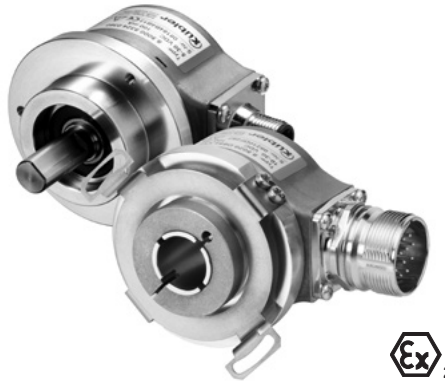
**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**



**Due to their sturdy bearing construction in Safety-Lock™ Design, the Sendix 5000 and 5020 offer high resistance against vibration and installation errors.**

**The rugged housing, high protection level of up to IP67, as well as the wide temperature range of -40°C up to +85°C, make this product range the perfect encoder for all applications.**




Safety-Lock™ | High rotational speed | Temperature range | High protection level | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Short-circuit proof | Reverse polarity protection | Optical sensor | Surface protection salt spray-tested optional

## Robust performance

- Increased resistance against vibrations and tolerance of installation errors, elimination of machine downtime and repairs thanks to sturdy bearing construction in "Safety-Lock™ Design".
- Ensures highest safety against field breakdowns and is thus suitable also for outside use thanks to its resistant die-cast housing and protection up to IP67.
- Undetachable clamping ring on hollow shaft encoders.
- Wide temperature range, -40°C ... +85°C.

**NEW:**

- Higher shock resistance.
- Higher vibration resistance.
- IP66 and IP67 protection level in one version.

## Many variants

- Suitable connection variant for every specific case: cable connection, M12, M23, MIL and Sub-D connector.
- Reliable mounting in a wide variety of installation situations: comprehensive and proven fixing possibilities.
- Compatible with all US and European standards.
- Max. 5000 pulses per revolution.

**NEW:**

- Double number of standard pulse numbers.
- Variants with connector fitted in the cable – for error-free electrical connection to your control.
- Additional connector variants (M12 / 5-pin, Sub-D).
- Additional standard cable lengths.

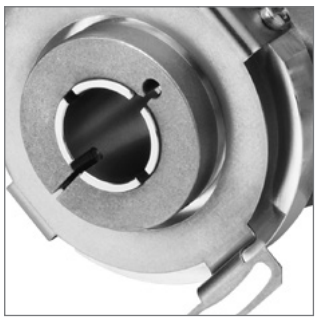
## Technology in detail

**Robust Safety-Lock™ bearing structure**

**Cables with fitted connector**

**Undetachable clamping ring**

Slotted clamping ring + slotted shaft



**Tangential cable outlet**

**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**

## Order code Shaft version

| 8.5000 | . | X | X | X | X | . | XXXX | . | P | XX | X | X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | | a | b | c | d | | e | | | f | g | h |

**a** *Flange*

| | |
|---|---|
| 5 = synchro flange, IP66/IP67 | ø 50.8 mm [2"] |
| 6 = synchro flange, IP65 | ø 50.8 mm [2"] |
| 7 = clamping flange, IP66/IP67 | ø 58 mm [2.28"] |
| 8 = clamping flange, IP65 | ø 58 mm [2.28"] |
| A = synchro flange, IP66/IP67 | ø 58 mm [2.28"] |
| B = synchro flange, IP65 | ø 58 mm [2.28"] |
| C = square flange, IP66/IP67 | □ 63.5 mm [2.5"] |
| D = square flange, IP65 | □ 63.5 mm [2.5"] |
| G = Euroflansch, IP66/IP67 | ø 115 mm [4.53"] 1) |
| 1 = servo flange, IP66/IP67 | ø 50.8 mm [2"] |
| 2 = servo flange, IP65 | ø 50.8 mm [2"] |
| 3 = square flange, IP66/IP67 | □ 52.3 mm [2.06"] |
| 4 = square flange, IP65 | □ 52.3 mm [2.06"] |
| E = servo flange, IP66/IP67 | ø 63.5 mm [2.5"] |
| F = servo flange, IP65 | ø 63.5 mm [2.5"] |

**b** *Shaft (ø x L), with flat*

1 = ø 6 x 10 mm [0.24 x 0.39"]
2 = ø 1/4 x 5/8" (6.35 x 15.875 mm)
6 = ø 8 x 15 mm [0.32 x 0.59"]
3 = ø 10 x 20 mm [0.39 x 0.79"]
4 = ø 3/8 x 5/8"(9.5 x 15.875 mm)
B = ø 11 x 33 mm [0.43 x 1.30"], with feather key shaft slot 2)
5 = ø 12 x 20 mm [0.47 x 0.79"]
7 = ø 1/4 x 7/8"
8 = ø 3/8 x 7/8"

**c** *Output circuit / power supply*

4 = RS422 (with inverted signal) / 5 V DC
1 = RS422 (with inverted signal) / 5 ... 30 V DC
2 = Push-Pull (7272 compatible with inverted signal) / 5 ... 30 V DC
5 = Push-Pull (with inverted signal) / 10 ... 30 V DC
7 = Push-Pull (without inverted signal) / 10 ... 30 V DC 3)
3 = Open collector (with inverted signal) / 5 ... 30 V DC
8 = Push-Pull (7272 with inverted signal), without capacitor / 5 ... 30 V DC 4)

**d** *Type of connection – cable*

1 = axial cable, 1 m [3.28'] PVC
A = axial cable, special length PVC *)
2 = radial cable, 1 m [3.28'] PVC
B = radial cable, special length PVC *)

*Type of connection – connector*

P = axial M12 connector, 5-pin 5)
R = radial M12 connector, 5-pin 5)
3 = axial M12 connector, 8-pin
4 = radial M12 connector, 8-pin
7 = axial M23 connector, 12-pin
8 = radial M23 connector, 12-pin
Y = radial MIL connector, 10-pin
W = radial MIL connector, 7-pin
9 = radial MIL connector, 6-pin

*Type of connection – connector with cable*

L = radial cable with M12 connector, 8-pin, special length PVC *)
M = radial cable with M23 connector, 12-pin, special length PVC *)
N = radial cable with Sub-D connector, 9-pin, special length PVC *)

*) Available special lengths (connection types A, B, L, M, N:
0.3, 0.5, 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20 m [0.98, 1.64, 3.28, 6.56, 9.84, 13.12, 16.40, 19,69, 26.25, 32.80, 39.37, 49.21, 65,62']
order code expansion .XXXX = length in dm
ex.: 8.5000.814A.1024.0030 (for cable length 3 m)

**e** *Pulse rate*

1, 2, 4, 5, 10, 12, 14, 20, 25, 28, 30, 32, 36, 50, 60, 64, 80, 100, 120, 125, 150, 180, 200, 240, 250, 256, 300, 342, 360, 375, 400, 500, 512, 600, 625, 720, 800, 900, 1000, 1024, 1200, 1250, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 4000, 4096, 5000
(e.g. 100 pulses => 0100)

**f** *Special output signal formats*

00 = standard output
other = see page 8

**g** *Capacitor*

0 = standard
A = no bypass capacitor (vector motor)
(only valide with output circuits 1, 3, 4, 5)

**h** *Special connector pin configuration*

0 = standard wiring
other = see page 6

*Optional on request*

- other pulse rates
- Ex 2/22 6)
- surface protection salt spray

1) Only in conjunction with shaft type B.
2) Only in conjunction with flange type G.
3) Only in conjunction with type of connection P or R.
4) Attention: no CE types!
5) Only in conjunction with output circuit 7.
6) For the cable connection type, cable material PUR.

**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**

**Order code Hollow shaft**

| 8.5020 | . | X | X | X | X | . | XXXX | . | P | XX | X | X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | | a | b | c | d | | e | | | f | g | h |

**a** *Flange*
1 = with spring element, long, IP66/IP67
2 = with spring element, long, IP65
3 = with fastening arm, long, IP66/IP67
4 = with fastening arm, long, IP65
7 = with stator coupling, IP66/IP67 ø 65 mm [2.56"]
8 = with stator coupling, IP65 ø 65 mm [2.56"]
C = with stator coupling, IP66/IP67 ø 63 mm [2.48"]
D = with stator coupling, IP65 ø 63 mm [2.48"]

5 = with stator coupling, IP66/IP67 ø 57.2 mm [2.25"]
6 = with stator coupling, IP65 ø 57.2 mm [2.25"]

**b** *Hollow shaft*
1 = ø 6 mm [0.24"]
2 = ø 1/4"
9 = ø 8 mm [0.32"]
4 = ø 3/8"
3 = ø 10 mm [0.39"]
5 = ø 12 mm [0.47"]
6 = ø 1/2"
A = ø 14 mm [0.55"]
8 = ø 15 mm [0.59"]
7 = ø 5/8"

**c** *Output circuit / power supply*
4 = RS422 (with inverted signal) / 5 V DC
1 = RS422 (with inverted signal) / 5 ... 30 V DC
2 = Push-Pull (7272 compatible with inverted signal) / 5 ... 30 V DC
5 = Push-Pull (with inverted signal) / 10 ... 30 V DC
7 = Push-Pull (without inverted signal) / 10 ... 30 V DC [2]

3 = Open collector (with inverted signal) / 5 ... 30 V DC
8 = Push-Pull (7272 with inverted signal), without capacitor / 5 ... 30 V DC [1]

**d** *Type of connection – cable*
1 = radial cable, 1 m [3.28'] PVC
A = radial cable, special length PVC *)
E = tangential cable, 1 m [3.28'] PVC
F = tangential cable, special length PVC *)

*Type of connection – connector*
R = radial M12 connector, 5-pin [3]
2 = radial M12 connector, 8-pin
4 = radial M23 connector, 12-pin
6 = radial MIL connector, 7-pin
7 = radial MIL connector, 10-pin

*Type of connection – connector with cable*
H = tangential cable, 0.3 m [0.98'] PVC, incl. M12 connector, 8-pin for central fastening
L = tangential cable with M12 connector, 8-pin, special length PVC *)
M = tangential cable with M23 connector, 12-pin, special length PVC *)
N = tangential cable with Sub-D connector, 9-pin, special length PVC *)

*) Available special lengths (connection types A, F, L, M, N):
0.3, 0.5, 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20 m [0.98, 1.64, 3.28, 6.56, 9.84, 13.12, 16.40, 19,69, 26.25, 32.80, 39.37, 49.21, 65,62']
order code expansion .XXXX = length in dm
ex.: 8.5020.234A.1024.0030 (for cable length 3 m)

**e** *Pulse rate*
1, 2, 4, 5, 10, 12, 14, 20, 25, 28, 30, 32, 36, 50, 60, 64, 80, 100, 120, 125, 150, 180, 200, 240, 250, 256, 300, 342, 360, 375, 400, 500, 512, 600, 625, 720, 800, 900, 1000, 1024, 1200, 1250, 1500, 1800, 2000, 2048, 2500, 3000, 3600, 4000, 4096, 5000
(e.g. 100 pulses => 0100)

**f** *Special output signal formats*
00 = standard output
other = see page 8

**g** *Capacitor*
0 = standard
A = no bypass capacitor (vector motor)
(only valide with output circuits 1, 3, 4, 5)

**h** *Special connector pin configuration*
0 = standard wiring
other = see page 6

*Optional on request*
- other pulse rates
- Ex 2/22 (not for type of connection E, F, H, L, M, N) [4]
- surface protection salt spray tested



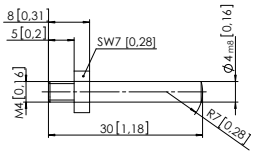
1) Attention: no CE types!
2) Only in conjunction with type of connection R.
3) Only in conjunction with output circuit 7.
4) For the cable connection type, cable material PUR.

# Incremental encoders

| Standard optical | Sendix 5000 / 5020 (shaft / hollow shaft) | Push-Pull / RS422 / Open collector |
|---|---|---|

| Mounting accessory for shaft encoders | | Order no. |
|---|---|---|
| **Coupling** | bellows coupling ø 19 mm [0.75“] for shaft 6 mm [0.24“] | **8.0000.1102.0606** |
| | bellows coupling ø 19 mm [0.75“] for shaft 10 mm [0.39“] | **8.0000.1102.1010** |

| Mounting accessory for hollow shaft encoders | | Order no. |
|---|---|---|
| **Cylindrical pin, long**<br>for torque stops | with fixing thread | **8.0010.4700.0000** |




| Isolation / adapter inserts for hollow shaft encoders order code 8.5020.X8XX.XXXX | D1 | Isolation insert |
|---|---|---|
| | 6 mm [0.24“] | **8.0010.4021.0000** |
| | 8 mm [0.32“] | **8.0010.4020.0000** |
| | 10 mm [0.39“] | **8.0010.4023.0000** |
| | 12 mm [0.47“] | **8.0010.4025.0000** |
| | 1/4“ | **8.0010.4022.0000** |
| | 3/8“ | **8.0010.4024.0000** |
| | 1/2“ | **8.0010.4026.0000** |

**Thermal and electrical isolation of the encoders (Temperature range -40 ... +115°C [-40°F ... +239°F])**
Isolation inserts prevent currents from passing through the encoder bearings. These currents can occur when using inverter controlled three-phase or AC vector motors and considerably shorten the service life of the encoder bearings. In addition the encoder is thermally isolated as the plastic does not transfer the heat to the encoder.

Further accessories can be found in the accessories section or in the accessories area of our website.

| Connection technology | | Order no. |
|---|---|---|
| **Connector, self-assembly (straight)** | M12 female connector with coupling nut | **05.CMB 8181-0** |
| | M23 female connector with coupling nut | **8.0000.5012.0000** |
| | MIL female connector with coupling nut, 10-pin | **8.0000.5062.0000** |
| **Cordset, pre-assembled** | M12 female connector with coupling nut, 2 m [6.56'] PVC cable | **05.00.6041.8211.002M** |
| | M23 female connector with coupling nut, 2 m [6.56'] PVC cabl | **8.0000.6901.0002** |

Additional connectors can be found in the connection technology section or in the connection technology area of our website.

**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**

## Technical data

### Mechanical characteristics

| | | |
|---|---|---|
| **Maximum speed** | IP65 | 12000 min$^{-1}$<br>6000 min$^{-1}$ (continuous) |
| | IP66/IP67 | 6000 min$^{-1}$<br>3000 min$^{-1}$ (continuous) |
| **Mass moment of inertia** | shaft version | approx. 1.8 x 10$^{-6}$ kgm$^2$ |
| | hollow shaft version | approx. 6 x 10$^{-6}$ kgm$^2$ |
| **Starting torque** at 20°C [68°F] | IP65 | < 0.01 Nm |
| | IP66/IP67 | < 0.05 Nm |
| **Shaft load capacity** | radial | 100 N |
| | axial | 50 N |

| | | |
|---|---|---|
| **Weight** | | approx. 0.4 kg [14.11 oz] |
| **Protection** acc. to EN 60529 | | |
| | without shaft seal | IP65 |
| | with shaft seal | IP66/IP67 |
| **Working temperature range** | | -40°C [1] ... +85°C [-40°F [1] ... +185°F] |
| **Material** | shaft | stainless steel |
| **Shock resistance** acc. to EN 60068-2-27 | | 3000 m/s$^2$, 6 ms [2] |
| **Vibration resistance** acc. to EN 60068-2-6 | | 300 m/s$^2$, 10 ... 2000 Hz [3] |

### Electrical characteristics

| **Output circuit** | **RS422** (TTL compatible) | **RS422** (TTL compatible) | **Push-Pull** | **Push-Pull** (7272 compatible) | **Push-Pull** (7272, without capacitor) | **Open collector** (7273) |
|---|---|---|---|---|---|---|
| Order code | **1** | **4** | **5, 7** | **2** | **8** | **3** |
| **Power supply** | 5 ... 30 V DC | 5 V DC (±5 %) | 10 ... 30 V DC | 5 ... 30 V DC | 5 ... 30 V DC | 5 ... 30 V DC |
| **Power consumption** (no load) | typ. 40 mA<br>max. 90 mA | typ. 40 mA<br>max. 90 mA | typ. 50 mA<br>max. 100 mA | typ. 50 mA<br>max. 100 mA | typ. 50 mA<br>max. 100 mA | 100 mA |
| **Permissible load / channel** | max. +/- 20 mA | max. +/- 20 mA | max. +/- 20 mA | max. +/- 20 mA | max. +/- 20 mA | +/- 20 mA sink at 30 V DC |
| **Pulse frequency** | max. 300 kHz | max. 300 kHz | max. 300 kHz | max. 300 kHz [4] | max. 300 kHz | max. 300 kHz |
| **Signal level** HIGH<br>LOW | min. 2.5 V<br>max. 0.5 V | min. 2.5 V<br>max. 0.5 V | min +V - 1.0 V<br>max. 0.5 V | min. +V - 2.0 V<br>max. 0.5 V | min. +V - 2.0 V<br>max. 0.5 V | |
| **Rising edge time $t_r$** | max. 200 ns | max. 200 ns | max. 1 µs | max. 1 µs | max. 1 µs | |
| **Falling edge time $t_f$** | max. 200 ns | max. 200 ns | max. 1 µs | max. 1 µs | max. 1 µs | |
| **Short circuit proof outputs** [5] | yes [6] | yes [6] | yes | yes | yes [6] | yes |
| **Reverse polarity protection of the power supply** | yes | no | yes | no | no | no |
| **UL approval** | file 224618 | | | | | |
| **CE compliant** acc. to | EMC guideline 2014/30/EC<br>RoHS guideline 2011/65/EU | | | | | |

1) With connector: -40°C [-40°F], cable fixed: -30°C [-22°F], cable moved: -20°C [-4°F].
2) For MIL connectors: 2500 m/ s$^2$
3) For MIL connectors: 100 m/ s$^2$
4) Max. recommended cable length 30 m [98.43'].
5) If power supply correctly applied.
6) Only one channel allowed to be shorted-out:
at +V= 5 V DC, short-circuit to channel, 0 V, or +V is permitted.
at +V= 5 ... 30 V DC, short-circuit to channel or 0 V is permitted.

**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**

### Terminal assignment – Standard wiring

| Output circuit | Type of connection | Cable (isolate unused wires individually before initial start-up) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1, 2, 3, 4, 5, 8 | 5000: 1, 2, A, B | Signal: | 0 V | +V | 0 Vsens | +Vsens | A | $\overline{A}$ | B | $\overline{B}$ | 0 | $\overline{0}$ | ⏚ |
| | 5020: 1, A, E, F | Cable colour: | WH | BN | GY PK | RD BU | GN | YE | GY | PK | BU | RD | shield |

| Output circuit | Type of connection | M12 connector, 5-pin | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1, 2, 3, 4, 7, 8 | 5000: P, R | Signal: | 0 V | +V | A | B | 0 | ⏚ |
| | 5020: R | Pin: | 1 | 2 | 3 | 4 | 5 | PH [1] |

| Output circuit | Type of connection | M12 connector, 8-pin | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1, 2, 3, 4, 5, 8 | 5000: 3, 4, L | Signal: | 0 V | +V | A | $\overline{A}$ | B | $\overline{B}$ | 0 | $\overline{0}$ | ⏚ |
| | 5020: 2, H [2], L | Pin: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | PH [1] |

| Output circuit | Type of connection | M23 connector, 12-pin | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1, 2, 3, 4, 5, 8 | 5000: 7, 8, M | Signal: | 0 V | +V | 0 Vsens | +Vsens | A | $\overline{A}$ | B | $\overline{B}$ | 0 | $\overline{0}$ | ⏚ |
| | 5020: 4, M | Pin: | 10 | 12 | 11 | 2 | 5 | 6 | 8 | 1 | 3 | 4 | PH [1] |

| Output circuit | Type of connection | MIL connector, 10-pin | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1, 2, 3, 4, 5, 8 | 5000: Y | Signal: | 0 V | +V | +Vsens | A | $\overline{A}$ | B | $\overline{B}$ | 0 | $\overline{0}$ | ⏚ |
| | 5020: 7 | Pin: | F | D | E | A | G | B | H | C | I | J |

| Output circuit | Type of connection | MIL connector, 7-pin | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1, 3, 4, 7, 8 | 5000: W | Signal: | 0 V | +V | +Vsens | A | B | 0 | ⏚ |
| | 5020: 6 | Pin: | F | D | E | A | B | C | G |

| Output circuit | Type of connection | MIL connector, 6-pin | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1, 3, 4, 7, 8 | 5000: 9 | Signal: | 0 V | +V | A | B | 0 | ⏚ |
| | | Pin: | A | B | E | D | C | |

| Output circuit | Type of connection | Sub-D connector, 9-pin | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1, 2, 3, 4, 5, 8 | 5000: N | Signal: | 0 V | +V | A | $\overline{A}$ | B | $\overline{B}$ | 0 | $\overline{0}$ | ⏚ |
| | 5020: N | Pin: | 9 | 5 | 1 | 6 | 2 | 7 | 3 | 8 | PH [1] |

### Terminal assignment – Special connector pin configuration

| Order code h | Output circuit | Type of connection | M12 connector, 8-pin | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | 1, 2, 3, 4, 5, 8 | 5000: 3, 4, L | Signal: | 0 V | +V | A | $\overline{A}$ | B | $\overline{B}$ | 0 | $\overline{0}$ | ⏚ |
| | | 5020: 2, H [2], L | Pin: | 7 | 2 | 1 | 3 | 4 | 5 | 6 | 8 | PH [1] |

| Order code h | Output circuit | Type of connection | MIL connector, 6-pin | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1, 3, 4, 7, 8 | 5000: 9 | Signal: | 0 V | +V | A | B | 0 | ⏚ |
| | | | Pin: | A, F | B | D | E | C | |

| Order code h | Output circuit | Type of connection | MIL connector, 7-pin | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 4 | 1, 3, 4, 7, 8 | 5000: W | Signal: | 0 V | +V | A | $\overline{A}$ | B | $\overline{B}$ | ⏚ |
| | | 5020: 6 | Pin: | F | D | A | C | B | E | G |

| Order code h | Output circuit | Type of connection | MIL connector, 10-pin | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 1, 2, 3, 4, 5, 8 | 5000: Y | Signal: | 0 V | +V | A | $\overline{A}$ | B | $\overline{B}$ | 0 | $\overline{0}$ | ⏚ |
| | | 5020: 7 | Pin: | F | D | A | H | B | I | C | J | G |

+V: Encoder power supply +V DC
0 V: Encoder power supply ground GND (0 V)
0 $V_{sens}$ / +$V_{sens}$: Using the sensor outputs of the encoder, the voltage present can be measured and if necessary increased accordingly.

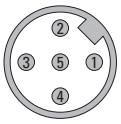
A, $\overline{A}$: Incremental output channel A
B, $\overline{B}$: Incremental output channel B
0, $\overline{0}$: Reference signal
PH ⏚: Plug connector housing (shield)

1) PH = shield is attached to connector housing.
2) With type of connection H shield is not attached to connector housing.

# Incremental encoders

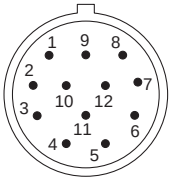
**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**

**Top view of mating side, male contact base**

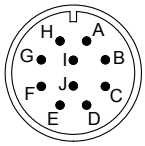



M12 connector, 5-pin

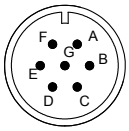

M12 connector, 8-pin



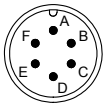

M23 connector, 12-pin



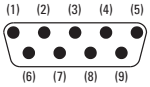

MIL connector, 10-pin




MIL connector, 7-pin




MIL connector, 6-pin



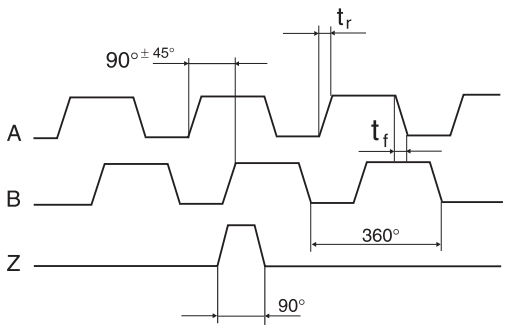

Sub-D connector, 9-pin

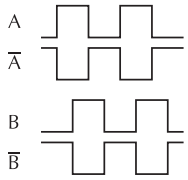
**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**

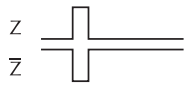
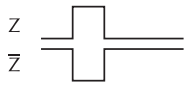
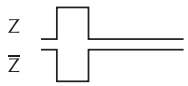
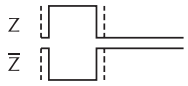
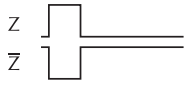
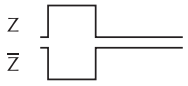
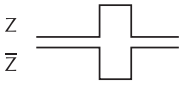
### Special output signal formats

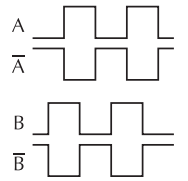
All Kübler encoders come standard with six channels where A leads B in the clockwise direction and the standard index is gated with A & B. The tolerance of the wave form affects the control and, in some cases, may affect the smoothness of system operation.

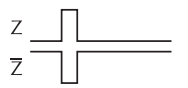
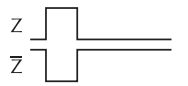
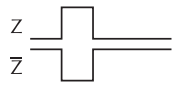
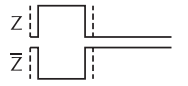
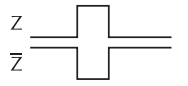
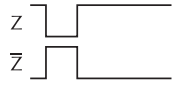
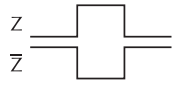
**Wave form tolerances**




| **A leads B**<br>when the shaft is rotated in the clockwise direction viewing the shaft or collet end.<br>This is the Kübler standard.<br>This format applies to the pin key codes listed below. |  |
|---|---|

| Order code ⓘ | | |
|---|---|---|
| | Z gated with A & B.<br>This is the Kübler standard.<br>Z is 90° wide. |  |
| **01** | Z gated with B.<br>Z is 180° wide. |  |
| **02** | Z gated with A.<br>Z is 180° wide. |  |
| **03** | Z ungated.<br>Z is 330° to 360° wide. |  |
| **08** | Z is 180° wide |  |
| **11** | Z is a minimum with of 270° (electrical degrees). |  |
| **13** | Z gated with $\overline{B}$.<br>Z is 160° wide. |  |

| **B leads A**<br>when the shaft is rotated in the clockwise direction viewing the shaft or collet end.<br>This format applies to the pin key codes listed below. |  |
|---|---|

| Order code ⓘ | | |
|---|---|---|
| **04** | Z gated with A & B.<br>Z is 90° wide. |  |
| **05** | Z gated with B.<br>Z is 180° wide. |  |
| **06** | Z gated with A.<br>Z is 180° wide. |  |
| **07** | Z ungated.<br>Z is 330° to 360° wide. |  |
| **09** | Z gated with $\overline{B}$.<br>Z is 160° wide. |  |
| **10** | Z is a negative marker gated with B.<br>Z is 180° wide. |  |
| **12** | Z has a minimum width of 270°. |  |

**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**

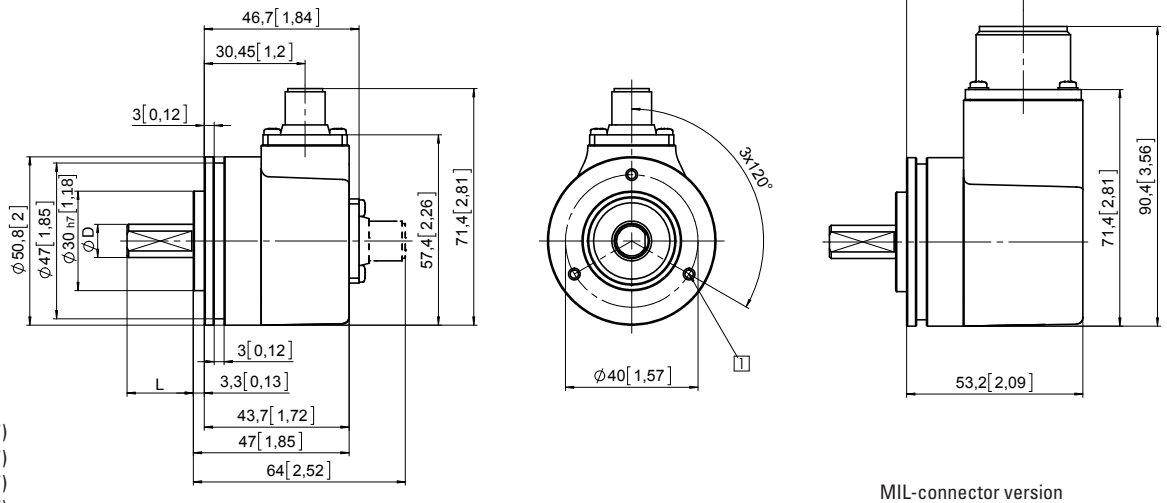


## Dimensions shaft version

Dimensions in mm [inch]

**Synchro flange, ø 50.8 [2]**
**Flange type 5 and 6**

1 M3, 6 [0.24] deep

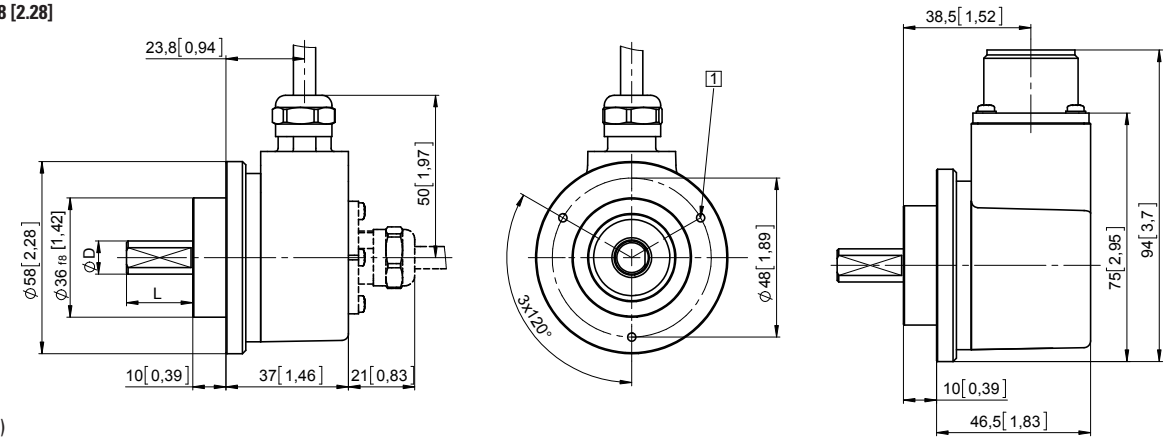



D = ø 6 h7 [0.24]
ø 8 h7 [0.32]
ø 10 f7 [0.39]
ø 12 h7 [0.47]
ø 1/4" h7 (L = 5/8")
ø 3/8" h7 (L = 5/8")
ø 1/4" h8 (L = 7/8")
ø 3/8" h8 (L = 7/8")

MIL-connector version

**Clamping flange, ø 58 [2.28]**
**Flange type 7 and 8**

1 M3, 6 [0.24] deep

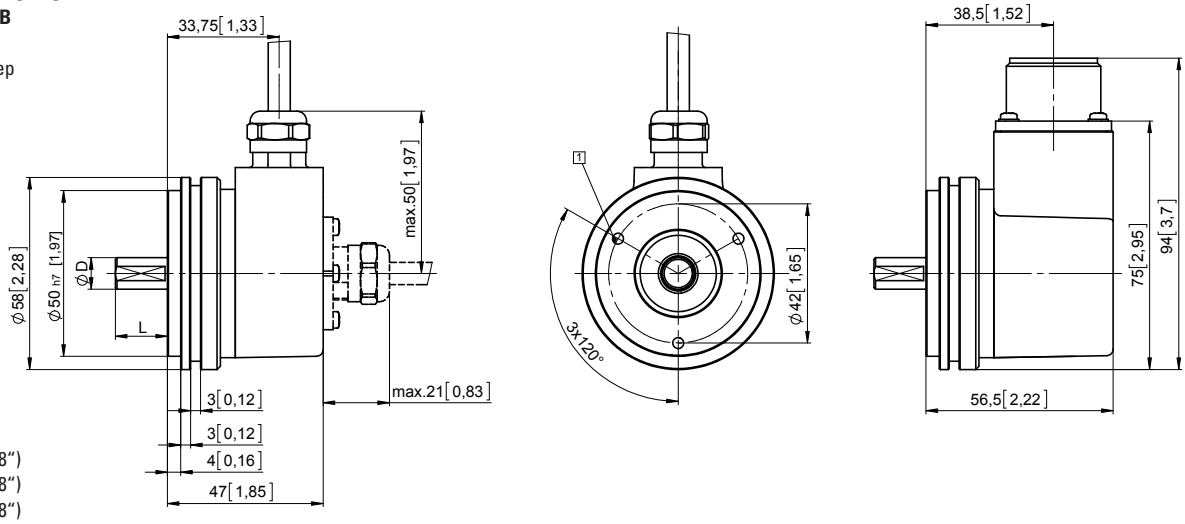



D = ø 6 h7 [0.24]
ø 8 h7 [0.32]
ø 10 f7 [0.39]
ø 12 h7 [0.47]
ø 1/4" h7 (L = 5/8")
ø 3/8" h7 (L = 5/8")
ø 1/4" h8 (L = 7/8")
ø 3/8" h8 (L = 7/8")

MIL-connector version

**Synchro flange, ø 58 [2.28]**
**Flange type A and B**

1 M4, 6 [0.24] deep




D = ø 6 h7 [0.24]
ø 8 h7 [0.32]
ø 10 f7 [0.39]
ø 12 h7 [0.47]
ø 1/4" h7 (L = 5/8")
ø 3/8" h7 (L = 5/8")
ø 1/4" h8 (L = 7/8")
ø 3/8" h8 (L = 7/8")

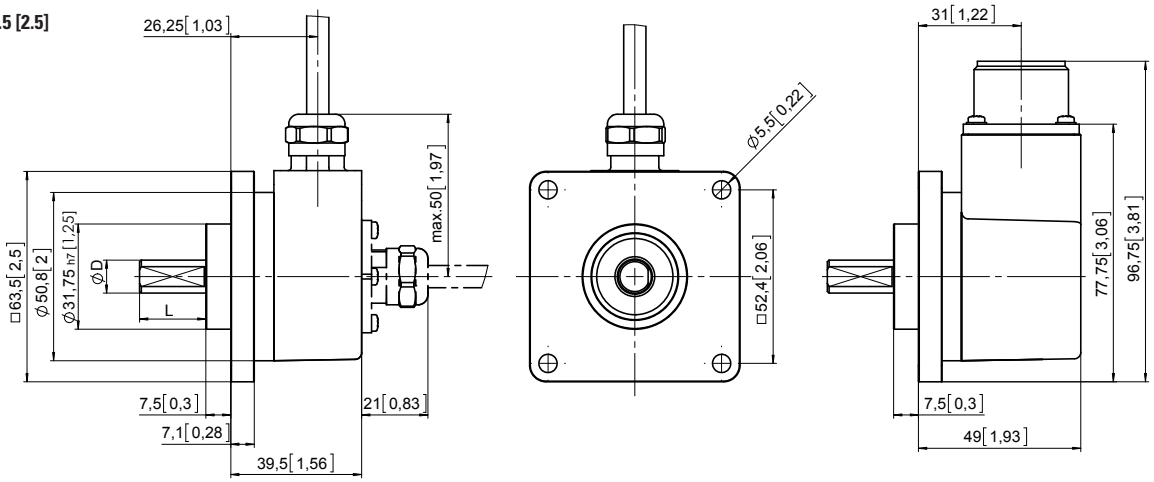
MIL-connector version

**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**

## Dimensions shaft version

Dimensions in mm [inch]

**Square flange, □ 63.5 [2.5]**
**Flange type C and D**




MIL-connector version

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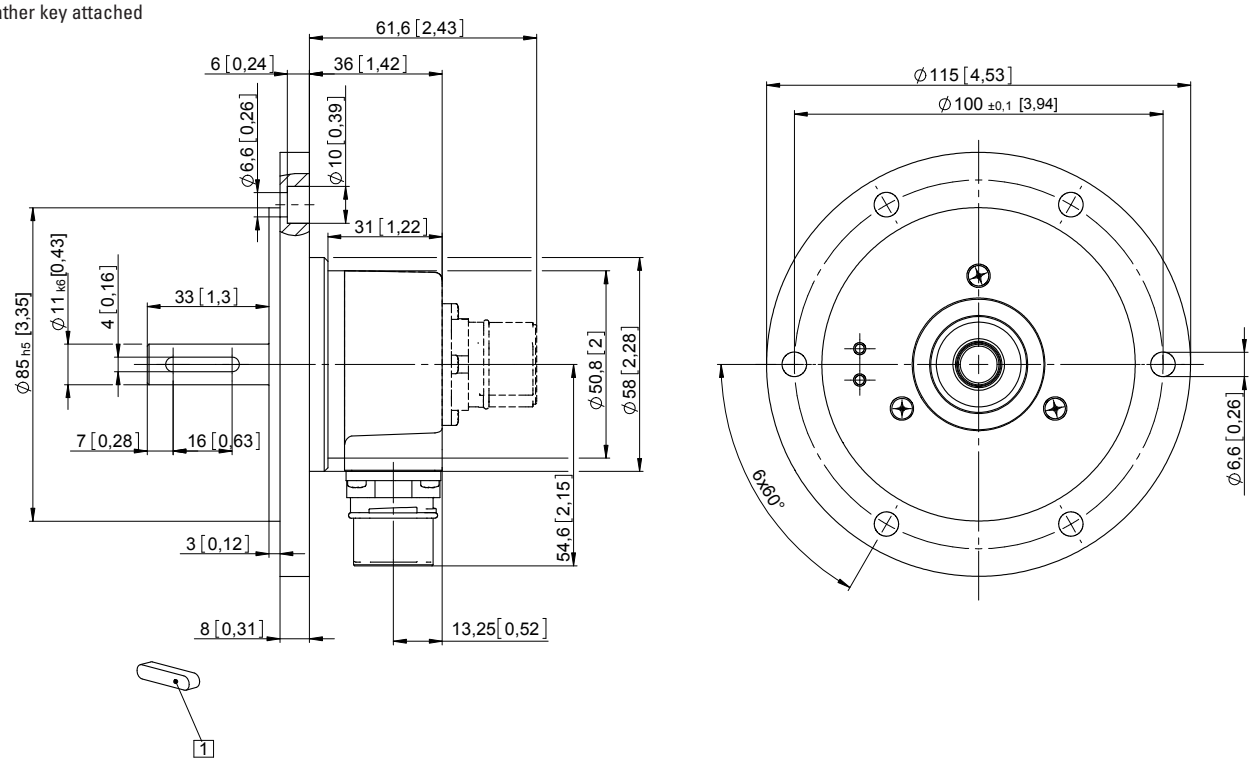
**Euro flange, ø 115 [4.53]**
**Flange type G**

1 Feather key attached

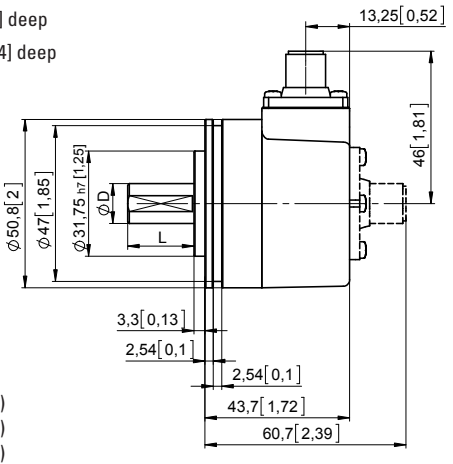


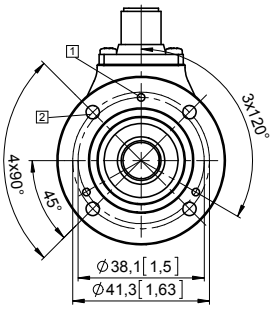
## Dimensions shaft version

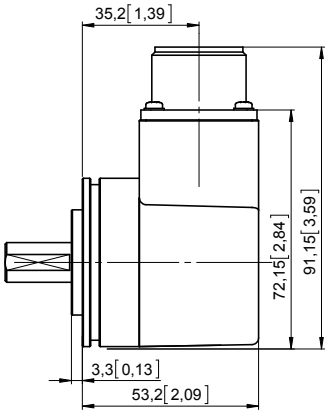
Dimensions in mm [inch]

**Servo flange, ø 50.8 [2]**
**Flange type 1 and 2**

1 6-32 UNC x 5 [0.2] deep
2 4-40 UNC x 6 [0.24] deep



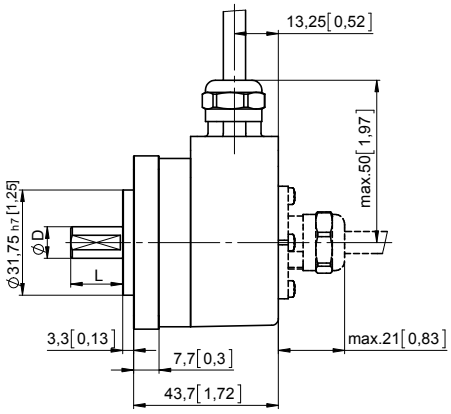



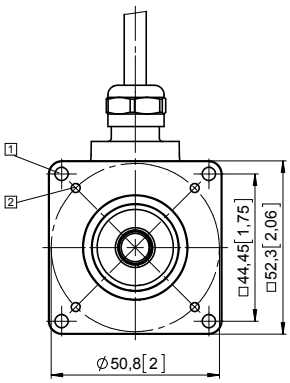

MIL-connector version

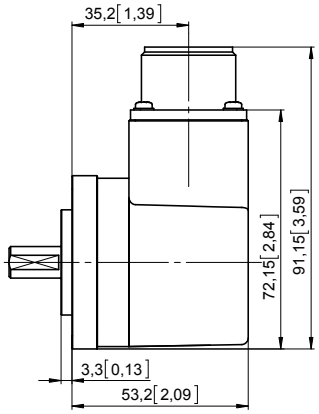
D = ø 6 h7 [0.24]
ø 8 h7 [0.32]
ø 10 f7 [0.39]
ø 12 h7 [0.47]
ø 1/4" h7 (L = 5/8")
ø 3/8" h7 (L = 5/8")
ø 1/4" h8 (L = 7/8")
ø 3/8" h8 (L = 7/8")

**Square flange, □ 52.3 [2.06]**
**Flange type 3 and 4**

1 ø 4 [0.16]
2 6-32 UNC x 5 [0.2] deep



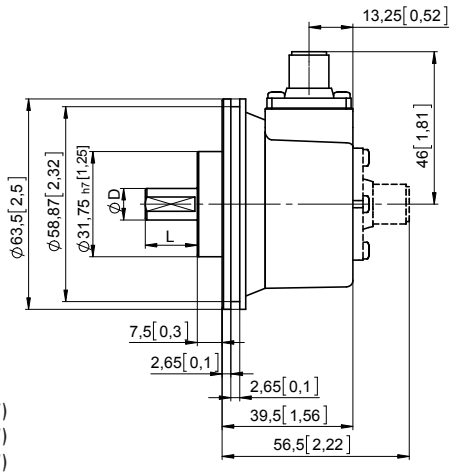



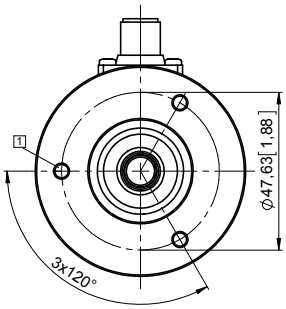

MIL-connector version

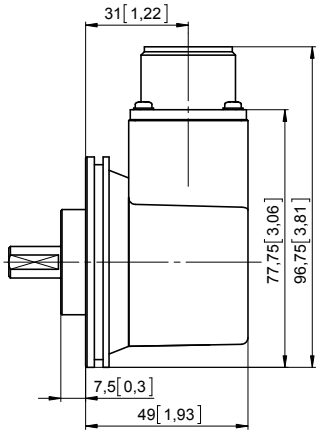
D = ø 6 h7 [0.24]
ø 8 h7 [0.32]
ø 10 f7 [0.39]
ø 12 h7 [0.47]
ø 1/4" h7 (L = 5/8")
ø 3/8" h7 (L = 5/8")
ø 1/4" h8 (L = 7/8")
ø 3/8" h8 (L = 7/8")

**Servo flange, ø 63.5 [2.5]**
**Flange type E and F**

1 6-32 UNC




MIL-connector version

D = ø 6 h7 [0.24]
ø 8 h7 [0.32]
ø 10 f7 [0.39]
ø 12 h7 [0.47]
ø 1/4" h7 (L = 5/8")
ø 3/8" h7 (L = 5/8")
ø 1/4" h8 (L = 7/8")
ø 3/8" h8 (L = 7/8")

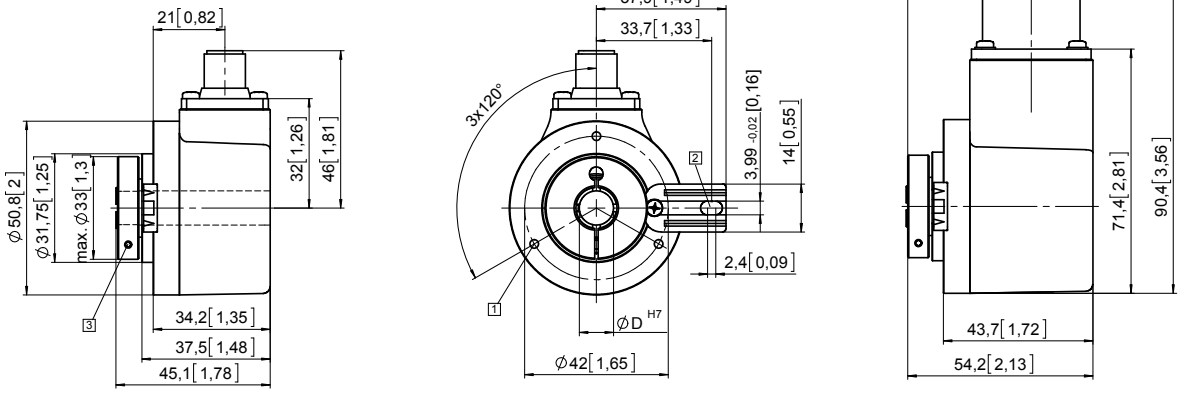
**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**

### Dimensions hollow shaft version

Dimensions in mm [inch]

**Flange with spring element, long**
**Flange type 1 and 2**

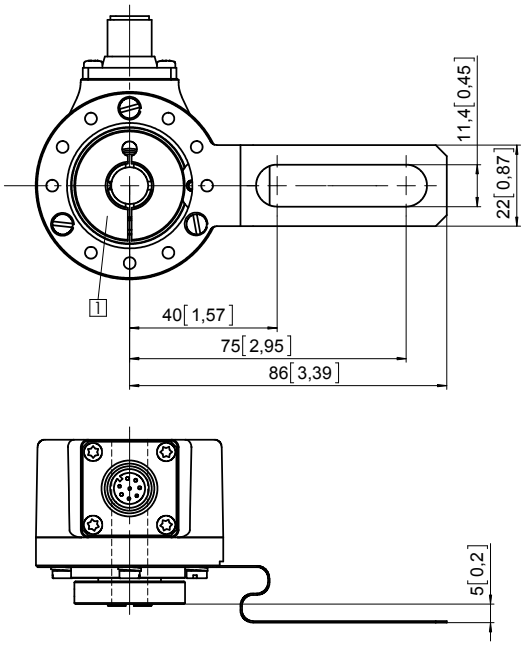
1 M3, 6 [0.24] deep
2 Torque stop slot,
recommendation: cylindrical pin DIN7, 4 [0.16]
3 Recommended torque for the clamping ring 0.6 Nm




MIL-connector version

**Flange with fastening arm, long**
**Flange type 3 and 4**

1 Recommended torque for the clamping ring 0.6 Nm



**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**

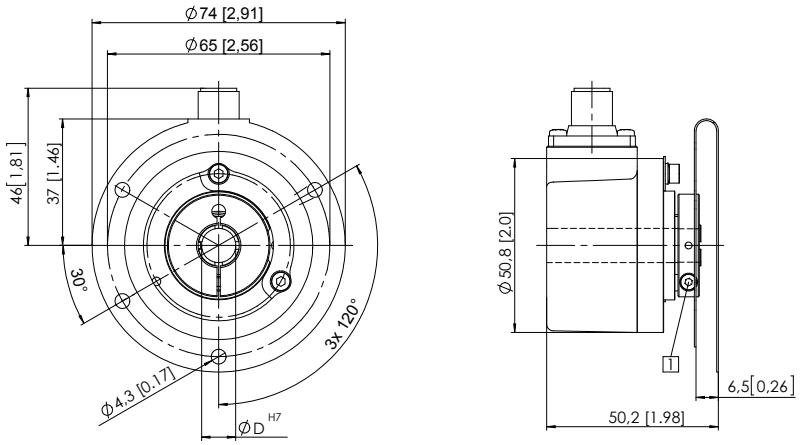


## Dimensions hollow shaft version

Dimensions in mm [inch]

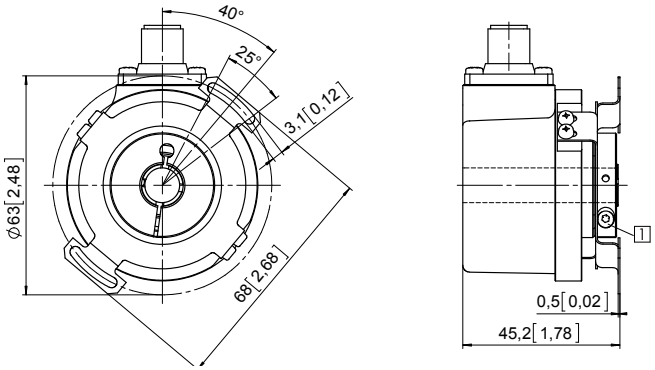
**Flange with stator coupling, ø 65 [2.56]**
**Flange type 7 and 8**

1 Recommended torque for the clamping ring 0.6 Nm



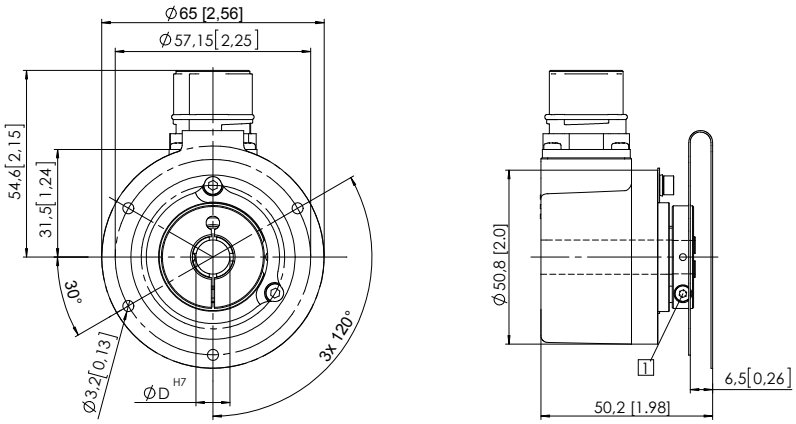

**Flange with stator coupling, ø 63 [2.48]**
**Flange type C and D**

1 Recommended torque for the clamping ring 0.6 Nm




**Flange with stator coupling, ø 57.2 [2.25]**
**Flange type 5 and 6**

1 Recommended torque for the clamping ring 0.6 Nm



**Standard optical** | **Sendix 5000 / 5020 (shaft / hollow shaft)** | **Push-Pull / RS422 / Open collector**

### Dimensions hollow shaft version

Dimensions in mm [inch]

**Flange with spring element, long and tangential cable outlet**
**Type of connection E, F and H**

1 M3, 6 [0.24] deep

2 Torque stop slot,
recommendation: cylindrical pin DIN7, 4 [0.16]

3 Recommended torque for the clamping ring 0.6 Nm