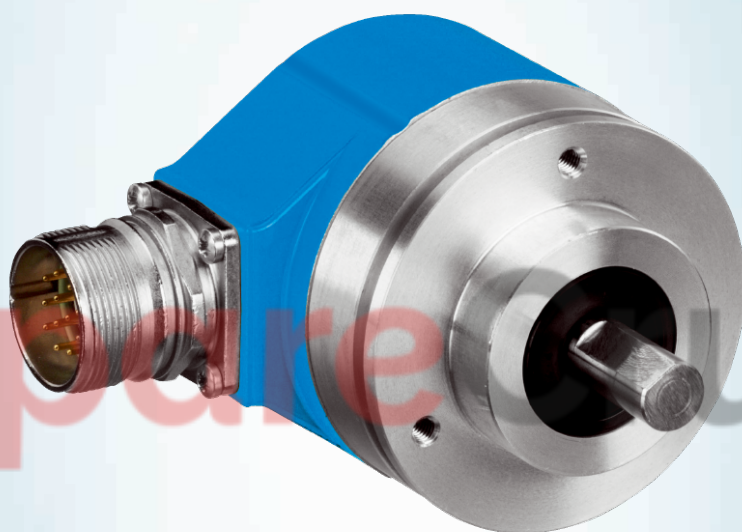


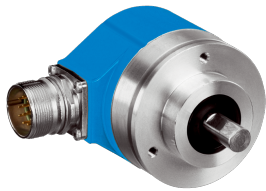


ARS60-A4A08192

ARS60

ABSOLUTE ENCODERS

**SICK**  
Sensor Intelligence.



## Ordering information

| Type           | part no. |
|----------------|----------|
| ARS60-A4A08192 | 1031447  |

Other models and accessories → [www.sick.com/ARS60](http://www.sick.com/ARS60)

Illustration may differ



## Detailed technical data

### Safety-related parameters

|                                                          |                                          |
|----------------------------------------------------------|------------------------------------------|
| <b>MTTF<sub>D</sub> (mean time to dangerous failure)</b> | 300 years (EN ISO 13849-1) <sup>1)</sup> |
|----------------------------------------------------------|------------------------------------------|

<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

|                                                               |                                               |
|---------------------------------------------------------------|-----------------------------------------------|
| <b>Number of steps per revolution (max. resolution)</b>       | 8,192 (13 bit)                                |
| <b>Measuring step</b>                                         | 360° / number of steps                        |
| <b>Measuring step deviation</b>                               | 0.005° binary number of steps                 |
| <b>Error limits G</b>                                         | 0.035° (binary number of steps) <sup>1)</sup> |
| <b>Repeatability standard deviation <math>\sigma_r</math></b> | 0.005° <sup>2)</sup>                          |

<sup>1)</sup> In accordance with DIN ISO 1319-1, position of the upper and lower error limit depends on the installation situation, specified value refers to a symmetrical position, i.e. deviation in upper and lower direction is the same.

<sup>2)</sup> In accordance with DIN ISO 55350-13; 68.3% of the measured values are inside the specified area.

### Interfaces

|                                           |                                                                     |
|-------------------------------------------|---------------------------------------------------------------------|
| <b>Communication interface</b>            | SSI                                                                 |
| <b>Initialization time</b>                | 80 ms <sup>1)</sup>                                                 |
| <b>Code type</b>                          | Gray                                                                |
| <b>Code sequence parameter adjustable</b> | CW (clockwise) increasing when viewing the clockwise rotating shaft |
| <b>Measured value backlash</b>            | 0.005°                                                              |
| <b>Response threshold</b>                 | 0.003°                                                              |

<sup>1)</sup> Valid positional data can be read once this time has elapsed.

### Electronics

|                          |                                     |
|--------------------------|-------------------------------------|
| <b>Connection type</b>   | Male connector, M23, 12-pin, radial |
| <b>Supply voltage</b>    | 10 ... 32 V                         |
| <b>Operating current</b> | Typ. 60 mA                          |

<sup>1)</sup> Only with shaft stationary (note initialisation time).

|                                          |                                                                         |
|------------------------------------------|-------------------------------------------------------------------------|
| <b>Switching level of control inputs</b> | Logic H = 0.7 x U <sub>S</sub> , Logic L = 0 V ... 0.3 x U <sub>S</sub> |
| <b>Actuation of set button</b>           | ≥ 100 ms <sup>1)</sup>                                                  |

<sup>1)</sup> Only with shaft stationary (note initialisation time).

## Mechanics

|                                       |                                                                                                          |
|---------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Mechanical design</b>              | Solid shaft, face mount flange                                                                           |
| <b>Shaft diameter</b>                 | 10 mm                                                                                                    |
| <b>Shaft length</b>                   | 19 mm                                                                                                    |
| <b>Characteristics of the shaft</b>   | With flat                                                                                                |
| <b>Weight</b>                         | Approx. 0.3 kg <sup>1)</sup>                                                                             |
| <b>Housing material</b>               | Aluminum die cast                                                                                        |
| <b>Start up torque</b>                | Typ. 0.4 Ncm                                                                                             |
| <b>Operating torque</b>               | Typ. 0.3 Ncm                                                                                             |
| <b>Permissible shaft loading</b>      | 20 N (radial)<br>10 N (axial)                                                                            |
| <b>Operating speed</b>                | ≤ 6,000 min <sup>-1</sup> with shaft seal<br>≤ 10,000 min <sup>-1</sup> without shaft seal <sup>2)</sup> |
| <b>Moment of inertia of the rotor</b> | 54 gcm <sup>2</sup>                                                                                      |
| <b>Bearing lifetime</b>               | 3.6 x 10 <sup>9</sup> revolutions                                                                        |
| <b>Angular acceleration</b>           | ≤ 500,000 rad/s <sup>2</sup>                                                                             |

<sup>1)</sup> Based on devices with male connector.

<sup>2)</sup> If the shaft seal has been removed by the customer.

## Ambient data

|                                      |                                                          |
|--------------------------------------|----------------------------------------------------------|
| <b>EMC</b>                           | According to EN 61000-6-2 and EN 61000-6-3 <sup>1)</sup> |
| <b>Enclosure rating</b>              | IP65, male connector (IEC 60529) <sup>2)</sup>           |
| <b>Permissible relative humidity</b> | 90 % (Condensation not permitted)                        |
| <b>Operating temperature range</b>   | -20 °C ... +85 °C                                        |
| <b>Storage temperature range</b>     | -40 °C ... +100 °C, without package                      |
| <b>Resistance to shocks</b>          | 50 g, 11 ms (EN 60068-2-27)                              |
| <b>Resistance to vibration</b>       | 20 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)                  |

<sup>1)</sup> EMC according to the standards quoted is achieved if shielded cables are used.

<sup>2)</sup> With mating connector fitted.

## Certificates

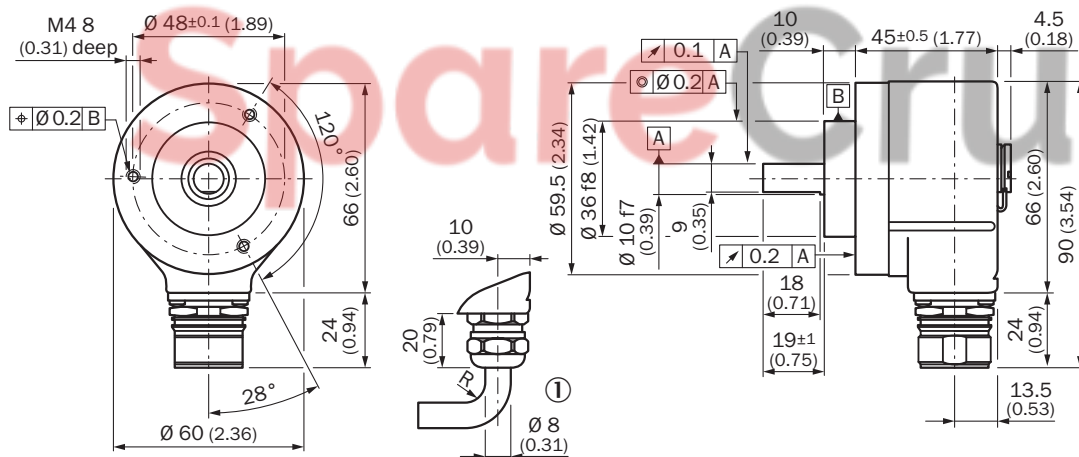
|                                                                              |   |
|------------------------------------------------------------------------------|---|
| <b>EU declaration of conformity</b>                                          | ✓ |
| <b>UK declaration of conformity</b>                                          | ✓ |
| <b>ACMA declaration of conformity</b>                                        | ✓ |
| <b>China RoHS</b>                                                            | ✓ |
| <b>cULus certificate</b>                                                     | ✓ |
| <b>Information according to Art. 3 of Data Act (Regulation EU 2023/2854)</b> | ✓ |

## Classifications

|                   |          |
|-------------------|----------|
| <b>ECLASS 5.0</b> | 27270502 |
|-------------------|----------|

|                       |          |
|-----------------------|----------|
| <b>ECLASS 5.1.4</b>   | 27270502 |
| <b>ECLASS 6.0</b>     | 27270590 |
| <b>ECLASS 6.2</b>     | 27270590 |
| <b>ECLASS 7.0</b>     | 27270502 |
| <b>ECLASS 8.0</b>     | 27270502 |
| <b>ECLASS 8.1</b>     | 27270502 |
| <b>ECLASS 9.0</b>     | 27270502 |
| <b>ECLASS 10.0</b>    | 27270502 |
| <b>ECLASS 11.0</b>    | 27270502 |
| <b>ECLASS 12.0</b>    | 27270502 |
| <b>ETIM 5.0</b>       | EC001486 |
| <b>ETIM 6.0</b>       | EC001486 |
| <b>ETIM 7.0</b>       | EC001486 |
| <b>ETIM 8.0</b>       | EC001486 |
| <b>UNSPSC 16.0901</b> | 41112113 |

### Dimensional drawing

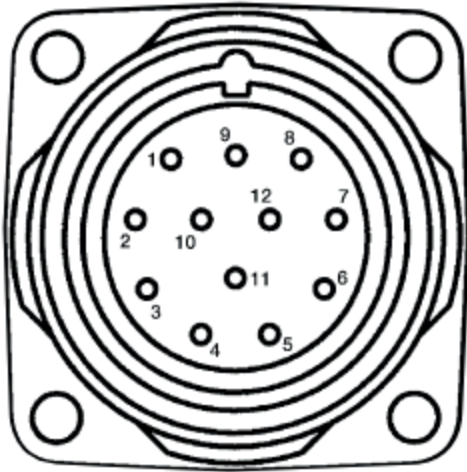


Dimensions in mm (inch)

General tolerances according to DIN ISO 2768-mk

① R = min. bending radius 40 mm

## Anschlussbelegung

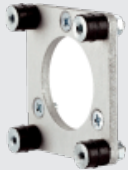


| PIN12-pin | Wire colors (cable connection)11-wire | Signal         |
|-----------|---------------------------------------|----------------|
| 1         | Blue                                  | GND            |
| 2         | White                                 | Data +         |
| 3         | Yellow                                | Clock +        |
| 4         | N.c.                                  | N.c.           |
| 5         | Pink                                  | CW/CCW (V/R)   |
| 6         | N.c.                                  | N.c.           |
| 7         | N.c.                                  | N.c.           |
| 8         | Red                                   | U <sub>S</sub> |
| 9         | Orange                                | SET            |
| 10        | Brown                                 | Data -         |
| 11        | Violet                                | Clock -        |
| 12        | N.c.                                  | N.c.           |

## Recommended accessories

Other models and accessories → [www.sick.com/ARS60](http://www.sick.com/ARS60)

|                                                                                     | Brief description                                                                                                                                                                                                                                                                                                                                                                                                   | Type             | part no. |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------|
| connectors and cables                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |          |
|    | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Flying leads</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> SSI, Incremental</li> <li>• <b>Items supplied:</b> By the meter</li> <li>• <b>Cable:</b> 11-wire, PUR</li> <li>• <b>Description:</b> SSI, shielded, Incremental</li> </ul>                                                               | LTG-2411-MW      | 6027530  |
|    | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Flying leads</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> SSI, Incremental</li> <li>• <b>Items supplied:</b> By the meter</li> <li>• <b>Cable:</b> 12-wire, PUR, halogen-free</li> <li>• <b>Description:</b> SSI, shielded, Incremental</li> </ul>                                                 | LTG-2512-MW      | 6027531  |
|    | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Flying leads</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> SSI, TTL, HTL, Incremental</li> <li>• <b>Items supplied:</b> By the meter</li> <li>• <b>Cable:</b> 12-wire, UV and saltwater-resistant, PUR, halogen-free</li> <li>• <b>Description:</b> SSI, shielded, TTL, HTL, Incremental</li> </ul> | LTG-2612-MW      | 6028516  |
|    | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Flying leads</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> SSI, Incremental, HIPERFACE®</li> <li>• <b>Items supplied:</b> By the meter</li> <li>• <b>Cable:</b> 8-wire, PUR, halogen-free</li> <li>• <b>Description:</b> SSI, shielded, Incremental, HIPERFACE®</li> </ul>                          | LTG-2308-MWENC   | 6027529  |
|   | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight, A-coded</li> <li>• <b>Signal type:</b> HIPERFACE®, SSI, Incremental</li> <li>• <b>Description:</b> HIPERFACE®, shieldedSSIIncremental</li> <li>• <b>Connection systems:</b> Solder connection</li> </ul>                                                                                           | DOS-2312-G       | 6027538  |
|  | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Male connector, M23, 12-pin, straight, A-coded</li> <li>• <b>Signal type:</b> HIPERFACE®, SSI, Incremental, RS-422</li> <li>• <b>Description:</b> HIPERFACE®, shieldedSSIIncrementalRS-422</li> <li>• <b>Connection systems:</b> Solder connection</li> </ul>                                                                               | STE-2312-G       | 6027537  |
|  | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> SSI</li> <li>• <b>Cable:</b> 3 m, 12-wire, PUR, halogen-free</li> <li>• <b>Description:</b> SSI, shielded</li> </ul>                                                                                          | DOL-2312-G03MMA2 | 2029207  |
|  | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> SSI</li> <li>• <b>Cable:</b> 1.5 m, 12-wire, PUR, halogen-free</li> <li>• <b>Description:</b> SSI, shielded</li> </ul>                                                                                        | DOL-2312-G1M5MA2 | 2029206  |
|  | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> SSI</li> <li>• <b>Cable:</b> 5 m, 12-wire, PUR, halogen-free</li> <li>• <b>Description:</b> SSI, shielded</li> </ul>                                                                                          | DOL-2312-G05MMA2 | 2029208  |
|  | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> SSI</li> <li>• <b>Cable:</b> 10 m, 12-wire, PUR, halogen-free</li> <li>• <b>Description:</b> SSI, shielded</li> </ul>                                                                                         | DOL-2312-G10MMA2 | 2029209  |
|  | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> SSI</li> <li>• <b>Cable:</b> 20 m, 12-wire, PUR, halogen-free</li> <li>• <b>Description:</b> SSI, shielded</li> </ul>                                                                                         | DOL-2312-G20MMA2 | 2029210  |
|  | <ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, M23, 12-pin, straight</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> SSI</li> <li>• <b>Cable:</b> 30 m, 12-wire, PUR, halogen-free</li> </ul>                                                                                                                                      | DOL-2312-G30MMA2 | 2029211  |

|                                                                                     | Brief description                                                                                                                                                                                                                                                                                                                                                                 | Type              | part no. |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|
|    | <ul style="list-style-type: none"> <li><b>Description:</b> SSI, shielded</li> <li><b>Connection type head A:</b> Female connector, M23, 9-pin, straight, A-coded</li> <li><b>Signal type:</b> HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shieldedSSIIncremental</li> <li><b>Connection systems:</b> Solder connection</li> </ul> | DOS-2309-G        | 6028533  |
|                                                                                     | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M23, 12-pin, angled, A-coded</li> <li><b>Signal type:</b> HIPERFACE<sup>®</sup>, SSI, Incremental</li> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shieldedSSIIncremental</li> <li><b>Connection systems:</b> Solder connection</li> </ul>                                             | DOS-2312-W01      | 2072580  |
| Mounting systems                                                                    |                                                                                                                                                                                                                                                                                                                                                                                   |                   |          |
|    | <ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaptation of face mount flange with 36 mm centering hub to 50 mm servo flange, aluminum, including 3 flat head screws M4 x 10</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> <li><b>Items supplied:</b> Including 3 countersunk screws M3 x 10</li> </ul>                  | BEF-FA-036-050    | 2029160  |
|    | <ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaptation of face mount flange with 36 mm centering hub to 60 mm square mounting plate, aluminum, including 3 flat head screws M4 x 8</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> <li><b>Items supplied:</b> Including 3 countersunk screws M4 x 8</li> </ul>           | BEF-FA-036-060REC | 2029162  |
|   | <ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaptation of face mount flange with 36 mm centering hub to 58 mm square mounting plate with shock absorbers, aluminum</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> </ul>                                                                                                 | BEF-FA-036-060RSA | 2029163  |
|  | <ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaptation of face mount flange with 36 mm centering hub to 100 mm servo flange with 60 mm centering hub, aluminum</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> </ul>                                                                                                     | BEF-FA-036-100    | 2029161  |
|  | <ul style="list-style-type: none"> <li><b>Description:</b> Mounting bracket for encoder with spigot 36 mm for face mount flange</li> <li><b>Items supplied:</b> Mounting kit included</li> </ul>                                                                                                                                                                                  | BEF-WF-36         | 2029164  |

|                                                                                   | Brief description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Type       | part no. |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| shaft adaptation                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |          |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Bellows coupling, shaft diameter 6 mm / 10 mm, maximum shaft offset: radial <math>\pm 0.25</math> mm, axial <math>\pm 0.4</math> mm, angular <math>\pm 4^\circ</math>; max. speed 10,000 rpm, <math>-30^\circ\text{C}</math> to <math>+120^\circ\text{C}</math>, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub</li> </ul>                                                   | KUP-0610-B | 5312982  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Spring washer coupling, shaft diameter 6 mm / 10 mm, Maximum shaft offset: radial <math>\pm 0.3</math> mm, axial <math>\pm 0.4</math> mm, angular <math>\pm 2.5^\circ</math>; max. speed 12,000 rpm, <math>-10^\circ</math> to <math>+80^\circ\text{C}</math>, max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin</li> </ul> | KUP-0610-F | 5312985  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Bellows coupling, shaft diameter 10 mm/10 mm; maximum shaft offset: radial <math>\pm 0.25</math> mm, axial <math>\pm 0.4</math> mm, angular <math>\pm 4^\circ</math>; max. revolutions 10,000 rpm, <math>-30^\circ</math> to <math>+120^\circ\text{C}</math>, max. torque 120 Ncm; material: stainless steel bellows, aluminum clamping hubs</li> </ul>                                            | KUP-1010-B | 5312983  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset, radial <math>\pm 0.3</math> mm, axial <math>\pm 0.4</math> mm, angle <math>\pm 2.5^\circ</math>, torsion spring stiffness 30 Nm/rad; material: aluminum flange, glass-fiber reinforced polyamide membrane and hardened steel coupling pin</li> </ul>                                                                   | KUP-1010-F | 5312986  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> 10 mm / 12 mm; maximum shaft offset: radial <math>\pm 0.25</math> mm, axial <math>\pm 0.4</math> mm, angular <math>\pm 4^\circ</math>; max. revolutions 10,000 rpm, <math>-30^\circ</math> to <math>+120^\circ\text{C}</math>, max. torque 120 Ncm; material: stainless steel bellows, aluminum clamping hubs</li> </ul>                                                                           | KUP-1012-B | 5312984  |

# SpareCruX



## 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.

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For us, that is “Sensor Intelligence.”

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SpareCruX