

# Absolute encoders – multiturn

**Compact, robust  
electronic multiturn, magnetic**

**Sendix M3663R (shaft)**

**SSI**



The Sendix M36 with Energy Harvesting Technology is an electronic multiturn encoder in miniature format, without gear and without battery.

The "R"obust version is particularly suitable for use in harsh environments. Protected up to IP69k, resistance against shock and extreme temperature fluctuations, the Sendix M36 encoder is suitable even for demanding outdoor applications.



Safety-Lockplus™



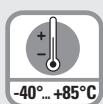
Standard option stainless steel



Standard option seawater resistant



High rotational speed



Temperature range -40°C ... +85°C



High protection level



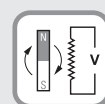
High shaft load capacity



Shock / vibration resistant



Reverse polarity protection



Energy Harvesting

## Highest robustness

- Sturdy bearing construction in Safety-Lockplus™ design for particularly high resistance.
- Extra large bearings.
- Mechanically protected shaft seal.
- Protection level IP66, IP67 and IP69k in one device.
- Wide temperature range -40°C ... +85°C.
- Without gear and without battery, thanks to the Energy Harvesting technology.

## Application oriented

- Absolute accuracy  $\pm 1^\circ$ .
- Repeat accuracy  $\pm 0.2^\circ$ .
- Short control cycles, clock frequency with SSI up to 2 MHz.
- Max. resolution 38 bit (14 bit ST + 24 bit MT).

## Order code

### Shaft version

**8.M3663R.**

Type

**.XX2X.XXX2**

a b c d e f g

### a Version

1 = standard <sup>1)</sup>

clamping flange  $\varnothing$  42 mm [1.65"]

7 = stainless steel V4A <sup>2)</sup>

clamping flange  $\varnothing$  42 mm [1.65"]

all metal parts accessible from outside are out of stainless steel V4A

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

1 =  $\varnothing$  6 x 12.5 mm [0.24 x 0.49"]

3 =  $\varnothing$  8 x 15 mm [0.32 x 0.59"]

5 =  $\varnothing$  10 x 20 mm [0.39 x 0.79"]

2 =  $\varnothing$  1/4" x 12.5 mm [0.49"]

E =  $\varnothing$  10 x 20 mm [0.39 x 0.79"], stainless steel V4A

### c Interface / power supply

2 = SSI / 10 ... 30 V DC

### d Type of connection

2 = radial cable, 1 m [3.28'] PUR

B = radial cable, special length PUR \*)

4 = radial M12 connector, 8-pin

\*) Available special lengths (connection type 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.M3663R.132B.G322.0030 (for cable length 3 m)

### e Code

B = SSI, binary

G = SSI, gray

### f Resolution (singleturn)

A = 10 bit ST

2 = 12 bit ST

3 = 13 bit ST

4 = 14 bit ST

### g Resolution (multiturn)

2 = 12 bit MT

6 = 16 bit MT

A = 20 bit MT

4 = 24 bit MT

### Optional on request

- Ex 2/22 (only for connection type 4)

- other shaft diameters out of V4A stainless steel

1) Not in conjunction with shaft type "E".

2) Only in conjunction with shaft type "E" + type of connection "4".

# Absolute encoders – multiturn

|   |  |   |                                       |
|---|--|---|---------------------------------------|
| <b>Compact, robust electronic multiturn, magnetic</b> |  | <b>Sendix M3663R (shaft)</b>              | <b>SSI</b>                            |
| <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> <sup>1)</sup> |
| <b>Connection technology</b>                          |  | Order no.                                 |                                       |
| <b>Cordset, pre-assembled</b>                         | M12 female connector with coupling nut, 8-pin<br>2 m [6.56"] PUR cable     | <b>05.00.6051.8211.002M</b> <sup>1)</sup> |                                       |
| <b>Connector, self-assembly (straight)</b>            | M12 female connector with coupling nut, 8-pin                              | <b>05.CMB 8181-0</b> <sup>1)</sup>        |                                       |
|   | M12 female connector with coupling nut, 8-pin, housing stainless steel V4A | <b>8.0000.5136.0000.V4A</b>               |                                       |

Further accessories can be found in the accessories section or in the accessories area of our website at: [kuebler.com/accessories](http://kuebler.com/accessories).  
Additional connectors can be found in the connection technology section or in the connection technology area of our website at: [kuebler.com/connection\\_technology](http://kuebler.com/connection_technology).

## Technical data

| Mechanical characteristics                |  |   |                                  |
|---|--|---|----------------------------------|
| Maximum speed                             |  | 4000 min <sup>-1</sup><br>2000 min <sup>-1</sup> (continuous) |                                  |
| Starting torque at 20°C [68°F]            |  | < 0.01 Nm   |                                  |
| Shaft load capacity                       |  | radial<br>axial   | 80 N<br>40 N                     |
| Weight                                    |  | approx. 0.2 kg [7.06 oz]                                      |                                  |
| Protection acc. to EN 60529/DIN 40050-9   |  | IP66, IP67, IP69k   |                                  |
| Working temperature range                 |  | -40°C ... +85°C [-40°F ... +185°F]                            |                                  |
| Materials                                 |  | version "1"<br>(standard)                                     | version "7"<br>(stainless steel) |
|   |  | shaft   | V2A                              |
|   |  | flange  | aluminum                         |
|   |  | housing   | zinc die-cast                    |
|   |  | cable   | PUR                              |
|   |  |   | —                                |
| Shock resistance acc. to EN 60068-2-27    |  | 5000 m/s <sup>2</sup> , 4 ms                                  |                                  |
| Vibration resistance acc. to EN 60068-2-6 |  | 300 m/s <sup>2</sup> , 10 ... 2000 Hz                         |                                  |

| SSI interface  |  |  |                        |
|--|--|--|------------------------|
| Output driver  |  | RS485 transceiver type                     |                        |
| Permissible load / channel   |  | max. +/- 30 mA                             |                        |
| Signal level   |  | HIGH<br>LOW with I <sub>Load</sub> = 20 mA | typ 3.8 V<br>typ 1.3 V |
| Resolution singleturn  |  | 10 ... 14 bit                              |                        |
| Absolute accuracy <sup>3)</sup>  |  | ±1°  |                        |
| Repeat accuracy  |  | ±0.2°                                      |                        |
| Number of revolutions (multiturn)  |  | max. 24 bit                                |                        |
| Code   |  | binary or gray                             |                        |
| SSI clock rate   |  | 50 kHz ... 2 MHz                           |                        |
| Data refresh rate  |  | 2 ms                                       |                        |
| Monoflop time  |  | ≤ 15 µs                                    |                        |
| Note: If the clock cycle starts within the monoflop time a second data transfer begins with the same data. If the clock cycle starts after the monoflop time the cycle begins with the new values. The update rate is dependent on the clock speed, data length and monoflop time. |  |  |                        |

| Electrical characteristics                      |  |
|---|--|
| Power supply                                    | 10 ... 30 V DC   |
| Current consumption (no load)                   | max. 30 mA   |
| Reverse polarity protection of the power supply | yes  |
| Short-circuit proof outputs                     | yes <sup>2)</sup>  |
| e1 compliant acc. to (pending)                  | EU guideline 2009/19/EC (acc. to EN 55025, ISO 11452 and ISO 7637) |
| UL approval                                     | File no. E224618   |
| CE compliant acc. to                            | EMC guideline 2014/30/EU<br>RoHS guideline 2011/65/EU              |

| SET input   |  |             |   |
|---|--|-------------|---|
| Input   |  | active HIGH |   |
| Input type  |  | comparator  |   |
| Signal level (+V = power supply)  |  | HIGH<br>LOW | min. 60 % of +V, max: +V<br>max. 30 % of +V |
| Input current   |  | < 0.5 mA    |   |
| Min. pulse duration (SET)   |  | 10 ms       |   |
| Input delay   |  | 1 ms        |   |
| New position data readable after  |  | 1 ms        |   |
| Internal processing time  |  | 200 ms      |   |
| The encoder can be set to zero at any position by means of a HIGH signal on the SET input. Other preset values can be factory-programmed. The SET input has a signal processing time of approx. 1 ms, after which the new position data can be read via SSI or BiSS. Once the SET function has been triggered, the encoder requires an internal processing time of typ. 200 ms; during this time the power supply must not be switched off. |  |             |   |
| The SET function should be carried out whilst the encoder is at rest.   |  |             |   |
| If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences.  |  |             |   |

1) Not for version "7" (V4A stainless steel)  
2) Short circuit proof to 0 V or to output when power supply correctly applied.  
3) Over the whole temperature range.

# Absolute encoders – multiturn

|   |                              |            |
|---|------------------------------|------------|
| <b>Compact, robust<br/>electronic multiturn, magnetic</b> | <b>Sendix M3663R (shaft)</b> | <b>SSI</b> |
|---|------------------------------|------------|

|  |   |
|--|---|
| <b>DIR input</b><br>Direction input: A HIGH signal switches the direction of rotation from the default cw to ccw. This inverted function can also be factory-programmed.<br>If this input is not used, it should be connected to 0 V (Encoder ground GND) in order to avoid interferences. | <b>Power-ON</b><br>After Power-ON the device requires a time of approx. 150 ms before valid data can be read.<br>Hot plugging of the encoder should be avoided. |
| <b>Response time (DIR input)</b>   | 1 ms  |

## Terminal assignment

| Interface | Type of connection | Features | Cable (isolate unused cores individually before initial start-up) |     |    |    |    |    |    |     |     |        |
|-----------|--------------------|----------|---|-----|----|----|----|----|----|-----|-----|--------|
| 2         | 2, B               | SET, DIR | Signal:   | 0 V | +V | C+ | C- | D+ | D- | SET | DIR | ⊥      |
|           |                    |          | Core color:   | WH  | BN | GN | YE | GY | PK | BU  | RD  | shield |

| Interface | Type of connection | Features | M12 connector, 8-pin |     |    |    |    |    |    |     |     |    |
|-----------|--------------------|----------|----------------------|-----|----|----|----|----|----|-----|-----|----|
| 2         | 4                  | SET, DIR | Signal:              | 0 V | +V | C+ | C- | D+ | D- | SET | DIR | ⊥  |
|           |                    |          | Pin:                 | 1   | 2  | 3  | 4  | 5  | 6  | 7   | 8   | PH |

+V: Encoder power supply +V DC  
 0 V: Encoder power supply ground GND (0 V)  
 C+, C-: Clock signal  
 D+, D-: Data signal  
 SET: Set input  
 DIR: Direction input  
 PH ⊥: Plug connector housing (shield)

## Top view of mating side, male contact base



M12 connector, 8-pin

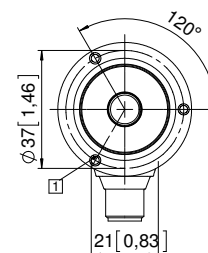
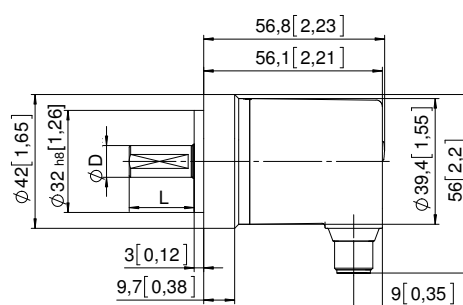
## Dimensions

Dimensions in mm [inch]

**Aluminum,  
clamping flange, ø 42 [1.65]  
version 1**

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] |



**Stainless steel V4A  
clamping flange, ø 42 [1.65]  
version 7**

1 4 x M4, 8 [0.31] 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] |

