

Инкрементные энкодеры миниатюрные 2400, 2420, 2440, 2430, 3620, 3610, компактные Sendix Base KIS40, Sendix Base KIH40

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Incremental encoders

Compact optical

3610 / 3620 (shaft / hollow shaft)

Push-pull / RS422



The compact incremental encoders type 3610 / 3620 with optical sensor technology are available with a resolution of up to 2500 pulses per revolution.

The versions with hollow shaft are designed for diameters up to 8 mm.



High rotational speed



Temperature range



Shock / vibration resistant



Short-circuit proof



Reverse polarity protection



Magnetic field proof



Optical sensor

Compact

- Only 36 mm outer diameter.
- Through hollow shaft up to 8 mm.
- Ideally suited for use where space is tight.

Versatile

- Available with cable outlet or M12 connector.
- Maximum resolution of 2500 pulses per revolution.
- Supply voltage 5 ... 18 V DC or 8 ... 30 V DC.

Order code

Shaft version

8.3610

Type

. XXXXX . XXXX

a b c d e

a Flange

- 2 = synchro flange, $\varnothing$ 36.5 mm [1.44"]
3 = clamping flange, $\varnothing$ 36.5 mm [1.44"]
 8 = clamping / synchro flange, $\varnothing$ 36.8 mm [1.45"]

b Shaft ($\varnothing \times L$)

- 1 = $\varnothing$ 4 x 10 mm [0.16 x 0.39"]
 2 = $\varnothing$ 5 x 10 mm [0.20 x 0.39"]
3 = $\varnothing$ 6 x 12.5 mm [0.24 x 0.49"], with flat
 5 = $\varnothing$ 1/4" x 12.5 mm [1/4" x 0.49"], with flat

c Output circuit / supply voltage

- 2 = push-pull (with inverted signal) / 5 ... 18 V DC
4 = push-pull (with inverted signal) / 8 ... 30 V DC
 3 = push-pull (without inverted signal) / 8 ... 30 V DC
 6 = RS422 (with inverted signal) / 5 V DC
 5 = RS422 (with inverted signal) / 8 ... 30 V DC

d Type of connection

- 1 = axial cable, 2 m [5.56'] PVC
 A = axial cable, special length PVC *)
2 = radial cable, 2 m [5.56'] PVC
 B = radial cable, special length PVC *)
 3 = axial M12 connector, 8-pin
 4 = radial M12 connector, 8-pin
 *) 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.: 8.3610.334A.1024.0030 (for cable length 3 m)

e Pulse rate

- 10, 25, 100, **200**, 360, **500**, 512, 600, 1000,
1024, 1250, 1500, 2000, **2048**, **2500**
 (e.g. 500 pulses => 0500)

Optional on request

- other pulse rates

Stock types

- 8.3610.3332.1024**
8.3610.333B.1250.0100
8.3610.3342.0200
8.3610.3342.0360
8.3610.3342.1024

Incremental encoders

Compact optical	3610 / 3620 (shaft / hollow shaft)	Push-pull / RS422
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Order code	8.3620	.XXXXX.XXXX
Hollow shaft	Type	a b c d e
a Flange 1 = with spring element, short 2 = with spring element, long 5 = with stator coupling, ø 46 mm [1.81"] b Through hollow shaft 2 = ø 6 mm [0.24"] 4 = ø 8 mm [0.32"] 3 = ø 1/4" c Output circuit / supply voltage 2 = push-pull (with inverted signal) / 5 ... 18 V DC 4 = push-pull (with inverted signal) / 8 ... 30 V DC 3 = push-pull (without inverted signal) / 8 ... 30 V DC 6 = RS422 (with inverted signal) / 5 V DC 5 = RS422 (with inverted signal) / 8 ... 30 V DC d Type of connection E = radial cable, 2 m [5.56'] PVC B = radial cable, special length PVC *) 4 = radial M12 connector, 8-pin *) Available special lengths (connection type 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.: 8.3620.224B.1024.0030 (for cable length 3 m) e Pulse rate 10, 25, 100, 200, 360, 500, 512, 600, 1000, 1024, 1250, 1500, 2000, 2048, 2500 (e.g. 500 pulses => 0500) <i>Optional on request</i> - other pulse rates		

Mounting accessory for shaft encoders		Order no.
Coupling	bellows coupling ø 15 mm [0.59"] for shaft 6 mm [0.24"]	8.0000.1202.0606
Connection technology		Order no.
Cordset, pre-assembled	M12 female connector with coupling nut, 8-pin, A coded, straight single-ended 2 m [6.56'] PVC cable	05.00.6041.8211.002M
Connector, self-assembly	M12 female connector with coupling nut, 8-pin, A coded, straight (metal)	05.CMB 8181-0

Incremental encoders

Compact optical	3610 / 3620 (shaft / hollow shaft)	Push-pull / RS422
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Technical data

Mechanical characteristics			Electrical characteristics			
Maximum speed	shaft version hollow shaft version	12000 min ⁻¹ 6000 min ⁻¹	Output circuit	RS422	Push-pull ¹⁾ (7272 comp.)	Push-pull ¹⁾ (7272 comp.)
Mass moment of inertia		approx. 0.2 x 10 ⁻⁶ kgm ²	Supply voltage	5 V DC (±5 %) or 8 ... 30 V DC	5 ... 18 V DC	8 ... 30 V DC
Starting torque - at 20 °C [68 °F]		< 0.05 Nm	Power consumption with inverted signal (no load)	typ. 40 mA / max. 90 mA	max. 40 mA	max. 40 mA
Shaft load capacity	radial axial	40 N 20 N	Permissible load / channel	max. +/- 20 mA	max. +/- 20 mA	max. +/- 20 mA
Weight		approx. 0.08 kg [2.82 oz]	Pulse frequency	max. 300 kHz	max. 200 kHz	max. 200 kHz
Protection acc. to EN 60529	housing side flange side	IP65 IP50 (IP64 on request)	Signal level	HIGH LOW	min. 2.5 V max. 0.5 V	min. +V - 2.5 V max. 0.5 V
Working temperature range		-20 °C ... +85 °C [-4 °F ... +185 °F]	Rising edge time t_r	max. 200 ns	max. 1 µs	max. 1 µs
Materials	shaft hollow shaft housing cable	stainless steel brass aluminum PVC	Falling edge time t_f	max. 200 ns	max. 1 µs	max. 1 µs
Shock resistance acc. to EN 60068-2-27		1000 m/s ² , 6 ms	Short circuit proof outputs ²⁾	yes	yes	yes
Vibration resistance acc. to EN 60068-2-6		100 m/s ² , 55 ... 2000 Hz	Reverse polarity protection of the supply voltage	yes	yes	yes

Approvals

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

Terminal assignment

Output circuit	Type of connection	Cable (isolate unused cores individually before initial start-up)									
2, 4, 5, 6 with inv. signal	1, 2, A, B, E	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)									
3 without inv. signal	1, 2, A, B, E	Signal:	0 V	+V	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	
		Core color:	WH	BN	GN	-	YE	-	GY	-	
Output circuit	Type of connection	M12 connector, 8-pin									
2, 4, 5, 6 with inv. signal	3, 4	Signal:	0 V	+V	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	
		Pin:	1	2	3	4	5	6	7	8	
Output circuit	Type of connection	M12 connector, 8-pin									
3 without inv. signal	3, 4	Signal:	0 V	+V	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	
		Pin:	1	2	3	-	5	-	7	-	

+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

Top view of mating side, male contact base



M12 connector, 8-pin

1) Max. recommended cable length 30 m [98.43'].

2) If supply voltage correctly applied.

Incremental encoders

Compact optical	3610 / 3620 (shaft / hollow shaft)	Push-pull / RS422
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Dimensions shaft version

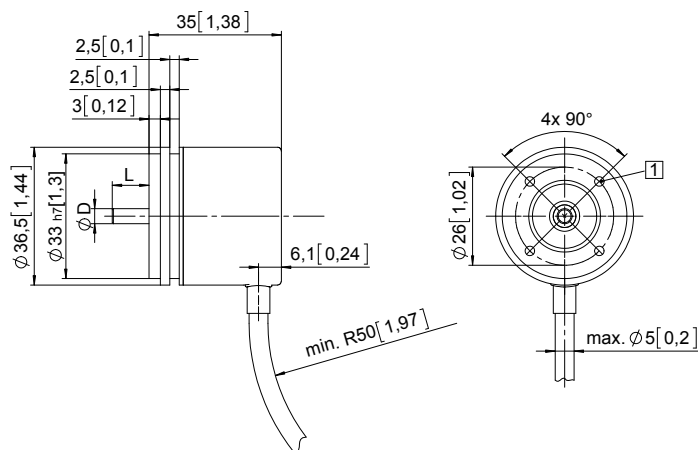
Dimensions in mm [inch]

Synchro flange, ø 36.5 [1.44]

Flange type 2

- 1 4 x M3, 5 [0.20] deep

D	Fit	L
4 [0.16]	f7	10 [0.39]
5 [0.20]	f7	10 [0.39]
6 [0.24]	f7	12.5 [0.49]
1/4"	f7	12.5 [0.49]

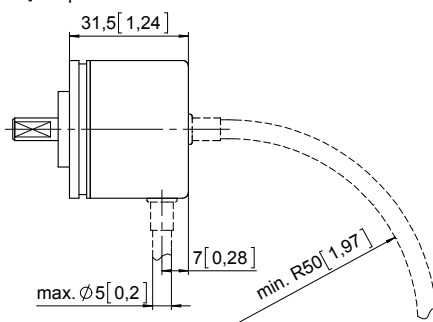


Clamping / synchro flange, ø 36.5 [1.44]

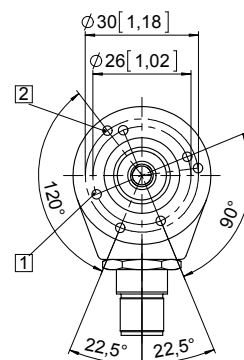
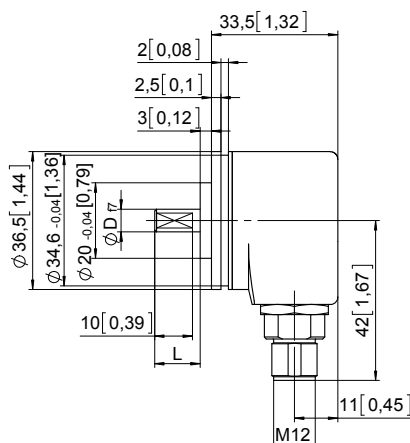
Flange type 3

- 1 4 x M3, 5 [0.20] deep

- 2 3 x M3, 5 [0.20] deep



D	Fit	L
4 [0.16]	f7	10 [0.39]
5 [0.20]	f7	10 [0.39]
6 [0.24]	f7	12.5 [0.49]
1/4"	f7	12.5 [0.49]

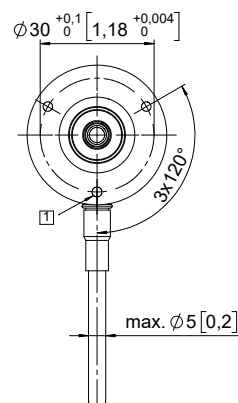
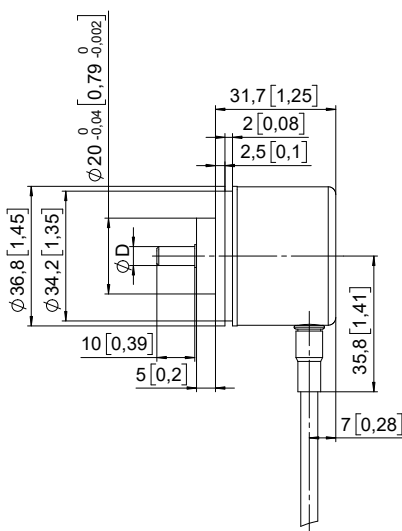


Clamping/ synchro flange, ø 36.8 [1.45]

Flange type 8

- 1 3 x M3, 6 [0.24] deep

D	Fit	L
4 [0.16]	f7	10 [0.39]
5 [0.20]	f7	10 [0.39]
6 [0.24]	f7	12.5 [0.49]
1/4"	f7	12.5 [0.49]



Incremental encoders

Compact optical

3610 / 3620 (shaft / hollow shaft)

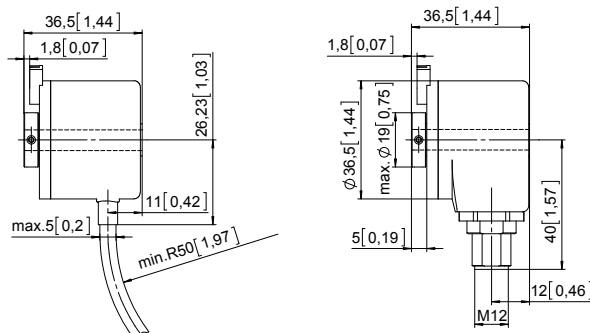
Push-pull / RS422

Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with spring element, short Flange type 1

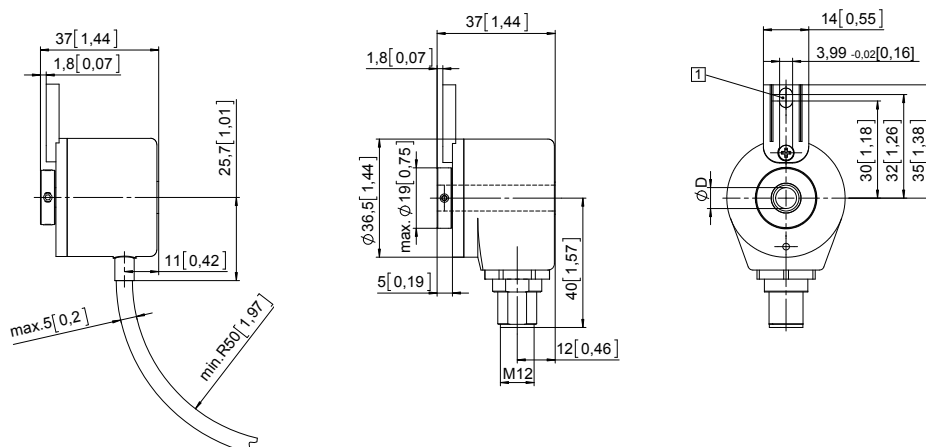
- 1 Slot spring element,
recommendation:
torque pin DIN 7, $\varnothing$ 4 [0.16]



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

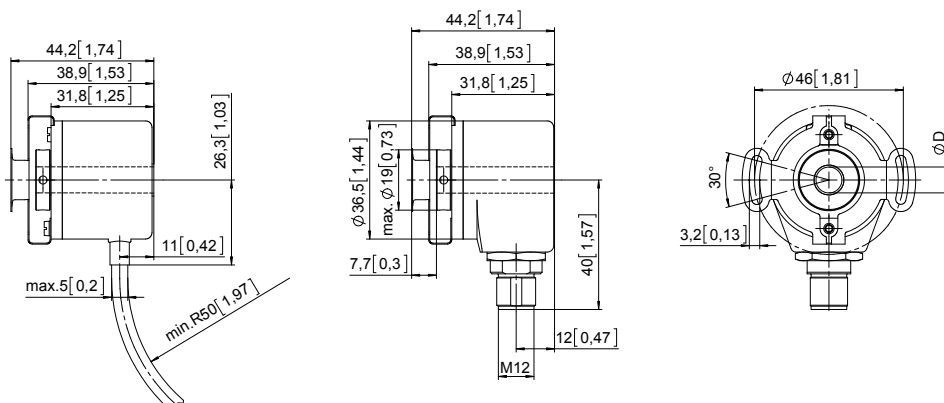
Flange with spring element, long Flange type 2

- 1 Slot spring element,
recommendation:
torque pin DIN 7, $\varnothing$ 4 [0.16]



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

Flange with stator coupling, $\varnothing$ 46 [1.81] Flange type 5



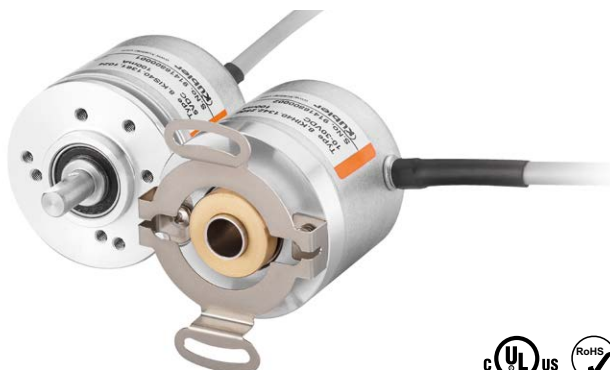
D	Fit
6 [0.24]	H7
8 [0.32]	H7
1/4"	H7

Incremental encoders

Compact optical

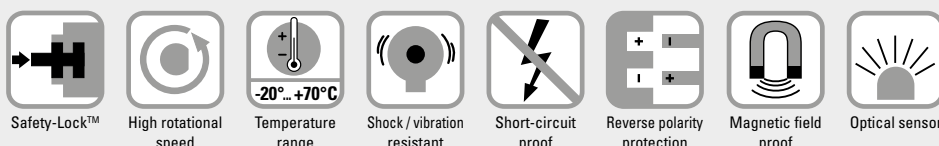
Sendix Base KIS40 / KIH40 (shaft / hollow shaft)

Push-pull / RS422 / Open collector



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.



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.

Order code
Shaft version

8.KIS40 . 1XXX . XXXX . P03¹⁾
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

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

e.g.: 8.KIS40.134A.1024. (P03.) 0050 (for cable length 5 m)

e Pulse rate

10, 25, 50, 60, 100, 120, 150, 200, 250, **360**, 400, **500**, 512, 600, **1000**, **1024**, 1500, 1800, **2000**, **2048**, **2500**, 2560
(e.g. 500 pulses => 0500)

f Special signal format

P03 = see page 4

Optional on request

- other pulse rates

Stock types

8.KIS40.1342.0500

8.KIS40.1342.1000

8.KIS40.1342.1024

8.KIS40.1342.2000

8.KIS40.1342.2048

8.KIS40.1342.2500

8.KIS40.1362.0500

8.KIS40.1362.1024

8.KIS40.1362.2048

8.KIS40.1362.2500

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

Incremental encoders

Compact optical	Sendix Base KIS40 / KIH40 (shaft / hollow shaft)	Push-pull / RS422 / Open collector
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Order code	8.KIH40	.XXXXX	.XXXX	.P03¹⁾
Hollow shaft	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, 100, 120, 150, 200, 250, 360, 400, 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 Stock types 8.KIH40.2442.1024 8.KIH40.5442.0360 8.KIH40.5442.0500 8.KIH40.5442.1024 8.KIH40.5442.2048 8.KIH40.5462.1024				

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

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

Incremental encoders

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

Electrical characteristics			
Output circuit	RS422 (TTL comp.)	Push-pull ¹⁾ (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 ²⁾	yes ³⁾	yes	yes
Reverse polarity protection of the supply voltage	no/yes	yes	yes

Mechanical characteristics		
Maximum speed		4500 min ⁻¹
Mass moment of inertia		approx. 0.2 x 10 ⁻⁶ kgm ²
Starting torque – at 20 °C [68 °F]		< 0.05 Nm
Shaft load capacity	radial axial	40 N 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 flange housing cable	stainless steel aluminum aluminum PVC
Shock resistance acc. to EN 60068-2-27		1000 m/s ² , 6 ms
Vibration resistance acc. to EN 60068-2-6		100 m/s ² , 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
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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	–	

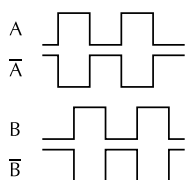
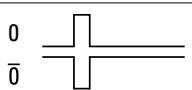
Output circuit	Type of connection	M12 connector, 8-pin										
3, 4, 6, A, B, C with inv. signal	6	Signal:	0 V	+V	A	$\bar{A}$	B	$\bar{B}$	0	$\bar{0}$	$\perp$	
		Pin:	1	2	3	4	5	6	7	8	PH ¹⁾	

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 ¹⁾	

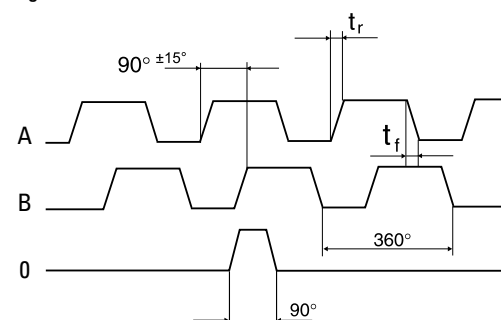
+V: Supply voltage encoder +V DC
 0 V: Supply voltage encoder ground GND (0 V)
 A, $\bar{A}$: Incremental output channel A
 B, $\bar{B}$: Incremental output channel B
 0, $\bar{0}$: Reference signal

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.

A leads 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	1	
standard	0 gated with A & B. This is the Kübler standard. 0 is 90° wide.	
P03	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

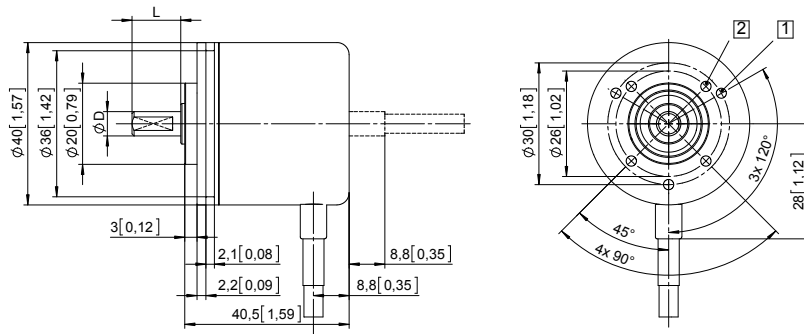
Dimensions shaft version

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]

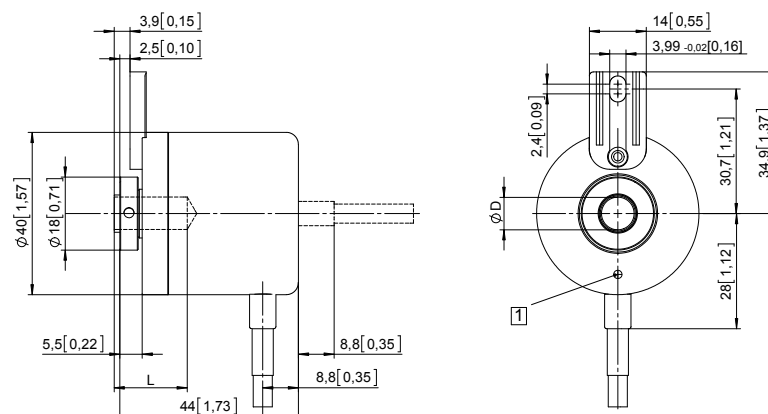
Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with spring element, long

Flange type 2

- 1 M2,5, 4 [0.16] deep

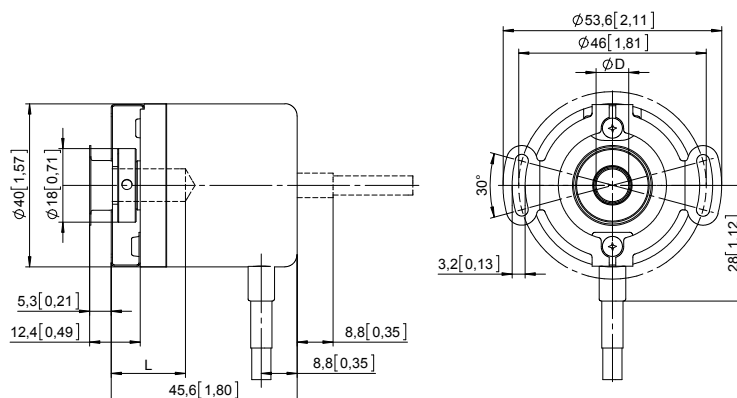


D	Fit	L
6 [0.24]	H7	18 [0.71]
8 [0.32]	H7	18 [0.71]
1/4"	H7	18 [0.71]

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]

Incremental encoders

Miniature optical

2400 / 2420 (shaft / hollow shaft)

Push-pull, RS422



The incremental miniature encoders type 2400 / 2420 with their optical sensor technology offer a resolution of up to 1024 pulses per revolution.

With a diameter of just 24 mm this encoder is ideal for use where space is tight.



High rotational speed



Temperature range
-20° ... +85°C



Shock / vibration resistant



Short-circuit proof



Magnetic field proof



Optical sensor

Reliable

- Robust bearing construction.
- Cable outlet boasts high degree of strain relief thanks to multiple clamping.
- Short-circuit proof outputs.

Versatile

- Ideally suited for use in small devices.

Order code Shaft version

05.2400 . XXXX . XXXX
Type a b c d e

a Flange

- 1 = $\varnothing$ 24 mm [0.94"]
3 = $\varnothing$ 28 mm [1.10"]
2 = $\varnothing$ 30 mm [1.18"]

b Shaft ($\varnothing \times L$)

- 1 = $\varnothing$ 4 x 10 mm [0.16 x 0.39"]
3 = $\varnothing$ 5 x 10 mm [0.20 x 0.39"], with flat
2 = $\varnothing$ 6 x 10 mm [0.24 x 0.39"]

4 = $\varnothing$ 1/4" x 10 mm [1/4" x 0.39"], with flat ¹⁾
6 = $\varnothing$ 6 x 10 mm [0.24 x 0.39"], with flat ¹⁾

c Output circuit / supply voltage

- 1 = push-pull (without inverted signal) / 5 ... 24 V DC
2 = push-pull (with inverted signal) / 5 ... 24 V DC
3 = push-pull (without inverted signal) / 8 ... 30 V DC
4 = push-pull (with inverted signal) / 8 ... 30 V DC
6 = RS422 (with inverted signal) / 5 V DC

d Type of connection

- 1 = axial cable, 2 m [6.56'] PVC
A = axial cable, special length PVC *)
2 = radial cable, 2 m [6.56'] 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.: 05.2400.122A.1024.0030 (for cable length 3 m)

e Pulse rate

- 4, 6, 8, 10, 16, 20, 25, 36, 40, 50, 60,
80, 100, 120, 125, 180, 200, 250, 300,
360, 400, 500, 512, 1000, 1024
(e.g. 360 pulses => 0360)

Optional on request
- other pulse rates

Stock types

- 05.2400.1112.0500
05.2400.1122.0100
05.2400.1122.0360
05.2400.1122.0500
05.2400.1122.1000
05.2400.1122.1024
05.2400.1212.1000
05.2400.1222.0500
05.2400.1222.1024
05.2400.123B.0050.0050

1) US version.

Incremental encoders

Miniature optical	2400 / 2420 (shaft / hollow shaft)	Push-pull, RS422
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Order code Hollow shaft	05.2420 Type	1XXXX a b c d e	XXXX e
a Flange 1 = ø 24 mm [0.94"] b Blind hollow shaft <i>(insertion depth max. 14 mm [0.55"])</i> 1 = ø 4 mm [0.16"] 2 = ø 6 mm [0.24"] 4 = ø 1/4" ¹⁾ c Output circuit / supply voltage 1 = push-pull (without inverted signal) / 5 ... 24 V DC 2 = push-pull (with inverted signal) / 5 ... 24 V DC 3 = push-pull (without inverted signal) / 8 ... 30 V DC 4 = push-pull (with inverted signal) / 8 ... 30 V DC 6 = RS422 (with inverted signal) / 5 V DC d Type of connection 1 = axial cable, 2 m [6.56'] PVC A = axial cable, special length PVC *) 2 = radial cable, 2 m [6.56'] 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.: 05.2420.122A.1024.0030 (for cable length 3 m) e Pulse rate 4, 6, 8, 10, 16, 20, 25, 36, 40, 50, 60, 80, 100, 120, 125, 180, 200, 250, 300, 360, 400, 500, 512, 1000, 1024 (e.g. 360 pulses => 0360) <i>Optional on request</i> - other pulse rates Stock types 05.2420.1222.0500 05.2420.1222.1000 05.2420.1222.1024			

Mounting accessory for shaft encoders	Order no.
Coupling	bellows coupling ø 15 mm [0.59"] for shaft 4 mm [0.16"]
	8.0000.1202.0404

1) US version.

Incremental encoders

Miniature optical	2400 / 2420 (shaft / hollow shaft)	Push-pull, RS422
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Technical data

Mechanical characteristics		Approvals	
Maximum speed	12000 min ⁻¹	UL compliant in accordance with	File no. E224618
Mass moment of inertia	approx. 0.1 x 10 ⁻⁶ kgm ²	CE compliant in accordance with	
Starting torque – at 20 °C [68 °F]	< 0.01 Nm ³⁾	EMC Directive	2014/30/EU
Shaft load capacity	radial 20 N axial 10 N	RoHS Directive	2011/65/EU
Weight	approx. 0.06 kg [2.12 oz]		
Protection acc. to EN 60529	housing side IP65 flange side IP50 (IP64 on request)		
Working temperature range	-20 °C ... +85 °C [-4 °F ... +185 °F]		
Materials	shaft stainless steel blind hollow shaft brass		
Shock resistance acc. to EN 60068-2-27	1000 m/s ² , 6 ms		
Vibration resistance acc. to EN 60068-2-6	100 m/s ² , 55 ... 2000 Hz		

Electrical characteristics			
Output circuit	Push-pull ¹⁾ (7272 compatible)	Push-pull ¹⁾ (7272 compatible)	RS422 (TTL compatible)
Supply voltage	5 ... 24 V DC ²⁾	8 ... 30 V DC	5 V DC (±5 %)
Power consumption (no load)	max. 50 mA	max. 50 mA	max. 90 mA
Permissible load / channel	max. +/- 50 mA	max. +/- 50 mA	max. +/- 20 mA
Pulse frequency	max. 160 kHz	max. 160 kHz	max. 300 kHz
Signal level	HIGH min. +V - 2.5 V LOW max. 0.5 V	min. +V - 3.0 V max. 0.5 V	min. 2.5 V max. 0.5 V
Rising edge time t_r	max. 1 µs	max. 1 µs	max. 200 ns
Falling edge time t_f	max. 1 µs	max. 1 µs	max. 200 ns
Short circuit proof outputs	yes	yes	yes

Terminal assignment

Output circuit	Type of connection	Cable (isolate unused cores individually before initial start-up)						
1, 3 without inv. signal	1, 2, A, B	Signal:	0 V	+V	A	B	0	
		Core color:	WH	BN	GN	YE	GY	

Output circuit	Type of connection	Cable (isolate unused cores individually before initial start-up)								
2, 4, 6 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

+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

1) Max. recommended cable length 30 m [98.4'].
 2) With 24 V DC there is no tolerance above 24 V DC. Please use output circuit 8 ... 30 V DC.
 3) Also for protection level IP64 on the shaft.

Incremental encoders

Miniature optical	2400 / 2420 (shaft / hollow shaft)	Push-pull, RS422
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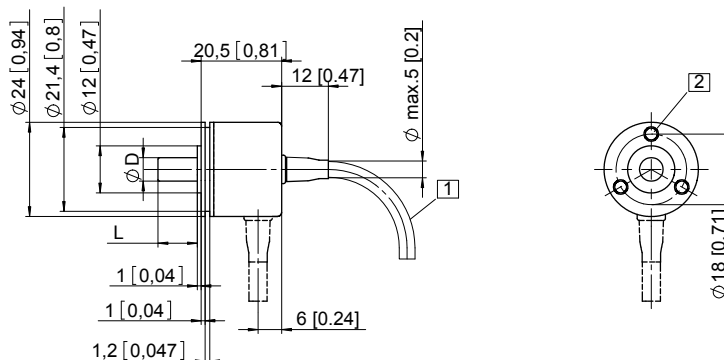
Dimensions shaft version

Dimensions in mm [inch]

Flange type 1, $\varnothing$ 24 [0.94]

- 1 min R50 [1.97]
- 2 3 x M3, 4 [0.16] deep

D	Fit	L
4 [0.16]	f7	10 [0.39]
5 [0.20]	f7	10 [0.39]
6 [0.24]	f7	10 [0.39]
1/4"	f7	10 [0.39]

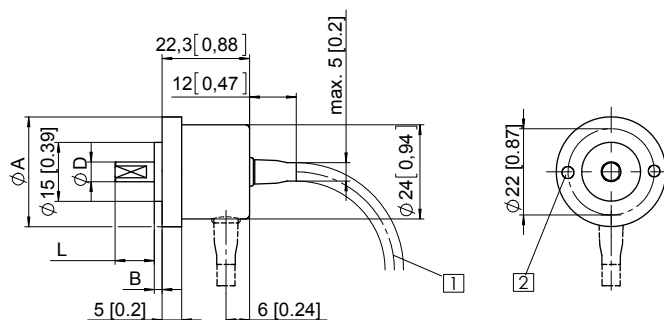


Flange type 2, $\varnothing$ 30 [1.18]

Flange type 3, $\varnothing$ 28 [1.10]

- 1 min R50 [1.97]
- 2 2 x M3, 4 [0.16] deep

D	Fit	L
4 [0.16]	f7	10 [0.39]
5 [0.20]	f7	10 [0.39]
6 [0.24]	f7	10 [0.39]
1/4"	f7	10 [0.39]



Flange type	A	B
2	$\varnothing$ 30 [1.18]	3 [0.12]
3	$\varnothing$ 28 [1.10]	2 [0.08]

Dimensions hollow shaft version

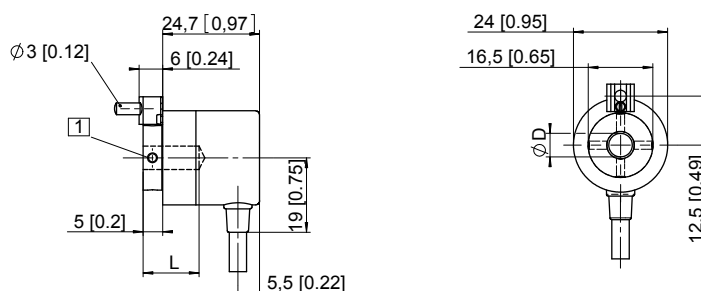
Dimensions in mm [inch]

Flange type 1, $\varnothing$ 24 [0.94]

- 1 4 x M3 DIN 915 - SW1.5
- Recommended torque for the set screw in the clamping ring 0.1 Nm.
To ensure optimal clamping by the clamping ring, the customer shaft should be without flat surface.

D	Fit	L
4 [0.16]	H7	14 [0.55]
6 [0.24]	H7	14 [0.55]
1/4"	H7	14 [0.55]

L = insertion depth max. blind hollow shaft



Incremental encoders

Miniature magnetic

2430 / 2440 (shaft / hollow shaft)

RS422

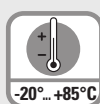


Thanks to their non-contact magnetic scanning technology the miniature-format encoders 2430 and 2440 guarantee exceptional ruggedness – and this with a resolution of up to 256 pulses per revolution.

As a result of their compact outer diameter of only 24 mm, they are ideal for use where installation space is restricted.



High rotational speed



Temperature range
-20°...+85°C



Shock / vibration resistant



Short-circuit proof



Reverse polarity protection



Magnetic sensor technology

Magnetically robust

- The non-contact magnetic technology prevents wear and guarantees a long service life.
- Multiple clamping affords high strain relief to the cable outlet, ensuring longer life.
- Wide temperature range from -20 °C up to +85 °C.
- Flexible connection possibilities: can be supplied with radial or axial cable outlet.

Compact power

- Resolution up to 256 pulses per revolution.
- Shaft and hollow shaft version.

Order code Shaft version

8.2430

Type

. X X 6 X . XXXX

a Flange

- 1 = ø 24 mm [0.94"]
- 3 = ø 28 mm [1.10"]
- 2 = ø 30 mm [1.18"]

b Shaft (ø x L)

- 1 = ø 4 x 10 mm [0.16 x 0.39"]
- 3 = ø 5 x 10 mm [0.20 x 0.39"], with flat
- 2 = ø 6 x 10 mm [0.24 x 0.39"]

c Output circuit / supply voltage

- 6 = RS422 (with inverted signal) / 5 V DC

d Type of connection

- 1 = axial cable, 2 m [5.56'] PVC
- A = axial cable, special length PVC *)
- 2 = radial cable, 2 m [5.56'] 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.: 8.2430.126A.0256.0030 (for cable length 3 m)

e Pulse rate

- 1 ... 128 (factory programmable)
- 256
- (e.g. 128 pulses => 0128)

Optional on request
- other pulse rates

Order code Hollow shaft

8.2440

Type

. 1 X 6 X . XXXX

a Flange

- 1 = ø 24 mm [0.94"]

b Blind hollow shaft

- (insertion depth max. 14 mm [0.55"])
- 1 = ø 4 mm [0.16"]
- 2 = ø 6 mm [0.24"]

c Output circuit / supply voltage

- 6 = RS422 (with inverted signal) / 5 V DC

d Type of connection

- 1 = axial cable, 2 m [5.56'] PVC
- A = axial cable, special length PVC *)
- 2 = radial cable, 2 m [5.56'] 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.: 8.2440.126A.0256.0030 (for cable length 3 m)

e Pulse rate

- 1 ... 128 (factory programmable)
- 256
- (e.g. 128 pulses => 0128)

Optional on request
- other pulse rates

Incremental encoders

Miniature magnetic	2430 / 2440 (shaft / hollow shaft)	RS422
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Mounting accessory for shaft encoders	Order no.
Coupling	bellows coupling ø 15 mm [0.59"] for shaft 4 mm [0.16"]
	8.0000.1202.0404

Technical data

Mechanical characteristics		Electrical characteristics	
Maximum speed	12000 min ⁻¹	Output circuit	RS422 (TTL compatible)
Mass moment of inertia	approx. 0.1 x 10 ⁻⁶ kgm ²	Supply voltage	5 V DC (±5 %)
Starting torque - at 20 °C [68 °F]	< 0.01 Nm	Power consumption with inverted signal (no load)	typ. 40 mA max. 90 mA
Shaft load capacity	radial 20 N axial 10 N	Permissible load / channel	max. +/- 20 mA
Weight	approx. 0.06 kg [2.11 oz]	Pulse frequency	max. 300 kHz
Protection acc. to EN 60529	housing side IP65 flange side IP50 (IP64 on request)	Signal level	HIGH min. 2.5 V LOW max. 0.5 V
Working temperature range	-20 °C ... +85 °C [-4 °F ... +185 °F]	Rising edge time t_r	max. 200 ns
Materials	shaft / hollow shaft stainless steel clamping flange MS58	Falling edge time t_f	max. 200 ns
Shock resistance acc. to EN 60068-2-27	1000 m/s ² , 6 ms	Min. pulse edge interval	0.5 µs ¹⁾
Vibration resistance acc. to EN 60068-2-6	100 m/s ² , 55 ... 2000 Hz	Short circuit proof outputs²⁾	yes ³⁾
		Reverse polarity protection of the supply voltage	no

Approvals	
UKCA compliant in accordance with	
EMC Regulations	S.I. 2016/1091
RoHS Regulations	S.I. 2012/3032

Terminal assignment

Output circuit	Type of connection	Cable (isolate unused cores individually before initial start-up)									
6 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	

+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

1) For max. speed use a counter with input frequency of min. 500 kHz.
 2) If supply voltage correctly applied.
 3) Only one channel allowed to be shorted-out:
 If +V = 5 V DC short circuit to channel, 0 V, or +V is permitted.

Incremental encoders

Miniature magnetic

(shaft / hollow shaft)

RS422

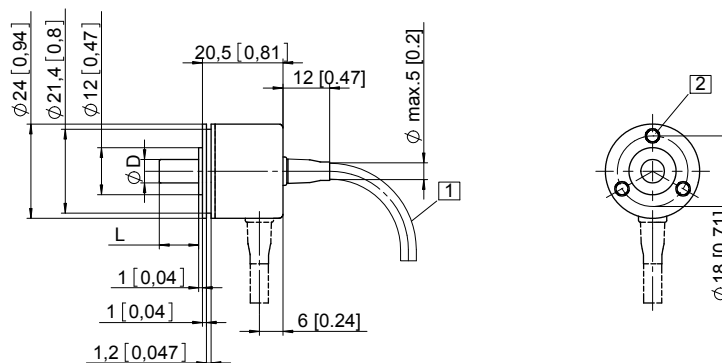
Dimensions shaft version

Dimensions in mm [inch]

Flange type 1, $\varnothing$ 24 [0.94]

- 1 min R50 [1.97]
- 2 3 x M3, 4 [0.16] deep

D	Fit	L
4 [0.16]	f7	10 [0.39]
5 [0.20]	f7	10 [0.39]
6 [0.24]	f7	10 [0.39]

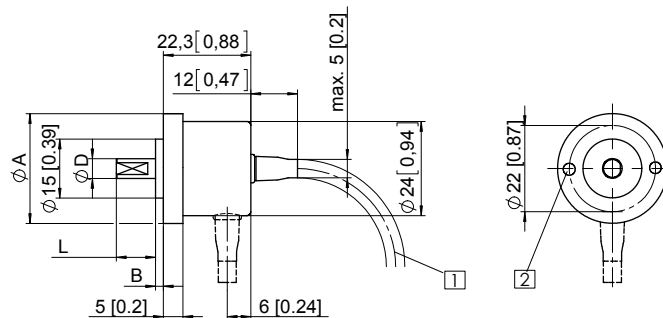


Flange type 2, $\varnothing$ 30 [1.18]

Flange type 3, $\varnothing$ 28 [1.10]

- 1 min R50 [1.97]
- 2 2 x M3, 4 [0.16] deep

D	Fit	L
4 [0.16]	f7	10 [0.39]
5 [0.20]	f7	10 [0.39]
6 [0.24]	f7	10 [0.39]



Flange type	A	B
2	$\varnothing$ 30 [1.18]	3 [0.12]
3	$\varnothing$ 28 [1.10]	2 [0.08]

Dimensions hollow shaft version

Dimensions in mm [inch]

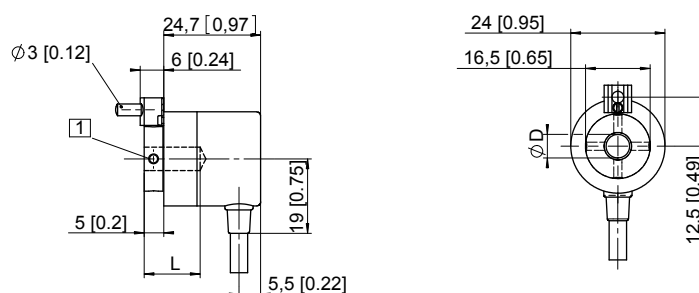
Flange type 1, $\varnothing$ 24 [0.94]

- 1 4 x M3 DIN 915 - SW1.5

Recommended torque for the set screw in the clamping ring 0.1 Nm.
To ensure optimal clamping by the clamping ring, the customer shaft should be without flat surface.

D	Fit	L
4 [0.16]	H7	14 [0.55]
6 [0.24]	H7	14 [0.55]
1/4"	H7	14 [0.55]

L = insertion depth max. blind hollow shaft





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Сыктывкар (8212)25-95-17
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Тверь (4822)63-31-35

Тольятти (8482)63-91-07
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Тула (4872)33-79-87
Тюмень (3452)66-21-18
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