



AFM60A-BEKA262144

AFS/AFM60 SSI

ABSOLUTE ENCODERS





Ordering information

Туре	part no.
AFM60A-BEKA262144	1073128

Other models and accessories → www.sick.com/AFS_AFM60_SSI

Illustration may differ



Detailed technical data

Safety-related parameters

MTTF _D (mean time to dangerous failure)	250 years (EN ISO 13849-1) 1)
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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)	262,144 (18 bit)
Number of revolutions	4,096 (12 bit)
Max. resolution (number of steps per revolution x number of revolutions)	18 bit x 12 bit (262,144 x 4,096)
Error limits G	0.03° ¹⁾
Repeatability standard deviation $\boldsymbol{\sigma}_{r}$	0.002° 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.

Interfaces

Communication interface	SSI
Communication Interface detail	SSI + Sin/Cos
Initialization time	50 ms ¹⁾
Position forming time	< 1 µs
Code type	Gray
Code sequence parameter adjustable	CW/CCW (V/R) parameter adjustable
Clock frequency	≤ 2 MHz ²⁾
Set (electronic adjustment)	H-active (L = $0 - 3 \text{ V}$, H = $4.0 - U_s \text{ V}$)

 $^{^{1)}}$ Valid positional data can be read once this time has elapsed.

 $^{^{2)}}$ In accordance with DIN ISO 55350-13; 68.3% of the measured values are inside the specified area.

²⁾ Minimum, LOW level (Clock +): 250 ns.

CW/CCW (counting sequence when turning)	L-active (L = 0 - 1,5 V, H = 2,0 - Us V)
Sine/cosine periods per revolution	1,024
Output frequency	≤ 200 kHz
Load resistance	≥ 120 Ω
Signal before differential generation	$0.5 V_{pp}$, ± 20 %, 120 Ω
Signal offset before differential generation	2.5 V ± 10 %
Signal after differential generation	$1V_{pp}$, $\pm20\%$

 $^{^{1)}}$ Valid positional data can be read once this time has elapsed.

Electronics

Connection type	Male connector, M23, 12-pin, radial
Supply voltage	4.5 32 V
Power consumption	≤ 0.7 W (without load)
Reverse polarity protection	✓

Mechanics

Mechanical design	Blind hollow shaft
Shaft diameter	12 mm
Characteristics of the shaft	Front clamp
Weight	0.2 kg ¹⁾
Shaft material	Stainless steel
Flange material	Aluminum
Housing material	Aluminum die cast
Start up torque	< 0.8 Ncm (+20 °C)
Operating torque	< 0.6 Ncm (+20 °C)
Permissible movement static	± 0.3 mm (radial) ± 0.5 mm (axial)
Permissible movement dynamic	± 0.05 mm (radial) ± 0.1 mm (axial)
Operating speed	≤ 6,000 min ^{-1 2)}
Moment of inertia of the rotor	40 gcm ²
Bearing lifetime	3.0 x 10^9 revolutions
Angular acceleration	≤ 500,000 rad/s²

 $^{^{1)}}$ Based on devices with male connector.

Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3 1)
Enclosure rating	IP65, shaft side (IEC 60529) IP67, housing side (IEC 60529) ²⁾

 $^{^{1)}}$ EMC according to the standards quoted is achieved if shielded cables are used.

 $^{^{2)}}$ Minimum, LOW level (Clock +): 250 ns.

²⁾ Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

²⁾ For devices with male connector: with mounted mating connector.

³⁾ Stationary position of the cable.

Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	-40 °C +100 °C ³⁾
Storage temperature range	-40 °C +100 °C, without package
Resistance to shocks	60 g, 6 ms (EN 60068-2-27)
Resistance to vibration	20 g, 10 Hz 2,000 Hz (EN 60068-2-6)

 $^{^{1)}\,\}mathrm{EMC}$ according to the standards quoted is achieved if shielded cables are used.

Certificates

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

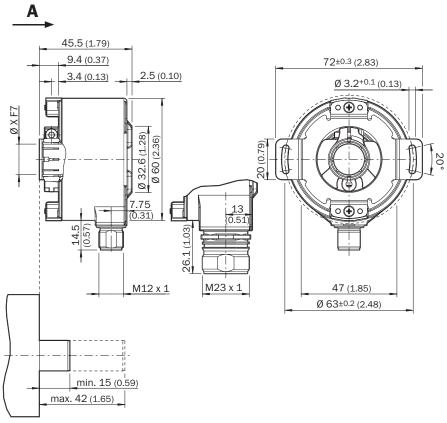
Classifications

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

²⁾ For devices with male connector: with mounted mating connector.

³⁾ Stationary position of the cable.

Dimensional drawing



Dimensions in mm (inch)

Anschlussbelegung M23 male connector, 12-pin and cable, 12-wire, SSI/Gray + SIN/COS

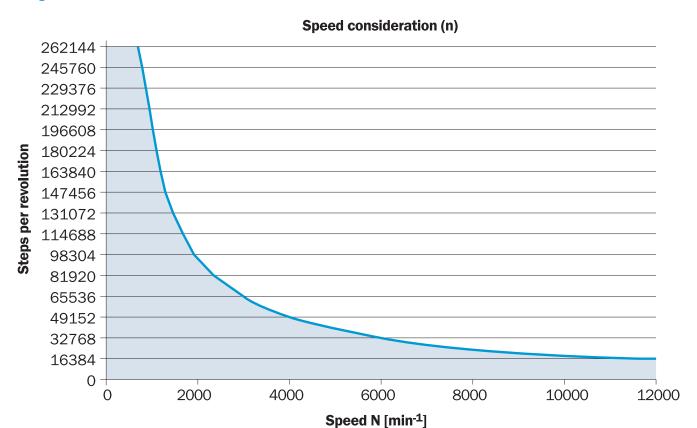


view of M23 male device connector on encoder

PIN	Wire colors (cable connection)	SignalIncremental	Explanation
1	Red	U _S	Operating voltage
2	Blue	GND	Ground connection
3	Yellow	Clock +	Interface signals
4	White	Data +	Interface signals
5	Orange	SET	Electronic adjustment
6	Brown	Data -	Interface signals
7	Violet	Clock -	Interface signals
8	Black	- SIN	Signal wire
9	Orange-black	CW/CCW (V/R)	Sequence in direction of rotation
10	Green	- COS	Signal wire

PIN	Wire colors (cable connection)	SignalIncremental	Explanation
11	Gray	+ COS	Signal wire
12	Pink	+ SIN	Signal wire
-	-	Shielding	Screen connected to hous- ing on encoder side. Connect- ed to ground on control side.

Diagrams



The maximum speed is also dependent on the shaft type.

Recommended accessories

Other models and accessories → www.sick.com/AFS_AFM60_SSI

	Brief description	Туре	part no.	
connectors and cables				
(A)	Connection type head A: Female connector, M23, 12-pin, angled, A-coded Signal type: HIPERFACE [®] , SSI, Incremental Description: HIPERFACE [®] , shieldedSSIIncremental Connection systems: Solder connection	DOS-2312-W01	2072580	
	Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE [®] , SSI, Incremental Description: HIPERFACE [®] , shieldedSSIIncremental Connection systems: Solder connection	DOS-2312-G02	2077057	
	Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE [®] , SSI, Incremental Description: HIPERFACE [®] , shieldedSSIIncremental Connection systems: Solder connection	DOS-2312-G	6027538	
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 3 m, 12-wire Description: Shielded 	DOL-2312- G03MMD2	2062300	
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 5 m, 12-wire Description: Shielded 	DOL-2312- G05MMD2	2062301	
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 1.5 m, 12-wire Description: Unshielded 	DOL-2312- G1M5MD2	2062284	
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 10 m, 12-wire Description: Shielded 	DOL-2312- G10MMD2	2062302	
	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 20 m, 12-wire Description: Shielded 	DOL-2312- G20MMD2	2062303	
-	 Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 30 m, 12-wire Description: Shielded 	DOL-2312- G30MMD2	2062304	
	Connection type head A: Female connector, M23, 9-pin, straight, A-coded Signal type: HIPERFACE [®] , SSI, Incremental Description: HIPERFACE [®] , shieldedSSIIncremental Connection systems: Solder connection	DOS-2309-G	6028533	

SICK AT A GLANCE

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