



AFM60I-S4RM262144

AFS/AFM60 SSI

ABSOLUTE ENCODERS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

| Type | Part no. |
|-------------------|----------|
| AFM60I-S4RM262144 | 1127883 |

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

Detailed technical data

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) |
| Measuring step deviation | ± 0.002° pulses > 10,000 |
| 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 |
| 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 - U _s V) |
| Pulses per revolution | 1/4 of number of SSI steps per revolution |

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.

| | |
|-------------------------|-----------|
| 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.

Electrical data

| | |
|---|--|
| Connection type | Cable, 12-wire, radial, 5 m |
| Supply voltage | 4.5 ... 32 V DC |
| Power consumption | ≤ 0.5 W (without load) |
| Reverse polarity protection | ✓ |
| MTTF: 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 | Solid shaft, face mount flange |
| Shaft diameter | 10 mm |
| Shaft length | 19 mm |
| 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 shaft loading | 80 N (radial) 40 N (axial) |
| Operating speed | 9,000 min ⁻¹ ²⁾ |
| Moment of inertia of the rotor | 6.2 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 |

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 shocks | 100 g, 6 ms (EN 60068-2-27) |
| 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.

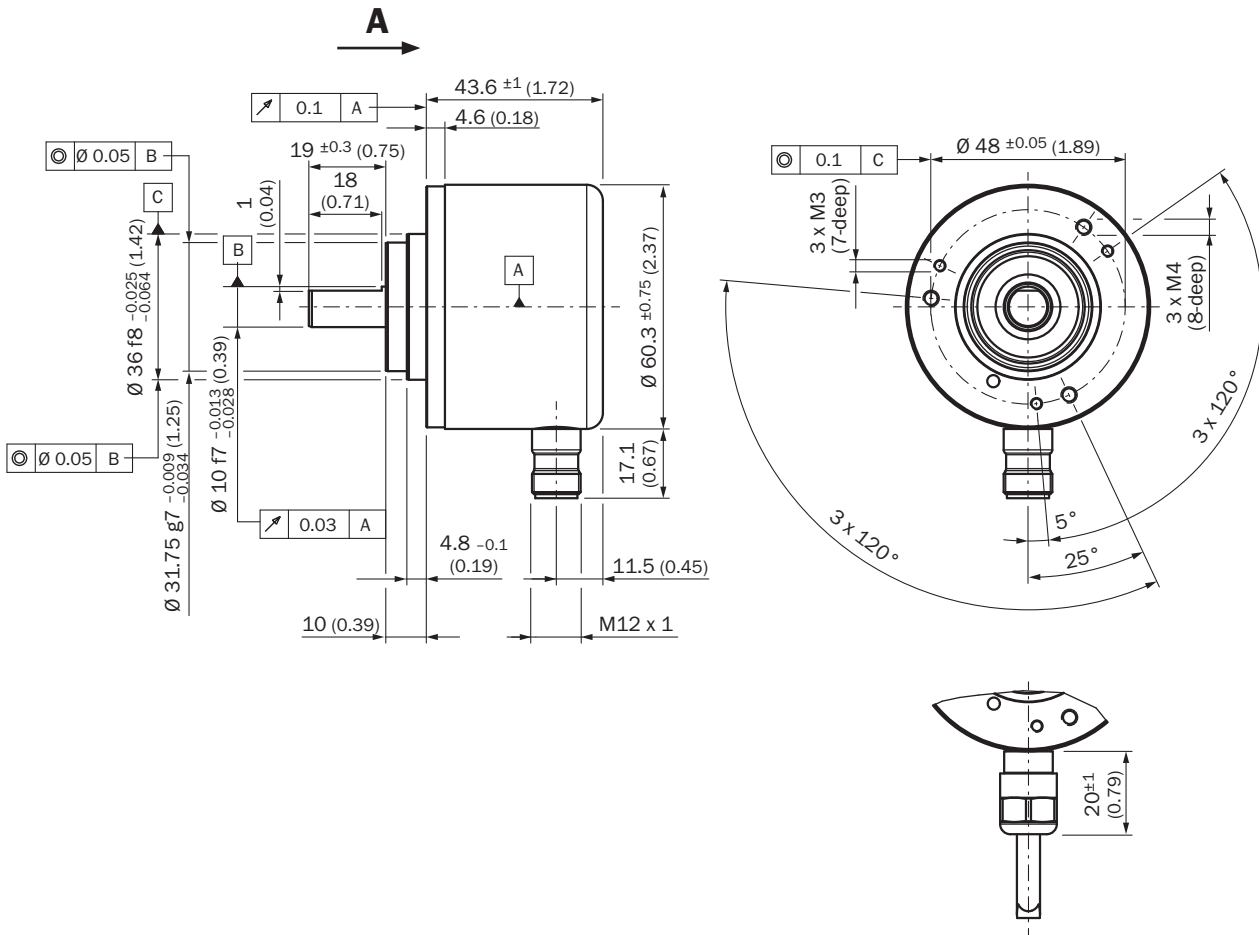
³⁾ Flexible position of the cable.

Classifications

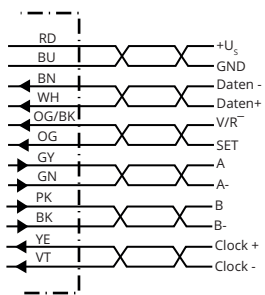
| | |
|-----------------------|----------|
| eCl@ss 5.0 | 27270502 |
| eCl@ss 5.1.4 | 27270502 |
| eCl@ss 6.0 | 27270590 |
| eCl@ss 6.2 | 27270590 |
| eCl@ss 7.0 | 27270502 |
| eCl@ss 8.0 | 27270502 |
| eCl@ss 8.1 | 27270502 |
| eCl@ss 9.0 | 27270502 |
| eCl@ss 10.0 | 27270502 |
| eCl@ss 11.0 | 27270502 |
| eCl@ss 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))

Solid shaft, face mount flange



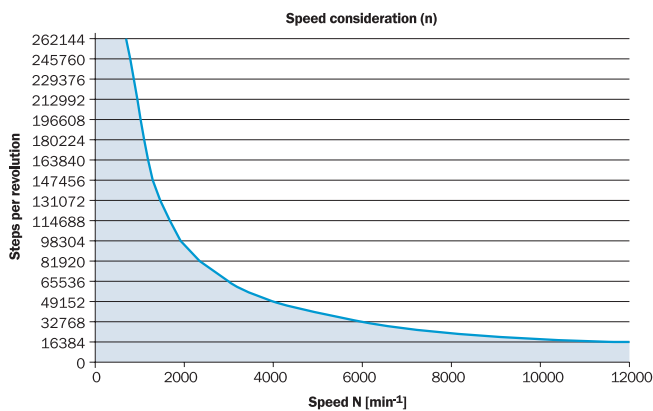
PIN assignment



| Male connector M12, 8-pin | Connector M12, 12-pin | Wire colors (cable connection) | Signal Incremental | Signal Sin/Cos | Explanation |
|---------------------------|-----------------------|--------------------------------|--------------------|----------------|-----------------------------------|
| 3 | 1 | Orange/black | V/R | V/R | Sequence in direction of rotation |
| 2 | 2 | White | Data + | Data + | Interface signals |
| 1 | 3 | Brown | Data - | Data - | Interface signals |
| 6 | 4 | Violet | Clock - | Clock - | Interface signals |

| Male connector M12, 8-pin | Connector M12, 12-pin | Wire colors (cable connection) | Signal Incremental | Signal Sin/Cos | Explanation |
|---------------------------|-----------------------|--------------------------------|--------------------|-----------------|---|
| 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 |
| | | | Screen | 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.

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