



# Absolute encoders – multiturn

|                                               |                                                    |               |
|-----------------------------------------------|----------------------------------------------------|---------------|
| <b>Compact electronic multiturn, magnetic</b> | <b>Sendix M3661 / M3681 (shaft / hollow shaft)</b> | <b>Analog</b> |
|-----------------------------------------------|----------------------------------------------------|---------------|

|                                                                                                                                                                                                            |                                                                                                                                                               |                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Order code</b><br><b>Hollow shaft</b>                                                                                                                                                                   | <b>8.M3681</b><br>Type                                                                                                                                        | <b>.XXXXX.XX12</b><br>a b c d e f                                                               | If for each parameter of an encoder the <u>underlined preferred option</u> is selected, then the delivery time will be 10 working days for a maximum of 10 pieces.<br>Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.                                                                                                                                                                                                                                          | <b>10 by 10</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                    |
| <b>a Flange</b><br><u>2 = with stator coupling, IP65, ø 46 mm [1.81"]</u><br>3 = with spring element, long, IP65<br>5 = with stator coupling, IP67, ø 46 mm [1.81"]<br>6 = with spring element, long, IP67 | <b>b Blind hollow shaft</b><br>(insertion depth max. 18.5 mm [0.73"])<br>1 = ø 6 mm [0.24"]<br>3 = ø 8 mm [0.32"]<br><u>4 = ø 10 mm [0.39"]</u><br>2 = ø 1/4" | <b>c Output circuit <sup>1)</sup></b><br><u>3 = current output</u><br><u>4 = voltage output</u> | <b>d Type of connection</b><br>1 = axial cable, 1 m [3.28'] PVC<br>A = axial cable, special length PVC *)<br>2 = radial cable, 1 m [3.28'] PVC<br>B = radial cable, special length PVC *)<br>3 = axial M12 connector, 5-pin<br><u>4 = radial M12 connector, 5-pin</u><br>*) Available special lengths (connection types A, B):<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.M3681.243A.3112.0030 (for cable length 3 m) | <b>e Measuring range</b><br><u>1 = 16 revolutions / cw</u><br>2 = 16 revolutions / ccw<br>3 = scalable up to 65,536 revolutions, with limit switch function / cw<br>4 = scalable up to 65,536 revolutions, without limit switch function / cw<br>5 = scalable up to 65,536 revolutions, with limit switch function / ccw<br>6 = scalable up to 65,536 revolutions, without limit switch function / ccw<br><br><i>Optional on request</i><br>- Ex 2/22 (only for connection types 3 and 4)<br>- surface protection salt spray tested | <b>f Interface / resolution / supply voltage</b><br><u>3 = 4 ... 20 mA / 12 bit / 10 ... 30 V DC</u><br><u>4 = 0 ... 10 V / 12 bit / 15 ... 30 V DC</u><br>5 = 0 ... 5 V / 11 bit / 10 ... 30 V DC |

|                                              |           |
|----------------------------------------------|-----------|
| <b>Mounting accessory for shaft encoders</b> | Order no. |
|----------------------------------------------|-----------|

|                 |                                                         |                         |
|-----------------|---------------------------------------------------------|-------------------------|
| <b>Coupling</b> | Bellows coupling ø 19 mm [0.75"] for shaft 8 mm [0.32"] | <b>8.0000.1102.0808</b> |
|-----------------|---------------------------------------------------------|-------------------------|

|                                                     |                         |           |
|-----------------------------------------------------|-------------------------|-----------|
| <b>Mounting accessory for hollow shaft encoders</b> | Dimensions in mm [inch] | Order no. |
|-----------------------------------------------------|-------------------------|-----------|

|                                                                                    |                        |                         |
|------------------------------------------------------------------------------------|------------------------|-------------------------|
| <b>Torque pin, ø 4 mm</b><br>for flange with spring element<br>(flange type 3 + 6) | with fixing thread<br> | <b>8.0010.4700.0000</b> |
|------------------------------------------------------------------------------------|------------------------|-------------------------|

|                              |           |
|------------------------------|-----------|
| <b>Cables and connectors</b> | Order no. |
|------------------------------|-----------|

|                            |                                                                                                      |                             |
|----------------------------|------------------------------------------------------------------------------------------------------|-----------------------------|
| <b>Preassembled cables</b> | M12 female connector with coupling nut, 5-pin, A coded, straight open ended<br>2 m [6.56'] PVC cable | <b>05.00.6081.2211.002M</b> |
|----------------------------|------------------------------------------------------------------------------------------------------|-----------------------------|

|                   |                                                                          |                         |
|-------------------|--------------------------------------------------------------------------|-------------------------|
| <b>Connectors</b> | M12 female connector with coupling nut, 5-pin, A coded, straight (metal) | <b>8.0000.5116.0000</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)

1) Output circuit "3" only in conjunction with interface "3", output circuit "4" only in conjunction with interface "4" or "5".

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|                                                |                                                    |               |
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## Technical data

| Electrical characteristics current interface 4 ... 20 mA |                                                                                                                                                                                                                                                                              |                                   |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>Supply voltage</b>                                    | 10 ... 30 V DC                                                                                                                                                                                                                                                               |                                   |
| <b>Current consumption (no load)</b>                     | max. 30 mA                                                                                                                                                                                                                                                                   |                                   |
| <b>Reverse polarity protection of the supply voltage</b> | yes                                                                                                                                                                                                                                                                          |                                   |
| <b>Short-circuit proof outputs</b>                       | yes <sup>1)</sup>                                                                                                                                                                                                                                                            |                                   |
| <b>Measuring range</b>                                   | factory setting                                                                                                                                                                                                                                                              | 2 <sup>4</sup> revolutions        |
|                                                          | optionally scalable                                                                                                                                                                                                                                                          | up to 2 <sup>16</sup> revolutions |
| <b>DA converter resolution</b>                           | 12 bit                                                                                                                                                                                                                                                                       |                                   |
| <b>Angular measurement deviation <sup>2)</sup></b>       | ±0,5°                                                                                                                                                                                                                                                                        |                                   |
| <b>Temperature coefficient</b>                           | < 100 ppm/K                                                                                                                                                                                                                                                                  |                                   |
| <b>Repeat accuracy, at 25 °C [77 °F]</b>                 | ±0.2°                                                                                                                                                                                                                                                                        |                                   |
| <b>Output load</b>                                       | at 10 V DC                                                                                                                                                                                                                                                                   | max. 200 Ohm                      |
|                                                          | at 24 V DC                                                                                                                                                                                                                                                                   | max. 900 Ohm                      |
|                                                          | at 30 V DC                                                                                                                                                                                                                                                                   | max. 1200 Ohm                     |
| <b>Setting time</b>                                      | < 1 ms, R <sub>Burden</sub> = 900 Ohm, 25 °C [77 °F]                                                                                                                                                                                                                         |                                   |
| <b>LEDs (green/red)</b>                                  | <ul style="list-style-type: none"> <li>- system status</li> <li>- current loop interruption – input load too high</li> <li>- reference point display (only with factory settings) at cw: betw. 0° and 1° at ccw: betw. 0° and -1°</li> <li>- status in teach mode</li> </ul> |                                   |
| <b>Options</b>                                           | <ul style="list-style-type: none"> <li>- output signal scalable via the teach inputs</li> <li>- output signal scalable via the teach inputs + limit switch function</li> </ul>                                                                                               |                                   |
| <b>Teach inputs</b>                                      | level = +V for 1 s min.                                                                                                                                                                                                                                                      |                                   |
| <b>PowerON Time</b>                                      | < 1 s                                                                                                                                                                                                                                                                        |                                   |
| <b>Update rate</b>                                       | 1 ms                                                                                                                                                                                                                                                                         |                                   |

| Mechanical characteristics                       |                                                            |                                                               |
|--------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------|
| <b>Maximum speed</b>                             | shaft or blind hollow shaft version                        |                                                               |
|                                                  | without shaft seal (IP65)                                  | 6000 min <sup>-1</sup><br>3000 min <sup>-1</sup> (continuous) |
|                                                  | shaft or blind hollow shaft version with shaft seal (IP67) | 4000 min <sup>-1</sup><br>2000 min <sup>-1</sup> (continuous) |
| <b>Starting torque at 20 °C [68 °F]</b>          | without shaft seal                                         | < 0.007 Nm                                                    |
|                                                  | with shaft seal (IP67)                                     | < 0.01 Nm                                                     |
| <b>Shaft load capacity</b>                       | radial                                                     | 40 N                                                          |
|                                                  | axial                                                      | 20 N                                                          |
| <b>Weight</b>                                    | approx. 210 g [7.41 oz]                                    |                                                               |
| <b>Protection acc. to EN 60529</b>               | IP65 or IP67                                               |                                                               |
| <b>Working temperature range</b>                 | -40 °C ... +85 °C [-40 °F ... +185 °F]                     |                                                               |
| <b>Materials</b>                                 | shaft / hollow shaft                                       | stainless steel                                               |
|                                                  | flange                                                     | aluminum                                                      |
|                                                  | housing                                                    | zinc die-cast                                                 |
|                                                  | cable                                                      | PVC                                                           |
| <b>Shock resistance acc. to EN 60068-2-27</b>    | 2500 m/s <sup>2</sup> , 6 ms                               |                                                               |
| <b>Vibration resistance acc. to EN 60068-2-6</b> | 300 m/s <sup>2</sup> , 10 ... 2000 Hz                      |                                                               |

| Electrical characteristics voltage interface 0 ... 10 V / 0 ... 5 V |                                                                                                                                                                                                                   |                                   |
|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>Supply voltage</b>                                               | output 0 ... 5 V                                                                                                                                                                                                  | 10 ... 30 V DC                    |
|                                                                     | output 0 ... 10 V                                                                                                                                                                                                 | 15 ... 30 V DC                    |
| <b>Current consumption (no load)</b>                                | max. 30 mA                                                                                                                                                                                                        |                                   |
| <b>Reverse polarity protection of the supply voltage</b>            | yes                                                                                                                                                                                                               |                                   |
| <b>Short-circuit proof outputs</b>                                  | yes <sup>1)</sup>                                                                                                                                                                                                 |                                   |
| <b>Measuring range</b>                                              | factory setting                                                                                                                                                                                                   | 2 <sup>4</sup> revolutions        |
|                                                                     | optionally scalable                                                                                                                                                                                               | up to 2 <sup>16</sup> revolutions |
| <b>DA converter resolution</b>                                      | 0 ... 10 V                                                                                                                                                                                                        | 12 bit                            |
|                                                                     | 0 ... 5 V                                                                                                                                                                                                         | 11 bit                            |
| <b>Angular measurement deviation <sup>2)</sup></b>                  | ±0,5°                                                                                                                                                                                                             |                                   |
| <b>Temperature coefficient</b>                                      | < 100 ppm/K                                                                                                                                                                                                       |                                   |
| <b>Repeat accuracy, at 25 °C [77 °F]</b>                            | ±0.2°                                                                                                                                                                                                             |                                   |
| <b>Current output</b>                                               | max. 10 mA                                                                                                                                                                                                        |                                   |
| <b>Setting time</b>                                                 | < 1 ms, R <sub>Load</sub> = 1000 Ohm, 25 °C [77 °F]                                                                                                                                                               |                                   |
| <b>LEDs (green/red)</b>                                             | <ul style="list-style-type: none"> <li>- system status</li> <li>- reference point display (only with factory settings) at cw: betw. 0° and 1° at ccw: betw. 0° and -1°</li> <li>- status in teach mode</li> </ul> |                                   |
| <b>Options</b>                                                      | <ul style="list-style-type: none"> <li>- output signal scalable via the teach inputs</li> <li>- output signal scalable via the teach inputs + limit switch function</li> </ul>                                    |                                   |
| <b>Teach inputs</b>                                                 | level = +V for 1 s min.                                                                                                                                                                                           |                                   |
| <b>PowerON Time</b>                                                 | < 1 s                                                                                                                                                                                                             |                                   |
| <b>Update rate</b>                                                  | 1 ms                                                                                                                                                                                                              |                                   |

| Approvals                                |                                                        |
|------------------------------------------|--------------------------------------------------------|
| <b>E1 compliant</b> in accordance with   | ECE guideline                                          |
| <b>UL compliant</b> in accordance with   | File no. E224618                                       |
| <b>CE compliant</b> in accordance with   |                                                        |
|                                          | EMC Directive 2014/30/EU                               |
|                                          | RoHS Directive 2011/65/EU                              |
|                                          | ATEX Directive 2014/34/EU (for Ex 2/22 variants)       |
| <b>UKCA compliant</b> in accordance with |                                                        |
|                                          | EMC Regulations S.I. 2016/1091                         |
|                                          | RoHS Regulations S.I. 2012/3032                        |
|                                          | UKEX Regulations S.I. 2016/1107 (for Ex 2/22 variants) |

1) When the supply voltage is correctly applied.  
But not output to +V. Supply voltage and sensor output signal are not galvanically isolated.  
2) Over the whole temperature range.

# Absolute encoders – multiturn

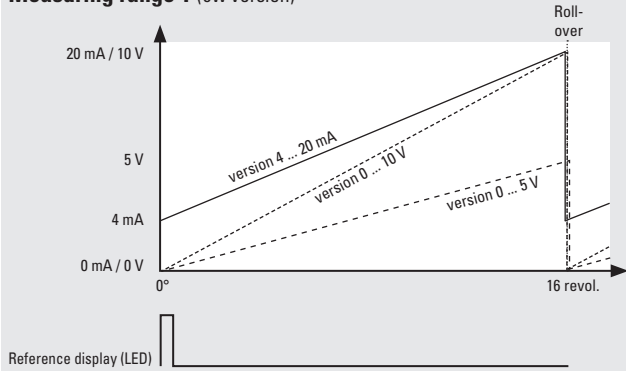
**Compact  
electronic multiturn, magnetic**

**Sendix M3661 / M3681 (shaft / hollow shaft)**

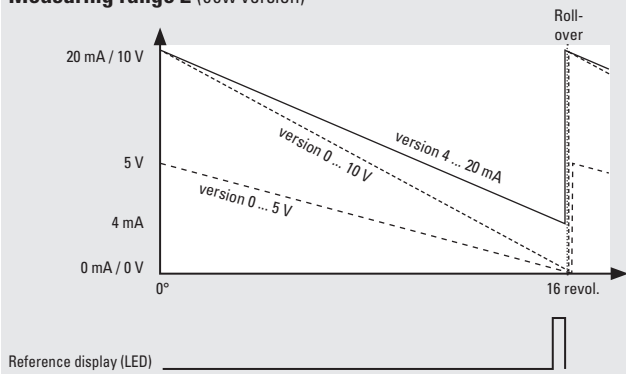
**Analog**

## Example (output signal evolution) – factory setting

### Measuring range 1 (cw version)

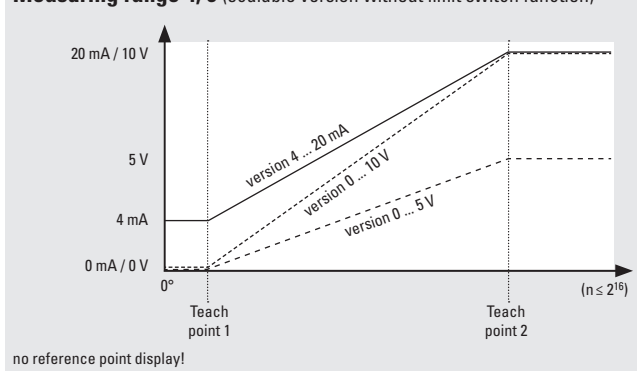


### Measuring range 2 (ccw version)

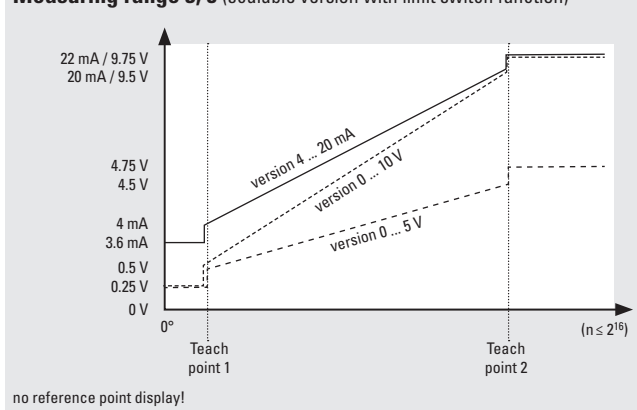


## Example (output signal evolution) – option: scalable

### Measuring range 4, 6 (scalable version without limit switch function)



### Measuring range 3, 5 (scalable version with limit switch function)



#### Factory-set measuring range

2<sup>4</sup> revolutions with roll-over

| Limit switch function | version | 0 ... 10 V | 0 ... 5 V | 4 ... 20 mA |
|-----------------------|---------|------------|-----------|-------------|
| limit switch low      |         | 0.25 V     | 0.25 V    | 3.6 mA      |
| limit switch high     |         | 9.75 V     | 4.75 V    | 22.0 mA     |

1) For scalable version.

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## Terminal assignment

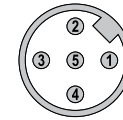
| Interface      | Type of connection | Cable (isolate unused cores individually before initial start-up) |     |    |    |                     |                     |
|----------------|--------------------|-------------------------------------------------------------------|-----|----|----|---------------------|---------------------|
| 3<br>(current) | 1, 2, A, B         | Signal:                                                           | 0 V | +V | +I | SET 1 <sup>1)</sup> | SET 2 <sup>1)</sup> |
|                |                    | Core color:                                                       | WH  | BN | GN | GY                  | PK                  |

| Interface      | Type of connection | M12 connector, 5 pin |     |    |    |                     |                     |
|----------------|--------------------|----------------------|-----|----|----|---------------------|---------------------|
| 3<br>(current) | 3, 4               | Signal:              | 0 V | +V | +I | SET 1 <sup>1)</sup> | SET 2 <sup>1)</sup> |
|                |                    | Pin:                 | 3   | 2  | 1  | 5                   | 4                   |

| Interface         | Type of connection | Cable (isolate unused cores individually before initial start-up) |     |    |    |                     |                     |
|-------------------|--------------------|-------------------------------------------------------------------|-----|----|----|---------------------|---------------------|
| 4, 5<br>(voltage) | 1, 2, A, B         | Signal:                                                           | 0 V | +V | +U | SET 1 <sup>1)</sup> | SET 2 <sup>1)</sup> |
|                   |                    | Core color:                                                       | WH  | BN | GN | GY                  | PK                  |

| Interface         | Type of connection | M12 connector, 5 pin |     |    |    |                     |                     |
|-------------------|--------------------|----------------------|-----|----|----|---------------------|---------------------|
| 4, 5<br>(voltage) | 3, 4               | Signal:              | 0 V | +V | +U | SET 1 <sup>1)</sup> | SET 2 <sup>1)</sup> |
|                   |                    | Pin:                 | 3   | 2  | 1  | 5                   | 4                   |

Top view of mating side, male contact base



M12 connector, 5-pin

+V : supply voltage encoder +V DC

0 V : supply voltage encoder ground GND (0 V)

+U : voltage

+I : current

SET 1 : set input for teachpoint 1

SET 2 : set input for teachpoint 2

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**Compact  
electronic multiturn, magnetic**

**Sendix M3661 / M3681 (shaft / hollow shaft)**

**Analog**

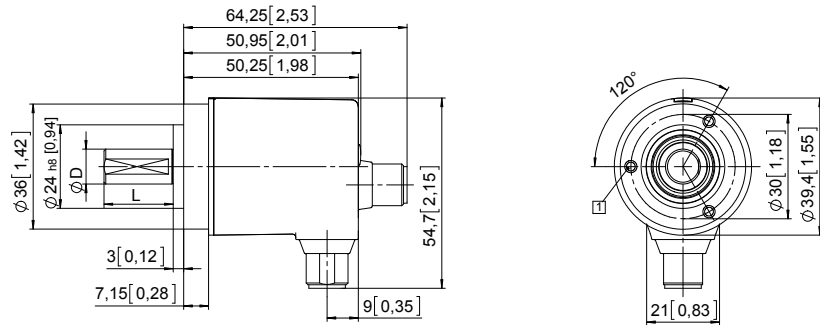
## Dimensions shaft version

Dimensions in mm [inch]

### Clamping flange, ø 36 [1.42]

Flange type 1 and 3

1 3 x M3, 6 [0.24] deep

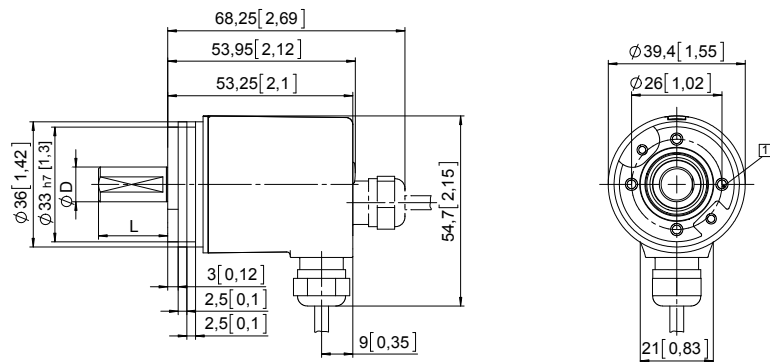


| D         | Fit | L           |
|-----------|-----|-------------|
| 6 [0.24]  | h7  | 12.5 [0.49] |
| 8 [0.32]  | h7  | 15 [0.59]   |
| 10 [0.39] | f7  | 20 [0.79]   |
| 1/4"      | h7  | 12.5 [0.49] |

### Synchro flange, ø 36 [1.42]

Flange type 2 and 4

1 4 x M3, 6 [0.24] deep



| D         | Fit | L           |
|-----------|-----|-------------|
| 6 [0.24]  | h7  | 12.5 [0.49] |
| 8 [0.32]  | h7  | 15 [0.59]   |
| 10 [0.39] | f7  | 20 [0.79]   |
| 1/4"      | h7  | 12.5 [0.49] |

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## Dimensions hollow shaft version

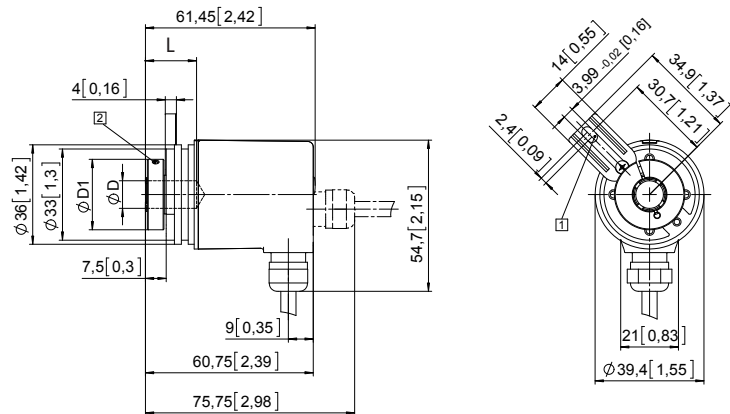
Dimensions in mm [inch]

### Flange with spring element, long Flange type 3 and 6

- 1 Slot spring element, recommendation: torque pin DIN 7,  $\varnothing 4$  [0.16]
- 2 Recommended torque for the clamping ring 0.7 Nm

| D         | Fit | L           | D1          |
|-----------|-----|-------------|-------------|
| 6 [0.24]  | H7  | 18.5 [0.73] | 24 [0.94]   |
| 8 [0.32]  | H7  | 18.5 [0.73] | 25.5 [1.00] |
| 10 [0.39] | H7  | 18.5 [0.73] | 25.5 [1.00] |
| 1/4"      | H7  | 18.5 [0.73] | 24 [0.94]   |

L = insertion depth max. blind hollow shaft



### Flange with stator coupling, $\varnothing 46$ [1.81] Flange type 2 and 5

- 1 Recommended torque for the clamping ring 0.7 Nm

| D         | Fit | L           | D1          |
|-----------|-----|-------------|-------------|
| 6 [0.24]  | H7  | 18.5 [0.73] | 24 [0.94]   |
| 8 [0.32]  | H7  | 18.5 [0.73] | 25.5 [1.00] |
| 10 [0.39] | H7  | 18.5 [0.73] | 25.5 [1.00] |
| 1/4"      | H7  | 18.5 [0.73] | 24 [0.94]   |

L = insertion depth max. blind hollow shaft

