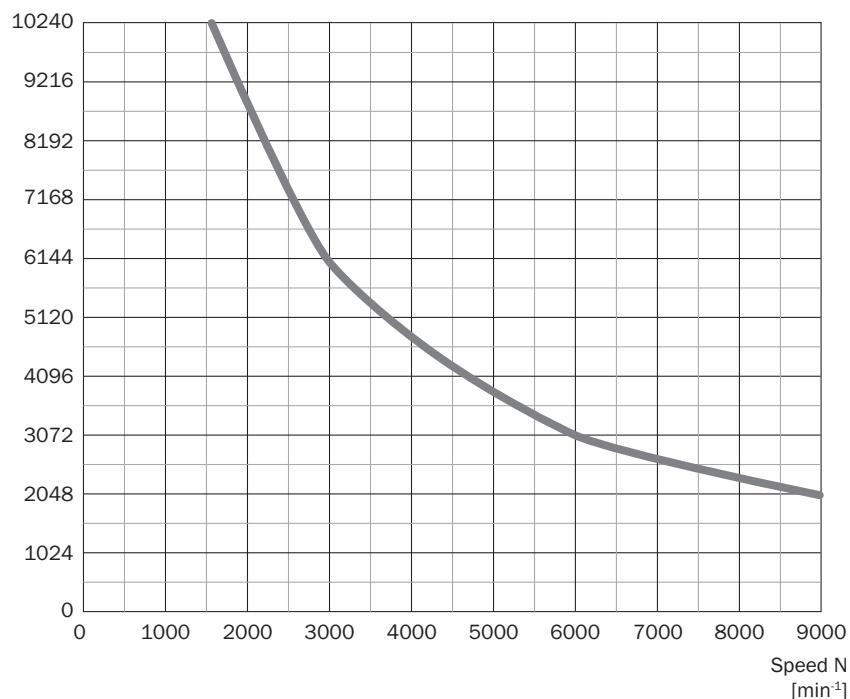


view of M23 male device connector on cable / housing

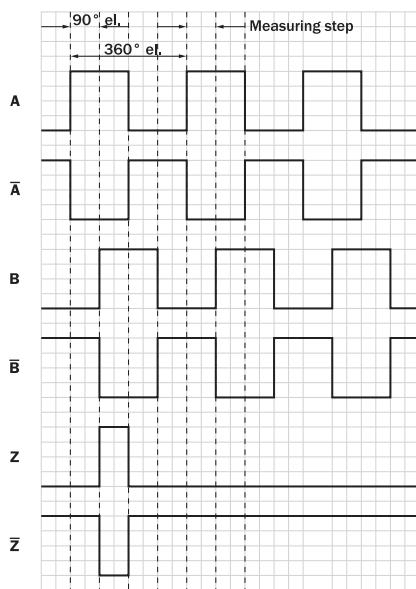
Wire colors (cable connection)	Male connector M12, 8-pin	Male connector M23, 12-pin	TTL/HTL 6-channel signal	Explanation
Brown	1	6	A-	Signal wire
White	2	5	A	Signal wire
Black	3	1	B-	Signal wire
Pink	4	8	B	Signal wire
Yellow	5	4	Z-	Signal wire
Purple	6	3	Z	Signal wire
Blue	7	10	GND	Ground connection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

## Diagrams

Pulses per revolution



## 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	TTL
10 V ... 30 V	TTL
10 V ... 27 V	HTL

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

## Recommended accessories

Other models and accessories → [www.sick.com/DBS60](http://www.sick.com/DBS60)

	Brief description	Type	part no.
connectors and cables			
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Flying leads</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> SSI, Incremental, HIPERFACE®</li><li><b>Items supplied:</b> By the meter</li><li><b>Cable:</b> 8-wire, PUR, halogen-free</li><li><b>Description:</b> SSI, shielded, Incremental, HIPERFACE®</li></ul>	LTG-2308-MWENC	6027529
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Flying leads</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> SSI, Incremental</li><li><b>Items supplied:</b> By the meter</li><li><b>Cable:</b> 11-wire, PUR</li><li><b>Description:</b> SSI, shielded, Incremental</li></ul>	LTG-2411-MW	6027530
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Flying leads</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> SSI, Incremental</li><li><b>Items supplied:</b> By the meter</li><li><b>Cable:</b> 12-wire, PUR, halogen-free</li><li><b>Description:</b> SSI, shielded, Incremental</li></ul>	LTG-2512-MW	6027531
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Flying leads</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> SSI, TTL, HTL, Incremental</li><li><b>Items supplied:</b> By the meter</li><li><b>Cable:</b> 12-wire, UV and saltwater-resistant, PUR, halogen-free</li><li><b>Description:</b> SSI, shielded, TTL, HTL, Incremental</li></ul>	LTG-2612-MW	6028516
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> Incremental</li><li><b>Cable:</b> 30 m, 11-wire, PUR</li><li><b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G30MLA3	2030702
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> Incremental</li><li><b>Cable:</b> 25 m, 11-wire, PUR</li><li><b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G25MLA3	2030699
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> Incremental</li><li><b>Cable:</b> 20 m, 11-wire, PUR</li><li><b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G20MLA3	2030695
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> Incremental</li><li><b>Cable:</b> 15 m, 11-wire, PUR</li><li><b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G15MLA3	2030692
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> Incremental</li><li><b>Cable:</b> 10 m, 11-wire, PUR</li><li><b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G10MLA3	2030688
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> Incremental</li><li><b>Cable:</b> 7 m, 11-wire, PUR</li><li><b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G07MLA3	2030685
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li><li><b>Connection type head B:</b> Flying leads</li><li><b>Signal type:</b> Incremental</li><li><b>Cable:</b> 2 m, 11-wire, PUR</li><li><b>Description:</b> Incremental, shielded</li></ul>	DOL-2312-G02MLA3	2030682
	<ul style="list-style-type: none"><li><b>Connection type head A:</b> Female connector, M23, 12-pin, angled, A-coded</li><li><b>Signal type:</b> HIPERFACE®, SSI, Incremental</li><li><b>Description:</b> HIPERFACE®, shieldedSSIIncremental</li></ul>	DOS-2312-W01	2072580

	<b>Brief description</b>	<b>Type</b>	<b>part no.</b>
	<ul style="list-style-type: none"><li>• <b>Connection systems:</b> Solder connection</li><li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight, A-coded</li><li>• <b>Signal type:</b> HIPERFACE®, SSI, Incremental</li><li>• <b>Description:</b> HIPERFACE®, shieldedSSIIncremental</li><li>• <b>Connection systems:</b> Solder connection</li></ul>	DOS-2312-G02	2077057

## 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.

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