

Incremental encoders

Miniature optical

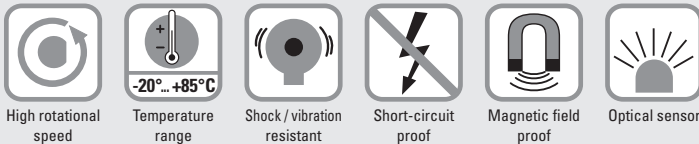
2400 / 2420 (shaft / hollow shaft)

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.



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**

If for each parameter of an encoder the underlined preferred option is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.



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"]
- 4 = ø 1/4" x 10 mm [1/4" x 0.39"], with flat ¹⁾
- 6 = ø 6 x 10 mm [0.24 x 0.39"], with flat ¹⁾

c Output circuit / power supply

- 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)

Stock types

- 05.2400.1122.0050
- 05.2400.1122.0360
- 05.2400.1122.0500
- 05.2400.1122.1000
- 05.2400.1122.1024

Optional on request
- other pulse rates

1) US version.

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Order code Hollow shaft	05.2420 Type	. 1 X X X . XXXX a b c d e	<p>If for each parameter of an encoder the <u>underlined preferred option</u> is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.</p>
<p>a Flange <u>1 = \varnothing 24 mm [0.94"]</u></p> <p>b Blind hollow shaft (insertion depth max. 14 mm [0.55"]) <u>1 = \varnothing 4 mm [0.16"]</u> 2 = \varnothing 6 mm [0.24"]</p> <p>4 = \varnothing 1/4" ¹⁾</p>	<p>c Output circuit / power supply 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 <u>4 = push-pull (with inverted signal) / 8 ... 30 V DC</u> 6 = RS422 (with inverted signal) / 5 V DC</p> <p>d Type of connection <u>1 = axial cable, 2 m [6.56'] PVC</u> A = axial cable, special length PVC *) 2 = radial cable, 2 m [6.56'] PVC B = radial cable, special length PVC *)</p> <p>*) 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)</p>	<p>e Pulse rate 4, 6, 8, 10, 16, 20, 25, 36, 40, 50, 60, 80, <u>100</u>, 120, 125, 180, 200, 250, 300, <u>360</u>, 400, 500, <u>512</u>, <u>1000</u>, <u>1024</u> (e.g. 360 pulses => 0360)</p> <p><i>Stock types</i> 05.2420.1212.0500 05.2420.1222.0500 05.2420.1222.1000 05.2420.1222.1024</p> <p><i>Optional on request</i> - other pulse rates</p>	

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

Further accessories can be found in the accessories section or in the accessories area of our website at: www.kuebler.com/accessories.
Additional connectors can be found in the connection technology section or in the connection technology area of our website at: www.kuebler.com/connection_technology.

Technical data

Mechanical characteristics		Protection acc. to EN 60529	
Maximum speed	12000 min ⁻¹	housing side	IP65
Mass moment of inertia	approx. 0.1 x 10 ⁻⁶ kgm ²	flange side	IP50 (IP64 on request)
Starting torque – at 20°C [68°F]	< 0.01 Nm ⁴⁾	Working temperature range	-20°C ... +85°C [-4°F ... +185°F]
Shaft load capacity	radial 10 N	Materials	shaft stainless steel
	axial 20 N		blind hollow shaft brass
Weight	approx. 0.06 kg [2.12 oz]	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 ²⁾ (7272 compatible)	Push-pull ²⁾ (7272 compatible)	RS422 (TTL compatible)
Power supply	5 ... 24 V DC ³⁾	8 ... 30 V DC	5 V DC (\pm 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 μ s	max. 1 μ s	max. 200 ns
Falling edge time t _f	max. 1 μ s	max. 1 μ s	max. 200 ns
Short circuit proof outputs	yes	yes	yes
UL approval	file no. E224618		
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU		

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

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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: Encoder power supply +V DC
 0 V: Encoder power supply ground GND (0 V)
 A, \bar{A} : Incremental output channel A
 B, \bar{B} : Incremental output channel B
 0, $\bar{0}$: Reference signal

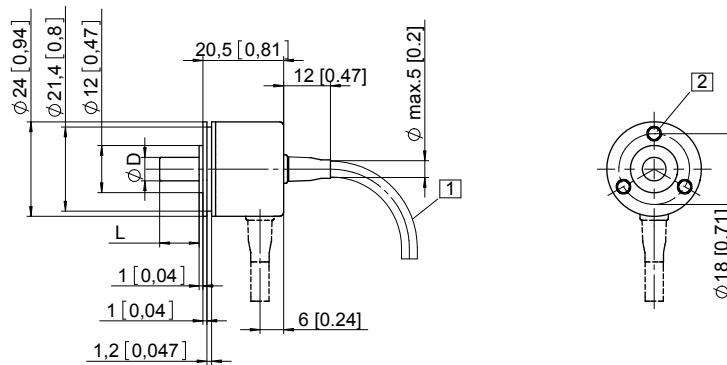
Dimensions shaft version

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]

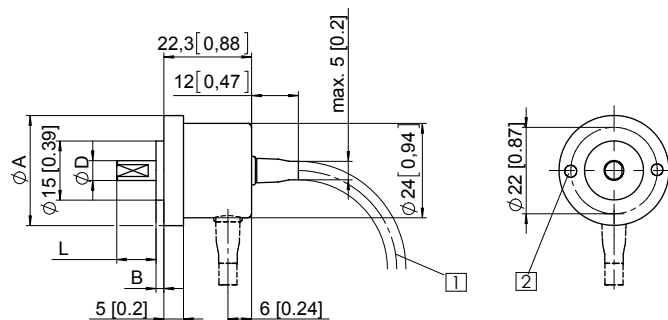


Flange type 2, \varnothing 30 [1.18]

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

