

# Incremental encoders

**Standard optical**

**Sendix Base KIS50 / KIH50 (shaft / hollow shaft)**

**Push-pull / RS422 / Open collector**



The encoders Sendix Base KIS50 / KIH50 offer a protection level up to IP65 and can be used with temperatures from -20 °C up to +70 °C. They are ideal for use in standard applications and in simple machines.

The Sendix Base KIS50 / KIH50 family also features our well proven Safety-Lock™ system, allowing higher tolerance of possible installation errors and increasing the overall performance of this encoder.



Safety-Lock™



High rotational speed



Temperature range  
-20...+70°C



High protection level  
IP



High shaft load capacity



Shock / vibration resistant



Magnetic field proof



Short-circuit proof



Reverse polarity protection



Optical sensor

## Robust

- Resistant die-cast housing and protection up to IP65.
- Wide temperature range, -20 °C ... +70 °C.
- Elimination of machine downtime thanks to sturdy bearing construction in "Safety-Lock™ Design".

## Flexible

- Suitable connection variant for every specific case: cable connection, M12 and M23 connector.
- Various mounting options.
- Up to 5000 pulses per revolution.

## Order code

### Shaft version

8.KIS50 . XXXX . XXXX . PXX0X  
Type      a   b   c   d      e      f   g   h

#### a Flange

8 = clamping flange, IP65     $\varnothing$  58 mm [2.28"]  
B = synchro flange, IP65     $\varnothing$  58 mm [2.28"]  
D = square flange, IP65     $\varnothing$  63,5 mm [2.5"]

#### b Shaft ( $\varnothing \times L$ ), with flat

3 =  $\varnothing$  10 x 20 mm [0.39 x 0.79"]  
5 =  $\varnothing$  12 x 20 mm [0.47 x 0.79"]  
8 =  $\varnothing$  3/8 x 7/8"

#### c Output circuit / power supply

4 = RS422 / 5 V DC  
1 = RS422 / 5 ... 30 V DC  
2 = push-pull / 5 ... 30 V DC  
5 = push-pull / 10 ... 30 V DC  
3 = open collector / 5 ... 30 V DC

#### d Type of connection

1 = axial cable, 1 m [3.28'] PVC  
2 = radial cable, 1 m [3.28'] PVC  
P = axial M12 connector, 5-pin  
R = radial M12 connector, 5-pin  
3 = axial M12 connector, 8-pin  
4 = radial M12 connector, 8-pin  
7 = axial M23 connector, 12-pin  
8 = radial M23 connector, 12-pin

#### e Pulse rate

100, 200, 250, 256, 360, 500, 512,  
600, 1000, 1024, 2000, 2048, 2500,  
3600, 4096, 5000  
(e.g. 100 pulses => 0100)

#### f Special output signal formats

00 = standard output  
other = see page 4

#### g Capacitor

0 = standard

#### h Special connector pin configuration

0 = standard wiring  
other = see page 4



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## Technical data

### Mechanical characteristics

<b>Maximum speed</b>	6000 min <sup>-1</sup> 3000 min <sup>-1</sup> (continuous)	<b>Weight</b>	approx. 0.4 kg [14.11 oz]
<b>Mass moment of inertia</b>	shaft version approx. 1.8 x 10 <sup>-6</sup> kgm <sup>2</sup> hollow shaft version approx. 6 x 10 <sup>-6</sup> kgm <sup>2</sup>	<b>Protection</b> acc. to EN 60529	IP65
<b>Starting torque</b> at 20 °C [68 °F]	< 0.01 Nm	<b>Working temperature range</b>	-20 °C ... +70 °C [-4 °F ... +158 °F]
<b>Shaft load capacity</b>	radial 80 N axial 40 N	<b>Material</b>	shaft stainless steel
		<b>Shock resistance</b> acc. to EN 60068-2-27	1000 m/s <sup>2</sup> , 6 ms
		<b>Vibration resistance</b> acc. to EN 60068-2-6	100 m/s <sup>2</sup> , 10 ... 2000 Hz

### Electrical characteristics

Output circuit	RS422 (TTL compatible)	RS422 (TTL compatible)	Push-pull	Push-pull (HTL/TTL universal, 7272 compatible)	Open collector (7273)
Order code	<b>1</b>	<b>4</b>	<b>5</b>	<b>2</b>	<b>3</b>
<b>Power supply</b>	5 ... 30 V DC	5 V DC (±5 %)	10 ... 30 V DC	5 ... 30 V DC	5 ... 30 V DC
<b>Power consumption</b> (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	100 mA
<b>Permissible load / channel</b>	max. +/- 20 mA	max. +/- 20 mA	max. +/- 20 mA	max. +/- 20 mA	+/- 20 mA sink at 30 V DC
<b>Pulse frequency</b>	max. 300 kHz	max. 300 kHz	max. 300 kHz	max. 300 kHz <sup>1)</sup>	max. 300 kHz
<b>Signal level</b>	HIGH min. 2.5 V LOW max. 0.5 V	min. 2.5 V max. 0.5 V	min +V - 1.0 V max. 0.5 V	min. +V - 2.0 V max. 0.5 V	
<b>Rising edge time t<sub>r</sub></b>	max. 200 ns	max. 200 ns	max. 1 µs	max. 1 µs	
<b>Falling edge time t<sub>f</sub></b>	max. 200 ns	max. 200 ns	max. 1 µs	max. 1 µs	
<b>Short circuit proof outputs</b> <sup>2)</sup>	yes <sup>3)</sup>	yes <sup>3)</sup>	yes	yes	yes
<b>Reverse polarity protection of the power supply</b>	yes	no	yes	no	no
<b>CE compliant</b> acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU				

1) Max. recommended cable length 30 m [98.43'].  
2) If power supply correctly applied.

3) 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.

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## Terminal assignment

Output circuit	Type of connection	Cable (isolate unused cores individually before initial start-up)											
		Signal:	0 V	+V	0 Vsens	+Vsens	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	$\perp$
1, 2, 3, 4, 5	KIS50: 1, 2	Core color:	WH	BN	GY PK	RD BU	GN	YE	GY	PK	BU	RD	shield
	KIH50: 1, E												

Output circuit	Type of connection	M12 connector, 5-pin						
1, 2, 3, 4, 5	KIS50: P, R	Signal:	0 V	+V	A	B	0	$\perp$
	KIH50: R	Pin:	1	2	3	4	5	PH <sup>4)</sup>

Output circuit	Type of connection	M12 connector, 8-pin											
1, 2, 3, 4, 5	KIS50: 3, 4	Signal:	0 V	+V	0 Vsens	+Vsens	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	$\perp$
	KIH50: 2	Pin:	1	2			3	4	5	6	7	8	PH <sup>4)</sup>

Output circuit	Type of connection	M23 connector, 12-pin											
1, 2, 3, 4, 5	KIS50: 7, 8	Signal:	0 V	+V	0 Vsens	+Vsens	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	$\perp$
	KIH50: 4	Pin:	10	12	11	2	5	6	8	1	3	4	PH <sup>4)</sup>

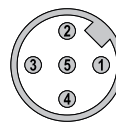
## Terminal assignment – Special connector pin configuration

Order code <sup>1)</sup>	Output circuit	Type of connection	M12 connector, 8-pin										
7	1, 2, 3, 4, 5	KIS50: 3, 4	Signal:	0 V	+V	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	$\perp$	
		KIH50: 2	Pin:	7	2	1	3	4	5	6	8	PH <sup>1)</sup>	

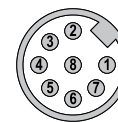
Order code <sup>1)</sup>	Output circuit	Type of connection	M12 connector, 5-pin						
9	1, 2, 3, 4, 5	KIS50: P, R	Signal:	0 V	+V	A	B	0	$\perp$
		KIH50: R	Pin:	3	1	4	2	5	PH <sup>1)</sup>

- +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)

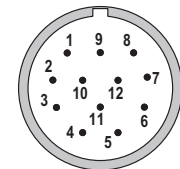
### Top view of mating side, male contact base



M12 connector, 5-pin



M12 connector, 8-pin

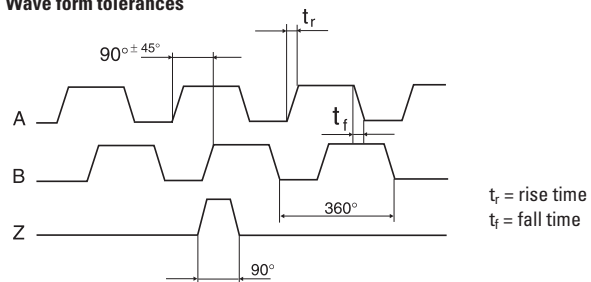


M23 connector, 12-pin

## 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



<b>A leads B</b> when the shaft is rotated in the clockwise direction viewing the shaft or collet end. This is the Kübler standard. This format applies to the pin key codes listed below.	
Order code <sup>1)</sup>	
Z gated with A & B. This is the Kübler standard. Z is 90° wide.	

<b>B leads A</b> when the shaft is rotated in the clockwise direction viewing the shaft or collet end. This format applies to the pin key codes listed below.	
Order code <sup>1)</sup>	
<b>04</b> Z gated with A & B. Z is 90° wide.	

1) PH = shield is attached to connector housing.

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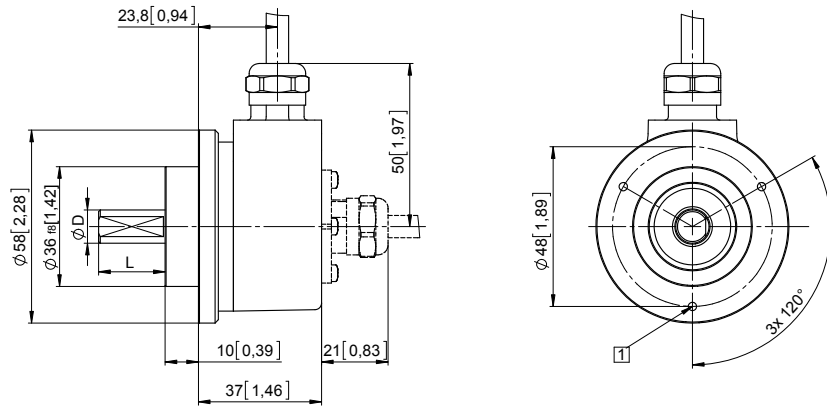
## Dimensions shaft version

Dimensions in mm [inch]

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

1 3 x M3, 6 [0.24] deep

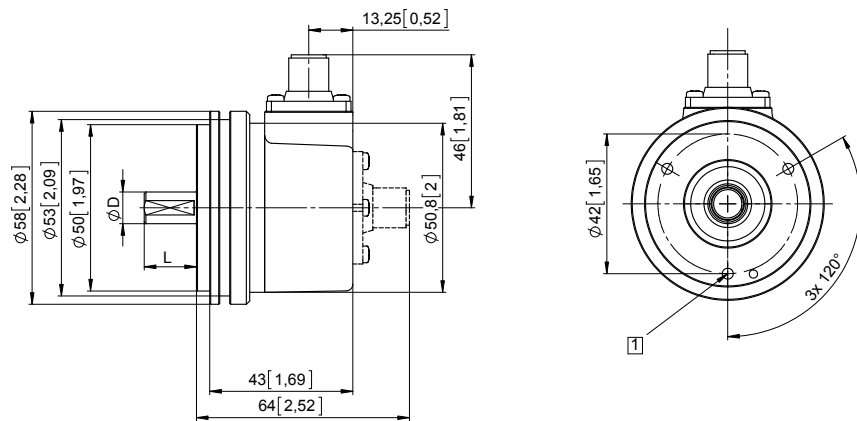
D	Fit	L
10 [0.39]	h7	20 [0.79]
12 [0.47]	h7	20 [0.79]
3/8"	h8	7/8"



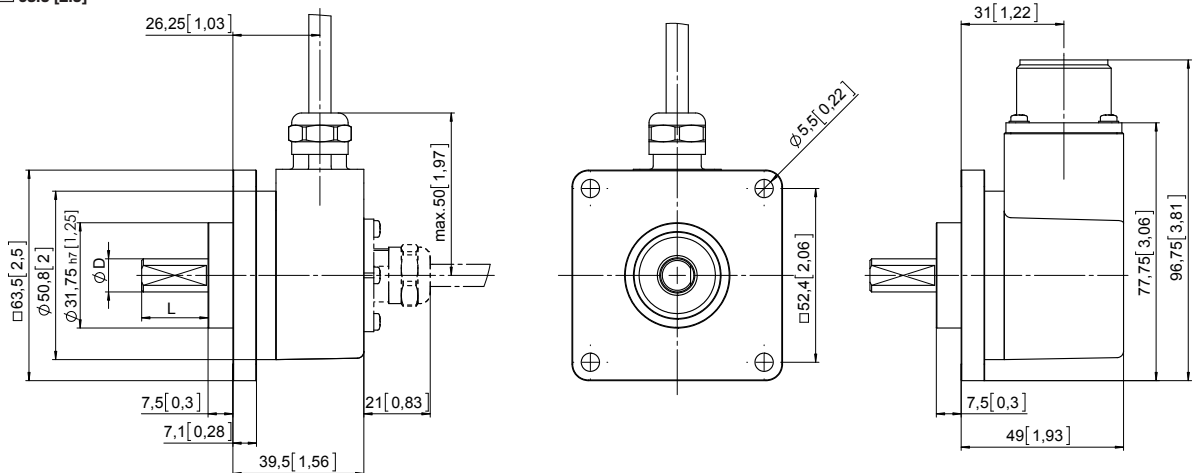
### Synchro flange, $\varnothing$ 58 [2.28] Flange type B

1 3 x M4, 6 [0.24] deep

D	Fit	L
10 [0.39]	h7	20 [0.79]
12 [0.47]	h7	20 [0.79]
3/8"	h8	7/8"



### Square flange, $\square$ 63.5 [2.5] Flange type D



MIL-connector version

D	Fit	L
10 [0.39]	h7	20 [0.79]
12 [0.47]	h7	20 [0.79]
3/8"	h8	7/8"

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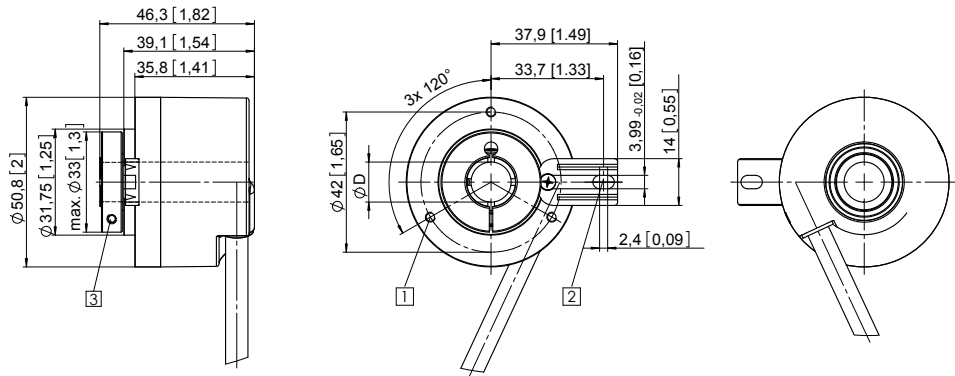
### Dimensions hollow shaft version

Dimensions in mm [inch]

#### Flange with spring element, long Flange type 2

- 1 3 x M3, 6 [0.24] deep
- 2 Slot spring element, recommendation: cylindrical pin DIN 7,  $\varnothing 4$  [0.16]
- 3 Recommended torque for the clamping ring 0.6 Nm

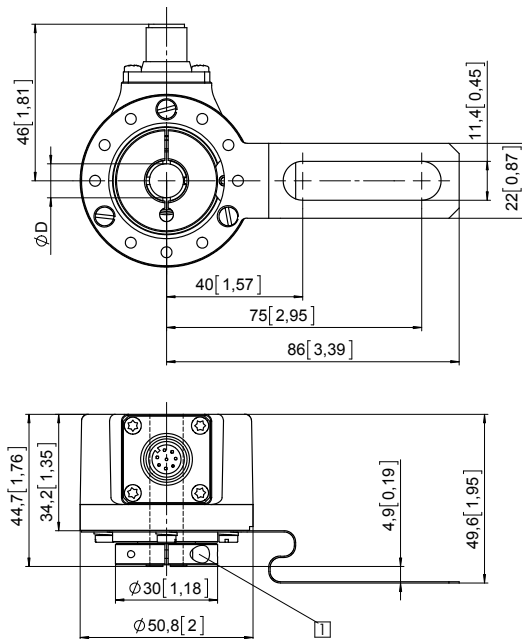
D	Fit
1/4"	H7
3/8"	H7
10 [0.39]	H7
12 [0.47]	H7
1/2"	H7
14 [0.55]	H7
15 [0.59]	H7
5/8"	H7



#### Flange with torque stop, long Flange type 4

- 1 Recommended torque for the clamping ring 0.6 Nm

D	Fit
1/4"	H7
3/8"	H7
10 [0.39]	H7
12 [0.47]	H7
1/2"	H7
14 [0.55]	H7
15 [0.59]	H7
5/8"	H7



#### Flange with stator coupling, $\varnothing 63$ [2.48] Flange type D

- 1 Recommended torque for the clamping ring 0.6 Nm

D	Fit
1/4"	H7
3/8"	H7
10 [0.39]	H7
12 [0.47]	H7
1/2"	H7
14 [0.55]	H7
15 [0.59]	H7
5/8"	H7

