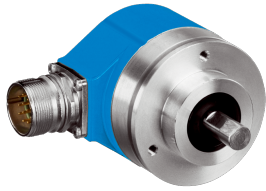


# ARS60-F4A01440

ARS60

**ABSOLUTE ENCODERS**

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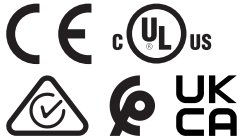


### Ordering information

Type	part no.
ARS60-F4A01440	1213264

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>	1,440
<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
<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>	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) 10 N (axial)
<b>Operating speed</b>	≤ 6,000 min <sup>-1</sup> with shaft seal ≤ 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.

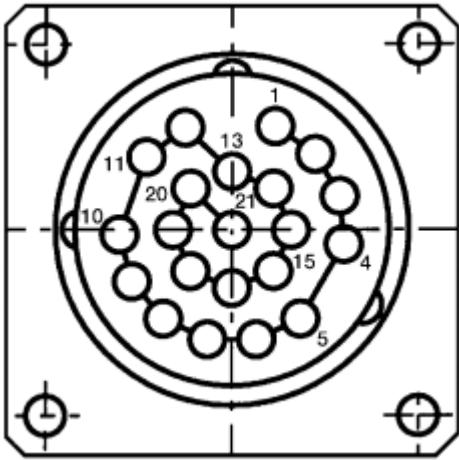
<sup>2)</sup> With mating connector fitted.

## Certificates

<b>EU declaration of conformity</b>	✓
<b>UK declaration of conformity</b>	✓
<b>ACMA declaration of conformity</b>	✓
<b>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>	✓

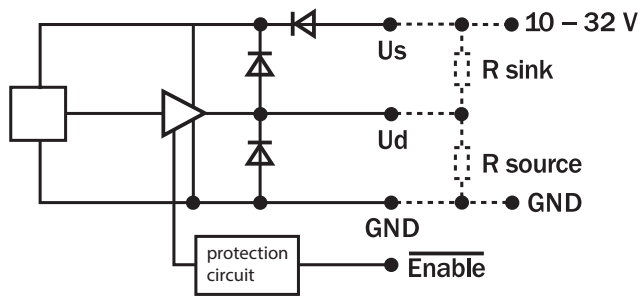


## Anschlussbelegung



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








### 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.
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

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