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DATA SHEET

DBV50E-22RKA0500

DBV50
Measuring wheel encoders

SICK Sensor Intelligence



Illustration may differ

MEASURING WHEEL ENCODERS

DBV50E-22RKA0500

ORDERING INFORMATION

Type	part no.
DBV50E-22RKA0500	1143388

Further device versions and accessories at www.sick.com/DBV50

DETAILED TECHNICAL DATA

SAFETY-RELATED PARAMETERS

$MTTF_D$ (mean time to dangerous failure)	600 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.

PERFORMANCE

Pulses per revolution	500
Resolution in pulses/mm	2.5
Measuring increment (resolution in mm/pulse)	0.4
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	Open Collector
Number of signal channels	3 channel

ELECTRONICS

Operating power consumption (no load)	50 mA
Connection type	Cable, 5-wire, universal, 1.5 m [1]
Power consumption max. without load	≤ 0.5 W

[1] Number of wires depending on electrical interface: Interface A, C, E: 8-wire; Interface G, P, R: 5-wire.

[2] The short-circuit rating is only given if Us and GND are connected correctly.

Supply voltage	4.5 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]

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MECHANICS

Measuring wheel circumference	200 mm
Measuring wheel surface	O-ring NBR70 [1]
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 core	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	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)	± 3 mm
Recommended spring deflection	2 mm ... 13 mm
Service life of spring element	> 1.4 million cycles [4]
Mounting position relative to the measuring object	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.

[2] No permanent operation. Decreasing signal quality.

[3] When measured from the top of the measuring surface.

[4] One cycle corresponds to an upward and downward movement of ± 3 mm from the recommended pretension position.

[5] When mounted from below, the encoder weight during spring pretensioning must be taken into account.

AMBIENT DATA

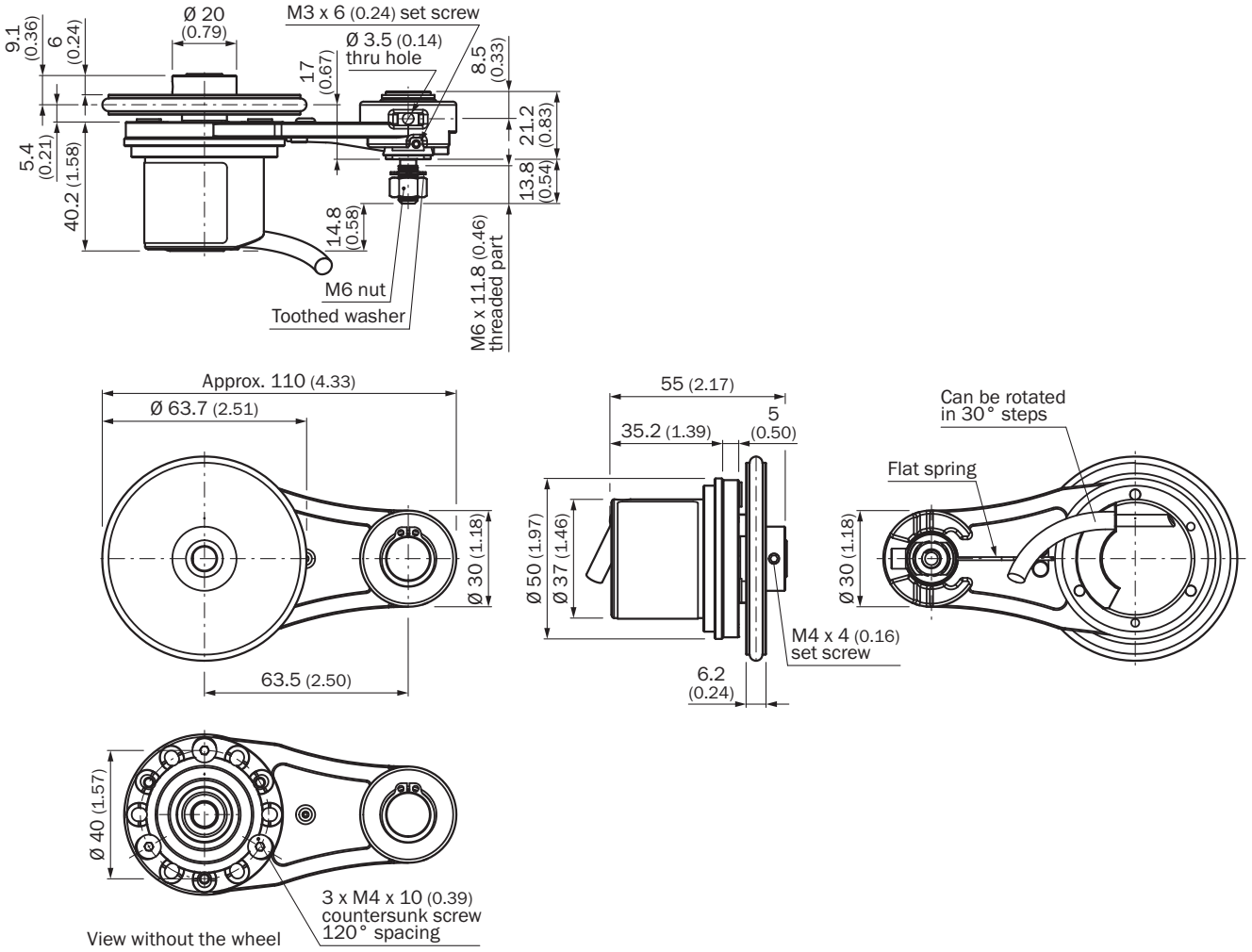
EMC	According to EN 61000-6-2 and EN 61000-6-3 (class A)
Enclosure rating	IP65
Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	–20 °C ... +85 °C –35 °C ... +95 °C (on request)
Storage temperature range	–40 °C ... +100 °C, without package
Resistance to shocks	100 g, 6 ms (EN 60068-2-27)

Resistance to vibration	20 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)

CERTIFICATES

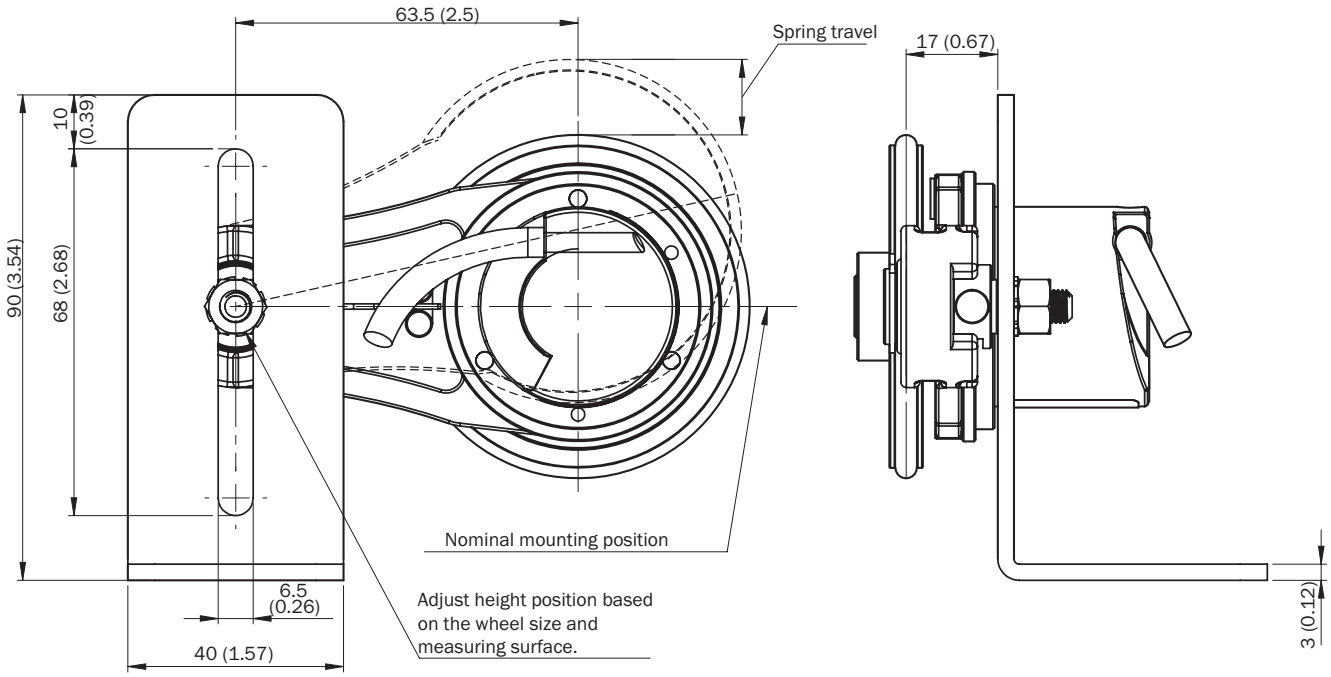
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
China RoHS	✓
cRUus certificate	✓
Information according to Art. 3 of Data Act (Regulation EU 2023/2854)	✓

DIMENSIONAL DRAWING 63.5 MM SPRING ARM, ENCODER ON MOUNTING SIDE (LEFT), SINGLE WHEEL

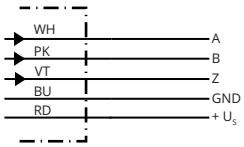


Dimensions in mm (inch)

ATTACHMENT SPECIFICATIONS

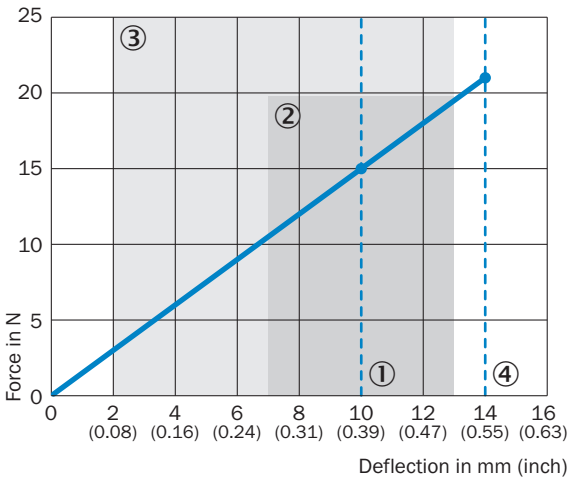


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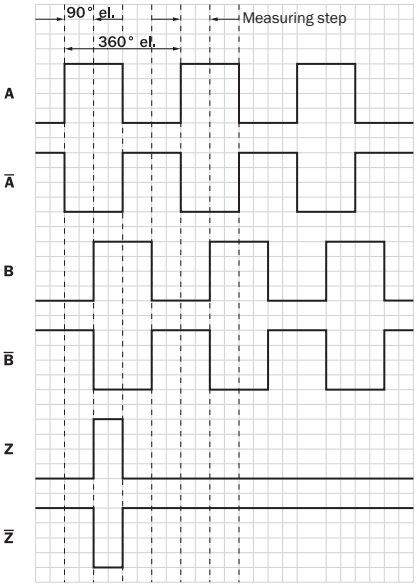
Wire colors (cable connection)	Male connector M12, 8-pin	Male connector M23, 12-pin	SignalOpen Collector3 channel	Explanation
White	2	5	A	Signal wire
Pink	4	8	B	Signal wire
Purple	6	3	Z	Signal wire
Blue	7	10	GND	Ground connection
Red	8	12	$+U_s$	Supply voltage

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
④ Maximum spring travel: 14 mm

DIAGRAMS 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.

Further information as well as suitable accessories, example applications and downloads such as CAD dimensional models, operating instructions and software can be found at www.sick.com/1143388

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SICK AT A GLANCE

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SICK combines sensor intelligence with industry expertise and certified consulting services. We provide the ideal foundation for scalable as well as tailor-made automation solutions and create added value along the entire value chain. Our close partnerships with our customers are more than just a promise: Together, we optimize productivity, improve quality, protect health and safety, and help build a sustainable future. All with empathy and trust.

Since 1946, we have been developing innovative technologies with passion and a pioneering spirit. With a global network in around 40 countries, SICK has a global presence and is always close by. The company's headquarters are located in Waldkirch near Freiburg, Germany. Our customers benefit from our understanding of both local and global requirements, which enables us to deliver tailor-made solutions

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