AFM60B-THSZ000S25

AFS/AFM60 SSI

ABSOLUTE ENCODERS

SICK
Sensor Intelligence.

Illustration may differ

Ordering information

Type	Part no.
AFM60B-THSZ000S25	1089740

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

CE c(UL)us

Detailed technical data

Features

Special device	✔
Specialty	Customized housing (see drawing), no premounted cable connection, customized encoder cable (included loose)
Standard reference device	AFM60B-THSA032768, 1054240

Performance

Number of steps per revolution (max. resolution)	32,768 (15 bit)
Number of revolutions	4,096 (12 bit)
Max. resolution (number of steps per revolution x number of revolutions)	15 bit x 12 bit (32,768 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
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

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

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

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.

Electrical data

Supply voltage	4.5 ... 32 V DC
Power consumption	≤ 0.7 W (without load)
Reverse polarity protection	✓
MTTFd: 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.

Mechanical data

Mechanical design	Through hollow shaft
Shaft diameter	15 mm
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	± 0.5 mm (axial) ± 0.3 mm (radial)
Permissible movement dynamic	± 0.2 mm (axial) ± 0.1 mm (radial)
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

[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.

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.

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

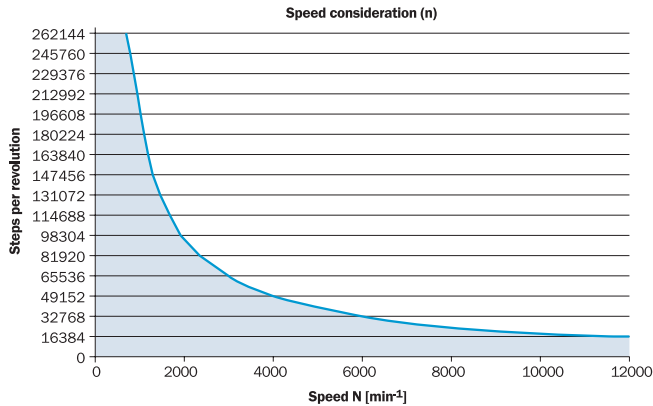## Dimensional drawing (Dimensions in mm (inch))
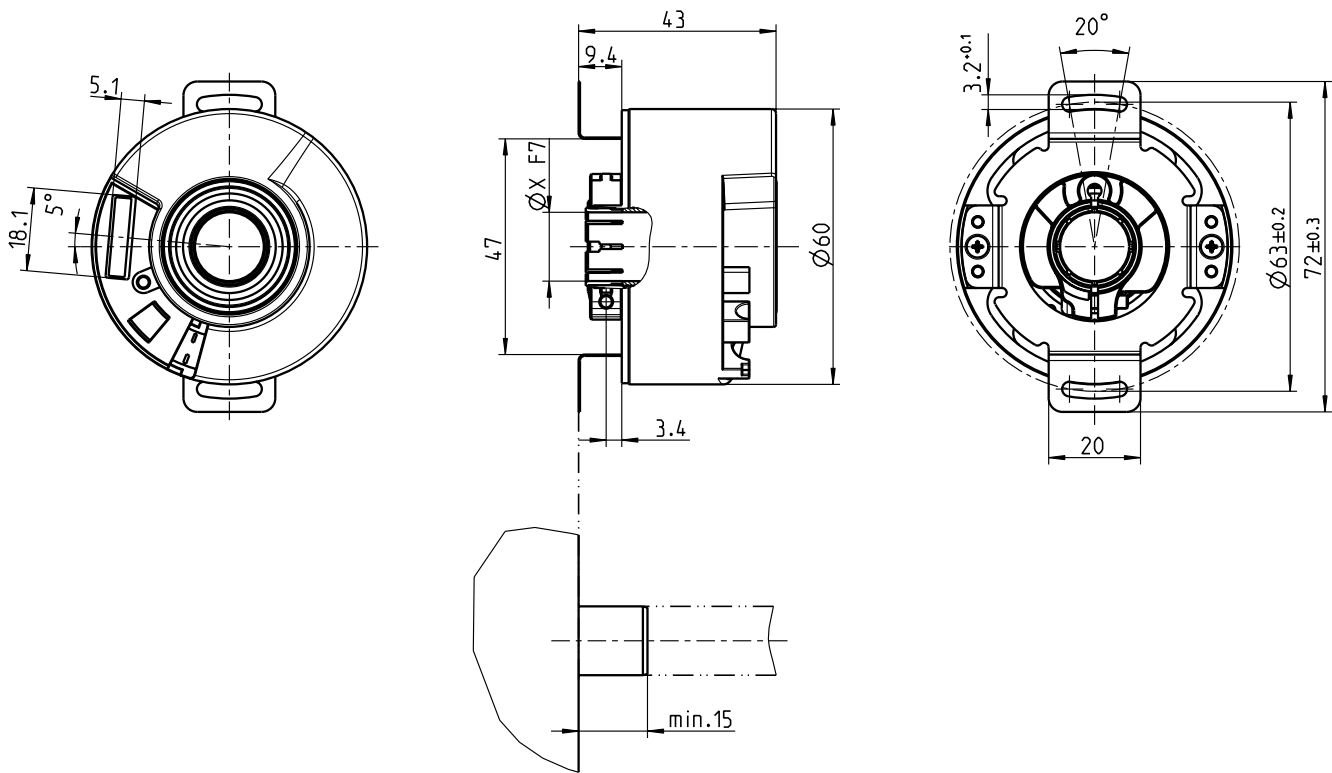
PIN assignment

M23 male connector, 12-pin and cable, 12-wire, SSI/Gray + SIN/COS
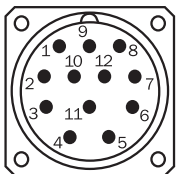
View of M23 male device connector on encoder

Farbe/colour	Stecker-Leiste connector-edge 14-polig	Belegung configuration
blau/blue	14	GND
rot/red	13	US
weiss/white	1	Data+
braun/brown	2	Data-
rosa/pink	9	B/Sin
schwarz/black	10	$\overline{B}/\overline{Sin}$
violett/purple	5	Clock-
gelb/yellow	6	Clock+
gruen/green	8	$\overline{A}/\overline{Cos}$
grau/grew	7	A/Cos
orange/orange	3	SET
orange-schwarz/ orange-black	4	CW /CCW
N.C.	11	
N.C.	12	

Diagrams

Speed consideration (n)

Steps per revolution (y-axis): 0, 16384, 32768, 49152, 65536, 81920, 98304, 114688, 131072, 147456, 163840, 180224, 196608, 212992, 229376, 245760, 262144

Speed N [min⁻¹] (x-axis): 0, 2000, 4000, 6000, 8000, 10000, 12000

The maximum speed is also dependent on the shaft type.

SICK AT A GLANCE

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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.

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