

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 . XXXXX . 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

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Order code Hollow shaft	05.2420 Type	1 a	X b	X c	X d	XXXX e	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. 10 by 10
a Flange 1 = ø 24 mm [0.94"]		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		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)			
b Blind hollow shaft (insertion depth max. 14 mm [0.55"]) 1 = ø 4 mm [0.16"] 2 = ø 6 mm [0.24"]		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 *)		Stock types 05.2420.1212.0500 05.2420.1222.0500 05.2420.1222.1000 05.2420.1222.1024			
4 = ø 1/4" ¹⁾		*) 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)		Optional on request - other pulse rates			

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

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	
Maximum speed	12000 min ⁻¹
Mass moment of inertia	approx. 0.1 x 10 ⁻⁶ kgm ²
Starting torque – at 20°C [68°F]	< 0.01 Nm ⁴⁾
Shaft load capacity	radial 10 N axial 20 N
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 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 (±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
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
		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

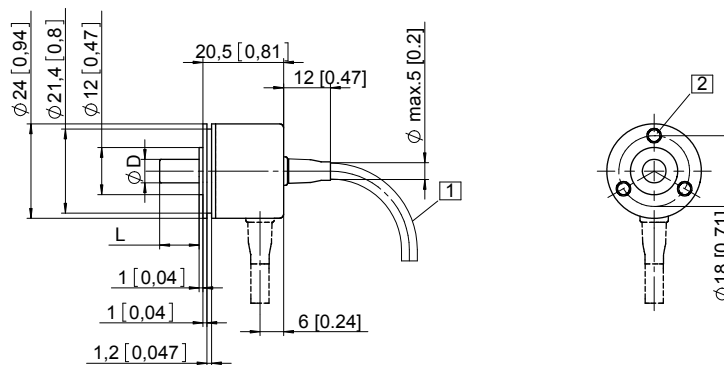
Dimensions shaft version

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]

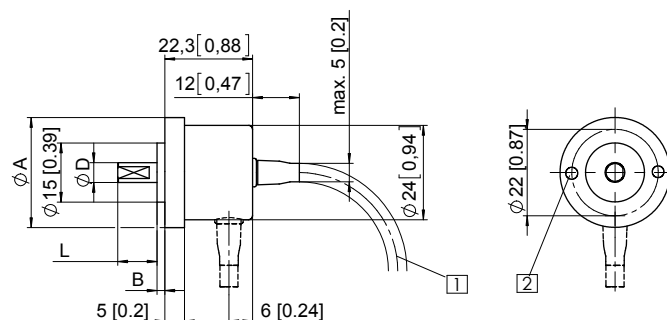


Flange type 2, $\varnothing$ 30 [1.18]

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

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

