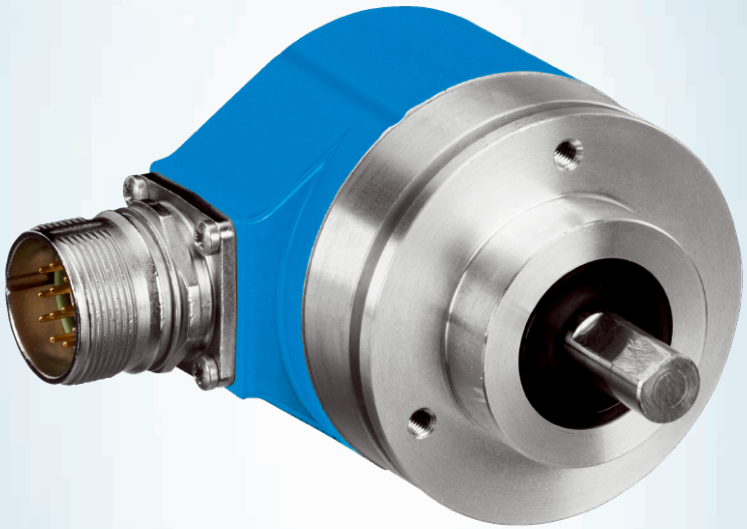
Data sheet



ATM60-A4A12x12

ATM60

ABSOLUTE ENCODERS

SICK
Sensor Intelligence.

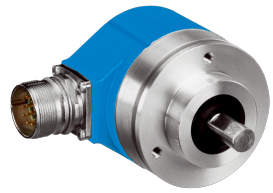


Illustration may differ

Ordering information

Type	part no.
ATM60-A4A12x12	1030001

Other models and accessories ➜ www.sick.com/ATM60

Detailed technical data

Safety-related parameters

$MTTF_D$ (mean time to dangerous failure)	150 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)	8,192 (13 bit)
Number of revolutions	8,192 (13 bit)
Max. resolution (number of steps per revolution x number of revolutions)	13 bit x 13 bit (8,192 x 8,192)
Resolution	Maximum permissible resolution: 25 bit (12 bit singleturn x 13 bit multiturn or 13 bit singleturn x 12 bit multiturn).
Measuring step	0.043°
Error limits G	± 0.25° [1]
Repeatability standard deviation σ_r	0.1° [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	SSI
Initialization time	1,050 ms [1]
Position forming time	0.15 ms
Parameterising data	Number of steps per revolution Number of revolutions Code type Electronic adjustment
Code type	Gray, binary

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

[2] Minimum, LOW level (Clock +): 500 ns.

Code sequence parameter adjustable	CW/CCW (V/R)
Clock frequency	1 MHz [2]
Set (electronic adjustment)	H-active (L = 0 - 4,7 V, H = 10 - Us V)
CW/CCW (counting sequence when turning)	L-active (L = 0 - 1,5 V, H = 2,0 - Us V)

[1] Valid positional data can be read once this time has elapsed.
[2] Minimum, LOW level (Clock +): 500 ns.

Electronics

Connection type	Male connector, M23, 12-pin, radial
Supply voltage	10 ... 32 V
Power consumption	≤ 0.8 W (without load)
Reverse polarity protection	✓

Mechanics

Mechanical design	Solid shaft, face mount flange
Shaft diameter	10 mm
Shaft length	19 mm
Weight	0.5 kg [1]
Shaft material	Stainless steel
Flange material	Aluminum
Start up torque	2.5 Ncm (+20 °C), with shaft seal 0.5 Ncm (+20 °C), without shaft seal [2]
Operating torque	1.8 Ncm (+20 °C), with shaft seal 0.3 Ncm (+20 °C), without shaft seal [2]
Permissible shaft loading	300 N (radial) 50 N (axial)
Operating speed	≤ 6,000 min^{-1} [3]
Moment of inertia of the rotor	35 gcm^2
Bearing lifetime	3.6 x 10^9 revolutions
Angular acceleration	≤ 500,000 rad/s^2

[1] Based on encoder with male connector.
[2] If the shaft seal has been removed by the customer.
[3] Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3
Enclosure rating	IP67, with shaft seal (IEC 60529) [1] IP43, without shaft seal, on encoder flange not sealed (IEC 60529) [1] IP65, without shaft seal, on encoder flange sealed (IEC 60529) [1]
Permissible relative humidity	98 %
Operating temperature range	–20 °C ... +85 °C
Storage temperature range	–40 °C ... +100 °C, without package
Resistance to shocks	100 g, 6 ms (EN 60068-2-27)

[1] With mating connector fitted.

Resistance to vibration	20 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)

[1] With mating connector fitted.

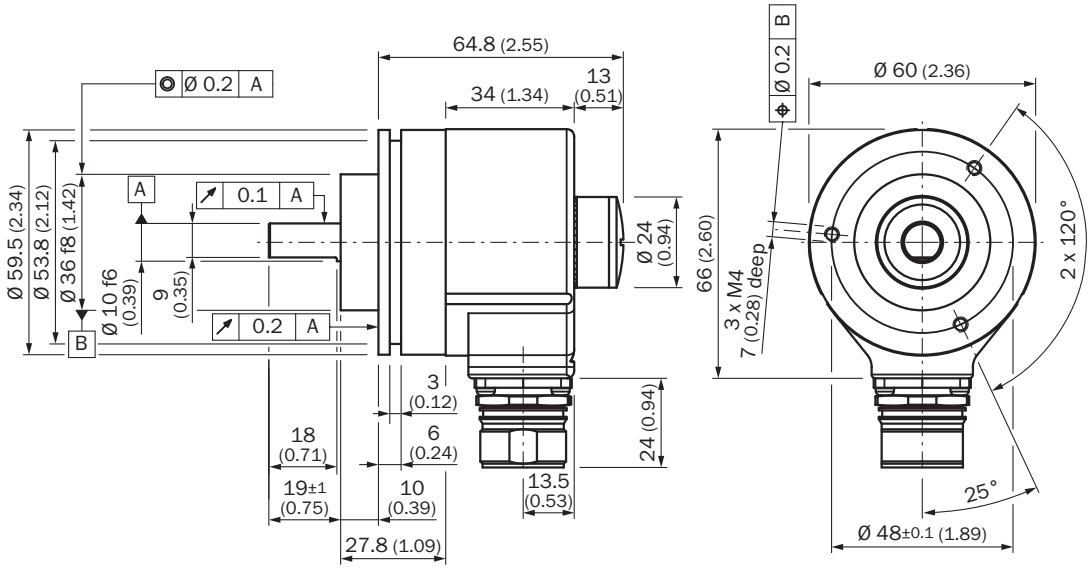
Certificates

EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓
cULus certificate	✓

Classifications

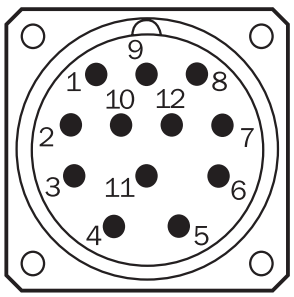
ECLASS 5.0	27270502
ECLASS 5.1.4	27270502
ECLASS 6.0	27270590
ECLASS 6.2	27270590
ECLASS 7.0	27270502
ECLASS 8.0	27270502
ECLASS 8.1	27270502
ECLASS 9.0	27270502
ECLASS 10.0	27270502
ECLASS 11.0	27270502
ECLASS 12.0	27270502
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
ETIM 8.0	EC001486
UNSPSC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

Dimensional drawing



Dimensions in mm (inch)

view of M23 male device connector on encoder



view of M23 male device connector on encoder

PIN	Signal	Wire colors (cable connection)	Explanation
1	GND	Blue	Ground connection
2	Data +	White	Interface signals
3	Clock +	Yellow	Interface signals
4	R x D +	Gray	RS-422 programming lines
5	R x D -	Green	RS-422 programming lines
6	T x D +	Pink	RS-422 programming lines
7	T x D -	Black	RS-422 programming lines
8	U_S	Red	Operating voltage
9	SET[1)]	Orange	Electronic adjustment
10	Data -	Brown	Interface signals
11	Clock -	Purple	Interface signals
12	V/R[2)]	Orange-black	Sequence in direction of rotation
–	Screen	–	Housing potential

PIN	Signal	Wire colors (cable connection)	Explanation
SET = This input activates the electronic zero set. If the SET cable is set to U_S for more than 100 ms, the mechanical position corresponds to the 0 value, i.e., the predetermined SET value. V/R = Forwards/Reverse: This input programs the counting direction for the encoder. When it is not connected, this input is set to HIGH. If the encoder shaft is rotat-ed clockwise (to the right) as viewed when facing the shaft, it counts in ascending order. If it should count in ascending order when the shaft is rotated counterclock-wise (to the left), then this connection must be permanently set to LOW level (GND).			

Recommended accessories

Other models and accessories ➜ www.sick.com/ATM60

	Brief description	Type	part no.
programming devices			
	• **Product segment:** Programming devices • **Product:** PGT-01-S • **Description:** Programming tool for ATM60, ATM90, and KH53 • **Items supplied:** Power supply, interface, link cable, encoder cable, and software	PGT-01-S	1030111

	Brief description	Type	part no.
connectors and cables			
	• **Description:** HIPERFACE®, shielded, SSI, Incremental • **Connection type head A:** Female connector, M23, 12-pin, straight, A-coded • **Signal type:** HIPERFACE®, SSI, Incremental • **Connection systems:** Solder connection	DOS-2312-G	6027538
	• **Description:** HIPERFACE®, shielded, SSI, Incremental, RS-422 • **Connection type head A:** Male connector, M23, 12-pin, straight, A-coded • **Signal type:** HIPERFACE®, SSI, Incremental, RS-422 • **Connection systems:** Solder connection	STE-2312-G	6027537
	• **Description:** HIPERFACE®, shielded, SSI, Incremental • **Connection type head A:** Female connector, M23, 9-pin, straight, A-coded • **Signal type:** HIPERFACE®, SSI, Incremental • **Connection systems:** Solder connection	DOS-2309-G	6028533
	• **Description:** HIPERFACE®, shielded, SSI, Incremental • **Connection type head A:** Female connector, M23, 12-pin, angled, A-coded • **Signal type:** HIPERFACE®, SSI, Incremental • **Connection systems:** Solder connection	DOS-2312-W01	2072580
	• **Description:** SSI, shielded, RS-422, TTL, HTL • **Connection type head A:** Female connector, M23, 12-pin, straight • **Connection type head B:** Flying leads • **Signal type:** SSI, RS-422, TTL, HTL • **Cable:** 1.5 m, 12-wire, PUR, halogen-free • **Application:** Zones with oils and lubricants	DOL-2312-G1M5MA1	2029200
	• **Description:** SSI, shielded, RS-422, TTL, HTL • **Connection type head A:** Female connector, M23, 12-pin, straight • **Connection type head B:** Flying leads • **Signal type:** SSI, RS-422, TTL, HTL • **Cable:** 3 m, 12-wire, PUR, halogen-free • **Application:** Zones with oils and lubricants	DOL-2312-G03MMA1	2029201
	• **Description:** SSI, shielded, RS-422, TTL, HTL • **Connection type head A:** Female connector, M23, 12-pin, straight • **Connection type head B:** Flying leads • **Signal type:** SSI, RS-422, TTL, HTL • **Cable:** 5 m, 12-wire, PUR, halogen-free • **Application:** Zones with oils and lubricants	DOL-2312-G05MMA1	2029202
	• **Description:** SSI, shielded, RS-422, TTL, HTL • **Connection type head A:** Female connector, M23, 12-pin, straight • **Connection type head B:** Flying leads • **Signal type:** SSI, RS-422, TTL, HTL • **Cable:** 10 m, 12-wire, PUR, halogen-free • **Application:** Zones with oils and lubricants	DOL-2312-G10MMA1	2029203
	• **Description:** SSI, shielded, RS-422 • **Connection type head A:** Female connector, M23, 12-pin, straight • **Connection type head B:** Flying leads • **Signal type:** SSI, RS-422 • **Cable:** 20 m, 12-wire, PUR, halogen-free • **Application:** Zones with oils and lubricants	DOL-2312-G20MMA1	2029204
	• **Description:** SSI, shielded, RS-422 • **Connection type head A:** Female connector, M23, 12-pin, straight • **Connection type head B:** Flying leads • **Signal type:** SSI, RS-422 • **Cable:** 30 m, 12-wire, PUR, halogen-free • **Application:** Zones with oils and lubricants	DOL-2312-G30MMA1	2029205
	• **Description:** SSI, shielded, RS-422, TTL, HTL • **Connection type head A:** Female connector, M23, 12-pin, straight • **Connection type head B:** Flying leads • **Signal type:** SSI, RS-422, TTL, HTL • **Cable:** 5 m, 12-wire, PUR, halogen-free	DOL-2312-G05MHA1	2059786

	Brief description	Type	part no.
Mounting systems			
	• **Description:** 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 • **Material:** Aluminum • **Details:** Aluminum • **Items supplied:** Including 3 countersunk screws M3 x 10	BEF-FA-036-050	2029160
	• **Description:** Flange adapter, adaptation of face mount flange with 36 mm centering hub to 100 mm servo flange with 60 mm centering hub, aluminum • **Material:** Aluminum • **Details:** Aluminum	BEF-FA-036-100	2029161
	• **Description:** 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 • **Material:** Aluminum • **Details:** Aluminum • **Items supplied:** Including 3 countersunk screws M4 x 8	BEF-FA-036-060REC	2029162
	• **Description:** Flange adapter, adaptation of face mount flange with 36 mm centering hub to 58 mm square mounting plate with shock absorbers, aluminum • **Material:** Aluminum • **Details:** Aluminum	BEF-FA-036-060RSA	2029163
	• **Description:** Mounting bracket for encoder with spigot 36 mm for face mount flange • **Items supplied:** Mounting kit included	BEF-WF-36	2029164

	Brief description	Type	part no.
shaft adaptation			
	• **Product segment:** Shaft adaptation • **Product:** Shaft couplings • **Description:** Bellows coupling, shaft diameter 6 mm / 10 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular +/- 4°; max. speed 10,000 rpm, –30 °C to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub	KUP-0610-B	5312982
	• **Product segment:** Shaft adaptation • **Product:** Shaft couplings • **Description:** Bellows coupling, shaft diameter 10 mm/10 mm; maximum shaft offset: radial +/- 0.25 mm, axial +/- 0.4 mm, angular +/- 4°; max. revolutions 10,000 rpm, –30° to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum clamping hubs	KUP-1010-B	5312983
	• **Product segment:** Shaft adaptation • **Product:** Shaft couplings • **Description:** 10 mm / 12 mm; maximum shaft offset: radial +/- 0.25 mm, axial +/- 0.4 mm, angular +/- 4°; max. revolutions 10,000 rpm, –30° to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum clamping hubs	KUP-1012-B	5312984
	• **Product segment:** Shaft adaptation • **Product:** Shaft couplings • **Description:** Spring washer coupling, shaft diameter 6 mm / 10 mm, Maximum shaft offset: radial +/- 0.3 mm, axial +/- 0.4 mm, angular +/- 2.5°; max. speed 12,000 rpm, –10° to +80 °C, max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin	KUP-0610-F	5312985
	• **Product segment:** Shaft adaptation • **Product:** Shaft couplings • **Description:** Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset, radial ± 0.3 mm, axial ± 0.4 mm, angle ± 2.5°, torsion spring stiffness 30 Nm/rad; material: aluminum flange, glass-fiber reinforced polyamide membrane and hardened steel coupling pin	KUP-1010-F	5312986

SICK AT A GLANCE

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