

DBV50E-22EMA1000

DBV50

MEASURING WHEEL ENCODERS





Ordering information

Туре	Part no.
DBV50E-22EMA1000	1081894

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



Illustration may differ

Detailed technical data

Performance

Pulses per revolution	1,000
Resolution in pulses/mm	5
Measuring increment (resolution in mm/ pulse)	0.2
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	6-channel

Electrical data

Operating power consumption (no load)	50 mA
Connection type	Cable, 8-wire, universal, 5 m ¹⁾
Power consumption max. without load	≤ 0.5 W
Supply voltage	7 V 30 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	✓
Short-circuit protection of the outputs	✓ ²⁾
MTTFd: mean time to dangerous failure	600 years (EN ISO 13849-1) 3)

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

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

³⁾ 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 surface 00 mm Spring arm design 0.5 ms spring arm, encoder on mounting side (left), single wheel Mass + 300 g Encoder material Staniless steel A Luminum Auminum Cabie PVC Spring arm mechanism material Spring steel, anti-corrosive Measuring wheel, spring arm Meninum Spring elemen Spring steel, anti-corrosive Measuring wheel, spring arm Minimum Start up torque 0.9 Ncm (at 20°C) Operating torque 0.6 Ncm (at 20°C) Operating speed 3,000 min¹² Maximum operating speed 3,000 min¹² Maximum travel/deflection of spring arm 4 mm at 14 N spring travel Recommended pretension 15 N At 10 mm deflection ³ Max. permissible working area for the gring (continuous operation) 3 mm Recommended spring deflection 2 mm13 mm Service life of spring element > 1.4 million cycles ⁴ Mounting position relative to the measuring pererably from above, from below possible ⁵			
Spring arm design Mass + 300 g Encoder material Shaft Flange Housing Aluminum Cable Spring arm mechanism material Spring element Measuring wheel, spring arm Maximum operating speed 1,500 min ⁻¹ Maximum operating speed 2,000 min ⁻¹ Maximum travel/deflection of spring arm Recommended pring deflection 2 mm 13 mm Service life of spring element y Mass	Measuring wheel circumference	200 mm	
### And ### An	Measuring wheel surface	O-ring NBR70 ¹⁾	
Encoder material Shaft Stainless steel Aluminum Housing Cable Spring arm mechanism material Spring element Measuring wheel, spring arm Measuring wheel, spring arm Operating torque Operating speed Maximum operating speed Maximum operating speed Bearing lifetime Aluminum 15 N At 10 mm deflection Max. permissible working area for the spring (continuous operation) Recommended spring deflection Stain us 13 mm Service life of spring element Naunum position relative to the measuring Mounting position relative to the measuring PVC Spring steel Aluminum Aluminum Spring steel, anti-corrosive Aluminum Aluminum Aluminum Op Ncm (at 20 °C) Operating speed Operating speed 1,500 min ⁻¹ 2,0 x 10^9 revolutions 14 mm at 14 N spring travel 15 N At 10 mm deflection ³⁾ ± 3 mm Service life of spring element > 1.4 million cycles ⁴⁾ Mounting position relative to the measuring Preferably from above, from below possible ⁵⁾	Spring arm design	63.5 mm spring arm, encoder on mounting side (left), single wheel	
Shaft Flange Housing Cable Spring arm mechanism material Spring element Measuring wheel, spring arm Start up torque Operating torque Operating speed Aluminum 1,500 min ⁻¹ Maximum operating speed Maximum operating speed Maximum travel/deflection of spring arm Recommended pretension Max. permissible working area for the spring (continuous operation) Recommended spring element Mounting position relative to the measuring PVC Spring steel, anti-corrosive Aluminum Alumica Co' Aluminum Alumica Co' Alumica Co' Alumica Co' Alumica Co' Alumica Co' Alumica	Mass	+ 300 g	
Flange Housing Cable Cable Spring arm mechanism material Spring element Measuring wheel, spring arm Measuring wheel, spring arm Start up torque O.9 Ncm (at 20 °C) Operating torque O.9 Ncm (at 20 °C) Operating speed 1,500 min ⁻¹ Maximum operating speed Maximum operating speed Spring steel, anti-corrosive Aluminum Start up torque O.9 Ncm (at 20 °C) Operating speed 1,500 min ⁻¹ Maximum operating speed Spring lifetime 2.0 x 10^9 revolutions Haximum travel/deflection of spring arm Recommended pretension 15 N At 10 mm deflection 3) 4 mm at 14 N spring travel 15 N At 10 mm deflection 3) Max. permissible working area for the spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element Mounting position relative to the measuring Preferably from above, from below possible 5)	Encoder material		
Aluminum Cable Spring arm mechanism material Spring element Measuring wheel, spring arm Measuring wheel, spring arm Start up torque O.9 Ncm (at 20 °C) Operating torque O.6 Ncm (at 20 °C) Operating speed 1,500 min ⁻¹ Maximum operating speed 3,000 min ⁻¹ 2) 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 ³⁾ ± 3 mm Max. permissible working area for the spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element Nounting position relative to the measuring Preferably from above, from below possible ⁵⁾	Shaft	Stainless steel	
Cable Spring arm mechanism material Spring element Measuring wheel, spring arm Start up torque Operating torque Operating speed Maximum operating speed Maximum operating speed Spring steel, anti-corrosive Aluminum Start up torque Operating torque One Ncm (at 20 °C) Operating speed 1,500 min ⁻¹ 3,000 min ⁻¹ 2) Bearing lifetime 2.0 x 10^9 revolutions Maximum travel/deflection of spring arm Recommended pretension Max. permissible working area for the spring (continuous operation) Max. permissible working area for the spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element PVC Spring steel, anti-corrosive Aluminum Aluminum 1 un 1 un 2 no 1 un 1 un 1 un 2 no 2 mm 13 mm Service life of spring element Preferably from above, from below possible 5)	Flange	Aluminum	
Spring arm mechanism material Spring element Measuring wheel, spring arm Measuring wheel, spring arm Start up torque O.9 Ncm (at 20 °C) Operating torque O.6 Ncm (at 20 °C) Operating speed 1,500 min ⁻¹ Maximum operating speed Bearing lifetime 2.0 x 10^9 revolutions Maximum travel/deflection of spring arm Recommended pretension Max. permissible working area for the spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element > 1.4 million cycles ⁴⁾ Preferably from above, from below possible ⁵⁾	Housing	Aluminum	
Spring element 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 ⁻¹ Maximum operating speed 3,000 min ^{-1 2)} Bearing lifetime 2.0 x 10^9 revolutions Maximum travel/deflection of spring arm Recommended pretension 15 N At 10 mm deflection ³⁾ ### Auximum travel operation Max. permissible working area for the spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element Preferably from above, from below possible ⁵⁾	Cable	PVC	
Measuring wheel, spring arm Start up torque 0.9 Ncm (at 20 °C) Operating torque 0.6 Ncm (at 20 °C) Operating speed 1,500 min ⁻¹ 3,000 min ⁻¹ Bearing lifetime 2.0 x 10^9 revolutions Maximum travel/deflection of spring arm Recommended pretension 15 N At 10 mm deflection ³⁾ ± 3 mm Max. permissible working area for the spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element > 1.4 million cycles ⁴⁾ Mounting position relative to the measuring Preferably from above, from below possible ⁵⁾	Spring arm mechanism material		
Start up torque 0.9 Ncm (at 20 °C) Operating torque 0.6 Ncm (at 20 °C) Operating speed 1,500 min ⁻¹ 3,000 min ⁻¹ 2) 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 3) Max. permissible working area for the spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element > 1.4 million cycles 4) Mounting position relative to the measuring Preferably from above, from below possible 5)	Spring element	Spring steel, anti-corrosive	
Operating torque 0.6 Ncm (at 20 °C) Operating speed 1,500 min ⁻¹ 3,000 min ⁻¹ 3,000 min ⁻¹ 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 ³⁾ ± 3 mm Max. permissible working area for the spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element > 1.4 million cycles ⁴⁾ Preferably from above, from below possible ⁵⁾	Measuring wheel, spring arm		
Operating speed 1,500 min ⁻¹ 3,000 min ⁻¹ 2.0 x 10^9 revolutions Maximum travel/deflection of spring arm Recommended pretension 15 N At 10 mm deflection ³⁾ ### Asyring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element Preferably from above, from below possible ⁵⁾	Start up torque	0.9 Ncm (at 20 °C)	
Maximum operating speed 3,000 min ^{-1 2)} 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 ³⁾ ### 43 mm ### 43 mm ### 5 mm ### 6 mm ##	Operating torque		
Bearing lifetime 2.0 x 10^9 revolutions 14 mm at 14 N spring travel Recommended pretension 15 N At 10 mm deflection ³⁾ Max. permissible working area for the spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element > 1.4 million cycles ⁴⁾ Preferably from above, from below possible ⁵⁾	Operating speed	1,500 min ⁻¹	
Maximum travel/deflection of spring arm 14 mm at 14 N spring travel 15 N At 10 mm deflection 3) Max. permissible working area for the spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element > 1.4 million cycles 4) Preferably from above, from below possible 5)	Maximum operating speed	3,000 min ^{-1 2)}	
Recommended pretension 15 N At 10 mm deflection ³⁾ ± 3 mm ### spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element > 1.4 million cycles ⁴⁾ Preferably from above, from below possible ⁵⁾	Bearing lifetime	2.0 x 10^9 revolutions	
Max. permissible working area for the spring (continuous operation) Recommended spring deflection 2 mm 13 mm Service life of spring element > 1.4 million cycles ⁴⁾ Preferably from above, from below possible ⁵⁾	Maximum travel/deflection of spring arm	14 mm at 14 N spring travel	
spring (continuous operation) Recommended spring deflection 2 mm 13 mm > 1.4 million cycles ⁴⁾ Mounting position relative to the measuring Preferably from above, from below possible ⁵⁾	Recommended pretension	15 N At 10 mm deflection ³⁾	
Service life of spring element > 1.4 million cycles ⁴⁾ Mounting position relative to the measuring Preferably from above, from below possible ⁵⁾		± 3 mm	
Mounting position relative to the measuring Preferably from above, from below possible 5)	Recommended spring deflection	2 mm 13 mm	
Treferably from above, from below possible	Service life of spring element	> 1.4 million cycles ⁴⁾	
	J. 3	Preferably from above, from below possible ⁵⁾	

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.

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 +85 °C -35 °C +95 °C (on request)
Storage temperature range	-40 °C +100 °C, without package

Classifications

eCl@ss 5.0	27270501
eCl@ss 5.1.4	27270501
eCl@ss 6.0	27270590

²⁾ No permanent operation. Decreasing signal quality.

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

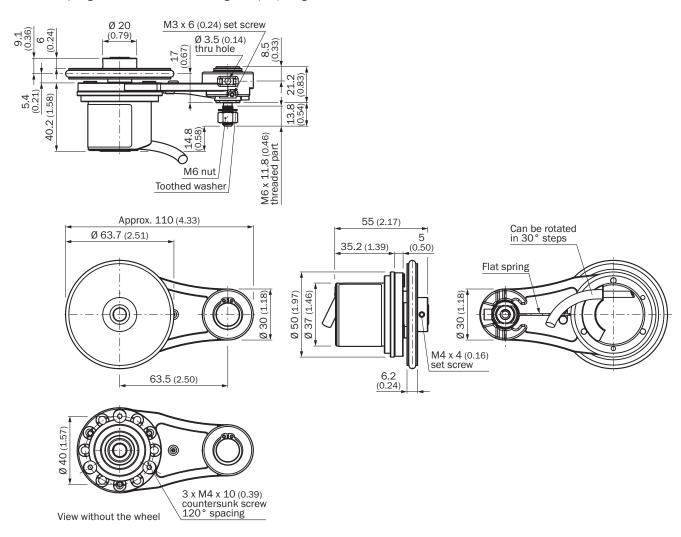
 $^{^{4)}}$ One cycle corresponds to an upward and downward movement of \pm 3 mm from the recommended pretension position.

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

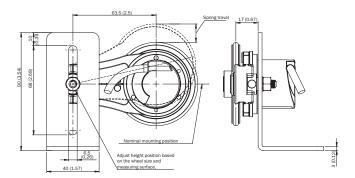
eCl@ss 6.2	27270590
eCl@ss 7.0	27270501
eCl@ss 8.0	27270501
eCl@ss 8.1	27270501
eCl@ss 9.0	27270501
eCl@ss 10.0	27270790
eCl@ss 11.0	27270707
eCl@ss 12.0	27270504
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
ETIM 8.0	EC001486
UNSPSC 16.0901	41112113

Dimensional drawing (Dimensions in mm (inch))

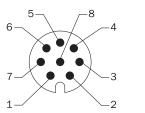
63.5 mm spring arm, encoder on mounting side (left), single wheel



Attachment specifications



PIN assignment

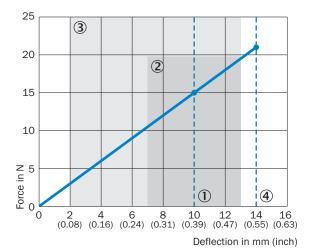




View of M12 male device connector on cable / housing

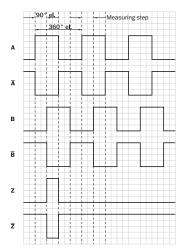
Diagrams

Force deflection chart with working range



- 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 bra	ckets and plates		
	Mounting bracket for encoder with spigot 36 mm	BEF-WF-MRS	2084709
Other mounti	ng accessories		
	Aluminium measuring wheel with O-ring (NBR70) for 8 mm solid shaft, circumference 200 mm	BEF-MR008020R	2055223
	0-ring for measuring wheels (circumference 200 mm)	BEF-OR-053-040	2064061
Plug connecto	ors and cables		
<u></u>	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
\	Head A: cable Head B: Flying leads Cable: SSI, TTL, HTL, Incremental, PUR, halogen-free, shielded	LTG-2612-MW	6028516

	Brief description	Туре	Part no.
	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, M12, 8-pin, straight, A-coded Cable: Incremental, SSI, shielded	DOS-1208-GA01	6045001
	Head A: female connector, M23, 9-pin, straight Cable: HIPERFACE®, SSI, Incremental, shielded	DOS-2309-G	6028533
	Head A: female connector, M23, 12-pin, straight	DOS-2312-G	6027538
	Cable: HIPERFACE [®] , SSI, Incremental, shielded	DOS-2312-G02	2077057
(1)	Head A: female connector, M23, 12-pin, angled Cable: HIPERFACE [®] , SSI, Incremental, shielded	DOS-2312-W01	2072580
	Head A: male connector, M12, 8-pin, straight, A-coded Cable: Incremental, shielded	STE-1208-GA01	6044892
	Head A: male connector, M23, 12-pin, straight Cable: HIPERFACE [®] , SSI, Incremental, RS-422, shielded	STE-2312-G	6027537
	Head A: male connector, M23, 12-pin, straight Cable: HIPERFACE [®] , SSI, Incremental, shielded	STE-2312-G01	2077273

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."

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