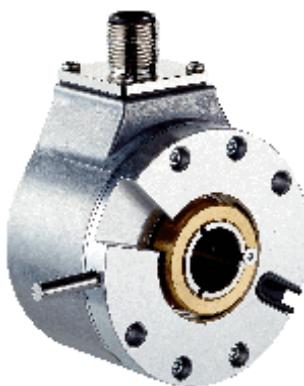


DBS60E-BEFCC1024

DBS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.



Ordering information

Type	part no.
DBS60E-BEFCC1024	On request

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

Illustration may differ

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	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 / 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

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

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	Blind hollow shaft
Shaft diameter	12 mmFront clamp
Flange type / stator coupling	Axial and radial register pin mounting, for 4 mm register pin
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	IP67, 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)
Resistance to vibration	30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)

¹⁾ With mating connector fitted.

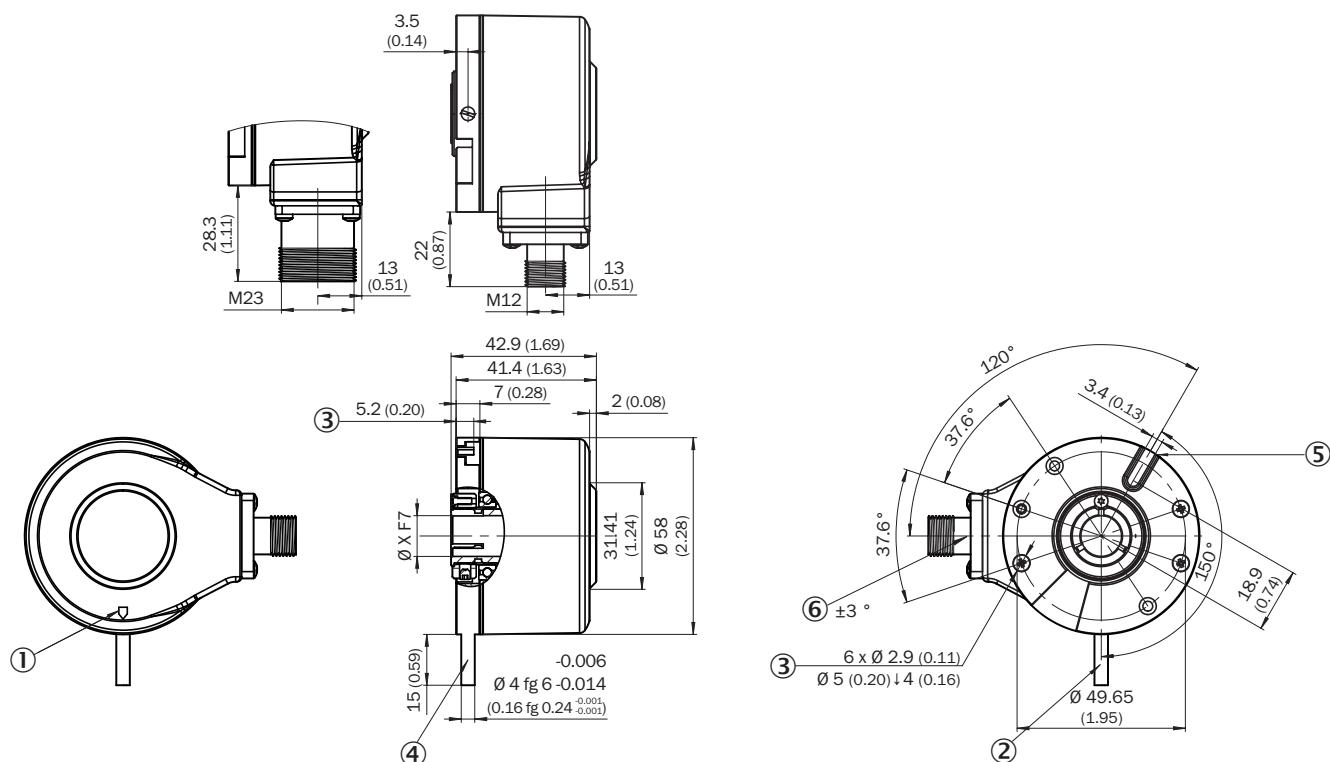
²⁾ These values relate to all mechanical versions including recommended accessories unless otherwise noted.

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



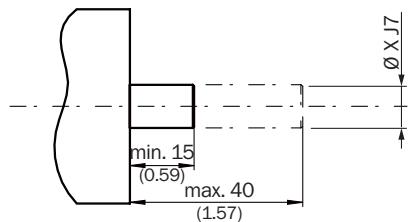
Dimensions in mm (inch)

XF7 values see shaft diameter table for blind hollow shaft

- 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
- ⑥ male connector tolerance in relation to hole pattern

Type	Blind hollow shaft	Shaft diameter XF7
DBS60x-BAxxxxxx	DBS60x-B1xxxxxx	6 mm
DBS60x-BBxxxxxx	DBS60x-B2xxxxxx	8 mm
DBS60x-BCxxxxxx	DBS60x-B3xxxxxx	3/8"
DBS60x-BDxxxxxx	DBS60x-B4xxxxxx	10 mm
DBS60x-BExxxxxx	DBS60x-B5xxxxxx	12 mm
DBS60x-BFxxxxxx	DBS60x-B6xxxxxx	1/2"
DBS60x-BGxxxxxx	DBS60x-B7xxxxxx	14 mm
DBS60x-BHxxxxxx	DBS60x-B8xxxxxx	15 mm
DBS60x-BJxxxxxx		5/8"
		-

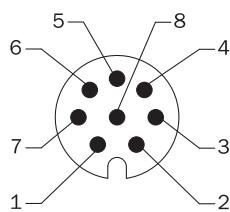
Attachment specifications Blind hollow shaft



customer side

Type	Blind hollow shaft	Shaft diameter xJ7
DBS60x-BAxxxxxx	DBS60x-B1xxxxxx	6 mm
DBS60x-BBxxxxxx	DBS60x-B2xxxxxx	8 mm
DBS60x-BCxxxxxx	DBS60x-B3xxxxxx	3/8"
DBS60x-BDxxxxxx	DBS60x-B4xxxxxx	10 mm
DBS60x-BExxxxxx	DBS60x-B5xxxxxx	12 mm
DBS60x-BFxxxxxx	DBS60x-B6xxxxxx	1/2"
DBS60x-BGxxxxxx	DBS60x-B7xxxxxx	14 mm
DBS60x-BHxxxxxx	DBS60x-B8xxxxxx	15 mm
DBS60x-BJxxxxxx		5/8"
		-

PIN assignment

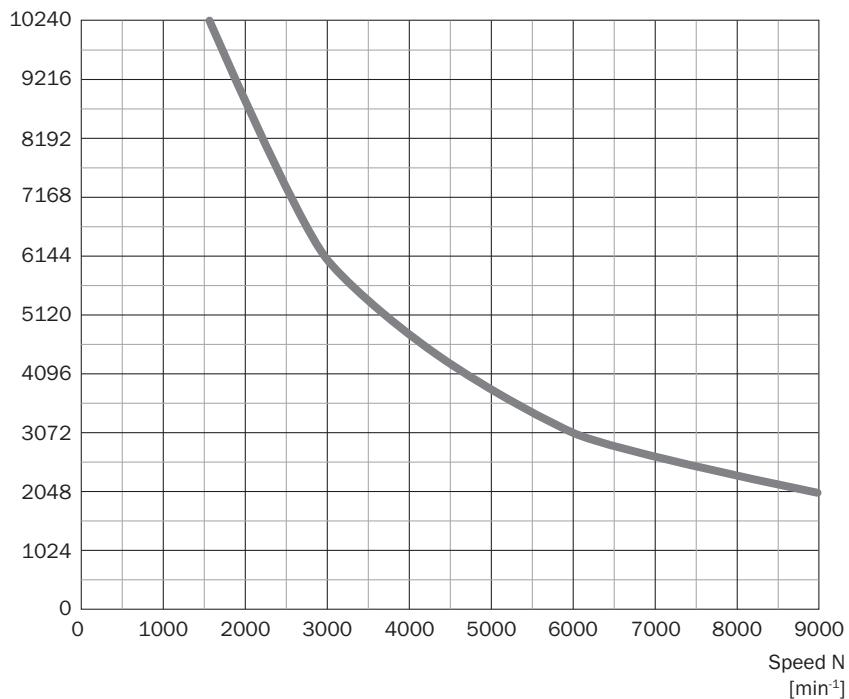


view of M12 male device connector on cable / housing

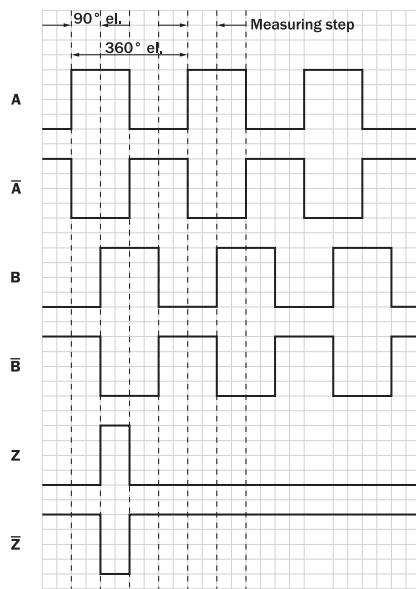
Wire colors (cable connection)	Male connector M12, 8-pin	Male connector M23, 12-pin	TTL/HTL 6-channel signal	Explanation
Brown	1	6	A-	Signal wire
White	2	5	A	Signal wire
Black	3	1	B-	Signal wire
Pink	4	8	B	Signal wire
Yellow	5	4	Z-	Signal wire
Purple	6	3	Z	Signal wire
Blue	7	10	GND	Ground connection
Red	8	12	+U _s	Supply voltage
-	-	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



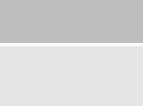
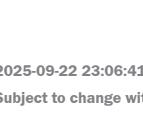
Cw with view on the encoder shaft in direction "A", compare dimensional drawing.

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"> 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 Description: SSI, shielded, Incremental, HIPERFACE® 	LTG-2308-MWENC	6027529
	<ul style="list-style-type: none"> 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 Description: SSI, shielded, Incremental 	LTG-2411-MW	6027530
	<ul style="list-style-type: none"> 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 Description: SSI, shielded, Incremental 	LTG-2512-MW	6027531
	<ul style="list-style-type: none"> 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 Description: SSI, shielded, TTL, HTL, Incremental 	LTG-2612-MW	6028516
	<ul style="list-style-type: none"> 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 Description: Incremental, shieldedSSI Connection systems: Flying leads 	DOL-1208-G02MAC1	6032866
	<ul style="list-style-type: none"> 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 Description: Incremental, shieldedSSI Connection systems: Flying leads 	DOL-1208-G05MAC1	6032867
	<ul style="list-style-type: none"> 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 Description: Incremental, shieldedSSI Connection systems: Flying leads 	DOL-1208-G10MAC1	6032868
	<ul style="list-style-type: none"> 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 Description: Incremental, shieldedSSI Connection systems: Flying leads 	DOL-1208-G20MAC1	6032869
	<ul style="list-style-type: none"> 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 Description: Incremental, shieldedSSI Connection systems: Flying leads 	DOL-1208-G25MAC1	6067859
	<ul style="list-style-type: none"> Connection type head A: Female connector, M12, 8-pin, straight, A-coded Signal type: Incremental, SSI Cable: CAT5, CAT5e Description: Incremental, shieldedSSI Connection systems: IDC quick connection Permitted cross-section: 0.14 mm² ... 0.34 mm² 	DOS-1208-GA01	6045001
	<ul style="list-style-type: none"> 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 	YF2AA8-200S01M-KA18	2099208

	Brief description	Type	part no.
	<ul style="list-style-type: none">• Permitted cross-section: ≤ 0.25 mm²• Note: Drag chain use• Application: Drag chain operation		
	<ul style="list-style-type: none">• 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• Description: Shielded• Permitted cross-section: ≤ 0.25 mm²• Note: Drag chain use• Application: Drag chain operation	YF2AA8-020S01M-KA18	2099207
	<ul style="list-style-type: none">• 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	YF2AA8-050S01M-KA18	2099209
	<ul style="list-style-type: none">• 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• Description: Shielded• Permitted cross-section: ≤ 0.25 mm²• Note: Drag chain use• Application: Drag chain operation	YF2AA8-100S01M-KA18	2099210
	<ul style="list-style-type: none">• 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[®], shieldedIncremental	DOL-1208-W02MAC1	6037724
	<ul style="list-style-type: none">• 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[®], shieldedIncremental	DOL-1208-W05MAC1	6037725
	<ul style="list-style-type: none">• 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[®], shieldedIncremental	DOL-1208-W10MAC1	6037726
	<ul style="list-style-type: none">• 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[®], shieldedIncremental	DOL-1208-W20MAC1	6037727
	<ul style="list-style-type: none">• Connection type head A: Female connector, M12, 8-pin, angled• Connection type head B: Flying leads• Cable: 2 m, 8-wire, PVC• Description: Shielded• Connection systems: Flying leads	DOL-1208-W02MA	6020992
	<ul style="list-style-type: none">• 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• Description: Sensor/actuator cable, shielded• Connection systems: Flying leads	DOL-1208-W02MAS01	6029224
	<ul style="list-style-type: none">• Connection type head A: Female connector, M12, 8-pin, angled• Connection type head B: Flying leads• Cable: 2 m, 8-wire, PUR, halogen-free• Description: Unshielded	DOL-1208-W02MC	6035623
	<ul style="list-style-type: none">• Connection type head A: Female connector, M12, 8-pin, angled• Connection type head B: Flying leads• Cable: 5 m, 8-wire, PVC• Description: Shielded	DOL-1208-W05MA	6021033

	Brief description	Type	part no.
	<ul style="list-style-type: none"> Connection systems: Flying leads Connection type head A: Female connector, M12, 8-pin, angled Connection type head B: Flying leads Cable: 5 m, 8-wire, PUR Description: Unshielded 	DOL-1208-W05MC	6035624
	<ul style="list-style-type: none"> Connection type head A: Female connector, M12, 8-pin, angled Connection type head B: Flying leads Cable: 10 m, 8-wire, PUR, halogen-free Description: Unshielded 	DOL-1208-W10MC	6035625
Mounting systems			
	<ul style="list-style-type: none"> Description: Bearing bracket for hollow shaft encoders, fastening screws included the Bearing Block is intended for very large radial and axial shaft loads. Particularly for application on: Belt pulleys, Chain pinions, Friction wheels. It is designed this way to enable fitting of encoder with blind hollow shaft with \varnothing 12 mm. Operating speed max. 6,000 rpm⁻¹, axial shaft load 100 N, radial shaft load 100 N, bearing service life 3.6×10^9 revolutions Items supplied: Fastening screws included 	BEF-FA-B12-010	2042728

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