

# Incremental encoders

|   |   |                          |
|---|---|--------------------------|
| <b>Standard<br/>high temperature, optical</b> | <b>5803 / 5823 (shaft / hollow shaft)</b> | <b>Push-pull / RS422</b> |
|---|---|--------------------------|



The incremental encoders of the high temperature series 5803 / 5823 can be used at up to max. 110 °C.

The high heat resistance – at the same time as high speed – make these encoders the ideal solution for all applications in a high temperature environment.



|                       |                   |                       |                          |                             |                      |                     |                             |                |
|-----------------------|-------------------|-----------------------|--------------------------|-----------------------------|----------------------|---------------------|-----------------------------|----------------|
|                       |                   |                       |                          |                             |                      |                     |                             |                |
| High rotational speed | Temperature range | High protection level | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Short-circuit proof | Reverse polarity protection | Optical sensor |

### Powerful

- Can be used at temperatures of up to max. 110 °C.
- High resolution up to 5000 pulses per revolution.
- Maximum speed of 12000 revolutions per minute.

### Flexible

- Various connection types for different application purposes.
- Shaft or hollow shaft version.
- With push-pull or RS422 interface.

|                      |               |                |             |
|----------------------|---------------|----------------|-------------|
| <b>Order code</b>    | <b>8.5803</b> | <b>.XXXXX.</b> | <b>XXXX</b> |
| <b>Shaft version</b> | Type          | a b c d        | e           |

#### a Flange

- 1 = clamping flange     $\varnothing$  58 mm [2.28"]
- 2 = synchro flange     $\varnothing$  58 mm [2.28"]
- P = synchro flange     $\varnothing$  63.5 mm [2.5"]
- M = square flange     $\square$  63.5 mm [2.5"]

#### b Shaft ( $\varnothing \times L$ ), with flat

- 1 =  $\varnothing$  6 x 10 mm [0.24 x 0.39"]
- 2 =  $\varnothing$  10 x 20 mm [0.39 x 0.79"]
- P =  $\varnothing$  3/8" x 7/8" <sup>1)</sup>

#### c Output circuit / supply voltage

- 4 = RS422 (with inverted signal) / 5 V DC
- 5 = RS422 (with inverted signal) / 10 ... 30 V DC
- 6 = push-pull (with inverted signal) / 10 ... 30 V DC
- 7 = push-pull (without inverted signal) / 10 ... 30 V DC

#### d Type of connection

- 1 = axial cable, 1 m [3.28'] TPE
- A = axial cable, special length TPE \*)
- 2 = radial cable, 1 m [3.28'] TPE
- B = radial cable, special length TPE \*)
- 3 = axial M23 connector, 12-pin
- 5 = radial M23 connector, 12-pin
- W = radial MIL connector, 7-pin <sup>2)</sup>
- Y = radial MIL connector, 10-pin

\*) Available special lengths (connection types A, B):  
2, 3, 5, 8, 10, 15 m [5.56, 9.84, 16.40, 26.25, 32.80, 49.21']  
order code expansion .XXXX = length in dm  
ex.: 8.5803.114A.0100.0030 (for cable length 3 m)

#### e Pulse rate

- 25, 50, 60, 100, 125, 200, 250,  
256, 300, 360, 500, 512, 600,  
720, 800, 1000, 1024, 1200,  
1250, 1500, 2000, 2048, 2500,  
3000, 3600, 4000, 4096, 5000  
(e.g. 100 pulses => 0100)

Optional on request  
- other pulse rates

1) Only in conjunction with flange M or P.  
2) Only with output circuit 7.

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|  |                       |                         |                   |
|--|-----------------------|-------------------------|-------------------|
| <b>Order code</b><br><b>Hollow shaft</b> | <b>8.5823</b><br>Type | <b>.XXXX</b><br>a b c d | <b>.XXXX</b><br>e |
|--|-----------------------|-------------------------|-------------------|

|   |   |  |
|---|---|--|
| <p><b>a Flange</b></p> <p>1 = with hollow shaft and spring element, short<br/>         2 = with blind hollow shaft and spring element, short<br/>         3 = with hollow shaft and stator coupling, <math>\phi</math> 65 mm [2.56"]<br/>         4 = with blind hollow shaft and stator coupling, <math>\phi</math> 65 mm [2.56"]</p> <p><b>b Hollow shaft</b><br/> <i>(insertion depth blind hollow shaft with flange 2 and 4 max. 30 mm [1.18"])</i></p> <p>1 = <math>\phi</math> 6 mm [0.24"], IP40<br/>         2 = <math>\phi</math> 6 mm [0.24"], IP66<br/>         3 = <math>\phi</math> 8 mm [0.32"], IP40<br/>         4 = <math>\phi</math> 8 mm [0.32"], IP66<br/>         5 = <math>\phi</math> 10 mm [0.39"], IP40<br/>         6 = <math>\phi</math> 10 mm [0.39"], IP66<br/>         7 = <math>\phi</math> 12 mm [0.47"], IP40<br/>         8 = <math>\phi</math> 12 mm [0.47"], IP66</p> | <p><b>c Output circuit / supply voltage</b></p> <p>1 = RS422 (with inverted signal) / 5 V DC<br/>         4 = RS422 (with inverted signal) / 10 ... 30 V DC<br/>         3 = push-pull (with inverted signal) / 10 ... 30 V DC<br/>         2 = push-pull (without inverted signal) / 10 ... 30 V DC</p> <p><b>d Type of connection</b></p> <p>1 = radial cable, 1 m [3.28'] TPE<br/>         A = radial cable, special length TPE *)<br/>         2 = radial M23 connector, 12-pin</p> <p>*) Available special lengths (connection types A):<br/>         2, 3, 5, 8, 10, 15 m [5.56, 9.84, 16.40, 26.25, 32.80, 49.21']<br/>         order code expansion .XXXX = length in dm<br/>         ex.: 8.5823.114A.0100.0030 (for cable length 3 m)</p> | <p><b>e Pulse rate</b></p> <p>25, 50, 60, 100, 125, 200, 250, 256, 300, 360, 500, 512, 600, 720, 800, 1000, 1024, 1200, 1250, 1500, 2000, 2048, 2500, 3000, 3600, 4000, 4096, 5000 (e.g. 100 pulses =&gt; 0100)</p> <p><i>Optional on request</i><br/>         - other pulse rates</p> |
|---|---|--|

| Mounting accessory for shaft encoders |   | Order no.               |
|---------------------------------------|---|-------------------------|
| <b>Coupling</b>                       | bellows coupling $\phi$ 19 mm [0.75"] for shaft 6 mm [0.24"]  | <b>8.0000.1102.0606</b> |
|                                       | bellows coupling $\phi$ 19 mm [0.75"] for shaft 10 mm [0.39"] | <b>8.0000.1102.1010</b> |

| Mounting accessory for hollow shaft encoders |                    | Dimensions in mm [inch] | Order no.               |
|--|--------------------|-------------------------|-------------------------|
| <b>Torque pin, <math>\phi</math> 4 mm</b>    | with fixing thread |                         | <b>8.0010.4700.0000</b> |

|   |  |                         |
|---|--|-------------------------|
| <b>Stator coupling, <math>\phi</math> 63 mm [2.48"]</b> |  | <b>8.0010.4D00.0000</b> |
|---|--|-------------------------|

| Cables and connectors      |  | Order no.               |
|----------------------------|--|-------------------------|
| <b>Preassembled cables</b> | M23 female connector with coupling nut, 12-pin, cw single ended<br>2 m [6.56'] PVC cable | <b>8.0000.6E01.0002</b> |
| <b>Connectors</b>          | M23 female connector with coupling nut, 12-pin, cw                                       | <b>8.0000.5012.0000</b> |

Further Kübler accessories can be found at: [kuebler.com/accessories](http://kuebler.com/accessories)  
 Further Kübler cables and connectors can be found at: [kuebler.com/connection-technology](http://kuebler.com/connection-technology)

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| <b>Standard high temperature, optical</b> | <b>5803 / 5823 (shaft / hollow shaft)</b> | <b>Push-pull / RS422</b> |
|---|---|--------------------------|

## Technical data

| Mechanical characteristics                       |                                 |   |
|--|---------------------------------|---|
| <b>Maximum speed</b>                             | shaft IP65                      | 12000 min <sup>-1</sup>                         |
|  | hollow shaft IP40               | 12000 min <sup>-1</sup>                         |
|  | hollow shaft IP66 <sup>1)</sup> | 6000 min <sup>-1</sup>                          |
| <b>Mass moment of inertia</b>                    | shaft                           | approx. 1.8 x 10 <sup>-6</sup> kgm <sup>2</sup> |
|  | hollow shaft                    | approx. 6.0 x 10 <sup>-6</sup> kgm <sup>2</sup> |
| <b>Starting torque – at 20 °C [68 °F]</b>        | shaft IP65 / hollow shaft IP40  | < 0.01 Nm                                       |
|  | hollow shaft IP66               | < 0.05 Nm                                       |
|  |                                 |   |
| <b>Load capacity of shaft</b>                    | radial                          | 80 N  |
|  | axial                           | 40 N  |
| <b>Weight</b>                                    |                                 | approx. 0.4 kg [14.11 oz]                       |
| <b>Protection</b> acc. to EN 60529               | shaft                           | IP65  |
|  | hollow shaft without seal       | IP40  |
|  | hollow shaft with seal          | IP66  |
|  |                                 |   |
| <b>Working temperature range</b>                 | shaft IP65 / hollow shaft IP40  | -20 °C ... +110 °C [-4 °F ... +230 °F]          |
|  | hollow shaft IP66               | -20 °C ... +90 °C [-4 °F ... +194 °F]           |
|  |                                 |   |
| <b>Material</b>                                  | shaft                           | stainless steel H7                              |
| <b>Shock resistance</b> acc. to EN 60068-2-27    |                                 | 1000 m/s <sup>2</sup> , 6 ms                    |
| <b>Vibration resistance</b> acc. to EN 60068-2-6 |                                 | 100 m/s <sup>2</sup> , 10 ... 2000 Hz           |

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

| Electrical characteristics                               |                                    |                          |
|--|------------------------------------|--------------------------|
| Output circuit   | RS422 (TTL compatible)             | Push-pull                |
| <b>Supply voltage</b>                                    | 5 V DC (±5 %)<br>or 10 ... 30 V DC | 10 ... 30 V DC           |
| <b>Power consumption</b> (no load)                       | without inverted signal            | typ. 55 mA / max. 125 mA |
|  | with inverted signal               | typ. 40 mA / max. 100 mA |
| <b>Permissible load / channel</b>                        | max. +/- 20 mA                     | max. +/- 30 mA           |
| <b>Pulse frequency</b>                                   | max. 300 kHz                       | max. 300 kHz             |
| <b>Signal level</b>                                      | HIGH                               | min. 2.5 V               |
|  | LOW                                | max. 0.5 V               |
| <b>Rising edge time t<sub>r</sub></b>                    | max. 200 ns                        | max. 1 µs                |
| <b>Falling edge time t<sub>f</sub></b>                   | max. 200 ns                        | max. 1 µs                |
| <b>Short circuit proof outputs</b> <sup>2)</sup>         | yes <sup>3)</sup>                  | yes                      |
| <b>Reverse polarity protection of the supply voltage</b> | no; 10 ... 30 V DC: yes            | yes                      |

1) For continuous operation max. 3000 min<sup>-1</sup>, ventilated.  
 2) If supply voltage correctly applied.  
 3) Only one channel allowed to be shorted-out:  
 if +V = 5 V DC, short-circuit to channel, 0 V, or +V is permitted.  
 if +V = 10 ... 30 V DC, short-circuit to channel or 0 V is permitted.

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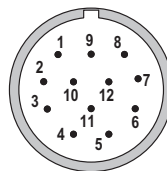
## Terminal assignment

| Output circuit      | Type of connection | Cable (isolate unused cores individually before initial start-up) |                        |                        |                      |                      |    |           |    |           |    |           |                  |  |
|---------------------|--------------------|---|------------------------|------------------------|----------------------|----------------------|----|-----------|----|-----------|----|-----------|------------------|--|
| 1, 2, 3, 4, 5, 6, 7 | 5803: 1, 2, A, B   | Signal:   | 0 V                    | +V                     | 0Vsens <sup>2)</sup> | +Vsens <sup>2)</sup> | A  | $\bar{A}$ | B  | $\bar{B}$ | 0  | $\bar{0}$ | $\perp$          |  |
|                     | 5823: 1, A         | Core color:   | WH 0.5 mm <sup>2</sup> | BN 0.5 mm <sup>2</sup> | WH                   | BN                   | GN | YE        | GY | PK        | BU | RD        | shield           |  |
| Output circuit      | Type of connection | M23 connector, 12-pin   |                        |                        |                      |                      |    |           |    |           |    |           |                  |  |
| 1, 2, 3, 4, 5, 6, 7 | 5803: 3, 5         | Signal:   | 0 V                    | +V                     | 0Vsens <sup>2)</sup> | +Vsens <sup>2)</sup> | A  | $\bar{A}$ | B  | $\bar{B}$ | 0  | $\bar{0}$ | $\perp$          |  |
|                     | 5823: 2            | Pin:  | 10                     | 12                     | 11                   | 2                    | 5  | 6         | 8  | 1         | 3  | 4         | PH <sup>1)</sup> |  |
| Output circuit      | Type of connection | MIL connector, 7-pin  |                        |                        |                      |                      |    |           |    |           |    |           |                  |  |
| 7                   | 5803: W            | Signal:   | 0 V                    | +V                     | 0Vsens <sup>2)</sup> | +Vsens <sup>2)</sup> | A  | $\bar{A}$ | B  | $\bar{B}$ | 0  | $\bar{0}$ | $\perp$          |  |
|                     | 5823: –            | Pin:  | F                      | D                      | –                    | E                    | A  | –         | B  | –         | C  | –         | G                |  |
| Output circuit      | Type of connection | MIL connector, 10-pin   |                        |                        |                      |                      |    |           |    |           |    |           |                  |  |
| 1, 2, 3, 4, 5, 6, 7 | 5803: Y            | Signal:   | 0 V                    | +V                     | 0Vsens <sup>2)</sup> | +Vsens <sup>2)</sup> | A  | $\bar{A}$ | B  | $\bar{B}$ | 0  | $\bar{0}$ | $\perp$          |  |
|                     | 5823: –            | Pin:  | F                      | D                      | –                    | E                    | A  | G         | B  | H         | C  | I         | J                |  |

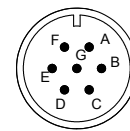
Using RS422 outputs and long cable distances, a wave impedance has to be applied at each cable end.

- +V: Supply voltage encoder +V DC
- 0 V: Supply voltage encoder ground GND (0 V)
- 0 Vsens / +Vsens: Using the sensor outputs of the encoder, the voltage present can be measured and if necessary increased accordingly.
- A,  $\bar{A}$ : Incremental output channel A
- B,  $\bar{B}$ : Incremental output channel B
- 0,  $\bar{0}$ : Reference signal
- PH  $\perp$ : Plug connector housing (shield)

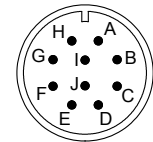
### Top view of mating side, male contact base



M23 connector, 12-pin



MIL connector, 7-pin



MIL connector, 10-pin

1) PH = shield is attached to connector housing.  
 2) The sensor cables are connected to the supply voltage internally. If long feeder cables are involved they can be used to adjust or control the voltage at the encoder.

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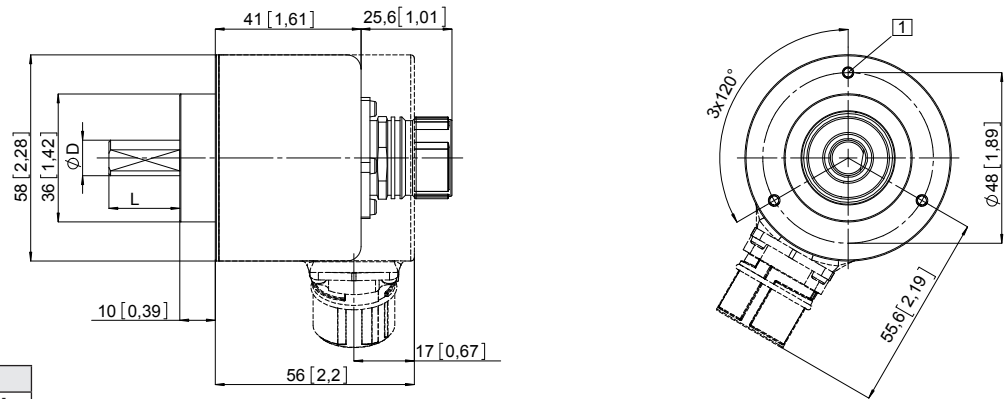
## Dimensions shaft version

Dimensions in mm [inch]

### Clamping flange, ø 58 [2.28]

#### Flange type 1

1 3 x M3, 5 [0.2] deep



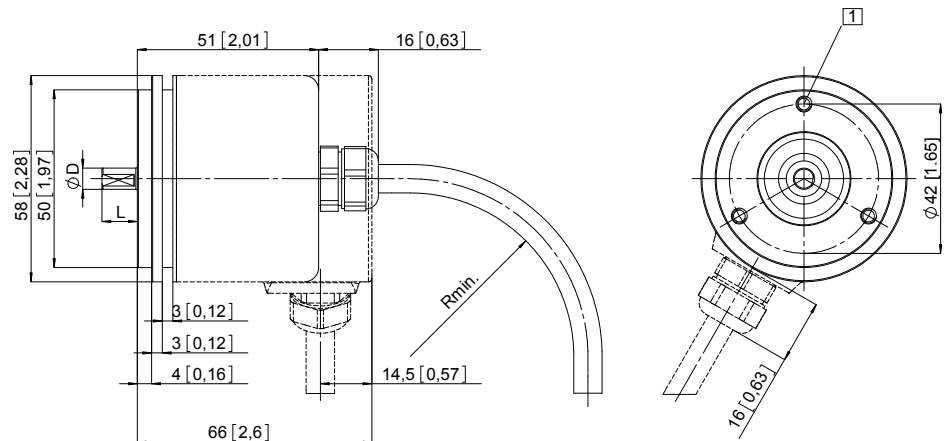
| D         | Fit | L         |
|-----------|-----|-----------|
| 6 [0.24]  | h7  | 10 [0.39] |
| 10 [0.39] | f7  | 20 [0.79] |
| 3/8"      | h7  | 7/8"      |

### Synchro flange, ø 58 [2.28]

#### Flange type 2

1 3 x M4, 5 [0.2] deep

R<sub>min</sub>:  
 - securely installed: 55 [2.17]  
 - flexibly installed: 70 [2.76]



| D         | Fit | L         |
|-----------|-----|-----------|
| 6 [0.24]  | h7  | 10 [0.39] |
| 10 [0.39] | f7  | 20 [0.79] |
| 3/8"      | h7  | 7/8"      |

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**Standard**  
**high temperature, optical**

**5803 / 5823 (shaft / hollow shaft)**

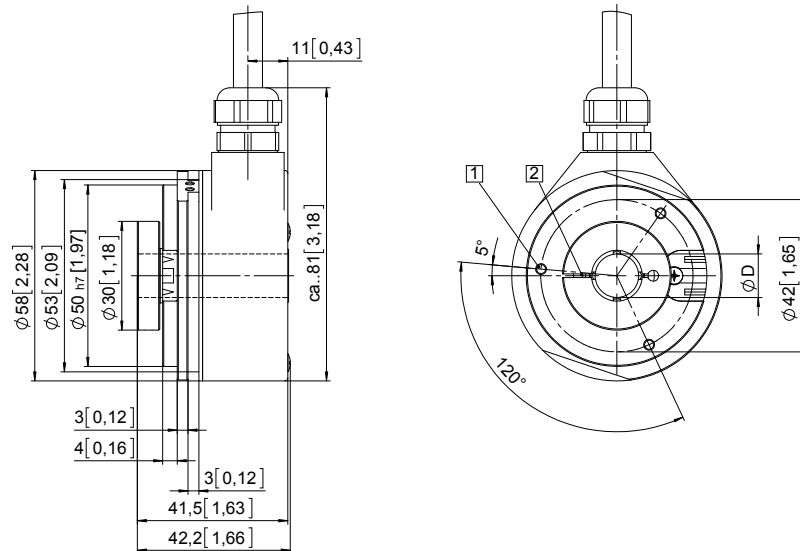
**Push-pull / RS422**

## Dimensions hollow shaft version

Dimensions in mm [inch]

### Flange with spring element, short Flange type 1 and 2

- 1 3 x M3, 5 [0.2] deep
- 2 Recommended torque for the clamping ring 0.6 Nm

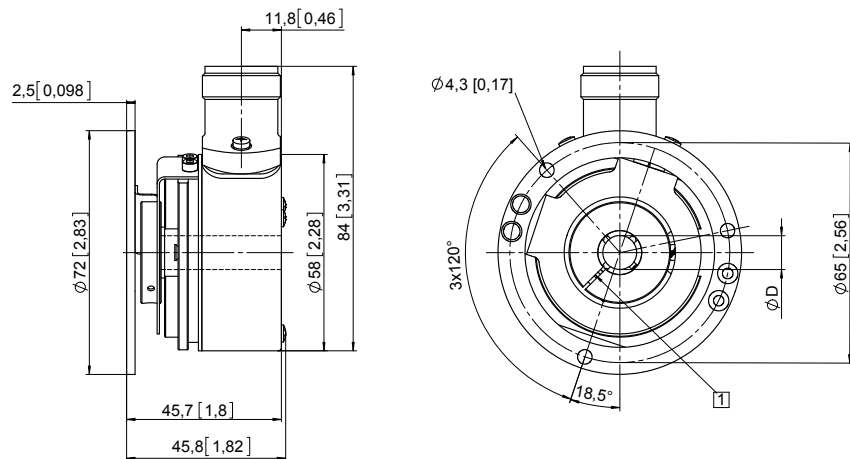


| D         | Fit |
|-----------|-----|
| 6 [0.24]  | H7  |
| 8 [0.32]  | H7  |
| 10 [0.39] | H7  |
| 12 [0.47] | H7  |

Insertion depth blind hollow shaft with flange 2:  
max. 30 mm [1.18"]

### Flange with stator coupling, ø 65 [2.56] Flange type 3 and 4

- 1 Recommended torque for the clamping ring 0.6 Nm



| D         | Fit |
|-----------|-----|
| 6 [0.24]  | H7  |
| 8 [0.32]  | H7  |
| 10 [0.39] | H7  |
| 12 [0.47] | H7  |

Min. insertion depth = 1.5 x D  
Insertion depth blind hollow shaft with flange 4:  
max. 30 mm [1.18"]