DFS60B-S4PZ00S94

DFS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.

DFS60B-S4PZ00S94 | DFS60
INCREMENTAL ENCODERS

Ordering information

Type	part no.
DFS60B-S4PZ00S94	1095382

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

Illustration may differ

Detailed technical data

Features

Special device	✓
Specialty	Plug, M23, 12-pin, axial, customer-specific pin assignment Pulses per revolution: preprogrammed to 600 Electrical interface: preprogrammed to HTL
Standard reference device	DFS60B-S4PB10000, 1056523

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	600 [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 HTL
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	Male connector, M23, 12-pin, axial, Customer-specific pin assignment
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	Solid shaft, face mount flange
Shaft diameter	10 mmWith flat
Shaft length	19 mm
Weight	+ 0.3 kg
Shaft material	Stainless steel
Flange material	Aluminum
Housing material	Aluminum die cast
Start up torque	0.5 Ncm (+20 °C)
Operating torque	0.3 Ncm (+20 °C)
Permissible shaft loading	80 N (radial) 40 N (axial)
Operating speed	≤ 9,000 min^{-1} [1]
Moment of inertia of the rotor	6.2 gcm²
Bearing lifetime	3.6 x 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	IP67, Housing side, male connector (IEC 60529) [1] IP65, shaft side (IEC 60529)
Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	–40 °C ... +100 °C [2] –30 °C ... +100 °C [3]
Storage temperature range	–40 °C ... +100 °C, without package
Resistance to shocks	70 g, 6 ms (EN 60068-2-27)

[1] With mating connector fitted.

[2] Stationary position of the cable.

[3] Flexible position of the cable.

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

[1] With mating connector fitted.
[2] Stationary position of the cable.
[3] 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 Face mount flange, M12 and M23 axial male connector

Connector orientation

X1   X2
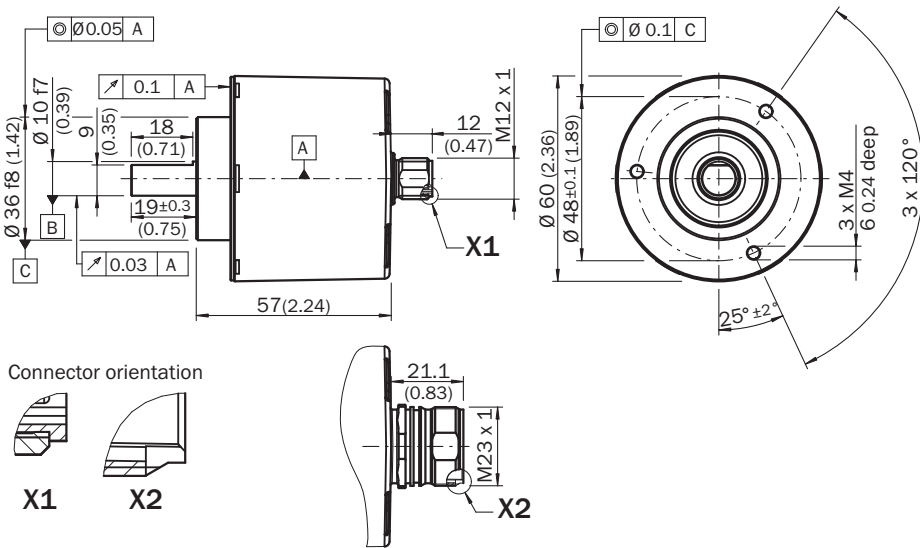
Dimensions in mm (inch)
General tolerances according to DIN ISO 2768-mk

PIN assignment

| Pin, 12-pin, M23 connector	TTl/HTL signal	Explanation
1	¯B	Signal cable
2	Sense+	Internal connection to +Us
3	Z	Signal cable
4	¯Z	Signal cable
5	A	Signal cable
6	¯A	Signal cable
7	N.C.	Not assigned
8	B	Signal cable
9	N.C.	Not assigned
10	GND	Ground connection of the encoder
11	Sense-	Internal connection to GND
12	+U$_S$	Supply voltage (volt-free to housing)
Shield	Shield	Shield connected to housing on side of encoder. Connected to ground on side of control.

View of the connector M23 fitted to the encoder body

## maximum revolution range

Speed consideration (n)
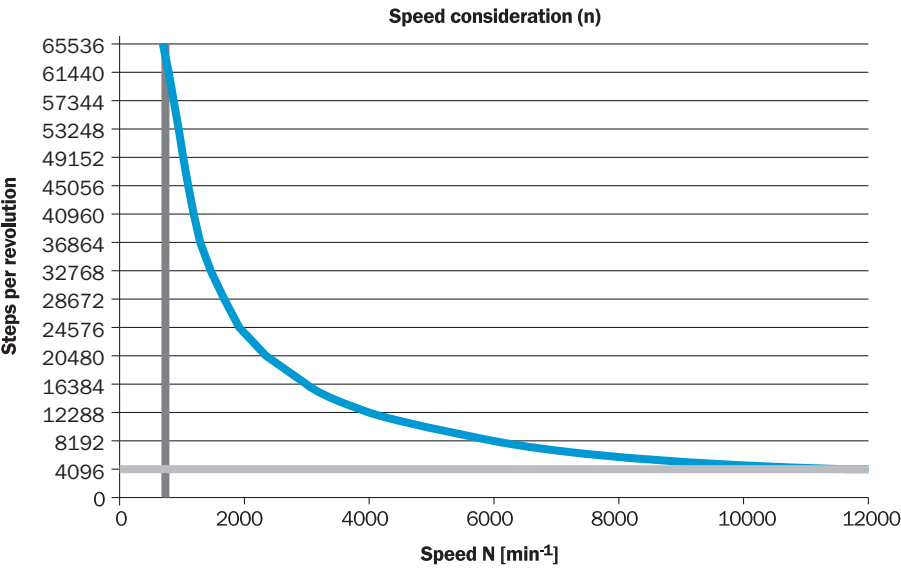
Diagrams Electrical zero pulse width can be configured to 90°, 180°, or 270°. Width of the zero pulse in relation to a pulse period.
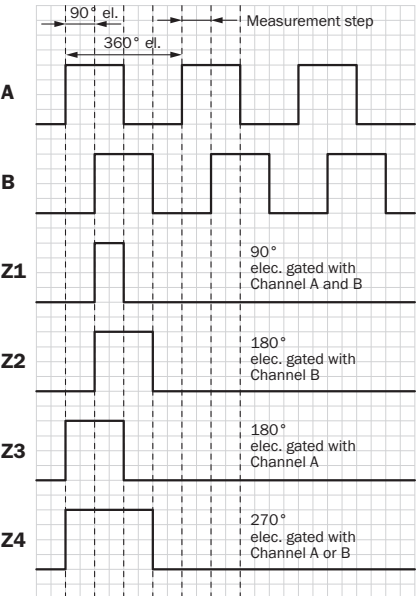
Cw with view on the encoder shaft in direction "A", compare dimensional drawing.

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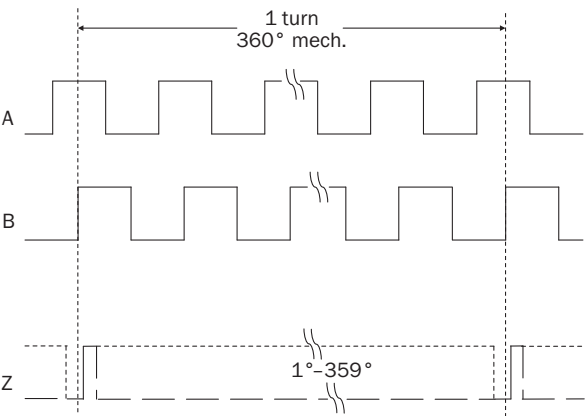
Supply voltage	Output
4,5 V … 32 V	TTL/HTL programmable

SICK AT A GLANCE

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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.

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