

Incremental encoders

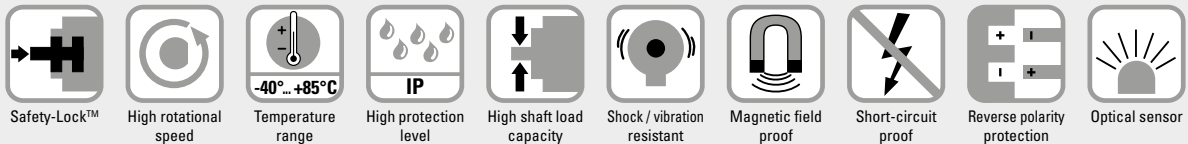
Standard optical	Sendix K80I (large hollow shaft)	Push-pull / RS422 / SinCos
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With reduced size - For large shafts.

The new Sendix encoders are based on state-of-the-art sensor and electronic components as well as a robust metal code disk. The incremental Sendix K80I encoders achieve a resolution of up to 5,000 pulses per revolution with a high level of reliability.

The Sendix K80I encoder for large shafts has the outstanding feature of combining a continuous hollow shaft of 42 mm with a reduced size of 80 mm.



Features and benefits

- High accuracy and reliability**
 State-of-the-art sensor technology with resolutions up to 5.000 ppr.
- Prepared for the toughest operating conditions and a wide range of external influences**
 - Temperature range from -40 °C bis +85 °C
 - Protection class up to a maximum of IP67
 - Optimized EMC shielding concept
 - Advanced Safety Lock technology
- Reduced installation space even in large applications**
 Hollow shaft up to 42 mm diameter with 80 mm size.
- Seamless integration into modern, digital networks**
 Prepared for use with digital type plate and digital twin for monitoring and maintaining machines and for a wide range of documentation tasks.
 Optimizing processes and increasing efficiency.

Incremental encoders

Standard optical	Sendix K80I (large hollow shaft)	Push-pull / RS422 / SinCos
Bestellschlüssel Hollow shaft		K80I 0 XX XXXXXX X XX XX XX XX R X X XXXX XX
a <i>Interface</i> PP = Push Pull (only with supply voltage 5 ... 30 V DC) RS = RS422 SC = SinCos (only with number of pulses 1024, b = 01024) b <i>Pulse rate (1 ... 5000 ppr)</i> XXXXX = 00001 ... 05000 c <i>Supply voltage</i> 1 = 5 V DC 2 = 5 ... 30 V DC d <i>Version</i> H1 = through hollow shaft, clamping on flange side for hollow shaft i = 28, 30, 35, 38, 40, 42, 1 1/8", 1 1/4" H2 = through hollow shaft, clamping on flange side with pre-assembled insulation / reduction insert for hollow shaft i = 14, 15, 16, 18, 20, 30, 32, 5/8", 3/4", 7/8", 1" e <i>Mounting type</i> 18 = spring element, long R 48.8 ... 51.2 mm [1.92 ... 2.02"] 48 = torque stop, short R 72.2 ... 77.2 mm [2.84 ... 3.04"] D8 = torque stop, long R 52 ... 103 mm [2.05 ... 4.06"] 58 = tether arm, flexible, 70 mm [2.76"] 68 = tether arm, flexible, 100 mm [3.94"] 78 = tether arm, flexible, 150 mm [5.91"] i <i>Through hollow shaft</i> 28 = ø 28 mm [1.10"] 30 = ø 30 mm [1.18"] 35 = ø 35 mm [1.38"] 38 = ø 38 mm [1.50"] 40 = ø 40 mm [1.57"] 42 = ø 42 mm [1.65"] 8A = ø 1 1/8" (28.575 mm) 9A = ø 1 1/4" (31.75 mm) <i>Through hollow shaft with insulation / reduction insert</i> 14 = ø 14 mm [0.55"] 15 = ø 15 mm [0.59"] 16 = ø 16 mm [0.63"] 18 = ø 18 mm [0.71"] 20 = ø 20 mm [0.79"] 25 = ø 25 mm [0.98"] 30 = ø 30 mm [1.18"] 32 = ø 32 mm [1.26"] 4A = ø 5/8" (15.875 mm) 5A = ø 3/4" (19.05 mm) 6A = ø 7/8" (22.225 mm) 7A = ø 1" (25.4 mm)		g <i>Type of protection</i> 65 = IP65 6A = IP66/IP67 h <i>Position connection</i> R = radial i <i>Type of connection</i> 1 = cable, PVC (open-ended or with connector) C = connector on the housing k <i>Cable / connector type</i> 1 = cable, open ended 2 = M12 connector, 8-pin 3 = M12 connector, 5-pin 4 = M23 connector, 12-pin D = MIL connector, 7-pin (not with type of connection cable i = 1) E = MIL connector, 10-pin (not with type of connection cable i = 1) l <i>Cable length (in dm)</i> 0010 = 1 m [3.28'] 0020 = 2 m [6.56'] 0030 = 3 m [9.84'] 0050 = 5 m [13.12'] 0100 = 10 m [32.80'] m <i>Optional: special formats for output signals</i> XX = see page 7 <i>Optional on request</i> - Ex 2/22 (only for variants with connector on the housing) - Surface protection salt spray tested - Other cable lengths Stock types: K80I.OPP.02048.2H11838.65RC4

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Mounting accessory for hollow shaft encoders			Order no.
Torque pin, ø 4 mm for flange with spring element (mounting type E = 18)			8.0010.4700.0000
with fixing thread 			
Tapered shaft mounting kit for K80I with hollow shaft, ø 38 mm [1.50"]			8.0010.4028.0000
For use in upgrading for tapered shaft mounting. Tapered shafts are used for high-precision direct coupling. An insulation insert is also included in the mounting kit; this reliably protects the encoder from shaft currents. Included in the set: • Insert for cone blind hole, cone 1:10, 17 mm [0.67"] length • Insulation / reduction insert • Allen screw for central fixing			
Insulation / reduction insert for hollow shaft, ø 38 mm [1.50"] Temperature range -40 °C ... +115 °C [-40 °F ... +239 °F]			
Insulation 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. For more details please call our technical hotline (+49 7720 3903 849) or send us an email (info@kuebler.com)			
Also available pre-assembled as version I = H2			
			ø D1: 12 mm 14 mm 15 mm 16 mm 18 mm 20 mm 25 mm 28 mm 30 mm 32 mm 1/2" (12.75 mm) 5/8" (15.875 mm) 3/4" (19.05 mm) 7/8" (22.225 mm) 1" (25.4 mm) 1 1/8" (28.575 mm) 1 1/4" (31.75 mm)
Insulation / reduction insert for hollow shaft, ø 42 mm [1.65"]			8.0010.4091.0000
external diameter 42 mm [1.65"] / internal diameter 38 mm [1.50"]			8.0010.4027.0000
external diameter 42 mm [1.65"] / internal diameter 12 mm [0.47"]			8.0010.4038.0000
			8.0010.4038.0000
			8.0010.4019.0000
			8.0010.4080.0000
			8.0010.4011.0000
			8.0010.4012.0000
			8.0010.4061.0000
			8.0010.4016.0000
			8.0010.4015.0000
			8.0010.4013.0000
			8.0010.4070.0000
			8.0010.4090.0000
			8.0010.4018.0000
			8.0010.4050.0000
			8.0010.4014.0000
			8.0010.4060.0000
Insulation / reduction insert for hollow shaft, ø 42 mm [1.65"]			8.0010.4017.0000
			8.0010.4029.0000

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Standard optical		Sendix K80I (large hollow shaft)	Push-pull / RS422 / SinCos
Cables and connectors			Order no.
Preassembled cables	M12 female connector with coupling nut, 5-pin, A coded, straight single ended 2 m [6.56'] PVC cable		05.00.6081.2211.002M
	M12 female connector with coupling nut, 8-pin, A coded, straight single ended 2 m [6.56'] PVC cable		05.00.6041.8211.002M
	M23 female connector with coupling nut, 12-pin, cw single ended 2 m [6.56'] PVC cable		8.0000.6901.0002
Connectors	M12 female connector with coupling nut, 5-pin, A coded, straight (plastic)		05.B-8151-0/9
	M12 female connector with coupling nut, 8-pin, A coded, straight (metal)		05.CMB 8181-0
	M23 female connector with coupling nut, 12-pin, cw		8.0000.5012.0000

Further Kübler accessories can be found at: [kuebler.com/accessories](https://www.kuebler.com/accessories)

Further Kübler cables and connectors can be found at: [kuebler.com/connection-technology](https://www.kuebler.com/connection-technology)

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Technical data

Mechanical characteristics

Maximum speed	IP65	5000 min ⁻¹ 1600 min ⁻¹ (continuous)
	IP66/IP67	2000 min ⁻¹ 1000 min ⁻¹ (continuous)
Mass moment of inertia		approx. 91.3 ... 158.6 x 10 ⁻⁶ kgm ² (depending on the hollow shaft version)
Starting torque with seal at 20 °C [68 °F]		< 0.12 Nm
Shaft load capacity	radial	200 N
	axial	100 N
Weight		approx. 0.8 kg [28.22 oz]
Protection acc. to EN 60529	IP65	
	IP66/IP67	
Working temperature range		-40 °C ¹⁾ ... +85 °C

Shock resistance acc. to EN 60068-2-27 2000 m/s², 6 ms

Vibration resistance acc. to EN 60068-2-6

5 ... 8.7 Hz	±0.35 mm
8.7 ... 200 Hz	30 m/s ²
200 ... 2000 Hz	300 m/s ²

Approvals

UL compliant in accordance with	File no. E224618	
CE compliant in accordance with	EMC Directive	2014/30/EU
	RoHS Directive	2011/65/EU
	ATEX Directive	2014/34/EU (for Ex 2/22 variants)

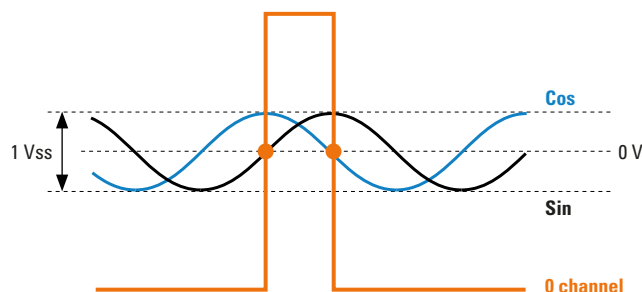
Electrical characteristics

Output circuit	RS422 (TTL compatible)		RS422 (TTL compatible)	Push-pull (HTL/TTL universal, 7272 compatible)
	Order code ^a	RS	RS	PP
Supply voltage		5 ... 30 V DC	5 V DC (±5 %)	5 ... 30 V DC
Power consumption (no load)		typ. 40 mA / max. 90 mA	typ. 40 mA / max. 90 mA	typ. 40 mA / max. 90 mA
Permissible load / channel		max. +/- 20 mA	max. +/- 20 mA	max. +/- 20 mA
Pulse frequency		max. 300 kHz	max. 300 kHz	max. 300 kHz ²⁾
Signal level	HIGH	min. 2.5 V	min. 2.5 V	min. 2.5 V
	LOW	max. 0.5 V	max. 0.5 V	max. 0.5 V
Rising edge time t_r		max. 200 ns	max. 200 ns	max. 200 ns
Falling edge time t_f		max. 200 ns	max. 200 ns	max. 200 ns
Short circuit proof outputs ³⁾		yes ⁴⁾	yes ⁴⁾	yes ⁴⁾
Reverse polarity protection of the supply voltage		yes	no	yes

Electrical characteristics SinCos output

Output circuit	SinCos U = 1 Vss	SinCos U = 1 Vss
Supply voltage	5 V DC (±5 %)	5 ... 30 V DC
Power consumption (no load)	typ. 65 mA	typ. 65 mA
	max. 110 mA	max. 110 mA
-3 dB frequency	< 180 kHz	< 180 kHz
Signal level		
	channels A/B	1 Vss (±20 %)
	channel 0 digital	min. 2.5 V
	HIGH	max. 0.5 V
	LOW	max. 0.5 V
Short circuit proof outputs ³⁾	yes	yes
Reverse polarity protection of the supply voltage	no	yes

Signal level channel 0



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:
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.

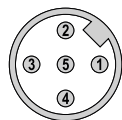
Incremental encoders

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Terminal assignment

+V : Supply voltage encoder +V DC
 0 V : Supply voltage encoder 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, $\bar{A}$: Incremental output channel A
 B, $\bar{B}$: Incremental output channel B
 0, $\bar{0}$: Reference signal
 PH $\perp$: Shield is connected to the connector housing

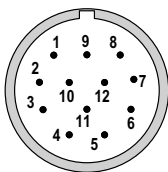
Top view of mating side, male contact base



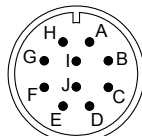
M12 connector, 5-pin



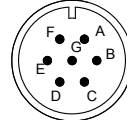
M12 connector, 8-pin



M23 connector, 12-pin



MIL connector, 10-pin

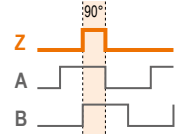
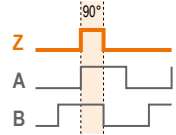
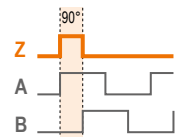
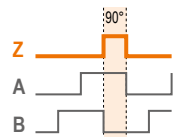
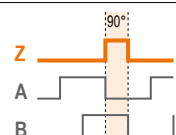
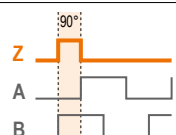
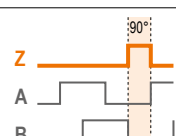
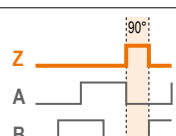
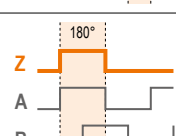
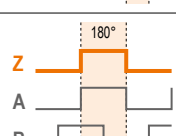
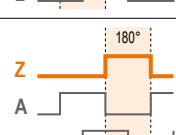
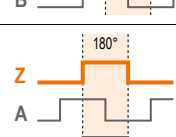
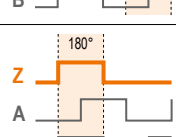
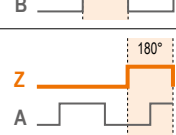
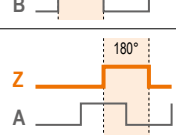
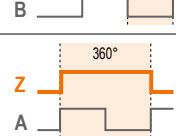
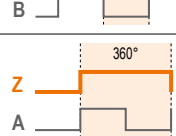
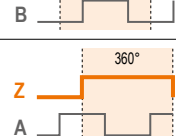
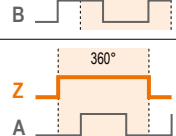


MIL connector, 7-pin

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Special formats for output signals

A leading B when the shaft is rotated clockwise with the flange side facing you.			B leading A when the shaft is rotated clockwise with the flange side facing you.		
Order code 			Order code 		
Standard No specification in the order code	Z at A / B = 1 / 1 Z is 90° wide		B0	Z at A / B = 1 / 1 Z is 90° wide	
A1	Z at A / B = 1 / 0 Z is 90° wide		B1	Z at A / B = 1 / 0 Z is 90° wide	
A2	Z at A / B = 0 / 1 Z is 90° wide		B2	Z at A / B = 0 / 1 Z is 90° wide	
A3	Z at A / B = 0 / 0 Z is 90° wide		B3	Z at A / B = 0 / 0 Z is 90° wide	
A4	Z at A = 1 Z is 180° wide		B4	Z at A = 1 Z is 180° wide	
A5	Z at A = 0 Z is 180° wide		B5	Z at A = 0 Z is 180° wide	
A6	Z at B = 1 Z is 180° wide		B6	Z at B = 1 Z is 180° wide	
A7	Z at B = 0 Z is 180° wide		B7	Z at B = 0 Z is 180° wide	
A8	Z at A Z is 360° wide		B8	Z at A Z is 360° wide	
A9	Z at B Z is 360° wide		B9	Z at B Z is 360° wide	

Incremental encoders

Standard optical

Sendix K80I (large hollow shaft)

Push-pull / RS422 / SinCos

Dimensions hollow shaft version

Dimensions in mm [inch]

Spring element, long R 48.8 ... 51.2 mm

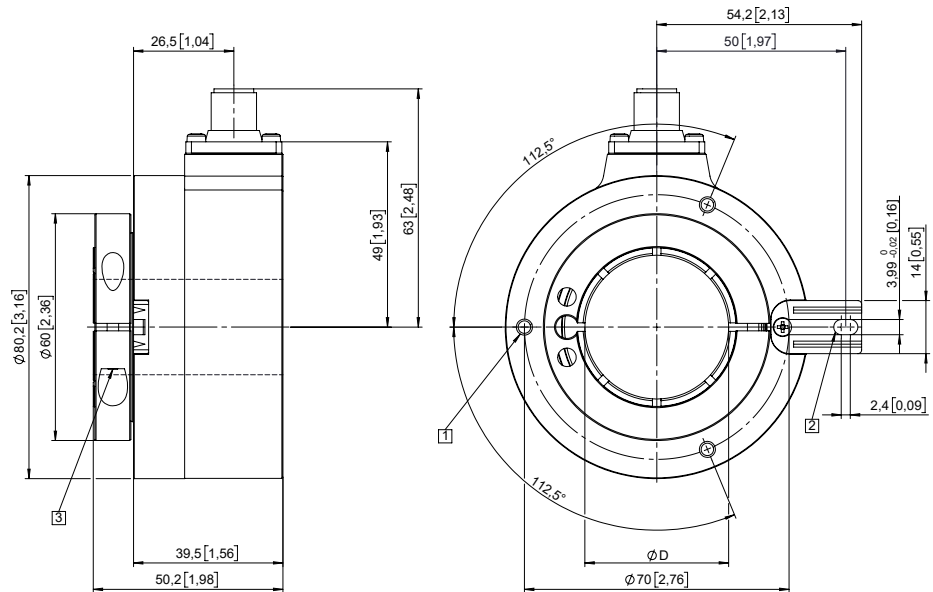
Connection, radial
Connector on the housing
M12 connector, 5- or 8-pin

mounting type **E** = 18
position connection **I** = R
type of connection **I** = C
connector type **K** = 2 or 3

- 1 3 x M4, 7 [0.28] deep
- 2 Slot spring element, recommendation: torque pin DIN 7, ϕ 4 [0.16]
- 3 Recommended torque for the clamping ring 1 Nm

D	Fit
28 [1.10]	H7
30 [1.18]	H7
35 [1.38]	H7
38 [1.50]	H7
40 [1.57]	H7
42 [1.65]	H7
1 1/8"	H7
1 1/4"	H7

Recommended fit for shaft on customer side is g6.



Torque stop, short

R 72.2 ... 77.2 mm

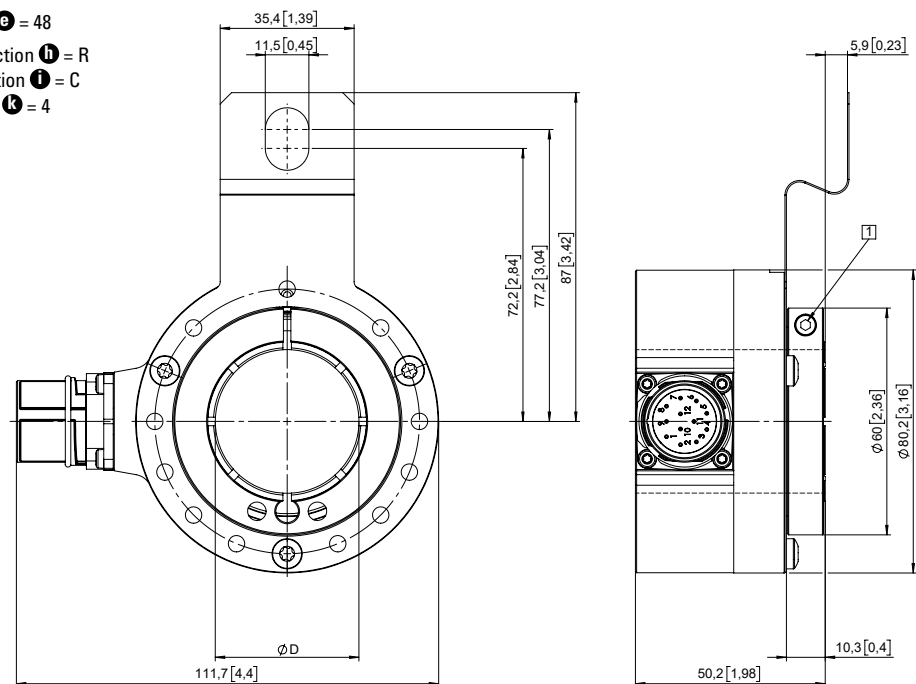
Connection, radial
Connector on the housing
M23 connector, 12-pin

mounting type **E** = 48
position connection **I** = R
type of connection **I** = C
connector type **K** = 4

- 1 Recommended torque for the clamping ring 1 Nm

D	Fit
28 [1.10]	H7
30 [1.18]	H7
35 [1.38]	H7
38 [1.50]	H7
40 [1.57]	H7
42 [1.65]	H7
1 1/8"	H7
1 1/4"	H7

Recommended fit for shaft on customer side is g6.



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**Standard
optical**

Sendix K80I (large hollow shaft)

Push-pull / RS422 / SinCos

Dimensions hollow shaft version

Dimensions in mm [inch]

**Torque stop, long
R 52 ... 103 mm**

Connection, radial
Connector on the housing
M23 connector, 12-pin

mounting type **e** = D8

position connection **i** = R

type of connection **i** = C

connector type **k** = 4

1 Recommended torque for the
clamping ring 1 Nm

D	Fit
28 [1.10]	H7
30 [1.18]	H7
35 [1.38]	H7
38 [1.50]	H7
40 [1.57]	H7
42 [1.65]	H7
1 1/8"	H7
1 1/4"	H7
Recommended fit for shaft on customer side is g6.	

