

Absolute encoders – multiturn

**Compact, robust
electronic multiturn, magnetic**

Sendix M3668R (shaft)

SAE J1939

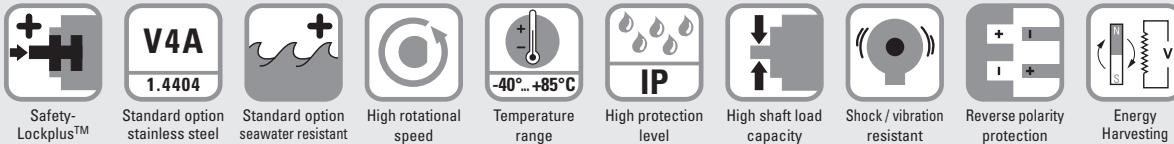


The Sendix M36 with Energy Harvesting Technology is an electronic multiturn encoder in miniature format, without gear and without battery. It is characterized by robustness, reliability and cost-efficiency.

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.



SAE J1939



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

- Up-to-the-minute fieldbus performance in the application: SAE J1939 with CAN-highspeed to ISO 11898.
- Universal Scaling Function.
- Fast determination of the operating status via two-color LED.

Order code 8.M3668R.XX3X.3222
Shaft version Type a b c d e

a Version

- 1 = standard ¹⁾
clamping flange \varnothing 42 mm [1.65"]
- 7 = stainless steel V4A ²⁾
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

- 3 = SAE J1939 / 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.M3668.133B.3222.0030 (for cable length 3 m)

e Fieldbus profile

- 32 = SAE J1939

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".

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| | | | |
|---|--|------------------------------|---|
| Compact, robust electronic multiturn, magnetic | | Sendix M3668R (shaft) | SAE J1939 |
| 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 ¹⁾ |
| 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 ¹⁾ |
| | M12 female connector with coupling nut, 5-pin 1 m [3.28'] PVC cable | | 05.00.6091.22C7.001M ¹⁾ |
| | Deutsch connector, 6-pin, DT04 | | 05.00.6091.22C7.001M ¹⁾ |
| Connector, self-assembly (straight) | M12 female connector with coupling nut, 5-pin | | 8.0000.5116.0000 ¹⁾ |
| | M12 female connector with coupling nut, 5-pin, housing stainless steel V4A | | 8.0000.5116.0000.V4A |

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 | | 4000 min ⁻¹ 2000 min ⁻¹ (continuous) | |
| Starting torque at 20°C [68°F] | | < 0.01 Nm | |
| Shaft load capacity | radial axial | 80 N 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" (standard) | version "7" (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 ² , 4 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 ²⁾ | |
| 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 | |
| Interface characteristics SAE J1939 | | | |
| Resolution singleturn | | 1 ... 16.384 (14 bit), scalable default: 16.384 (14 bit) | |
| Absolute accuracy ³⁾ | | ±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, CAN specification 2.0 B | |
| Protocol | | SAE J1939 | |
| Power-ON time | | < 1200 ms | |
| Baud rate | | 250 kbit/s switchable by software to 500 kbit/s | |
| Node address | | software configurable | |
| Termination | | software configurable | |

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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SAE J1939

General information concerning SAE J1939

The protocol J1939 originates from the international Society of Automotive Engineers (SAE) and operates on the physical layer with high speed CAN as per ISO11898. The application emphasis lies in the area of the power train and chassis of commercial vehicles. It serves to transfer diagnostic data (for example, motor speed, position, temperature) and control information. Type series M3658 and M3678 encoders support the total functionality of J1939.

This protocol is a multimaster system with decentralized network management that does not involve channel-based communication.

It supports up to 254 logic nodes and 30 physical control devices per segment. The information is described as parameters (signals) and combined on 4 memory pages (data pages) into parameter groups (PGs). Each parameter group can be identified via a unique number, the parameter group number (PGN). Independently of this, each signal is assigned a unique SPN (suspect parameter number).

The major part of the communication occurs cyclically and can be received by all control devices without the explicit request for data (Broadcast). Furthermore the parameter groups are optimized to a length of 8 data bytes. This enables very efficient utilization of the CAN protocol. If greater amounts of data need to be transferred, then transport protocols (TP) can be used: BAM (broadcast announce message) and CMDT (connection mode data transfer). With BAM TP the transfer of data occurs as a broadcast.

Encoder implementation SAE J1939

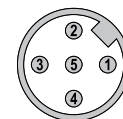
- PGNs that are adaptable to the customer's application.
- Resolution of address conflicts -> Address Claiming (ACL).
- Continuous checking whether control addresses have been assigned twice within a network.
- Change of control device addresses during run-time.
- Unique identification of a control device with the help of a name that is unique worldwide. This name serves to identify the functionality of a control device in the network.
- Predefined PGs for position, speed and alarm.
- 250 kbit/s, 29 bit identifier.
- Watchdog controlled device.

A two-color LED, located on the rear of the encoder, signals the operating and fault status of the J1939 protocol, as well as the status of the internal sensor diagnostics.

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 | CAN_L |
| | | Core color: | BN | WH | GY | GN | YE |
| Interface | Type of connection | M12 connector, 5-pin | | | | | |
| 2 | 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

1) Over the whole temperature range.

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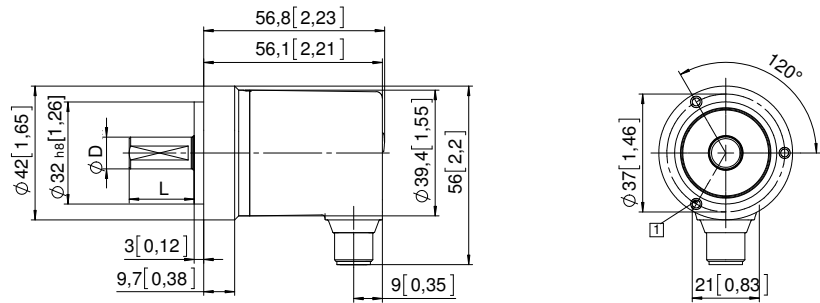
Dimensions

Dimensions in mm [inch]

Aluminum, clamping flange, \varnothing 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, \varnothing 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] |

