Data sheet

AFM60I-BGRM262144

AFS/AFM60 SSI

ABSOLUTE ENCODERS

SICK
Sensor Intelligence.

Illustration may differ

Ordering information

Type	part no.
AFM60I-BGRM262144	1138124

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

Detailed technical data

Safety-related parameters

$MTTF_D$ (mean time to dangerous failure)	250 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)	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 σ_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.

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

Interfaces

Communication interface	SSI
Communication Interface detail	SSI + incremental
Initialization time	50 ms [1]
Position forming time	< 1 µs
Code type	Gray
Code sequence parameter adjustable	CW/CCW (V/R)

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

[2] SSI max. clock frequency 2 MHz, and min. LOW level (Clock+): 500 ns.

Interface signals	A, A/, B, B/: digital, differential
Clock frequency	2 MHz [2]
Set (electronic adjustment)	H-active (L = 0 - 3 V, H = 4,0 - U_s V)
CW/CCW (counting sequence when turning)	L-active (L = 0 - 1,5 V, H = 2,0 - Us V)
Pulses per revolution	1/4 of number of SSI steps per revolution
Output frequency	≤ 820 kHz
Load current	≤ 30 mA

[1] Valid positional data can be read once this time has elapsed.
[2] SSI max. clock frequency 2 MHz, and min. LOW level (Clock+): 500 ns.

Electronics

Connection type	Cable, 12-wire, radial, 5 m
Supply voltage	4.5 ... 32 V DC
Power consumption	≤ 0.5 W (without load)
Reverse polarity protection	✓

Mechanics

Mechanical design	Blind hollow shaft
Shaft diameter	14 mm
Characteristics of the shaft	Front clamp
Weight	0.5 kg [1]
Shaft material	Stainless steel V2A
Flange material	Stainless steel V2A
Housing material	Stainless steel V2A
Start up torque	1 Ncm (+20 °C)
Operating torque	0.5 Ncm (+20 °C)
Permissible movement static	± 0.3 mm (radial) ± 0.5 mm (axial)
Permissible movement dynamic	± 0.1 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/s^2

[1] Based on devices with male connector.
[2] 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 [1]
Enclosure rating	IP67, shaft side (IEC 60529) IP67, housing side, cable connection (IEC 60529)

[1] EMC according to the standards quoted is achieved if shielded cables are used.
[2] Stationary position of the cable.
[3] Flexible position of the cable.

Permissible relative humidity	90 % (Condensation not permitted)
Operating temperature range	–40 °C ... +100 °C [2] –30 °C ... +100 °C [3]
Storage temperature range	–40 °C ... +100 °C, without package
Resistance to shocks	100 g, 6 ms (EN 60068-2-27)
Resistance to vibration	10 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] Stationary position of the cable.
[3] Flexible position of the cable.

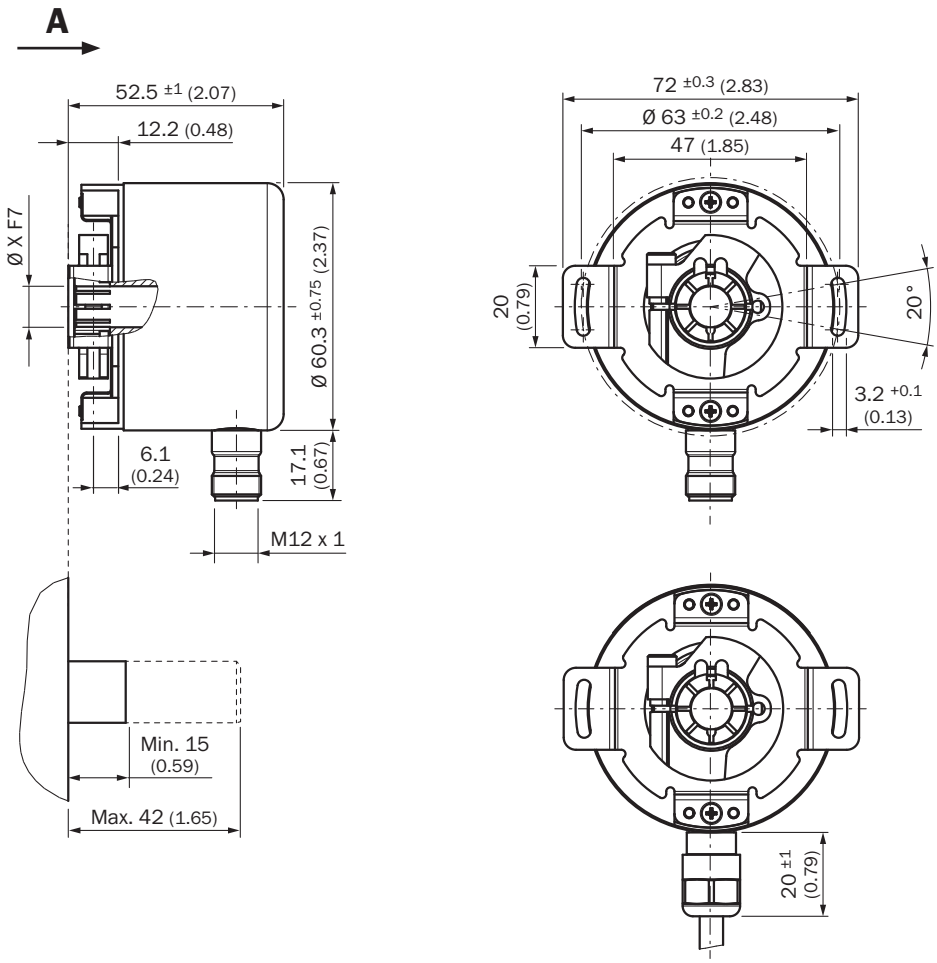
Certificates

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

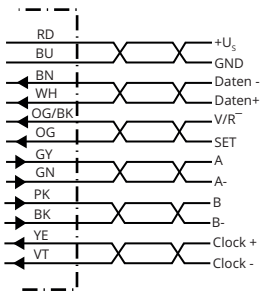
ECLASS 5.0	27270502
ECLASS 5.1.4	27270502
ECLASS 6.0	27270590
ECLASS 6.2	27270590
ECLASS 7.0	27270502
ECLASS 8.0	27270502
ECLASS 8.1	27270502
ECLASS 9.0	27270502
ECLASS 10.0	27270502
ECLASS 11.0	27270502
ECLASS 12.0	27270502
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
ETIM 8.0	EC001486
UNSPSC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

Dimensional drawing



Dimensions in mm (inch)

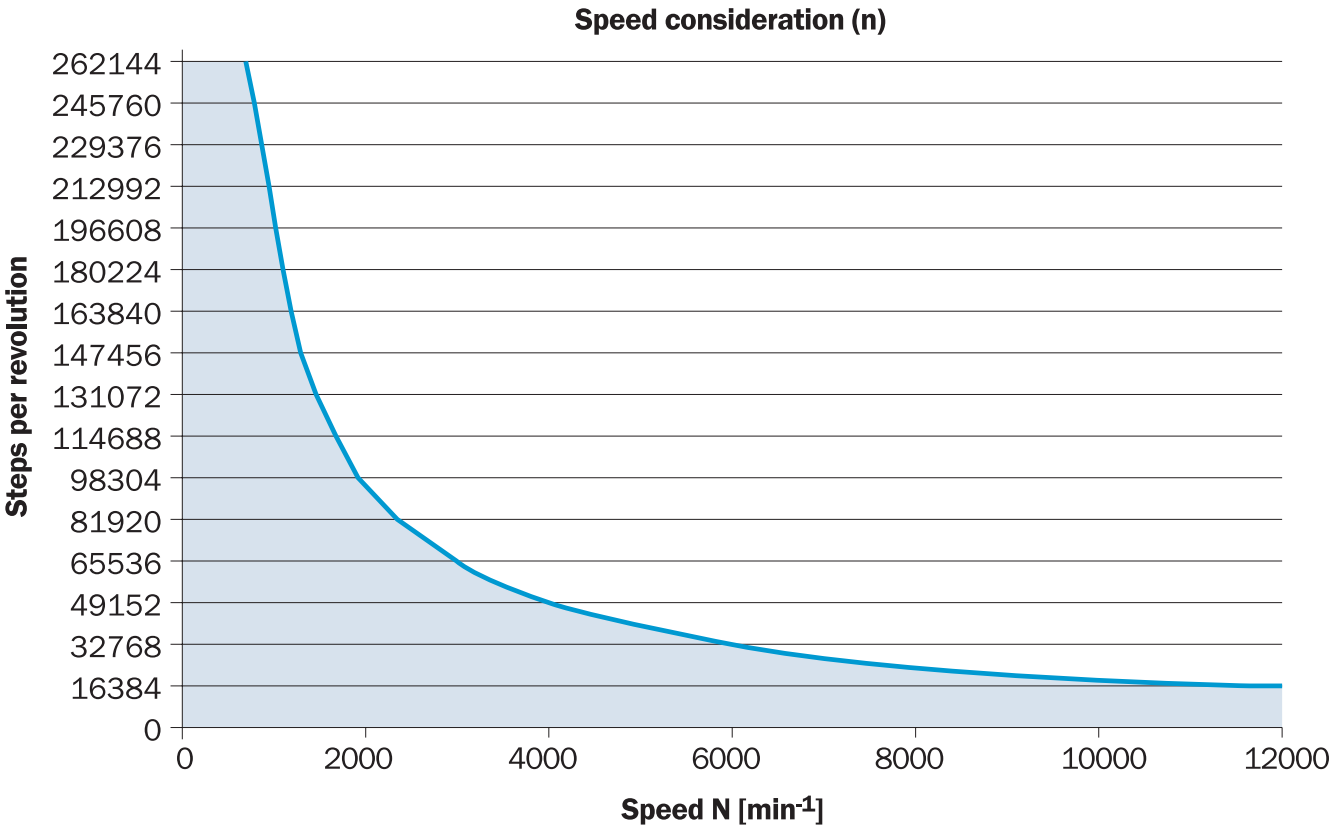
Anschlussbelegung



Male connector M12, 8-pin	Connector M12, 12-pin	Wire colors (cable connection)	SignalIncremental	SignalSin/Cos	Explanation
3	1	Orange/black	V/R	V/R	Sequence in direction of rotation
2	2	White	Data +	Data +	Interface signals
1	3	Brown	Data -	Data -	Interface signals
6	4	Violet	Clock -	Clock -	Interface signals

Male connector M12, 8-pin	Connector M12, 12-pin	Wire colors (cable connection)	SignalIncremental	SignalSin/Cos	Explanation
8	5	Red	$+U_S$	$+U_S$	Operating voltage
-	6	Gray	A	+ COS	Signal cable
-	7	Green	$\overline{A}$	- COS	Signal cable
4	8	Pink	B	+ SIN	Signal cable
-	9	Black	$\overline{B}$	- SIN	Signal cable
-	10	Orange	SET	SET	Electronic adjustment
5	11	Yellow	Clock +	Clock +	Interface signals
7	12	Blue	GND	GND	Ground connection
–	–	–	Shielding	Shielding	Screen connected to housing on encoder side. Connected to ground on control side.

Diagrams



The maximum speed is also dependent on the shaft type.

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We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

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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