AFM60B-TEKZ000S08

AFS/AFM60 SSI

ABSOLUTE ENCODERS

SICK
Sensor Intelligence.

Ordering information

SICK

Illustration may differ

Type	part no.
AFM60B-TEKZ000S08	1071349

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

Detailed technical data

Features

Special device	✔
Specialty	12-wire cable connection, 500 mm with M23 male connector and protective plastic cap Female connector M23 included in delivery (part no.: 6041733)
Standard reference device	AFM60B-TEKK008192,1070600

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)	8,192 (13 bit)
Number of revolutions	4,096 (12 bit)
Max. resolution (number of steps per revolution x number of revolutions)	13 bit x 12 bit (8,192 x 4,096)
Error limits G	0.05° [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 + 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

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

[2] Minimum, LOW level (Clock +): 250 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)
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	1 V_{pp}, ± 20 %

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

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

Electronics

Connection type	Special version
Connection type Detail	12-wire cable connection, 500 mm with M23 male connector and protective plastic cap
Supply voltage	4.5 ... 32 V DC
Power consumption	≤ 0.7 W (without load)
Reverse polarity protection	✓

Mechanics

Mechanical design	Through 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	± 0.1 mm (radial) ± 0.2 mm (axial)
Operating speed	≤ 9,000 min^{-1} [2]
Moment of inertia of the rotor	40 gcm²
Bearing lifetime	3.0 x 10^9 revolutions
Angular acceleration	≤ 500,000 rad/s²

[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	IP65, shaft side (IEC 60529)
	IP67, housing side (IEC 60529) [2]
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	70 g, 6 ms (EN 60068-2-27)
Resistance to vibration	30 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] For devices with male connector: with mounted mating connector.

[3] Stationary 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
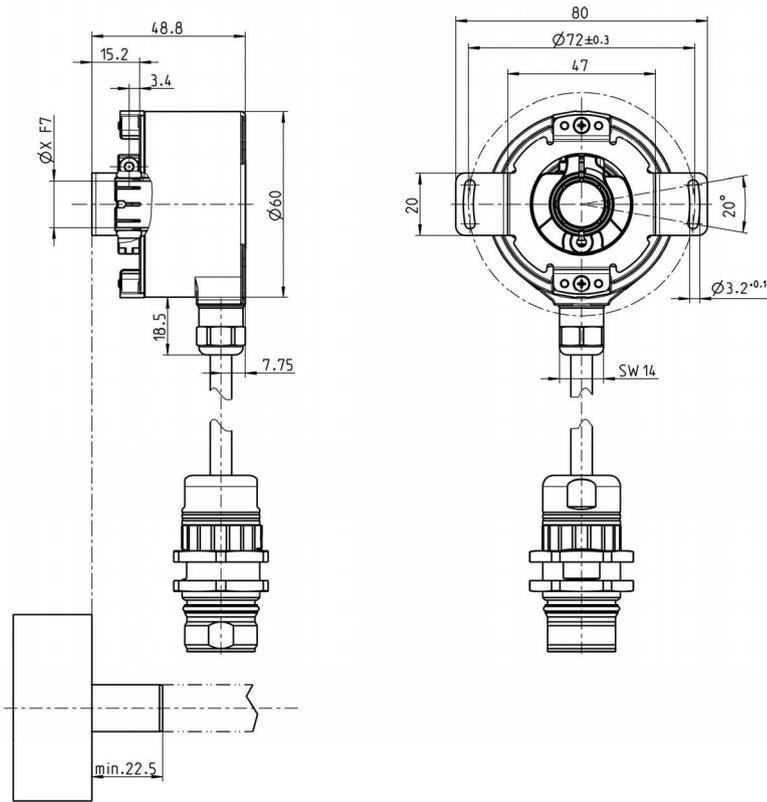
Dimensions in mm (inch)

Anschlussbelegung

| PIN	Signal	Beschreibung
1	GND	Masseanschluss des Encoders
2	+U_s	Versorgungsspannung (potentialfrei zum Gehäuse)
3	Clock +	Schnittstellensignale
4	Clock -	Schnittstellensignale
5	Daten +	Schnittstellensignale
6	Daten -	Schnittstellensignale
7	N.C.	Nicht belegt
8	**V/R**	**Schrittfolge Drehrichtung**
9	N.C.	Nicht belegt
10	N.C.	Nicht belegt
11	N.C.	Nicht belegt
12	N.C.	Nicht belegt
Schirm	Schrirm	Schirm encoderseitig mit Gehäuse verbunden. Steuerungsseitig mit Erde verbinden.

Ansicht des Gerätesteckers M23 am Encoder

Anschlussbelegung

| PIN	Signal	Explanation
	SSI/Gray + Sin/Cos	
1	+U_S	Supply voltage
2	GND	Earth connection
3	Clock +	Interface signal
4	Data +	Interface signal
5	SET	Electronic adjustment
6	Data –	Interface signal
7	Clock –	Interface signal
8	Sin –	Signal line
9	CW/CCW	Counting sequence when turning
10	Cos –	Signal line
11	Cos +	Signal line
12	Sin +	Signal line
Screen		Screen on the encoder side connected to the housing. On the control side connected to earth.
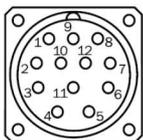
View of the connector M23
fitted to the encoder body

Diagrams

Speed consideration (n)
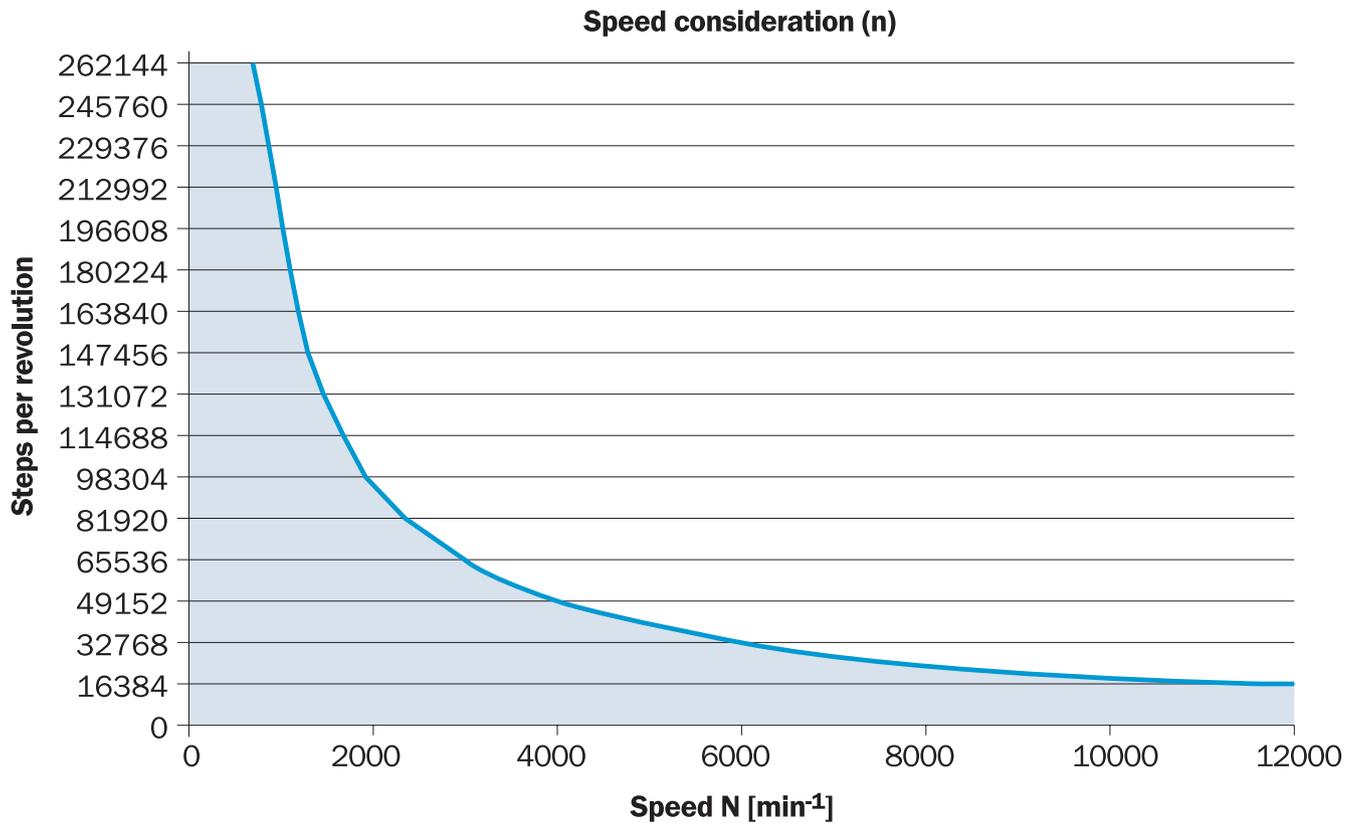
The maximum speed is also dependent on the shaft type.

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