DFS60B-S4PZ00S05

DFS60

INCREMENTAL ENCODERS

SICK
Sensor Intelligence.

DFS60B-S4PZ00S05 | DFS60

INCREMENTAL ENCODERS

Ordering information

Type	part no.
DFS60B-S4PZ00S05	1100717

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

Illustration may differ

Detailed technical data

Features

Special device	✓
Specialty	DFS60B-S4PZ00S04 - cable, universal, 0.5 m with M12 8-pin, following additional accessories included with delivery, customer-specific type label: 6028369 M12 8-pin male connector 2029160 Adapter flange 5326697 Double couplings 6-10 mm 5326704 Double couplings 8-10 mm 5326703 Double couplings 10-10 mm Additional blank label included for noting the programming settings
Standard reference device	DFS60B-S4PK10000, 1036722

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
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, M12, 8-pin, universal, 0.5 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	Solid shaft, face mount flange
Shaft diameter	10 mm With 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, 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
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.

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 5326697, 5326704, 5326703 couplings
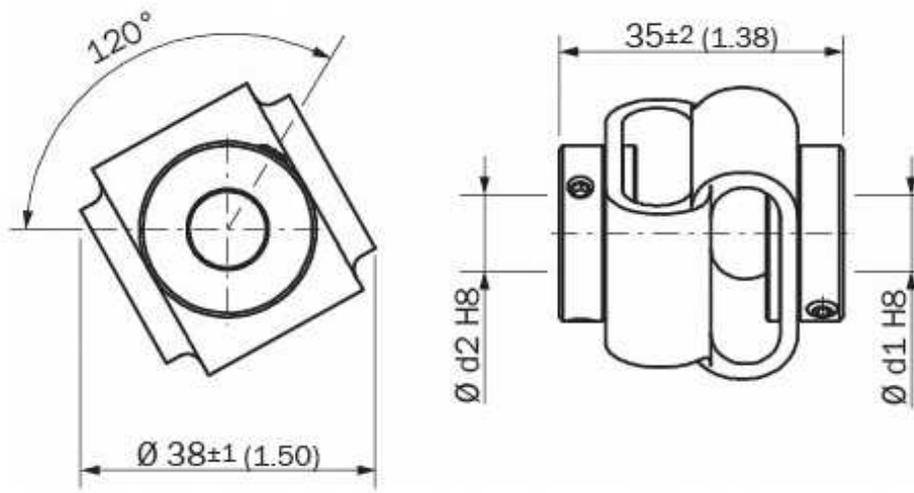
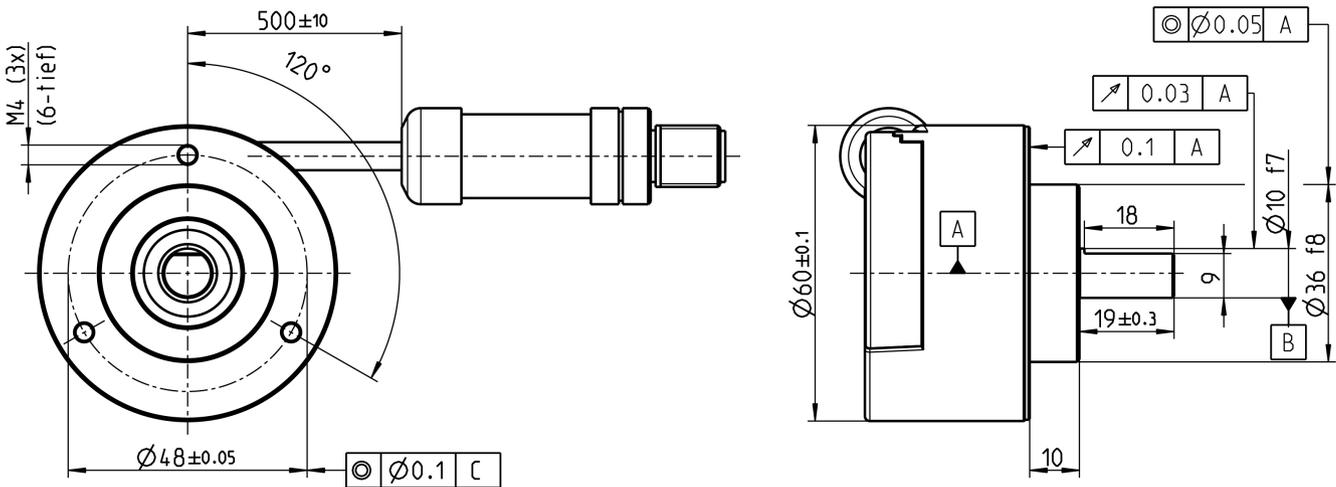|	5326697	5326704	5326703
d1	6 mm (0.24)	8 mm (0.31)	10 mm (0.39)
d2	10 mm (0.39)	10 mm (0.39)	10 mm (0.39)

Dimensions in mm (inch)

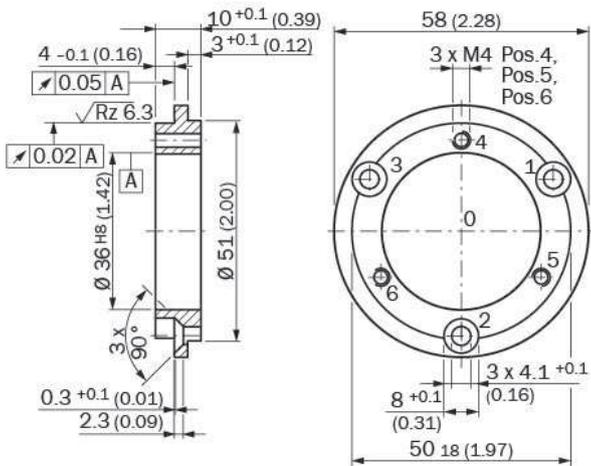## Dimensional drawing 6028369 Female Connector
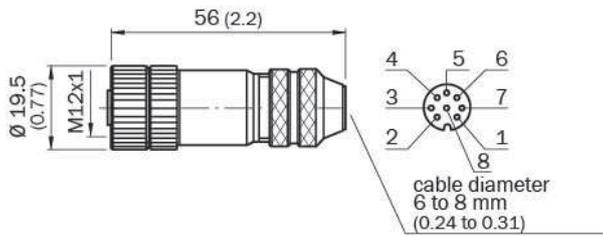
Dimensions in mm (inch)
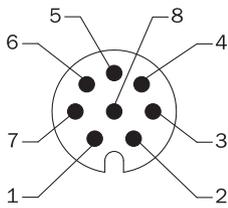
Dimensional drawing

Dimensions in mm (inch)

Dimensional drawing 2029160 adaptor flange

Dimensions in mm (inch)

PIN assignment

view of M12 male device connector on encoder

PINMale connector M12, 8-pin	PINMale connector M23, 12-pin	Wire colors (cable connection)	TTL/HTL signal	Sin/Cos 1.0 V_{PP}	Explanation
1	6	Brown	$\overline{A}$	COS-	Signal wire
2	5	White	A	COS+	Signal wire
3	1	Black	$\overline{B}$	SIN-	Signal wire
4	8	Pink	B	SIN+	Signal wire
5	4	Yellow	$\overline{Z}$	$\overline{Z}$	Signal wire
6	3	Purple	Z	Z	Signal wire
7	10	Blue	GND	GND	Ground connection
8	12	Red	$+U_S$	$+U_S$	Supply voltage
-	9	-	N.c.	N.c.	Not assigned
-	2	-	N.c.	N.c.	Not assigned
-	11	-	N.c.	N.c.	Not assigned
-	7 [1]	Orange	0-SET [1]	N.c.	Set zero pulse[1]
Screen	Screen	Screen	Screen	Screen	Screen connected to housing on encoder side. Connected to ground on control side.

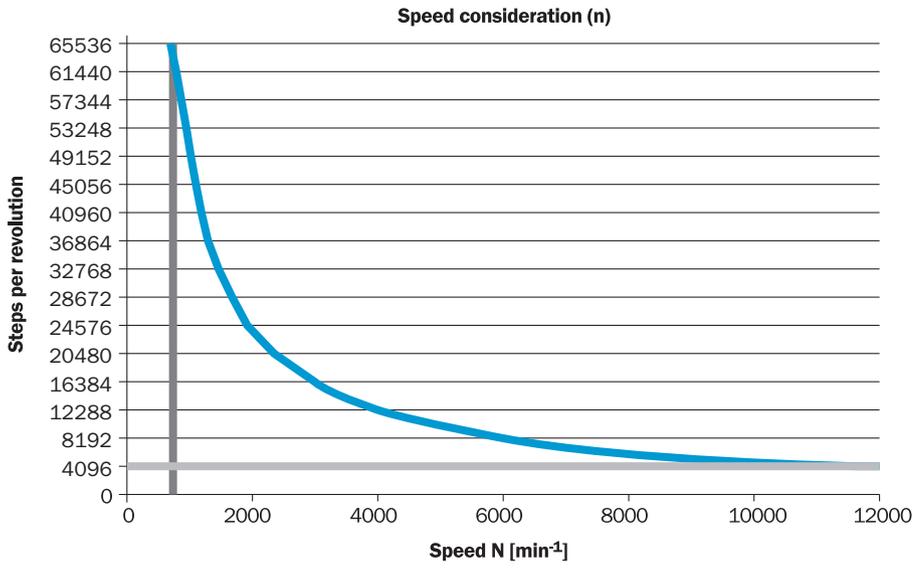[1]For electrical interfaces only: M, U, V, W with 0-SET function on PIN 7 on M23 plug. The 0-SET input is used to set the zero pulse to the current shaft position. If the 0-SET input is applied to US for longer than 250 ms after it has previously been open or applied to GND for at least 1,000 ms, the current shaft position is assigned zero pulse signal "Z".

Type label

Sample Encoder label

maximum revolution range

Speed consideration (n)

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

X-axis: Speed N [min⁻¹] — 0, 2000, 4000, 6000, 8000, 10000, 12000

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