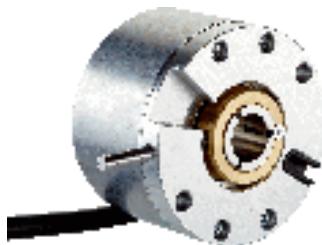


## DBS60E-THFPC1024

DBS60

INCREMENTAL ENCODERS

**SICK**  
Sensor Intelligence.



## Ordering information

Type	part no.
DBS60E-THFPC1024	On request

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

<sup>1)</sup> Output level depends on the supply voltage.

<sup>2)</sup> Valid signals can be read once this time has elapsed.

<sup>3)</sup> Up to 450 kHz on request.

## Electronics

<b>Connection type</b>	Cable, 8-wire, with male connector, M12, 8-pin, universal, 0.5 m <sup>1)</sup>
<b>Supply voltage</b>	4.5 ... 30 V
<b>Reference signal, number</b>	1
<b>Reference signal, position</b>	90°, electric, logically gated with A and B
<b>Reverse polarity protection</b>	✓

<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> Short-circuit opposite to another channel, US or GND permissible for maximum 30 s.

**Short-circuit protection of the outputs**✓<sup>2)</sup>

- 1) The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.  
2) Short-circuit opposite to another channel, US or GND permissible for maximum 30 s.

**Mechanics**

<b>Mechanical design</b>	Through hollow shaft
<b>Shaft diameter</b>	15 mmFront clamp
<b>Flange type / stator coupling</b>	Axial and radial register pin mounting, for 4 mm register pin
<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>

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

2) Not applicable for stator coupling type C and K.

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**

<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>	-30 °C ... +100 °C, at maximum 3,000 pulses per revolution <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)
<b>Resistance to vibration</b>	30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)

1) With mating connector fitted.

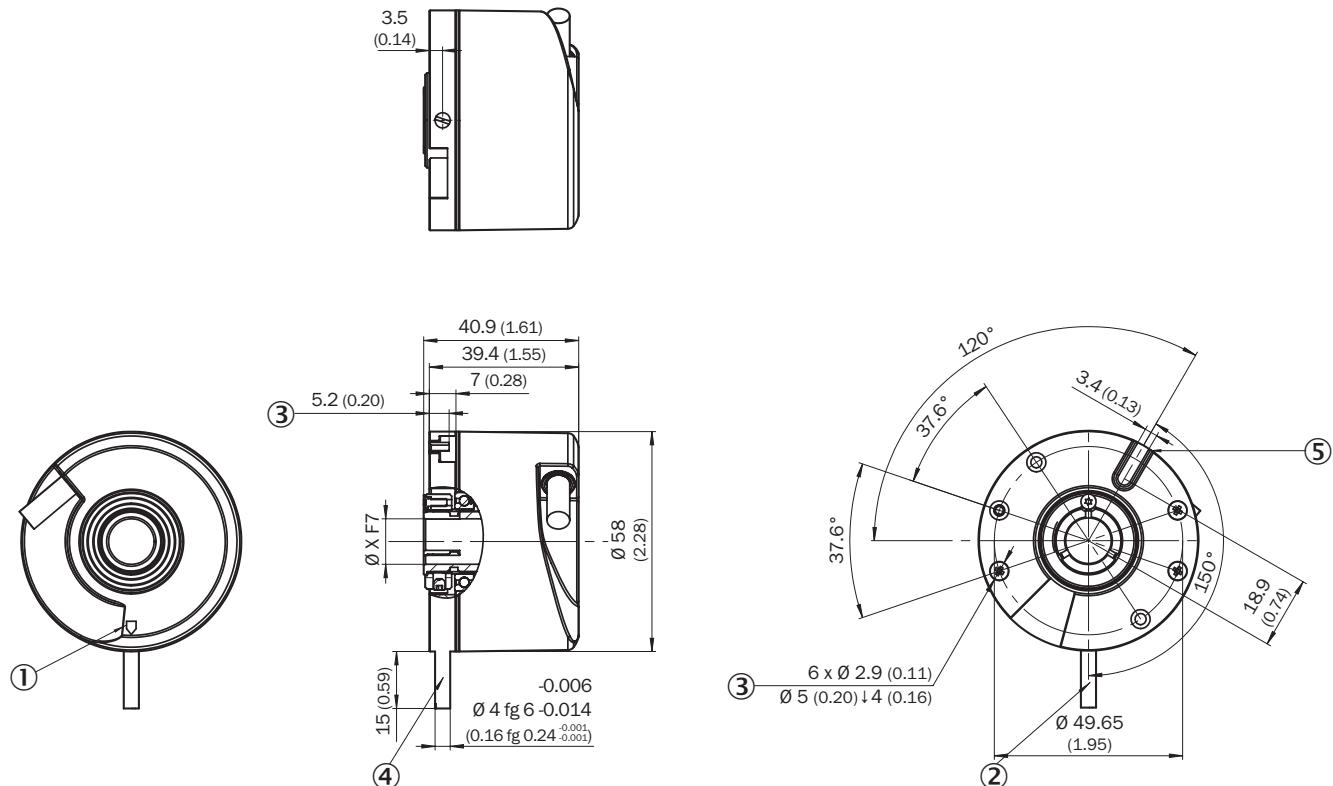
2) These values relate to all mechanical versions including recommended accessories unless otherwise noted.

**Classifications**

<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



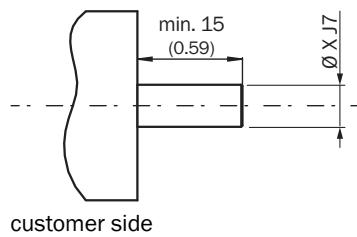
Dimensions in mm (inch)

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

- ① Zero pulse mark on housing
- ② register pin is the zero pulse mark
- ③ depth
- ④ register pin can be removed
- ⑤ rubber insert, material: NBR

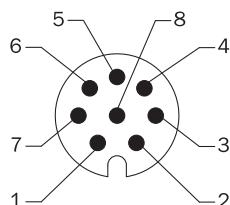
Type	Through hollow shaft with front clamping	Shaft diameter XF7
DBS60x-TAxxxxxx	DBS60x-T1xxxxxx	6 mm
DBS60x-TBxxxxxx	DBS60x-T2xxxxxx	8 mm
DBS60x-TCxxxxxx	DBS60x-T3xxxxxx	3/8"
DBS60x-TDxxxxxx	DBS60x-T4xxxxxx	10 mm
DBS60x-TExxxxxx	DBS60x-T5xxxxxx	12 mm
DBS60x-TFxxxxxx	DBS60x-T6xxxxxx	1/2"
DBS60x-TGxxxxxx	DBS60x-T7xxxxxx	14 mm
DBS60x-THxxxxxx	DBS60x-T8xxxxxx	15 mm
DBS60x-TJxxxxxx		5/8"
		-

### Attachment specifications Through hollow shaft with front clamping



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
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"
		-

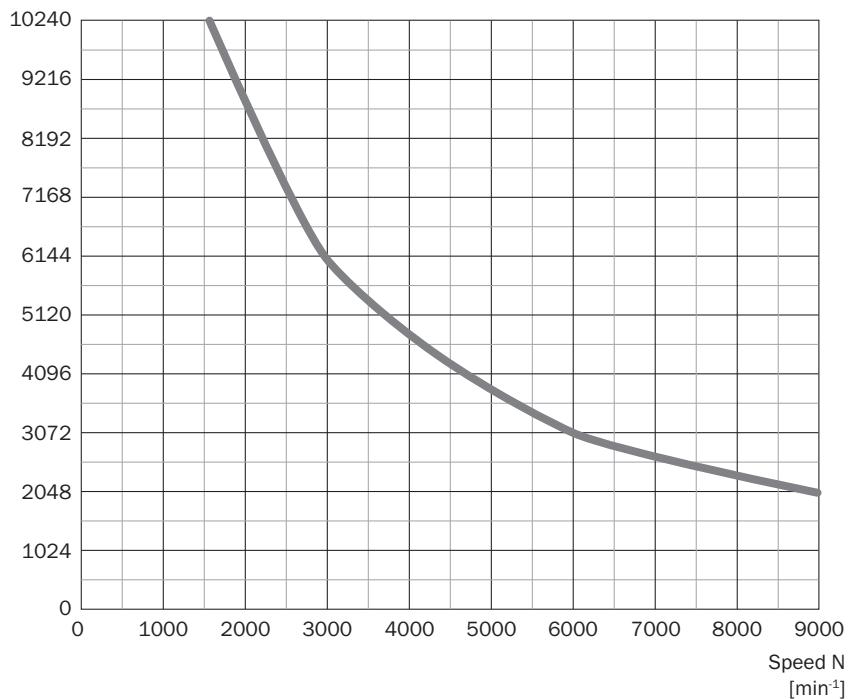
### PIN assignment



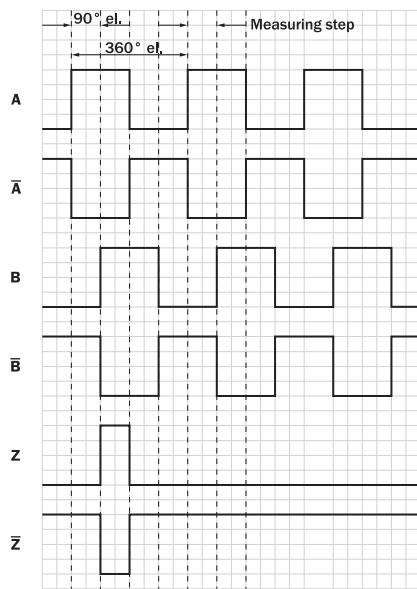
Wire colors (cable connection)	Male connector M12, 8-pin	Male connector M23, 12-pin	TTL/HTL 6-channel signal	Explanation
Brown	1	6	A-	Signal wire
White	2	5	A	Signal wire
Black	3	1	B-	Signal wire
Pink	4	8	B	Signal wire
Yellow	5	4	Z-	Signal wire
Purple	6	3	Z	Signal wire
Blue	7	10	GND	Ground connection
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
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, M12, 8-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental, SSI</li> <li><b>Cable:</b> 2 m, 8-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shieldedSSI</li> <li><b>Connection systems:</b> Flying leads</li> </ul>	DOL-1208-G02MAC1	6032866
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental, SSI</li> <li><b>Cable:</b> 5 m, 8-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shieldedSSI</li> <li><b>Connection systems:</b> Flying leads</li> </ul>	DOL-1208-G05MAC1	6032867
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental, SSI</li> <li><b>Cable:</b> 10 m, 8-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shieldedSSI</li> <li><b>Connection systems:</b> Flying leads</li> </ul>	DOL-1208-G10MAC1	6032868
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental, SSI</li> <li><b>Cable:</b> 20 m, 8-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shieldedSSI</li> <li><b>Connection systems:</b> Flying leads</li> </ul>	DOL-1208-G20MAC1	6032869
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental, SSI</li> <li><b>Cable:</b> 25 m, 8-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shieldedSSI</li> <li><b>Connection systems:</b> Flying leads</li> </ul>	DOL-1208-G25MAC1	6067859
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li> <li><b>Signal type:</b> Incremental, SSI</li> <li><b>Cable:</b> CAT5, CAT5e</li> <li><b>Description:</b> Incremental, shieldedSSI</li> <li><b>Connection systems:</b> IDC quick connection</li> <li><b>Permitted cross-section:</b> 0.14 mm² ... 0.34 mm²</li> </ul>	DOS-1208-GA01	6045001
	<ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li> <li><b>Connection type head B:</b> Male connector, M12, 8-pin, straight, A-coded</li> <li><b>Cable:</b> 20 m, 8-wire, PUR, halogen-free</li> <li><b>Description:</b> Shielded</li> </ul>	YF2AA8-200S01M-KA18	2099208

	<b>Brief description</b>	<b>Type</b>	<b>part no.</b>
	<ul style="list-style-type: none"><li>• <b>Permitted cross-section:</b> ≤ 0.25 mm<sup>2</sup></li><li>• <b>Note:</b> Drag chain use</li><li>• <b>Application:</b> Drag chain operation</li></ul>		
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li><li>• <b>Connection type head B:</b> Male connector, M12, 8-pin, straight, A-coded</li><li>• <b>Cable:</b> 2 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Shielded</li><li>• <b>Permitted cross-section:</b> ≤ 0.25 mm<sup>2</sup></li><li>• <b>Note:</b> Drag chain use</li><li>• <b>Application:</b> Drag chain operation</li></ul>	YF2AA8-020S01M-KA18	2099207
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li><li>• <b>Connection type head B:</b> Male connector, M12, 8-pin, straight, A-coded</li><li>• <b>Cable:</b> 5 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Shielded</li><li>• <b>Permitted cross-section:</b> ≤ 0.25 mm<sup>2</sup></li><li>• <b>Note:</b> Drag chain use</li><li>• <b>Application:</b> Drag chain operation</li></ul>	YF2AA8-050S01M-KA18	2099209
	<ul style="list-style-type: none"><li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li><li>• <b>Connection type head B:</b> Male connector, M12, 8-pin, straight, A-coded</li><li>• <b>Cable:</b> 10 m, 8-wire, PUR, halogen-free</li><li>• <b>Description:</b> Shielded</li><li>• <b>Permitted cross-section:</b> ≤ 0.25 mm<sup>2</sup></li><li>• <b>Note:</b> Drag chain use</li><li>• <b>Application:</b> Drag chain operation</li></ul>	YF2AA8-100S01M-KA18	2099210

## 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.

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**For us, that is "Sensor Intelligence."**

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