

# DBV50E-22GKA0020

DBV50

**MEASURING WHEEL ENCODERS** 





# Ordering information

Туре	Part no.
DBV50E-22GKA0020	1082276

Other models and accessories → www.sick.com/DBV50





#### Detailed technical data

# Safety-related parameters

MTTF <sub>D</sub> (mean time to dangerous failure)	600 years (EN ISO 13849-1) 1)
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<sup>1)</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.

#### Performance

Pulses per revolution	20
Resolution in pulses/mm	0.01
Measuring increment (resolution in mm/ pulse)	10
Measuring step deviation	± 18° / pulses per revolution
Error limits	± 4 mm/m, subject to the measuring wheel (wheel + surface)
Duty cycle	≤ 0.5 ± 5 %
Initialization time	< 3 ms

### Interfaces

Communication interface	Incremental
Communication Interface detail	HTL / Push pull
Number of signal channels	3 channel

#### Electrical data

Operating power consumption (no load)	50 mA
Connection type	Cable, 5-wire, universal, 1.5 m <sup>1)</sup>
Power consumption max. without load	≤ 0.5 W
Supply voltage	7 V 27 V
Load current max.	30 mA
Maximum output frequency	≤ 300 kHz
Reference signal, number	1
Reference signal, position	90°, electric, logically gated with A and B
Reverse polarity protection	✓

<sup>&</sup>lt;sup>1)</sup> Number of wires depending on electrical interface: Interface A, C, E: 8-wire; Interface G, P, R: 5-wire.

 $<sup>^{2)}</sup>$  The short-circuit rating is only given if Us and GND are connected correctly.

Short-circuit protection of the outputs

2)

#### Mechanical data

Measuring wheel circumference	200 mm	
Measuring wheel surface	O-ring NBR70 <sup>1)</sup>	
Spring arm design	63.5 mm spring arm, encoder on mounting side (left), single wheel	
Mass	+ 300 g	
Encoder material		
Shaft	Stainless steel	
Flange	Aluminum	
Housing	Aluminum	
Cable	PVC	
Spring arm mechanism material		
Spring element	Spring steel, anti-corrosive	
Measuring wheel, spring arm	Aluminum	
Start up torque	0.9 Ncm (at 20 °C)	
Operating torque	0.6 Ncm (at 20 °C)	
Operating speed	1,500 min <sup>-1</sup>	
Maximum operating speed	3,000 min <sup>-1 2)</sup>	
Bearing lifetime	2.0 x 10^9 revolutions	
Maximum travel/deflection of spring arm	14 mm at 14 N spring travel	
Recommended pretension	15 N At 10 mm deflection <sup>3)</sup>	
Max. permissible working area for the spring (continuous operation)	± 3 mm	
Recommended spring deflection	2 mm 13 mm	
Service life of spring element	> 1.4 million cycles <sup>4)</sup>	
Mounting position relative to the measuring object	Preferably from above, from below possible <sup>5)</sup>	

<sup>1)</sup> 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.

#### Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3 (class A)
Enclosure rating	IP65
Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	-20 °C +70 °C
Storage temperature range	-40 °C +100 °C, without package

 $<sup>^{1)}</sup>$  Number of wires depending on electrical interface: Interface A, C, E: 8-wire; Interface G, P, R: 5-wire.

 $<sup>^{\</sup>rm 2)}$  The short-circuit rating is only given if Us and GND are connected correctly.

 $<sup>^{2)}</sup>$  No permanent operation. Decreasing signal quality.

 $<sup>^{\</sup>rm 3)}$  When measured from the top of the measuring surface.

 $<sup>^{4)}</sup>$  One cycle corresponds to an upward and downward movement of  $\pm$  3 mm from the recommended pretension position.

 $<sup>^{5)}</sup>$  When mounted from below, the encoder weight during spring pretensioning must be taken into account.

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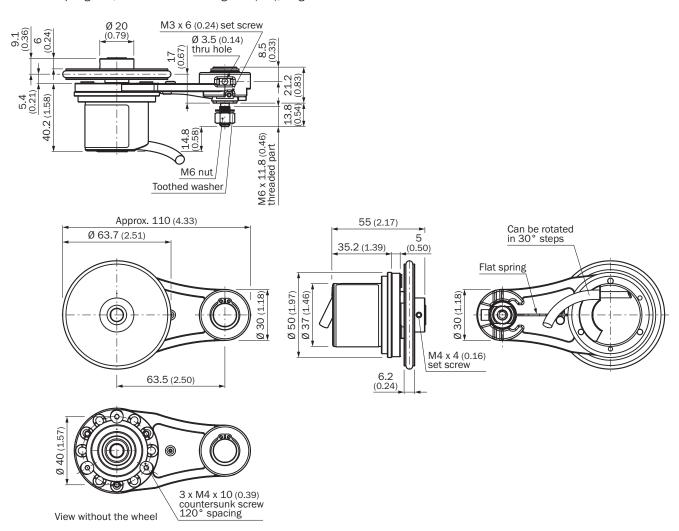
MEASURING WHEEL ENCODERS

# Classifications

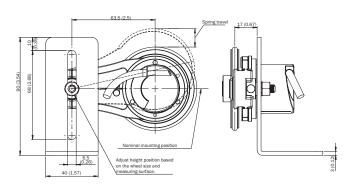
ECLASS 5.0	27270501
ECLASS 5.1.4	27270501
ECLASS 6.0	27270590
ECLASS 6.2	27270590
ECLASS 7.0	27270501
ECLASS 8.0	27270501
ECLASS 8.1	27270501
ECLASS 9.0	27270501
ECLASS 10.0	27270790
ECLASS 11.0	27270707
ECLASS 12.0	27270504
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
ETIM 8.0	EC001486
UNSPSC 16.0901	41112113

# Dimensional drawing (Dimensions in mm (inch))

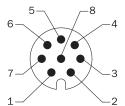
63.5 mm spring arm, encoder on mounting side (left), single wheel



# Attachment specifications



# PIN assignment

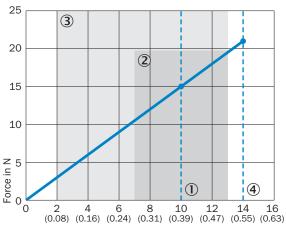




View of M12 male device connector on cable / housing

# **Diagrams**

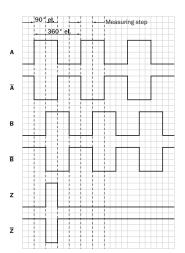
Force deflection chart with working range



Deflection in mm (inch)

- ① Proposed Pre-tension: 10 mm
- ② Allowed operating travel (continuous operation) +/- 3 mm
- ③ Proposed spring deflection: 2 13 mm
- Maximum spring travel: 14 mm

Signal outputs for electrical interfaces TTL and HTL



CW with view on the encoder shaft, compare dimensional drawing. Interfaces G, P, R perform only the channels A, B, Z.

# Recommended accessories

Other models and accessories → www.sick.com/DBV50

	Brief description	Туре	Part no.
Flanges			
	Adapter flange for modular measuring wheel system	BEF-AP-MRS	2084969
Mounting b	rackets and plates		
	Mounting bracket for encoder with spigot 36 mm	BEF-WF-MRS	2084709
Other moun	nting accessories		
	Aluminium measuring wheel with 0-ring (NBR70) for 8 mm solid shaft, circumference 200 mm	BEF-MR008020R	2055223
	O-ring for measuring wheels (circumference 200 mm)	BEF-OR-053-040	2064061
Others			
	<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: Incremental, SSI</li> <li>Cable: 2 m, 8-wire, PUR, halogen-free</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm², Ø 7.0 mm</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-G02MAC1	6032866
	<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: Incremental, SSI</li> <li>Cable: 5 m, 8-wire, PUR, halogen-free</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm², Ø 7.0 mm</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-G05MAC1	6032867
	<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: Incremental, SSI</li> <li>Cable: 10 m, 8-wire, PUR, halogen-free</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm², Ø 7.0 mm</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-G10MAC1	6032868
	<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: Incremental, SSI</li> <li>Cable: 20 m, 8-wire, PUR, halogen-free</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm², Ø 7.0 mm</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-G20MAC1	6032869
	<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight</li> <li>Connection type head B: Flying leads</li> <li>Signal type: Incremental, SSI</li> <li>Cable: 25 m, 8-wire, PUR, halogen-free</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm², Ø 7.0 mm</li> <li>Connection systems: Flying leads</li> </ul>	DOL-1208-G25MAC1	6067859

	Brief description	Туре	Part no.
<u></u>	Connection type head A: Flying leads Connection type head B: Flying leads Signal type: SSI, Incremental, HIPERFACE® Items supplied: By the meter Cable: 8-wire, PUR, halogen-free Description: SSI, Incremental, HIPERFACE®, shielded	LTG-2308-MWENC	6027529
/	<ul> <li>Connection type head A: Flying leads</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, Incremental</li> <li>Items supplied: By the meter</li> <li>Cable: 11-wire, PUR</li> <li>Description: SSI, Incremental, shielded</li> </ul>	LTG-2411-MW	6027530
/	<ul> <li>Connection type head A: Flying leads</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, Incremental</li> <li>Items supplied: By the meter</li> <li>Cable: 12-wire, PUR, halogen-free</li> <li>Description: SSI, Incremental, shielded</li> </ul>	LTG-2512-MW	6027531
	<ul> <li>Connection type head A: Flying leads</li> <li>Connection type head B: Flying leads</li> <li>Signal type: SSI, TTL, HTL, Incremental</li> <li>Items supplied: By the meter</li> <li>Cable: 12-wire, UV and saltwater-resistant, PUR, halogen-free</li> <li>Description: SSI, TTL, HTL, Incremental, shielded, Head A: cable Head B: cable Cable: suitable for drag chain, PUR, halogen-free, shielded, UV and saltwater resistant, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 2 x 0.14 mm², Ø 7.8 mm</li> </ul>	LTG-2612-MW	6028516
	<ul> <li>Connection type head A: Male connector, M12, 8-pin, straight, A-coded</li> <li>Signal type: Incremental</li> <li>Cable: CAT5, CAT5e</li> <li>Description: Incremental, shielded, Head A: male connector, M12, 8-pin, straight, A coded, shielded, for cable diameter 4 mm 8 mm Head B: - Operating temperature: -40 °C +85 °C</li> <li>Connection systems: IDC quick connection</li> <li>Permitted cross-section: 0.14 mm² 0.34 mm²</li> </ul>	STE-1208-GA01	6044892
	<ul> <li>Connection type head A: Male connector, M23, 12-pin, straight, A-coded</li> <li>Signal type: HIPERFACE<sup>®</sup>, SSI, Incremental, RS-422</li> <li>Description: HIPERFACE<sup>®</sup>, SSI, Incremental, RS-422, shielded, M23 male connector</li> <li>Connection systems: Solder connection</li> </ul>	STE-2312-G	6027537
	<ul> <li>Connection type head A: Male connector, M23, 12-pin, straight, A-coded</li> <li>Signal type: HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li>Description: HIPERFACE<sup>®</sup>, SSI, Incremental, shielded, Head A: male connector, M23, 12-pin, straight, for cable diameter 5.5 mm 10.5 mm Head B: - Operating temperature: -40 °C +125 °C</li> <li>Connection systems: Solder connection</li> </ul>	STE-2312-G01	2077273
	<ul> <li>Connection type head A: Female connector, M12, 8-pin, straight, A-coded</li> <li>Signal type: Incremental, SSI</li> <li>Cable: CAT5, CAT5e</li> <li>Description: Incremental, SSI, shielded, Head A: female connector, M12, 8-pin, straight, A encoded, shielded, for cable diameter 4 mm 8 mm Head B: - Operating temperature: -40 °C +85 °C</li> <li>Connection systems: IDC quick connection</li> <li>Permitted cross-section: 0.14 mm² 0.34 mm²</li> </ul>	DOS-1208-GA01	6045001
	<ul> <li>Connection type head A: Female connector, M23, 12-pin, straight, A-coded</li> <li>Signal type: HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li>Description: HIPERFACE<sup>®</sup>, SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm 10.5 mm Head B: Operating temperature: -20 °C +130 °C</li> <li>Connection systems: Solder connection</li> </ul>	DOS-2312-G	6027538

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Brief description	Туре	Part no.
<ul> <li>Connection type head A: Female connector, M23, 12-pin, straight, A-coded</li> <li>Signal type: HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li>Description: HIPERFACE<sup>®</sup>, SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm 10.5 mm Head B: - Operating temperature: -40 °C +125 °C</li> <li>Connection systems: Solder connection</li> </ul>	DOS-2312-G02	2077057
<ul> <li>Connection type head A: Female connector, M23, 12-pin, angled, A-coded</li> <li>Signal type: HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li>Description: HIPERFACE<sup>®</sup>, SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, angled, shielded, for cable diameter 4.2 mm 6.6 mm Head B: - Operating temperature: -20 °C +130 °C</li> <li>Connection systems: Solder connection</li> </ul>	DOS-2312-W01	2072580
<ul> <li>Connection type head A: Female connector, M23, 9-pin, straight, A-coded</li> <li>Signal type: HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li>Description: HIPERFACE<sup>®</sup>, SSI, Incremental, shielded, Head A: female connector, M23, 9-pin, straight, shielded, for cable diameter 5.5 mm 10.5 mm Head B: Operating temperature: -20 °C +130 °C</li> <li>Connection systems: Solder connection</li> </ul>	DOS-2309-G	6028533

# 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.

For us, that is "Sensor Intelligence."

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