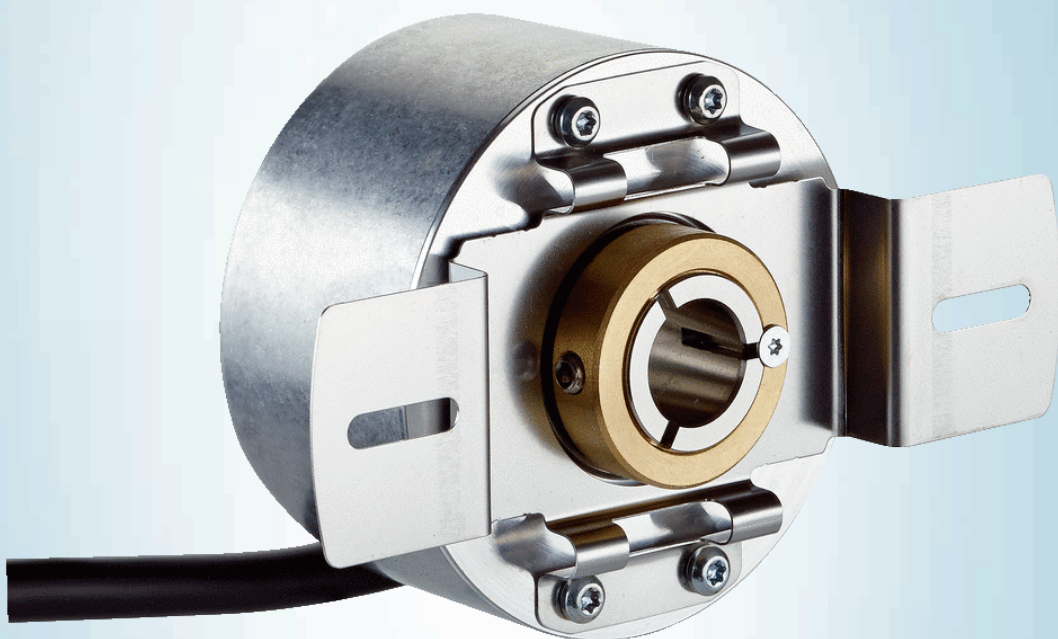




DBS60E-TJAQ02048

DBS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.

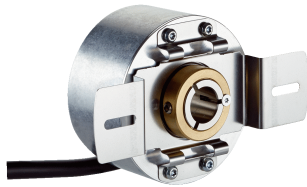


Illustration may differ



Ordering information

Type	Part no.
DBS60E-TJAQ02048	1069757

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

Detailed technical data

Performance

Pulses per revolution	2,048
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 ¹⁾
Output frequency	+ 300 kHz ²⁾
Load current	≤ 30 mA, per channel
Operating current	≤ 50 mA (without load)

¹⁾ Valid signals can be read once this time has elapsed.

²⁾ Up to 450 kHz on request.

Electrical data

Connection type	Cable, 8-wire, with male connector, M23, 12-pin, universal, 0.5 m ^{1) 2)}
Supply voltage	4.5 ... 5.5 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	✓ ³⁾
MTTFd: mean time to dangerous failure	500 years (EN ISO 13849-1) ⁴⁾

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

²⁾ M23 male connector for central mounting.

³⁾ Short-circuit opposite to another channel or GND permissible for max. 60 s. No protection signal against U_S.

⁴⁾ 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	5/8"
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
Material, cable	PVC
Start up torque	+ 0.5 Ncm (+20 °C)
Operating torque	0.4 Ncm (+20 °C)
Permissible movement static	± 0.3 mm (radial) ± 0.5 mm (axial) ²⁾
Permissible movement dynamic	± 0.1 mm (radial) ± 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/s ²

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

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	-20 °C ... +85 °C 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.

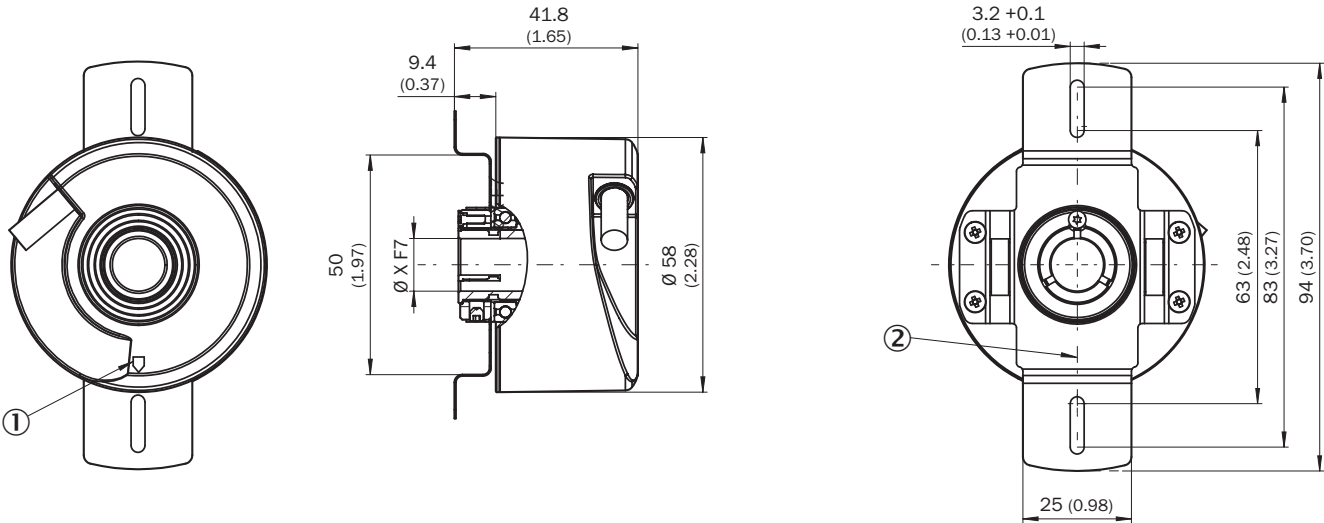
²⁾ These values relate to all mechanical versions including recommended accessories unless otherwise noted.

Classifications

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
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

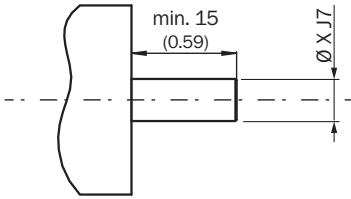
- ① Zero pulse mark on housing
- ② Zero pulse mark on flange under stator coupling

Type Through hollow shaft with front clamping	Shaft diameter XF7
DBS60x-TAxxxxxxx DBS60x-T1xxxxxxx	6 mm
DBS60x-TBxxxxxxx DBS60x-T2xxxxxxx	8 mm
DBS60x-TCxxxxxxx DBS60x-T3xxxxxxx	3/8"
DBS60x-TDxxxxxxx DBS60x-T4xxxxxxx	10 mm
DBS60x-TExxxxxxx DBS60x-T5xxxxxxx	12 mm
DBS60x-TFxxxxxxx DBS60x-T6xxxxxxx	1/2"
DBS60x-TGxxxxxxx	14 mm

Type Through hollow shaft with front clamping	Shaft diameter XF7
DBS60x-T7xxxxxxx	
DBS60x-THxxxxxxx DBS60x-T8xxxxxxx	15 mm
DBS60x-TJxxxxxxx	5/8"

Attachment specifications

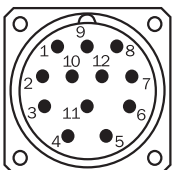
Through hollow shaft with front clamping



Customer side

Type Through hollow shaft with front clamping	Shaft diameter xj7
DBS60x-TAxxxxxxx DBS60x-T1xxxxxxx	6 mm
DBS60x-TBxxxxxxx DBS60x-T2xxxxxxx	8 mm
DBS60x-TCxxxxxxx DBS60x-T3xxxxxxx	3/8"
DBS60x-TDxxxxxxx DBS60x-T4xxxxxxx	10 mm
DBS60x-TExxxxxxx DBS60x-T5xxxxxxx	12 mm
DBS60x-TFxxxxxxx DBS60x-T6xxxxxxx	1/2"
DBS60x-TGxxxxxxx DBS60x-T7xxxxxxx	14 mm
DBS60x-THxxxxxxx DBS60x-T8xxxxxxx	15 mm
DBS60x-TJxxxxxxx	5/8"

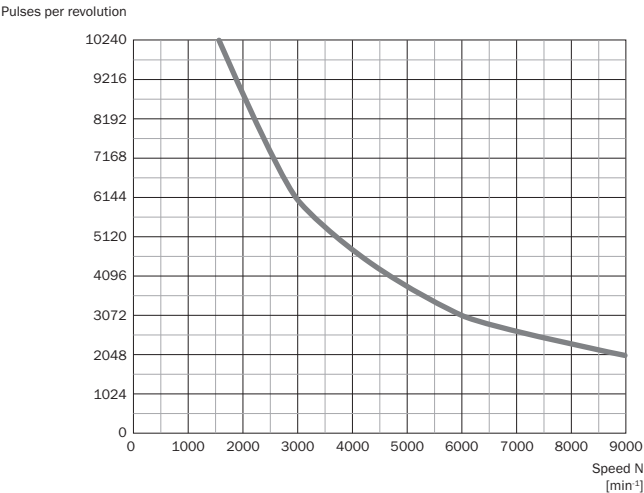
PIN assignment



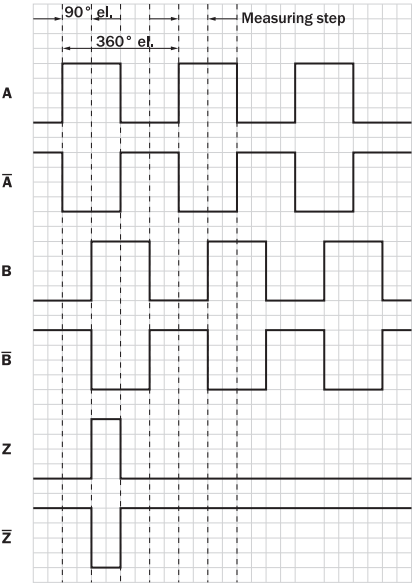
View of M23 male device connector on cable / housing

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 _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 encoder housing

Diagrams



Signal outputs for electrical interfaces TTL and HTL

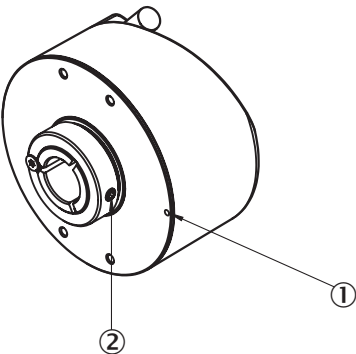


Cw with view on the encoder shaft in direction "A", compare dimensional drawing.

Supply voltage	Output
4,5 V ... 5,5 V	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

Operation note

Hollow shaft

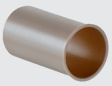
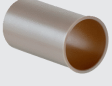
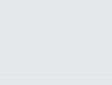


Attention! If stator coupling is mounted, the zero pulse mark can be hidden by the stator coupling

- 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	Type	Part no.
Shaft adaptation			
	Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 6 mm, outer diameter 5/8" (15.875 mm), plastic, PEEK	SPZ-58Z-006-P	2076228
	Collet metal for hollow shaft, shaft diameter 8 mm, outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-008-M	2076219
	Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 8 mm, outer diameter 5/8" (15.875 mm), plastic, PEEK	SPZ-58Z-008-P	2076229
	Collet metal for hollow shaft, shaft diameter 10 mm, outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-010-M	2076220
	Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 10 mm, outer diameter 5/8" (15.875 mm), plastic, PEEK	SPZ-58Z-010-P	2076230
	Collet metal for hollow shaft, shaft diameter 11 mm, outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-011-M	2094671
	Collet metal for hollow shaft, shaft diameter 12 mm, outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-012-M	2076221
	Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 12 mm, outer diameter 5/8" (15.875 mm), plastic, PEEK	SPZ-58Z-012-P	2076231
	Collet metal for hollow shaft, shaft diameter 14 mm, outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-014-M	2076222
	Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 14 mm, outer diameter 5/8" (15.875 mm), plastic, PEEK	SPZ-58Z-014-P	2076232
	Collet metal for hollow shaft, shaft diameter 15 mm, outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-015-M	2076223
	Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 15 mm, outer diameter 5/8" (15.875 mm), plastic, PEEK	SPZ-58Z-015-P	2076233
	Collet metal for hollow shaft, shaft diameter 1/2" (12.7 mm), outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-12Z-M	2076225
	Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 1/2" (12.7 mm), outer diameter 5/8" (15.875 mm), plastic, PEEK	SPZ-58Z-12Z-P	2076227
	Collet metal for hollow shaft, shaft diameter 3/8" (9.525 mm), outer diameter 5/8" (15.875 mm), metal	SPZ-58Z-38Z-M	2076224
	Collet plastic (PEEK) insulated for hollow shaft, shaft diameter 3/8" (9.525 mm), outer diameter 5/8" (15.875 mm), plastic, PEEK	SPZ-58Z-38Z-P	2076226

	Brief description	Type	Part no.
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
	• Connection type head A: Flying leads • Connection type head B: Flying leads • Signal type: SSI, Incremental • Cable: 11-wire, PUR • Description: SSI, Incremental, shielded • Items supplied: By the meter	LTG-2411-MW	6027530
	• Connection type head A: Flying leads • Connection type head B: Flying leads • Signal type: SSI, Incremental • Cable: 12-wire, PUR, halogen-free • Description: SSI, Incremental, shielded • Items supplied: By the meter	LTG-2512-MW	6027531
	• Connection type head A: Flying leads • Connection type head B: Flying leads • Signal type: SSI, TTL, HTL, Incremental • Cable: 12-wire, UV and saltwater-resistant, PUR, halogen-free • 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 • Items supplied: By the meter	LTG-2612-MW	6028516
	• Connection type head A: Female connector, M23, 12-pin, straight • Connection type head B: Flying leads • Signal type: Incremental • Cable: 30 m, 11-wire, PUR • Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm	DOL-2312-G30MLA3	2030702
	• Connection type head A: Female connector, M23, 12-pin, straight • Connection type head B: Flying leads • Signal type: Incremental • Cable: 25 m, 11-wire, PUR • Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm	DOL-2312-G25MLA3	2030699
	• Connection type head A: Female connector, M23, 12-pin, straight • Connection type head B: Flying leads • Signal type: Incremental • Cable: 20 m, 11-wire, PUR • Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm	DOL-2312-G20MLA3	2030695
	• Connection type head A: Female connector, M23, 12-pin, straight • Connection type head B: Flying leads • Signal type: Incremental • Cable: 15 m, 11-wire, PUR • Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm	DOL-2312-G15MLA3	2030692

	Brief description	Type	Part no.
	• Connection type head A: Female connector, M23, 12-pin, straight • Connection type head B: Flying leads • Signal type: Incremental • Cable: 10 m, 11-wire, PUR • Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm	DOL-2312-G10MLA3	2030688
	• Connection type head A: Female connector, M23, 12-pin, straight • Connection type head B: Flying leads • Signal type: Incremental • Cable: 7 m, 11-wire, PUR • Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm	DOL-2312-G07MLA3	2030685
	• Connection type head A: Female connector, M23, 12-pin, straight • Connection type head B: Flying leads • Signal type: Incremental • Cable: 2 m, 11-wire, PUR • Description: Incremental, shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: incremental, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm	DOL-2312-G02MLA3	2030682
	• Connection type head A: Female connector, M23, 12-pin, angled, A-coded • Signal type: HIPERFACE[®], SSI, Incremental • Description: HIPERFACE[®], SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, angled, shielded, for cable diameter 4.2 mm ... 6.6 mm Head B: - Operating temperature: -20 °C ... +130 °C • Connection systems: Solder connection	DOS-2312-W01	2072580
	• Connection type head A: Female connector, M23, 12-pin, straight, A-coded • Signal type: HIPERFACE[®], SSI, Incremental • Description: HIPERFACE[®], SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: - Operating temperature: -40 °C ... +125 °C • Connection systems: Solder connection	DOS-2312-G02	2077057

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