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DATA SHEET

# AFM60B-TFPL032768

AFS/AFM60 SSI
Absolute encoders

SICK Sensor Intelligence



Illustration may differ

# ABSOLUTE ENCODERS

# AFM60B-TFPL032768

## ORDERING INFORMATION

| Type | part no. |
|---|---|
| AFM60B-TFPL032768 | 1148666 |

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) | 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 $\sigma_r$ | 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.

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

### INTERFACES

| | |
|---|---|
| Communication interface | SSI |
| 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) |

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

[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) |

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

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

## ELECTRONICS

| | |
|---|---|
| Connection type | Cable, 8-wire, universal, 3 m [1] |
| Supply voltage | 4.5 ... 32 V |
| Power consumption | ≤ 0.7 W (without load) |
| Reverse polarity protection | ✓ |

[1] The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

## MECHANICS

| | |
|---|---|
| Mechanical design | Through hollow shaft |
| Shaft diameter | 1/2″ |
| 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)<br>± 0.5 mm (axial) |
| Permissible movement dynamic | ± 0.1 mm (radial)<br>± 0.2 mm (axial) |
| Operating speed | ≤ 9,000 $min^{-1}$ [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 | IP65, shaft side (IEC 60529)<br>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.

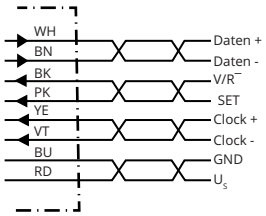
[2] For devices with male connector: with mounted mating connector.

[3] Stationary position of the cable.

## CERTIFICATES

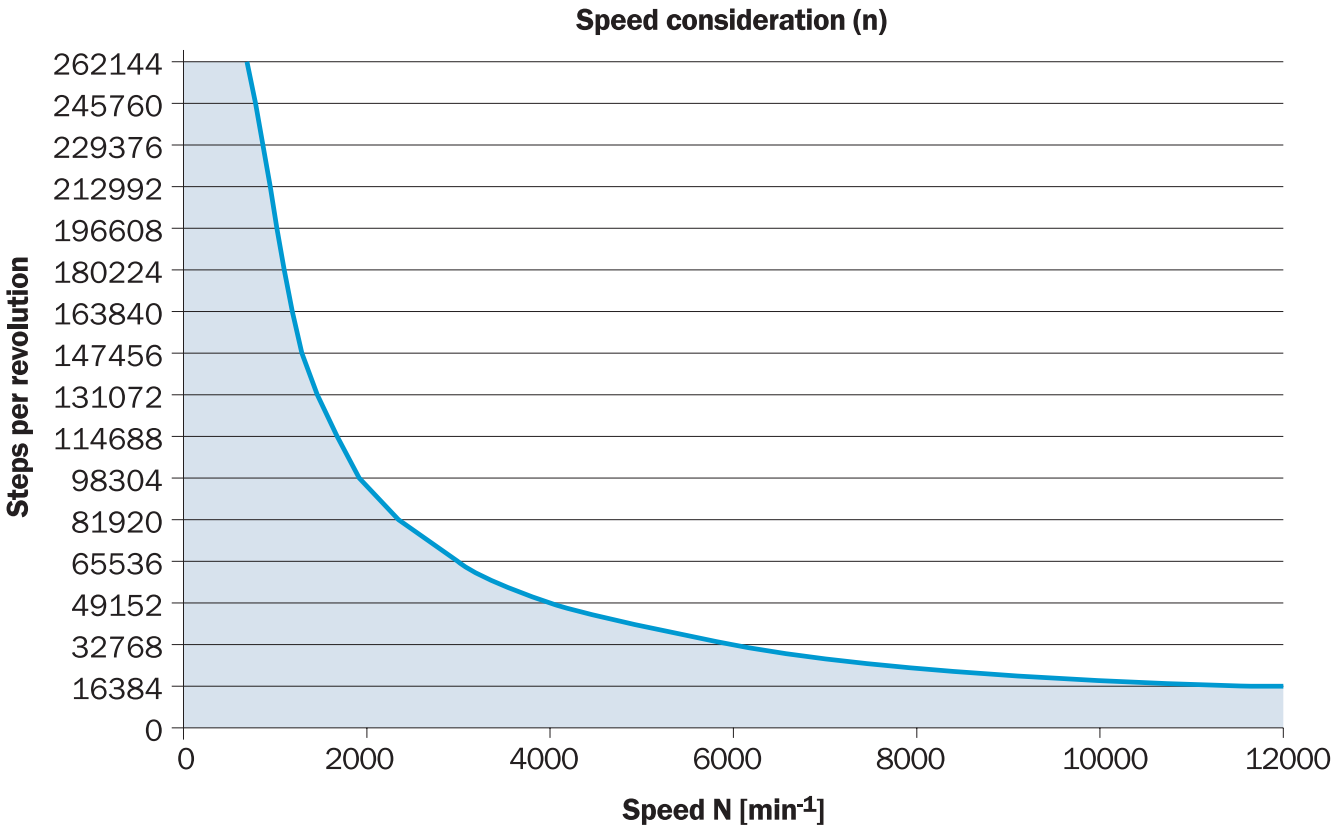
| | |
|---|---|
| EU declaration of conformity | ✓ |
| UK declaration of conformity | ✓ |
| ACMA declaration of conformity | ✓ |
| Moroccan declaration of conformity | ✓ |
| China RoHS | ✓ |
| Information according to Art. 3 of Data Act (Regulation EU 2023/2854) | ✓ |

## ANSCHLUSSBELEGUNG




| PIN | Wire colors (cable connection) | Signal | Explanation |
|---|---|---|---|
| 1 | Brown | Data - | Interface signals |
| 2 | White | Data + | Interface signals |
| 3 | Black | V/R | Sequence in direction of rotation |
| 4 | Pink | SET | Electronic adjustmentInterface signals |
| 5 | Yellow | Clock + | Interface signals |
| 6 | Purple | Clock - | Interface signals |
| 7 | Blue | GND | Ground connection |
| 8 | Red | $U_s$ | Operating voltage |
| – | – | 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/1148666

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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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