



## Absolute encoders AFS/AFM60 SSI

AFM60B-BESA032768

**Model Name** > [AFM60B-BESA032768](#)  
**Part No.** > [1054225](#)



#### At a glance

- High-resolution absolute encoders with up to 30 bits (AFM60) or up to 18 bits (AFS60)
- Face mount flange, servo flange, blind or through hollow shaft
- SSI, SSI + Incremental or SSI + Sin/Cos interface
- Programmable resolution and offset (dependent on type)
- Connection system: M12, M23 connector or cable outlet
- Enclosure rating: IP 67 (housing), IP 65 (shaft)
- Operating temperature: -30 °C to +100 °C (depends on type)

#### Your benefits

- Programmability of the encoders means less storage, greater machine availability and easy installation
- Precise positioning due to high resolutions
- Large selection of mechanical interfaces and electrical contacting possibilities: Suitable for all applications
- Suitable for applications with limited space requirements (extremely short installation depth of 30 mm)
- Very good rotation accuracy due to increased bearing distance
- One programming tool and software with automatic encoder detection for AFS60/AFM60/DFS60



#### Performance

|                                      |                     |
|--------------------------------------|---------------------|
| Max. number of steps per revolution: | 32,768              |
| Max. number of revolutions:          | 4,096               |
| Resolution power:                    | 32,768 x 4,096      |
| Resolution:                          | 15 bit x 12 bit     |
| Error limits:                        | ± 0.05 °            |
| Repeatability (Ta not constant):     | 0.002 °             |
| Measuring step deviation:            | ± 0.01 °            |
| Initialization time:                 | 50 ms <sup>1)</sup> |

<sup>1)</sup> Valid positional data can be read once this time has elapsed

#### Mechanical data

|                       |                    |
|-----------------------|--------------------|
| Mechanical interface: | Blind hollow shaft |
| Shaft diameter:       | 12 mm              |
| Mass:                 | 0.2 kg             |

|                                             |                                   |
|---------------------------------------------|-----------------------------------|
| Start up torque:                            | 0.8 Ncm (20 °C)                   |
| Operating torque:                           | 0.6 Ncm (20 °C)                   |
| Maximum operating speed:                    | 6,000 /min <sup>1)</sup>          |
| Moment of inertia of the rotor:             | 40 gcm <sup>2</sup>               |
| Bearing lifetime:                           | 3.0 x 10 <sup>9</sup> revolutions |
| Max. angular acceleration:                  | 500,000 rad/s <sup>2</sup>        |
| Permissible movement axial static/dynamic:  | ± 0.5 mm, ± 0.2 mm                |
| Permissible movement radial static/dynamic: | ± 0.3 mm, ± 0.1 mm                |

<sup>1)</sup> Self warming of 3.3 K per 1000 revolutions/min when applying note working temperature range

## Electrical data

|                                        |                                      |
|----------------------------------------|--------------------------------------|
| Power consumption:                     | 0.5 W (without load)                 |
| Operating voltage range:               | 4.5 V DC ... 32 V DC                 |
| Maximum output frequency:              | 200 kHz                              |
| Load resistance min.:                  | 120 Ω                                |
| MTTFd: mean time to dangerous failure: | 250 a (EN ISO 13849-1) <sup>1)</sup> |

<sup>1)</sup> 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.

## Interfaces

|                                          |                                                                                   |
|------------------------------------------|-----------------------------------------------------------------------------------|
| Electrical interface:                    | Connector M23, 12-pin, radial                                                     |
| Interface signals:                       | Clock +, Clock -, Data +, Data-, Sin +, Sin -, Cos +, Cos -: analog, differential |
| Clock frequency:                         | 2 MHz <sup>1)</sup>                                                               |
| SET (electronic adjustment):             | H-active (L ≡ 0 - 1,5 V, H ≡ 2,0 - Us V)                                          |
| CW/CCW (counting sequence when turning): | L-active (L ≡ 0 - 1,5 V, H ≡ 2,0 - Us V)                                          |
| Signal before differential generation:   | ± 20 %                                                                            |
| Signal offset:                           | 2.5 V ± 10 %                                                                      |

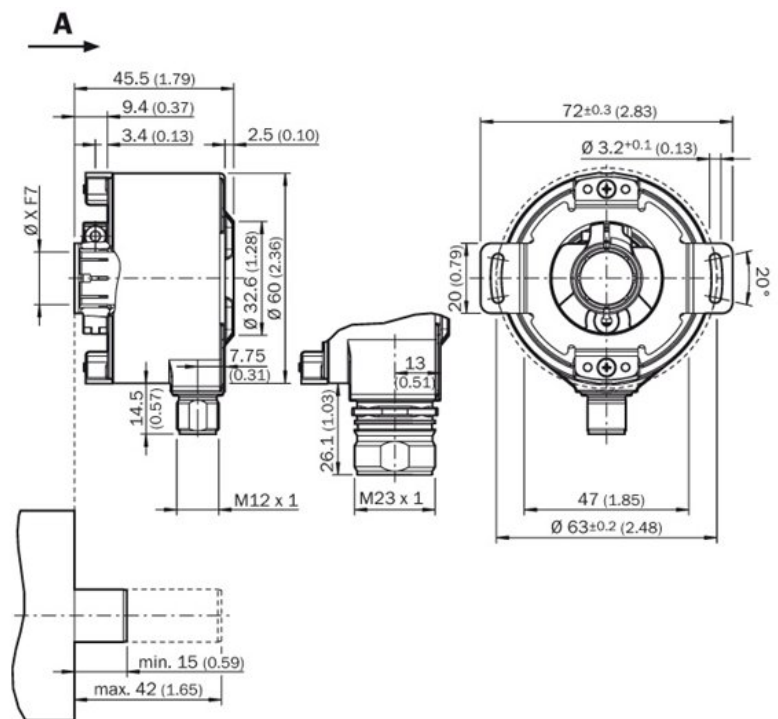
<sup>1)</sup>

## Ambient data

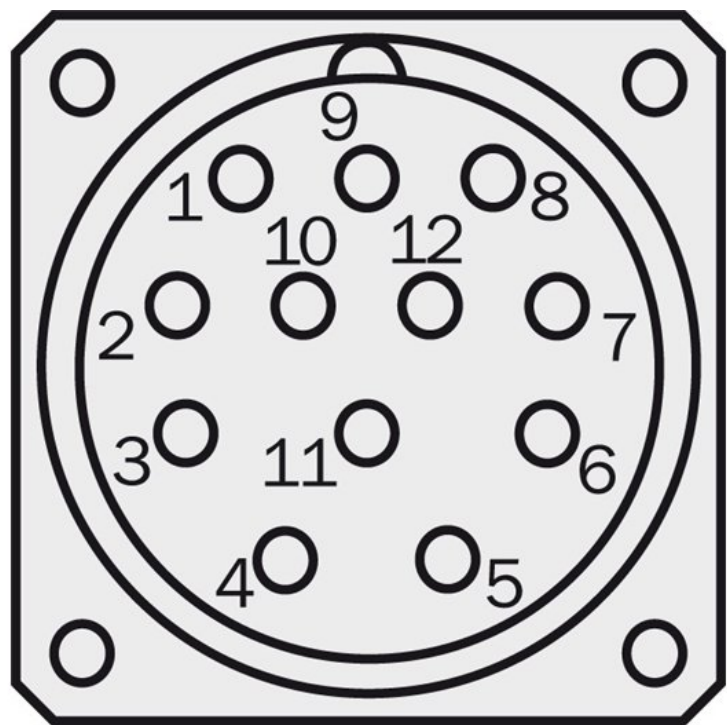
|                                |                                                                            |
|--------------------------------|----------------------------------------------------------------------------|
| EMC:                           | (according to EN 61000-6-2 and EN 61000-6-3) <sup>1)</sup>                 |
| Enclosure rating:              | IP 65 (according to IEC 60529), shaft side, IP 67 (according to IEC 60529) |
| Permissible relative humidity: | 90 % (condensation of the optical scanning not permitted)                  |
| Working temperature range:     | -30 °C ... 100 °C                                                          |
| Storage temperature range:     | -40 °C ... 100 °C, without package                                         |
| Resistance to shocks:          | 70 g (according to EN 60068-2-27)                                          |
| Resistance to vibration:       | 30 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)                       |

<sup>1)</sup> <sup>2)</sup> With mating connector fitted

Dimensional drawing



PIN assignment



#### **Australia**

Phone +61 3 9457 0600  
1800 334 802 – tollfree  
E-Mail sales@sick.com.au

#### **Belgium/Luxembourg**

Phone +32 (0)2 466 55 66  
E-Mail info@sick.be

#### **Brasil**

Phone +55 11 3215-4900  
E-Mail sac@sick.com.br

#### **Canada**

Phone +1 905 771 14 44  
E-Mail information@sick.com

#### **Ceská Republika**

Phone +420 2 57 91 18 50  
E-Mail sick@sick.cz

#### **China**

Phone +86 4000 121 000  
E-Mail info.china@sick.net.cn  
Phone +852-2153 6300  
E-Mail ghk@sick.com.hk

#### **Danmark**

Phone +45 45 82 64 00  
E-Mail sick@sick.dk

#### **Deutschland**

Phone +49 211 5301-301  
E-Mail kundenservice@sick.de

#### **España**

Phone +34 93 480 31 00  
E-Mail info@sick.es

#### **France**

Phone +33 1 64 62 35 00  
E-Mail info@sick.fr

#### **Great Britain**

Phone +44 (0)1727 831121  
E-Mail info@sick.co.uk

#### **India**

Phone +91-22-4033 8333  
E-Mail info@sick-india.com

#### **Israel**

Phone +972-4-6801000  
E-Mail info@sick-sensors.com

#### **Italia**

Phone +39 02 27 43 41  
E-Mail info@sick.it

#### **Japan**

Phone +81 (0)3 3358 1341  
E-Mail support@sick.jp

#### **Magyarország**

Phone +36 1 371 2680  
E-Mail office@sick.hu

#### **Nederlands**

Phone +31 (0)30 229 25 44  
E-Mail info@sick.nl

#### **Norge**

Phone +47 67 81 50 00  
E-Mail austefjord@sick.no

#### **Österreich**

Phone +43 (0)22 36 62 28 8-0  
E-Mail office@sick.at

#### **Polska**

Phone +48 22 837 40 50  
E-Mail info@sick.pl

#### **România**

Phone +40 356 171 120  
E-Mail office@sick.ro

#### **Russia**

Phone +7-495-775-05-30  
E-Mail info@sick.ru

#### **Schweiz**

Phone +41 41 619 29 39  
E-Mail contact@sick.ch

#### **Singapore**

Phone +65 6744 3732  
E-Mail admin@sicksgp.com.sg

#### **Slovenija**

Phone +386 (0)1-47 69 990  
E-Mail office@sick.si

#### **South Africa**

Phone +27 11 472 3733  
E-Mail info@sickautomation.co.za

#### **South Korea**

Phone +82 2 786 6321/4  
E-Mail info@sickkorea.net

#### **Suomi**

Phone +358-9-25 15 800  
E-Mail sick@sick.fi

#### **Sverige**

Phone +46 10 110 10 00  
E-Mail info@sick.se

#### **Taiwan**

Phone +886-2-2375-6288  
E-Mail sales@sick.com.tw

#### **Türkiye**

Phone +90 (216) 528 50 00  
E-Mail info@sick.com.tr

#### **United Arab Emirates**

Phone +971 (0) 4 8865 878  
E-Mail info@sick.ae

#### **USA/México**

Phone +1(952) 941-6780  
1 800-325-7425 – tollfree  
E-Mail info@sickusa.com

More representatives and agencies  
at [www.sick.com](http://www.sick.com)