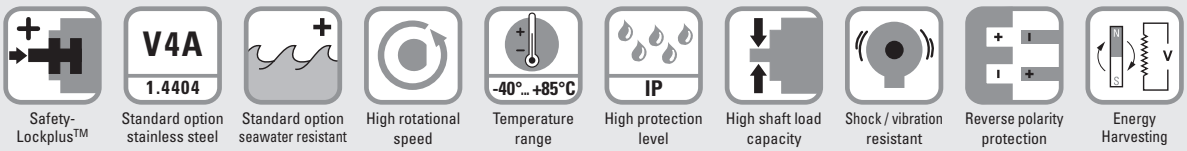
Compact, robust electronic multiturn, magnetic | **Sendix M3668R (shaft)** | **SAE J1939**

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



Safety-Lockplus™ | Standard option stainless steel | Standard option seawater resistant | High rotational speed | Temperature range | 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

- 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 Shaft version

8.M3668R.	X	X	3	X	.	32	2	2
Type	a	b	c	d		e		

a *Version*
1 = standard [1]
clamping flange ø 42 mm [1.65"]
7 = stainless steel V4A [2]
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 / supply voltage*
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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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]

Cables and connectors

			Order no.
Preassembled cables	M12 female connector with coupling nut, 5-pin, A coded, straight open ended 5 m [16.40‘] PVC cable	Bus in	**05.00.6091.A211.005M** [1]
	M12 female connector with coupling nut, 5-pin, A coded, straight Deutsch connector DT04, male contacts, 6-pin, straight 1 m [3.28‘] PVC cable	Bus in	**05.00.6091.22C7.001M** [1]
Connectors	M12 female conn. with coupling nut, 5-pin, A coded, straight (metal)	Bus in	**8.0000.5116.0000** [1]
	M12 female conn. with coupling nut, 5-pin, A coded, straight (stainless steel V4A)	Bus in	**8.0000.5116.0000.V4A**

Further Kübler accessories can be found at: kuebler.com/accessories
Further Kübler cables and connectors can be found at: 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. 250 g [8.82 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

Supply voltage	10 ... 30 V DC
Current consumption (no load)	max. 30 mA
Reverse polarity protection of the supply voltage	yes
Short-circuit proof outputs	yes [2]

Interface characteristics SAE J1939

Resolution singleturn (MUR)	scalable default	1 ... 16 384 (14 bit) 16 384 (14 bit)
Number of revolutions (NDR)		1 ... 536 870 912 (29 bit) scalable only via the total resolution
Total resolution (TMR)	raw value scalable default	max. 8 796 093 022 208 (43 bit) 1 ... 4 294 967 296 (32 bit) 4 294 967 296 (32 bit)
Absolute accuracy [3]		±1°
Repeat accuracy		±0.2°
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

Approvals

E1 compliant in accordance with	ECE guideline
UL compliant in accordance with	File no. E224618
CE compliant in accordance with	
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU
ATEX Directive	2014/34/EU (for Ex 2/22 variants)
UKCA compliant 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) Not for version “7” (V4A stainless steel)
2) Short circuit proof to 0 V or to output when supply voltage correctly applied.
3) Over the whole temperature range.

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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.

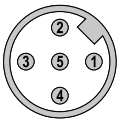
A two-color LED, located on the rear of the encoder, signals the operating and fault status of the J1939 protocol, as well as the status of the internal sensor diagnostics.

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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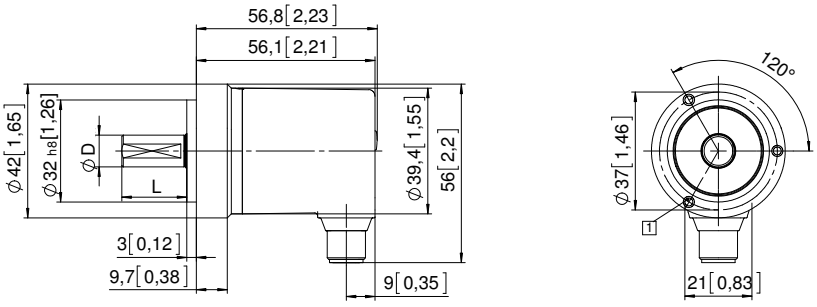
Dimensions

Dimensions in mm [inch]

Aluminum, clamping flange, 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
10 [0.39]	f7	20 [0.79]