



AFM60A-S1PL262144

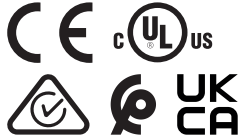
AFS/AFM60 SSI

ABSOLUTE ENCODERS

SICK
Sensor Intelligence.



Illustration may differ



Ordering information

| Type | part no. |
|-------------------|----------|
| AFM60A-S1PL262144 | 1037521 |

Other models and accessories → 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) | 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) |
| 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 |
| 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) |
| CW/CCW (counting sequence when turning) | L-active (L = 0 - 1,5 V, H = 2,0 - U _s 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 | Solid shaft, Servo flange |
| Shaft diameter | 6 mm |
| Shaft length | 10 mm |
| Characteristics of the shaft | With flat |
| Weight | 0.3 kg ¹⁾ |
| Shaft material | Stainless steel |
| Flange material | Aluminum |
| Housing material | Aluminum die cast |
| Start up torque | < 0.5 Ncm (+20 °C) |
| Operating torque | < 0.3 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 | IP65, shaft side (IEC 60529) 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 | 60 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.

³⁾ Stationary position of the cable.

Certificates

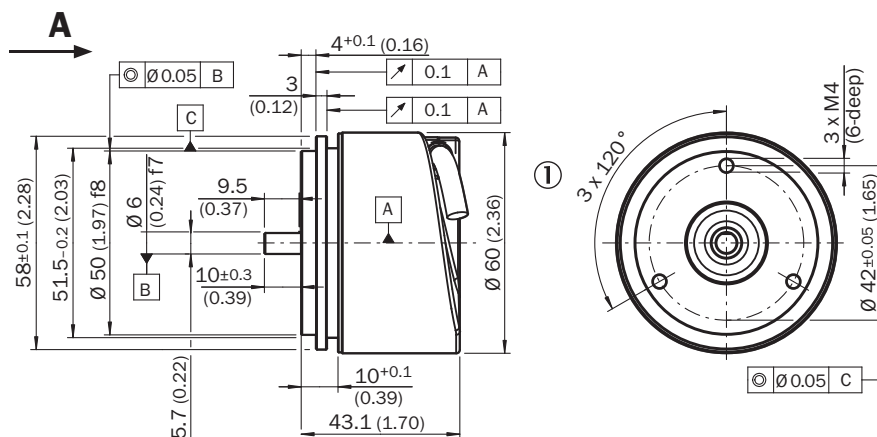
| | |
|---------------------------------------|---|
| EU declaration of conformity | ✓ |
| UK declaration of conformity | ✓ |
| ACMA declaration of conformity | ✓ |

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

Classifications

| | |
|----------------|----------|
| ECLASS 5.0 | 27270502 |
| ECLASS 5.1.4 | 27270502 |
| ECLASS 6.0 | 27270590 |
| ECLASS 6.2 | 27270590 |
| ECLASS 7.0 | 27270502 |
| ECLASS 8.0 | 27270502 |
| ECLASS 8.1 | 27270502 |
| ECLASS 9.0 | 27270502 |
| ECLASS 10.0 | 27270502 |
| ECLASS 11.0 | 27270502 |
| ECLASS 12.0 | 27270502 |
| ETIM 5.0 | EC001486 |
| ETIM 6.0 | EC001486 |
| ETIM 7.0 | EC001486 |
| ETIM 8.0 | EC001486 |
| UNSPSC 16.0901 | 41112113 |

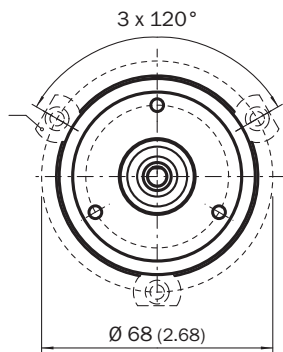
Dimensional drawing



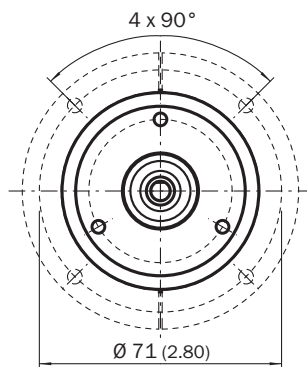
Dimensions in mm (inch)

① cable diameter = 5.6 mm +/- 0.2 mm bend radius = 30 mm

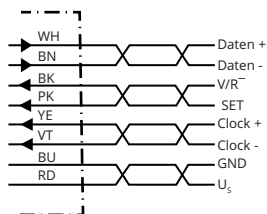
Attachment specifications



Attachment specifications



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 adjustment-Interface signals |
| 5 | Yellow | Clock + | Interface signals |
| 6 | Purple | Clock - | Interface signals |
| 7 | Blue | GND | Ground connection |
| 8 | Red | U _S | Operating voltage |

| PIN | Wire colors (cable connection) | Signal | Explanation |
|-----|--------------------------------|-----------|---|
| - | - | Shielding | Screen connected to housing on encoder side. Connected to ground on control side. |


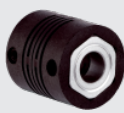


Diagrams




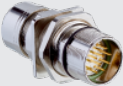





The maximum speed is also dependent on the shaft type.

Recommended accessories

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

| | Brief description | Type | part no. |
|---|---|------------|----------|
| shaft adaptation | | | |
|  | <ul style="list-style-type: none"> Product segment: Shaft adaptation Product: Shaft couplings Description: Bellows coupling, shaft diameter 6 mm / 10 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular $\pm 4^\circ$; max. speed 10,000 rpm, -30°C to $+120^\circ\text{C}$, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub | KUP-0610-B | 5312982 |
|  | <ul style="list-style-type: none"> Product segment: Shaft adaptation Product: Shaft couplings Description: Double loop coupling, shaft diameter 6 mm / 10 mm, max. shaft offset: radially ± 2.5 mm, axially ± 3 mm, angle ± 10 degrees; max. speed 3,000 rpm, -30 to $+80$ degrees Celsius, torsional spring stiffness of 25 Nm/rad | KUP-0610-D | 5326697 |
|  | <ul style="list-style-type: none"> Product segment: Shaft adaptation Product: Shaft couplings Description: Spring washer coupling, shaft diameter 6 mm / 10 mm, Maximum shaft offset: radial ± 0.3 mm, axial ± 0.4 mm, angular $\pm 2.5^\circ$; max. speed 12,000 rpm, -10° to $+80^\circ\text{C}$, max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin | KUP-0610-F | 5312985 |
|  | <ul style="list-style-type: none"> Product segment: Shaft adaptation Product: Shaft couplings Description: Bar coupling, shaft diameter 6 mm / 10 mm, max. shaft offset: radial ± 0.3 mm, axial ± 0.3 mm, angular $\pm 3^\circ$; max. speed 10,000 rpm, -10° to $+80^\circ\text{C}$, max. torque: 80 Ncm, material: fiber-glass reinforced polyamide, aluminum hub | KUP-0610-S | 2056407 |
|  | <ul style="list-style-type: none"> Product segment: Shaft adaptation Product: Shaft couplings Description: Claw coupling, shaft diameter 6 mm / 10 mm, damping element 80 shore blue, maximum shaft offset: radial ± 0.22 mm, axial ± 1 mm angular $\pm 1.3^\circ$, max. speed 19,000 rpm, angle of twist max. 10°, -30°C to $+80^\circ\text{C}$, max. torque 800 Ncm, tightening torque of screws: ISO 4029 150 Ncm, material: aluminum flange, damping element: polyurethane | KUP-0610-J | 2127056 |
|  | <ul style="list-style-type: none"> Product segment: Shaft adaptation Product: Shaft couplings Description: Bellows coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular $\pm 4^\circ$; max. speed 10,000 rpm, -30°C to $+120^\circ\text{C}$, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub | KUP-0606-B | 5312981 |
|  | <ul style="list-style-type: none"> Product segment: Shaft adaptation Product: Shaft couplings Description: Cross-slotted coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial ± 0.3 mm, axial ± 0.2 mm, angle $\pm 3^\circ$; max. speed 10,000 rpm, -10° to $+80^\circ\text{C}$, max. torque 80 Ncm; material: fiber-glass reinforced polyamide, aluminum hub | KUP-0606-S | 2056406 |
|  | <ul style="list-style-type: none"> Product segment: Shaft adaptation Product: Shaft couplings Description: Bar coupling, shaft diameter 6 mm / 8 mm, maximum shaft offset radial ± 0.3 mm, axial ± 0.2 mm, angle $\pm 3^\circ$, max. speed 10,000 rpm, torsion spring rigidity 38 Nm/wheel; material: fiber-glass reinforced polyamide, aluminum hub | KUP-0608-S | 5314179 |
| Mounting systems | | | |
|  | <ul style="list-style-type: none"> Description: Servo clamps, large, for servo flange (clamps, eccentric fastener), 3 pcs, without mounting material Items supplied: Without mounting hardware | BEF-WK-SF | 2029166 |

| | Brief description | Type | part no. |
|---|---|------------------|----------|
| programming devices | | | |
|  | <ul style="list-style-type: none"> Product segment: Programming devices Product family: PGT-10 Pro Description: Programming unit display for programmable SICK DFS60, DFV60, AFS/AFM60, AHS/AHM36 encoders, and wire draw encoder with DFS60, AFS/AFM60 and AHS/AHM36. Compact dimensions, low weight, and intuitive operation. Items supplied: 1 x PGT-10-Pro stand-alone programming tool, 4 x alkaline type batteries, 1.5 V Mignon (AA) | PGT-10-Pro | 1072254 |
|  | <ul style="list-style-type: none"> Product segment: Programming devices Product family: PGT-08-S Description: USB programming unit, for programmable SICK encoders AFS60, AFM60, DFS60, VFS60, DFV60 and wire draw encoders with programmable encoders. Not compatible with the portable SOPAS ET versions. | PGT-08-S | 1036616 |
| connectors and cables | | | |
|  | <ul style="list-style-type: none"> Connection type head A: Male connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE[®], SSI, Incremental, RS-422 Description: HIPERFACE[®], shielded SSI Incremental RS-422 Connection systems: Solder connection | STE-2312-G | 6027537 |
|  | <ul style="list-style-type: none"> Connection type head A: Male connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE[®], SSI, Incremental Description: HIPERFACE[®], shielded SSI Incremental Connection systems: Solder connection | STE-2312-GX | 6028548 |
|  | <ul style="list-style-type: none"> Connection type head A: Male connector, M23, 12-pin, straight, A-coded Signal type: HIPERFACE[®], SSI, Incremental Description: HIPERFACE[®], shielded SSI Incremental Connection systems: Solder connection | STE-2312-G01 | 2077273 |
|  | <ul style="list-style-type: none"> Connection type head A: Male connector, M12, 8-pin, straight, A-coded Signal type: Incremental Cable: CAT5, CAT5e Description: Incremental, shielded Connection systems: IDC quick connection Permitted cross-section: 0.14 mm² ... 0.34 mm² | STE-1208-GA01 | 6044892 |
|  | <ul style="list-style-type: none"> Connection type head A: Female connector, terminal box, 8-pin, straight Connection type head B: Male connector, D-Sub, 9-pin, straight Signal type: SSI + incremental Cable: 0.5 m, 4-wire, PVC Description: SSI + incremental, shielded Note: Programming adapter cable for programming tool PGT-10-Pro and PGT-08-S | DSL-0D08-G0M5AC3 | 2061739 |

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.

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