

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 | 05.2400 | .XXXX | .XXXX |
| Shaft version | 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.



| | | |
|---|--|---|
| <p>a Flange <u>1 = ø 24 mm [0.94"]</u> 3 = ø 28 mm [1.10"] 2 = ø 30 mm [1.18"]</p> <p>b Shaft (ø x L) <u>1 = ø 4 x 10 mm [0.16 x 0.39"]</u> 3 = ø 5 x 10 mm [0.20 x 0.39"], with flat 2 = ø 6 x 10 mm [0.24 x 0.39"]</p> <p>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⁾</p> | <p>c Output circuit / supply voltage 1 = push-pull (without inverted signal) / 5 ... 24 V DC <u>2 = push-pull (with inverted signal) / 5 ... 24 V DC</u> 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</p> <p>d Type of connection 1 = axial cable, 2 m [6.56'] PVC A = axial cable, special length PVC *) <u>2 = radial cable, 2 m [6.56'] PVC</u> 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.: 05.2400.122A.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, <u>200</u>, 250, 300, <u>360</u>, 400, <u>500</u>, 512, <u>1000</u>, <u>1024</u> (e.g. 360 pulses => 0360)</p> <p><i>Optional on request</i> - other pulse rates</p> |
|---|--|---|

1) US version.

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| | | | | | | | |
|--|--|--|----------|----------|----------|-------------|---|
| Order code | 05.2420 | 1 | X | X | X | XXXX | <p>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.</p> <div style="text-align: right; border: 1px solid black; border-radius: 50%; padding: 2px 5px; display: inline-block;">10 by 10</div> |
| Hollow shaft | Type | a | b | c | d | e | |
| <p>a Flange <u>1 = ø 24 mm [0.94"]</u></p> <p>b Blind hollow shaft (insertion depth max. 14 mm [0.55"]) 1 = ø 4 mm [0.16"] <u>2 = ø 6 mm [0.24"]</u></p> <p>4 = ø 1/4" ¹⁾</p> | <p>c Output circuit / supply voltage 1 = push-pull (without inverted signal) / 5 ... 24 V DC <u>2 = push-pull (with inverted signal) / 5 ... 24 V DC</u> 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</p> <p>d Type of connection 1 = axial cable, 2 m [6.56'] PVC A = axial cable, special length PVC *) <u>2 = radial cable, 2 m [6.56'] PVC</u> 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, <u>200</u>, 250, 300, <u>360</u>, 400, <u>500</u>, 512, <u>1000</u>, <u>1024</u> (e.g. 360 pulses => 0360)</p> <p><i>Optional on request</i> - other pulse rates</p> | | | | | |

| | |
|--|---|
| 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.

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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 ³⁾ |
| Shaft load capacity | radial 20 N axial 10 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 |

| Approvals | |
|--|------------------|
| UL compliant in accordance with | File no. E224618 |
| CE compliant in accordance with | |
| EMC Directive | 2014/30/EU |
| RoHS Directive | 2011/65/EU |
| UKCA compliant in accordance with | |
| EMC Regulations | S.I. 2016/1091 |
| RoHS Regulations | S.I. 2012/3032 |

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.

