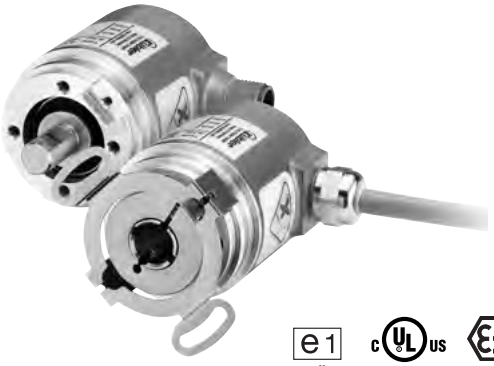
Compact electronic multiturn, magnetic | **Sendix M3668 / M3688 (shaft / hollow shaft)** | **CANopen**



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

It is characterized by robustness, reliability and cost-efficiency.

e1 pending | cULus | Ex 2/22 | RoHS | CANopen

Safety-Lock™ | High rotational speed | Temperature range | High protection level | High shaft load capacity | Shock / vibration resistant | Reverse polarity protection | Surface protection salt spray-tested optional | Energy Harvesting

Reliable and insensitive

- Sturdy bearing construction in Safety-Lock™ design for resistance against vibration and installation errors.
- Reduced number of components ensures magnetic insensitivity.
- IP67 protection and 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.M3668	.	X	X	2	X	.	21	2	2
Type		a	b	c	d		e		

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces. Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

10 by 10

a *Flange*
1 = clamping flange, IP67, ø 36 mm [1.42"]
3 = clamping flange, IP65, ø 36 mm [1.42"]
2 = synchro flange, IP67, ø 36 mm [1.42"]
4 = synchro flange, IP65, ø 36 mm [1.42"]

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"]

c *Interface / power supply*
2 = CANopen DS301 V4.2 / 10 ... 30 V DC

d *Type of connection*
1 = axial cable, 1 m [3.28'] PVC
A = axial cable, special length PVC *)
2 = radial cable, 1 m [3.28'] PVC
B = radial cable, special length PVC *)
3 = axial M12 connector, 5-pin
4 = radial M12 connector, 5-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.M3668.432A.2122.0030 (for cable length 3 m)

e *Fieldbus profile*
21 = CANopen

Optional on request
- Ex 2/22 (only for connection types 3 and 4)
- surface protection salt spray tested

Compact electronic multiturn, magnetic	Sendix M3668 / M3688 (shaft / hollow shaft)	CANopen

Order code Hollow shaft

8.M3688 . X X 2 X . 21 2 2
Type a b c d e

If for each parameter of an encoder the **underlined preferred option** is selected, then the delivery time will be 10 working days for a maximum of 10 pieces.
Qts. up to 50 pcs. of these types generally have a delivery time of 15 working days.

10 by 10

a *Flange*
2 = with stator coupling, IP65, ø 46 mm [1.81"]
3 = with spring element, long, IP65
5 = with stator coupling, IP67, ø 46 mm [1.81"]
6 = with spring element, long, IP67

b *Blind hollow shaft*
(insertion depth max. 18.5 mm [0.73"])
1 = ø 6 mm [0.24"]
3 = ø 8 mm [0.32"]
4 = ø 10 mm [0.39"]
2 = ø 1/4"

c *Interface / power supply*
2 = CANopen DS301 V4.2 / 10 ... 30 V DC

d *Type of connection*
1 = axial cable, 1 m [3.28'] PVC
A = axial cable, special length PVC *)
2 = radial cable, 1 m [3.28'] PVC
B = radial cable, special length PVC *)
3 = axial M12 connector, 5-pin
4 = radial M12 connector, 5-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.M3688.242A.2122.0030 (for cable length 3 m)

e *Fieldbus profile*
21 = CANopen

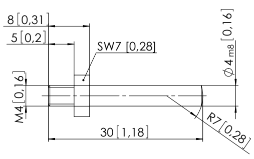
Optional on request
- Ex 2/22 (only for connection types 3 and 4)
- surface protection salt spray tested

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**

Mounting accessory for hollow shaft encoders

	Dimensions in mm [inch]	Order no.
Cylindrical pin, long for flange with spring element (flange type 3 + 6)	with fixing thread	**8.0010.4700.0000**



Connection technology

		Order no.
Cordset, pre-assembled	M12 female connector with coupling nut, 5-pin 5 m [16.40'] PVC cable	**05.00.6091.A211.005M**
Connector, self-assembly (straight)	M12 female connector with coupling nut, 5-pin	**8.0000.5116.0000**

Further accessories can be found in the accessories section or in the accessories area of our website at: 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.

Technical data

Mechanical characteristics

Maximum speed shaft or blind hollow shaft version without shaft seal (IP65)	6000 min^{-1} 3000 min^{-1} (continuous)
shaft or blind hollow shaft version with shaft seal (IP67)	4000 min^{-1} 2000 min^{-1} (continuous)
Starting torque at 20°C [68°F] without shaft seal with shaft seal (IP67	 < 0.007 Nm < 0.01 Nm
Shaft load capacity radial axial	40 N 20 N
Weight	approx. 0.2 kg [7.06 oz]
Protection acc. to EN 60529	IP65 or IP67
Working temperature range	-40°C ... +85°C [-40°F ... +185°F]
Materials shaft / hollow shaft flange housing cable	stainless steel aluminum zinc die-cast PVC

Shock resistance acc. to EN 60068-2-27	2500 m/s^2, 6 ms
Vibration resistance acc. to EN 60068-2-6	300 m/s^2, 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 1)
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 RoHS guideline 2011/65/EU

1) Short circuit proof to 0 V or to output when power supply correctly applied.

Compact
electronic multiturn, magnetic | **Sendix M3668 / M3688 (shaft / hollow shaft)** | **CANopen**

Interface characteristics CANopen	
Resolution singleturn	1 ... 16.384 (14 bit), scalable default: 16.384 (14 bit)
Absolute accuracy [1]	±1°
Repeat accuracy	±0.2°
Number of revolutions (multiturn)	max. 536.870.912 (29 bit) scalable only via the total resolution default: 262.144 (18 bit)
Total resolution	1 ... 8.796.093.022.208 (43 bit), scalable default: 4.294.967.296 (32 bit)
Interface	CAN high-speed acc. to ISO 11898, Basic- and Full-CAN, CAN specification 2.0 B
Protocol	CANopen profile DS406 V4.0 with manufacturer-specific add-ons, LSS-Service, bootloader

Power-ON time	< 1200 ms
SDO timeout	< 1000 ms
Baud rate	10 ... 1000 kbit/s software configurable
Node address	1 ... 127 software configurable
Termination	software configurable
LSS protocol	CIA LSS protocol DS305, global command support for node address and baud rate, selective commands via attributes of the identity object
Bootloader	configuration management CIA DS 302-3

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 support of node-ID and baud rate.
- 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.

1) Over the whole temperature range.

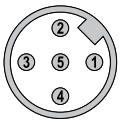
Compact electronic multiturn, magnetic | **Sendix M3668 / M3688 (shaft / hollow shaft)** | **CANopen**

Terminal assignment

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

Interface	Type of connection	M12 connector, 5-pin					
2	3, 4	Signal:	+V	0 V	CAN_GND	CAN_H	CAN_L
		Pin:	2	3	1	4	5

Top view of mating side, male contact base



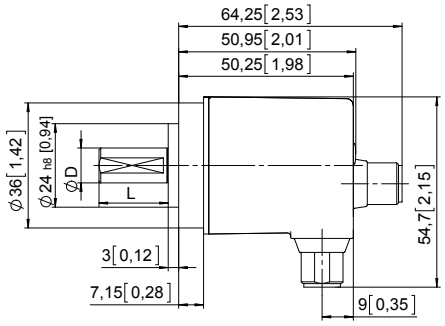
M12 connector, 5-pin

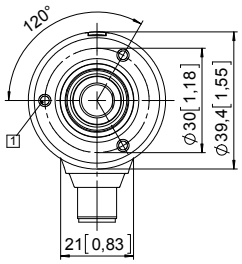
Dimensions shaft version

Dimensions in mm [inch]

Clamping flange, ø 36 [1.42]
Flange type 1 and 3

1 3 x M3, 6 [0.24] deep

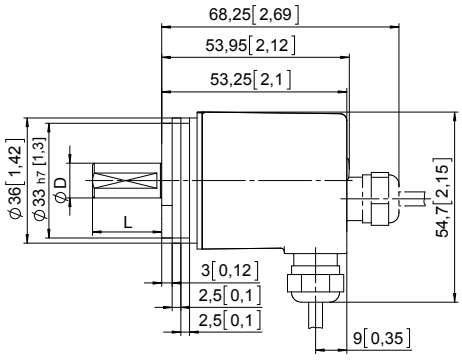


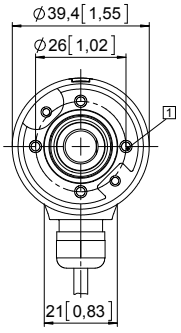


D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4“	h7	12.5 [0.49]

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]

Compact electronic multiturn, magnetic | **Sendix M3668 / M3688 (shaft / hollow shaft)** | **CANopen**

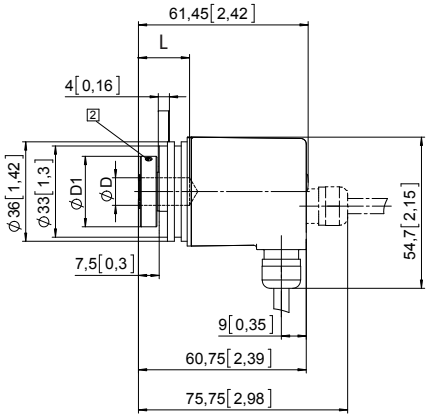
Dimensions hollow shaft version

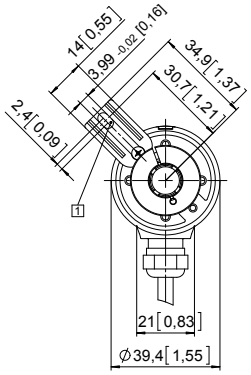
Dimensions in mm [inch]

Flange with spring element, long
Flange type 3 and 6

1 Slot spring element, recommendation: cylindrical pin DIN 7, ø 4 [0.16]

2 Recommended torque for the clamping ring 0.7 Nm

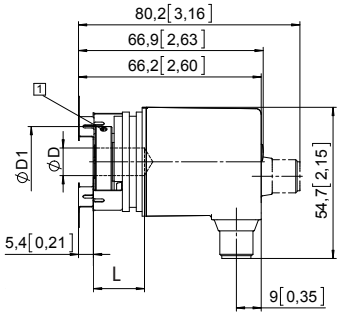


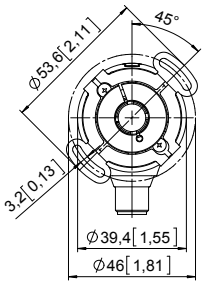


D	Fit	L	D1
6 [0.24]	H7	18.5 [0.73]	24 [0.94]
8 [0.32]	H7	18.5 [0.73]	25.5 [1.00]
10 [0.39]	H7	18.5 [0.73]	25.5 [1.00]
1/4"	H7	18.5 [0.73]	24 [0.94]
L = insertion depth max. blind hollow shaft			

Flange with stator coupling, ø 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			