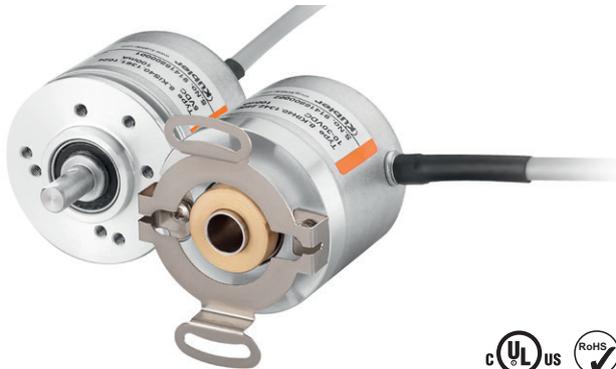


# Incremental encoders

<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 2500 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 2500 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</b>	<b>. 1</b>	<b>XXX</b>	<b>. XXXX</b>	<b>. PXX<sup>1)</sup></b>
<b>Shaft version</b>	Type	a	b c d	e	f

- a Flange**  
1 = clamping-synchro flange, ø 40 mm [1.57"]
- b Shaft (ø x L)**  
3 = ø 6 x 12.5 mm [0.24 x 0.49"], with flat  
5 = ø 1/4" x 12.5 mm [1/4" x 0.49"], with flat  
6 = ø 8 x 12.5 mm [0.32 x 0.49"], with flat
- 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  
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.KIS40.134A.1024.0050 (for cable length 5 m)
- e Pulse rate**  
25, 50, 60, 100, 200, 360, 500, 512, 600, 1000, 1024, 2000, 2048, 2500 (e.g. 500 pulses => 0500)
- f Special signal format**  
P03 = see page 62

- Stock types**  
8.KIS40.1342.0360  
8.KIS40.1342.0500  
8.KIS40.1342.1000  
8.KIS40.1342.1024  
8.KIS40.1342.2048  
8.KIS40.1342.2500  
8.KIS40.1362.0500  
8.KIS40.1362.1024  
8.KIS40.1362.2048

*Optional on request*  
- other pulse rates

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>.XXXXX</b>	<b>.XXXX</b>	<b>.PXX<sup>1)</sup></b>	
<b>Hollow shaft</b>	Type	a b c d	e	f	
<b>a Flange</b>	2 = with spring element, long 5 = with stator coupling, ø 46 mm [1.81"]	<b>b Blind hollow shaft (insertion depth max. 18 mm [0.71"])</b>	2 = ø 6 mm [0.24"] 4 = ø 8 mm [0.32"] 3 = ø 1/4"	<b>c Output circuit / supply voltage</b>	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
<b>d Type of connection</b>	1 = axial cable, 2 m [6.56'] PVC 2 = radial cable, 2 m [6.56'] PVC A = axial cable, special length PVC *) B = radial cable, special length PVC *)	<b>e Pulse rate</b>	25, 50, 60, 100, 200, 360, 500, 512, 600, 1000, 1024, 2000, 2048, 2500 (e.g. 500 pulses => 0500)	<b>f Special signal format</b>	P03 = see page 62
	*) 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.1024.0050 (for cable length 5 m)	<b>Stock types</b>	8.KIH40.2442.1024 8.KIH40.2462.1000 8.KIH40.2462.1024 8.KIH40.5442.0360 8.KIH40.5442.0500 8.KIH40.5442.1024 8.KIH40.5442.2048 8.KIH40.5442.2500 8.KIH40.5462.0500 8.KIH40.5462.2048		
		<b>Optional on request</b>	- other pulse rates		

Mounting accessory for shaft encoders		Order no.
<b>Coupling</b>	bellows coupling ø 15 mm [0.59"] for shaft 6 mm [0.24"]	<b>8.0000.1202.0606</b>
Connection technology		Order no.
<b>Connector, self-assembly (straight)</b>	M12 female connector with coupling nut, 8-pin	<b>05.CMBS 8181-0</b>

Further accessories can be found in the accessories section or in the accessories area of our website at: [kuebler.com/accessories](http://kuebler.com/accessories).  
Additional connectors can be found in the connection technology section or in the connection technology area of our website at: [kuebler.com/connection\\_technology](http://kuebler.com/connection_technology).

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

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

<b>Compact optical</b>	<b>Sendix Base KIS40 / KIH40 (shaft / hollow shaft)</b>	<b>Push-pull / RS422 / Open collector</b>
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Electrical characteristics			
<b>Output circuit</b>		<b>RS422</b> (TTL comp.)	<b>Push-pull</b> <sup>2)</sup> (7272 comp.) <b>Open collector NPN</b> (7273)
<b>Supply voltage</b>		5 V DC ( $\pm 5\%$ ) / 5 ... 30 V DC	10 ... 30 V DC / 5 ... 30 V DC      10 ... 30 V DC / 5 ... 30 V DC
<b>Power consumption with inverted signal</b> (no load)		typ. 40 mA max. 90 mA / max. 165 mA	typ. 50 mA max. 100 mA      100 mA
<b>Permissible load / channel</b>		max. +/- 20 mA	max. +/- 20 mA      20 mA sink at 30 V DC
<b>Pulse frequency</b>		max. 250 kHz	max. 250 kHz      max. 250 kHz
<b>Signal level</b>	HIGH LOW	min. 2.5 V max. 0.5 V	min. +V - 2.0 V max. 0.5 V
<b>Rising edge time <math>t_r</math></b>		max. 200 ns	max. 1 $\mu$ s
<b>Falling edge time <math>t_f</math></b>		max. 200 ns	max. 1 $\mu$ s
<b>Short circuit proof outputs</b> <sup>3)</sup>		yes <sup>4)</sup>	yes      yes
<b>Reverse polarity protection of the supply voltage</b>		no/yes	yes      yes
<b>UL approval</b>		file no. E224618	
<b>CE compliant</b> acc. to		EMC guideline 2014/30/EU – RoHS guideline 2011/65/EU	

## 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	
7, 8 without inv. signal	1, 2, A, B	Signal:	0 V	+V	A	–	B	–	0	–	
		Core color:	WH	BN	GN	–	GY	–	BU	–	

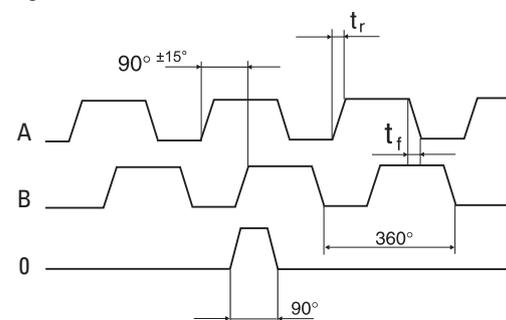
- +V: Supply voltage encoder +V DC
- 0 V: Supply voltage encoder ground GND (0 V)
- A,  $\bar{A}$ : Incremental output channel A
- B,  $\bar{B}$ : Incremental output channel B
- 0,  $\bar{0}$ : Reference signal

## 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.

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

## Signal tolerances



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

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

## Compact optical

Sendix Base KIS40 / KIH40 (shaft / hollow shaft)

Push-pull / RS422 / Open collector

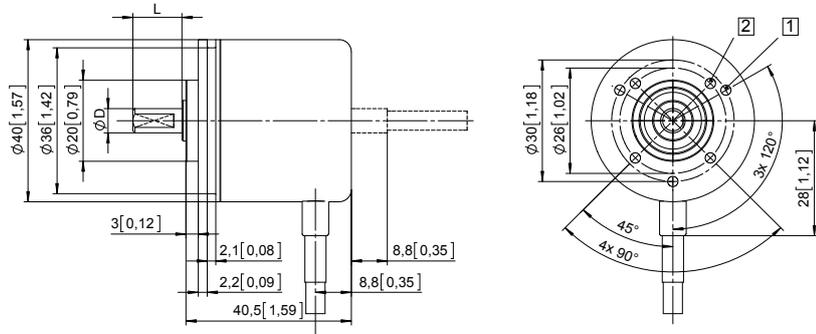
### Dimensions shaft version

Dimensions in mm [inch]

#### Clamping-synchro flange, $\varnothing$ 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]

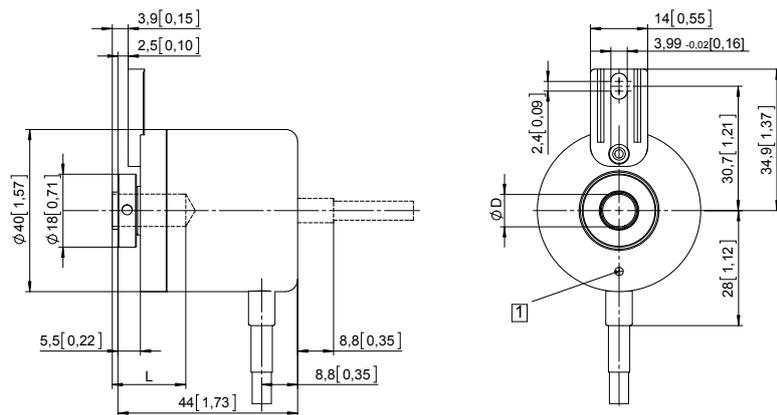
### Dimensions hollow shaft version

Dimensions in mm [inch]

#### Flange with spring element, long

##### Flange type 2

- 1 M2,5, 4 [0.16] deep

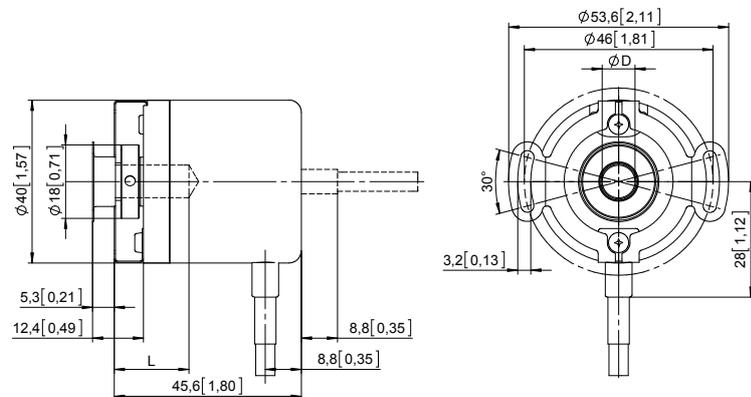


D	Fit	L
6 [0.24]	H7	18 [0.71]
8 [0.32]	H7	18 [0.71]
1/4"	H7	18 [0.71]

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

#### Flange with stator coupling, $\varnothing$ 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]