

Incremental Encoders

**Miniature
Optical**

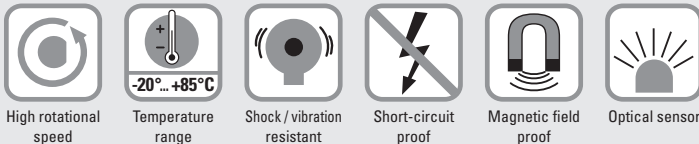
2400 / 2420 (Shaft / Hollow shaft)

Push-Pull



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

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 inputs

Versatile

- Ideally suited for use in small devices
- Meets the certification requirements of Railways Standard EN 50121

Order code Shaft version

05.2400 . X X X X . 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

d Type of connection

- 1 = axial cable, 2 m [6.56'] PVC
- 2 = radial cable, 2 m [6.56'] PVC

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)
- Other pulse rates on request

Stock types

- 05.2400.1122.0050
- 05.2400.1122.0360
- 05.2400.1122.0500
- 05.2400.1122.1000
- 05.2400.1122.1024

Order code Hollow shaft

05.2420 . 1 X X X . 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"]

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⁾

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

d Type of connection

- 1 = axial cable, 2 m [6.56'] PVC
- 2 = radial cable, 2 m [6.56'] PVC

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)
- Other pulse rates on request

Stock types

- 05.2420.1212.0500
- 05.2420.1212.1000
- 05.2420.1222.0500
- 05.2420.1222.1000
- 05.2420.1222.1024

1) US version

Incremental Encoders

Miniature Optical	2400 / 2420 (Shaft / Hollow shaft)	Push-Pull
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Mounting accessory for shaft encoders		Order-No.
Coupling	Bellows coupling \varnothing 15 mm [0.59"] for shaft 4 mm [0.16"]	8.0000.1201.0404

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		
Speed		max. 12 000 min ⁻¹
Moment of inertia		approx. 0.1 x 10 ⁻⁶ kgm ²
Starting torque - at 20°C [68°F]		< 0.01 Nm
Shaft load capacity	radial axial	10 N 20 N
Weight		approx. 0.06 kg [2.12 oz]
Protection acc. to EN 60529	housing side flange side	IP65 IP50 (IP64 on request)
Working temperature range		-20°C ... +85°C [-4°F ... +185°F]
Materials	shaft hollow shaft	stainless steel 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)
Power supply	5 ... 24 V DC ²⁾	8 ... 30 V DC
Power consumption (no load)	max. 50 mA	max. 50 mA
Permissible load / channel	max. 50 mA	max. 50 mA
Pulse frequency	max. 160 kHz	max. 160 kHz
Signal level	HIGH LOW	min. +V - 2.5 V max. 0.5 V
Rising edge time t_r	max. 1 μ s	max. 1 μ s
Falling edge time t_f	max. 1 μ s	max. 1 μ s
Short circuit proof outputs	yes	yes
UL approval	File 224618	
CE compliant acc. to	EMC guideline 2004/108/EC	
RoHS compliant acc. to	guideline 2002/95/EC	

Incremental Encoders

An independent test laboratory (TTI-PG115/96-01) approved by the German Accreditation Council (DAR) certified the compliance with the Railways Standard, according to EN 50121. This means our encoder is compatible with higher electromagnetic noise standards than standard industrial encoders.



You will have a higher quality encoder even in applications with higher EMC noise levels. We will gladly send you a copy of the test report on request. When ordering an encoder to the railway standard, please ensure you state this explicitly on the order.

Terminal assignment

Output circuit	Type of connection	Cable (isolate unused wires individually before initial start-up)									
1, 3 without inv. signal	1, 2	Signal:	0 V	+V	A	B	0				
		Cable colour:	WH	BN	GN	YE	GY				
Output circuit	Type of connection	Cable (isolate unused wires individually before initial start-up)									
2, 4 with inv. signal	1, 2	Signal:	0 V	+V	A	\bar{A}	B	\bar{B}	0	$\bar{0}$	
		Cable colour:	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

1) Max. recommended cable length 30 m [6.56']
 2) With 24 V DC there is no tolerance above 24 V DC. Please use output circuit 8 ... 30 V DC.

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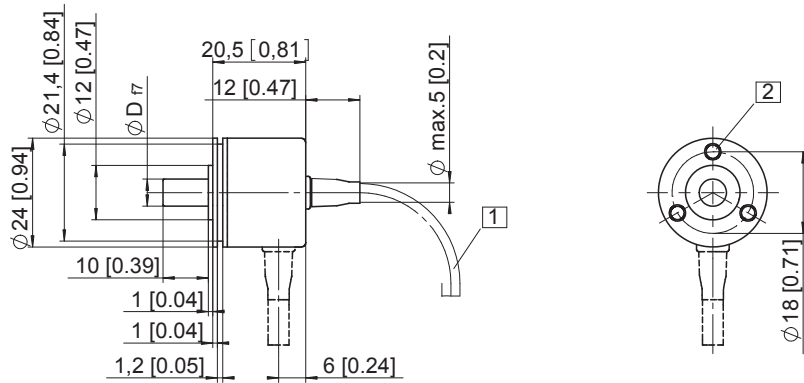
Push-Pull

Dimensions shaft version

Dimensions in mm [inch]

Flange type 1, ø 24 [0.94]

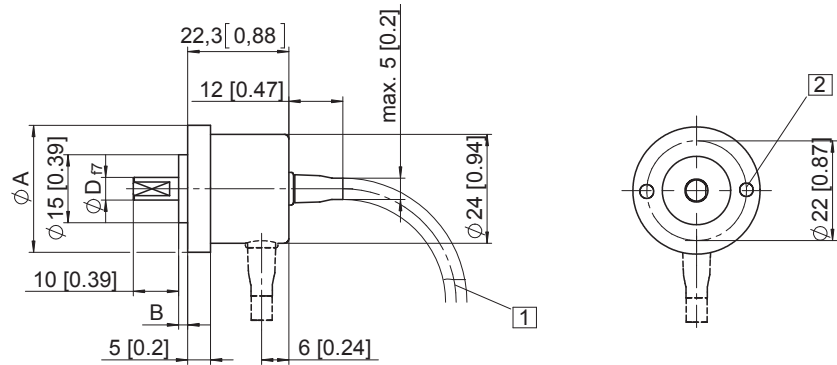
- 1 min R50 [1.97]
- 2 3 x M3, 4 [0.16] deep



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



Flange type	A	B
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

