



DBS60E-TGFCA2048

DBS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

Type	part no.
DBS60E-TGFCA2048	1076604

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

Detailed technical data

Safety-related parameters

MTTF_D (mean time to dangerous failure)	500 years (EN ISO 13849-1) ¹⁾
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¹⁾ 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

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

¹⁾ Output level depends on the supply voltage.

²⁾ Valid signals can be read once this time has elapsed.

³⁾ Up to 450 kHz on request.

Electronics

Connection type	Male connector, M12, 8-pin, radial
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	✓ ¹⁾

¹⁾ Short-circuit opposite to another channel, US or GND permissible for maximum 30 s.

Mechanics

Mechanical design	Through hollow shaft
Shaft diameter	14 mm Front clamp
Flange type / stator coupling	Without stator coupling, flange with 4 x M2,5
Weight	+ 0.25 kg ¹⁾
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	± 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	-30 °C ... +100 °C, at maximum 3,000 pulses per revolution ²⁾
Storage temperature range	-40 °C ... +100 °C, without package
Resistance to shocks	250 g, 3 ms (EN 60068-2-27)

¹⁾ With mating connector fitted.

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

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

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

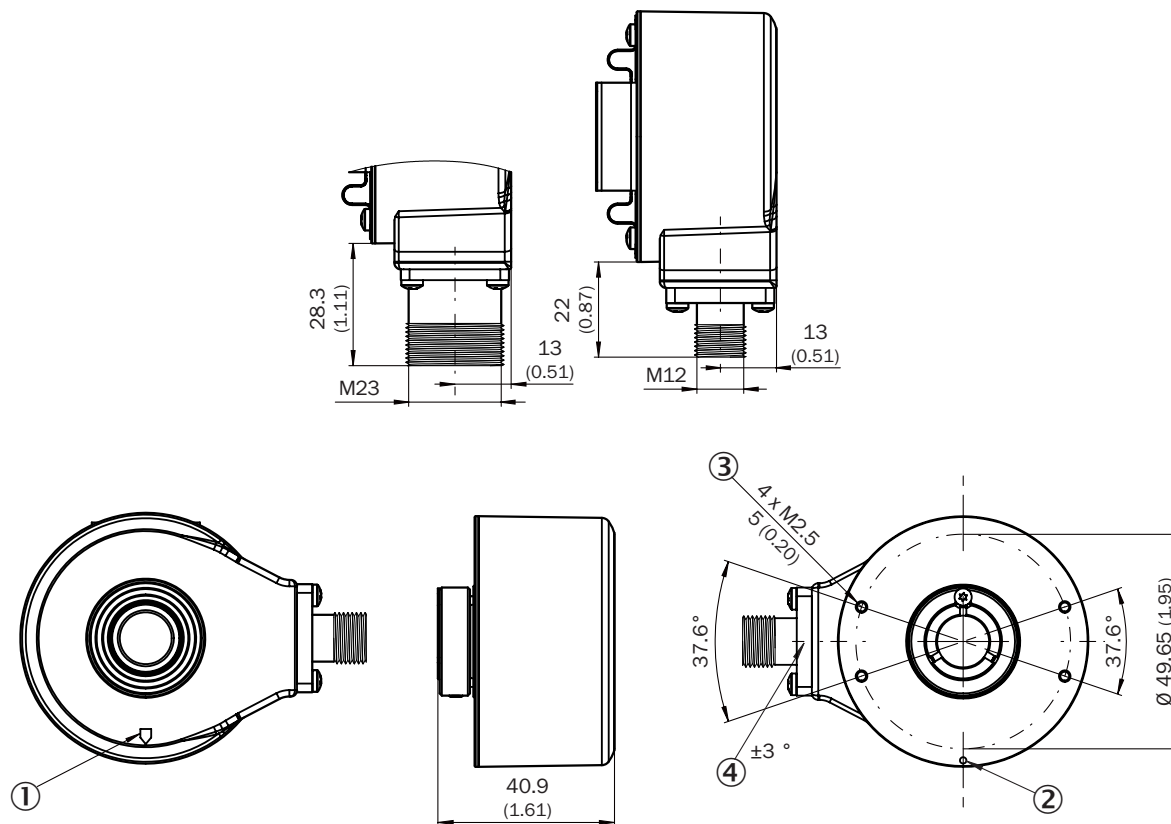
Certificates

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

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

③ depth

④ male connector tolerance in relation to hole pattern

Type	Through hollow shaft with front clamping	Shaft diameter XF7
DBS60x-TAxxxxxxx		6 mm
DBS60x-T1xxxxxxx		
DBS60x-TBxxxxxxx		8 mm
DBS60x-T2xxxxxxx		
DBS60x-TCxxxxxxx		3/8"
DBS60x-T3xxxxxxx		
DBS60x-TDxxxxxxx		10 mm
DBS60x-T4xxxxxxx		
DBS60x-TExxxxxxx		12 mm
DBS60x-T5xxxxxxx		
DBS60x-TFxxxxxxx		1/2"
DBS60x-T6xxxxxxx		
DBS60x-TGxxxxxxx		14 mm
DBS60x-T7xxxxxxx		
DBS60x-THxxxxxxx		15 mm
DBS60x-T8xxxxxxx		
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 M12 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

Wire colors (cable connection)	Male connector M12, 8-pin	Male connector M23, 12-pin	TTL/HTL 6-channel signal	Explanation
-	-	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

	Brief description	Type	part no.
connectors and cables			
	<ul style="list-style-type: none"> Description: SSI, shielded, Incremental, HIPERFACE® Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, Incremental, HIPERFACE® Items supplied: By the meter Cable: 8-wire, PUR, halogen-free 	LTG-2308-MWENC	6027529
	<ul style="list-style-type: none"> Description: SSI, shielded, Incremental Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, Incremental Items supplied: By the meter Cable: 11-wire, PUR 	LTG-2411-MW	6027530
	<ul style="list-style-type: none"> Description: SSI, shielded, Incremental Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, Incremental Items supplied: By the meter Cable: 12-wire, PUR, halogen-free 	LTG-2512-MW	6027531
	<ul style="list-style-type: none"> Description: SSI, shielded, TTL, HTL, Incremental Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, TTL, HTL, Incremental Items supplied: By the meter Cable: 12-wire, UV and saltwater-resistant, PUR, halogen-free 	LTG-2612-MW	6028516
	<ul style="list-style-type: none"> Description: Incremental, shielded, SSI Connection type head A: Female connector, M12, 8-pin, straight Connection type head B: Flying leads Signal type: Incremental, SSI Cable: 2 m, 8-wire, PUR, halogen-free Connection systems: Flying leads Application: Drag chain operation, Zones with oils and lubricants 	DOL-1208-G02MAC1	6032866
	<ul style="list-style-type: none"> Description: Incremental, shielded, SSI Connection type head A: Female connector, M12, 8-pin, straight Connection type head B: Flying leads Signal type: Incremental, SSI Cable: 5 m, 8-wire, PUR, halogen-free Connection systems: Flying leads Application: Drag chain operation, Zones with oils and lubricants 	DOL-1208-G05MAC1	6032867
	<ul style="list-style-type: none"> Description: Incremental, shielded, SSI Connection type head A: Female connector, M12, 8-pin, straight Connection type head B: Flying leads Signal type: Incremental, SSI Cable: 10 m, 8-wire, PUR, halogen-free Connection systems: Flying leads Application: Drag chain operation, Zones with oils and lubricants 	DOL-1208-G10MAC1	6032868
	<ul style="list-style-type: none"> Description: Incremental, shielded, SSI Connection type head A: Female connector, M12, 8-pin, straight Connection type head B: Flying leads Signal type: Incremental, SSI Cable: 20 m, 8-wire, PUR, halogen-free Connection systems: Flying leads Application: Drag chain operation, Zones with oils and lubricants 	DOL-1208-G20MAC1	6032869
	<ul style="list-style-type: none"> Description: Incremental, shielded, SSI Connection type head A: Female connector, M12, 8-pin, straight Connection type head B: Flying leads Signal type: Incremental, SSI Cable: 25 m, 8-wire, PUR, halogen-free Connection systems: Flying leads Application: Drag chain operation, Zones with oils and lubricants 	DOL-1208-G25MAC1	6067859
	<ul style="list-style-type: none"> Description: Incremental, shielded, SSI Connection type head A: Female connector, M12, 8-pin, straight, A-coded Signal type: Incremental, SSI Cable: CAT5, CAT5e Connection systems: IDC quick connection 	DOS-1208-GA01	6045001

	Brief description	Type	part no.
	<ul style="list-style-type: none"> • Permitted cross-section: 0.14 mm² ... 0.34 mm² • Description: Shielded • 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 • Permitted cross-section: ≤ 0.25 mm² • Note: Drag chain use • Application: Drag chain operation 	YF2AA8-200S01M-KA18	2099208
	<ul style="list-style-type: none"> • Description: Shielded • 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: 2 m, 8-wire, PUR, halogen-free • Permitted cross-section: ≤ 0.25 mm² • Note: Drag chain use • Application: Drag chain operation 	YF2AA8-020S01M-KA18	2099207
	<ul style="list-style-type: none"> • Description: Shielded • 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 • Permitted cross-section: ≤ 0.25 mm² • Note: Drag chain use • Application: Drag chain operation 	YF2AA8-050S01M-KA18	2099209
	<ul style="list-style-type: none"> • Description: Shielded • 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: 10 m, 8-wire, PUR, halogen-free • Permitted cross-section: ≤ 0.25 mm² • Note: Drag chain use • Application: Drag chain operation 	YF2AA8-100S01M-KA18	2099210
	<ul style="list-style-type: none"> • Description: HIPERFACE[®], shielded, Incremental • 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 • Application: Zones with oils and lubricants 	DOL-1208-W02MAC1	6037724
	<ul style="list-style-type: none"> • Description: HIPERFACE[®], shielded, Incremental • 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 • Application: Zones with oils and lubricants 	DOL-1208-W05MAC1	6037725
	<ul style="list-style-type: none"> • Description: HIPERFACE[®], shielded, Incremental • 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 • Application: Zones with oils and lubricants 	DOL-1208-W10MAC1	6037726
	<ul style="list-style-type: none"> • Description: HIPERFACE[®], shielded, Incremental • 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 • Application: Zones with oils and lubricants 	DOL-1208-W20MAC1	6037727
	<ul style="list-style-type: none"> • Description: Shielded • Connection type head A: Female connector, M12, 8-pin, angled • Connection type head B: Flying leads • Cable: 2 m, 8-wire, PVC • Connection systems: Flying leads 	DOL-1208-W02MA	6020992
	<ul style="list-style-type: none"> • Description: Sensor/actuator cable, shielded • Connection type head A: Female connector, M12, 8-pin, angled • Connection type head B: Flying leads • Signal type: Sensor/actuator cable • Cable: 2 m, 8-wire, PUR, halogen-free 	DOL-1208-W02MAS01	6029224

	Brief description	Type	part no.
	<ul style="list-style-type: none"> Connection systems: Flying leads Description: Unshielded Connection type head A: Female connector, M12, 8-pin, angled Connection type head B: Flying leads Cable: 2 m, 8-wire, PUR, halogen-free 	DOL-1208-W02MC	6035623
	<ul style="list-style-type: none"> Description: Shielded Connection type head A: Female connector, M12, 8-pin, angled Connection type head B: Flying leads Cable: 5 m, 8-wire, PVC Connection systems: Flying leads 	DOL-1208-W05MA	6021033
	<ul style="list-style-type: none"> Description: Unshielded Connection type head A: Female connector, M12, 8-pin, angled Connection type head B: Flying leads Cable: 5 m, 8-wire, PUR 	DOL-1208-W05MC	6035624
	<ul style="list-style-type: none"> Description: Unshielded Connection type head A: Female connector, M12, 8-pin, angled Connection type head B: Flying leads Cable: 10 m, 8-wire, PUR, halogen-free 	DOL-1208-W10MC	6035625

Mounting systems

	<ul style="list-style-type: none"> Description: Flange adapter (for hollow shaft) for register pin mounting (pin 4 mm) 	BEF-DS-13	2076218
	<ul style="list-style-type: none"> Product family: Stator couplings Description: Torque support, 1-sided, slotted hole, screw hole radius 31.5 mm - 48.5 mm, hole width 5.1 mm 	BEF-DS-12	2076217
	<ul style="list-style-type: none"> Product family: Stator couplings Description: One-sided stator coupling, slots, slot radius 32.75 mm - 142.65 mm, slot width 4.5 mm 	BEF-DS-11	2076216
	<ul style="list-style-type: none"> Product family: Stator couplings Description: Two-sided stator coupling, slot, slot radius 63 mm - 83 mm, slot width 3.2 mm 	BEF-DS-10	2076215
	<ul style="list-style-type: none"> Product family: Stator couplings Description: Two-sided stator coupling, screw hole circle diameter 63 mm, slot width 3.2 mm 	BEF-DS-09	2076214
	<ul style="list-style-type: none"> Product family: Stator couplings Description: One-sided stator coupling, slot, slot radius 32.1 mm - 37.6 mm, slot width 4.5 mm 	BEF-DS-14	2076678

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:

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