

**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.













Magnetic field

### 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**



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.  ${\tt Qts.}$  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"]

 $2 = \emptyset 30 \text{ mm} [1.18"]$ 

### **b** Shaft (ø x L)

 $1 = \emptyset 4 \times 10 \text{ mm} [0.16 \times 0.39"]$ 

 $3 = \emptyset 5 \times 10 \text{ mm} [0.20 \times 0.39]$ , with flat

 $2 = \emptyset 6 \times 10 \text{ mm} [0.24 \times 0.39"]$ 

 $4 = \emptyset 1/4$ " x 10 mm [1/4" x 0.39"], with flat 1)  $6 = \emptyset 6 \times 10 \text{ mm} [0.24 \times 0.39^{\circ}], \text{ with flat}^{1)}$ 

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

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)

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



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

Order code U5.2420 . 1 X X X . XXX Hollow shaft Type 0 0 0 0

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"]

**b** Blind hollow shaft (insertion depth max. 14 mm [0.55"])

1 = ø 4 mm [0.16"]

2 = Ø 6 mm [0.24"] 4 = Ø 1/4" 1) 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)

Pulse rate

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

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 Kübler accessories can be found at: kuebler.com/accessories Further Kübler cables and connectors can be found at: kuebler.com/connection-technology



Miniature optical

2400 / 2420 (shaft / hollow shaft)

Push-pull, RS422

### Technical data

Mechanical characteristics	
Maximum speed	12000 min <sup>-1</sup>
Mass moment of inertia	approx. 0.1 x 10 <sup>-6</sup> kgm²
Starting torque – at 20 °C [68 °F]	< 0.01 Nm <sup>3)</sup>
Shaft load capacity radia axia	. =
Weight	approx. 0.06 kg [2.12 oz]
Protection acc. to EN 60529	
housing side	e IP65
flange side	e IP50 (IP64 on request)
Working temperature range	-20 °C +85 °C [-4 °F +185 °F]
Materials shaf	t stainless steel
blind hollow shaf	t brass
Shock resistance acc. to EN 60068-2-2	7 1000 m/s², 6 ms
Vibration resistance acc. to EN 60068-2-	6 100 m/s², 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				

Electrical characteristics						
Output circuit		Push-pull <sup>1)</sup> (7272 compatible)		Push-pull <sup>1)</sup> (7272 compatible)	RS422 (TTL compatible)	
Supply voltage		5 24 V DC <sup>2)</sup>		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 LOW	min. +V - 2.5 V 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 <sub>r</sub>		max. 1 µs		max. 1 µs	max. 200 ns	
Falling edge time t,		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	d cores in	dividually	before in	itial start-	up)			
1, 3	1, 2, A, B	Signal:	0 V	+V	Α	В	0			
without inv. signal	I, Z, A, D	Core color:	WH	BN	GN	YE	GY			
Output circuit	Type of connection	Cable (isolate unused cores individually before initial start-up)								
2, 4, 6	1, 2, A, B	Signal:	0 V	+V	Α	Ā	В	B	0	ō
with inv. signal	1, 2, A, D	Core color:	WH	BN	GN	YE	GY	PK	BU	RD

+V:

Supply voltage encoder <+V DC Supply voltage encoder ground GND (0 V)

0 V: A, <u>A</u>: Incremental output channel A Incremental output channel B

B,  $\overline{B}$ : 0,  $\overline{0}$ : Reference signal

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



# **Miniature** optical

### 2400 / 2420 (shaft / hollow shaft)

# Push-pull, RS422

### **Dimensions shaft version**

Dimensions in mm [inch]

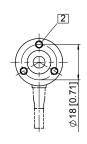
#### Flange type 1, ø 24 [0.94]

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]

# Ø24 [0,94] Ø21,4 [0,8] max.5 [0.2] 20,5 [0,81] Ø Ø D 1 [0,04 1 [0,04] 6 [0.24] 1,2 [0,047]



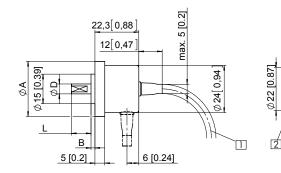
#### Flange type 2, ø 30 [1.18] Flange type 3, ø 28 [1.10]

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	Α	В
2	ø 30 [1.18]	3 [0.12]
3	ø 28 [1.10]	2 [0.08]



### **Dimensions hollow shaft version**

Dimensions in mm [inch]

#### Flange type 1, ø 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					

