DFS60B-TGPZ00S01

DFS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.

DFS60B-TGPZ00S01 | DFS60

INCREMENTAL ENCODERS

Ordering information

Type	part no.
DFS60B-TGPZ00S01	1142145

Other models and accessories ➜ www.sick.com/DFS60

Detailed technical data

Features

Special device	✓
Specialty	Cable, with male connector, M23, 12-pin, 0.35 m Customer-specific pin assignment
Standard reference device	DFS60B-TGPK10000, 1036926

Safety-related parameters

MTTF$_D$ (mean time to dangerous failure)	300 years (EN ISO 13849-1) [1]

[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	10,000 [1]
Measuring step	90°, electric/pulses per revolution
Measuring step deviation at non binary number of lines	± 0.01°
Error limits	± 0.05°

[1] See maximum revolution range.

Interfaces

Communication interface	Incremental
Communication Interface detail	TTL / HTL
Factory setting	Factory setting: output level TTL
Number of signal channels	6-channel
Programmable/configurable	✓
Initialization time	32 ms, 30 ms [1]
Output frequency	≤ 600 kHz

[1] With mechanical zero pulse width.

Load current	≤ 30 mA
Power consumption	≤ 0.7 W (without load)

[1] With mechanical zero pulse width.

Electronics

Connection type	Special version
Connection type Detail	Cable, with male connector, M23, 12-pin, 0.35 m
Supply voltage	4.5 … 32 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] [2]

[1] Programming TTL with ≥ 5.5 V: short-circuit opposite to another channel or GND permissable for maximum 30 s.

[2] Programming HTL or TTL with < 5.5 V: short-circuit opposite to another channel, US or GND permissable for maximum 30 s.

Mechanics

Mechanical design	Through hollow shaft
Shaft diameter	14 mmFront clamp
Weight	+ 0.2 kg
Shaft material	Stainless steel
Flange material	Aluminum
Housing material	Aluminum die cast
Start up torque	0.8 Ncm (+20 °C)
Operating torque	0.6 Ncm (+20 °C)
Permissible movement static	± 0.3 mm (radial) ± 0.5 mm (axial)
Permissible movement dynamic	± 0.1 mm (radial) ± 0.2 mm (axial)
Operating speed	≤ 6,000 min⁻¹ [1]
Moment of inertia of the rotor	40 gcm²
Bearing lifetime	3.6×10^{10} revolutions
Angular acceleration	≤ 500,000 rad/s²

[1] Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3
Enclosure rating	IP65, housing side, cable connection (IEC 60529) IP65, shaft side (IEC 60529)
Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	–40 °C … +100 °C [1] –30 °C … +100 °C [2]
Storage temperature range	–40 °C … +100 °C, without package

[1] Stationary position of the cable.

[2] Flexible position of the cable.

Resistance to shocks	70 g, 6 ms (EN 60068-2-27)
Resistance to vibration	30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)

[1] Stationary position of the cable.

[2] Flexible position of the cable.

Certificates

| EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan 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
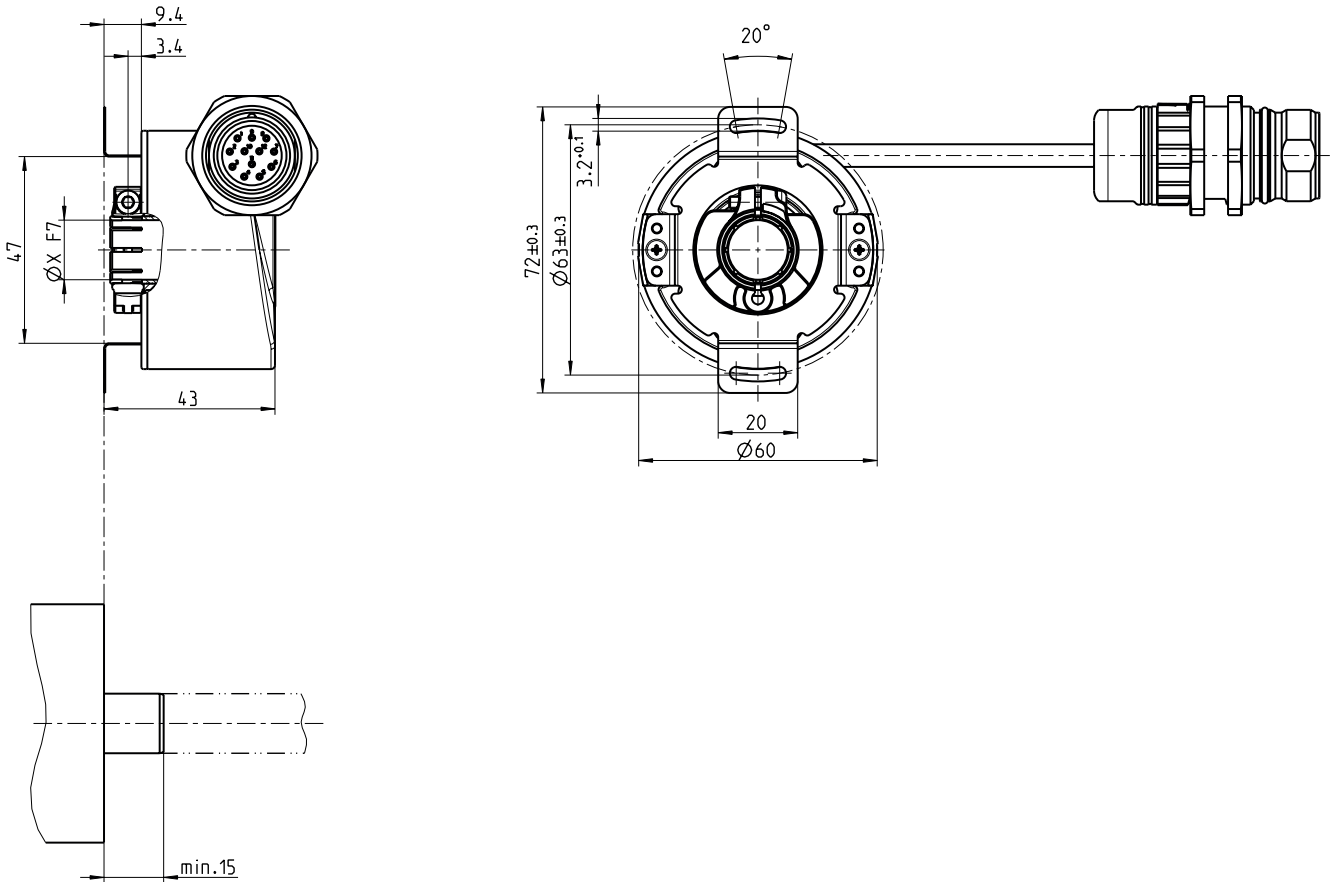
Dimensions in mm (inch)

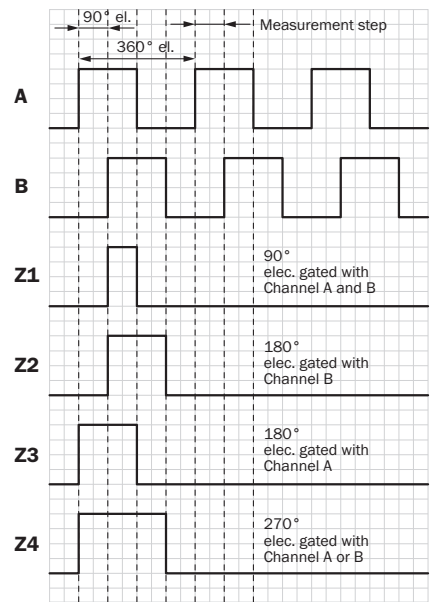## Dimensional drawing
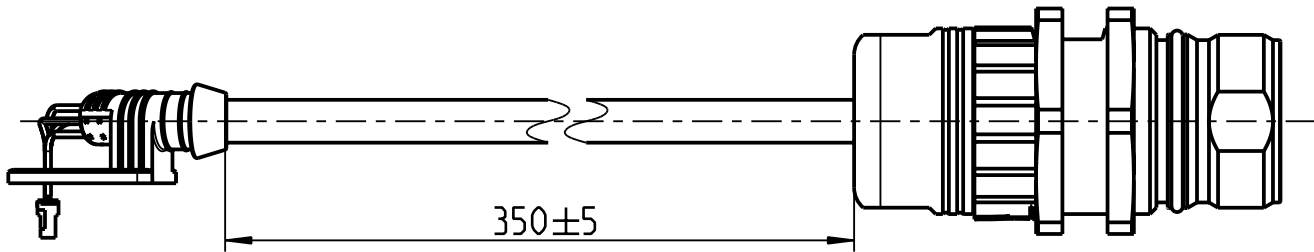
Dimensions in mm (inch)

PIN assignment
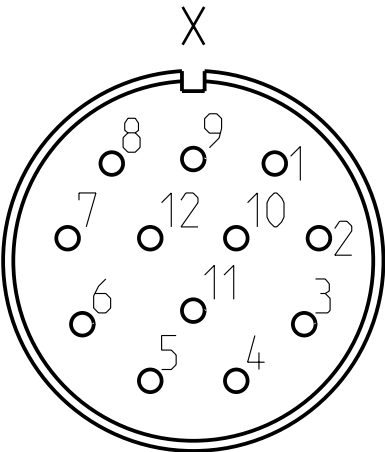
Color	Male connector	Signal
Black	1	$\overline{B}$
–	2	–
Purple	3	Z
Yellow	4	$\overline{Z}$
White	5	A
Brown	6	$\overline{A}$
–	7	–
Pink	8	B
Screen	9	–
Blue	10	GND
–	11	–
Red	12	U_S

maximum revolution range

Speed consideration (n)

Steps per revolution (y-axis): 0, 4096, 8192, 12288, 16384, 20480, 24576, 28672, 32768, 36864, 40960, 45056, 49152, 53248, 57344, 61440, 65536

Speed N [min^{-1}] (x-axis): 0, 2000, 4000, 6000, 8000, 10000, 12000
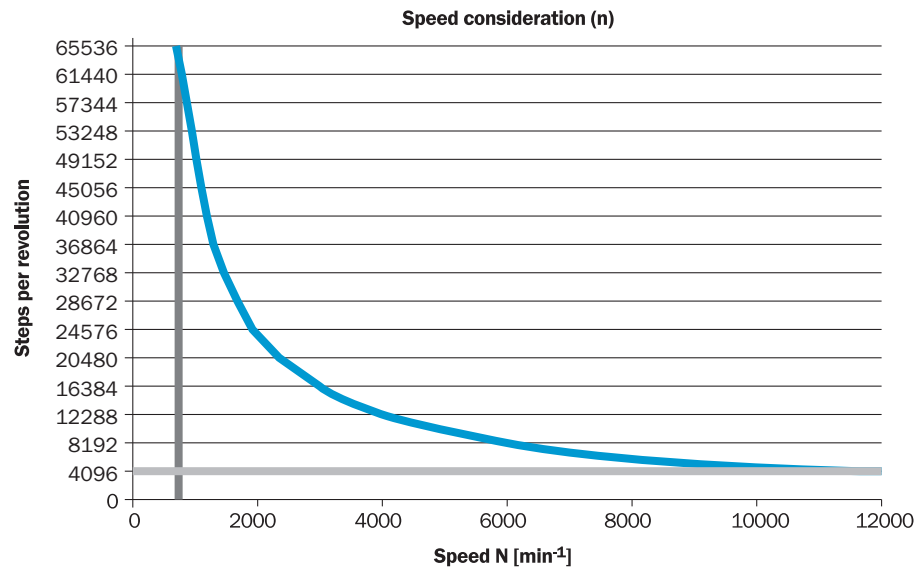
Diagrams Electrical zero pulse width can be configured to 90°, 180°, or 270°. Width of the zero pulse in relation to a pulse period.

A

B

Z1 — 90° elec. gated with Channel A and B

Z2 — 180° elec. gated with Channel B

Z3 — 180° elec. gated with Channel A

Z4 — 270° elec. gated with Channel A or B

90° el.
360° el.
Measurement step

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

Supply voltage	Output
4,5 V … 32 V	TTL/HTL programmable

Diagrams Mechanical zero pulse width 1° to 359° programmable. Width of the zero pulse in relation to a mechanical revolution of the shaft.
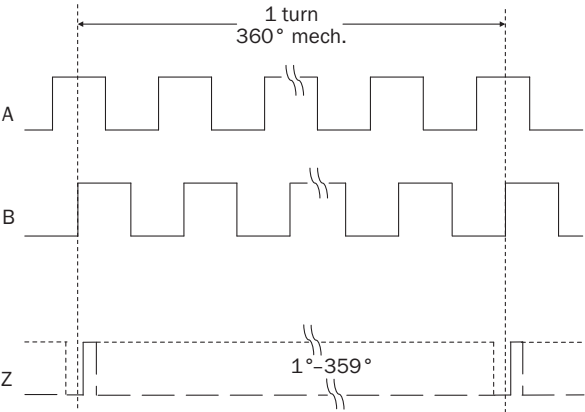
Supply voltage	Output
4,5 V ... 32 V	TTL/HTL programmable

Recommended accessories

Other models and accessories ➜ www.sick.com/DFS60

	Brief description	Type	part no.
connectors and cables			
	• **Connection type head A:** Female connector, JST, 8-pin, straight • **Connection type head B:** Flying leads • **Signal type:** Incremental, SSI • **Items supplied:** JST including sealing • **Cable:** 5 m, 8-wire, PUR, halogen-free • **Description:** Incremental, shielded, SSI	DOL-0J08-G05MAA3	2046876
	• **Connection type head A:** Female connector, JST, 8-pin, straight • **Connection type head B:** Flying leads • **Signal type:** Incremental, SSI • **Items supplied:** JST including sealing • **Cable:** 0.5 m, 8-wire, PUR, halogen-free • **Description:** Incremental, shielded, SSI	DOL-0J08-G0M5AA3	2046873
	• **Connection type head A:** Female connector, JST, 8-pin, straight • **Connection type head B:** Flying leads • **Signal type:** Incremental, SSI • **Items supplied:** JST including sealing • **Cable:** 10 m, 8-wire, PUR, halogen-free • **Description:** Incremental, shielded, SSI	DOL-0J08-G10MAA3	2046877
	• **Connection type head A:** Female connector, JST, 8-pin, straight • **Connection type head B:** Flying leads • **Signal type:** SSI, Incremental • **Items supplied:** JST including sealing • **Cable:** 1.5 m, 8-wire, PUR, halogen-free • **Description:** SSI, shielded, Incremental	DOL-0J08-G1M5AA6	2048590
	• **Connection type head A:** Female connector, JST, 8-pin, straight • **Connection type head B:** Flying leads • **Signal type:** SSI, Incremental • **Items supplied:** JST including sealing • **Cable:** 3 m, 8-wire, PUR, halogen-free • **Description:** SSI, shielded, Incremental	DOL-0J08-G3M0AA6	2048591
	• **Connection type head A:** Female connector, terminal box, 8-pin, straight • **Connection type head B:** Male connector, D-Sub, 9-pin, straight • **Signal type:** SSI + incremental • **Cable:** 0.5 m, 4-wire, PVC • **Description:** SSI + incremental, shielded • **Note:** Programming adapter cable for programming tool PGT-10-Pro and PGT-08-S	DSL-0D08-G0M5AC3	2061739
	• **Connection type head A:** Male connector, M12, 8-pin, straight, A-coded • **Signal type:** Incremental • **Cable:** CAT5, CAT5e • **Description:** Incremental, shielded • **Connection systems:** IDC quick connection • **Permitted cross-section:** 0.14 mm² ... 0.34 mm²	STE-1208-GA01	6044892
	• **Connection type head A:** Female connector, JST, 8-pin, straight • **Connection type head B:** Male connector, M23, 12-pin, straight • **Signal type:** Incremental • **Cable:** 1 m, 8-wire, PUR, halogen-free • **Description:** Incremental, shielded	STL-2312-G01MAA3	2061622
	• **Connection type head A:** Female connector, JST, 8-pin, straight • **Connection type head B:** Male connector, M23, 12-pin, straight • **Signal type:** Incremental • **Cable:** 2 m, 8-wire, PUR, halogen-free • **Description:** Incremental, shielded	STL-2312-G02MAA3	2061504
	• **Connection type head A:** Female connector, JST, 8-pin, straight • **Connection type head B:** Male connector, M23, 12-pin, straight • **Signal type:** Incremental • **Cable:** 0.35 m, 8-wire, PUR, halogen-free • **Description:** Incremental, shielded	STL-2312-GM35AA3	2061621
	• **Connection type head A:** Male connector, M23, 12-pin, straight, A-coded • **Signal type:** HIPERFACE®, SSI, Incremental • **Description:** HIPERFACE®, shieldedSSIIncremental	STE-2312-G01	2077273

	Brief description	Type	part no.
	• **Connection systems:** Solder connection • **Connection type head A:** Male connector, M23, 12-pin, straight, A-coded • **Signal type:** HIPERFACE®, SSI, Incremental • **Description:** HIPERFACE®, shieldedSSIIncremental • **Connection systems:** Solder connection	STE-2312-GX	6028548

Mounting systems

	Brief description	Type	part no.
	• **Product family:** Stator couplings • **Description:** Standard stator coupling	BEF-DS00XFX	2056812
	• **Description:** Clamping ring for metal hollow shaft • **Material:** Steel • **Details:** Metal	BEF-KR-M	2064709

programming devices

	Brief description	Type	part no.
	• **Product segment:** Programming devices • **Product family:** PGT-08-S • **Description:** USB programming unit, for programmable SICK encoders AFS60, AFM60, DFS60, VFS60, DFV60 and wire draw encoders with programmable encoders. Not compatible with the portable SOPAS ET versions.	PGT-08-S	1036616
	• **Product segment:** Programming devices • **Product family:** PGT-10 Pro • **Description:** Programming unit display for programmable SICK DFS60, DFV60, AFS/AFM60, AHS/AHM36 encoders, and wire draw encoder with DFS60, AFS/AFM60 and AHS/AHM36. Compact dimensions, low weight, and intuitive operation. • **Items supplied:** 1 x PGT-10-Pro stand-alone programming tool,4 x alkaline type batteries, 1.5 V Mignon (AA)	PGT-10-Pro	1072254

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**

SICK
Sensor Intelligence.