

## EN580E.ML-SC - SSI

Solid shaft with clamping flange

Optical multiturn encoders 13 bit ST / 12 bit MT

### Overview

- Absolute encoder multiturn
- Optical sensing method
- Resolution: singleturn 13 bit, multiturn 12 bit
- Clamping flange
- Maximum resistant against magnetic fields
- High connection flexibility thanks to flexible M12 and flylead connector M23



### Technical data

#### Technical data - electrical ratings

|                             |                                                                          |
|-----------------------------|--------------------------------------------------------------------------|
| Voltage supply              | 8...30 VDC                                                               |
| Reverse polarity protection | Yes                                                                      |
| Short-circuit proof         | Yes                                                                      |
| Consumption w/o load        | ≤80 mA (24 VDC)                                                          |
| Interface                   | SSI                                                                      |
| Function                    | Multiturn                                                                |
| Steps per revolution        | 8192 / 13 bit                                                            |
| Number of revolutions       | 4096 / 12 bit                                                            |
| Absolute accuracy           | ±0.03 °                                                                  |
| Sensing method              | Optical                                                                  |
| Code                        | Gray or binary                                                           |
| Code sequence               | CW: ascending values with clockwise sense of rotation; looking at flange |
| Input signals               | SSI clock<br>Zero setting input<br>Counting direction                    |
| Output stages               | SSI data: Linedriver RS422                                               |
| Output signals              | SSI data                                                                 |
| Interference immunity       | EN 61000-6-2                                                             |
| Emitted interference        | EN 61000-6-4                                                             |
| Approval                    | UL-Listing: E217823                                                      |

#### Technical data - mechanical design

|                       |                                                                                                                            |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------|
| Size (flange)         | ø58 mm                                                                                                                     |
| Shaft type            | ø10 x 20 mm, solid shaft with flat                                                                                         |
| Flange                | Clamping flange                                                                                                            |
| Protection EN 60529   | IP 54 (flange side)<br>IP 65 (housing side)                                                                                |
| Operating speed       | ≤6000 rpm (+25 °C)                                                                                                         |
| Starting acceleration | ≤1000 U/s <sup>2</sup>                                                                                                     |
| Starting torque       | ≤0.02 Nm                                                                                                                   |
| Admitted shaft load   | ≤40 N axial<br>≤80 N radial                                                                                                |
| Material              | Housing: aluminium<br>Shaft: stainless steel                                                                               |
| Operating temperature | -25...+85 °C (see general information)                                                                                     |
| Relative humidity     | 95 % non-condensing                                                                                                        |
| Resistance            | EN 60068-2-6 Vibration 30 g, 10-2000 Hz<br>EN 60068-2-27 Shock 100 g, 6 ms                                                 |
| Weight approx.        | 400 g                                                                                                                      |
| Connection            | Connector M12, 8-pin, flexible<br>Flange connector M23, 12-pin<br>Flylead connector M23, 12-pin, tangential, length 300 mm |

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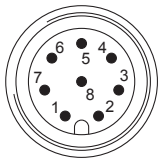
### General information

Self-heating correlated to installation and ambient conditions as well as to electronics and supply voltage must be considered for precise thermal dimensioning. Operating the encoder close to the maximum limits requires measuring the real prevailing temperature at the encoder flange.

### Terminal assignment

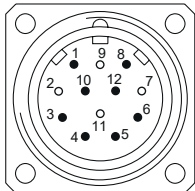
#### Connector M12, 8-pin

| Pin | Assignment |
|-----|------------|
| 1   | 0 V        |
| 2   | +Vs        |
| 3   | Clock+     |
| 4   | Clock-     |
| 5   | Data+      |
| 6   | Data-      |
| 7   | SET        |
| 8   | DIR        |



#### Flange socket M23, 12-pin, male contact, CCW

| Pin | Assignment |
|-----|------------|
| 1   | Data-      |
| 2   | –          |
| 3   | SET        |
| 4   | DIR        |
| 5   | Clock+     |
| 6   | Clock-     |
| 7   | –          |
| 8   | Data+      |
| 9   | –          |
| 10  | 0 V        |
| 11  | –          |
| 12  | +Vs        |

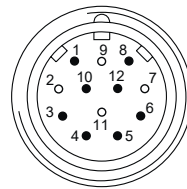


### Terminal assignment

#### Flylead connector M23, 12-pin, male contacts, CCW

| Pin | Assignment |
|-----|------------|
| 1   | Data-      |
| 2   | –          |
| 3   | SET        |
| 4   | DIR        |
| 5   | Clock+     |
| 6   | Clock-     |
| 7   | –          |
| 8   | Data+      |
| 9   | –          |
| 10  | 0 V        |
| 11  | –          |
| 12  | +Vs        |

Screen: connected to housing



### Terminal significance

|     |                                                                                                                                                                                                                                                                                                                                                                 |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SET | Zero setting input.<br>Input for zero setting at any position.<br>The zero setting operation is triggered by a high pulse and has to be in line with the selected direction of rotation (DIR).<br>Impulse duration >100 ms.<br>Connect to 0 V after zero setting for maximum interference immunity.                                                             |
| DIR | Counting direction input.<br>This input is standard on high.<br>DIR-High means ascending output data with clockwise shaft rotation when looking at flange.<br>DIR-Low means ascending values with counterclockwise shaft rotation when looking at flange.<br>For maximum interference immunity connect to +Vs respectively 0 V depending on counting direction. |

### Trigger level

| SSI       | Circuit                               |
|-----------|---------------------------------------|
| SSI-Clock | RS422 with terminating resistor 120 Ω |
| SSI-Data  | RS422                                 |

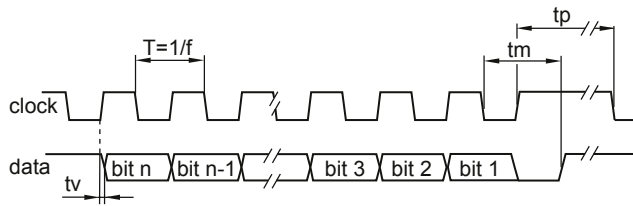
| Control inputs   | Input circuit |
|------------------|---------------|
| Input level High | >0.7 UB       |
| Input level Low  | <0.3 UB       |
| Input resistance | 10 kΩ         |

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### Data transfer



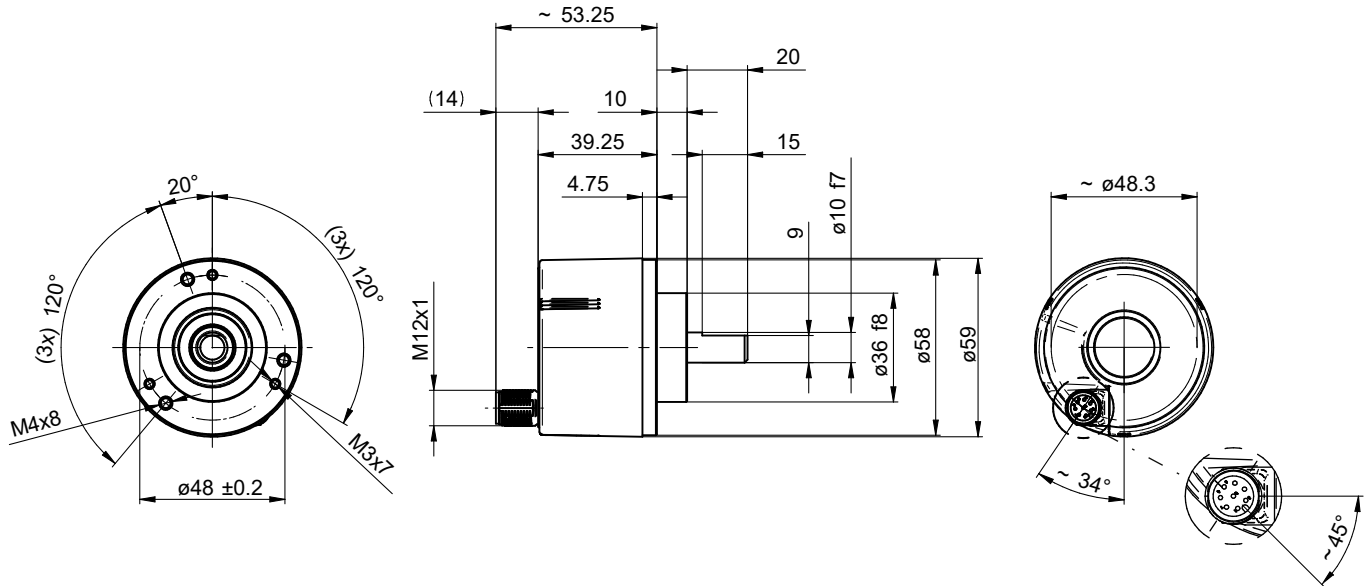
|                      |                                   |
|----------------------|-----------------------------------|
| Clock frequency $f$  | 80...2000 kHz                     |
| Delay time $t_v$     | 70 ns ( $R_L = 120 \text{ Ohm}$ ) |
| Monoflop time $t_m$  | 16 ... 24 $\mu\text{s} + T/2$     |
| Clock interval $t_p$ | 30 $\mu\text{s}$                  |

## EN580E.ML-SC - SSI

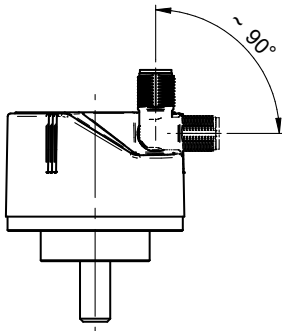
Solid shaft with clamping flange

Optical multiturn encoders 13 bit ST / 12 bit MT

### Dimensions



Clamping flange, connector M12



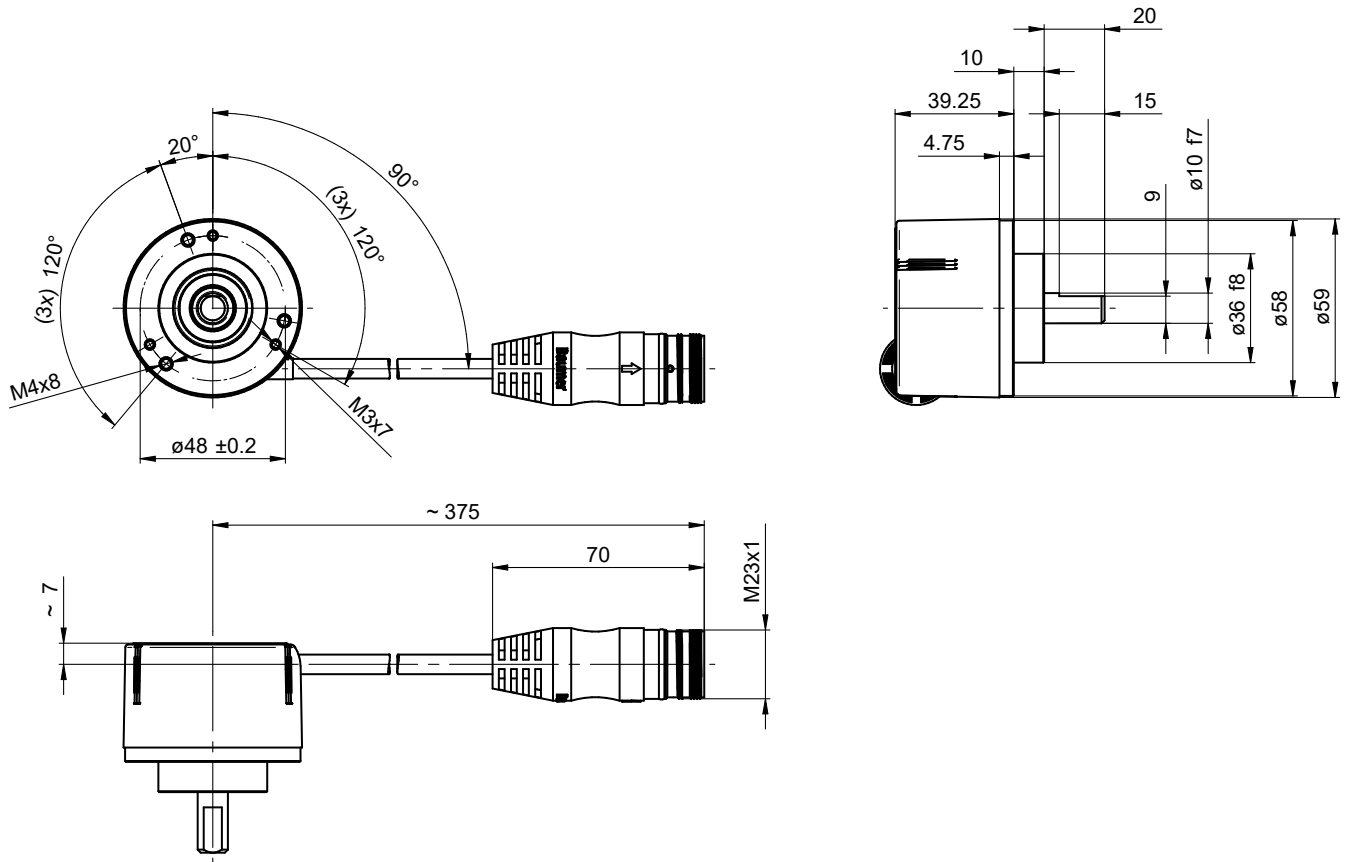
Clamping flange, flexible connector M12

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Solid shaft with clamping flange

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### Dimensions



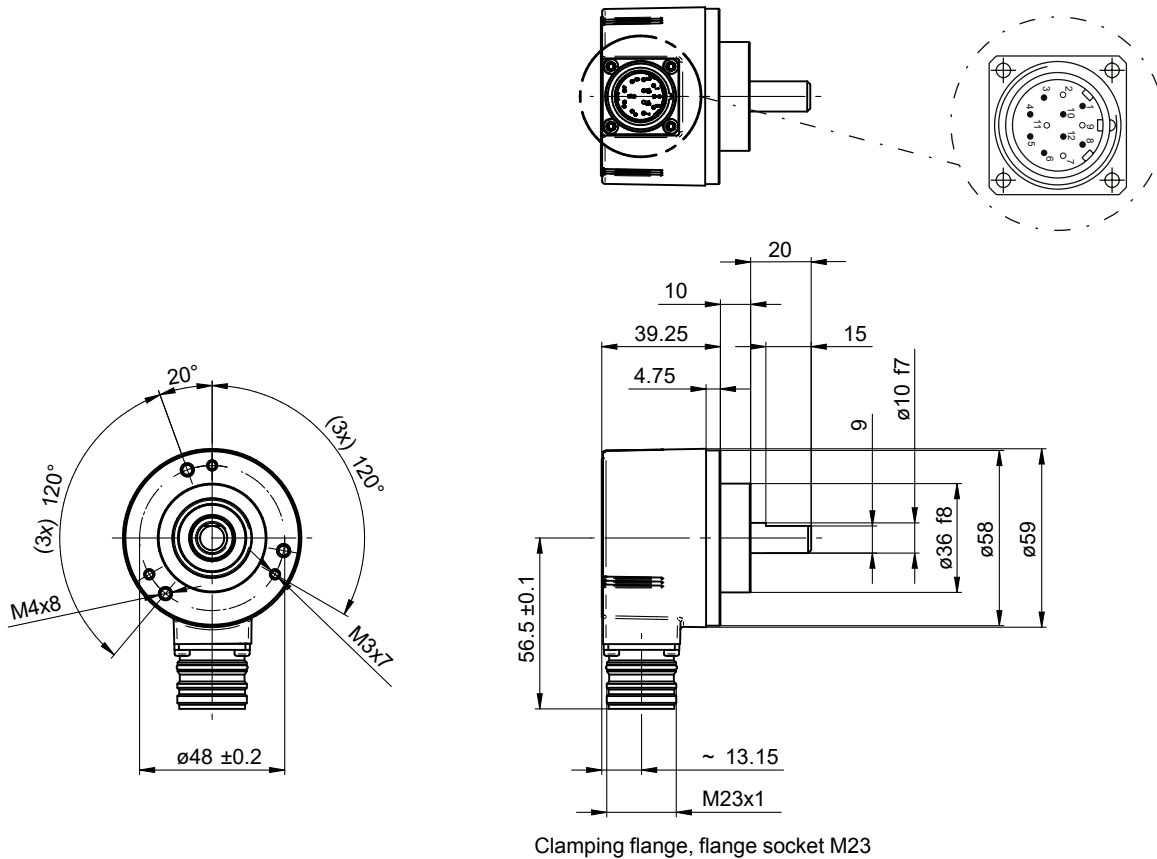
Clamping flange, flylead connector M23

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### Dimensions



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## Ordering reference

|                                                                                           | EN | 580 | E | . | M | L | - | S | C | 10 | . | G | ## | ## | . | 13 | 12 | 0 | . | H |
|-------------------------------------------------------------------------------------------|----|-----|---|---|---|---|---|---|---|----|---|---|----|----|---|----|----|---|---|---|
| <b>Product</b>                                                                            |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| Encoder                                                                                   | EN |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| <b>Series</b>                                                                             |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| 580                                                                                       |    | 580 |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| <b>Focus</b>                                                                              |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| Essential                                                                                 |    |     | E |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| <b>Function</b>                                                                           |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| Multiturn                                                                                 |    |     |   |   | M |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| <b>Sensing</b>                                                                            |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| Optical                                                                                   |    |     |   |   |   | L |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| <b>Shaft type</b>                                                                         |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| Solid shaft                                                                               |    |     |   |   |   |   |   | S |   |    |   |   |    |    |   |    |    |   |   |   |
| <b>Flange (shaft)</b>                                                                     |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| Clamping flange, centering collar ø36 x 10 mm,<br>pitch circle diameter 48 mm - 3xM3/3xM4 |    |     |   |   |   |   |   |   | C |    |   |   |    |    |   |    |    |   |   |   |
| <b>Shaft</b>                                                                              |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| ø10 x 20 mm, with flat                                                                    |    |     |   |   |   |   |   |   |   | 10 |   |   |    |    |   |    |    |   |   |   |
| <b>Protection class</b>                                                                   |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| Flange: IP 54, Housing: IP 65                                                             |    |     |   |   |   |   |   |   |   |    |   | G |    |    |   |    |    |   |   |   |
| <b>Connection</b>                                                                         |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| Connector moveable, M12, 8-pin,<br>male contacts, CCW (A-cod)                             |    |     |   |   |   |   |   |   |   |    |   |   | A1 |    |   |    |    |   |   |   |
| Flange socket radial, M23, 12-pin, male contacts, CCW                                     |    |     |   |   |   |   |   |   |   |    |   |   | B1 |    |   |    |    |   |   |   |
| Flylead connector, M23, 12-pin, male contacts, CCW,<br>tangential, 0.3 m                  |    |     |   |   |   |   |   |   |   |    |   |   | E1 |    |   |    |    |   |   |   |
| <b>Voltage supply / interface</b>                                                         |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| 8...30 VDC, SSI binary                                                                    |    |     |   |   |   |   |   |   |   |    |   |   |    | 1B |   |    |    |   |   |   |
| 8...30 VDC, SSI gray                                                                      |    |     |   |   |   |   |   |   |   |    |   |   |    | 1G |   |    |    |   |   |   |
| <b>Resolution Singleturn</b>                                                              |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| 13 Bit                                                                                    |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   | 13 |    |   |   |   |
| <b>Resolution Multiturn</b>                                                               |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| 12 Bit                                                                                    |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    | 12 |   |   |   |
| <b>Resolution supplement</b>                                                              |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| No option                                                                                 |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    | 0 |   |   |
| <b>Operating temperature</b>                                                              |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   |   |
| -25...+85 °C                                                                              |    |     |   |   |   |   |   |   |   |    |   |   |    |    |   |    |    |   |   | H |

## Accessories

### Mounting accessories

|          |                                        |
|----------|----------------------------------------|
| 11101781 | Double loops coupling (D1=10 / D2=10)  |
| 11050507 | Bellows coupling (D1=06 / D2=10)       |
| 11065923 | Coupling CPS25 (L=19, D1=10 / D2=10)   |
| 11065922 | Coupling CPS25 (L=19, D1=10 / D2=06)   |
| 10141132 | Spring washer coupling (D1=6 / D2=10)  |
| 10141133 | Spring washer coupling (D1=10 / D2=10) |
| 11069337 | Coupling CPS37 (L=24, D1=10 / D2=06)   |
| 11069340 | Coupling CPS37 (L=24, D1=10 / D2=10)   |
| 11053277 | Bellows coupling (D1=10 / D2=10)       |
| 11101893 | Spring encoder arm                     |
| 10125051 | Mounting adaptor                       |