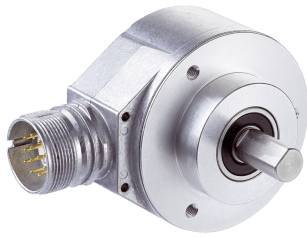




## AFS/AFM60 SSI

Precise, flexible, programmable

**SICK**  
Sensor Intelligence.



Technical data overview

|   |   |                           |   |                                |       |                    |  |                      |  |                            |       |
|---|---|---------------------------|---|--------------------------------|-------|--------------------|--|----------------------|--|----------------------------|-------|
| <b>Encoder design</b>                                   | Singleturn / Multiturn (depending on type)  |                           |   |                                |       |                    |  |                      |  |                            |       |
| <b>Shaft type</b>                                       | Solid shaft, Servo flange<br>Solid shaft, face mount flange<br>Blind hollow shaft<br>Through hollow shaft<br>Solid shaft, Square flange   |                           |   |                                |       |                    |  |                      |  |                            |       |
| <b>Shaft diameter</b>                                   | <table border="0"> <tr> <td>Solid shaft, Servo flange</td> <td>6 mm</td> </tr> <tr> <td>Solid shaft, face mount flange</td> <td>10 mm</td> </tr> <tr> <td>Blind hollow shaft</td> <td>12 mm<br/>15 mm<br/>8 mm<br/>3/8"<br/>10 mm<br/>1/2"<br/>14 mm<br/>5/8" <sup>1)</sup></td> </tr> <tr> <td>Through hollow shaft</td> <td>8 mm<br/>14 mm<br/>15 mm<br/>10 mm<br/>12 mm<br/>1/2"<br/>3/8"<br/>5/8" <sup>1)</sup></td> </tr> <tr> <td>Solid shaft, Square flange</td> <td>10 mm</td> </tr> </table> | Solid shaft, Servo flange | 6 mm  | Solid shaft, face mount flange | 10 mm | Blind hollow shaft | 12 mm<br>15 mm<br>8 mm<br>3/8"<br>10 mm<br>1/2"<br>14 mm<br>5/8" <sup>1)</sup> | Through hollow shaft | 8 mm<br>14 mm<br>15 mm<br>10 mm<br>12 mm<br>1/2"<br>3/8"<br>5/8" <sup>1)</sup> | Solid shaft, Square flange | 10 mm |
| Solid shaft, Servo flange                               | 6 mm  |                           |   |                                |       |                    |  |                      |  |                            |       |
| Solid shaft, face mount flange                          | 10 mm   |                           |   |                                |       |                    |  |                      |  |                            |       |
| Blind hollow shaft                                      | 12 mm<br>15 mm<br>8 mm<br>3/8"<br>10 mm<br>1/2"<br>14 mm<br>5/8" <sup>1)</sup>  |                           |   |                                |       |                    |  |                      |  |                            |       |
| Through hollow shaft                                    | 8 mm<br>14 mm<br>15 mm<br>10 mm<br>12 mm<br>1/2"<br>3/8"<br>5/8" <sup>1)</sup>  |                           |   |                                |       |                    |  |                      |  |                            |       |
| Solid shaft, Square flange                              | 10 mm   |                           |   |                                |       |                    |  |                      |  |                            |       |
| <b>Connection type</b>                                  | Male connector, M23, 12-pin, radial<br>Male connector, M12, 8-pin, radial<br>Cable, 8-wire, universal<br>Cable, 12-wire, radial<br>Male connector, M12, 12-pin, radial  |                           |   |                                |       |                    |  |                      |  |                            |       |
| <b>Communication interface</b>                          | SSI   |                           |   |                                |       |                    |  |                      |  |                            |       |
| <b>Number of steps per revolution (max. resolution)</b> | <table border="0"> <tr> <td>SSI, non programmable</td> <td>512 (9 bit)<br/>2,048 (11 bit)<br/>360<br/>1,024 (10 bit)<br/>4,096 (12 bit)<br/>262,144 (18 bit)<br/>32,768 (15 bit)<br/>65,536 (16 bit)<br/>8,192 (13 bit)<br/>131,072 (17 bit)<br/>3,600<br/>16,384 (14 bit)<br/>31,680<br/>256 (8 bit)<br/>720<br/>1,080<br/>7,200<br/>28,800 (15 bit)<br/>36,000</td> </tr> </table>  | SSI, non programmable     | 512 (9 bit)<br>2,048 (11 bit)<br>360<br>1,024 (10 bit)<br>4,096 (12 bit)<br>262,144 (18 bit)<br>32,768 (15 bit)<br>65,536 (16 bit)<br>8,192 (13 bit)<br>131,072 (17 bit)<br>3,600<br>16,384 (14 bit)<br>31,680<br>256 (8 bit)<br>720<br>1,080<br>7,200<br>28,800 (15 bit)<br>36,000 |                                |       |                    |  |                      |  |                            |       |
| SSI, non programmable                                   | 512 (9 bit)<br>2,048 (11 bit)<br>360<br>1,024 (10 bit)<br>4,096 (12 bit)<br>262,144 (18 bit)<br>32,768 (15 bit)<br>65,536 (16 bit)<br>8,192 (13 bit)<br>131,072 (17 bit)<br>3,600<br>16,384 (14 bit)<br>31,680<br>256 (8 bit)<br>720<br>1,080<br>7,200<br>28,800 (15 bit)<br>36,000   |                           |   |                                |       |                    |  |                      |  |                            |       |

1) 5/8" not available with multiturn.  
 2) Stationary position of the cable.  
 3) Flexible position of the cable.  
 4) For devices with male connector: with mounted mating connector.  
 5) With mating connector fitted.

|   |   |
|---|---|
|   | 600<br>18,000   |
| SSI, programmable   | 262,144 (18 bit)<br>32,768 (15 bit)<br>18,000   |
| <b>Max. resolution (number of steps per revolution x number of revolutions)</b> |   |
| SSI, non programmable   | 9 bit x 12 bit (512 x 4,096)<br>10 bit x 12 bit (1,024 x 4,096)<br>12 bit x 12 bit (4,096 x 4,096)<br>15 bit x 12 bit (32,768 x 4,096)<br>13 bit x 12 bit (8,192 x 4,096)<br>14 bit x 12 bit (16,384 x 4,096)<br>16 bit x 12 bit (65,536 x 4,096)<br>18 bit x 12 bit (262,144 x 4,096)<br>11 bit x 12 bit (2,048 x 4,096)<br>8 bit x 12 bit (256 x 4,096)<br>13 bit x 12 bit (4,096 x 4,096)<br>17 bit x 12 bit (131,072 x 4,096) |
| SSI, programmable   | 18 bit x 12 bit (262,144 x 4,096)<br>15 bit x 12 bit (32,768 x 4,096)<br>12 bit x 12 bit (4,096 x 4,096)  |
| SSI, SSI + incremental, non programmable  | 10 bit x 12 bit (1,024 x 4,096)<br>12 bit x 12 bit (4,096 x 4,096)<br>14 bit x 12 bit (16,384 x 4,096)<br>16 bit x 12 bit (65,536 x 4,096)<br>13 bit x 12 bit (8,192 x 4,096)<br>9 bit x 12 bit (512 x 4,096)<br>18 bit x 12 bit (262,144 x 4,096)<br>11 bit x 12 bit (2,048 x 4,096)<br>15 bit x 12 bit (32,768 x 4,096)<br>17 bit x 12 bit (131,072 x 4,096)  |
| SSI, SSI + Sin/Cos, non programmable  | 16 bit x 12 bit (65,536 x 4,096)<br>18 bit x 12 bit (262,144 x 4,096)<br>15 bit x 12 bit (32,768 x 4,096)<br>12 bit x 12 bit (4,096 x 4,096)<br>11 bit x 12 bit (2,048 x 4,096)<br>13 bit x 12 bit (8,192 x 4,096)<br>10 bit x 12 bit (1,024 x 4,096)<br>9 bit x 12 bit (512 x 4,096)<br>14 bit x 12 bit (16,384 x 4,096)   |
| SSI, SSI + incremental, programmable  | 18 bit x 12 bit (262,144 x 4,096)<br>15 bit x 12 bit (32,768 x 4,096)<br>13 bit x 12 bit (8,192 x 4,096)  |
| SSI, SSI + Sin/Cos, programmable  | 18 bit x 12 bit (262,144 x 4,096)<br>15 bit x 12 bit (32,768 x 4,096)<br>12 bit x 12 bit (4,096 x 4,096)  |
| <b>Programmable/configurable</b>  | Over handheld programming tool<br>Over SOPAS (depending on type)  |
| <b>Operating temperature range</b>  | -40 °C ... +100 °C <sup>2)</sup><br>0 °C ... +85 °C<br>-30 °C ... +100 °C <sup>3)</sup>   |
| <b>Enclosure rating</b>   | IP65<br>(IEC 60529)<br>Shaft side   |

<sup>1)</sup> 5/8" not available with multiturn.

<sup>2)</sup> Stationary position of the cable.

<sup>3)</sup> Flexible position of the cable.

<sup>4)</sup> For devices with male connector: with mounted mating connector.

<sup>5)</sup> With mating connector fitted.

|  |  |
|--|--|
|  | IP67<br>(IEC 60529)                        |
|  | Housing side <sup>4)</sup>                 |
|  | IP67<br>(IEC 60529)                        |
|  | Shaft side                                 |
|  | IP67<br>(IEC 60529)                        |
|  | Housing side, male connector <sup>5)</sup> |
|  | IP67<br>(IEC 60529)                        |
|  | Housing side, cable connection             |

- 1) 5/8" not available with multiturn.
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## Product description

The AFS/AFM60 SSI offers a maximum total resolution of up to 30 bits (AFM60), a large selection of programmable parameters, good concentricity properties, and a compact design. Thanks to the combination of high resolution and high enclosure rating, the encoders are suitable for a wide variety of industrial applications. Variants with a stainless-steel housing are available for applications in harsh environments. The AFS/AFM60 SSI are equipped as standard with an SSI interface, and the AFM60 is also available with combined SSI and incremental as well as SSI and sin/cos interfaces. The encoders can be programmed via the PGT-08-S PC-based programming device or the PGT-10-Pro hand-held programming device.

## At a glance

- High-resolution absolute encoder with up to 30 bits (AFM60) or 18 bits (AFS60)
- Various types of solid and hollow shaft
- Connection: M12 male connector, M23 male connector or cable
- Communication interfaces: SSI, SSI + incremental, SSI + Sin/Cos
- Programmable (type-dependent)
- Stainless steel (Inox versions)
- Enclosure rating up to IP67

## Your benefits

- Their high resolution and measurement accuracy enable them to be used in demanding applications
- Application-specific solutions thanks to various mechanical interfaces
- Simple to mount due to compact design, even when space is limited
- Programmability ensures reduced storage, high machine availability, and easy installation
- Suitable programming tools for every application are available as accessories
- High resistance to environmental influences due to stainless-steel housing (Inox versions)
- High impermeability due to enclosure rating up to IP67

## Fields of application

Measurement of the absolute position in various machines and systems, such as machine tools, packaging systems, wood processing machines, presses, printing machines.

Type code

Other models and accessories → [www.sick.com/AFS\\_AFM60\\_SSI](http://www.sick.com/AFS_AFM60_SSI)



- 1) Only for type Inox.
- 2) Only for solid shaft type.
- 3) Only for solid shaft type, square flange and type Inox.
- 4) Only for blind hollow shaft and through hollow shaft type.
- 5) Only for Multiturn encoder versions.
- 6) Incremental number of lines is always 1/4 of the SSI/gray number of steps.
- 7) Incremental number of lines is always 1/4 of the SSI/gray number of steps.
- 8) Only for A and P communication interface.
- 9) The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.
- 10) Only for R, S, L, T and K communication interface.
- 11) See "Number of steps per revolution" table.
- 12) Other number of steps per revolution upon request.
- 13) See "Number of steps per revolution" table. Programmable (P and R communication interface): Increments per revolution 256 ... 32,768, set to 32,768 at the factory.
- 14) See "Number of steps per revolution" table. Programmable (P and R communication interface): Increments per revolution 256 ... 262,144, set to 262,144 at the factory.
- 15) See "Resolution" table.
- 16) Other resolutions upon request.
- 17) Number of revolutions: 4,096 (12 bit).
- 18) See "Resolution" table. Programmable (P and R communication interface): Resolution 8x12 ... 15x12, set to 15x12 at the factory.
- 19) See "Resolution" table. Programmable (P and R communication interface): Resolution 8x12 ... 18x12, set to 18x12 at the factory.

**Number of steps per revolution (more upon request)**

|                  | <b>AFS60E / AFM60E</b> | <b>AFS60B / AFM60B</b> | <b>AFS60A/AFM60A<br/>AFS60I/AFM60I</b> |
|------------------|------------------------|------------------------|--|
| Non-programmable | 00256                  | 00256                  | 00256                                  |
|                  | 00512                  | 00512                  | 00360                                  |
|                  | 01024                  | 01024                  | 00512                                  |
|                  | 02048                  | 02048                  | 00720                                  |
|                  | 04096                  | 04096                  | 01024                                  |
|                  | -                      | 08192                  | 02048                                  |
|                  | -                      | 16384                  | 03600                                  |
|                  | -                      | 32768                  | 04096                                  |
|                  | -                      | -                      | 08192                                  |
|                  | -                      | -                      | 16384                                  |
| Programmable     | -                      | 00256 ... 32,768       | 00256 ... 262,144                      |

**Resolution (available upon request)**

|                  | <b>AFS60E / AFM60E</b> | <b>AFS60B / AFM60B</b> | <b>AFS60A/AFM60A<br/>AFS60I/AFM60I</b> |
|------------------|------------------------|------------------------|--|
| Non-programmable | 08x12                  | 08x12                  | 08x12                                  |
|                  | 09x12                  | 09x12                  | 09x12                                  |
|                  | 10x12                  | 10x12                  | 10x12                                  |
|                  | 11x12                  | 11x12                  | 11x12                                  |
|                  | 12x12                  | 12x12                  | 12x12                                  |
|                  | -                      | 14x12                  | 13x12                                  |
|                  | -                      | 15x12                  | 14x12                                  |
|                  | -                      | -                      | 15x12                                  |
|                  | -                      | -                      | 16x12                                  |
|                  | -                      | -                      | 17x12                                  |
| -                | -                      | 18x12                  |  |
| Programmable     | -                      | 08x12 ... 15x12        | 08x12 ... 18x12                        |

## SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

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.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

## WORLDWIDE PRESENCE:

Contacts and other locations –[www.sick.com](http://www.sick.com)