



# ARS60-BDA03600

ARS60

**ABSOLUTE ENCODERS**

**SICK**  
Sensor Intelligence.



## Ordering information

| Type           | part no. |
|----------------|----------|
| ARS60-BDA03600 | 1031536  |

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>       | 3,600   |
| <b>Measuring step</b>   | 360° / number of steps                            |
| <b>Measuring step deviation</b>                               | 0.016° non-binary number of steps                 |
| <b>Error limits G</b>   | 0.046° (non-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, trimmed   |
| <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                         |

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

|  |   |
|--|---|
| <b>Operating current</b>                 | Typ. 60 mA  |
| <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>              | Through hollow shaft                  |
| <b>Shaft diameter</b>                 | 12 mm <sup>1)</sup>                   |
| <b>Characteristics of the shaft</b>   | Front clamp                           |
| <b>Weight</b>                         | Approx. 0.3 kg <sup>2)</sup>          |
| <b>Housing material</b>               | Aluminum die cast                     |
| <b>Start up torque</b>                | Typ. 2.2 Ncm                          |
| <b>Operating torque</b>               | Typ. 1.6 Ncm                          |
| <b>Permissible movement static</b>    | ± 0.3 mm (radial)<br>± 0.5 mm (axial) |
| <b>Permissible movement dynamic</b>   | ± 0.1 mm (radial)<br>± 0.2 mm (axial) |
| <b>Operating speed</b>                | ≤ 3,000 min <sup>-1</sup>             |
| <b>Moment of inertia of the rotor</b> | See figure                            |
| <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> 12 mm requires the corresponding collet, this and other collets for 6, 8, 10 mm as well as 1/4", 3/8" and 1/2" need to be ordered separately as accessories.

<sup>2)</sup> Based on devices with male connector.

## Ambient data

|                                      |  |
|--------------------------------------|--|
| <b>EMC</b>                           | According to EN 61000-6-2 and EN 61000-6-3 <sup>1)</sup> |
| <b>Enclosure rating</b>              | IP64, 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

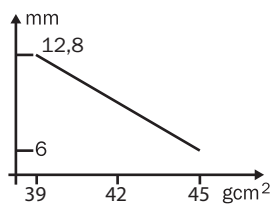
② Insertion depth of mounting shaft min. 15 mm

## 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.           |








## Diagrams Moment of inertia of the rotor













through hollow shaft

### 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>Description:</b> HIPERFACE®, shielded, SSI, Incremental</li> <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>Connection systems:</b> Solder connection</li> </ul>   | DOS-2312-G       | 6027538  |
|  | <ul style="list-style-type: none"> <li>• <b>Description:</b> HIPERFACE®, shielded, SSI, Incremental, RS-422</li> <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>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> <li>• <b>Application:</b> Zones with oils and lubricants</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> <li>• <b>Application:</b> Zones with oils and lubricants</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> <li>• <b>Application:</b> Zones with oils and lubricants</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> <li>• <b>Application:</b> Zones with oils and lubricants</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  |

|   | Brief description   | Type             | part no. |
|---|---|------------------|----------|
|    | <ul style="list-style-type: none"> <li><b>Application:</b> Zones with oils and lubricants</li> <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> <li><b>Description:</b> SSI, shielded</li> <li><b>Application:</b> Zones with oils and lubricants</li> </ul> | DOL-2312-G30MMA2 | 2029211  |
|    | <ul style="list-style-type: none"> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shielded, SSI, Incremental</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>Connection systems:</b> Solder connection</li> </ul>  | DOS-2309-G       | 6028533  |
|    | <ul style="list-style-type: none"> <li><b>Description:</b> HIPERFACE<sup>®</sup>, shielded, SSI, Incremental</li> <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>Connection systems:</b> Solder connection</li> </ul>   | DOS-2312-W01     | 2072580  |
| shaft adaptation  |   |                  |          |
|    | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Collets</li> <li><b>Description:</b> Collet for through hollow shaft, shaft diameter 6 mm, outer diameter 14 mm</li> </ul>   | SPZ-006-AD-D     | 2029192  |
|    | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Collets</li> <li><b>Description:</b> Collet for through hollow shaft, shaft diameter 1/4" (6.35 mm), outer diameter 14 mm</li> </ul>   | SPZ-1E4-AD-D     | 2029193  |
|    | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Collets</li> <li><b>Description:</b> Collet for through hollow shaft, shaft diameter 8 mm, outer diameter 14 mm</li> </ul>   | SPZ-008-AD-D     | 2029194  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Collets</li> <li><b>Description:</b> Collet for through hollow shaft, shaft diameter 3/8" (9.525 mm), outer diameter 14 mm</li> </ul>  | SPZ-3E8-AD-D     | 2029195  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Collets</li> <li><b>Description:</b> Collet for through hollow shaft, shaft diameter 10 mm, outer diameter 14 mm</li> </ul>  | SPZ-010-AD-D     | 2029196  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Collets</li> <li><b>Description:</b> Collet for through hollow shaft, shaft diameter 12 mm, outer diameter 14 mm</li> </ul>  | SPZ-012-AD-D     | 2029197  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Collets</li> <li><b>Description:</b> Collet for through hollow shaft, shaft diameter 1/2" (12.7 mm), outer diameter 14 mm</li> </ul>   | SPZ-1E2-AD-D     | 2029198  |

## 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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