



# ARS60-GAA02280

ARS60

ABSOLUTE ENCODERS

**SICK**  
Sensor Intelligence.



## Ordering information

Type	part no.
ARS60-GAA02280	1212153

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>
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<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>	2,280
<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>	Parallel data world
<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, 21-pin, radial
<b>Supply voltage</b>	10 ... 32 V

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

<b>Operating current</b>	Typ. 90 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>	Blind hollow shaft
<b>Shaft diameter</b>	15 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. 0.6 Ncm
<b>Operating torque</b>	Typ. 0.4 Ncm
<b>Permissible movement static</b>	± 0.3 mm (radial) ± 0.5 mm (axial)
<b>Permissible movement dynamic</b>	± 0.1 mm (radial) ± 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> 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.

<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>	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>Moroccan 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



PIN	Wire colors (cable connection)	SignalBinary	SignalGray	SignalBCD	
1	Violet	$2^0$	$G^0$	$2^0 \text{ v. } 10^0$	-
2	White/brown	$2^1$	$G^1$	$2^1 \text{ v. } 10^0$	-
3	White/green	$2^2$	$G^2$	$2^2 \text{ v. } 10^0$	-
4	White/yellow	$2^3$	$G^3$	$2^3 \text{ v. } 10^0$	-
5	White/grey	$2^4$	$G^4$	$2^0 \text{ v. } 10^1$	-
6	White/pink	$2^5$	$G^5$	$2^1 \text{ v. } 10^1$	-
7	White/blue	$2^6$	$G^6$	$2^2 \text{ v. } 10^1$	-
8	White/red	$2^7$	$G^7$	$2^3 \text{ v. } 10^1$	-
9	White/black	$2^8$	$G^8$	$2^0 \text{ v. } 10^2$	-
10	Brown/green	$2^9$	$G^9$	$2^1 \text{ v. } 10^2$	-
11	Brown/yellow	$2^{10}$	$G^{10}$	$2^2 \text{ v. } 10^2$	-
12	Brown/gray	$2^{11}$	$G^{11}$	$2^3 \text{ v. } 10^2$	-
13	Brown/pink	$2^{12}$	$G^{12}$	$2^0 \text{ v. } 10^3$	-
14	Brown/blue	$2^{13}$	$G^{13}$	$2^1 \text{ v. } 10^3$	-
15	Brown/red	$2^{14}$	$G^{14}$	$2^2 \text{ v. } 10^3$	-
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



## 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>Description:</b> Parallel, shielded</li> <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> Parallel</li> <li><b>Items supplied:</b> By the meter</li> <li><b>Cable:</b> 22-wire, PUR, halogen-free</li> </ul>	LTG-2622-MW	6027532
	<ul style="list-style-type: none"> <li><b>Description:</b> SSI, shielded</li> <li><b>Connection type head A:</b> Female connector, M23, 21-pin, straight, A-coded</li> <li><b>Signal type:</b> SSI</li> <li><b>Connection systems:</b> Crimp contacts</li> </ul>	DOS-2321-G	6027539
	<ul style="list-style-type: none"> <li><b>Description:</b> Parallel, shielded</li> <li><b>Connection type head A:</b> Female connector, M23, 21-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Parallel</li> <li><b>Cable:</b> 1.5 m, 22-wire, PUR, halogen-free</li> <li><b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2321-G1M5PA4	2029218
	<ul style="list-style-type: none"> <li><b>Description:</b> Parallel, shielded</li> <li><b>Connection type head A:</b> Female connector, M23, 21-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Parallel</li> <li><b>Cable:</b> 3 m, 22-wire, PUR, halogen-free</li> <li><b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2321-G03MPA4	2029219
	<ul style="list-style-type: none"> <li><b>Description:</b> Parallel, shielded</li> <li><b>Connection type head A:</b> Female connector, M23, 21-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Parallel</li> <li><b>Cable:</b> 5 m, 22-wire, PUR, halogen-free</li> <li><b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2321-G05MPA4	2029220
	<ul style="list-style-type: none"> <li><b>Description:</b> Parallel, shielded</li> <li><b>Connection type head A:</b> Female connector, M23, 21-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Parallel</li> <li><b>Cable:</b> 10 m, 22-wire, PUR, halogen-free</li> <li><b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2321-G10MPA4	2029221
	<ul style="list-style-type: none"> <li><b>Description:</b> Parallel, shielded</li> <li><b>Connection type head A:</b> Female connector, M23, 21-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Parallel</li> <li><b>Cable:</b> 20 m, 22-wire, PUR, halogen-free</li> <li><b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-2321-G20MPA4	2029222

	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> Collets</li> <li>• <b>Description:</b> Collet for blind hollow shaft, shaft diameter 6 mm, outer diameter 15 mm</li> </ul>	SPZ-006-AD-A	2029174
	<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 blind hollow shaft, shaft diameter 1/4" (6.35 mm), outer diameter 15 mm</li> </ul>	SPZ-1E4-AD-A	2029175
	<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 blind hollow shaft, shaft diameter 8 mm, outer diameter 15 mm</li> </ul>	SPZ-008-AD-A	2029176
	<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 blind hollow shaft, shaft diameter 3/8" (9.525 mm), outer diameter 15 mm</li> </ul>	SPZ-3E8-AD-A	2029177
	<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 blind hollow shaft, shaft diameter 10 mm, outer diameter 15 mm</li> </ul>	SPZ-010-AD-A	2029178
	<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 blind hollow shaft, shaft diameter 12 mm, outer diameter 15 mm</li> </ul>	SPZ-012-AD-A	2029179
	<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 blind hollow shaft, shaft diameter 1/2" (12.7 mm), outer diameter 15 mm</li> </ul>	SPZ-1E2-AD-A	2029180

## 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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Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

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