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DATA SHEET

AFM60I-BBRK262144

AFS/AFM60 SSI
Absolute encoders

SICK Sensor Intelligence



Illustration may differ

ABSOLUTE ENCODERS

AFM60I-BBRK262144

ORDERING INFORMATION

Type	part no.
AFM60I-BBRK262144	On request

Further device versions and accessories at 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)
Interface signals	A, A/, B, B/: digital, differential

[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.

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, 1.5 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	8 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)
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)

[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.

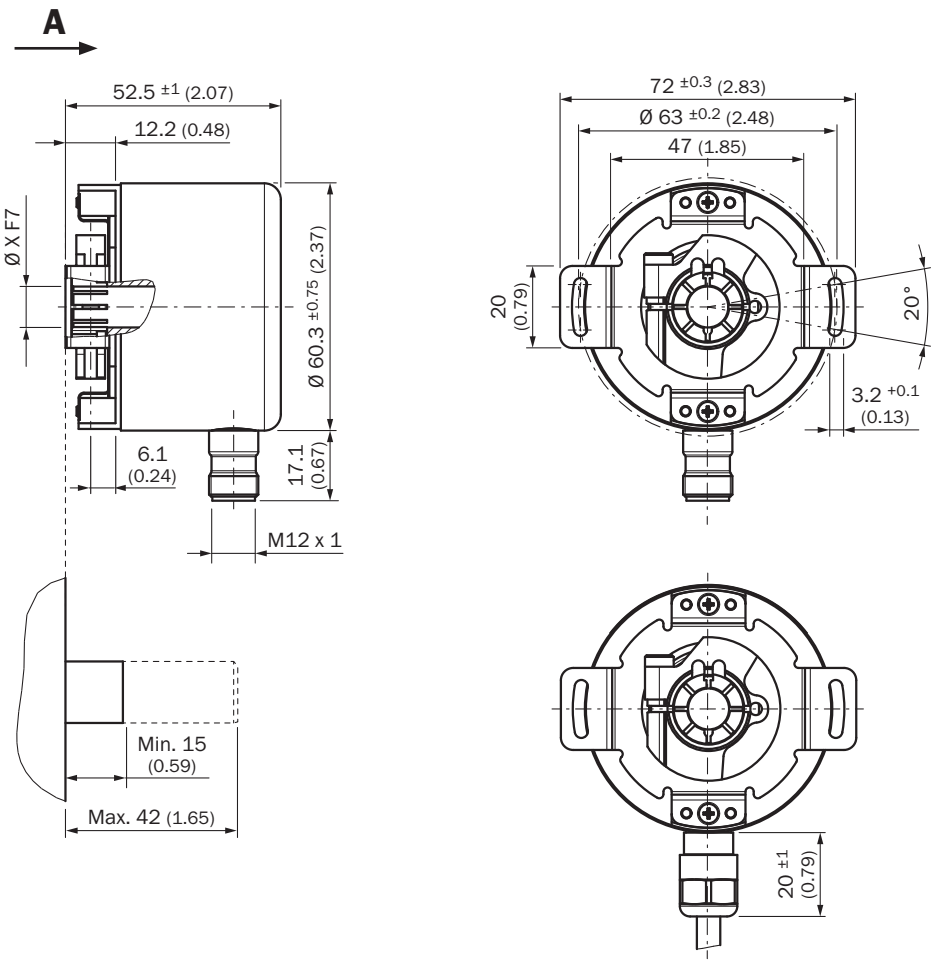
Resistance to vibration	10 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)

[1] EMC according to the standards quoted is achieved if shielded cables are used.

[2] Stationary position of the cable.

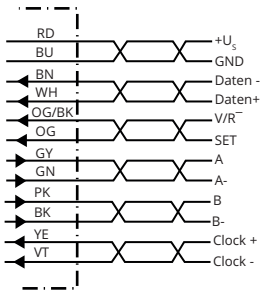
[3] Flexible position of the cable.

DIMENSIONAL DRAWING



Dimensions in mm (inch)

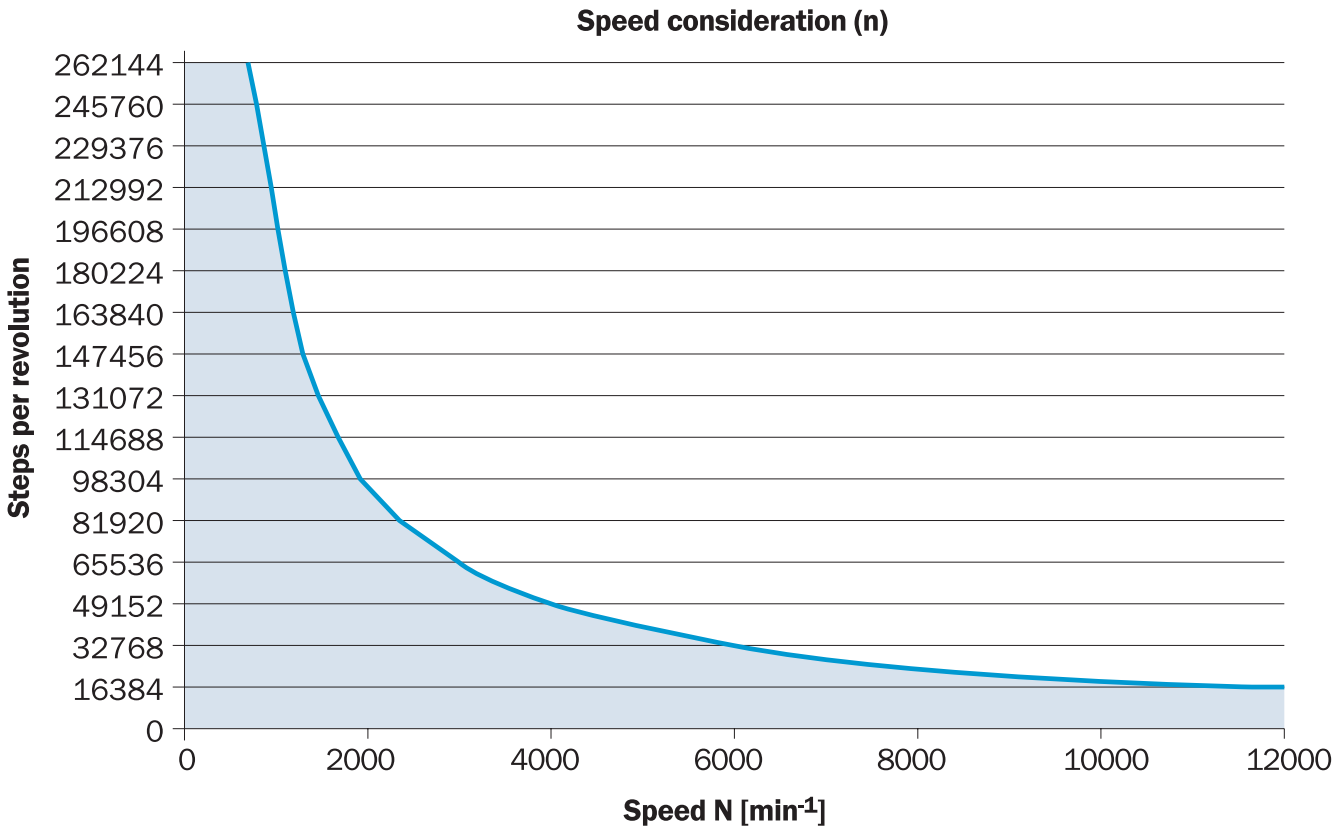
ANSCHLUSSBELEGUNG



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

Male connector M12, 8-pin	Connector M12, 12-pin	Wire colors (cable connection)	SignalIncremental	SignalSin/Cos	Explanation
1	3	Brown	Data -	Data -	Interface signals
6	4	Violet	Clock -	Clock -	Interface signals
8	5	Red	$+U_s$	$+U_s$	Operating voltage
-	6	Gray	A	+ COS	Signal cable
-	7	Green	A^-	- COS	Signal cable
4	8	Pink	B	+ SIN	Signal cable
-	9	Black	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	Shielding connected to housing on encoder side. Connected to ground on control side.

DIAGRAMS



The maximum speed is also dependent on the shaft type.

Further information as well as suitable accessories, example applications and downloads such as CAD dimensional models, operating instructions and software can be found at www.sick.com/AFS/AFM60 SSI

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SICK AT A GLANCE

SICK is a leading global technology company for intelligent sensors and integrated solutions in industrial automation. Our technologies set benchmarks, making your industrial processes more efficient, safer and more sustainable – both in logistics and manufacturing operations.

SICK combines sensor intelligence with industry expertise and certified consulting services. We provide the ideal foundation for scalable as well as tailor-made automation solutions and create added value along the entire value chain. Our close partnerships with our customers are more than just a promise: Together, we optimize productivity, improve quality, protect health and safety, and help build a sustainable future. All with empathy and trust.

Since 1946, we have been developing innovative technologies with passion and a pioneering spirit. With a global network in around 40 countries, SICK has a global presence and is always close by. The company's headquarters are located in Waldkirch near Freiburg, Germany. Our customers benefit from our understanding of both local and global requirements, which enables us to deliver tailor-made solutions

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