



# DFS25A-A2BAE000720

DFS2x

INCREMENTAL ENCODERS

**SICK**  
Sensor Intelligence.



Illustration may differ



### Ordering information

Type	Part no.
DFS25A-A2BAE000720	1073330

Other models and accessories → [www.sick.com/DFS2x](http://www.sick.com/DFS2x)

### Detailed technical data

#### Performance

<b>Pulses per revolution</b>	720
<b>Measuring step</b>	± 90° electric/pulses per revolution
<b>Measuring step deviation</b>	± 0.008° pulses 100 ... 10,000
<b>Error limits</b>	± 0.03°

#### Interfaces

<b>Communication interface</b>	Incremental
<b>Communication Interface detail</b>	HTL / Push pull
<b>Number of signal channels</b>	6-channel
<b>0-set function via hardware pin</b>	✓
<b>0-SET function</b>	H-active, L = 0 - 3 V, H = 4,0 - U <sub>s</sub> V
<b>Initialization time</b>	40 ms <sup>1)</sup>
<b>Output frequency</b>	820 kHz
<b>Load current</b>	30 mA
<b>Power consumption</b>	0.7 W (without load)
<b>4.5 V... 5.5 V, TTL/RS-422</b>	
Load current	30 mA
<b>4.5 V ... 5.5 V, Open Collector</b>	
Load current	30 mA
<b>TTL/RS-422</b>	
Load current	30 mA
Power consumption	0.7 W (without load)
<b>HTL/Push pull</b>	
Load current	30 mA
Power consumption	0.7 W (without load)

<sup>1)</sup> Valid positional data can be read once this time has elapsed.

<b>TTL/HTL</b>	Load current	30 mA
	Power consumption	0.7 W (without load)
<b>Open Collector</b>	Load current	30 mA
	Power consumption	0.7 W (without load)

<sup>1)</sup> Valid positional data can be read once this time has elapsed.

## Electrical data

<b>Connection type</b>	Male connector, MS, 7-pin, radial
<b>Supply voltage</b>	8 ... 30 V
<b>Reference signal, number</b>	1
<b>Reference signal, position</b>	180°, Degree Marker Gated with BN2
<b>Reverse polarity protection</b>	✓
<b>Short-circuit protection of the outputs</b>	✓ <sup>1)</sup>
<b>MTTFd: mean time to dangerous failure</b>	330 years (EN ISO 13849-1) <sup>2)</sup>

<sup>1)</sup> Short-circuit opposite to another channel or GND permissible for maximum 30 s.

<sup>2)</sup> 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.

## Mechanical data

<b>Mechanical design</b>	Solid shaft, Square flange
<b>Shaft diameter</b>	3/8"
<b>Shaft length</b>	16 mm
<b>Weight</b>	+ 0.4 kg <sup>1)</sup>
<b>Shaft material</b>	Stainless steel 1,4305
<b>Flange material</b>	Aluminum
<b>Housing material</b>	Aluminum
<b>Start up torque</b>	0.5 Ncm (+20 °C)
<b>Operating torque</b>	0.3 Ncm (+20 °C)
<b>Permissible shaft loading radial/axial</b>	80 N (radial) 40 N (axial)
<b>Operating speed</b>	≤ 9,000 min <sup>-1</sup>
<b>Moment of inertia of the rotor</b>	15 gcm <sup>2</sup>
<b>Bearing lifetime</b>	3.6 x 10 <sup>9</sup> revolutions
<b>Angular acceleration</b>	≤ 500,000 rad/s <sup>2</sup>

<sup>1)</sup> Relates to encoders with male connector MS.

## Ambient data

<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-3
<b>Enclosure rating</b>	IP65, shaft side (according to IEC 60529) IP67, housing side (according to IEC 60529)
<b>Permissible relative humidity</b>	90 % (Condensation not permitted)
<b>Operating temperature range</b>	-30 °C ... +85 °C

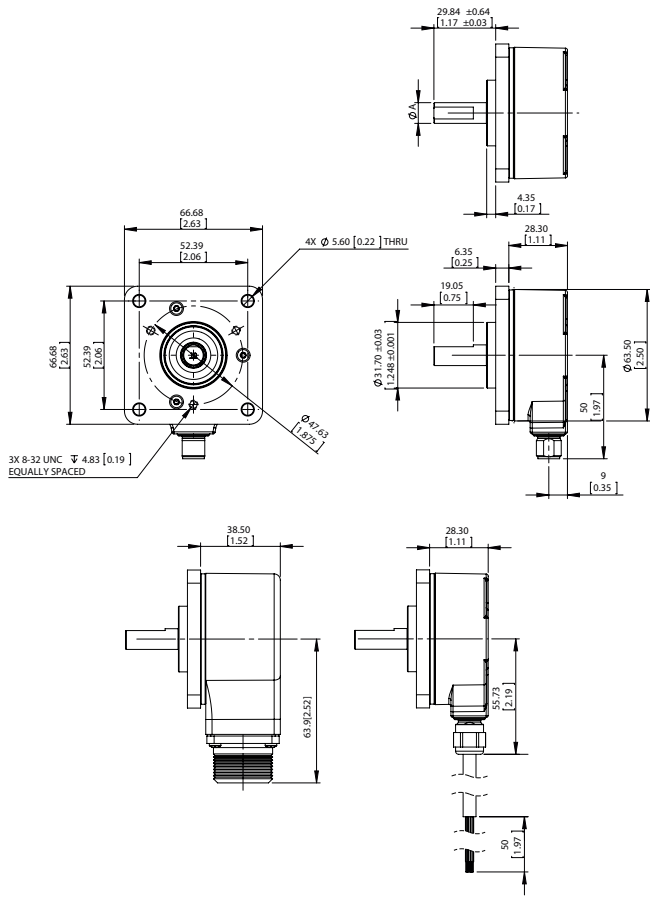
<b>Storage temperature range</b>	-40 °C ... +100 °C, without package
<b>Resistance to shocks</b>	100 g, 11 ms (according to EN 60068-2-27)
<b>Resistance to vibration</b>	30 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)

### Classifications

<b>ECl@ss 5.0</b>	27270501
<b>ECl@ss 5.1.4</b>	27270501
<b>ECl@ss 6.0</b>	27270590
<b>ECl@ss 6.2</b>	27270590
<b>ECl@ss 7.0</b>	27270501
<b>ECl@ss 8.0</b>	27270501
<b>ECl@ss 8.1</b>	27270501
<b>ECl@ss 9.0</b>	27270501
<b>ECl@ss 10.0</b>	27270501
<b>ECl@ss 11.0</b>	27270501
<b>ETIM 5.0</b>	EC001486
<b>ETIM 6.0</b>	EC001486
<b>ETIM 7.0</b>	EC001486
<b>ETIM 8.0</b>	EC001486
<b>UNSPSC 16.0901</b>	41112113

**Dimensional drawing** (Dimensions in mm (inch))

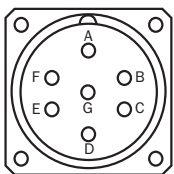
DFS25 square flange mount, radial connector outlet M12 and MS, cable outlet



Type	Shaft diameter A
DFS2x-x1xxxxxxxx	1/4"
DFS2x-x2xxxxxxxx	3/8"
DFS2x-xCxxxxxxxx	
DFS2x-xFxxxxxxxx	1/2"
DFS2x-x3xxxxxxxx	6 mm
DFS2x-x4xxxxxxxx	10 mm

**PIN assignment**

View of MS male device connector on encoder

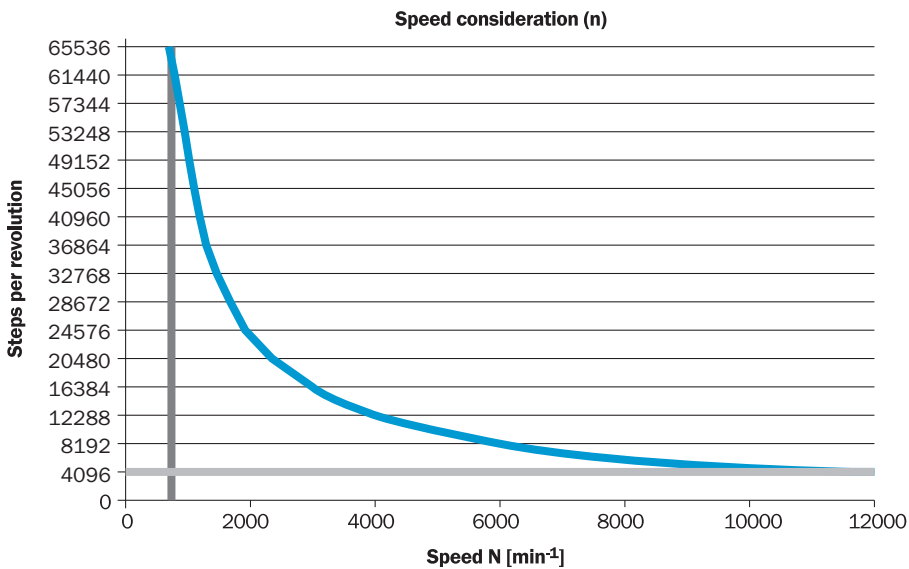


M12, 8-pin	MS, 10-pin	MS, 7-pin	MS, 6-pin	Cable, 9-wire	Signal	Description
1	H	-	-	Brown	$\bar{A}$	Signal wire

M12, 8-pin	MS, 10-pin	MS, 7-pin	MS, 6-pin	Cable, 9-wire	Signal	Description
2	A	A	E	White	A	Signal wire
3	I	-	-	Black	$\bar{B}$	Signal wire
4	B	B	D	Pink	B	Signal wire
5	J	-	-	Yellow	$\bar{Z}$	Signal wire
6	C	C	C	Purple	Z	Signal wire
7	F	F	A	Blue	GND	GND
8	D	D	B	Red	Us	Supply voltage
-	E	E	-	Orange	0-SET	Input signal
-	G	G	F	-	Housing	Electrically connected to the housing potential
-	-	-	-	-	Drain wire	Bare wire parallel to the braided screen
-	-	-	-	Screen	Screen	Screen connected to housing on encoder side

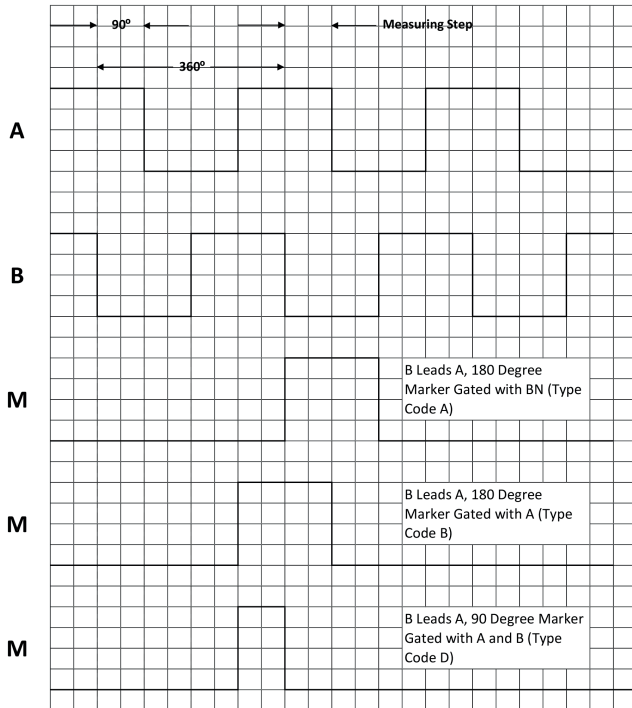
### Maximum revolution range

Maximum revolution range



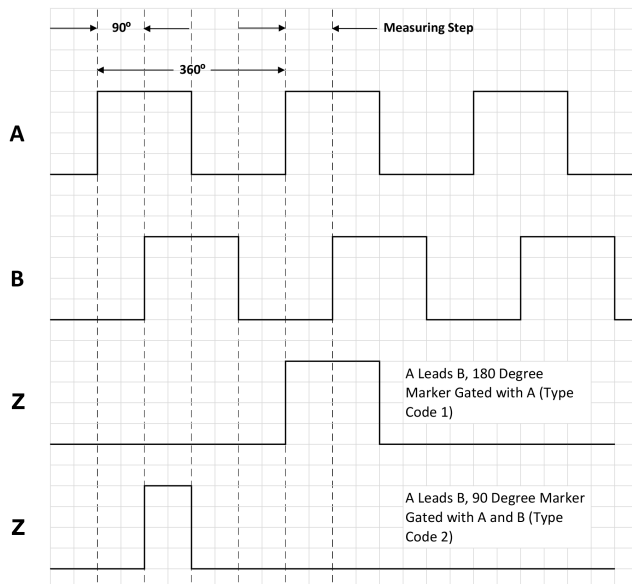
## Signal outputs

Signal Outputs with Counter Clock-wise Counting Direction Option Selected (B leads A for clock-wise rotation). Complement signals AN, BN and ZN are not shown.



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

Signal Outputs with Clock-wise Counting Direction Option Selected (A leads B for clock-wise rotation). Complement signals AN, BN and ZN are not shown.



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

### Recommended accessories

Other models and accessories → [www.sick.com/DFS2x](http://www.sick.com/DFS2x)

Brief description	Type	Part no.
Plug connectors and cables		
Head A: female connector, MS/07, 7-pin, straight Head B: Flying leads Cable: shielded, 3 m	DOL-MS07-G03MMA2	7102145
Head A: female connector, MS/07, 7-pin, straight Head B: Flying leads Cable: shielded, 5 m	DOL-MS07-G05MMA2	7102146
Head A: female connector, MS/07, 7-pin, straight Head B: Flying leads Cable: shielded, 10 m	DOL-MS07-G10MMA2	7102147
Head A: female connector, MS/07, 7-pin, straight Head B: Flying leads Cable: shielded, 1.5 m	DOL-MS07-G1M5MA2	7102144
Head A: female connector, MS/07, 7-pin, straight Head B: Flying leads Cable: shielded, 20 m	DOL-MS07-G20MMA2	7102148
Head A: female connector, MS/07, 7-pin, straight Head B: Flying leads Cable: shielded, 30 m	DOL-MS07-G30MMA2	7102149
Head A: female connector, MS/07, 7-pin, straight Head B: - Cable: unshielded	DOS-MS07-G	7102143



## 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](http://www.sick.com)