

# Absolute encoders – multiturn

**Compact, robust  
electronic multiturn, magnetic**

**Sendix M3668R (shaft)**

**CANopen**



The Sendix M36 with Energy Harvesting Technology is an electronic multiturn encoder in miniature format, without gear and without battery. It is characterized by robustness, reliability and cost-efficiency.

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



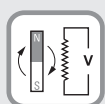
High shaft load capacity



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.

## Up-to-the-minute fieldbus performance

- LSS services for configuration of the node address and baud rate.
- Variable PDO mapping in the memory.
- Universal scaling function.
- Configuration management (bootloader).

## Order code

### Shaft version

**8.M3668R.**

Type

**XX2X.2122**

a

b

c

d

e

### a Version

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

clamping flange ø 42 mm [1.65"]

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

clamping flange ø 42 mm [1.65"]

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

### b Shaft (ø x L), with flat

1 = ø 6 x 12.5 mm [0.24 x 0.49"]

3 = ø 8 x 15 mm [0.32 x 0.59"]

5 = ø 10 x 20 mm [0.39 x 0.79"]

2 = ø 1/4" x 12.5 mm [0.49"]

E = ø 10 x 20 mm [0.39 x 0.79"], stainless steel V4A

### c Interface / power supply

2 = CANopen DS301 V4.2 / 10 ... 30 V DC

### d Type of connection

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

B = radial cable, special length PVC \*)

4 = radial M12 connector, 5-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.M3668.132B.2122.0030 (for cable length 3 m)

### e Fieldbus profile

21 = CANopen

### 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

| Compact, robust electronic multiturn, magnetic | Sendix M3668R (shaft)                                                   | CANopen                            |
|------------------------------------------------|-------------------------------------------------------------------------|------------------------------------|
| Mounting accessory for shaft encoders          |                                                                         | Order no.                          |
| Coupling                                       | Bellows coupling ø 19 mm [0.75"] for shaft 8 mm [0.32"]                 | 8.0000.1102.0808 <sup>1)</sup>     |
| Connection technology                          |                                                                         | Order no.                          |
| Cordset, pre-assembled                         | M12 female connector with coupling nut, 5-pin<br>5 m [19.69'] PVC cable | 05.00.6091.A211.005M <sup>1)</sup> |
| Connector, self-assembly (straight)            | M12 female connector with coupling nut, 5-pin                           | 8.0000.5116.0000 <sup>1)</sup>     |

Further accessories can be found in the accessories section or in the accessories area of our website at: [www.kuebler.com/accessories](http://www.kuebler.com/accessories).  
Additional connectors can be found in the connection technology section or in the connection technology area of our website at: [www.kuebler.com/connection\\_technology](http://www.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      | 80 N                                                                     |     |
|                                                 | axial       | 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" | version "7"                                                              |     |
|                                                 | (standard)  | (stainless steel)                                                        |     |
|                                                 | shaft       | V2A                                                                      | V4A |
|                                                 | flange      | aluminum                                                                 | V4A |
|                                                 | housing     | zinc die-cast                                                            | V4A |
| cable                                           | PVC         | —                                                                        |     |
| 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                                    |     |
| 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<br>(acc. to EN 55025,<br>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                    |     |

| Interface characteristics CANopen |                                                                                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Resolution singleturn             | 1 ... 16384 (14 bit), scalable<br>default: 8192 (13 bit)                                                                                            |
| Absolute accuracy <sup>3)</sup>   | ±1°                                                                                                                                                 |
| Repeat accuracy                   | ±0.2°                                                                                                                                               |
| Number of revolutions (multiturn) | max. 16.777.216 (24 bit)<br>scalable only via the total resolution                                                                                  |
| Total resolution                  | 1 ... 274.877.906.944 (38 bit), scalable<br>default: 33.554.432 (25 bit)                                                                            |
| Code                              | binary                                                                                                                                              |
| Interface                         | CAN high-speed acc. to ISO 11898,<br>Basic- and Full-CAN,<br>CAN specification 2.0 B                                                                |
| Protocol                          | CANopen profile DS406 V4.0<br>with manufacturer-specific add-ons,<br>LSS-Service, bootloader                                                        |
| Power-ON time                     | < 1200 ms                                                                                                                                           |
| SDO timeout                       | < 1000 ms                                                                                                                                           |
| Baud rate                         | 10 ... 1000 kbit/s<br>software configurable                                                                                                         |
| Node address                      | 1 ... 127<br>software configurable                                                                                                                  |
| Termination                       | software configurable                                                                                                                               |
| LSS protocol                      | CIA LSS protocol DS305,<br>global command support for node<br>address and baud rate,<br>selective commands via attributes of<br>the identity object |
| Bootloader                        | configuration management<br>CIA DS 302-3                                                                                                            |

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.

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**CANopen**

## General information about CANopen

The CANopen encoders support the latest CANopen communication profile according to DS301 V4.02. In addition, device-specific profiles like the encoder profile DS406 V3.2, DS305 (LSS) and DS302 (Bootloader) are available.

The following operating modes may be selected: Polled Mode, Cyclic Mode, Sync Mode. Moreover, scale factors, preset values, limit switch values and many other additional parameters can be programmed via the CANbus. When switching the device on, all parameters, which have been saved on a flash memory to protect them against power failure, are loaded again.

The following output values may be combined in a freely variable way as PDO (PDO mapping): **position, speed, acceleration** as well as the **status of the working area**.

The encoders are available with a connector or a cable connection.

The device address and baud rate can be set/modified by means of the software.

The two-color LED located on the back indicates the operating or fault status of the CAN-bus, as well as the status of the internal diagnostics.

## CANbus connection

The CANopen encoders are equipped with a bus trunk line in various lengths or a M12 connector and can be terminated in the device.

The devices do not have an integrated T-coupler nor they are looped internally and must therefore only be used as end devices.

## LSS layer setting services DS305 V2.0

- Global command support for node ID and baud rate configuration.
- Selective protocol via identity object (1018h).

## CANopen communication profile DS301 V4.2

Among others, the following functionality is integrated. (Class C2 functionality):

- NMT Slave.
- Heartbeat Protocol.
- Identity Object.
- Error Behavior Object.
- Variable PDO Mapping self-start programmable (Power on to operational), 3 Sending PDO's.
- Node address, baud rate and CANbus / programmable termination.

## CANopen encoder profile DS406 V4.0

The following parameters can be programmed:

- Event mode, start optional.
- 1 work area with upper and lower limit and the corresponding output states.
- Variable PDO mapping for position, speed, work area status, error and acceleration.
- Extended failure management for position sensing.
- User interface with visual display of bus and failure status 1 LED two colors.
- Customer-specific protocol.
- "Watchdog controlled" device.

## Bootloader functionality DS302-3

Configuration Management:

- Program download.
- Program start.
- Program erase.

## Terminal assignment

| Interface | Type of connection | Cable (isolate unused cores individually before initial start-up) |    |     |         |       |
|-----------|--------------------|-------------------------------------------------------------------|----|-----|---------|-------|
| 2         | 2, B               | Signal:                                                           | +V | 0 V | CAN_GND | CAN_H |
|           |                    | Core color:                                                       | BN | WH  | GY      | GN    |
| 2         | 4                  | Signal:                                                           | +V | 0 V | CAN_GND | CAN_H |
|           |                    | Pin:                                                              | 2  | 3   | 1       | 4     |

Top view of mating side, male contact base



M12 connector, 5-pin

1) Over the whole temperature range.

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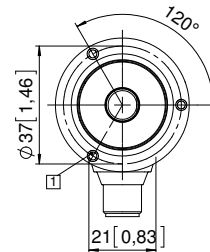
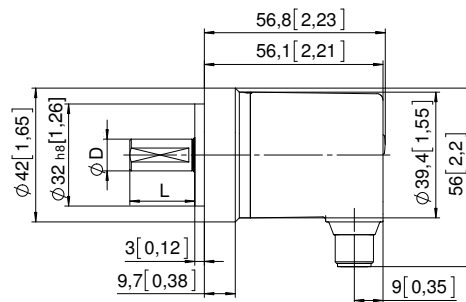
## Dimensions

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] |

