



AFM60E-TGLA001024

AFS/AFM60 SSI

ABSOLUTE ENCODERS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

| Type | Part no. |
|-------------------|----------|
| AFM60E-TGLA001024 | 1059567 |

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

Detailed technical data

Performance

| | |
|---|---------------------------------|
| Number of steps per revolution (max. resolution) | 1,024 (10 bit) |
| Number of revolutions | 4,096 (12 bit) |
| Max. resolution (number of steps per revolution x number of revolutions) | 10 bit x 12 bit (1,024 x 4,096) |
| Error limits G | 0.2° 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 / HTL / HTL |
| Initialization time | 50 ms ¹⁾ |
| Position forming time | < 1 μ s |
| Code type | Gray |
| Code sequence parameter adjustable | CW/CCW (V/R) parameter adjustable |
| Clock frequency | \leq 1 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 - U _s V) |
| Pulses per revolution | 1/4 of number of SSI steps per revolution |
| Output frequency | \leq 300 kHz |
| Load current | \leq 30 mA |

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

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

Electrical data

| | |
|--|--|
| Connection type | Male connector, M23, 12-pin, radial |
| Supply voltage | 4.5 ... 32 V |
| 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 | 14 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 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) IP67, housing side (IEC 60529) ²⁾ |
| Permissible relative humidity | 90 % (Condensation not permitted) |
| Operating temperature range | 0 °C ... +85 °C |
| Storage temperature range | -40 °C ... +100 °C, without package |
| Resistance to shocks | 50 g, 6 ms (EN 60068-2-27) |
| Resistance to vibration | 20 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.

Classifications

| | |
|---------------------|----------|
| ECLASS 5.0 | 27270502 |
| ECLASS 5.1.4 | 27270502 |

PIN assignment

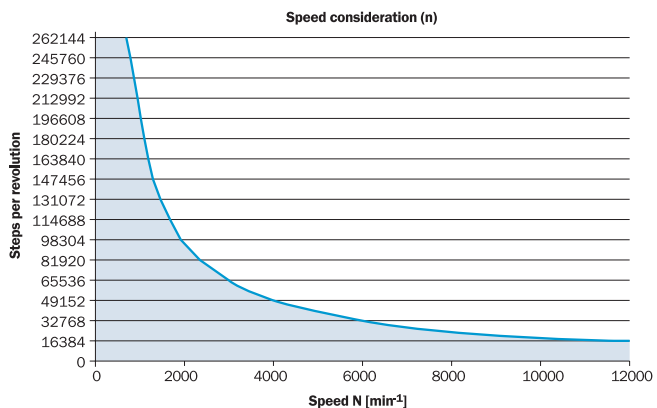
M23 male connector, 12-pin and cable, 12-wire, SSI/Gray + incremental



View of M23 male device connector on encoder

| PIN | Wire colors (cable connection) | Signal Sin/Cos | Explanation |
|-----|--------------------------------|----------------|---|
| 1 | Red | U _S | Operating voltage |
| 2 | Blue | GND | Ground connection |
| 3 | Yellow | Clock + | Interface signals |
| 4 | White | Data + | Interface signals |
| 5 | Orange | SET | Electronic adjustment |
| 6 | Brown | Data - | Interface signals |
| 7 | Violet | Clock - | Interface signals |
| 8 | Black | \bar{B} | Signal wire |
| 9 | Orange-black | CW/CCW (V/R) | Sequence in direction of rotation |
| 10 | Green | \bar{A} | Signal wire |
| 11 | Gray | A | Signal wire |
| 12 | Pink | B | Signal wire |
| | | Screen | Screen connected to housing on encoder side. Connected to ground on control side. |


Diagrams




The maximum speed is also dependent on the shaft type.

Recommended accessories

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

| | Brief description | Type | Part no. |
|---|---|------------------|----------|
| Others | | | |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, angled, A-coded Signal type: HIPERFACE[®], SSI, Incremental Description: HIPERFACE[®], SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, angled, shielded, for cable diameter 4.2 mm ... 6.6 mm Head B: - Operating temperature: -20 °C ... +130 °C Connection systems: Solder connection | DOS-2312-W01 | 2072580 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE[®], SSI, Incremental Description: HIPERFACE[®], SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: - Operating temperature: -40 °C ... +125 °C Connection systems: Solder connection | DOS-2312-G02 | 2077057 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE[®], SSI, Incremental Description: HIPERFACE[®], SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: Operating temperature: -20 °C ... +130 °C Connection systems: Solder connection | DOS-2312-G | 6027538 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 3 m, 12-wire Description: Shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: suitable for drag chain, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm | DOL-2312-G03MMD2 | 2062300 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 5 m, 12-wire Description: Shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: suitable for drag chain, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm | DOL-2312-G05MMD2 | 2062301 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 1.5 m, 12-wire Description: Unshielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: suitable for drag chain, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm | DOL-2312-G1M5MD2 | 2062284 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 10 m, 12-wire Description: Shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: suitable for drag chain, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm | DOL-2312-G10MMD2 | 2062302 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 20 m, 12-wire Description: Shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: suitable for drag chain, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm | DOL-2312-G20MMD2 | 2062303 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, M23, 12-pin, straight Connection type head B: Flying leads Cable: 30 m, 12-wire Description: Shielded, Head A: female connector, M23, 12-pin, straight Head B: cable Cable: suitable for drag chain, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.8 mm | DOL-2312-G30MMD2 | 2062304 |

| | Brief description | Type | Part no. |
|---|--|------------|----------|
|  | <ul style="list-style-type: none">• Connection type head A: Female connector, M23, 9-pin, straight, A-coded• Signal type: HIPERFACE[®], SSI, Incremental• Description: HIPERFACE[®], SSI, Incremental, shielded, Head A: female connector, M23, 9-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: Operating temperature: -20 °C ... +130 °C• Connection systems: Solder connection | DOS-2309-G | 6028533 |

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