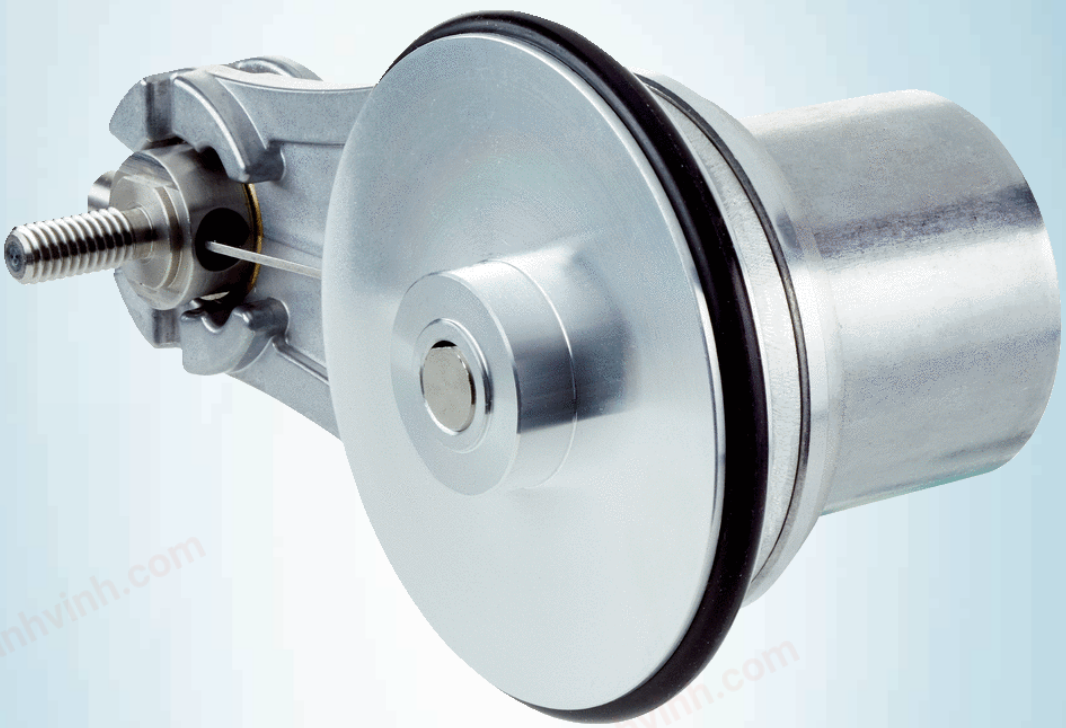
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Product data sheet



# DBV50E-22EKB0200

## DBV50 Core

MEASURING WHEEL ENCODERS

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Sensor Intelligence.

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# DBV50E-22EKB0200 | DBV50 Core

MEASURING WHEEL ENCODERS

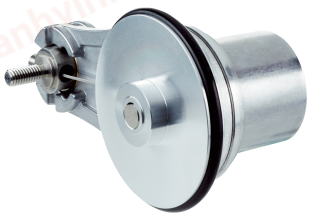


Illustration may differ

## Ordering information

| Type | Part no. |
|---|---|
| DBV50E-22EKB0200 | 1097189 |

Other models and accessories → www.sick.com/DBV50_Core

## Detailed technical data

### Performance

| | |
|---|---|
| **Pulses per revolution** | 200 |
| **Resolution in pulses/mm** | 1 |
| **Measuring increment (resolution in mm/pulse)** | 1 |
| **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 |

### Electrical data

| | |
|---|---|
| **Communication interface** | Incremental |
| **Communication Interface detail** | HTL<br>Push pull |
| **Supply voltage** | 7 V ... 30 V |
| **Connection type** | Cable, 8-wire, universal, 1.5 m [1] |
| **Operating power consumption (no load)** | 50 mA |
| **Power consumption max. without load** | ≤ 0.5 W |
| **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.

[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.

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## Mechanical data

| | |
|---|---|
| **Measuring wheel circumference** | 200 mm |
| **Measuring wheel surface** | O-ring NBR70 [1] |
| **Spring arm design** | 63.5 mm spring arm, wheel on mounting side (right), 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) |
| **Maximum operating speed** | 1,500 $min^{-1}$ |
| **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) |
| **Permissible relative humidity** | 90 % (condensation of the optical scanning not permitted) |
| **Operating temperature range** | –20 °C ... +85 °C (on request)<br>–35 °C ... +95 °C |
| **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 |
| **ECl@ss 6.2** | 27270590 |

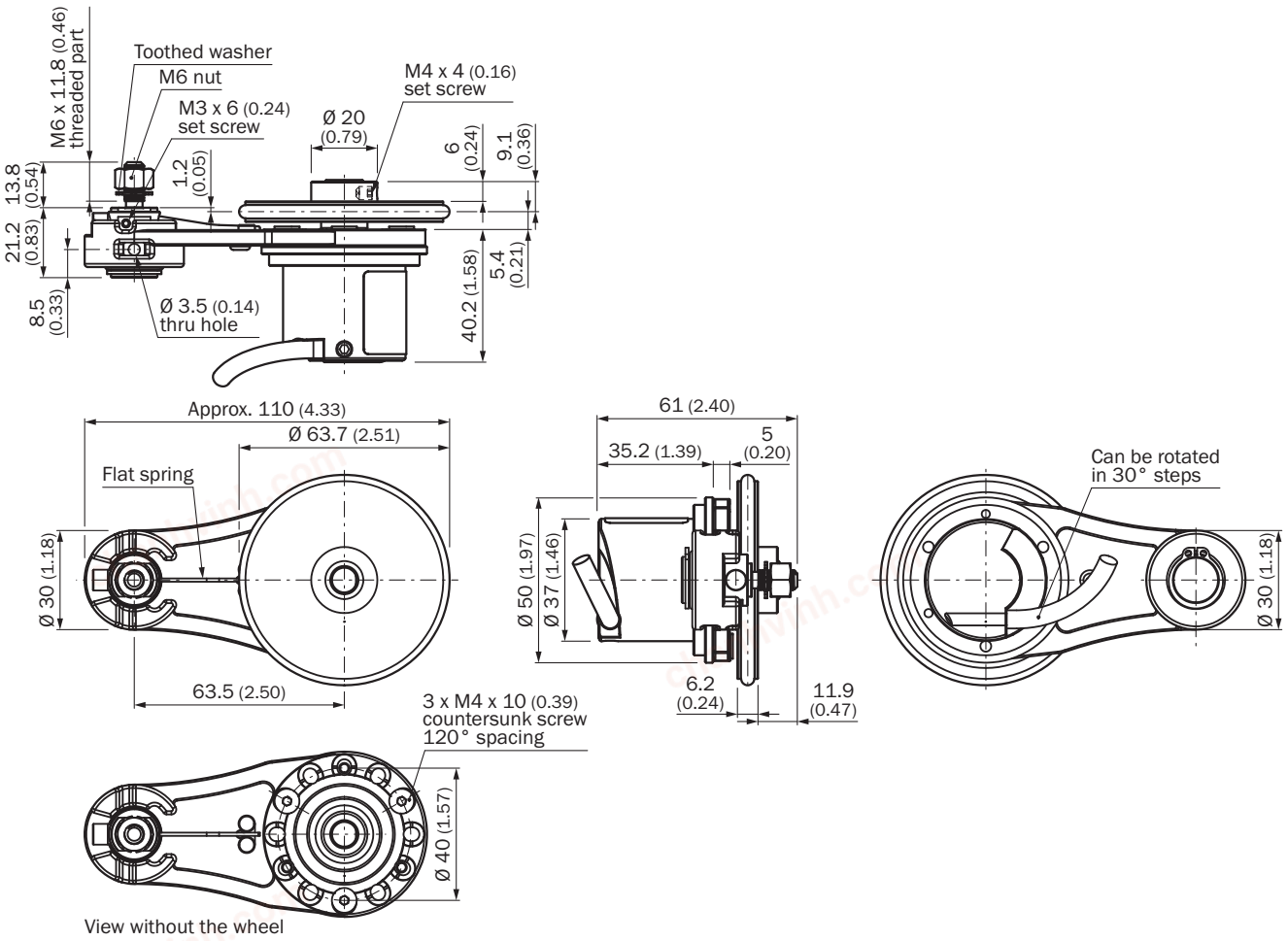
# DBV50E-22EKB0200 | DBV50 Core

MEASURING WHEEL ENCODERS

| | |
|---|---|
| **ECl@ss 7.0** | 27270501 |
| **ECl@ss 8.0** | 27270501 |
| **ECl@ss 8.1** | 27270501 |
| **ECl@ss 9.0** | 27270501 |
| **ETIM 5.0** | EC001486 |
| **ETIM 6.0** | EC001486 |
| **UNSPSC 16.0901** | 41112113 |

## Dimensional drawing (Dimensions in mm (inch))

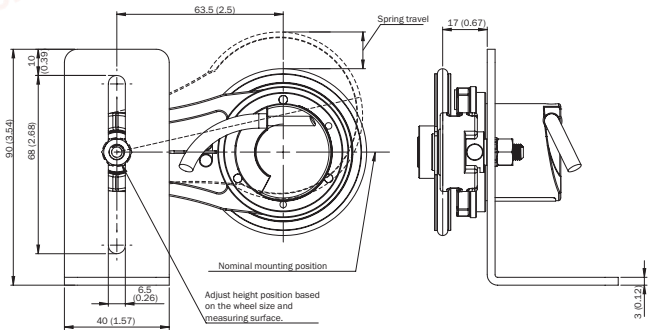
63.5 mm spring arm, wheel on mounting side (right), single wheel



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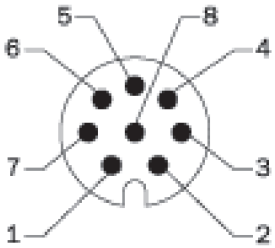
## Proposed fitting



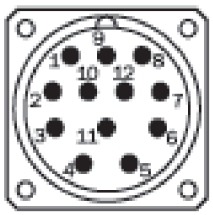

## PIN assignment

**8-core cable**

View of M12 device connector on cable




View of M23 device connector on cable



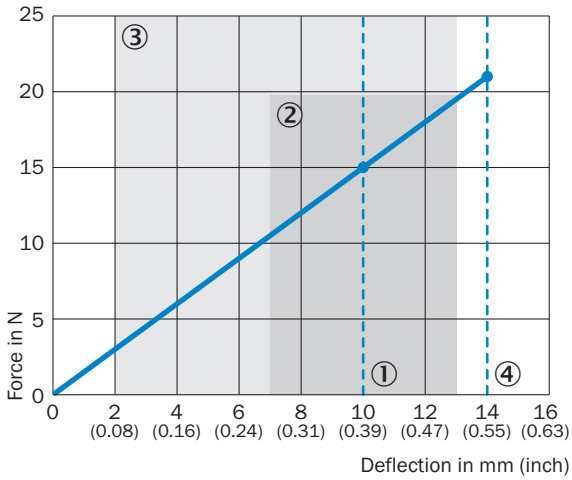

| Wire color | Pin 8-pole for M12 | Pin 12-pole for M23 | Signal HTL/OC 3-channel | Signal TTL/HTL 6-channel | Explanation |
|---|---|---|---|---|---|
| brown | 1 | 6 | Not connected | A- | Signal wire |
| white | 2 | 5 | A | A | Signal wire |
| black | 3 | 1 | Not connected | B- | Signal wire |
| pink | 4 | 8 | B | B | Signal wire |
| Yellow | 5 | 4 | Not connected | Z- | Signal wire |
| purple | 6 | 3 | Z | Z | Signal wire |
| blue | 7 | 10 | GND | GND | Ground connection of the encoder |
| Red | 8 | 12 | +Us | +Us | Supply voltage |
| - | - | 9 | Not connected | Not connected | Not connected |
| - | - | 2 | Not connected | Not connected | Not connected |
| - | - | 11 | Not connected | Not connected | Not connected |
| - | - | 7 | Not connected | Not connected | Not connected |
| Shield | Shield | Shield | Shield | Shield | Shield (connected with housing on the encoder side) |

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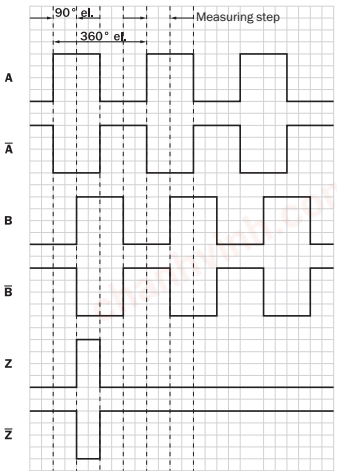
## Diagrams

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

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_Core

| | Brief description | Type | Part no. |
|---|---|---|---|
| Flanges | | | |
|  | Adapter flange for modular measuring wheel system | BEF-AP-MRS | 2084969 |

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| | Brief description | Type | Part no. |
|---|---|---|---|
| Mounting brackets and plates | | | |
|  | Mounting bracket for encoder with spigot 36 mm | BEF-WF-MRS | 2084709 |
| Other mounting accessories | | | |
| | O-ring for measuring wheels (circumference 200 mm) | BEF-OR-053-040 | 2064061 |
| Plug connectors and cables | | | |
|  | Head A: cable<br>Head B: Flying leads<br>Cable: SSI, Incremental, HIPERFACE®, PUR, halogen-free, shielded | LTG-2308-MWENC | 6027529 |
|  | Head A: cable<br>Head B: Flying leads<br>Cable: SSI, PUR, shielded | LTG-2411-MW | 6027530 |
|  | Head A: cable<br>Head B: Flying leads<br>Cable: SSI, PUR, halogen-free, shielded | LTG-2512-MW | 6027531 |
|  | Head A: cable<br>Head B: Flying leads<br>Cable: SSI, TTL, HTL, PUR, halogen-free, shielded | LTG-2612-MW | 6028516 |
|  | Head A: female connector, M12, 8-pin, straight<br>Head B: Flying leads<br>Cable: PUR, halogen-free, shielded, 2 m | DOL-1208-G02MAC1 | 6032866 |
| | Head A: female connector, M12, 8-pin, straight<br>Head B: Flying leads<br>Cable: PUR, halogen-free, shielded, 5 m | DOL-1208-G05MAC1 | 6032867 |
| | Head A: female connector, M12, 8-pin, straight<br>Head B: Flying leads<br>Cable: PUR, halogen-free, shielded, 10 m | DOL-1208-G10MAC1 | 6032868 |
| | Head A: female connector, M12, 8-pin, straight<br>Head B: Flying leads<br>Cable: PUR, halogen-free, shielded, 20 m | DOL-1208-G20MAC1 | 6032869 |
| | Head A: female connector, M12, 8-pin, straight<br>Head B: Flying leads<br>Cable: PUR, halogen-free, shielded, 25 m | DOL-1208-G25MAC1 | 6067859 |
|  | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, shielded, 2 m | DOL-2312-G02MLA3 | 2030682 |
|  | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, halogen-free, shielded, 3 m | DOL-2312-G03MMA3 | 2029213 |
| | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, halogen-free, shielded, 5 m | DOL-2312-G05MMA3 | 2029214 |
|  | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, shielded, 7 m | DOL-2312-G07MLA3 | 2030685 |
| | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, shielded, 10 m | DOL-2312-G10MLA3 | 2030688 |
|  | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, halogen-free, shielded, 10 m | DOL-2312-G10MMA3 | 2029215 |

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## MEASURING WHEEL ENCODERS

| | Brief description | Type | Part no. |
|---|---|---|---|
|  | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, shielded, 15 m | DOL-2312-G15MLA3 | 2030692 |
|  | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, halogen-free, shielded, 1.5 m | DOL-2312-G1M5MA3 | 2029212 |
|  | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, shielded, 20 m | DOL-2312-G20MLA3 | 2030695 |
|  | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, halogen-free, shielded, 20 m | DOL-2312-G20MMA3 | 2029216 |
|  | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, shielded, 25 m | DOL-2312-G25MLA3 | 2030699 |
| | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, shielded, 30 m | DOL-2312-G30MLA3 | 2030702 |
|  | Head A: female connector, M23, 12-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, PUR, halogen-free, shielded, 30 m | DOL-2312-G30MMA3 | 2029217 |
|  | Head A: female connector, M12, 8-pin, straight, A-coded<br>Head B: -<br>Cable: Incremental, SSI, shielded | DOS-1208-GA01 | 6045001 |
|  | Head A: female connector, M23, 12-pin, straight<br>Head B: -<br>Cable: HIPERFACE®, SSI, Incremental, shielded | DOS-2312-G<br>DOS-2312-G02 | 6027538<br>2077057 |
|  | Head A: female connector, M23, 12-pin, angled<br>Head B: -<br>Cable: HIPERFACE®, SSI, Incremental, shielded | DOS-2312-W01 | 2072580 |
|  | Head A: male connector, M12, 8-pin, straight, A-coded<br>Head B: -<br>Cable: Incremental, shielded | STE-1208-GA01 | 6044892 |
|  | Head A: male connector, M23, 12-pin, straight<br>Head B: -<br>Cable: HIPERFACE®, SSI, Incremental, RS-422, shielded | STE-2312-G | 6027537 |
|  | Head A: male connector, M23, 12-pin, straight<br>Head B: -<br>Cable: HIPERFACE®, SSI, Incremental, shielded | STE-2312-G01 | 2077273 |

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