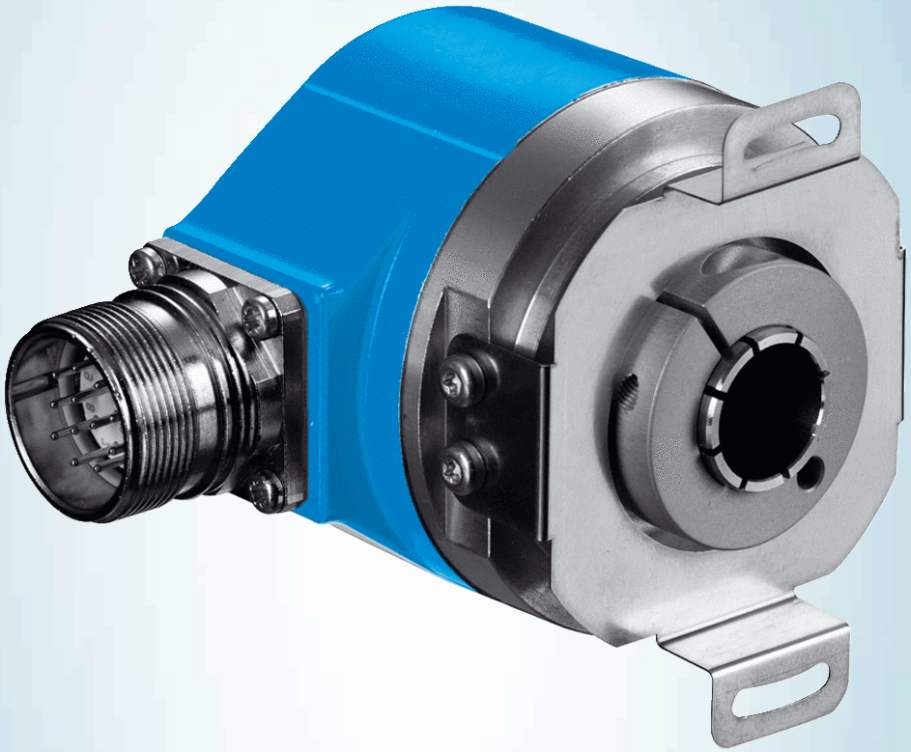
Data sheet



# ARS60-HAA01000

## ARS60

**ABSOLUTE ENCODERS**

SICK
Sensor Intelligence.

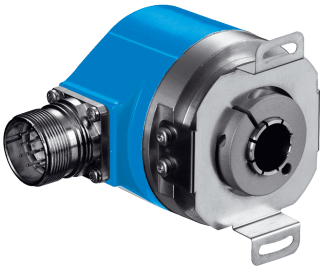


Illustration may differ

## Ordering information

| Type | part no. |
|---|---|
| ARS60-HAA01000 | 1035835 |

Other models and accessories ➜ www.sick.com/ARS60

## Detailed technical data

### Safety-related parameters

| | |
|---|---|
| **$MTTF_D$ (mean time to dangerous failure)** | 300 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

| | |
|---|---|
| **Number of steps per revolution (max. resolution)** | 1,000 |
| **Measuring step** | 360° /number of steps |
| **Measuring step deviation** | 0.016° non-binary number of steps |
| **Error limits G** | 0.046° (non-binary number of steps) [1] |
| **Repeatability standard deviation $\sigma_r$** | 0.005° [2] |

[1] 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.
[2] In accordance with DIN ISO 55350-13; 68.3% of the measured values are inside the specified area.

### Interfaces

| | |
|---|---|
| **Communication interface** | Parallel data world |
| **Initialization time** | 80 ms [1] |
| **Code type** | Binary |
| **Code sequence parameter adjustable** | CW (clockwise) increasing when viewing the clockwise rotating shaft |
| **Measured value backlash** | 0.005° |
| **Response threshold** | 0.003° |

[1] Valid positional data can be read once this time has elapsed.

### Electronics

| | |
|---|---|
| **Connection type** | Male connector, M23, 21-pin, radial |
| **Supply voltage** | 10 ... 32 V |

[1] Only with shaft stationary (note initialisation time).

| | |
|---|---|
| **Operating current** | Typ. 90 mA |
| **Switching level of control inputs** | Logic H = 0.7 x $U_S$, Logic L = 0 V ... 0.3 x $U_S$ |
| **Actuation of set button** | ≥ 100 ms [1] |

[1] Only with shaft stationary (note initialisation time).

## Mechanics

| | |
|---|---|
| **Mechanical design** | Blind hollow shaft |
| **Shaft diameter** | 15 mm [1] |
| **Characteristics of the shaft** | Front clamp |
| **Weight** | Approx. 0.3 kg [2] |
| **Housing material** | Aluminum die cast |
| **Start up torque** | Typ. 0.6 Ncm |
| **Operating torque** | Typ. 0.4 Ncm |
| **Permissible movement static** | ± 0.3 mm (radial)<br>± 0.5 mm (axial) |
| **Permissible movement dynamic** | ± 0.1 mm (radial)<br>± 0.2 mm (axial) |
| **Operating speed** | ≤ 3,000 $min^{-1}$ |
| **Moment of inertia of the rotor** | See figure |
| **Bearing lifetime** | 3.6 x $10^9$ revolutions |
| **Angular acceleration** | ≤ 500,000 rad/s² |

[1] Collets for 6, 8, 10, 12, 14 mm and 1/4", 3/8" and 1/2" as accessories, separate order item. For 15 mm shaft diameter collet is not needed.
[2] Based on devices with male connector.

## Ambient data

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

[1] EMC according to the standards quoted is achieved if shielded cables are used.
[2] With mating connector fitted.

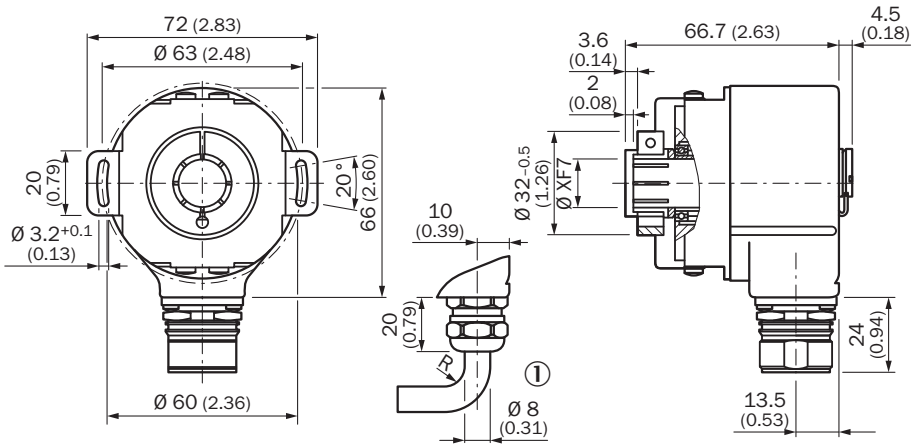
## Certificates

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

## Classifications

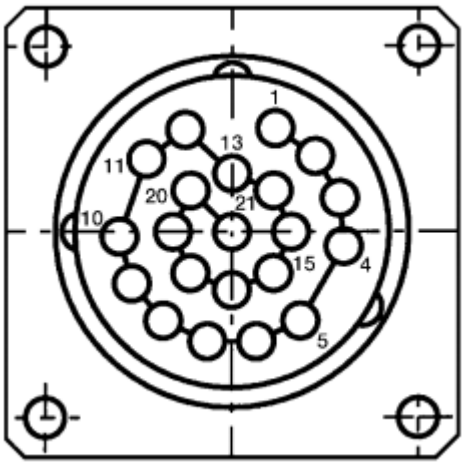
| | |
|---|---|
| **ECLASS 5.0** | 27270502 |
| **ECLASS 5.1.4** | 27270502 |
| **ECLASS 6.0** | 27270590 |
| **ECLASS 6.2** | 27270590 |
| **ECLASS 7.0** | 27270502 |
| **ECLASS 8.0** | 27270502 |
| **ECLASS 8.1** | 27270502 |
| **ECLASS 9.0** | 27270502 |
| **ECLASS 10.0** | 27270502 |
| **ECLASS 11.0**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

## Dimensional drawing



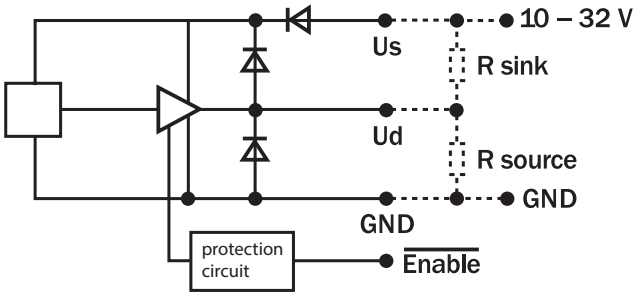

Dimensions in mm (inch)
General tolerances according to DIN ISO 2768-mk
① R = min. bending radius 40 mm

## Anschlussbelegung

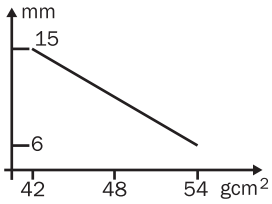



| PIN | Wire colors (cable connection) | SignalBinary | SignalGray | SignalBCD | |
|---|---|---|---|---|---|
| 1 | Violet | $2^0$ | $G^0$ | $2^0$ v. $10^0$ | – |
| 2 | White/brown | $2^1$ | $G^1$ | $2^1$ v. $10^0$ | – |
| 3 | White/green | $2^2$ | $G^2$ | $2^2$ v. $10^0$ | – |
| 4 | White/yellow | $2^3$ | $G^3$ | $2^3$ v. $10^0$ | – |
| 5 | White/grey | $2^4$ | $G^4$ | $2^0$ v. $10^1$ | – |
| 6 | White/pink | $2^5$ | $G^5$ | $2^1$ v. $10^1$ | – |
| 7 | White/blue | $2^6$ | $G^6$ | $2^2$ v. $10^1$ | – |
| 8 | White/red | $2^7$ | $G^7$ | $2^3$ v. $10^1$ | – |
| 9 | White/black | $2^8$ | $G^8$ | $2^0$ v. $10^2$ | – |
| 10 | Brown/green | $2^9$ | $G^9$ | $2^1$ v. $10^2$ | – |
| 11 | Brown/yellow | $2^{10}$ | $G^{10}$ | $2^2$ v. $10^2$ | – |
| 12 | Brown/gray | $2^{11}$ | $G^{11}$ | $2^3$ v. $10^2$ | – |
| 13 | Brown/pink | $2^{12}$ | $G^{12}$ | $2^0$ v. $10^3$ | – |
| 14 | Brown/blue | $2^{13}$ | $G^{13}$ | $2^1$ v. $10^3$ | – |
| 15 | Brown/red | $2^{14}$ | $G^{14}$ | $2^2$ v. $10^3$ | – |
| 16 | Green | Parity | | Parity | |
| 17 | Pink | | Store | | – |
| 18 | Yellow | | Enable | | – |
| 19 | Brown | | CW/CCW (V/R) | | – |
| * | Gray | | SET | | – |
| 20 | Blue | | GND | | – |
| 21 | Red | | $U_S$ | | – |

## Diagrams




## Diagrams Moment of inertia of the rotor




blind hollow shaft

## Recommended accessories

Other models and accessories ➜ www.sick.com/ARS60

| | Brief description | Type | part no. |
|---|---|---|---|
| connectors and cables | | | |
| | • **Connection type head A:** Flying leads<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Parallel<br>• **Items supplied:** By the meter<br>• **Cable:** 22-wire, PUR, halogen-free<br>• **Description:** Parallel, shielded | LTG-2622-MW | 6027532 |
| | • **Connection type head A:** Female connector, M23, 21-pin, straight, A-coded<br>• **Signal type:** SSI<br>• **Description:** SSI, shielded<br>• **Connection systems:** Crimp contacts | DOS-2321-G | 6027539 |
| | • **Connection type head A:** Female connector, M23, 21-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Parallel<br>• **Cable:** 1.5 m, 22-wire, PUR, halogen-free<br>• **Description:** Parallel, shielded | DOL-2321-G1M5PA4 | 2029218 |
| | • **Connection type head A:** Female connector, M23, 21-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Parallel<br>• **Cable:** 3 m, 22-wire, PUR, halogen-free<br>• **Description:** Parallel, shielded | DOL-2321-G03MPA4 | 2029219 |
| | • **Connection type head A:** Female connector, M23, 21-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Parallel<br>• **Cable:** 5 m, 22-wire, PUR, halogen-free<br>• **Description:** Parallel, shielded | DOL-2321-G05MPA4 | 2029220 |
| | • **Connection type head A:** Female connector, M23, 21-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Parallel<br>• **Cable:** 10 m, 22-wire, PUR, halogen-free<br>• **Description:** Parallel, shielded | DOL-2321-G10MPA4 | 2029221 |
| | • **Connection type head A:** Female connector, M23, 21-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** Parallel<br>• **Cable:** 20 m, 22-wire, PUR, halogen-free<br>• **Description:** Parallel, shielded | DOL-2321-G20MPA4 | 2029222 |

| | Brief description | Type | part no. |
|---|---|---|---|
| shaft adaptation | | | |
| | • **Product segment:** Shaft adaptation<br>• **Product:** Collets<br>• **Description:** Collet for blind hollow shaft, shaft diameter 6 mm, outer diameter 15 mm | SPZ-006-AD-A | 2029174 |
| | • **Product segment:** Shaft adaptation<br>• **Product:** Collets<br>• **Description:** Collet for blind hollow shaft, shaft diameter 1/4" (6.35 mm), outer diameter 15 mm | SPZ-1E4-AD-A | 2029175 |
| | • **Product segment:** Shaft adaptation<br>• **Product:** Collets<br>• **Description:** Collet for blind hollow shaft, shaft diameter 8 mm, outer diameter 15 mm | SPZ-008-AD-A | 2029176 |
| | • **Product segment:** Shaft adaptation<br>• **Product:** Collets<br>• **Description:** Collet for blind hollow shaft, shaft diameter 3/8" (9.525 mm), outer diameter 15 mm | SPZ-3E8-AD-A | 2029177 |
| | • **Product segment:** Shaft adaptation<br>• **Product:** Collets<br>• **Description:** Collet for blind hollow shaft, shaft diameter 10 mm, outer diameter 15 mm | SPZ-010-AD-A | 2029178 |
| | • **Product segment:** Shaft adaptation<br>• **Product:** Collets<br>• **Description:** Collet for blind hollow shaft, shaft diameter 12 mm, outer diameter 15 mm | SPZ-012-AD-A | 2029179 |
| | • **Product segment:** Shaft adaptation<br>• **Product:** Collets<br>• **Description:** Collet for blind hollow shaft, shaft diameter 1/2" (12.7 mm), outer diameter 15 mm | SPZ-1E2-AD-A | 2029180 |

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