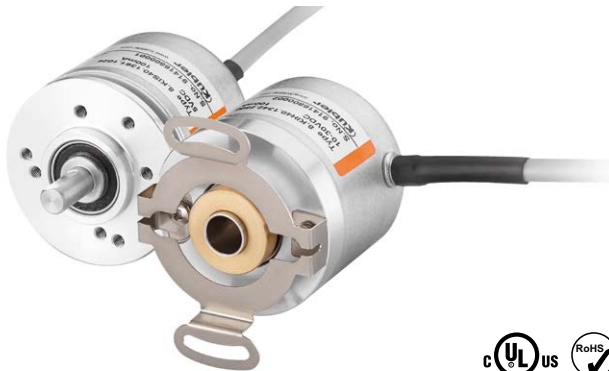


# Incremental encoders

<b>Compact optical</b>	<b>Sendix Base KIS40 / KIH40 (shaft / hollow shaft)</b>	<b>Push-pull / RS422 / Open collector</b>
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The incremental encoders type Sendix Base KIS40 / KIH40 with optical sensor technology have been designed for highest cost-effectiveness. They are available with a resolution of up to 2560 pulses per revolution.

They are particularly suitable for tight mounting spaces and small machines and appliances.



Safety-Lock™	High rotational speed	Temperature range	Shock / vibration resistant	Short-circuit proof	Reverse polarity protection	Magnetic field proof	Optical sensor

### Compact and robust

- Only 40 mm outer diameter.
- Ideally suited for use where space is tight.
- Sturdy bearing construction in Safety Lock™ design.
- Safe commissioning: reverse polarity protection and short-circuit proof.

### Flexible

- Maximum resolution of 2560 pulses per revolution.
- Supply voltage 5 V DC, 10 ... 30 V DC or 5 ... 30 V DC.
- Push-pull, RS422 or open collector
- Radial or axial cable.

<b>Order code</b>	<b>8.KIS40 . 1 XXXX . XXXX . P03<sup>1)</sup></b>							
<b>Shaft version</b>	<table border="1" style="font-size: small;"> <tr> <td>Type</td> <td>a</td> <td>b</td> <td>c</td> <td>d</td> <td>e</td> <td>f</td> </tr> </table>	Type	a	b	c	d	e	f
Type	a	b	c	d	e	f		

- |  |  |
|--|--|
| <p><b>a</b> Flange<br/>1 = clamping-synchro flange, ø 40 mm [1.57"]</p> <p><b>b</b> Shaft (ø x L)<br/>3 = ø 6 x 12.5 mm [0.24 x 0.49"], with flat<br/>5 = ø 1/4" x 12.5 mm [1/4" x 0.49"], with flat<br/>6 = ø 8 x 12.5 mm [0.32 x 0.49"], with flat</p> <p><b>c</b> Output circuit / supply voltage<br/>3 = open collector NPN (with inverted signal) / 10 ... 30 V DC<br/>4 = push-pull (with inverted signal) / 10 ... 30 V DC<br/>6 = RS422 (with inverted signal) / 5 V DC<br/>7 = open collector NPN (without inverted signal) / 10 ... 30 V DC<br/>8 = push-pull (without inverted signal) / 10 ... 30 V DC<br/>A = open collector NPN (with inverted signal) / 5 ... 30 V DC<br/>B = push-pull (with inverted signal) / 5 ... 30 V DC<br/>C = RS422 (with inverted signal) / 5 ... 30 V DC</p> <p><b>d</b> Type of connection<br/>1 = axial cable, 2 m [6.56'] PVC<br/>2 = radial cable, 2 m [6.56'] PVC<br/>4 = radial cable, 0.5 m [1.64'] PVC, with M12 connector, 5-pin<br/>6 = radial cable, 0.5 m [1.64'] PVC, with M12 connector, 8-pin<br/>A = axial cable, special length PVC *)<br/>B = radial cable, special length PVC *)</p> <p>*) Available special lengths (connection types A, B):<br/>3, 5, 8, 10, 15 m [9.84, 16.40, 26.25, 32.80, 49.21']<br/>order code expansion .XXXX = length in dm<br/>e.g.: 8.KIS40.134A.1024. (P03.) 0050 (for cable length 5 m)</p> | <p><b>e</b> Pulse rate<br/>10, 25, 50, 60, 88, 100, 120, 150, 200, 250, 360, 500, 512, 600, 1000, 1024, 1500, 1800, 2000, 2048, 2500, 2560<br/>(e.g. 500 pulses =&gt; 0500)</p> <p><b>f</b> Special signal format<br/>P03 = see page 4</p> <p><i>Optional on request</i><br/>- other pulse rates</p> |
|--|--|

1) Is only necessary when a special output signal format is required.

# Incremental encoders

<b>Compact optical</b>	<b>Sendix Base KIS40 / KIH40 (shaft / hollow shaft)</b>	<b>Push-pull / RS422 / Open collector</b>
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<b>Order code</b>	<b>8.KIH40</b>	<b>.XXXX</b>	<b>.XXXX</b>	<b>.P03<sup>1)</sup></b>
<b>Hollow shaft</b>	Type	a b c d	e	i

**a** *Flange*  
 2 = with spring element, long  
 5 = with stator coupling, ø 46 mm [1.81"]

**b** *Blind hollow shaft (insertion depth max. 18 mm [0.71"])*  
 2 = ø 6 mm [0.24"]  
 4 = ø 8 mm [0.32"]  
 3 = ø 1/4"

**c** *Output circuit / supply voltage*  
 3 = open collector NPN (with inverted signal) / 10 ... 30 V DC  
 4 = push-pull (with inverted signal) / 10 ... 30 V DC  
 6 = RS422 (with inverted signal) / 5 V DC  
 7 = open collector NPN (without inverted signal) / 10 ... 30 V DC  
 8 = push-pull (without inverted signal) / 10 ... 30 V DC  
 A = open collector NPN (with inverted signal) / 5 ... 30 V DC  
 B = push-pull (with inverted signal) / 5 ... 30 V DC  
 C = RS422 (with inverted signal) / 5 ... 30 V DC

**d** *Type of connection*  
 1 = axial cable, 2 m [6.56'] PVC  
 2 = radial cable, 2 m [6.56'] PVC  
 4 = radial cable, 0.5 m [1.64'] PVC, with M12 connector, 5-pin  
 6 = radial cable, 0.5 m [1.64'] PVC, with M12 connector, 8-pin  
 A = axial cable, special length PVC \*)  
 B = radial cable, special length PVC \*)

\*) Available special lengths (connection types A, B):  
 3, 5, 8, 10, 15 m [9.84, 16.40, 26.25, 32.80, 49.21']  
 order code expansion .XXXX = length in dm  
 ex.: 8.KIH40.544A.1024. (P03.) **0050** (for cable length 5 m)

**e** *Pulse rate*  
 10, 25, 50, 60, 88, 100, 120, 150, 200, 250, 360, 500, 512, 600, 1000,  
 1024, 1500, 1800, 2000, 2048, 2500, 2560  
 (e.g. 500 pulses => 0500)

**i** *Special signal format*  
 P03 = see page 4

*Optional on request*  
 - other pulse rates

<b>Mounting accessory for shaft encoders</b>		Order no.
<b>Coupling</b>	bellows coupling ø 15 mm [0.59"] for shaft 6 mm [0.24"]	<b>8.0000.1202.0606</b>

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

1) Is only necessary when a special output signal format is required.

# Incremental encoders

<b>Compact optical</b>	<b>Sendix Base KIS40 / KIH40 (shaft / hollow shaft)</b>	<b>Push-pull / RS422 / Open collector</b>
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## Technical data

Electrical characteristics			
Output circuit	RS422 (TTL comp.)	Push-pull <sup>1)</sup> (7272 comp.)	Open collector NPN (7273)
Supply voltage	5 V DC (±5 %) / 5 ... 30 V DC	10 ... 30 V DC / 5 ... 30 V DC	10 ... 30 V DC / 5 ... 30 V DC
Power consumption with inverted signal (no load)	typ. 40 mA max. 90 mA / max. 165 mA	typ. 50 mA max. 100 mA	100 mA
Permissible load / channel	max. +/- 20 mA	max. +/- 20 mA	20 mA sink at 30 V DC
Pulse frequency	max. 250 kHz	max. 250 kHz	max. 250 kHz
Signal level	HIGH min. 2.5 V LOW max. 0.5 V	min. +V - 2.0 V max. 0.5 V	
Rising edge time $t_r$	max. 200 ns	max. 1 µs	
Falling edge time $t_f$	max. 200 ns	max. 1 µs	
Short circuit proof outputs <sup>2)</sup>	yes <sup>3)</sup>	yes	yes
Reverse polarity protection of the supply voltage	no/yes	yes	yes

Mechanical characteristics	
Maximum speed	4500 min <sup>-1</sup>
Mass moment of inertia	approx. 0.2 x 10 <sup>-6</sup> kgm <sup>2</sup>
Starting torque – at 20 °C [68 °F]	< 0.05 Nm
Shaft load capacity	radial 40 N axial 20 N
Weight	ca. 0.17 kg [6.00 oz]
Protection acc. to EN 60529	IP64
Working temperature range	-20 °C ... +70 °C [-4 °F ... +158 °F]
Materials	shaft stainless steel flange aluminum housing aluminum cable PVC
Shock resistance acc. to EN 60068-2-27	1000 m/s <sup>2</sup> , 6 ms
Vibration resistance acc. to EN 60068-2-6	100 m/s <sup>2</sup> , 55 ... 2000 Hz

Approvals	
UL compliant in accordance with	File no. E224618
CE compliant in accordance with	
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU

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

# Incremental encoders

**Compact optical**

**Sendix Base KIS40 / KIH40 (shaft / hollow shaft)**

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

## Terminal assignment

Output circuit	Type of connection	Cable (isolate unused cores individually before initial start-up)								
3, 4, 6, A, B, C with inv. signal	1, 2, A, B	Signal:	0 V	+V	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$
		Core color:	WH	BN	GN	YE	GY	PK	BU	RD

Output circuit	Type of connection	Cable (isolate unused cores individually before initial start-up)								
7, 8 without inv. signal	1, 2, A, B	Signal:	0 V	+V	A	–	B	–	0	–
		Core color:	WH	BN	GN	–	GY	–	BU	–

Output circuit	Type of connection	M12 connector, 8-pin									
3, 4, 6, A, B, C without inv. signal	6	Signal:	0 V	+V	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	$\perp$
		Pin:	1	2	3	4	5	6	7	8	PH <sup>1)</sup>

Output circuit	Type of connection	M12 connector, 5-pin						
7, 8 without inv. signal	4	Signal:	0 V	+V	A	B	0	$\perp$
		Pin:	1	2	3	4	5	PH <sup>1)</sup>

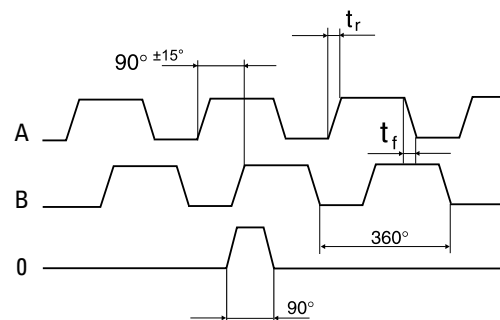
- +V: Supply voltage encoder +V DC
- 0 V: Supply voltage encoder ground GND (0 V)
- A,  $\bar{A}$ : Incremental output channel A
- B,  $\bar{B}$ : Incremental output channel B
- 0,  $\bar{0}$ : Reference signal

## 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.

<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.		
<b>Order code</b> <b>1</b>		
<b>standard</b>	0 gated with A & B. This is the Kübler standard. 0 is 90° wide.	
<b>P03</b>	0 ungated. 0 is 330° to 360° wide.	

## Signal tolerances



$t_r$  = rising edge time  
 $t_f$  = falling edge time

1) PH = shield is attached to connector housing.

# Incremental encoders

**Compact optical**      **Sendix Base KIS40 / KIH40 (shaft / hollow shaft)**      **Push-pull / RS422 / Open collector**

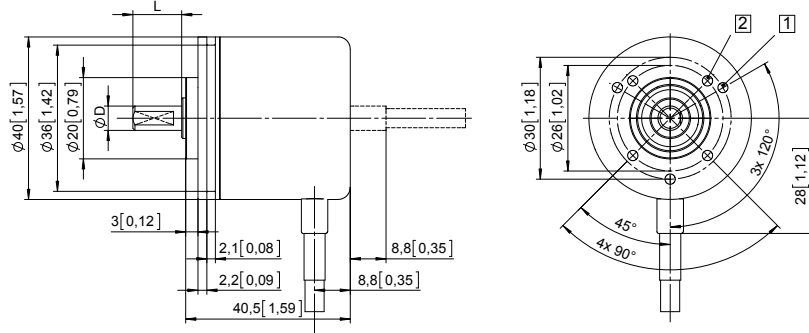
## Dimensions shaft version

Dimensions in mm [inch]

### Clamping-synchro flange, ø 40 [1.57]

#### Flange type 1

- 1 3 x M3, 4 [0.16] deep
- 2 4 x M3, 4 [0.16] deep



D	Fit	L
6 [0.24]	h7	12.5 [0.49]
1/4"	h7	12.5 [0.49]
8 [0.32]	h7	12.5 [0.49]

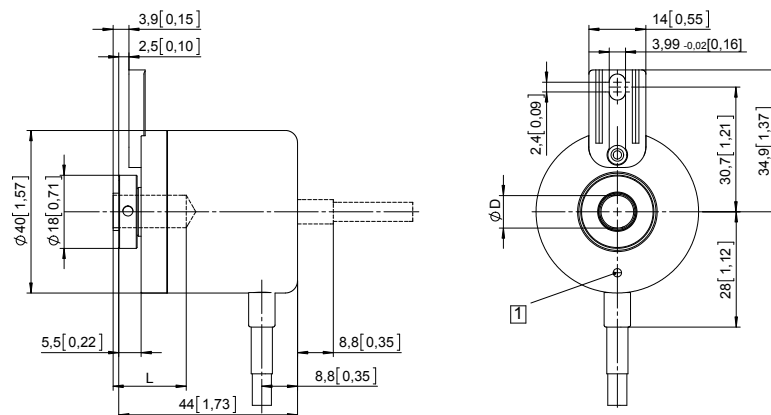
## Dimensions hollow shaft version

Dimensions in mm [inch]

### Flange with spring element, long

#### Flange type 2

- 1 M2,5, 4 [0.16] deep

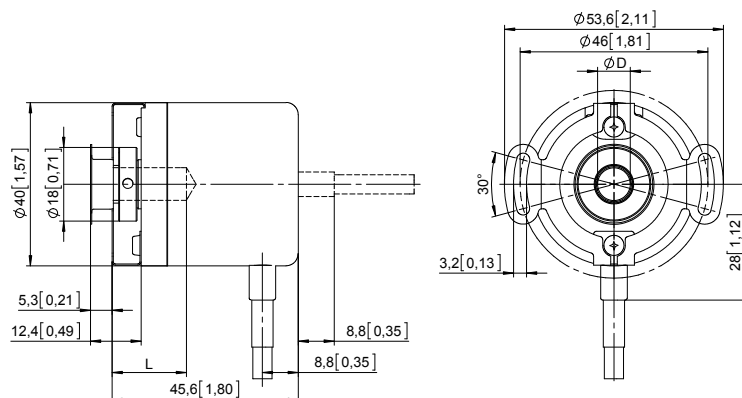


D	Fit	L
6 [0.24]	H7	18 [0.71]
8 [0.32]	H7	18 [0.71]
1/4"	H7	18 [0.71]

L = insertion depth max. blind hollow shaft  
insertion depth min. = 15 mm [0.59]

### Flange with stator coupling, ø 46 [1.81]

#### Flange type 5



D	Fit	L
6 [0.24]	H7	18 [0.71]
8 [0.32]	H7	18 [0.71]
1/4"	H7	18 [0.71]

L = insertion depth max. blind hollow shaft  
insertion depth min. = 15 mm [0.59]