



# DFS20A-A2ABD003000

DFS2x

INCREMENTAL ENCODERS

**SICK**  
Sensor Intelligence.



Illustration may differ



### Ordering information

Type	Part no.
DFS20A-A2ABD003000	1071912

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

### Detailed technical data

#### Performance

<b>Pulses per revolution</b>	3,000
<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>	TTL / RS-422
<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>Operating current</b>	50 mA (without load)
<b>4.5 V... 5.5 V, TTL/RS-422</b>	
Load current	30 mA
Operating current	50 mA (without load)
<b>4.5 V ... 5.5 V, Open Collector</b>	
Load current	30 mA
Operating current	50 mA (without load)
<b>TTL/RS-422</b>	
Load current	30 mA
<b>HTL/Push pull</b>	
Load current	30 mA

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

<b>TTL/HTL</b>	Load current	30 mA
<b>Open Collector</b>	Load current	30 mA

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

### Electrical data

<b>Connection type</b>	Male connector, MS, 10-pin, radial
<b>Supply voltage</b>	4.5 ... 5.5 V
<b>Reference signal, number</b>	1
<b>Reference signal, position</b>	180°, electric, gated with A
<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)

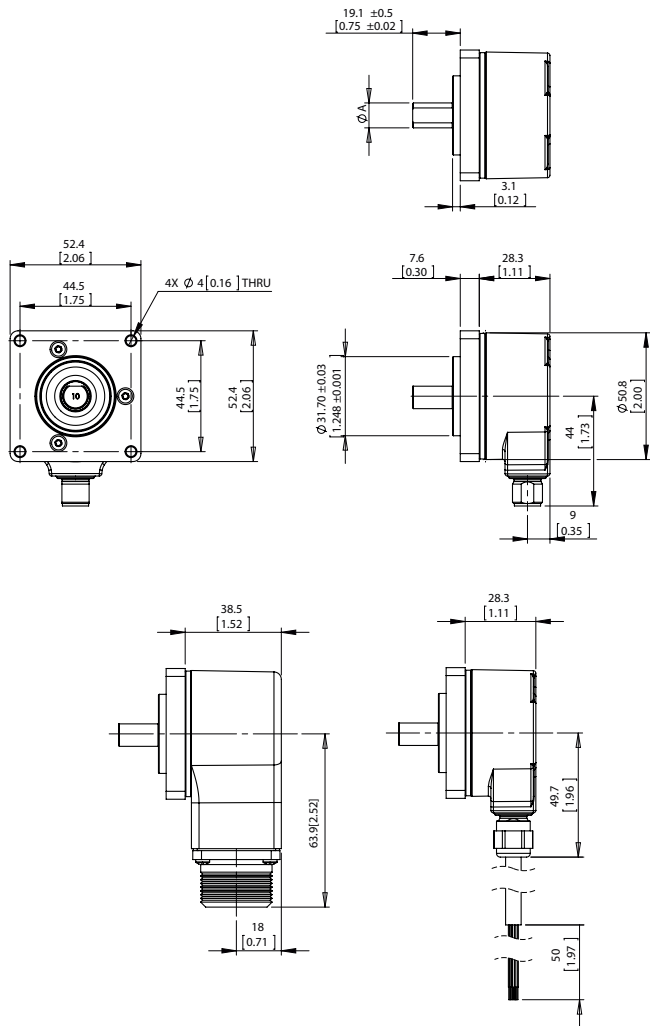
<b>Resistance to vibration</b>	30 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)
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### Classifications

<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))

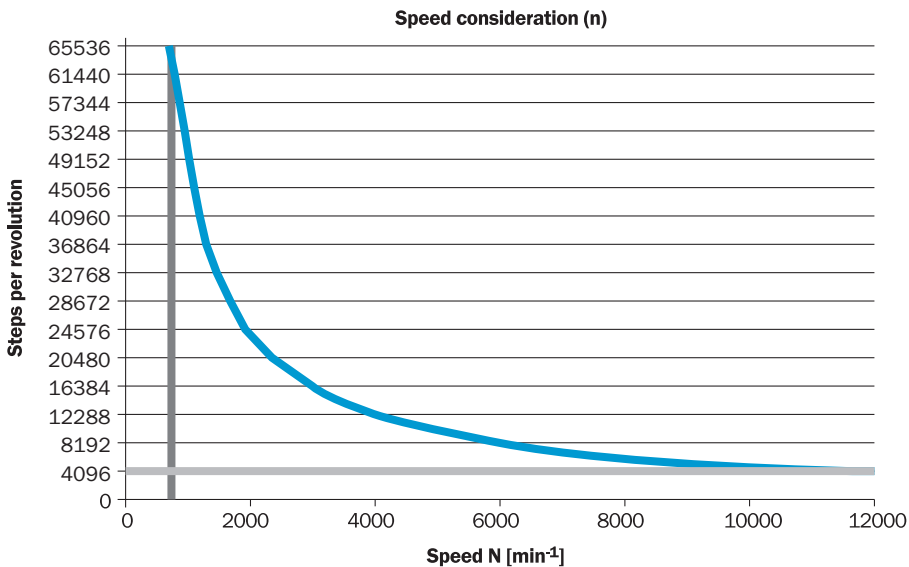
DFS20 square flange mount, radial connector outlet M12 and MS, cable outlet



Type	Shaft diameter A
DFS2x-x1xxxxxxx	1/4"
DFS2x-x2xxxxxxx DFS2x-xCxxxxxxx	3/8"
DFS2x-xFxxxxxxx	1/2"
DFS2x-x3xxxxxxx	6 mm
DFS2x-x4xxxxxxx	10 mm

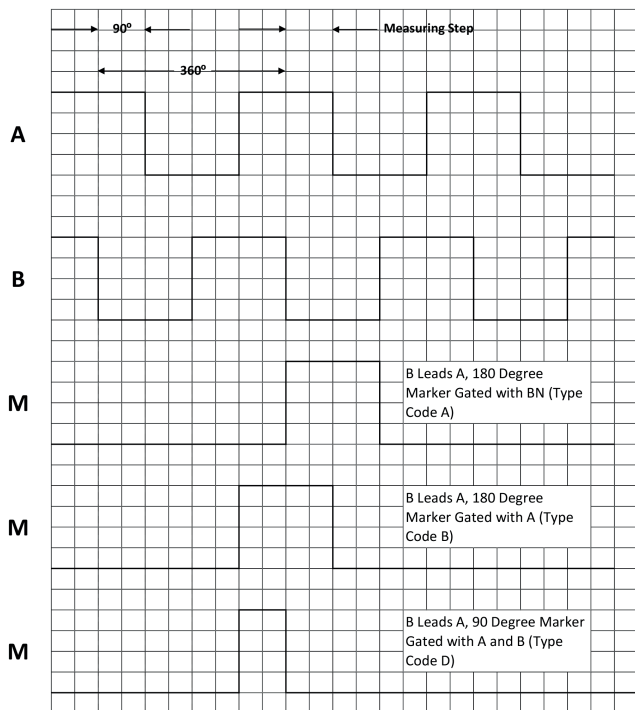
### Maximum revolution range

Maximum revolution range



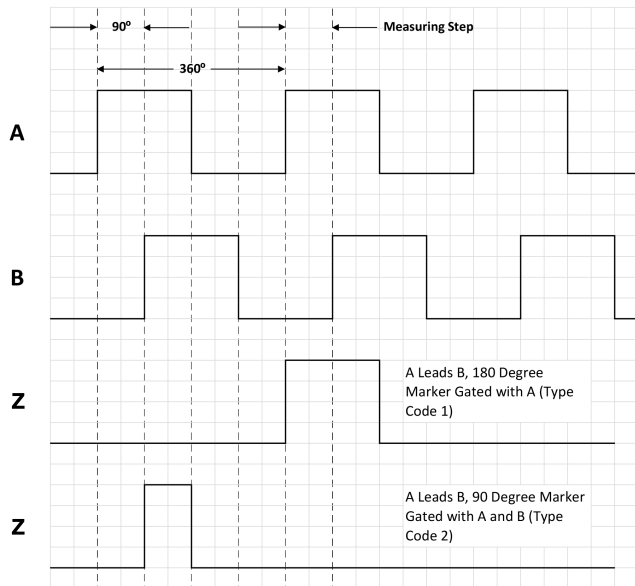
### Signal outputs

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/10, 10-pin, straight Head B: Flying leads Cable: shielded, 3 m	DOL-MS10-G03MMA2	7102131
Head A: female connector, MS/10, 10-pin, straight Head B: Flying leads Cable: shielded, 5 m	DOL-MS10-G05MMA2	7102132
Head A: female connector, MS/10, 10-pin, straight Head B: Flying leads Cable: shielded, 10 m	DOL-MS10-G10MMA2	7102133
Head A: female connector, MS/10, 10-pin, straight Head B: Flying leads Cable: shielded, 1.5 m	DOL-MS10-G1M5MA2	7102130
Head A: female connector, MS/10, 10-pin, straight Head B: Flying leads Cable: shielded, 20 m	DOL-MS10-G20MMA2	7102134
Head A: female connector, MS/10, 10-pin, straight Head B: Flying leads Cable: shielded, 30 m	DOL-MS10-G30MMA2	7102135
Head A: female connector, MS/10, 10-pin, straight Head B: - Cable: unshielded	DOS-MS10-G	7102129

## 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)