



AFS/AFM60 SSI

PRECISE, FLEXIBLE, VERSATILE

Absolute encoders

SICK
Sensor Intelligence.

PRECISE, FLEXIBLE, VERSATILE



Product description

With a high resolution of 18 bits (AFS60) or 30 bits (AFM60) and a large selection of programmable parameters, the AFS60 absolute singleturn encoder and the AFM60 absolute multiturn encoder set new standards when it comes to rotary encoders. The high resolution combined with the high IP protection class enables use in a multitude of industrial applications. Both encoders are equipped with the SSI interface while the AFM60 is also available with

the SSI + Incremental and SSI + Sin/Cos combined interfaces. A shaft bearing distance of 30 mm means the AFS60/AFM60 product family has significantly better rotation accuracy than encoders with blocked ball bearings. Yet despite their large bearing distance, the AFS60/AFM60 have a compact design. The AFS and AFM60 SSI can be programmed via the same PC-based programming tool (PGT-08-S) or the hand-held PGT-10-Pro programming tool.

At a glance

- High-resolution absolute encoder with up to 30 bits (AFM60) or 18 bits (AFS60)
- Face mount flange, servo flange, blind hollow shaft or through hollow shaft
- SSI, SSI + incremental or SSI + sin/cos interface
- Resolution, offset, etc. can be programmed (depending on the type)
- Connectivity: M12 or M23 male connector or cable connection
- Enclosure rating: IP67 (housing), IP65 (shaft)
- Operating temperature: -40 °C ... +100 °C (depending on the type)

Your benefits

- The programmability of the encoder results in reduced storage, high machine availability, and easy installation
- Precise positioning thanks to high resolutions
- Large selection of mechanical interfaces and electrical contacting options: suitable for all applications
- Suitable for applications with limited space (extremely short installation depth of 30 mm)
- Excellent concentricity properties due to long bearing distance
- Suitable programming tools are available as accessories for every application



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→ www.sick.com/AFS_AFM60_SSI

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



Fields of application

- Measurement of absolute position using one or more revolutions in various machines and systems such as tool machines, packaging systems, wood processing machines, presses, printing machines

Detailed technical data

Performance

| | Eco | Basic | Advanced |
|---|------------------------------------|-------------------------------------|--------------------------------------|
| Number of steps per revolution (max. resolution) | 4,096 (12 bit) ¹⁾ | 32,768 (15 bit) ¹⁾ | 262,144 (18 bit) ¹⁾ |
| Max. resolution (number of steps per revolution x number of revolutions) | 12 bit x 12 bit (4.096 x 4.096) | 15 bit x 12 bit (32.768 x 4.096) | 18 bit x 12 bit (262.144 x 4.096) |
| Error limits G | 0.2° ²⁾ | 0.05° ²⁾ | 0.03° ²⁾ |
| Repeatability standard deviation σ_r | 0.002° ³⁾ | | |

¹⁾ See table "Number of steps per revolution".

²⁾ 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.

³⁾ In accordance with DIN ISO 55350-13; 68.3% of the measured values are inside the specified area.

Interfaces

| | Eco | Basic | Advanced |
|--|---|---|----------------|
| Communication interface | SSI | | |
| Communication Interface detail | SSI + incremental, HTL SSI + incremental, TTL SSI + Sin/Cos | SSI + inkremental, HTL SSI + inkremental, TTL SSI + Sin/Cos SSI + inkremental (programmable) | |
| Initialization time | 50 ms ¹⁾ | | |
| Position forming time | < 1 μ s | | |
| SSI | | | |
| Code type | Gray | | |
| Code sequence parameter adjustable | CW/CCW (V/R^-) parameter adjustable | | |
| Clock frequency | ≤ 1 MHz ²⁾ | ≤ 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) | | |
| Incremental | | | |
| Pulses per revolution | 1/4 of number of SSI steps per revolution | | |
| Output frequency | ≤ 300 kHz | ≤ 600 kHz | ≤ 820 kHz |
| Load current | ≤ 30 mA | | |
| Sin/Cos | | | |
| Sine/cosine periods per revolution | 1,024 | | |
| Output frequency | ≤ 200 kHz | | |
| Load resistance | $\geq 120 \Omega$ | | |
| Signal before differential generation | 0.5 V_{pp} , ± 20 %, 120 Ω | | |
| Signal offset before differential generation | 2.5 V ± 10 % | | |
| Signal after differential generation | 1 V_{pp} , ± 20 % | | |

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

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

Electrical data

| | Eco | Basic | Advanced |
|--|---|-------|----------|
| Connection type | Male connector, M23, 12-pin, radial Male connector, M12, 8-pin, radial Cable, 8-wire, universal, 1.5 m ¹⁾ Cable, 8-wire, universal, 3 m ¹⁾ Cable, 8-wire, universal, 5 m ¹⁾ Cable, 8-wire, universal, 10 m ¹⁾ Cable, 12-wire, radial, 1.5 m Cable, 12-wire, radial, 3 m Cable, 12-wire, radial, 5 m Cable, 12-wire, radial, 10 m | | |
| Supply voltage | 4.5 ... 32 V DC | | |
| Power consumption | ≤ 0.7 W (without load) | | |
| Reverse polarity protection | ✓ | | |
| MTTFd: mean time to dangerous failure | 250 years (EN ISO 13849-1) ²⁾ | | |

¹⁾ The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

²⁾ 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

| | Eco | Basic | Advanced |
|--------------------------------|---|-------|----------|
| Shaft diameter | | | |
| Solid shaft, Servo flange | 6 mm | | |
| Solid shaft, face mount flange | 10 mm | | |
| Blind hollow shaft | 8 mm 10mm 12 mm 14 mm 15 mm 3/8" 1/2" 5/8" ¹⁾ | | |
| Through hollow shaft | 8 mm 10mm 12 mm 14 mm 15 mm 3/8" 1/2" 5/8" ¹⁾ | | |
| Shaft length | | | |
| Solid shaft, Servo flange | 10 mm | | |
| Solid shaft, face mount flange | 19 mm | | |
| Weight | | | |
| Solid shaft, Servo flange | 0.3 kg ²⁾ | | |
| Solid shaft, face mount flange | 0.3 kg ²⁾ | | |
| Blind hollow shaft | 0.2 kg ²⁾ | | |
| Through hollow shaft | 0.2 kg ²⁾ | | |
| Shaft material | Stainless steel | | |
| Flange material | Aluminum | | |

¹⁾ 5/8" not available with multiturn.

²⁾ Relates to devices with male connector.

³⁾ At 20 °C.

⁴⁾ Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

| | Eco | Basic | Advanced |
|---|---|-------|--|
| Housing material | Aluminum die cast | | |
| Start up torque | | | |
| Solid shaft, Servo flange | < 0.5 Ncm ³⁾ ³⁾ | | |
| Solid shaft, face mount flange | < 0.5 Ncm ³⁾ ³⁾ | | |
| Blind hollow shaft | < 0.8 Ncm ³⁾ ³⁾ | | |
| Through hollow shaft | < 0.8 Ncm ³⁾ ³⁾ | | |
| Operating torque | | | |
| Solid shaft, Servo flange | < 0.3 Ncm ³⁾ ³⁾ | | |
| Solid shaft, face mount flange | < 0.3 Ncm ³⁾ ³⁾ | | |
| Blind hollow shaft | < 0.6 Ncm ³⁾ ³⁾ | | |
| Through hollow shaft | < 0.6 Ncm ³⁾ ³⁾ | | |
| Permissible shaft movement, static (for hollow shafts only) | ± 0.5 mm (axial) ± 0.3 mm (radial) | | |
| Permissible shaft movement, dynamic (for hollow shafts only) | ± 0.2 mm (axial) ± 0.1 mm (radial) | | ± 0.1 mm (axial) ± 0.05 mm (radial) |
| Permissible shaft movement (for solid shafts only) | 40 N / axial 80 N / radial | | |
| Moment of inertia of the rotor | | | |
| Solid shaft, Servo flange | 6.2 gcm ² | | |
| Solid shaft, face mount flange | 6.2 gcm ² | | |
| Blind hollow shaft | 40 gcm ² | | |
| Through hollow shaft | 40 gcm ² | | |
| Bearing lifetime | 3.0 x 10 ⁹ revolutions | | |
| Angular acceleration | ≤ 500,000 rad/s ² | | |
| Operating speed | | | |
| Solid shaft, Servo flange | ≤ 9,000 min ⁻¹ ⁴⁾ | | |
| Solid shaft, face mount flange | ≤ 9,000 min ⁻¹ ⁴⁾ | | |
| Blind hollow shaft | ≤ 6,000 min ⁻¹ ⁴⁾ | | |
| Through hollow shaft | ≤ 9,000 min ⁻¹ ⁴⁾ | | |

¹⁾ 5/8" not available with multiturn.

²⁾ Relates to devices with male connector.

³⁾ At 20 °C.

⁴⁾ Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

Ambient data

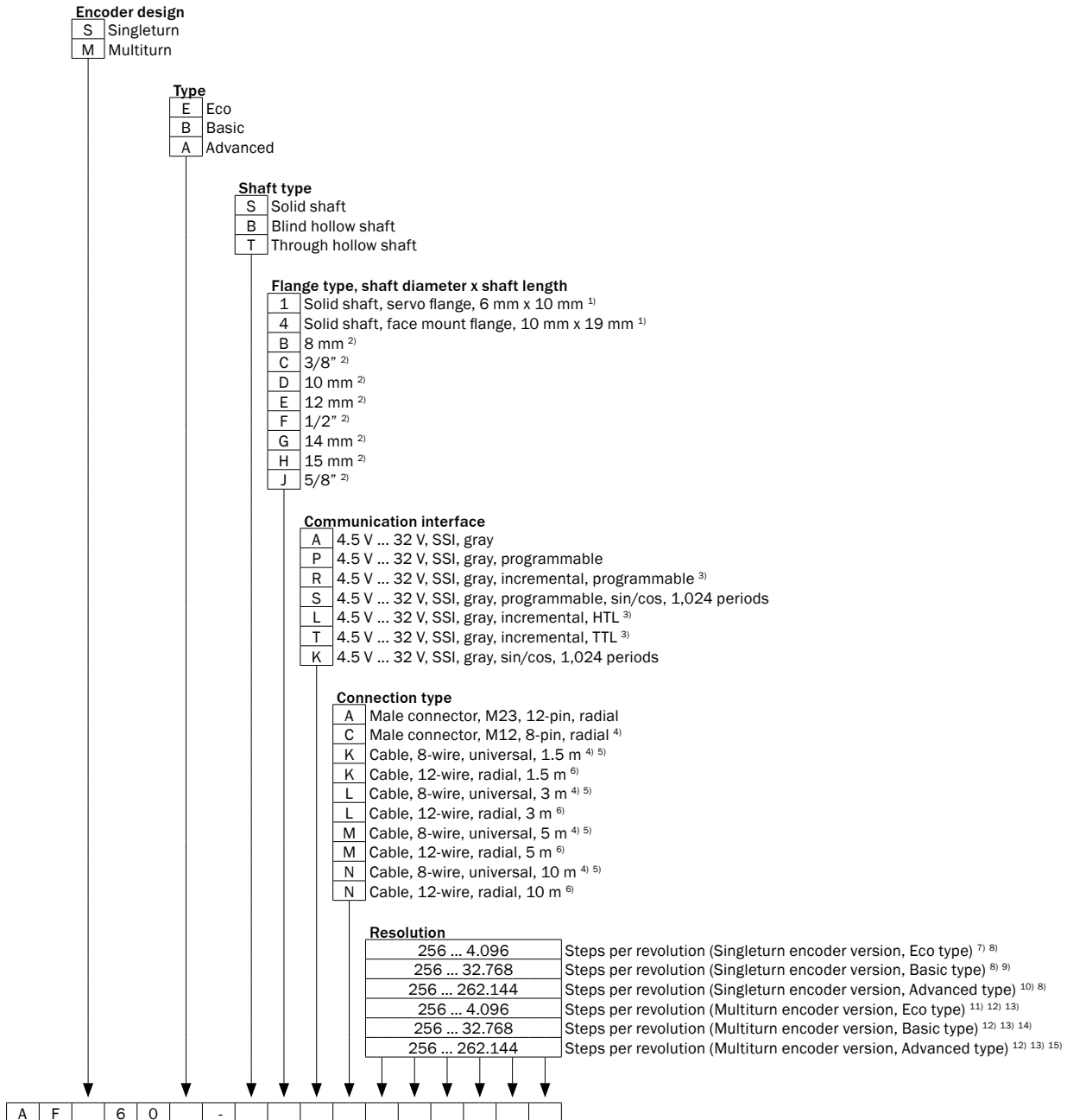
| | Eco | Basic | Advanced |
|--------------------------------------|--|--|--|
| EMC | According to EN 61000-6-2 and EN 61000-6-3 ¹⁾ | | |
| Enclosure rating | IP65, shaft side (according to IEC 60529) IP67, housing side (according to IEC 60529) ²⁾ | | |
| Permissible relative humidity | 90 % (condensation of the optical scanning not permitted) | | |
| Operating temperature range | 0 °C ... +85 °C | -40 °C ... +100 °C ³⁾ | |
| Storage temperature range | -40 °C ... +100 °C, without package | | |
| Resistance to shocks | 50 g, 6 ms (according to EN 60068-2-27) | 70 g, 6 ms (according to EN 60068-2-27) | 60 g, 6 ms (according to EN 60068-2-27) |
| Resistance to vibration | 20 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6) | 30 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6) | 20 g, 10 Hz ... 2,000 Hz (according to 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 mating connector mounted.

³⁾ Stationary position of the cable.

Type code



¹⁾ Only for solid shaft type.
²⁾ Only for blind hollow shaft and through hollow shaft type.
³⁾ Incremental number of lines is always 1/4 of the SSI/gray number of steps.
⁴⁾ Only for A and P communication interface.
⁵⁾ The universal cable outlet is positioned so that it is possible to lay it without bends in a radial or axial direction.
⁶⁾ Only for R, S, L, T and K communication interface.
⁷⁾ See "Number of steps per revolution" table.
⁸⁾ Other number of steps per revolution upon request.
⁹⁾ 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.
¹⁰⁾ 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.
¹¹⁾ See "Resolution" table.
¹²⁾ Other resolutions upon request.
¹³⁾ Number of revolutions: 4.096 (12 bit).
¹⁴⁾ See "Resolution" table. Programmable (P and R communication interface): Resolution 8x12 ... 15x12, set to 15x12 at the factory.
¹⁵⁾ 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)

| | AFS60E / AFM60E | AFS60B / AFM60B | AFS60A / AFM60A |
|------------------|-----------------|-----------------|------------------|
| 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 ... 32768 | 00256 ... 262144 |

Resolution (available upon request)

| | AFS60E / AFM60E | AFS60B / AFM60B | AFS60A / AFM60A |
|------------------|-----------------|-----------------|-----------------|
| 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 |

Ordering information

Solid shaft, Servo flange

- **Shaft diameter:** 6 mm
- **Shaft length:** 10 mm

| Communication Interface detail | Model | Connection type | Number of steps per revolution | Max. resolution | Programmable/configurable | Type | Part no. | |
|-----------------------------------|---|---|-----------------------------------|-------------------------------------|---------------------------|-----------------------------------|-------------------|-------------------|
| - | Multiturn | Cable, 8-wire, universal, 1.5 m ¹⁾ | - | 12 bit x 12 bit (4,096 x 4,096) | - | AFM60E-S1AK004096 | 1037650 | |
| | | | | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S1PK032768 | 1037515 | |
| - | Multiturn | Cable, 8-wire, universal, 1.5 m ¹⁾ | - | 15 bit x 12 bit (32,768 x 4,096) | - | AFM60B-S1AK032768 | 1037658 | |
| | | | | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S1PK262144 | 1037520 | |
| | | Cable, 8-wire, universal, 3 m ¹⁾ | - | 12 bit x 12 bit (4,096 x 4,096) | - | AFM60E-S1AL004096 | 1037651 | |
| | | | | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S1PL032768 | 1037516 | |
| | | | | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S1PL262144 | 1037521 | |
| | | | | 12 bit x 12 bit (4,096 x 4,096) | - | AFM60E-S1AM004096 | 1037652 | |
| | Cable, 8-wire, universal, 5 m ¹⁾ | - | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S1PM032768 | 1037517 | | |
| | | | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S1PM262144 | 1037522 | | |
| | Multiturn | Male connector, M12, 8-pin, radial | - | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S1PC032768 | 1037514 | |
| | | | | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S1PC262144 | 1037519 | |
| | | | | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S1PA032768 | 1037513 | |
| | | | | 18 bit x 12 bit (262,144 x 4,096) | - | AFM60B-S1AA032768 | 1037657 | |
| 15 bit x 12 bit (32,768 x 4,096) | | | | ✓ | AFM60B-S1PA262144 | 1037518 | | |
| 18 bit x 12 bit (262,144 x 4,096) | | | | ✓ | AFM60A-S1PA262144 | 1037518 | | |
| - | Singleturn | Cable, 8-wire, universal, 1.5 m ¹⁾ | 262.144 (18 bit) | - | ✓ | AFS60A-S1PK262144 | 1037500 | |
| | | | 32.768 (15 bit) | - | ✓ | AFS60B-S1PK032768 | 1037495 | |
| | | Cable, 8-wire, universal, 3 m ¹⁾ | 262.144 (18 bit) | - | ✓ | AFS60A-S1PL262144 | 1037501 | |
| | | | 32.768 (15 bit) | - | ✓ | AFS60B-S1PL032768 | 1037496 | |
| | | Cable, 8-wire, universal, 5 m ¹⁾ | 262.144 (18 bit) | - | ✓ | AFS60A-S1PM262144 | 1037502 | |
| | | | 32.768 (15 bit) | - | ✓ | AFS60B-S1PM032768 | 1037497 | |
| | | Male connector, M12, 8-pin, radial | 262.144 (18 bit) | - | ✓ | AFS60A-S1PC262144 | 1037499 | |
| | | | 32.768 (15 bit) | - | ✓ | AFS60B-S1PC032768 | 1037494 | |
| | | Male connector, M23, 12-pin, radial | 262.144 (18 bit) | - | ✓ | AFS60A-S1PA262144 | 1037498 | |
| | | | 32.768 (15 bit) | - | ✓ | AFS60B-S1PA032768 | 1037493 | |
| | | | | 4.096 (12 bit) | - | ✓ | AFS60E-S1AA004096 | 1037625 |
| | | SSI + incremental | Multiturn | Male connector, M23, 12-pin, radial | - | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S1RA262144 |
| SSI + incremental / HTL | Multiturn | Male connector, M23, 12-pin, radial | - | 13 bit x 12 bit (8,192 x 4,096) | - | AFM60B-S1LA008192 | 1060452 | |

¹⁾ The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

| Communication Interface detail | Model | Connection type | Number of steps per revolution | Max. resolution | Programmable/configurable | Type | Part no. |
|--------------------------------|-----------|-------------------------------------|--------------------------------|-----------------------------------|---------------------------|-------------------|----------|
| SSI + incremental / TTL | Multiturn | Male connector, M23, 12-pin, radial | - | 12 bit x 12 bit (4,096 x 4,096) | - | AFM60B-S1TA004096 | 1053516 |
| | | | | 13 bit x 12 bit (8,192 x 4,096) | - | AFM60B-S1TA008192 | 1099706 |
| SSI + Sin/Cos | Multiturn | Cable, 12-wire, radial, 1.5 m | - | 11 bit x 12 bit (2,048 x 4,096) | - | AFM60A-S1KK002048 | 1100793 |
| | | | | 15 bit x 12 bit (32,768 x 4,096) | - | AFM60B-S1KK032768 | 1076927 |
| | | Cable, 12-wire, radial, 3 m | - | 13 bit x 12 bit (8,192 x 4,096) | - | AFM60B-S1KL008192 | 1066300 |
| | | | | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S1SL262144 | 1061877 |
| | | Male connector, M23, 12-pin, radial | - | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S1SA032768 | 1054220 |
| | | | | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S1SA262144 | 1054219 |

⁴⁾ The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

Solid shaft, face mount flange

- **Shaft diameter:** 10 mm
- **Shaft length:** 19 mm

| Communication Interface detail | Model | Connection type | Number of steps per revolution | Max. resolution | Programmable/configurable | Type | Part no. |
|--------------------------------|-----------------------------------|---|------------------------------------|-----------------------------------|----------------------------------|-------------------|-------------------|
| - | Multiturn | Cable, 8-wire, universal, 1.5 m ¹⁾ | - | 12 bit x 12 bit (4,096 x 4,096) | - | AFM60E-S4AK004096 | 1037654 |
| - | Multiturn | Cable, 8-wire, universal, 1.5 m ¹⁾ | - | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S4PK032768 | 1037505 |
| | | | | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S4PK262144 | 1037510 |
| | | Cable, 8-wire, universal, 3 m ¹⁾ | - | 12 bit x 12 bit (4,096 x 4,096) | - | AFM60E-S4AL004096 | 1037655 |
| | | | | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S4PL032768 | 1037506 |
| | | | | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S4PL262144 | 1037511 |
| | | | | 12 bit x 12 bit (4,096 x 4,096) | - | AFM60E-S4AM004096 | 1037656 |
| | | Cable, 8-wire, universal, 5 m ¹⁾ | - | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S4PM032768 | 1037507 |
| | | | | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S4PM262144 | 1037512 |
| | | | | 12 bit x 12 bit (4,096 x 4,096) | - | AFM60E-S4AC004096 | 1037653 |
| | | | | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S4PC032768 | 1037504 |
| | | Male connector, M12, 8-pin, radial | - | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S4PC262144 | 1037509 |
| | | | | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S4PA032768 | 1037503 |
| | 18 bit x 12 bit (262,144 x 4,096) | | | ✓ | AFM60A-S4PA262144 | 1037508 | |
| | - | | | - | AFM60A-S4AA262144 | 1037669 | |
| | Singleturn | Cable, 8-wire, universal, 1.5 m ¹⁾ | 262,144 (18 bit) | - | ✓ | AFS60A-S4PK262144 | 1037490 |
| | | | | 32,768 (15 bit) | - | ✓ | AFS60B-S4PK032768 |
| | | Cable, 8-wire, universal, 3 m ¹⁾ | 262,144 (18 bit) | - | ✓ | AFS60A-S4PL262144 | 1037491 |
| | | | | 32,768 (15 bit) | - | ✓ | AFS60B-S4PL032768 |
| | | Cable, 8-wire, universal, 5 m ¹⁾ | 262,144 (18 bit) | - | ✓ | AFS60A-S4PM262144 | 1037492 |
| | | | | 32,768 (15 bit) | - | ✓ | AFS60B-S4PM032768 |
| | | Male connector, M12, 8-pin, radial | 262,144 (18 bit) | - | ✓ | AFS60A-S4PC262144 | 1037489 |
| | | | | 32,768 (15 bit) | - | ✓ | AFS60B-S4PC032768 |
| | | Male connector, M23, 12-pin, radial | 262,144 (18 bit) | - | ✓ | AFS60A-S4PA262144 | 1037488 |
| 32,768 (15 bit) | | | | - | ✓ | AFS60B-S4PA032768 | 1037483 |
| | | | 4,096 (12 bit) | - | - | AFS60E-S4AA004096 | 1037630 |
| SSI + incremental | | Multiturn | Male connector, M23, 12-pin, radia | - | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S4RA032768 |
| | - | | | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S4RA262144 | 1052624 |
| SSI + incremental / HTL | Multiturn | Male connector, M23, 12-pin, radial | - | 12 bit x 12 bit (4,096 x 4,096) | - | AFM60E-S4LA004096 | 1057332 |

¹⁾ The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

| Communication Interface detail | Model | Connection type | Number of steps per revolution | Max. resolution | Programmable/configurable | Type | Part no. |
|--------------------------------|-----------|-------------------------------------|--------------------------------|-----------------------------------|---------------------------|-------------------|----------|
| SSI + incremental / TTL | Multiturn | Male connector, M23, 12-pin, radial | - | 12 bit x 12 bit (4,096 x 4,096) | - | AFM60E-S4TA004096 | 1073804 |
| | | | | 18 bit x 12 bit (262,144 x 4,096) | - | AFM60A-S4TA262144 | 1074345 |
| SSI + Sin/Cos | Multiturn | Male connector, M23, 12-pin, radial | - | 12 bit x 12 bit (4,096 x 4,096) | - | AFM60E-S4KA004096 | 1073191 |
| | | | | 15 bit x 12 bit (32,768 x 4,096) | ✓ | AFM60B-S4SA032768 | 1054222 |
| | | | | 18 bit x 12 bit (262,144 x 4,096) | ✓ | AFM60A-S4SA262144 | 1054221 |
| | | | | | - | AFM60A-S4KA262144 | 1062576 |

⁴⁾ The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

Blind hollow shaft

| Communication Interface detail | Model | Shaft diameter | Connection type | Number of steps per revolution | Max. resolution | Type | Part no. | |
|--------------------------------|-----------|-------------------------------------|---|-------------------------------------|-----------------------------------|-------------------|-------------------|---------|
| - | Multiturn | 1/2" | Male connector, M12, 8-pin, radial | - | 18 bit x 12 bit (262,144 x 4,096) | AFM60A-BFAC262144 | 1082714 | |
| | | | Male connector, M23, 12-pin, radial | - | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-BFAA004096 | 1066692 | |
| | | 10 mm | Male connector, M12, 8-pin, radial | - | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-BDAC004096 | 1056699 | |
| | | | Male connector, M23, 12-pin, radial | - | 15 bit x 12 bit (32,768 x 4,096) | AFM60B-BDPA032768 | 1051109 | |
| | | 12 mm | Male connector, M12, 8-pin, radial | - | 15 bit x 12 bit (32,768 x 4,096) | AFM60B-BEPC032768 | 1051112 | |
| | | | Male connector, M23, 12-pin, radial | - | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-BEAA004096 | 1054115 | |
| | | 15 mm | Male connector, M23, 12-pin, radial | - | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-BHAA004096 | 1038933 | |
| | | 3/8" | Male connector, M23, 12-pin, radial | - | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-BCAA004096 | 1111294 | |
| | | 8 mm | Cable, 8-wire, universal, 1.5 m ¹⁾ | - | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-BBAK004096 | 1067006 | |
| | | | Male connector, M23, 12-pin, radial | - | 15 bit x 12 bit (32,768 x 4,096) | AFM60B-BBPA032768 | 1086364 | |
| | | 10 mm | Singleturn | Male connector, M23, 12-pin, radial | 4,096 (12 bit) | - | AFS60E-BDAA004096 | 1038040 |
| | | | | Male connector, M12, 8-pin, radial | 32,768 (15 bit) | - | AFS60B-BJAC032768 | 1060923 |
| | | | | | 4,096 (12 bit) | - | AFS60E-BJAC004096 | 1096327 |
| | | Male connector, M23, 12-pin, radial | 262,144 (18 bit) | - | AFS60A-BJPA262144 | 1066298 | | |
| SSI + incremental | Multiturn | 12 mm | Male connector, M23, 12-pin, radial | - | 18 bit x 12 bit (262,144 x 4,096) | AFM60A-BERA262144 | 1052850 | |
| | | 14 mm | Male connector, M23, 12-pin, radial | - | 18 bit x 12 bit (262,144 x 4,096) | AFM60A-BGRA262144 | 1052851 | |
| | | 15 mm | Male connector, M23, 12-pin, radial | - | 18 bit x 12 bit (262,144 x 4,096) | AFM60A-BHRA262144 | 1052852 | |
| SSI + incremental / HTL | Multiturn | 10 mm | Cable, 12-wire, radial, 5 m | - | 17 bit x 12 bit (131,072 x 4,096) | AFM60A-BDLM131072 | 1072417 | |

⁴⁾ The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

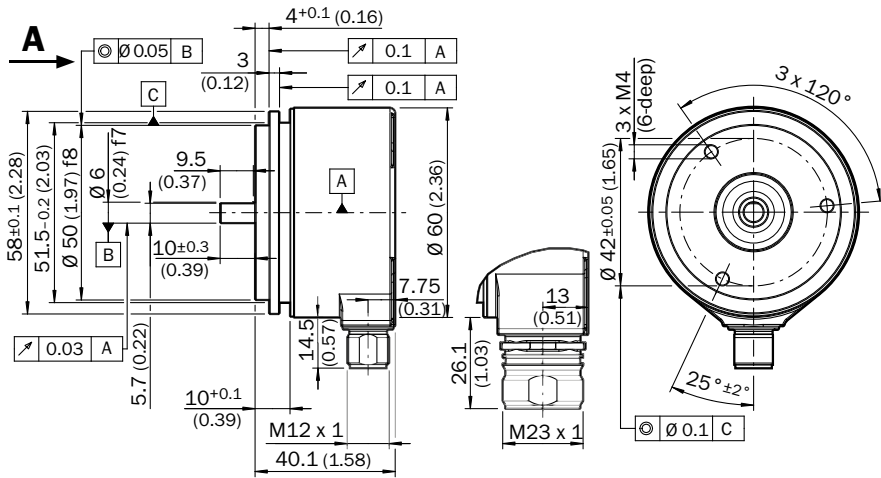
Through hollow shaft

| Communication Interface detail | Model | Shaft diameter | Connection type | Number of steps per revolution | Max. resolution | Type | Part no. |
|--------------------------------|-------------------|------------------------------------|---|-----------------------------------|-----------------------------------|----------------------------------|---------------------------------|
| - | Multiturn | 1/2" | Male connector, M12, 8-pin, radial | - | 15 bit x 12 bit (32,768 x 4,096) | AFM60B-TFPC032768 | 1077622 |
| | | 10 mm | Male connector, M23, 12-pin, radial | - | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-TDAA004096 | 1088055 |
| | | | | | 15 bit x 12 bit (32,768 x 4,096) | AFM60B-TDPA032768 | 1050966 |
| | | 12 mm | Cable, 8-wire, universal, 1.5 m ¹⁾ | - | 15 bit x 12 bit (32,768 x 4,096) | AFM60B-TEPK032768 | 1051053 |
| | | 14 mm | Cable, 8-wire, universal, 3 m ¹⁾ | - | 18 bit x 12 bit (262,144 x 4,096) | AFM60A-TGAL262144 | 1082827 |
| | | | | | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-TGAC004096 | 1059715 |
| | 15 mm | Male connector, M12, 8-pin, radial | - | 18 bit x 12 bit (262,144 x 4,096) | AFM60A-THPC262144 | 1078463 | |
| | Singleturn | 5/8" ²⁾ | Male connector, M12, 8-pin, radial | 262,144 (18 bit) | - | AFS60A-TJPC262144 | 1092154 |
| | | | | 4,096 (12 bit) | - | AFS60E-TJAC004096 | 1055323 |
| | SSI + incremental | Multiturn | 15 mm | Cable, 12-wire, radial, 1.5 m | - | 15 bit x 12 bit (32,768 x 4,096) | AFM60B-THRK032768 |
| SSI + incremental / HTL | Multiturn | 15 mm | Male connector, M23, 12-pin, radial | - | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-THLA004096 | 1065327 |
| SSI + incremental / TTL | Multiturn | 12 mm | Male connector, M23, 12-pin, radial | - | 16 bit x 12 bit (65,536 x 4,096) | AFM60A-TETA065536 | 1112116 |
| | | | | | 18 bit x 12 bit (262,144 x 4,096) | AFM60A-TETA262144 | 1064201 |
| | | 8 mm | Cable, 12-wire, radial, 3 m | - | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-TBTL004096 | 1070555 |
| SSI + Sin/Cos | Multiturn | 10 mm | Cable, 12-wire, radial, 1.5 m | - | 11 bit x 12 bit (2,048 x 4,096) | AFM60A-TDKK002048 | 1100794 |
| | | | | | 18 bit x 12 bit (262,144 x 4,096) | AFM60A-TDKK262144 | 1065974 |
| | | 12 mm | Cable, 12-wire, radial, 1.5 m | - | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-TEKK004096 | 1059602 |
| | | | | | Cable, 12-wire, radial, 5 m | - | 12 bit x 12 bit (4,096 x 4,096) |
| | | 15 mm | Cable, 12-wire, radial, 1.5 m | - | 12 bit x 12 bit (4,096 x 4,096) | AFM60E-THKK004096 | 1099416 |

¹⁾ The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

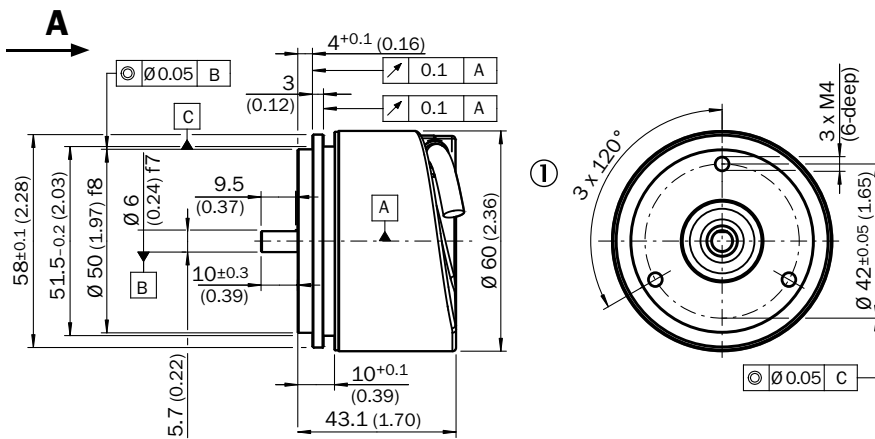
Dimensional drawings (Dimensions in mm (inch))

Servo flange, radial male connector M12 and M23



General tolerances according to DIN ISO 2768-mk

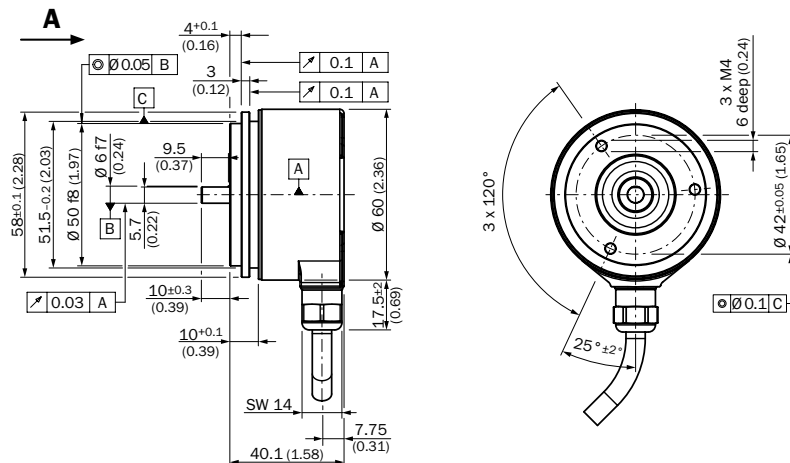
Servo flange, cable universal



General tolerances according to DIN ISO 2768-mk

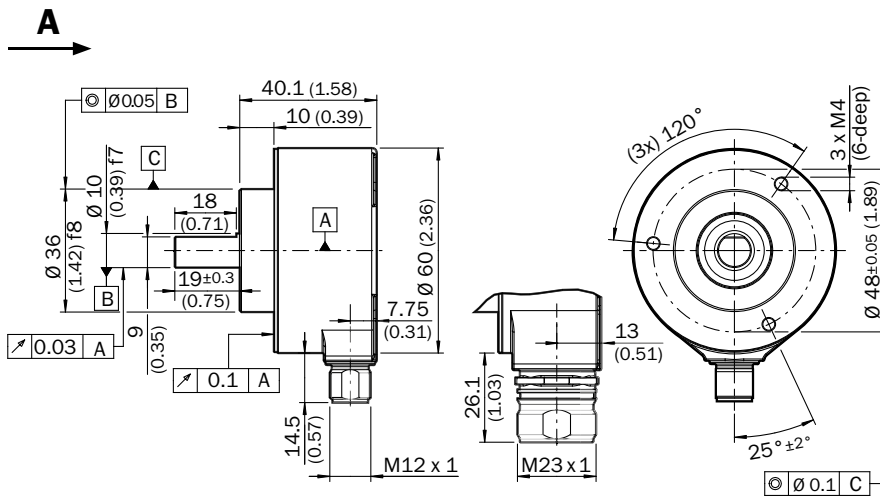
① Cable diameter = 5.6 mm +/- 0.2 mm bend radius = 30 mm

Servo flange, cable radial



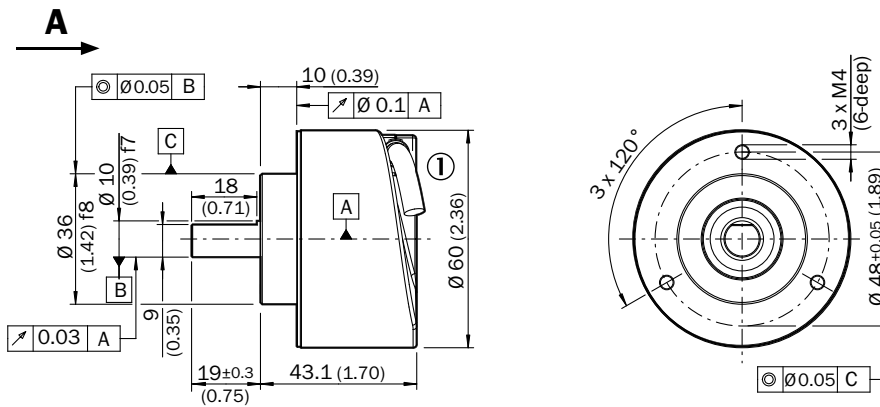
General tolerances according to DIN ISO 2768-mk

Face mount flange, radial male connector M12 and M23



General tolerances according to DIN ISO 2768-mk

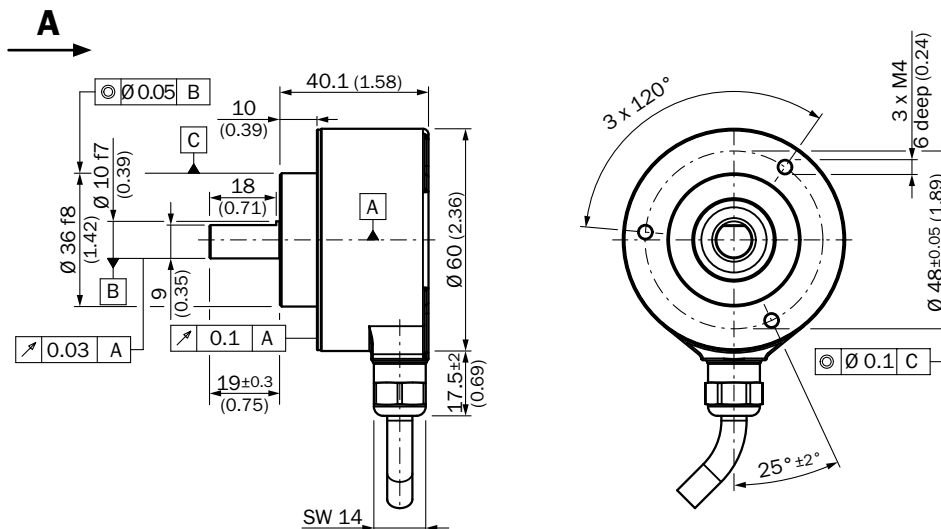
Face mount flange, cable universal



General tolerances according to DIN ISO 2768-mk

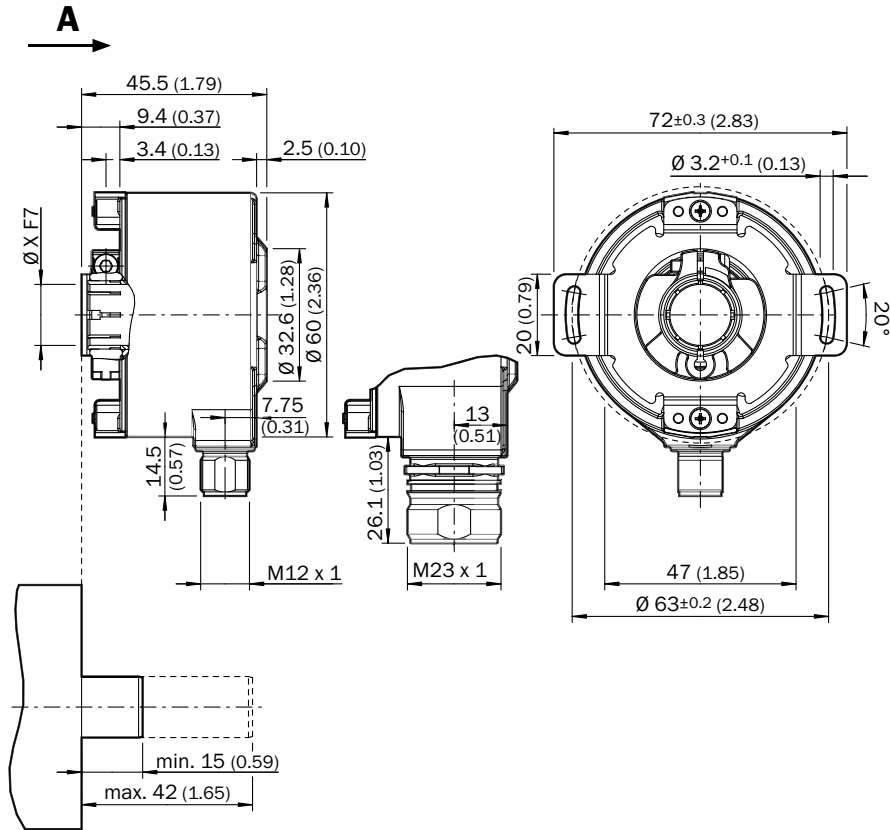
① Cable diameter = 5.6 mm +/- 0.2 mm bend radius = 30 mm

Face mount flange, cable radial



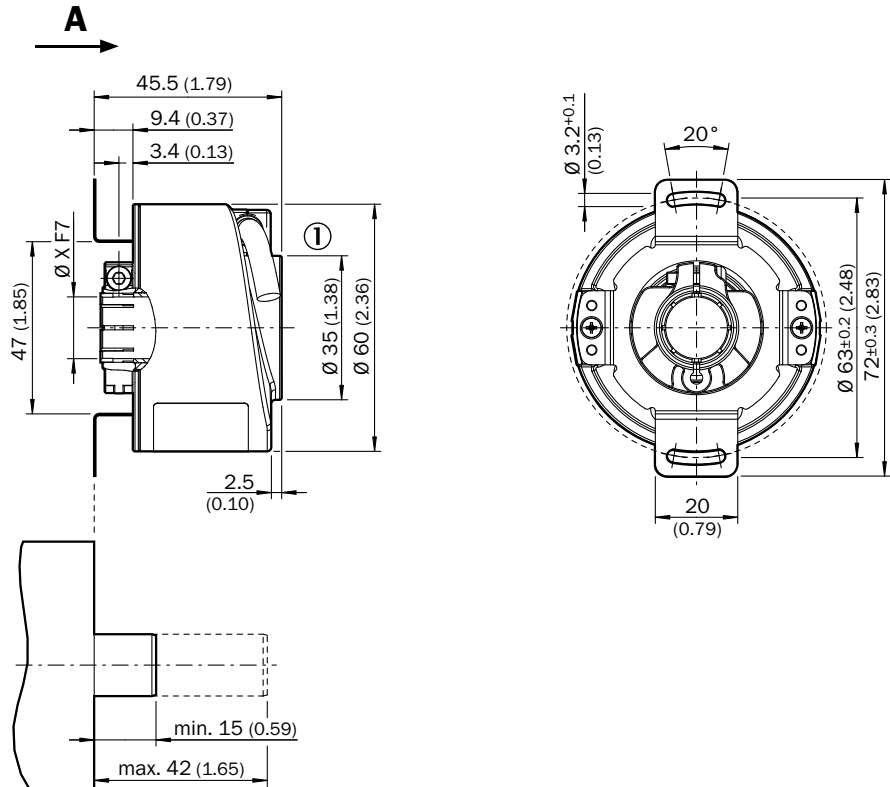
General tolerances according to DIN ISO 2768-mk

Blind hollow shaft, radial male connector M12 and M23



General tolerances according to DIN ISO 2768-mk

Blind hollow shaft, cable universal



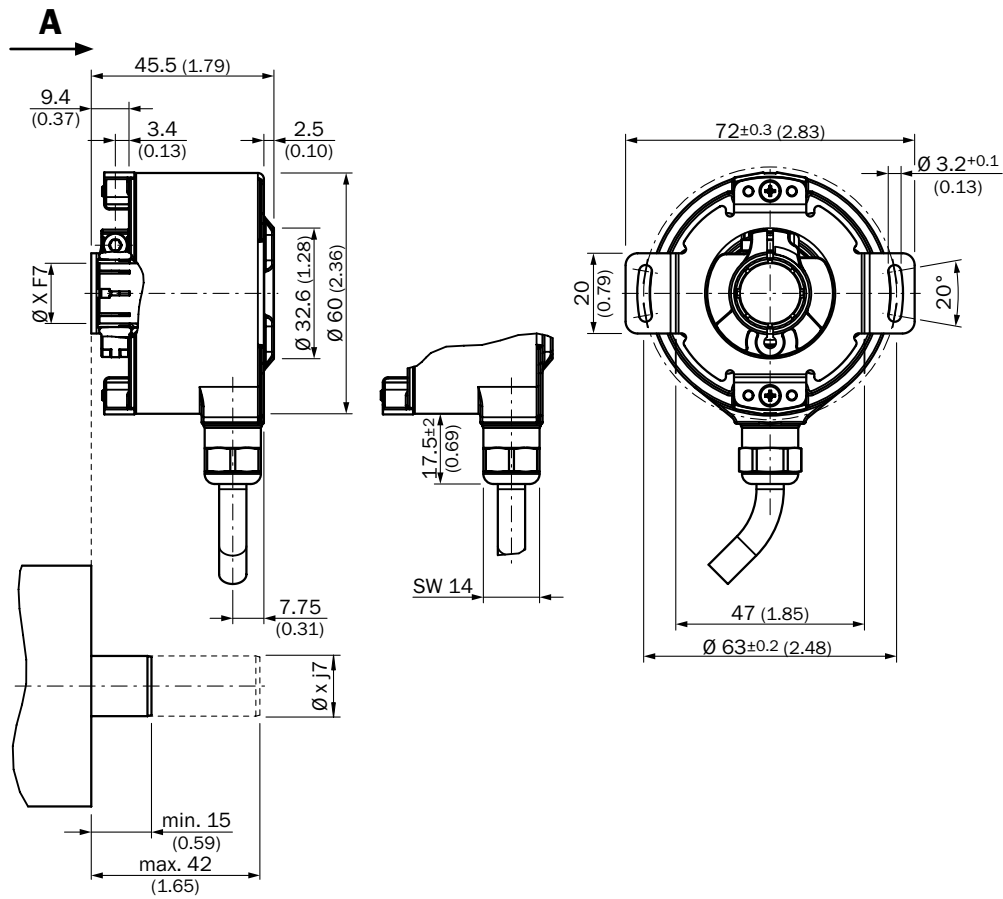
General tolerances according to DIN ISO 2768-mk

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

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Subject to change without notice

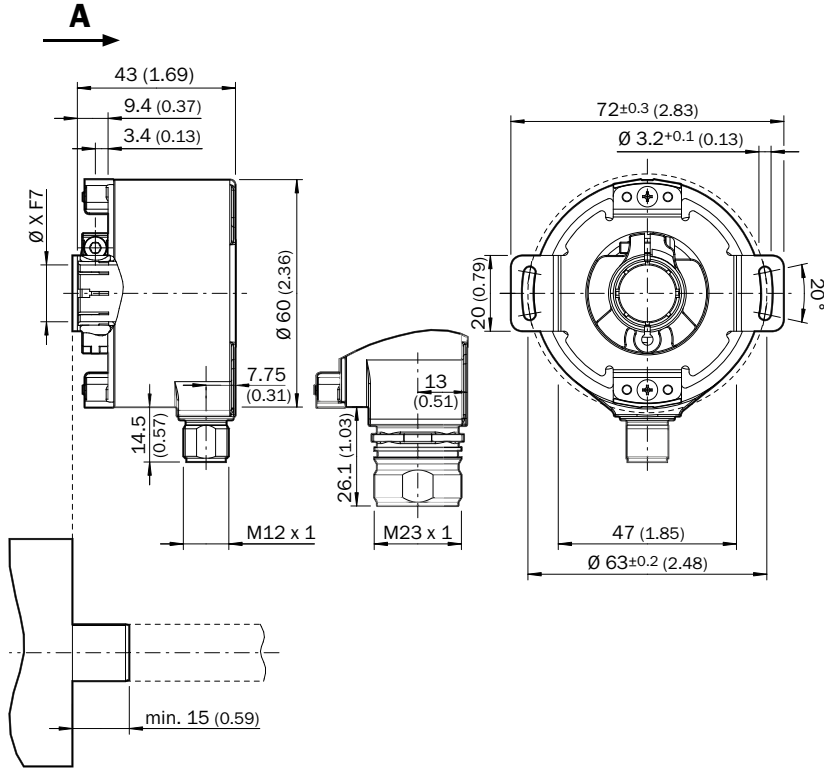
Blind hollow shaft, cable universal



Customer-side

General tolerances according to DIN ISO 2768-mk

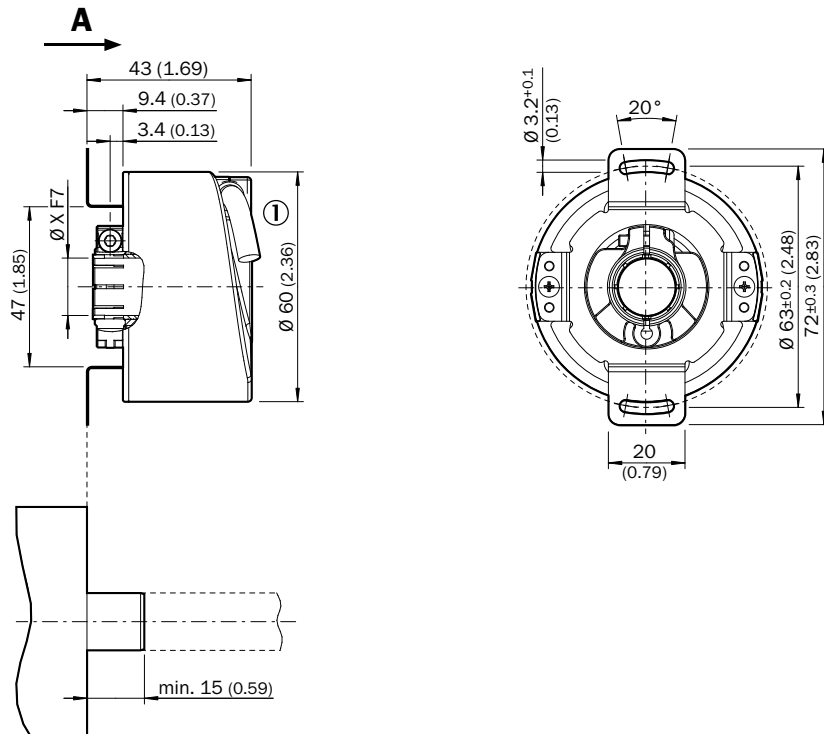
Through hollow shaft, radial male connector M12 and M23



General tolerances according to DIN ISO 2768-mk

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

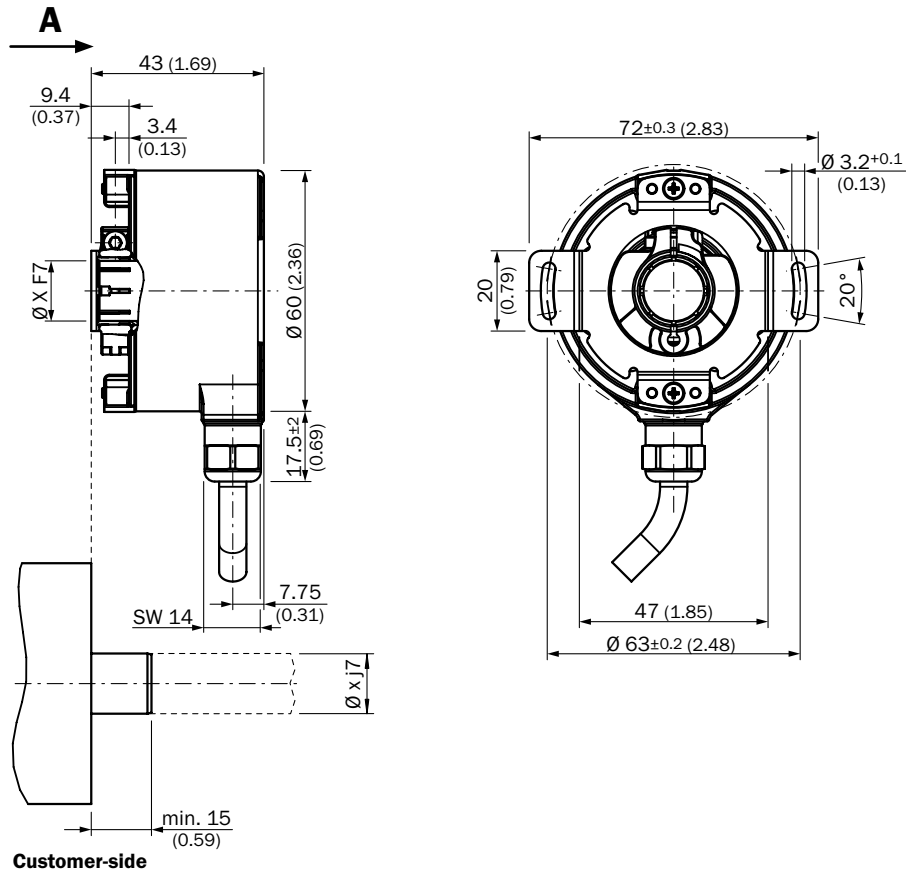
Through hollow shaft, cable universal



General tolerances according to DIN ISO 2768-mk

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

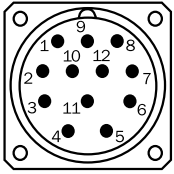
Through hollow shaft, cable radial



General tolerances according to DIN ISO 2768-mk

PIN assignment

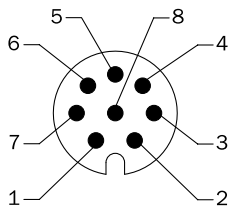
M23 male connector, 12-pin, SSI/Gray



View of M23 male device connector on encoder

| PIN | Signal | Explanation |
|-----|----------------|--|
| 1 | GND | Ground connection |
| 2 | Data + | Interface signals |
| 3 | Clock + | Interface signals |
| 4 | N.C. | Not assigned |
| 5 | N.C. | Not assigned |
| 6 | N.C. | Not assigned |
| 7 | N.C. | Not assigned |
| 8 | U _s | Operating voltage |
| 9 | SET | Electronic adjustment |
| 10 | Data - | Interface signals |
| 11 | Clock - | Interface signals |
| 12 | CW/CCW (V/R) | Sequence in direction of rotation |
| | Screen | Screen connected to housing on encoder side. Connected to ground on control side. |

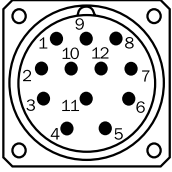
M12 male connector, 8-pin and cable, 8-wire, SSI/Gray



View of M12 male device connector on encoder

| PIN | Wire colors (cable connection) | Signal | Explanation |
|-----|--------------------------------|----------------|--|
| 1 | Brown | Data - | Interface signals |
| 2 | White | Data + | Interface signals |
| 3 | Black | CW/CCW (V/R) | Sequence in direction of rotation |
| 4 | Pink | SET | Electronic adjustment Interface signals |
| 5 | Yellow | Clock + | Interface signals |
| 6 | Violet | Clock - | Interface signals |
| 7 | Blue | GND | Ground connection |
| 8 | Red | U _s | Operating voltage |
| | | Screen | Screen connected to housing on encoder side. Connected to ground on control side. |

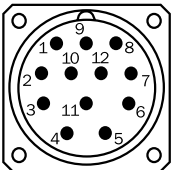
M23 male connector, 12-pin and cable, 12-wire, SSI/Gray + incremental



View of M23 male device connector on encoder

| PIN | Wire colors (cable connection) | Signal | 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/ \bar{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. |

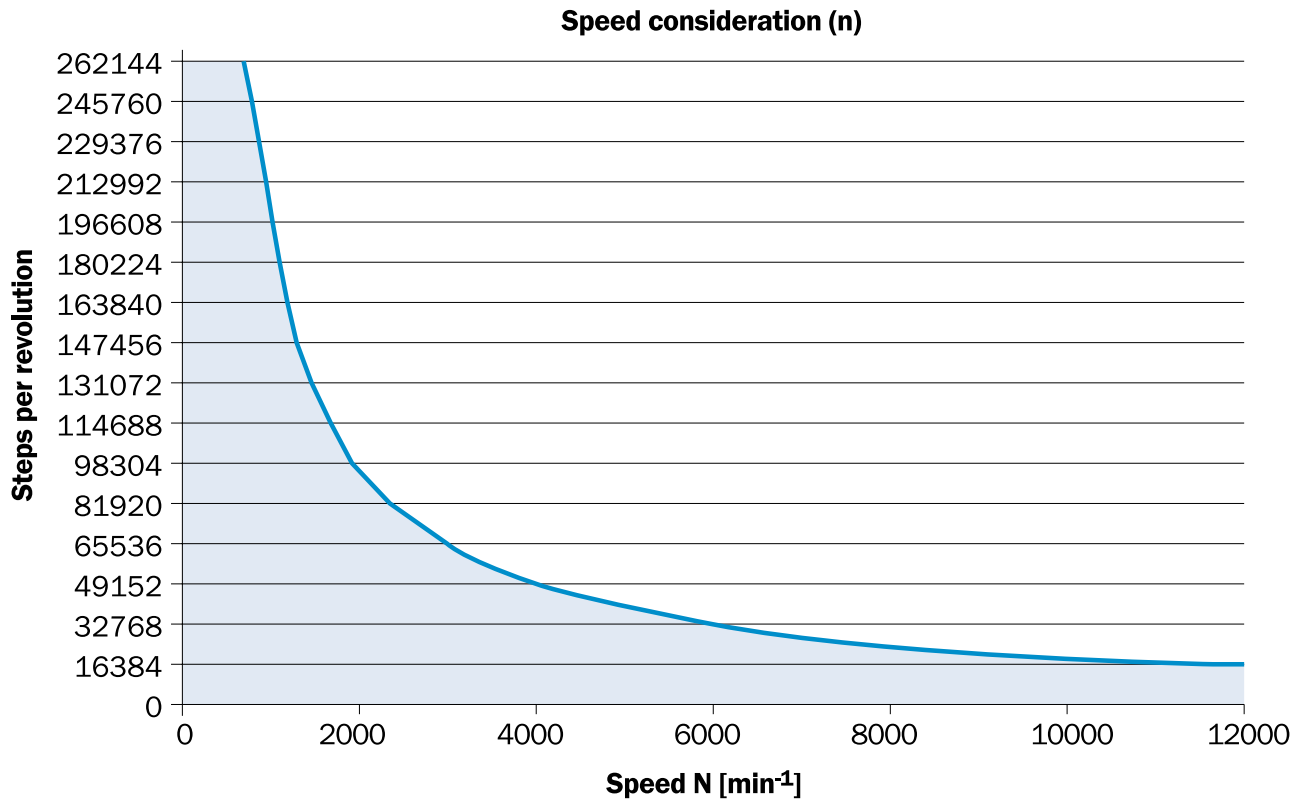
M23 male connector, 12-pin and cable, 12-wire, SSI/Gray + Sin/Cos



View of M23 male device connector on encoder

| PIN | Wire colors (cable connection) | Signal | 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 | - SIN | Signal wire |
| 9 | Orange-black | CW/CCW (V/ \bar{R}) | Sequence in direction of rotation |
| 10 | Green | - COS | Signal wire |
| 11 | Gray | + COS | Signal wire |
| 12 | Pink | + SIN | Signal wire |
| | | Screen | Screen connected to housing on encoder side. Connected to ground on control side. |

Maximum revolution range












The maximum speed is also dependent on the shaft type.

Accessories

Mounting systems

Flanges



Flange plates

| Figure | Brief description | Type | Part no. |
|---|---|-------------------|----------|
|  | Standard stator coupling | BEF-DS00XFX | 2056812 |
|  | Stator coupling, 16.5 mm high | BEF-DS05XFX | 2057423 |
|  | Stator coupling with hole circle diameter Ø72 mm | BEF-DS07XFX | 2059368 |
|  | Flange adapter, adaptation of face mount flange with 36 mm centering hub to 50 mm servo flange, aluminum, including 3 flat head screws M4 x 10, Aluminum, including 3 countersunk screws M4 x 10 | BEF-FA-036-050 | 2029160 |
|  | Flange adapter, adaptation of face mount flange with 36 mm centering hub to 60 mm square mounting plate, aluminum, including 3 flat head screws M4 x 8, Aluminum, including 3 countersunk screws M4 x 8 | BEF-FA-036-060REC | 2029162 |
|  | Flange adapter, adaptation of face mount flange with 36 mm centering hub to 58 mm square mounting plate with shock absorbers, aluminum, Aluminum | BEF-FA-036-060RSA | 2029163 |
|  | Flange adapter, adaptation of face mount flange with 36 mm centering hub to 63 mm square mounting plate, aluminum, including 3 flat head screws M4 x 10, Aluminum, including 3 countersunk screws M4 x 10 | BEF-FA-036-063REC | 2034225 |
|  | Flange adapter, adaptation of face mount flange with 36 mm centering hub to 100 mm servo flange with 60 mm centering hub, aluminum, Aluminum | BEF-FA-036-100 | 2029161 |
|  | Flange adapter, adapts blind hollow shaft to REO flange, Aluminum, Including 4 fillister head screws, M3 x 6 mm | BEF-FA-RE01112 | 2048948 |

Dimensional drawings → [page 28](#)

Mounting brackets and plates


Mounting brackets
















| Figure | Brief description | Type | Part no. |
|---|--|-----------|----------|
|  | Mounting bracket for encoder with spigot 36 mm for face mount flange, mounting kit included | BEF-WF-36 | 2029164 |
|  | Mounting angle spring-loaded, for flange with centerring collar 36 mm, working temperature range -40° ... +120°C, Aluminum | BEF-WF36F | 4084775 |

Dimensional drawings → [page 29-31](#)

Other mounting accessories


Measuring wheels and measuring wheel systems

| Figure | Brief description | Type | Part no. |
|---|---|---------------|----------|
|  | Plastic measuring wheel with smooth plastic surface (Hytrel), for 10 mm solid shaft, circumference 200 mm | BEF-MR-010020 | 5312988 |

| Figure | Brief description | Type | Part no. |
|---|--|----------------|----------|
|  | Measuring wheel with ridged plastic surface (Hytrel) for 10 mm solid shaft, circumference 200 mm | BEF-MR-010020G | 5318678 |
|  | Plastic measuring wheel with smooth plastic surface (Hytrel) for 10 mm solid shaft, circumference 500 mm | BEF-MR-010050 | 5312989 |
|  | Aluminium measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 200 mm | BEF-MR006020R | 2055222 |
| | Measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 300 mm | BEF-MR006030R | 2055634 |
| | Aluminium measuring wheel with O-ring (NBR70) for 6 mm solid shaft, circumference 500 mm | BEF-MR006050R | 2055225 |
| | Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 200 mm | BEF-MR010020R | 2055224 |
| | Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 300 mm | BEF-MR010030R | 2049278 |
| | Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 500 mm | BEF-MR010050R | 2055227 |
|  | Aluminum measuring wheel with cross-knurled surface for 6 mm solid shaft, circumference 200 mm | BEF-MR06200AK | 4084745 |
|  | Aluminum measuring wheel with smooth polyurethane surface for 6 mm solid shaft, circumference 200 mm | BEF-MR06200AP | 4084746 |
|  | Aluminum measuring wheel with ridged polyurethane surface for 6 mm solid shaft, circumference 200 mm | BEF-MR06200APG | 4084748 |
|  | Aluminum measuring wheel with studded polyurethane surface for 6 mm solid shaft, circumference 200 mm | BEF-MR06200APN | 4084747 |
|  | Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 200 mm | BEF-MR10200AK | 4084737 |
|  | Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 200 mm | BEF-MR10200AP | 4084738 |
|  | Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 200 mm | BEF-MR10200APG | 4084740 |
|  | Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 200 mm | BEF-MR10200APN | 4084739 |
|  | Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 500 mm | BEF-MR10500AK | 4084733 |
|  | Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 500 mm | BEF-MR10500AP | 4084734 |
|  | Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 500 mm | BEF-MR10500APG | 4084736 |
|  | Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 500 mm | BEF-MR10500APN | 4084735 |
| | O-ring for measuring wheels (circumference 200 mm) | BEF-OR-053-040 | 2064061 |
| | O-ring for measuring wheels (circumference 300 mm) | BEF-OR-083-050 | 2064076 |
| | O-ring for measuring wheels (circumference 500 mm) | BEF-OR-145-050 | 2064074 |


Dimensional drawings → [page 31-32](#)

Modular measuring wheel system

| Figure | Brief description | Type | Part no. |
|---|--|------------------|----------|
|  | SICK modular measuring wheel system for face mount flange encoder with S4 mechanical design (10 mm x 19 mm solid shaft), e.g., DFS60-S4: with O-ring measuring wheel, circumference 200 mm | BEF-MRS-10-U | 2085714 |
| | SICK modular measuring wheel system for face mount flange encoder with S4 mechanical design (10 mm x 19 mm solid shaft), e.g., DFS60-S4: with O-ring measuring wheel, circumference 300 mm | BEF-MRS-10-U-300 | 2109043 |





Dimensional drawings → [page 33](#)

Mounting bells

| Figure | Brief description | Type | Part no. |
|---|--|-----------|----------|
|  | Mounting bell for encoder with servo flange, 50 mm spigot, mounting kit included | BEF-MG-50 | 5312987 |



Dimensional drawings → [page 33](#)

Others

| Figure | Brief description | Type | Part no. |
|---|--|--------------------|----------|
|  | Flange adapter (adapts size 60 face mount flange encoder to bearing block with part. no. 2044591) | BEF-FA-036-050-019 | 2063378 |
|  | Bearing bracket for hollow shaft encoders, fastening screws included the Bearing Block is intended for very large radial and axial shaft loads. Particularly for application on: Belt pulleys, Chain pinions, Friction wheels. It is designed this way to enable fitting of encoder with blind hollow shaft with ø 12 mm., fastening screws included | BEF-FA-B12-010 | 2042728 |
|  | Bearing block for servo and face mount flange encoder. The heavy-duty bearing block is used to absorb very large radial and axial shaft loads. Particularly when using belt pulleys, chain sprockets, friction wheels. Operating speed max. 4,000 rpm^-1, axial shaft load 150 N, radial shaft load 250 N, bearing service life 3.6 x 10^9 revolutions | BEF-FA-LB1210 | 2044591 |
|  | Clamping ring for metal hollow shaft, metal | BEF-KR-M | 2064709 |
| | Mounting kit for servo flange encoder on the bearing block, 1 bar coupling SKPS 1520 06/06 1 hexagon socket wrench SW1.5 DIN 911, 3 mounting eccentric BEMN 1242 49 3 screws M4 x 10 DIN 912, 1 hexagon socket wrench SW3 DIN 911, 1 bar coupling SKPS 1520 06/06 1 hexagon socket wrench SW1.5 DIN 911, 3 mounting eccentric BEMN 1242 49 3 screws M4 x 10 DIN 912, 1 hexagon socket wrench SW3 DIN 911 | BEF-MK-LB | 5320872 |

Dimensional drawings → [page 34](#)


















Servo clamps

| Figure | Brief description | Type | Part no. |
|---|---|----------------|----------|
|  | Half-shell servo clamps (2 pcs.) for servo flanges with a 50 mm centering hub | BEF-WG-SF050 | 2029165 |
| | | BEF-WG-SF050S1 | 2088848 |
|  | Servo clamps, large, for servo flanges (clamps, eccentric fastener), 3 pcs., without mounting material, without mounting hardware | BEF-WK-SF | 2029166 |

Dimensional drawings → [page 33-34](#)

Shaft adaptation



Shaft couplings

| Figure | Brief description | Type | Part no. |
|---|--|------------|----------|
|  | 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 80 Ncm; material: stainless steel bellows, aluminum hub | KUP-0606-B | 5312981 |
|  | Double-loop coupling, shaft diameter 6 mm / 6 mm, maximum shaft offset: radial ± 2.5 mm, axial ± 3 mm, angular $\pm 10^\circ$; max. speed 3,000 rpm, -30°C to $+80^\circ\text{C}$, max. torque 1.5 Nm; material: polyurethane, galvanized steel flange | KUP-0606-D | 5340152 |
|  | Bar 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 |
|  | 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 |
|  | 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 80 Ncm; material: stainless steel bellows, aluminum hub | KUP-0610-B | 5312982 |
|  | 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 |
|  | 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 |
|  | 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 |
|  | Double loop coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radially ± 0.25 mm, axially ± 0.4 mm, angle ± 4 degrees; max. speed 10.000 rpm, -30 to $+120$ degrees Celsius, torsional spring stiffness of 150 Nm/rad | KUP-0810-D | 5326704 |
|  | Bar coupling, shaft diameter 8 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-0810-S | 5314178 |
|  | Bellows coupling, shaft diameter 10 mm/10 mm; maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular $\pm 4^\circ$; max. revolutions 10,000 rpm, -30° to $+120^\circ\text{C}$, max. torque 80 Ncm; material: stainless steel bellows, aluminum clamping hubs | KUP-1010-B | 5312983 |
|  | Double loop coupling, shaft diameter 10 mm / 10 mm, Maximum shaft offset: radial ± 2.5 mm, axial ± 3 mm, angular $\pm 10^\circ$; max. speed 3,000 rpm, -30° to $+80^\circ\text{C}$, max. torque 1.5 Nm; material: polyurethane, galvanized steel flange | KUP-1010-D | 5326703 |
|  | Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset, radial ± 0.3 mm, axial ± 0.4 mm, angle $\pm 2.5^\circ$, torsion spring stiffness 30 Nm/rad; material: aluminum flange, glass-fiber reinforced polyamide membrane and hardened steel coupling pin | KUP-1010-F | 5312986 |
|  | Bar coupling, shaft diameter 10 mm / 10 mm; maximum shaft offset: radial ± 0.3 mm, axial ± 0.2 mm, angular $\pm 3^\circ$; speed 10,000 rpm, -10° to $+80^\circ$ Celsius, max. torque 80 Ncm; material: glass fiber-reinforced polyamide, aluminum hub | KUP-1010-S | 2056408 |
|  | Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset, radial ± 0.3 mm, axial ± 0.4 mm, angle $\pm 2.5^\circ$, torsion spring stiffness 30 Nm/rad; material: aluminum flange, glass-fiber reinforced polyamide membrane and hardened steel coupling pin | KUP-1010-W | 5319914 |
|  | 10 mm / 12 mm; maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular $\pm 4^\circ$; max. revolutions 10,000 rpm, -30° to $+120^\circ\text{C}$, max. torque 80 Ncm; material: stainless steel bellows, aluminum clamping hubs | KUP-1012-B | 5312984 |
|  | Double loop coupling, shaft diameter 10 mm / 12 mm, Maximum shaft offset: radial ± 2.5 mm, axial ± 3 mm, angular $\pm 10^\circ$; max. speed 3,000 rpm, -30° to $+80^\circ\text{C}$, max. torque 1.5 Nm; material: polyurethane, galvanized steel flange | KUP-1012-D | 5326702 |

Dimensional drawings → page 35

Further accessories



Programming and configuration tools

| Figure | Brief description | Type | Part no. |
|---|---|------------|----------|
|  | USB programming unit, for programmable SICK encoders AFS60, AFM60, DFS60, VFS60, DFV60 and wire draw encoders with programmable encoders | PGT-08-S | 1036616 |
|  | 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. | PGT-10-Pro | 1072254 |




Plug connectors and cables


Plug connectors and cables

Cables (ready to assemble)

| Figure | Brief description | Type | Part no. |
|---|---|----------------|----------|
|  | Head A: cable Head B: Flying leads Cable: SSI, Incremental, HIPERFACE®, PUR, halogen-free, shielded, 4 x 2 x 0.15 mm ² , 5.6 mm | LTG-2308-MWENC | 6027529 |
|  | Head A: cable Head B: Flying leads Cable: SSI, TTL, HTL, Incremental, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm ² + 2 x 0.5 mm ² + 2 x 0.14 mm ² , 7.8 mm, UV and saltwater-resistant | LTG-2612-MW | 6028516 |




Connecting cables

| Figure | Brief description | Length of cable | Type | Part no. |
|---|--|-----------------|------------------|----------|
|  | Head A: female connector, JST, 8-pin, straight | 0.5 m | DOL-0J08-G0M5AA6 | 2048589 |
| | Head B: Flying leads Cable: SSI, PUR, halogen-free, shielded, 4 x 2 x 0.15 mm ² , Ø 5.6 mm | 10 m | DOL-0J08-G10MAA6 | 2048594 |
| | Head A: female connector, JST, 8-pin, straight | 1.5 m | DOL-0J08-G1M5AA6 | 2048590 |
| | Head B: Flying leads Cable: SSI, Incremental, PUR, halogen-free, shielded, 4 x 2 x 0.15 mm ² , 5.6 mm | 3 m | DOL-0J08-G3M0AA6 | 2048591 |
| | Head A: female connector, JST, 8-pin, straight Head B: Flying leads Cable: SSI, PUR, halogen-free, shielded, 4 x 2 x 0.15 mm ² , Ø 5.6 mm | 5 m | DOL-0J08-G5M0AA6 | 2048593 |
|  | Head A: female connector, M12, 8-pin, straight | 2 m | DOL-1208-G02MAC1 | 6032866 |
| | Head B: Flying leads | 5 m | DOL-1208-G05MAC1 | 6032867 |
| | Cable: Incremental, SSI, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm ² , 7 mm | 10 m | DOL-1208-G10MAC1 | 6032868 |
| | | 20 m | DOL-1208-G20MAC1 | 6032869 |
| | | 25 m | DOL-1208-G25MAC1 | 6067859 |
|  | Head A: female connector, M23, 12-pin, straight | 3 m | DOL-2308-G03MAA6 | 2048597 |
| | Head B: Flying leads | 5 m | DOL-2308-G05MAA6 | 2048598 |
| | Cable: SSI, PUR, halogen-free, shielded, 5.6 mm | 0.5 m | DOL-2308-G0M5AA6 | 2048595 |
| | | 10 m | DOL-2308-G10MAA6 | 2048599 |
| | | 1.5 m | DOL-2308-G1M5AA6 | 2048596 |




| Figure | Brief description | Length of cable | Type | Part no. |
|---|--|-----------------|-------------------|----------|
|  | Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: shielded, 7.8 mm | 3 m | DOL-2312-G03M-MD2 | 2062300 |
| | | 5 m | DOL-2312-G05M-MD2 | 2062301 |
| | | 10 m | DOL-2312-G10M-MD2 | 2062302 |
| | Head A: female connector, M23, 12-pin, straight Head B: Flying leads Cable: unshielded, 7.8 mm | 1.5 m | DOL-2312-G1M-5MD2 | 2062284 |
| | | 20 m | DOL-2312-G20M-MD2 | 2062303 |
| | | 30 m | DOL-2312-G30M-MD2 | 2062304 |






Dimensional drawings → [page 35-37](#)

Connection cables

| Figure | Brief description | Length of cable | Type | Part no. |
|---|---|-----------------|------------------|----------|
|  | Head A: female connector, terminal box, 8-pin, straight Head B: male connector, D-Sub, 9-pin, straight Cable: SSI + incremental, PVC, shielded Details: programming adapter cable for programming tool PGT-10-Pro and PGT-08-S | 0.5 m | DSL-0D08-G0M5AC3 | 2061739 |
|  | Head A: female connector, M12, 8-pin, straight Head B: male connector, D-Sub, 9-pin, straight Cable: SSI, PUR, halogen-free, shielded, 4 x 2 x 0.15 mm ² Details: suitable for use with SSI interfaces, not suitable for use with SSI + Incremental interface or SSI + Sin/Cos., programming adapter cable for programming tool PGT-10-Pro and PGT-08-S | 0.5 m | DSL-2D08-G0M5AC2 | 2048439 |
|  | Head A: female connector, M23, 12-pin, straight Head B: male connector, D-Sub, 9-pin, straight Cable: SSI + incremental, SSI + Sin/Cos, PUR, halogen-free, shielded, 4 x 2 x 0.15 mm ² Details: programming adapter cable for programming tool PGT-10-Pro and PGT-08-S | 0.5 m | DSL-3D08-G0M5AC4 | 2059270 |

Field-attachable connectors

| Figure | Brief description | Type | Part no. |
|--|--|---------------|----------|
|  | Head A: female connector, M12, 8-pin, straight, A-coded Head B: - Cable: Incremental, SSI, shielded, CAT5, CAT5e | DOS-1208-GA01 | 6045001 |
|  Illustration may differ | Head A: female connector, M23, 9-pin, straight Cable: HIPERFACE®, SSI, Incremental, shielded | DOS-2309-G | 6028533 |
|  | Head A: female connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, shielded | DOS-2312-G | 6027538 |
| | | DOS-2312-G02 | 2077057 |

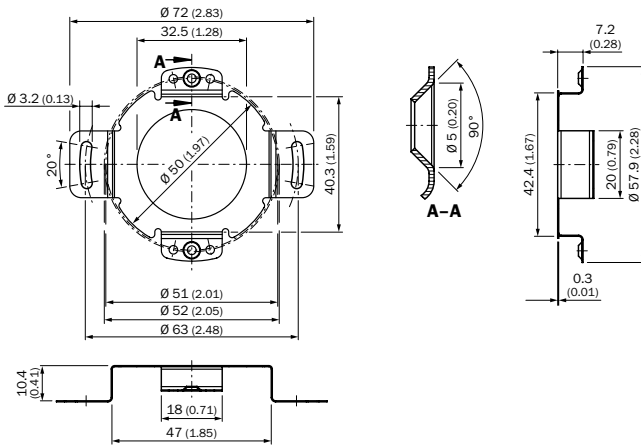
| Figure | Brief description | Type | Part no. |
|---|---|---------------|----------|
|  | Head A: female connector, M23, 12-pin, angled Head B: - Cable: HIPERFACE®, SSI, Incremental, shielded | DOS-2312-W01 | 2072580 |
|  | Head A: male connector, M12, 8-pin, straight, A-coded Head B: - Cable: Incremental, shielded, CAT5, CAT5e | STE-1208-GA01 | 6044892 |
|  | Head A: male connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, RS-422, shielded | STE-2312-G | 6027537 |
|  | Head A: male connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, shielded | STE-2312-G01 | 2077273 |
|  | Head A: male connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, shielded | STE-2312-GX | 6028548 |

Dimensional drawings → page 38-40

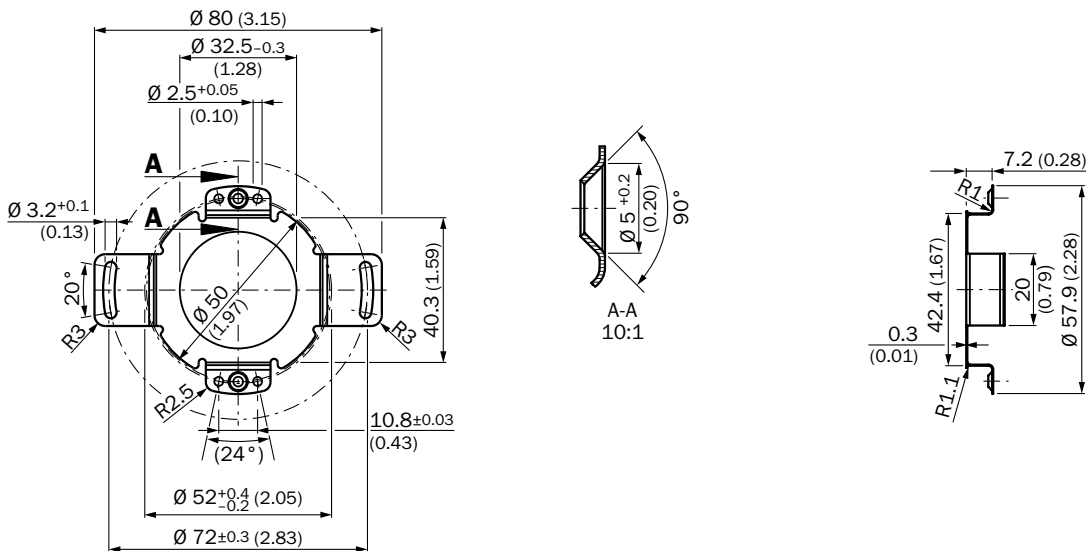
Dimensional drawings for accessories (Dimensions in mm (inch))

Flanges

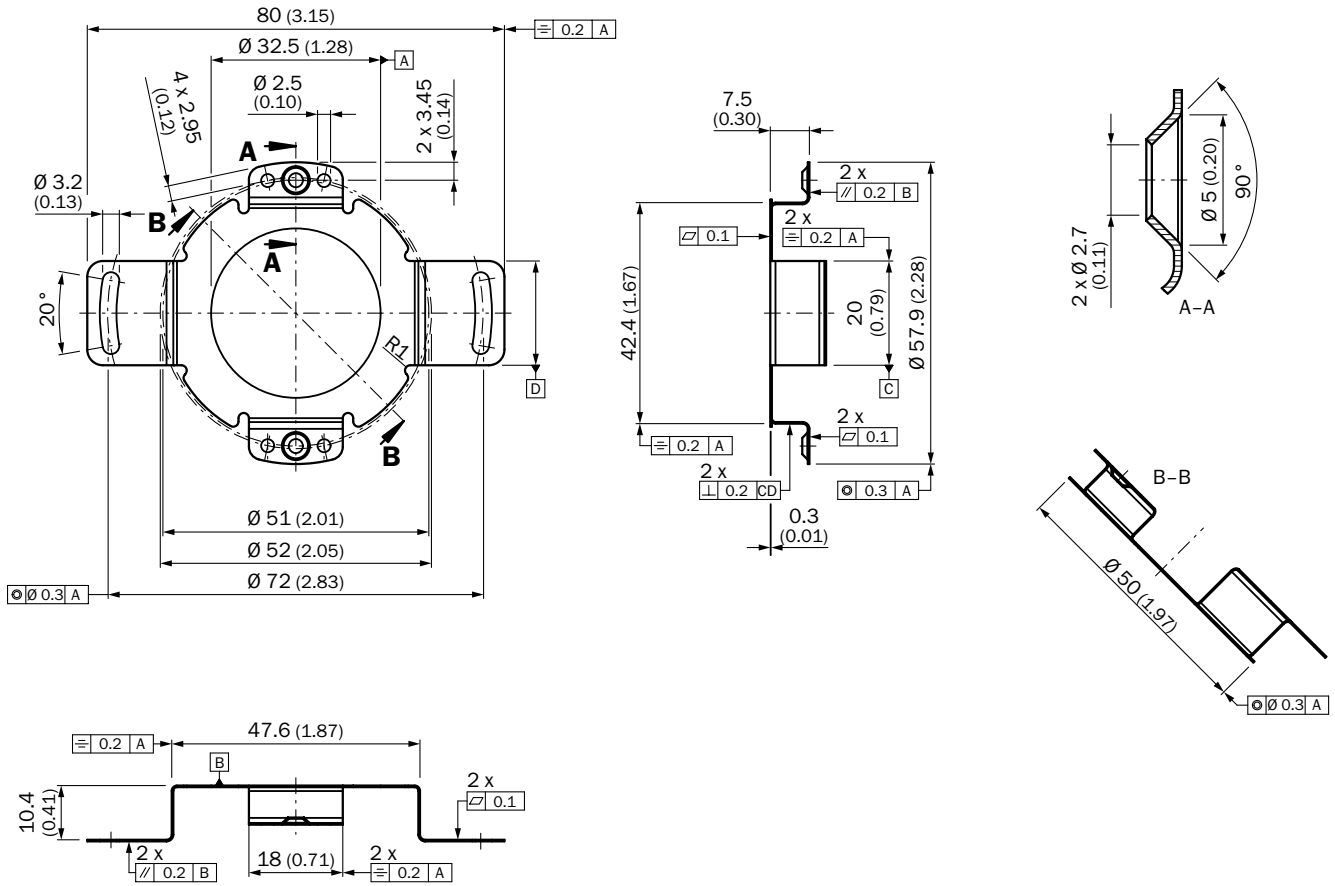
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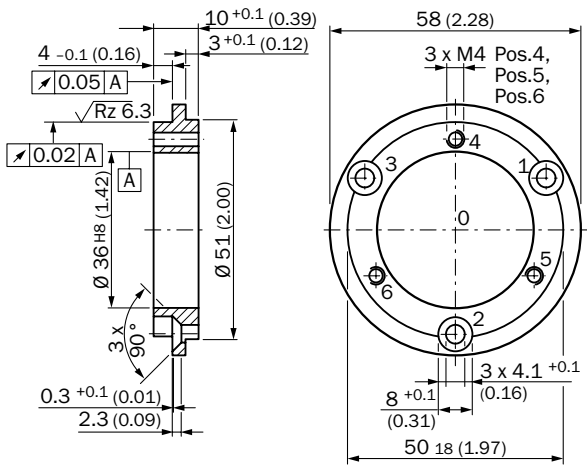
BEF-DS05XFX



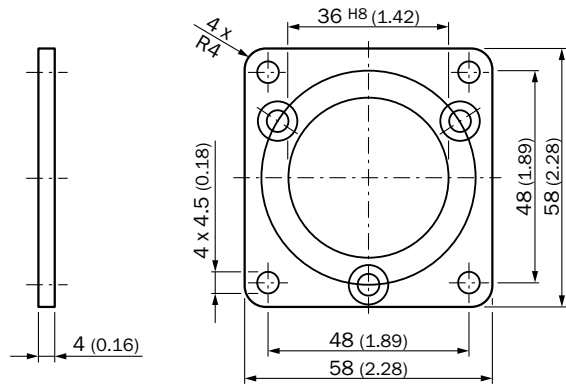
BEF-DS07XFX



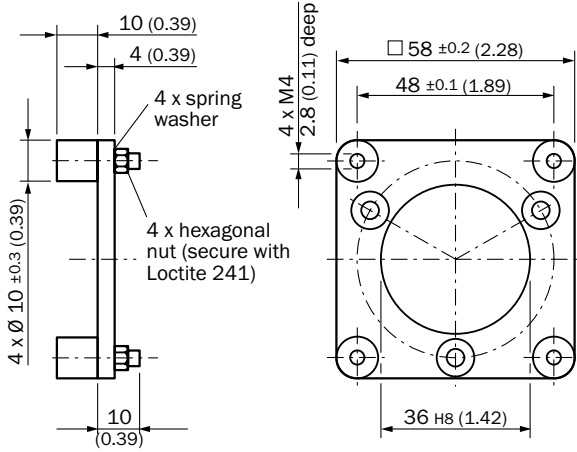
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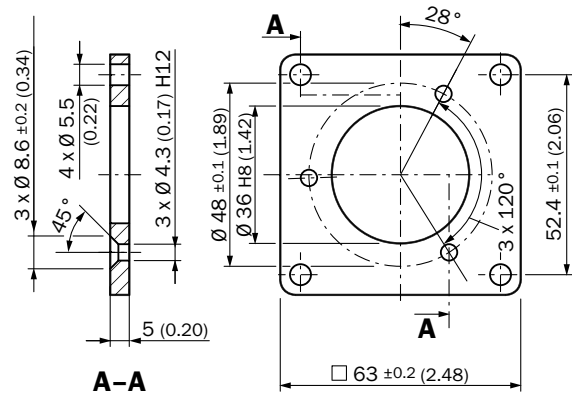
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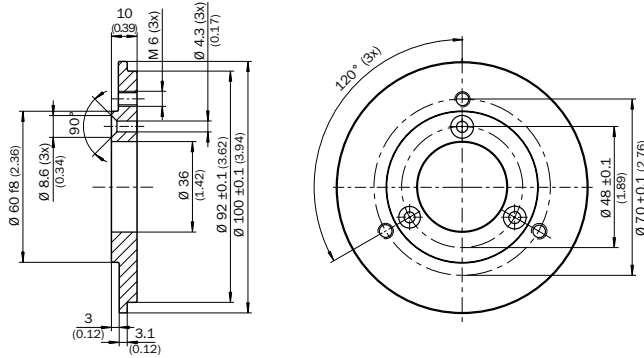
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BEF-FA-036-063REC

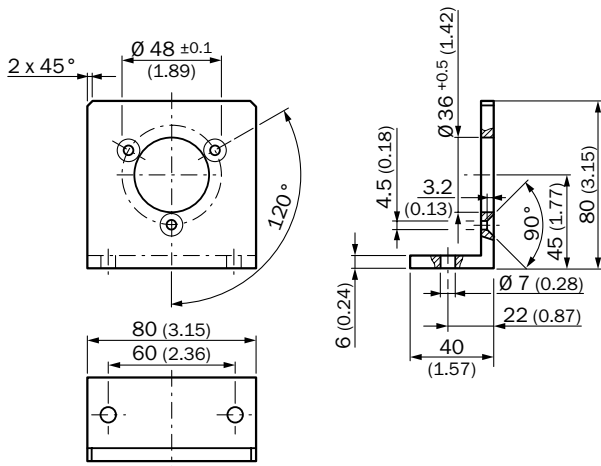


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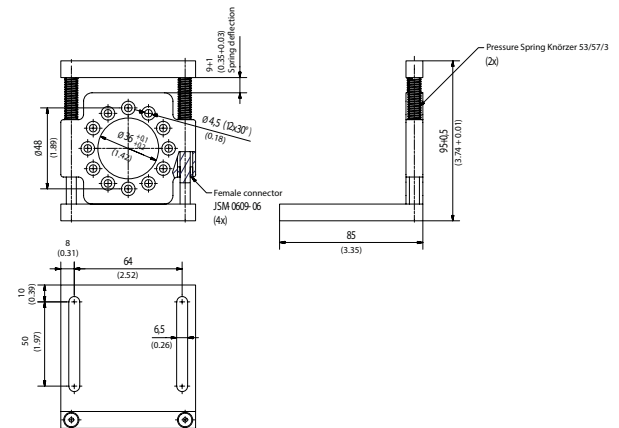


Mounting brackets and plates

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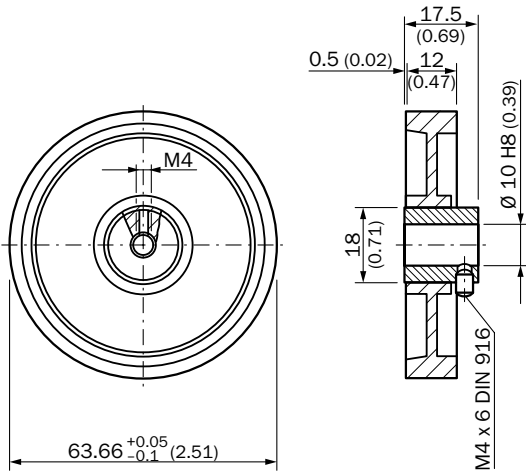


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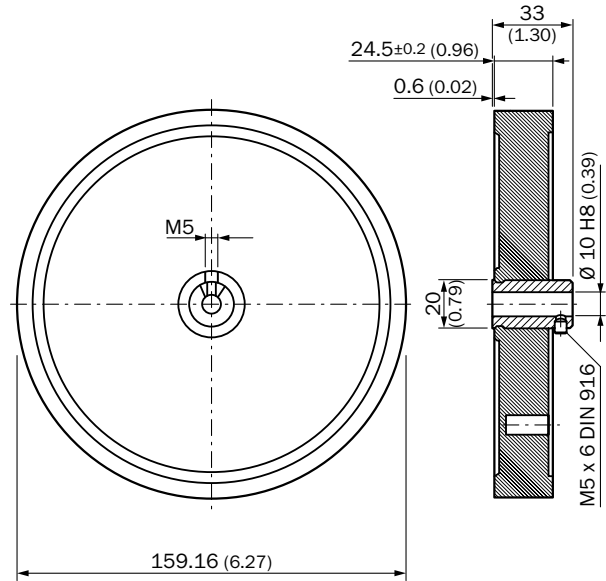


Other mounting accessories

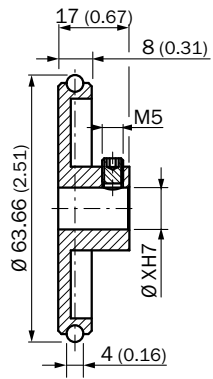
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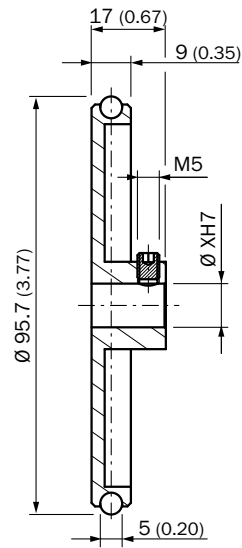
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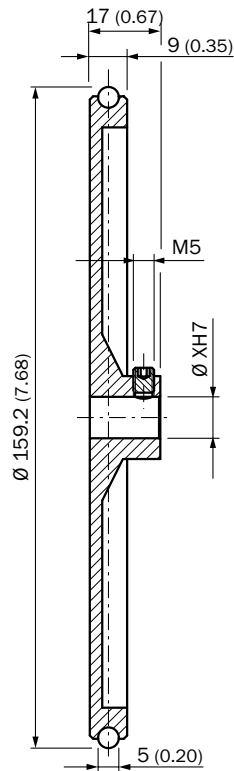
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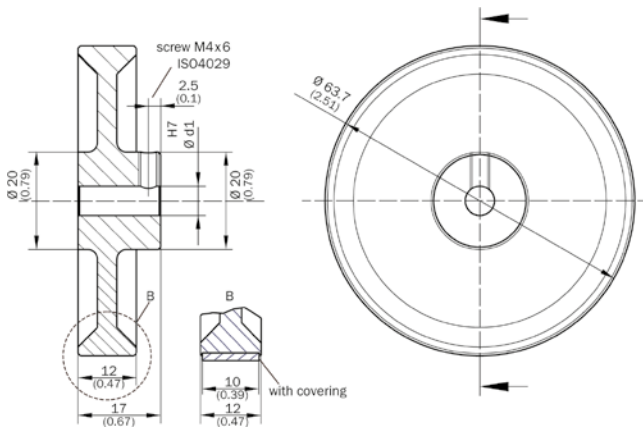
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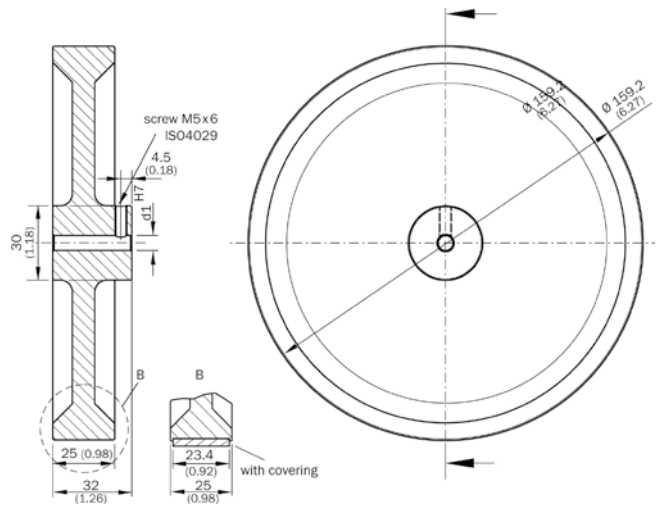
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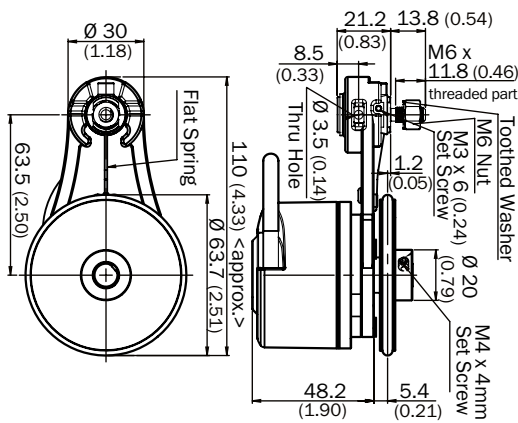
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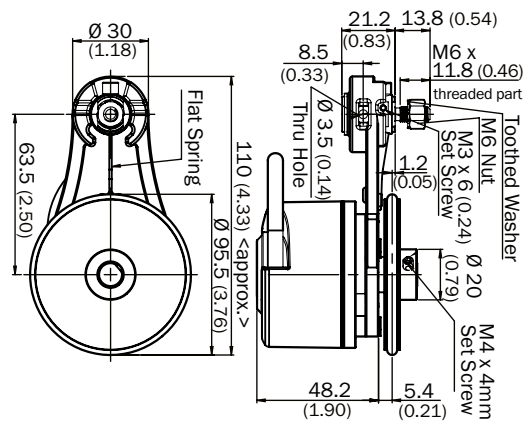
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 BEF-MR10500APG
 BEF-MR10500APN



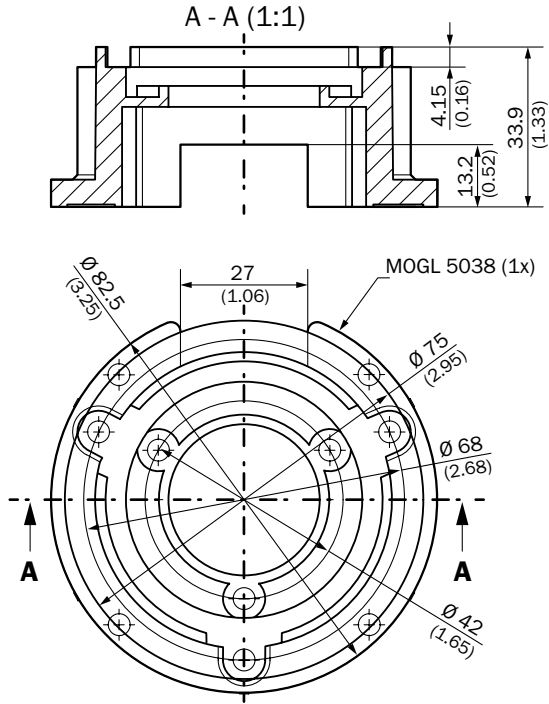
BEF-MRS-10-U
 Dimensional drawing



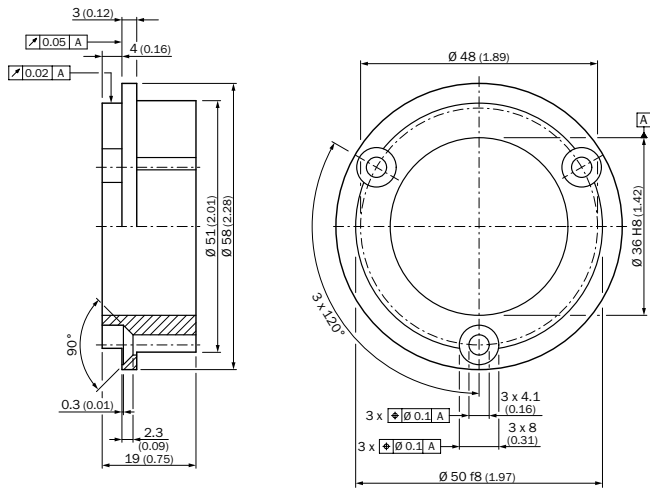
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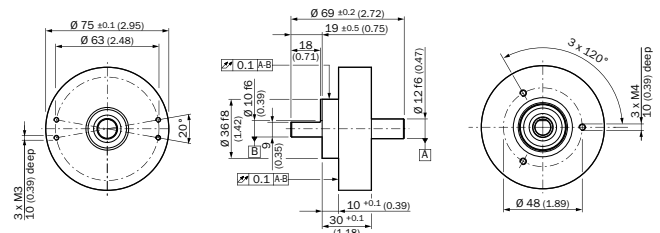
BEF-MG-50



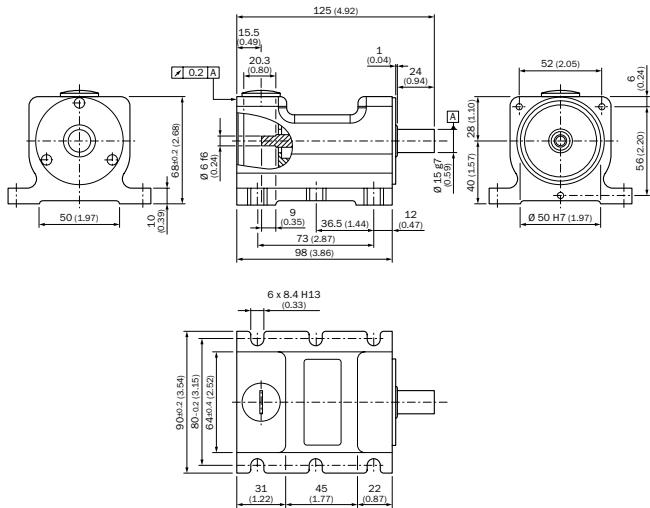
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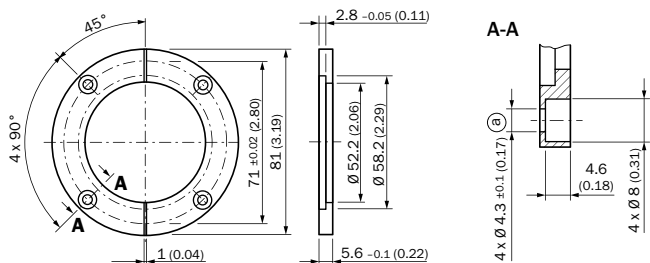
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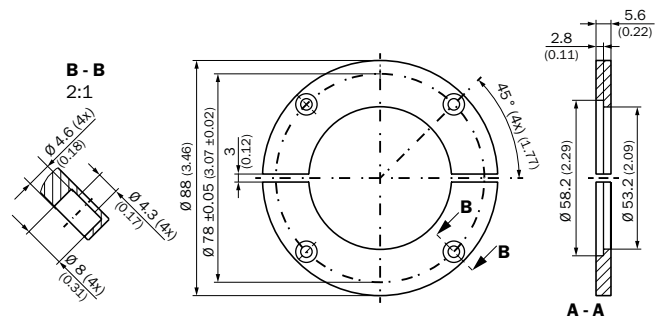
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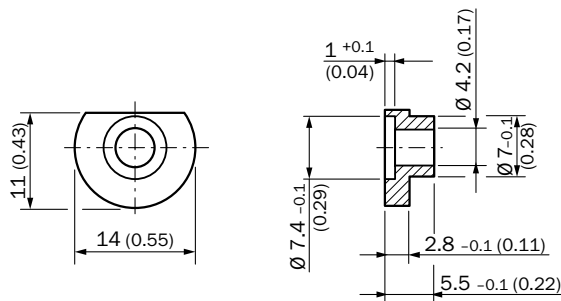
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BEF-WG-SF050S1



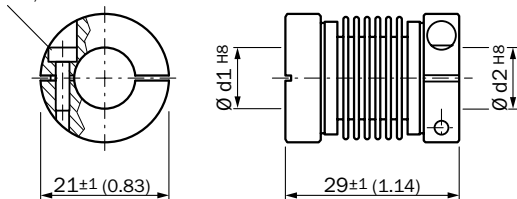
BEF-WK-SF



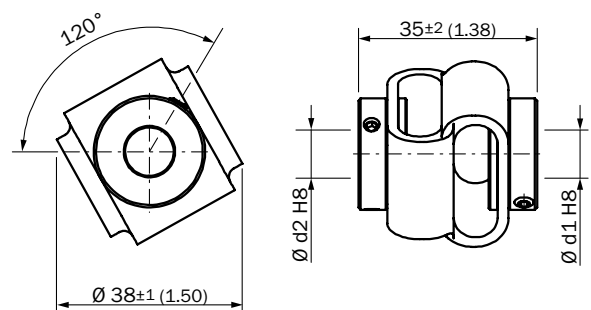
Shaft adaptation

KUP-xxxx-B

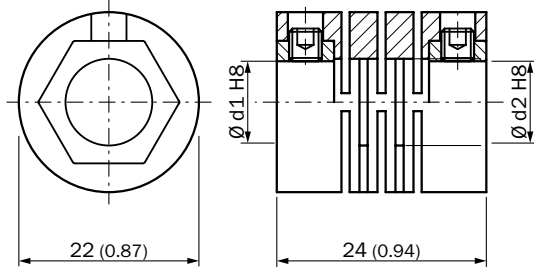
Cheese-head screw
M2.5 x 8, DIN 912 A2



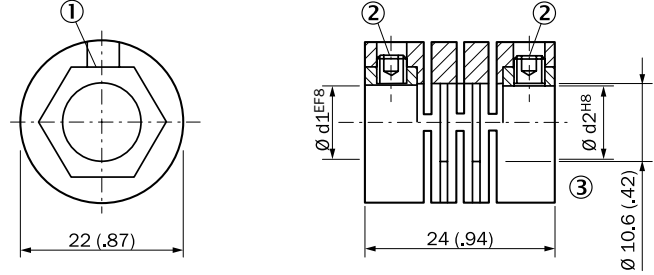
KUP-xxxx-D



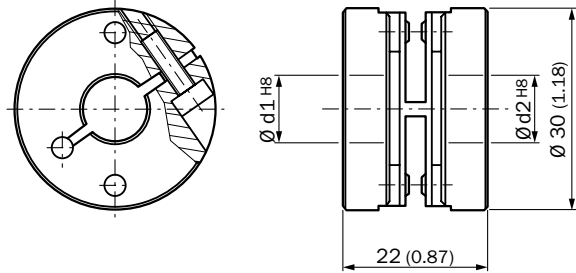
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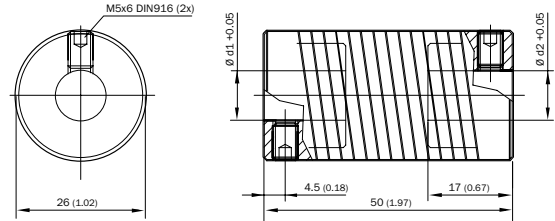
KUP-0xxx-S



KUP-xx10-F

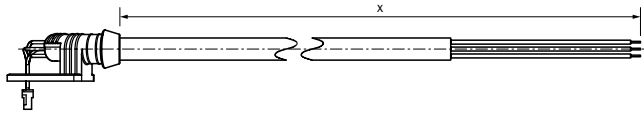


KUP-1010-W

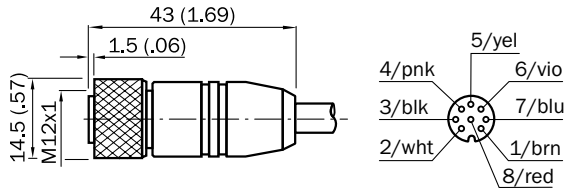


Plug connectors and cables

DOL-0J08-GxxxAA6

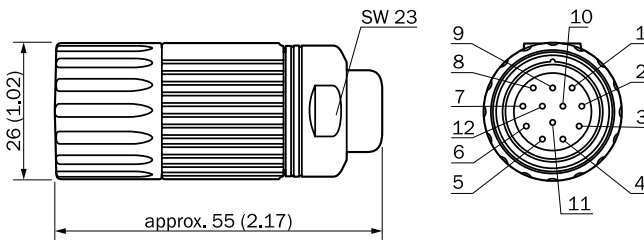


DOL-1208-GxxMAC1

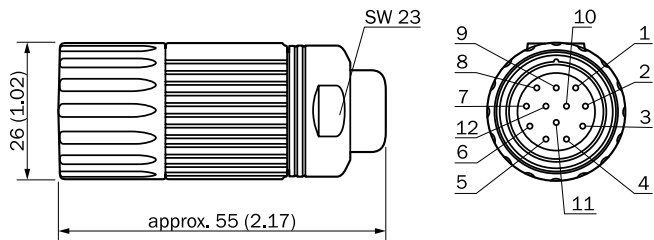


All dimensions in mm (inch)

DOL-2308-G03MAA6



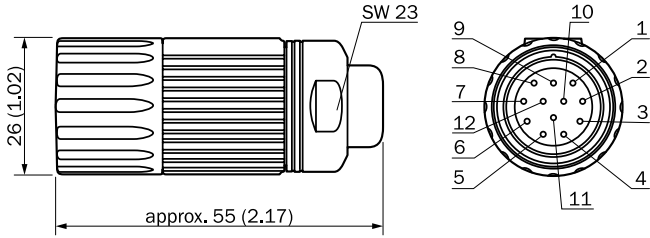
DOL-2308-G05MAA6



- ① Blue
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- ③ Yellow
- ⑧ Red
- ⑨ Pink
- ⑩ Brown
- ⑪ Purple
- ⑫ Black

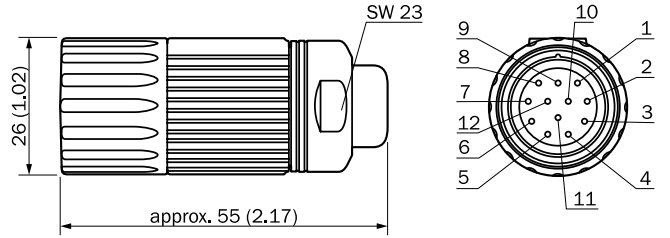
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DOL-2308-G0M5AA6



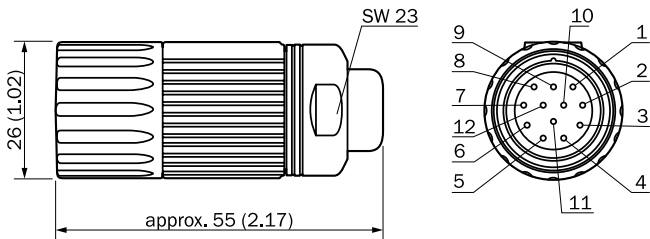
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DOL-2308-G10MAA6



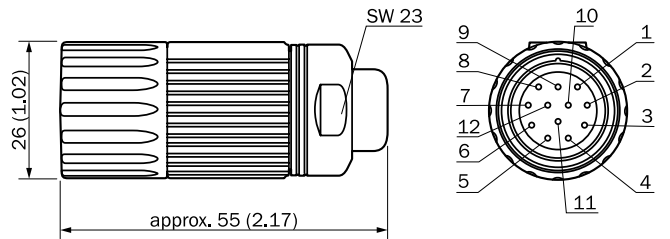
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DOL-2308-G1M5AA6



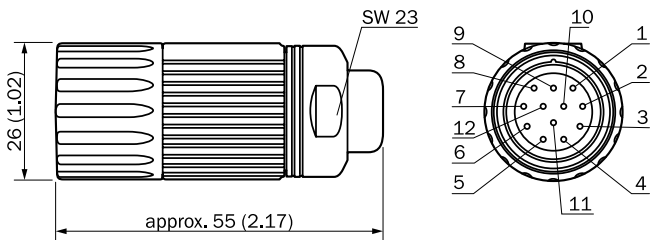
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DOL-2312-G03MMD2



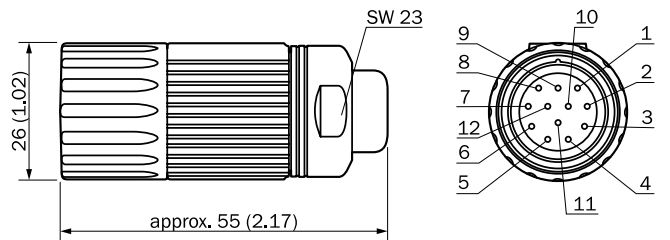
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- ⑤ Orange
- ⑥ Brown
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- ⑧ Black
- ⑨ Orange/black
- ⑩ Green
- ⑪ Gray
- ⑫ Pink

DOL-2312-G05MMD2



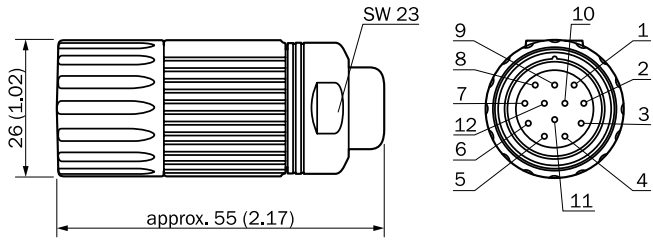
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- ⑩ Green
- ⑪ Gray
- ⑫ Pink

DOL-2312-G10MMD2



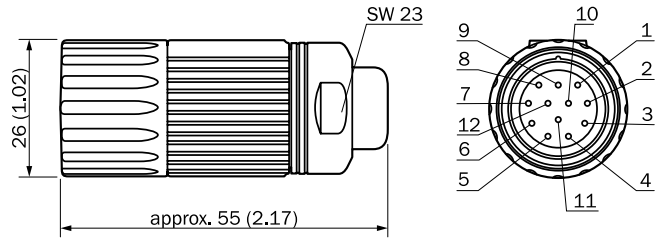
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DOL-2312-G1M5MD2



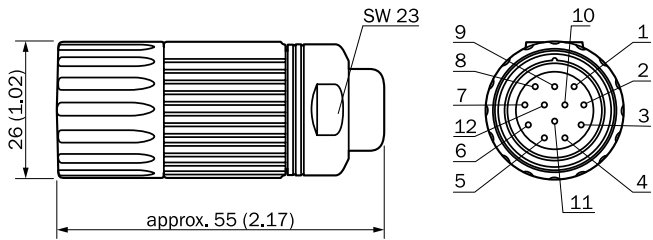
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DOL-2312-G20MMD2



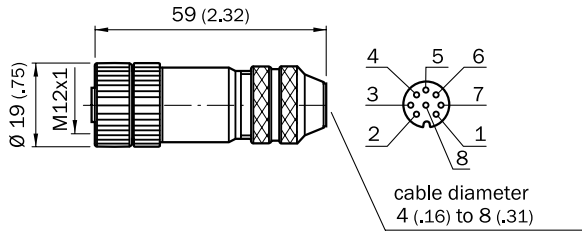
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- ⑩ Green
- ⑪ Gray
- ⑫ Pink

DOL-2312-G30MMD2

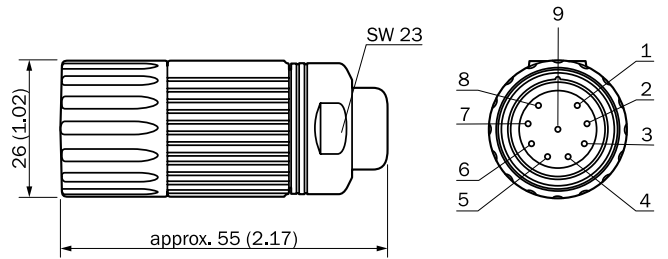


- ① Red
- ② Blue
- ③ Yellow
- ④ White
- ⑤ Orange
- ⑥ Brown
- ⑦ Purple
- ⑧ Black
- ⑨ Orange/black
- ⑩ Green
- ⑪ Gray
- ⑫ Pink

DOS-1208-GA01

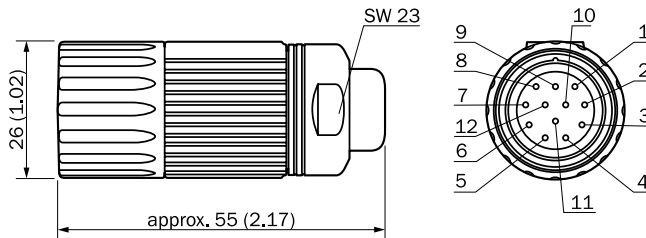


DOS-2309-G



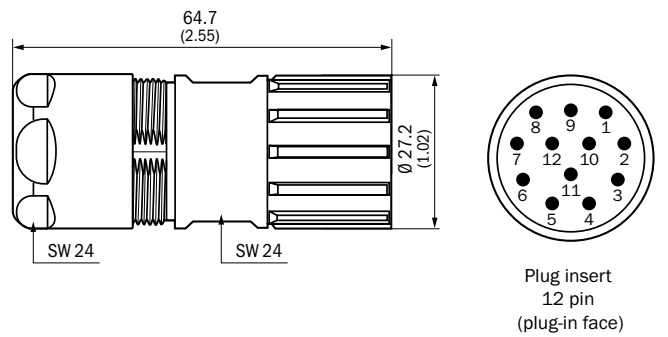
- ① Blue
- ② White
- ③ Yellow
- ④ Gray
- ⑤ Green
- ⑥ Pink
- ⑦ Black
- ⑧ Red
- ⑨ Orange

DOS-2312-G

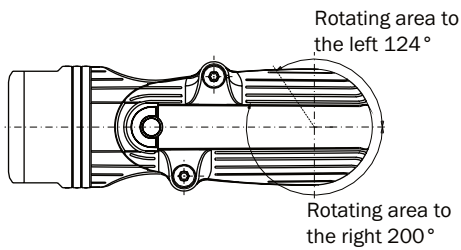
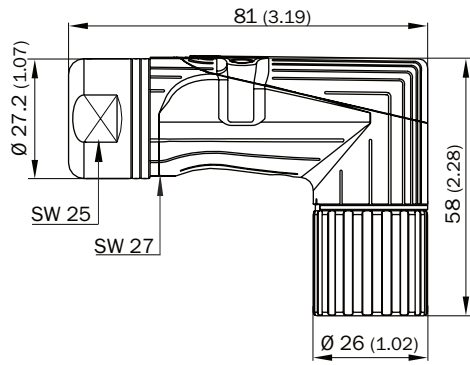


- ① Blue
- ② White
- ③ Yellow
- ④ Gray
- ⑤ Green
- ⑥ Pink
- ⑦ Black
- ⑧ Red
- ⑨ Orange
- ⑩ Brown
- ⑪ Purple
- ⑫ Orange/black

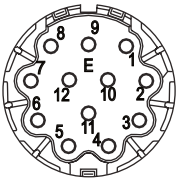
DOS-2312-G02



DOS-2312-W01

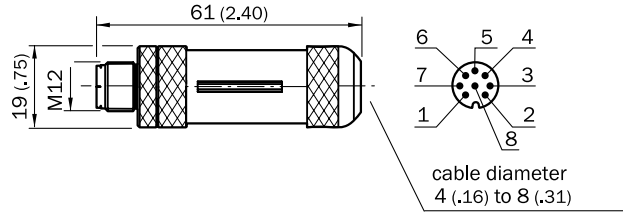


Main dimensions
Plug

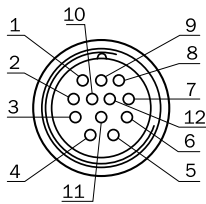
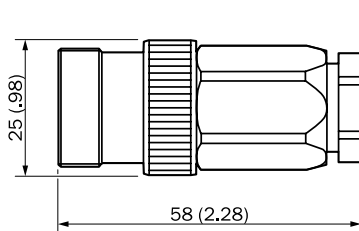


Contact arrangement
Mating view

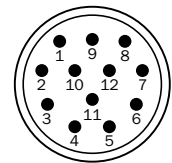
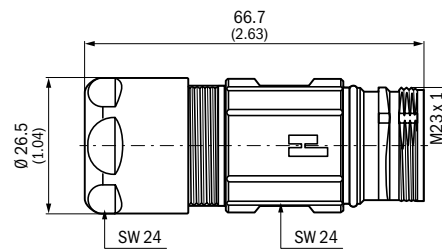
STE-1208-GA01



STE-2312-G

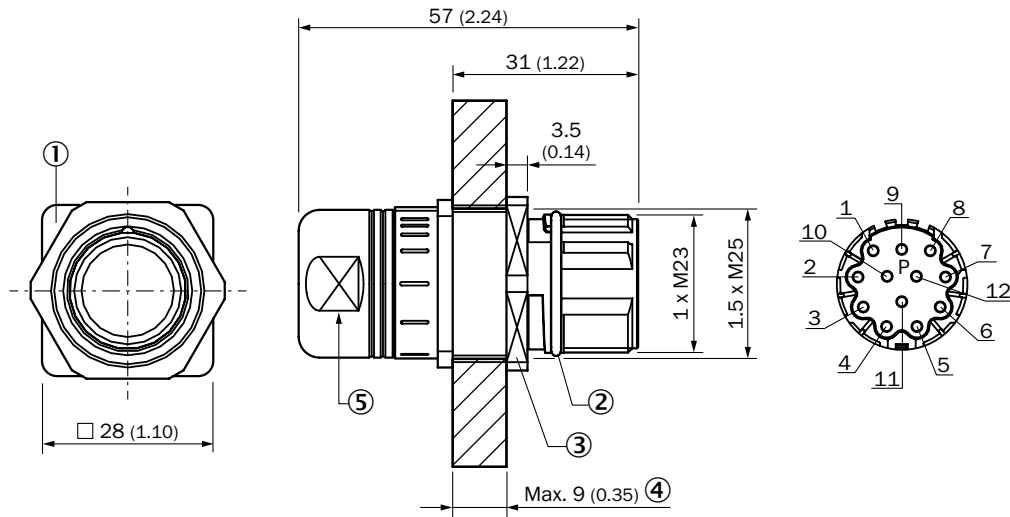


STE-2312-G01



Pin insert
12 pin
(plug-in face)

STE-2312-GX



- ① Fixed stop position
- ② Vibration protection
- ③ Fixing nut SW30
- ④ Max. wall thickness
- ⑤ SW23

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