

# DBS60E-TGACD1024

DBS60

**INCREMENTAL ENCODERS** 



#### Ordering information

Туре	Part no.
DBS60E-TGACD1024	1138629

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

Illustration may differ



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

 $<sup>^{1)}\,\</sup>mathrm{Valid}$  signals can be read once this time has elapsed.

#### Electrical data

Elocation dates		
Connection type	Male connector, M12, 8-pin, radial	
<b>Supply voltage</b> 4.5 5.5 V		
Reference signal, number	1	
<b>Reference signal, position</b> 90°, electric, logically gated with A and B		
Reverse polarity protection	✓	
Short-circuit protection of the outputs	<b>✓</b> ¹)	

 $<sup>^{1)}</sup>$  Short-circuit opposite to another channel or GND permissible for max. 60 s. No protection signal against U<sub>S</sub>.

 $<sup>^{2)}\,\</sup>mathrm{Up}$  to 450 kHz on request.

<sup>2)</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.

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

#### Mechanical data

Mechanical design	Through hollow shaft, Front clamp	
Shaft diameter	14 mm	
Flange type / stator coupling	1-sided stator coupling, slot, screw hole circle radius 31.5–48.5 mm	
Weight	+ 0.25 kg <sup>1)</sup>	
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 <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) <sup>1)</sup> IP65, shaft side (IEC 60529)
Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	-20 °C +85 °C <sup>2)</sup>
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> With mating connector fitted.

#### Classifications

ECLASS 5.0	27270501
ECLASS 5.1.4	27270501

 $<sup>^{1)}</sup>$  Short-circuit opposite to another channel or GND permissible for max. 60 s. No protection signal against U<sub>S</sub>.

<sup>&</sup>lt;sup>2)</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.

 $<sup>^{2)}\,\</sup>mathrm{Not}$  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.

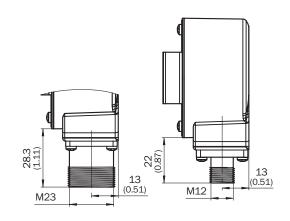
<sup>&</sup>lt;sup>2)</sup> These values relate to all mechanical versions including recommended accessories unless otherwise noted.

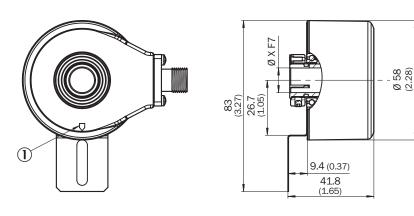
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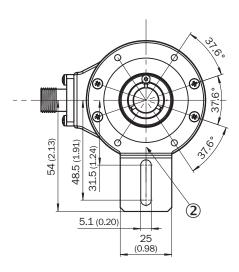
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ECLASS 6.0	27270590
ECLASS 6.2	27270590
ECLASS 7.0	27270501
ECLASS 8.0	27270501
ECLASS 8.1	27270501
ECLASS 9.0	27270501
ECLASS 10.0	27270501
ECLASS 11.0	27270501
ECLASS 12.0	27270501
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
ETIM 8.0	EC001486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

#### Dimensional drawing (Dimensions in mm (inch))







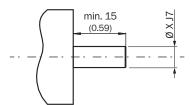
XF7 values see shaft diameter table for through hollow shaft, clamping at the front

- ① Zero pulse mark on housing
- ② Zero pulse mark on flange under stator coupling
- 3 Male connector tolerance in relation to hole pattern

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-TDxxxxxxxxx DBS60x-T4xxxxxxxxx	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"

#### Attachment specifications

Through hollow shaft with front clamping

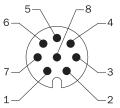


#### Customer side

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-TDxxxxxxxxx DBS60x-T4xxxxxxxxx	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

Type Through hollow shaft with front clamping	Shaft diameter xj7		
DBS60x-TJxxxxxxxxx	5/8"		

#### PIN assignment

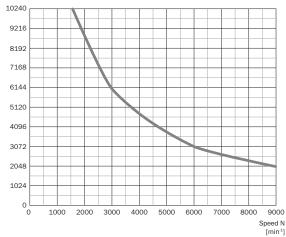


View of M12 male device connector on cable / housing

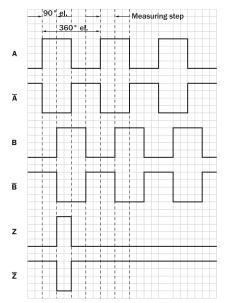
Wire colors (ca- ble connection)	Male connector M12, 8-pin	Male connector M23, 12-pin	TTL/HTL 6- channel signal	Explanation
Brown	1	6	A-	Signal wire
White	2	5	A	Signal wire
Black	3	1	B-	Signal wire
Pink	4	8	В	Signal wire
Yellow	5	4	Z-	Signal wire
Purple	6	3	Z	Signal wire
Blue	7	10	GND	Ground connection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

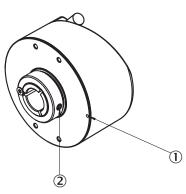


Cw with view on the encoder shaft in direction "A", compare dimensional drawing.

Supply voltage	Output
4,5 V 5,5 V	πι
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.
Others			
	<ul> <li>Connection type head A: Flying leads</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, Incremental, HIPERFACE<sup>®</sup></li> <li>Cable: 8-wire, PUR, halogen-free</li> <li>Description: SSI, Incremental, HIPERFACE<sup>®</sup>, shielded</li> <li>Items supplied: By the meter</li> </ul>	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

Brief description	Туре	Part no.
<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: Incremental, SSI</li> <li>Cable: 2 m, 8-wire, PUR, halogen-free</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm², Ø 7.0 mm</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-G02MAC1	6032866
<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: Incremental, SSI</li> <li>Cable: 5 m, 8-wire, PUR, halogen-free</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm², Ø 7.0 mm</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-G05MAC1	6032867
<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: Incremental, SSI</li> <li>Cable: 10 m, 8-wire, PUR, halogen-free</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm², Ø 7.0 mm</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-G10MAC1	6032868
<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: Incremental, SSI</li> <li>Cable: 20 m, 8-wire, PUR, halogen-free</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm², Ø 7.0 mm</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-G20MAC1	6032869
<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: Incremental, SSI</li> <li>Cable: 25 m, 8-wire, PUR, halogen-free</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm², Ø 7.0 mm</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-G25MAC1	6067859
<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight, A-coded</li> <li>Signal type: Incremental, SSI</li> <li>Cable: CAT5, CAT5e</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight, A encoded, 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>	DOS-1208-GA01	6045001
• Connection type head A: Female connector, M12, 8-pin, straight, A-coded • Connection type head B: Male connector, M12, 8-pin, straight, A-coded • Cable: 20 m, 8-wire, PUR, halogen-free • Description: Shielded • Permitted cross-section: ≤ 0.25 mm² • Note: Drag chain use • Application: Drag chain operation	YF2AA8- 200S01MKA18	2099208
<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight, A-coded</li> <li>Connection type head B: Male connector, M12, 8-pin, straight, A-coded</li> <li>Cable: 2 m, 8-wire, PUR, halogen-free</li> <li>Description: Shielded</li> <li>Permitted cross-section: ≤ 0.25 mm²</li> <li>Note: Drag chain use</li> <li>Application: Drag chain operation</li> </ul>	YF2AA8- 020S01MKA18	2099207

	Brief description	Туре	Part no.
	• Connection type head A: Female connector, M12, 8-pin, straight, A-coded • Connection type head B: Male connector, M12, 8-pin, straight, A-coded • Cable: 5 m, 8-wire, PUR, halogen-free • Description: Shielded • Permitted cross-section: ≤ 0.25 mm² • Note: Drag chain use • Application: Drag chain operation	YF2AA8- 050S01MKA18	2099209
	<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight, A-coded</li> <li>Connection type head B: Male connector, M12, 8-pin, straight, A-coded</li> <li>Cable: 10 m, 8-wire, PUR, halogen-free</li> <li>Description: Shielded</li> <li>Permitted cross-section: ≤ 0.25 mm²</li> <li>Note: Drag chain use</li> <li>Application: Drag chain operation</li> </ul>	YF2AA8- 100S01MKA18	2099210
	Connection type head A: Female connector, M12, 8-pin, angled Connection type head B: Flying leads Signal type: HIPERFACE®, Incremental Cable: 2 m, 8-wire, PUR, halogen-free Description: HIPERFACE®, Incremental, shielded	DOL-1208-W02MAC1	6037724
	Connection type head A: Female connector, M12, 8-pin, angled Connection type head B: Flying leads Signal type: HIPERFACE®, Incremental Cable: 5 m, 8-wire, PUR, halogen-free Description: HIPERFACE®, Incremental, shielded	DOL-1208-W05MAC1	6037725
	Connection type head A: Female connector, M12, 8-pin, angled Connection type head B: Flying leads Signal type: HIPERFACE®, Incremental Cable: 10 m, 8-wire, PUR, halogen-free Description: HIPERFACE®, Incremental, shielded	DOL-1208-W10MAC1	6037726
	Connection type head A: Female connector, M12, 8-pin, angled Connection type head B: Flying leads Signal type: HIPERFACE®, Incremental Cable: 20 m, 8-wire, PUR Description: HIPERFACE®, Incremental, shielded	DOL-1208-W20MAC1	6037727
	<ul> <li>Connection type head A: Female connector, M12, 8-pin, angled</li> <li>Connection type head B: Flying leads</li> <li>Cable: 2 m, 8-wire, PVC</li> <li>Description: Shielded</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-W02MA	6020992
	<ul> <li>Connection type head A: Female connector, M12, 8-pin, angled</li> <li>Connection type head B: Flying leads</li> <li>Signal type: Sensor/actuator cable</li> <li>Cable: 2 m, 8-wire, PUR, halogen-free</li> <li>Description: Sensor/actuator cable, shielded</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208- W02MAS01	6029224
9	<ul> <li>Connection type head A: Female connector, M12, 8-pin, angled</li> <li>Connection type head B: Flying leads</li> <li>Cable: 2 m, 8-wire, PUR, halogen-free</li> <li>Description: Unshielded, Cable, M12, 8-pin, angled connector female with molded cable, 2 m, PUR halogen free</li> </ul>	DOL-1208-W02MC	6035623
	<ul> <li>Connection type head A: Female connector, M12, 8-pin, angled</li> <li>Connection type head B: Flying leads</li> <li>Cable: 5 m, 8-wire, PVC</li> <li>Description: Shielded</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-W05MA	6021033

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	Brief description	Туре	Part no.
>	<ul> <li>Connection type head A: Female connector, M12, 8-pin, angled</li> <li>Connection type head B: Flying leads</li> <li>Cable: 5 m, 8-wire, PUR</li> <li>Description: Unshielded, Cable, M12, 8-pin, angled connector female with molded cable, 5 m, PUR halogen free</li> </ul>	DOL-1208-W05MC	6035624
9	<ul> <li>Connection type head A: Female connector, M12, 8-pin, angled</li> <li>Connection type head B: Flying leads</li> <li>Cable: 10 m, 8-wire, PUR, halogen-free</li> <li>Description: Unshielded, Cable, M12, 8-pin, angled connector female with molded cable, 10 m, PUR halogen free</li> </ul>	DOL-1208-W10MC	6035625

#### 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."

### **WORLDWIDE PRESENCE:**

Contacts and other locations -www.sick.com

