

Incremental Encoders

**Standard
Optical**

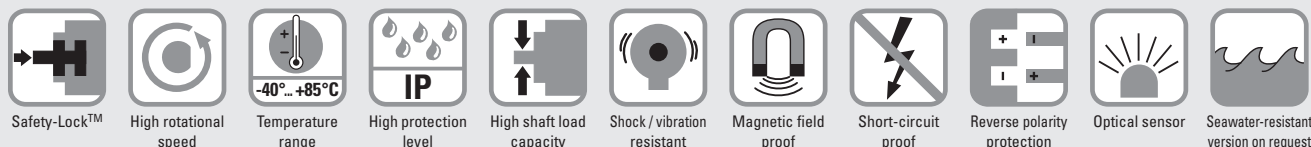
Sendix 5000 / 5020 (Shaft / Hollow shaft)

Push-Pull / RS422



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.



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
- Wide temperature range, -40°C ... +85°C
- Also available in seawater resistant version

Many variants

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

Order code Shaft version

8.5000 . XXXXX . XXXX
Type a b c d e

If for each parameter of an encoder the underlined preferred option is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.



a Flange

5 = synchro flange, IP67	∅ 50.8 mm [2"]
6 = synchro flange, IP65	∅ 50.8 mm [2"]
7 = clamping flange, IP67	∅ 58 mm [2.28"]
8 = clamping flange, IP65	∅ 58 mm [2.28"]
A = synchro flange, IP67	∅ 58 mm [2.28"]
B = synchro flange, IP65	∅ 58 mm [2.28"]
C = square flange, IP67	□ 63.5 mm [2.5"]
D = square flange, IP65	□ 63.5 mm [2.5"]
G = euro flange, IP67	∅ 115 mm [4.53"] ²⁾

1 = servo flange, IP67	∅ 50.8 mm [2"] ¹⁾
2 = servo flange, IP65	∅ 50.8 mm [2"] ¹⁾
3 = square flange, IP67	□ 50.8 mm [2"] ¹⁾
4 = square flange, IP65	□ 50.8 mm [2"] ¹⁾
E = servo flange, IP67	∅ 63.5 mm [2.5"] ¹⁾
F = servo flange, IP65	∅ 63.5 mm [2.5"] ¹⁾

b Shaft (∅ x L), with flat

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

7 = ∅ 1/4 x 7/8" ¹⁾	
8 = ∅ 3/8 x 7/8" ¹⁾	

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	

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

Stock types

8.5000.8358.0200	8.5000.8358.1000	8.5000.B157.5000
8.5000.8358.0360	8.5000.8358.5000	8.5000.8354.1024
8.5000.8358.0500	8.5000.B157.1024	8.5000.8354.5000

d Type of connection

1 = axial cable, 1 m [3.28'] PVC cable	
2 = radial cable, 1 m [3.28'] PVC cable	
3 = M12 connector, 8-pin, axial	
4 = M12 connector, 8-pin, radial	
7 = M23 connector, 12-pin, axial	
8 = M23 connector, 12-pin, radial	
Y = MIL connector, 10-pin, radial	
W = MIL connector, 7-pin, radial	

9 = MIL connector, 6-pin, radial ¹⁾	

e Pulse rate

1, 5, 10, 12, 36, 100, 200, 250, 256, 360 , 400, 500, 512 , 600, 800, 1000 , 1024 , 1200, 2000, 2048 , 2500 , 3600 , 4096 , 5000
(e.g. 100 pulses => 0100)
Other pulse rates on request

optional on request

- Ex 2/22
- seawater-resistant
- special cable length

1) US version
2) Only in conjunction with shaft type B
3) Only in conjunction with flange type G

Incremental Encoders

Standard Optical	Sendix 5000 / 5020 (Shaft / Hollow shaft)	Push-Pull / RS422
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Order code Hollow shaft	8.5020 Type	. XXXX . XXXX a b c d e	<p>If for each parameter of an encoder the <u>underlined preferred option</u> is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.</p>
a Flange	b Hollow shaft	c Output circuit / Power supply	e Pulse rate
1 = with spring element long, IP67 <u>2 = with spring element long, IP65</u> 3 = with fastening arm long, IP67 4 = with fastening arm long, IP65 7 = with stator coupling, IP67 \varnothing 65 mm [2.56"] <u>8 = with stator coupling, IP65 \varnothing 65 mm [2.56"]</u> C = with stator coupling, IP67 \varnothing 63 mm [2.48"] <u>D = with stator coupling, IP65 \varnothing 63 mm [2.48"]</u>	5 = with stator coupling, IP67 \varnothing 57.2 mm [2.25"] ¹⁾ 6 = with stator coupling, IP65 \varnothing 57.2 mm [2.25"] ¹⁾ 1 = \varnothing 6 mm [0.24"] 2 = \varnothing 1/4" <u>9 = \varnothing 8 mm [0.32"]</u> 4 = \varnothing 3/8" <u>3 = \varnothing 10 mm [0.39"]</u> 6 = \varnothing 1/2" <u>5 = \varnothing 12 mm [0.47"]</u> 7 = \varnothing 5/8" A = \varnothing 14 mm [0.55"] <u>8 = \varnothing 15 mm [0.59"]</u>	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 <u>5 = Push-Pull (with inverted signal) / 10 ... 30 V DC</u> 3 = Open collector (with inverted signal) / 5 ... 30 V DC ¹⁾ 8 = Push-Pull (7272 with inverted signal), without capacitor / 5 ... 30 V DC ¹⁾	1, 5, 10, 12, 36, 100, 200, 250, 256, <u>360, 400, 500, 512, 600, 800, 1000,</u> <u>1024, 1200, 2000, 2048, 2500, 3600,</u> <u>4096, 5000</u> (e.g. 100 pulses => 0100) Other pulse rates on request <i>optional on request</i> - Ex 2/22 - seawater-resistant - special cable length <i>Stock types</i> 8.5020.2351.1000 8.5020.8552.1024 8.5020.2351.2500 8.5020.8552.5000 8.5020.2551.0500
d Type of connection			
1 = radial cable, 1 m [3.28'] PVC cable <u>2 = M12 connector, 8-pin, radial</u> <u>4 = M23 connector, 12-pin, radial</u> 7 = MIL connector, 10-pin, radial <u>E = tangential cable, 1 m [3.28'] PVC cable</u> H = tangential cable, 0.3 m [0.98'] PVC cable, including M12 connector for central fastening			

Incremental Encoders

Mounting accessory for shaft encoders	Order No.
Coupling	
Bellows coupling \varnothing 19 mm [0.75"] for shaft 6 mm [0.24"]	8.0000.1101.0606
Bellows coupling \varnothing 19 mm [0.75"] for shaft 10 mm [0.39"]	8.0000.1101.1010
Mounting accessory for hollow shaft encoders	
Cylindrical pin, long	
for torque stops	
	8.0010.4700.0000
Isolation / adapter inserts for hollow shaft encoders	
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.	
Tip: By using these adapter inserts you can achieve six different hollow shaft diameters, all on the basis of the encoder 8.5020.X8XX.XXXX.	
	D1 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
Connection technology	
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 cable	8.0000.6201.0002

Further accessories can be found in the accessories section or in the accessories area of our website at: www.kuebler.com/accessories
 Additional connectors can be found in the connection technology section or in the connection technology area of our website at: www.kuebler.com/connection_technology

1) US version

Incremental Encoders

Standard Optical	Sendix 5000 / 5020 (Shaft / Hollow shaft)	Push-Pull / RS422
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Technical data

Mechanical characteristics			
Max. Speed	IP65	12 000 min ⁻¹ 6 000 min ⁻¹ (continuous)	Weight approx. 0.4 kg [14.11 oz]
	IP67	6 000 min ⁻¹ 3 000 min ⁻¹ (continuous)	
Moment of inertia	shaft version	approx. 1.8 x 10 ⁻⁶ kgm ²	Protection acc. to EN 60529 without shaft seal IP65 with shaft seal IP67
	hollow shaft version	approx. 6 x 10 ⁻⁶ kgm ²	
Starting torque at 20°C [68°F]	IP65	< 0.01 Nm	EX approval for hazardous areas optional Zone 2 and 22
	IP67	< 0.05 Nm	
Shaft load capacity	radial	80 N	Working temperature range -40°C ¹⁾ ... +85°C [-40°F ¹⁾ ... +185°F]
	axial	40 N	
			Material shaft stainless steel
			Shock resistance acc. to EN 60068-2-27 2500 m/s ² , 6 ms
			Vibration resistance acc. to EN 60068-2-6 100 m/s ² , 10 ... 2000 Hz

Electrical characteristics

Output circuit	RS422 (TTL compatible)	RS422 (TTL compatible)	Push-Pull	Push-Pull (7272 compatible)	Push-Pull (7272, without capacitor)	Open collector (7273)
Ordercode	1	4	5	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 max. 90 mA	typ. 40 mA max. 90 mA	typ. 50 mA max. 100 mA	typ. 50 mA max. 100 mA	typ. 50 mA 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 ²⁾	max. 300 kHz	max. 300 kHz
Signal level	HIGH	min. 2.5 V max. 0.5 V	min +V - 1 V max. 0.5 V	min. +V - 2.0 V max. 0.5 V	min. +V - 2.0 V max. 0.5 V	min. +V - 2.0 V max. 0.5 V
	LOW					
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 outputs³⁾	yes ⁴⁾	yes ⁴⁾	yes	yes	yes ⁴⁾	yes
Reverse polarity protection of the power supply	yes	no	yes	no	no	no
UL approval	File 224618					
CE compliant acc. to	EMC guideline 2004/108/EC					
RoHS compliant acc. to	guideline 2002/95/EC					

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

Incremental Encoders

Standard Optical	Sendix 5000 / 5020 (Shaft / Hollow shaft)	Push-Pull / RS422
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Terminal assignment

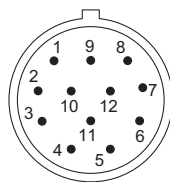
Output circuit	Type of connection	Cable (isolate unused wires individually before initial start-up)												
1, 2, 3, 4, 5, 8	5000: 1, 2	Signal:	0 V	+V	0 Vsens	+Vsens	A	\bar{A}	B	\bar{B}	0	$\bar{0}$	\perp	
	5020: 1, E	Cable colour:	WH	BN	GY PK	RD BU	GN	YE	GY	PK	BU	RD	shield	
1, 2, 3, 4, 5, 8	5000: 3, 4	M12 connector, 8-pin												
	5020: 2, H	Signal:	0 V	+V	0 Vsens	+Vsens	A	\bar{A}	B	\bar{B}	0	$\bar{0}$	\perp	
1, 2, 3, 4, 5, 8	5000: 7, 8	M23 connector, 12-pin												
	5020: 4	Pin:	10	12	11	2	5	6	8	1	3	4	PH ¹⁾	
1, 2, 3, 4, 5, 8	5000: Y	MIL connector, 10-pin												
	5020: 7	Signal:	0 V	+V	0 Vsens	+Vsens	A	\bar{A}	B	\bar{B}	0	$\bar{0}$	\perp	
1, 3, 4, 5, 8	5000: W	MIL connector, 7-pin												
	5020: 7	Pin:	F	D		E	A		B		C		G	
1, 3, 4, 5, 8	5000: 9	MIL connector, 6-pin												
	5020: 9	Signal:	0 V	+V	0 Vsens	+Vsens	A	\bar{A}	B	\bar{B}	0	$\bar{0}$	\perp	
1, 3, 4, 5, 8	5000: 9	Pin:	A	B			E		D		C			

- +V: Encoder power supply +V DC
- 0 V: Encoder power supply ground GND (0 V)
- 0 Vsens / +Vsens: Using the sensor outputs of the encoder, the voltage present can be measured and if necessary increased accordingly.
- A, \bar{A} : Incremental output channel A
- B, \bar{B} : Incremental output channel B
- 0, $\bar{0}$: Reference signal
- PH \perp : Plug connector housing (Shield)

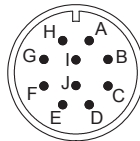
Top view of mating side, male contact base



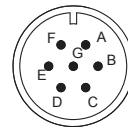
M12 connector, 8-pin



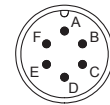
M23 connector, 12-pin



MIL connector, 10-pin



MIL connector, 7-pin



MIL connector, 6-pin

1) PH = Shield is attached to connector housing

Incremental Encoders

**Standard
Optical**

Sendix 5000 / 5020 (Shaft / Hollow shaft)

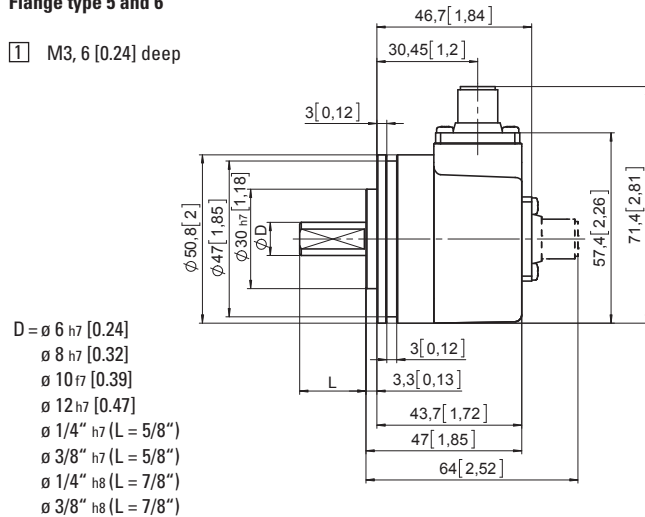
Push-Pull / RS422

Dimensions shaft version

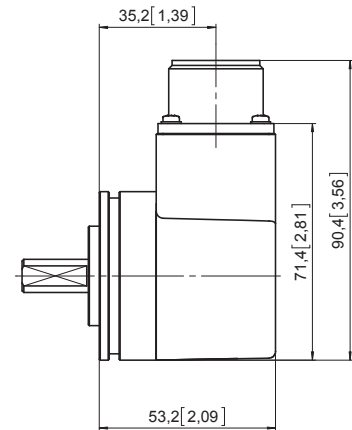
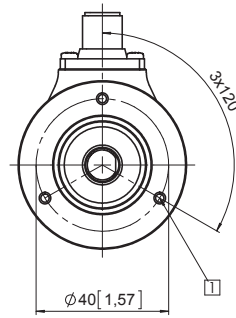
Dimensions in mm [inch]

Synchro flange, $\varnothing 50.8$ [2] Flange type 5 and 6

1 M3, 6 [0.24] deep



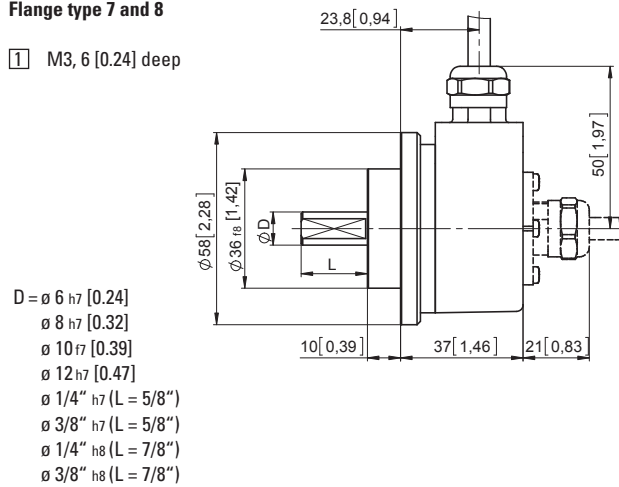
- D = $\varnothing 6$ h7 [0.24]
- $\varnothing 8$ h7 [0.32]
- $\varnothing 10$ f7 [0.39]
- $\varnothing 12$ h7 [0.47]
- $\varnothing 1/4''$ h7 (L = 5/8")
- $\varnothing 3/8''$ h7 (L = 5/8")
- $\varnothing 1/4''$ h8 (L = 7/8")
- $\varnothing 3/8''$ h8 (L = 7/8")



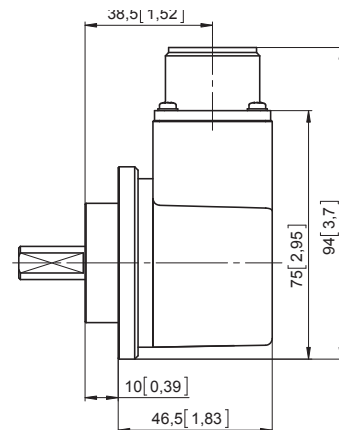
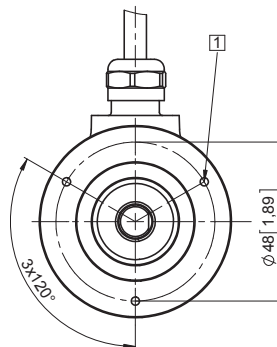
MIL-connector version

Clamping flange, $\varnothing 58$ [2.28] Flange type 7 and 8

1 M3, 6 [0.24] deep



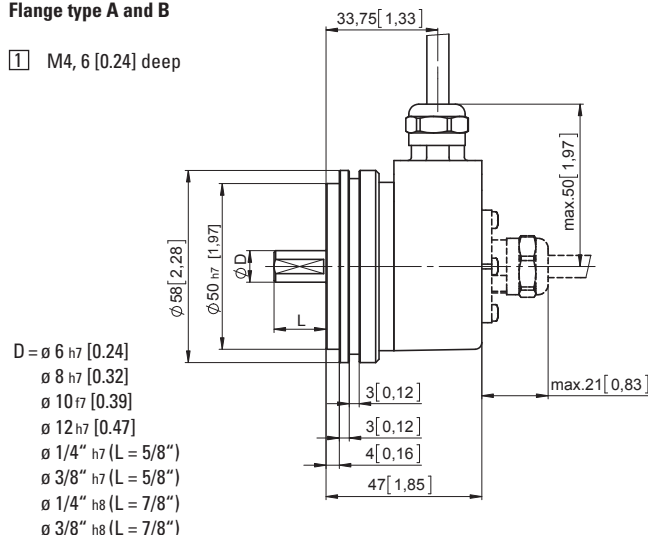
- D = $\varnothing 6$ h7 [0.24]
- $\varnothing 8$ h7 [0.32]
- $\varnothing 10$ f7 [0.39]
- $\varnothing 12$ h7 [0.47]
- $\varnothing 1/4''$ h7 (L = 5/8")
- $\varnothing 3/8''$ h7 (L = 5/8")
- $\varnothing 1/4''$ h8 (L = 7/8")
- $\varnothing 3/8''$ h8 (L = 7/8")



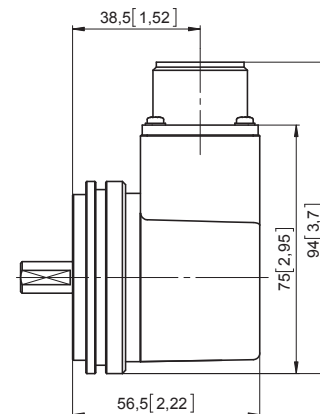
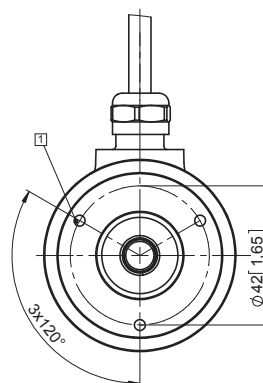
MIL-connector version

Synchro flange, $\varnothing 58$ [2.28] Flange type A and B

1 M4, 6 [0.24] deep



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



MIL-connector version

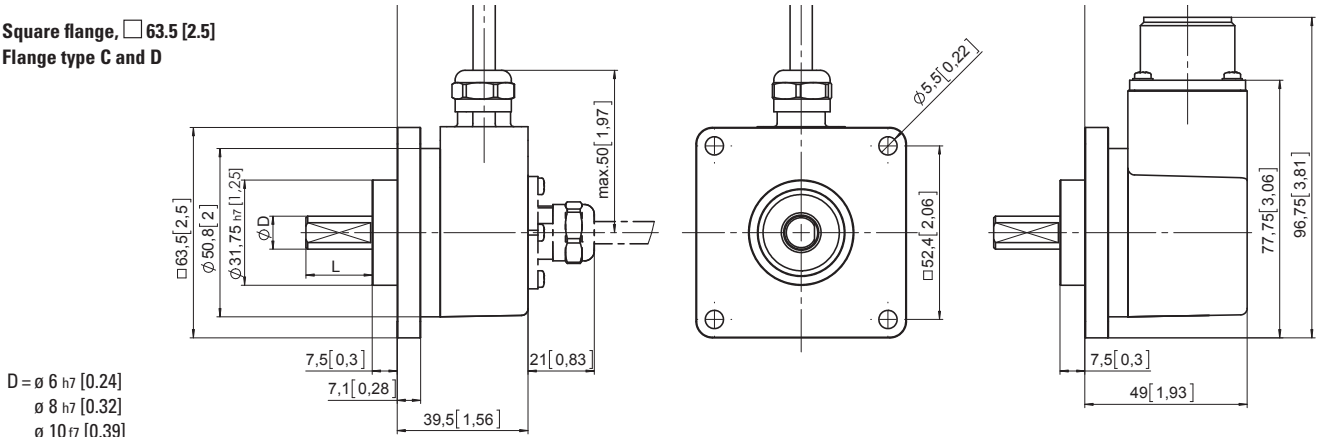
Incremental Encoders

Standard Optical	Sendix 5000 / 5020 (Shaft / Hollow shaft)	Push-Pull / RS422
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Dimensions shaft version

Dimensions in mm [inch]

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

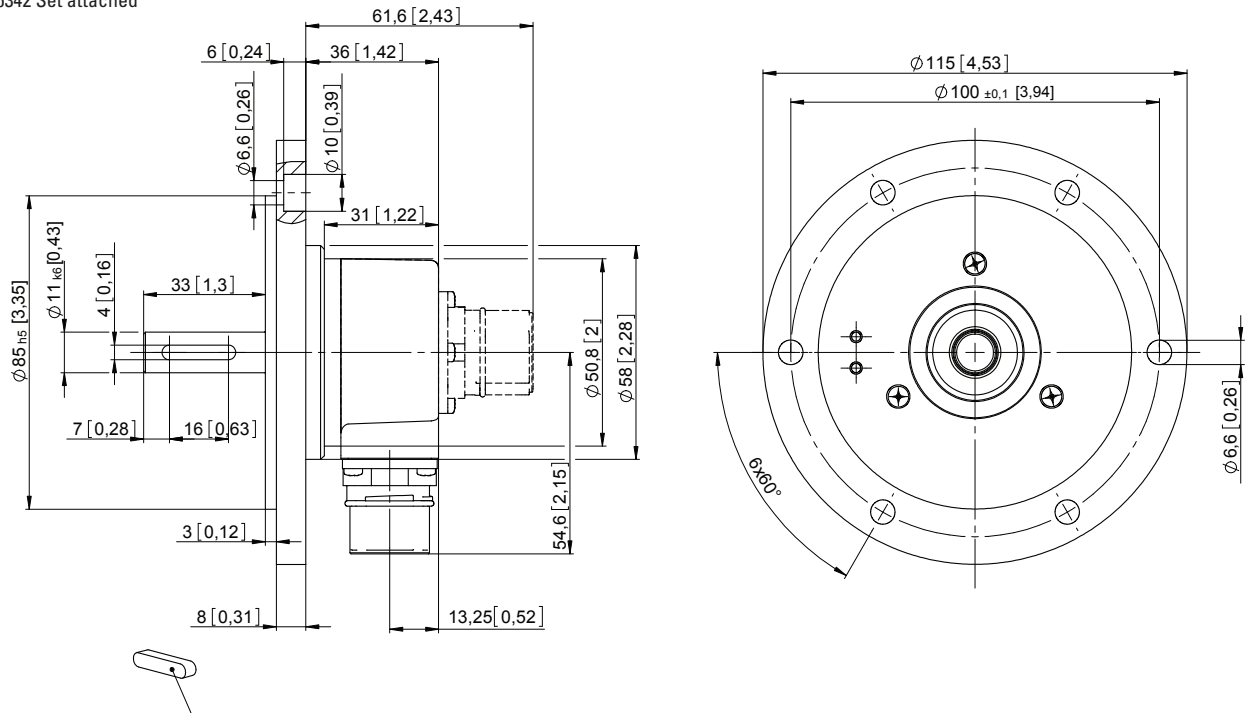


- D = \varnothing 6 h7 [0.24]
- \varnothing 8 h7 [0.32]
- \varnothing 10 h7 [0.39]
- \varnothing 12 h7 [0.47]
- \varnothing 1/4" h7 (L = 5/8")
- \varnothing 3/8" h7 (L = 5/8")
- \varnothing 1/4" h8 (L = 7/8")
- \varnothing 3/8" h8 (L = 7/8")

MIL-connector version

Euro flange, \varnothing 115 [4.53]
Flange type G

1 215342 Set attached



Incremental Encoders

**Standard
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Sendix 5000 / 5020 (Shaft / Hollow shaft)

Push-Pull / RS422

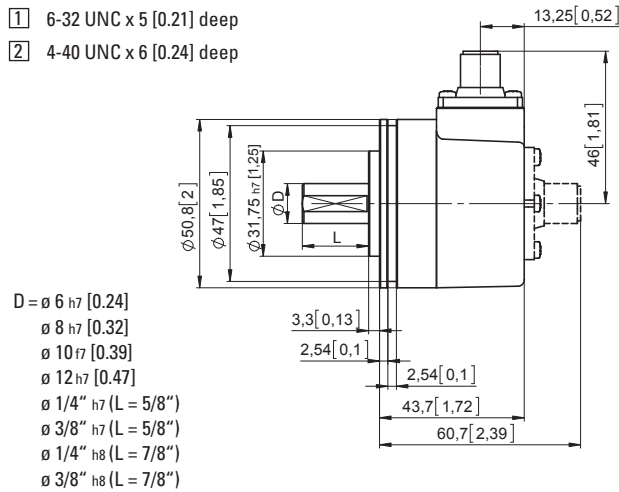
Dimensions shaft version

Dimensions in mm [inch]

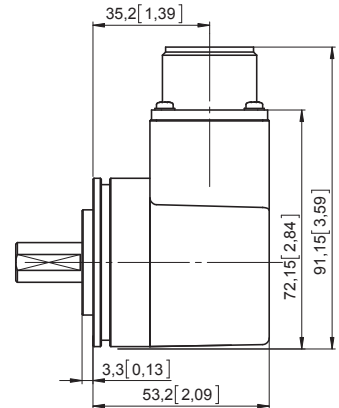
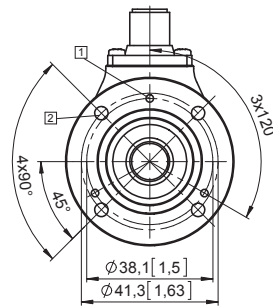
Servo flange, \varnothing 50.8 [2]

Flange type 1 and 2

- 1 6-32 UNC x 5 [0.21] deep
- 2 4-40 UNC x 6 [0.24] deep



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

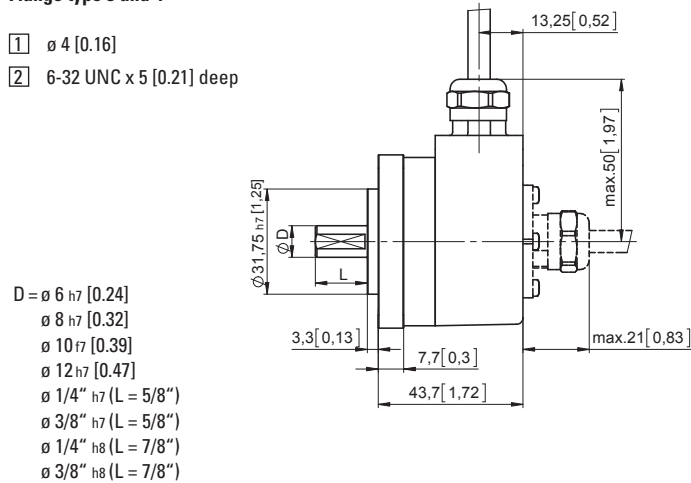


MIL-connector version

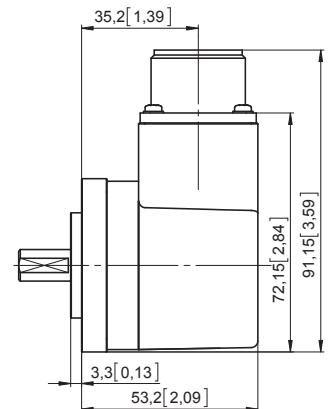
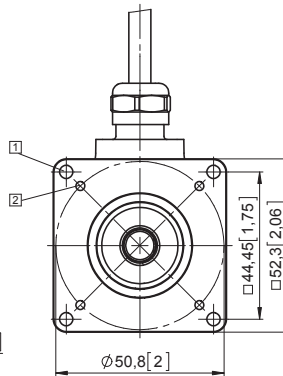
Square flange, \square 50.8 [2]

Flange type 3 and 4

- 1 \varnothing 4 [0.16]
- 2 6-32 UNC x 5 [0.21] deep



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

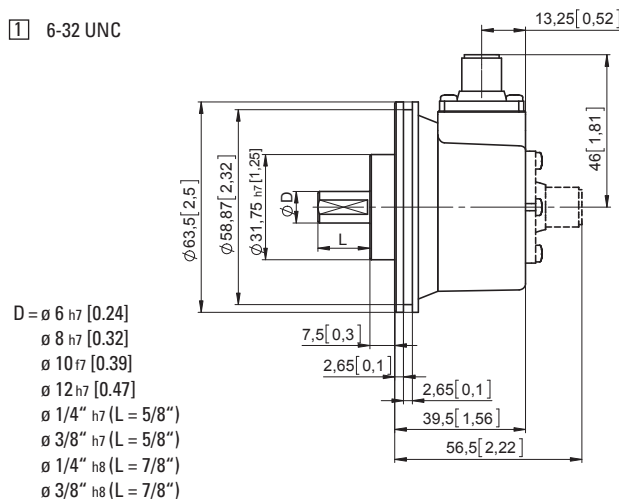


MIL-connector version

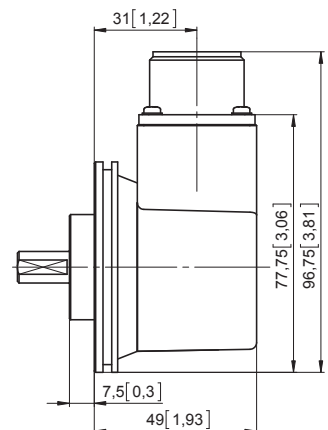
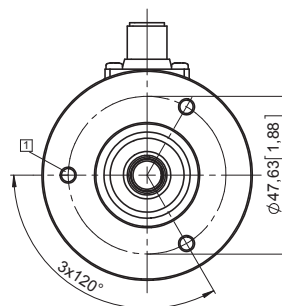
Servo flange, \varnothing 63.5 [2.5]

Flange type E and F

- 1 6-32 UNC



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



MIL-connector version

Incremental Encoders

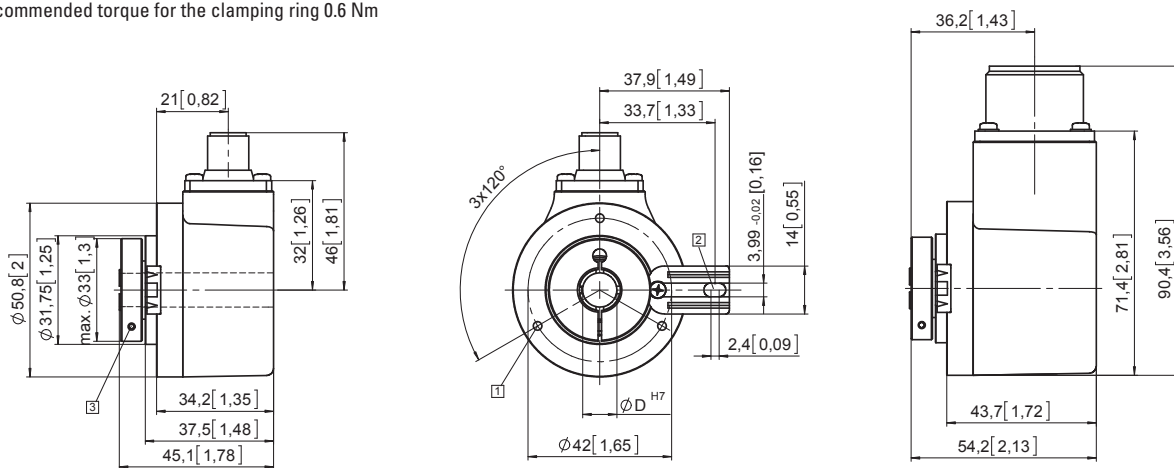
Standard Optical	Sendix 5000 / 5020 (Shaft / Hollow shaft)	Push-Pull / RS422
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Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with spring element long Flange type 1 and 2

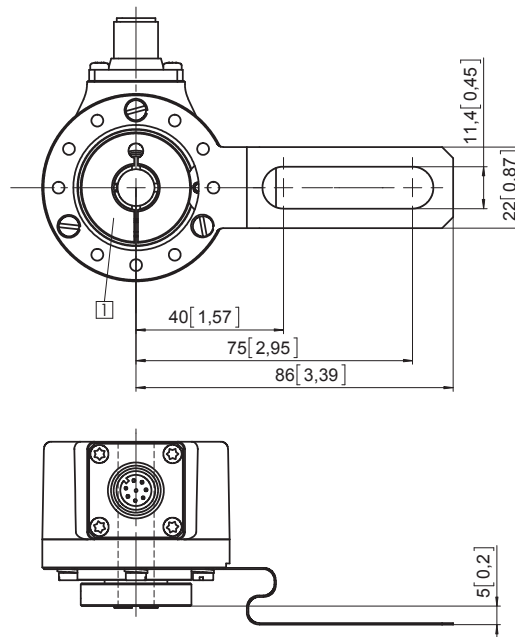
- 1 M3, 6 [0.24] deep
- 2 Torque stop slot,
Recommendation: Cylindrical pin DIN7, 4 [0.16]
- 3 Recommended torque for the clamping ring 0.6 Nm



MIL-connector version

Flange with fastening arm long Flange type 3 and 4

- 1 Recommended torque for the clamping ring 0.6 Nm



Incremental Encoders

**Standard
Optical**

Sendix 5000 / 5020 (Shaft / Hollow shaft)

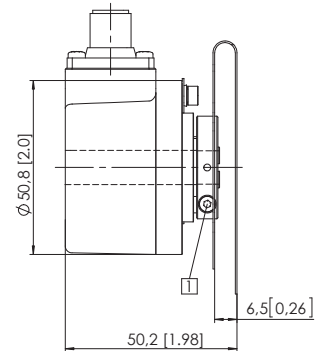
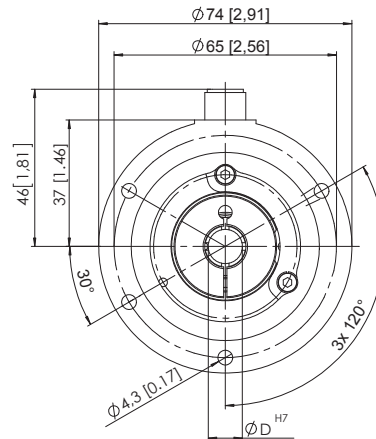
Push-Pull / RS422

Dimensions hollow shaft version

Dimensions in mm [inch]

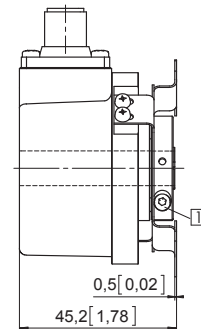
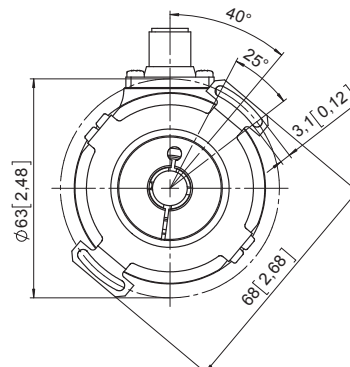
Flange with stator coupling, \varnothing 65 [2.56]
Flange type 7 and 8

1 Recommended torque for the clamping ring 0.6 Nm



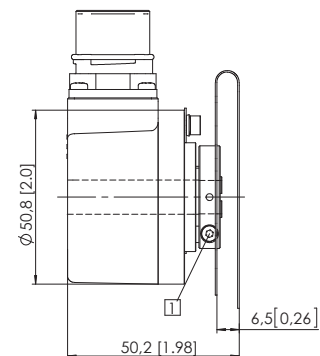
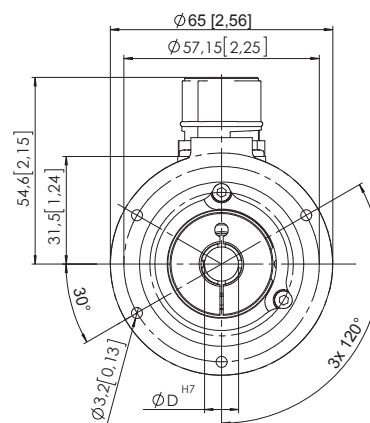
Flange with stator coupling, \varnothing 63 [2.48]
Flange type C and D

1 Recommended torque for the clamping ring 0.6 Nm



Flange with stator coupling, \varnothing 57.2 [2.25]
Flange type 5 and 6

1 Recommended torque for the clamping ring 0.6 Nm



Incremental Encoders

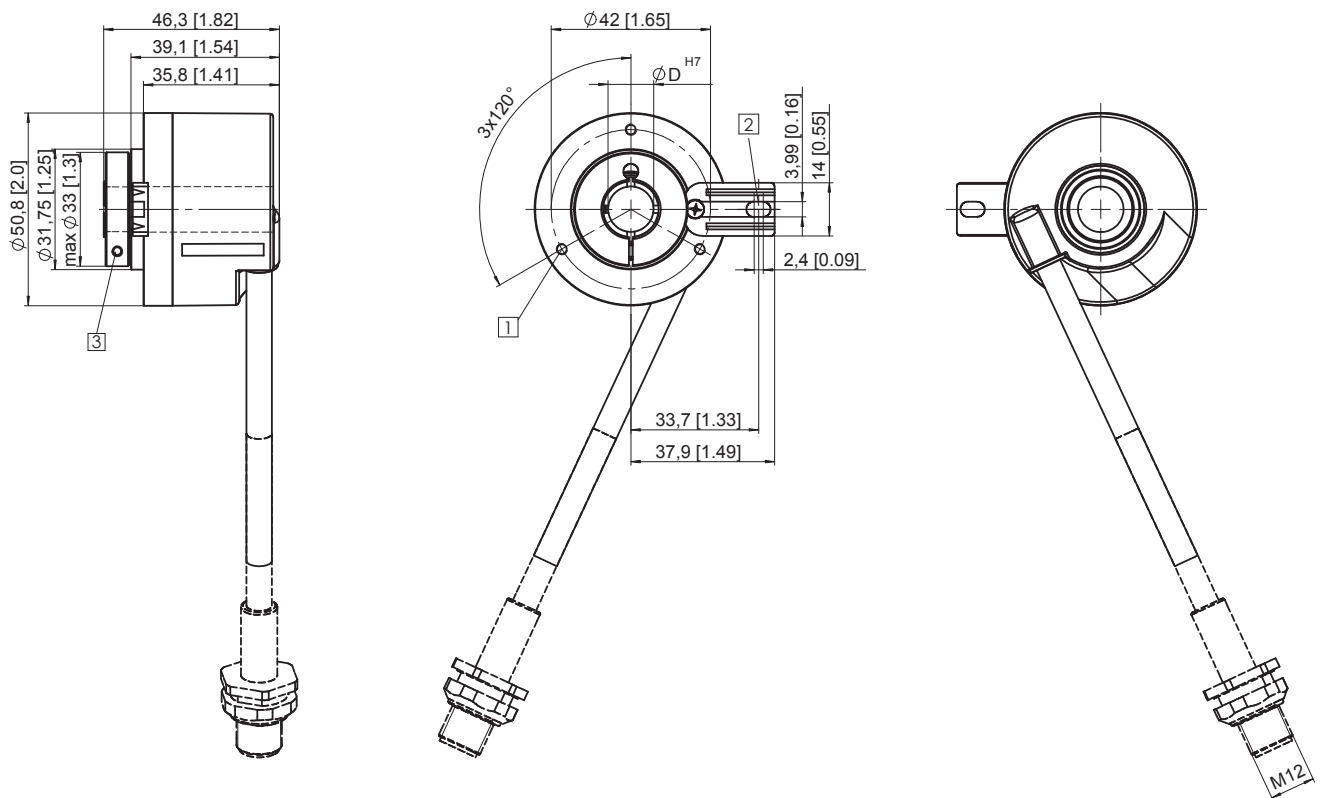
Standard Optical	Sendix 5000 / 5020 (Shaft / Hollow shaft)	Push-Pull / RS422
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Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with spring element long and tangential cable outlet
Type of connection E 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



Incremental Encoders