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Product data sheet



DFV60E-22EC01024

DFV60

MEASURING WHEEL ENCODERS

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DFV60E-22EC01024 | DFV60

MEASURING WHEEL ENCODERS



Illustration may differ

Ordering information

Type	Part no.
DFV60E-22EC01024	1060308

DFV60 spring arm (part number: 2056155) not included with delivery

Other models and accessories ➜ www.sick.com/DFV60

Detailed technical data

Features

Items supplied	DFV60 spring arm (part number: 2056155) not included with delivery

Performance

Pulses per revolution	1,024
Resolution in pulses/mm	3.41 Pulses/mm [1]
Measuring increment (resolution in mm/pulse)	0.3 mm/pulse [2]
Measuring step deviation	± 0.008° [3]
Error limits	± 4 mm/m, subject to measuring wheel (measuring wheel surface + measuring surface + ambient conditions)
Initialization time	30 ms

[1] Calculation example: Pulses per revolution / measuring wheel circumference = 16,384 pulses per revolution / 200 mm = 81.92 pulses/mm.

[2] Calculation example: Circumference of wheel / pulses per revolution = 200 mm / 16384 pulses per revolution = 0,012mm/pulse.

[3] Value refers to the mounted encoder.

Interfaces

Communication interface	Incremental
Communication Interface detail	HTL / Push pull

Electrical data

Connection type	Male connector, M12, 8-pin, radial
Power consumption max. without load	≤ 30 mA
Supply voltage	10 V ... 32 V
Load current max.	30 mA
Maximum output frequency	820 kHz
Reference signal, number	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.

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Reference signal, position	90°, electric, logically gated with A and B
Reverse polarity protection	✓
Short-circuit protection of the outputs	✓
MTTFd: 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.

Mechanical data

Measuring wheel circumference	300 mm
Measuring wheel surface	O-ring NBR70 [1]
Mass	+ 500 g
Encoder material	
Shaft	Stainless steel
Flange	Aluminum
Housing	Aluminum
Cable	PUR
Spring arm mechanism material	
Spring element	Not contained in the scope of delivery of the system
Measuring wheel, spring arm	Aluminum
Start up torque	0.8 Ncm (at 20 °C)
Operating torque	0.6 Ncm (at 20 °C)
Operating speed	1,500 min^{-1}
Maximum operating speed	3,000 min^{-1} [2]
Bearing lifetime	3 x 10^9 revolutions
Maximum travel/deflection of spring arm	40 mm
Max. permissible working area for the spring (continuous operation)	± 10 mm
Recommended spring deflection	20 mm ... 40 mm
Mounting position relative to the measuring object	Preferably from above, from below possible

[1] The surface of a measuring wheel is subject to wear. This depends on contact pressure, acceleration behavior in the application, traversing speed, measurement surface, mechanical alignment of the measuring wheel, temperature, and ambient conditions. We recommend you regularly check the condition of the measuring wheel and replace as required.

[2] 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 61000-6-4
Enclosure rating	IP65
Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	–20 °C ... +100 °C
Storage temperature range	–40 °C ... +100 °C, without package

Classifications

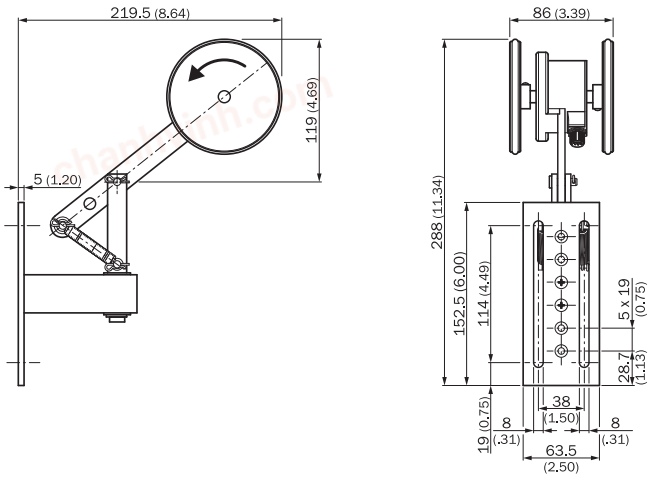
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eCl@ss 9.0	27270501
eCl@ss 10.0	27270790
eCl@ss 11.0	27270707
eCl@ss 12.0	27270504
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
ETIM 8.0	EC001486
UNSPSC 16.0901	41112113

Dimensional drawing (Dimensions in mm (inch))

DFV60 spring arm (part number: 2056155) not included with delivery

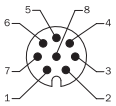


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PIN assignment

Cable 8-core

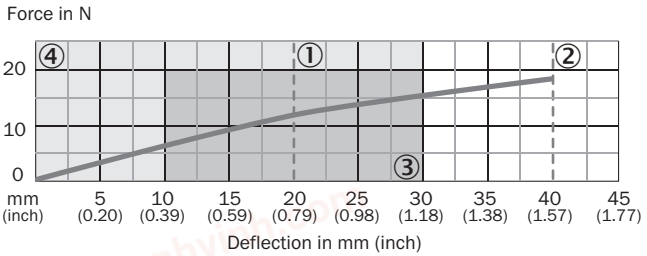
View to the connector M12 fitted to the encoder body



PIN, 8-pin, connector M12	Color of wires for encoders with cable outlet	Signal TTL, HTL	Explanation
1	Brown	$\overline{A}$	Signal line
2	White	A	Signal line
3	Black	$\overline{B}$	Signal line
4	Pink	B	Signal line
5	Yellow	$\overline{Z}$	Signal line
6	Lilac	Z	Signal line
7	Blue	GND	Ground connection of the encoder
8	Red	$+U_s$	Supply voltage (potential free to housing)
Screen	Screen	Screen	Screen connected to encoder housing. On the control side connected to earth.

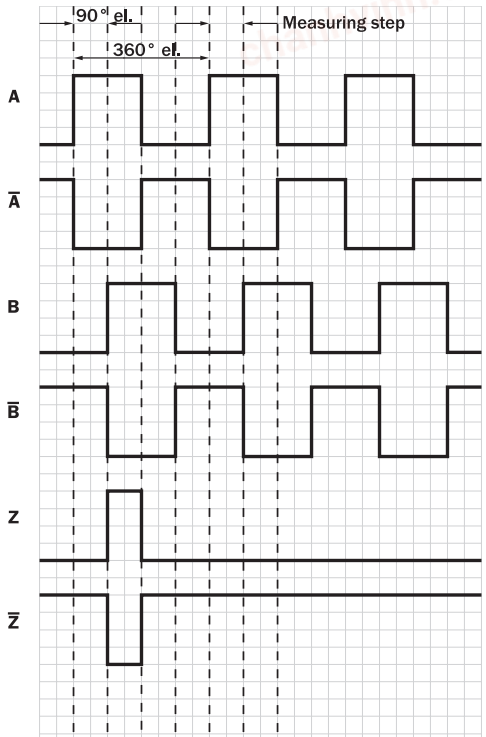
Diagrams

Dual wheel, spring tension, yoke mount



① Recommended pre-tension (20 mm)
② Maximum deflection (40 mm)
③ Recommended deflection range (10 – 30 mm)
④ Permissible working area (0 – 30 mm)

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Recommended accessories

Other models and accessories ➜ www.sick.com/DFV60

	Brief description	Type	Part no.
Mounting brackets and plates			
	Spring arm / mounting arm for DFV60	DFV60 spring arm	2056155
Other mounting accessories			
	Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 300 mm	BEF-MR010030R	2049278
	O-ring for measuring wheels (circumference 300 mm), 2x O-ring	BEF-OR-083-050	2064076
Plug connectors and cables			
	Head A: cable Head B: Flying leads Cable: SSI, Incremental, HIPERFACE®, PUR, halogen-free, shielded	LTG-2308-MWENC	6027529
	Head A: cable Head B: Flying leads Cable: SSI, Incremental, PUR, shielded	LTG-2411-MW	6027530
	Head A: cable Head B: Flying leads Cable: SSI, Incremental, PUR, halogen-free, shielded	LTG-2512-MW	6027531

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	Brief description	Type	Part no.
	Head A: cable Head B: Flying leads Cable: SSI, TTL, HTL, Incremental, PUR, halogen-free, shielded	LTG-2612-MW	6028516
	Head A: female connector, JST, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 0.5 m	DOL-0J08-G0M5AA3	2046873
	Head A: female connector, JST, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 10 m	DOL-0J08-G10MAA3	2046877
	Head A: female connector, JST, 8-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 1.5 m	DOL-0J08-G1M5AA3	2046874
	Head A: female connector, JST, 8-pin, straight Head B: Flying leads Cable: SSI, Incremental, PUR, halogen-free, shielded, 1.5 m	DOL-0J08-G1M5AA6	2048590
	Head A: female connector, JST, 8-pin, straight Head B: Flying leads Cable: SSI, Incremental, PUR, halogen-free, shielded, 3 m	DOL-0J08-G3M0AA6	2048591
	Head A: female connector, M12, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 2 m	DOL-1208-G02MAC1	6032866
	Head A: female connector, M12, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 5 m	DOL-1208-G05MAC1	6032867
	Head A: female connector, M12, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 10 m	DOL-1208-G10MAC1	6032868
	Head A: female connector, M12, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 20 m	DOL-1208-G20MAC1	6032869
	Head A: female connector, M12, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 25 m	DOL-1208-G25MAC1	6067859
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 2 m	DOL-2312-G02MLA3	2030682
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 3 m	DOL-2312-G03MMA3	2029213
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 5 m	DOL-2312-G05MMA3	2029214
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 7 m	DOL-2312-G07MLA3	2030685
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 10 m	DOL-2312-G10MLA3	2030688
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 10 m	DOL-2312-G10MMA3	2029215
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 15 m	DOL-2312-G15MLA3	2030692

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	Brief description	Type	Part no.
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 1.5 m	DOL-2312-G1M5MA3	2029212
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 20 m	DOL-2312-G20MLA3	2030695
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 20 m	DOL-2312-G20MMA3	2029216
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 25 m	DOL-2312-G25MLA3	2030699
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, shielded, 30 m	DOL-2312-G30MLA3	2030702
	Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: Incremental, PUR, halogen-free, shielded, 30 m	DOL-2312-G30MMA3	2029217

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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.

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