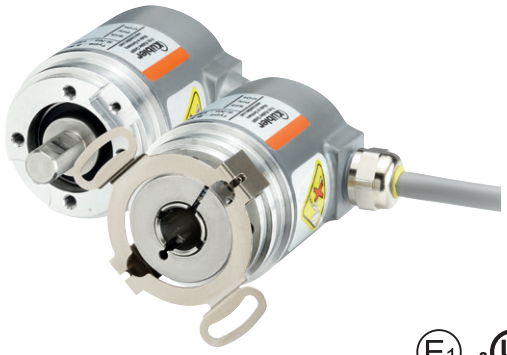
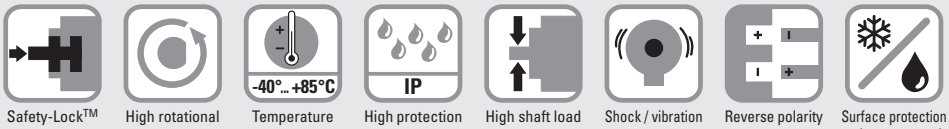
Compact magnetic | **Sendix M3658A / M3678A (shaft / hollow shaft)** | **SAE J1939**



The absolute encoders Singleturn Sendix M3658A / M3678A with SAE J1939 interface support all common requirements of the special protocol for commercial vehicles and make a significant contribution to comprehensive system diagnostics or fast fault localization.

The encoders can be put into operation quickly and error-free without having to set any switches; the addresses are assigned automatically by Address Claiming (ACL).

SAE J1939



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

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.

Up-to-the-minute fieldbus performance

- Up-to-the-minute fieldbus performance in the application: SAE J1939 with CAN-highspeed to ISO 11898.
- Fast determination of the operating status via two-color LED.
- Fast and error-free commissioning without setting switches with automatic address assignment (ACL).

Order code Shaft version

8.M3658A	.	X	X	3	X	.	32	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 / supply voltage*
3 = SAE J1939 / 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.M3658A.433A.3222.0030 (for cable length 3 m)

e *Fieldbus profile*
32= SAE J1939

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

Compact magnetic	Sendix M3658A / M3678A (shaft / hollow shaft)	SAE J1939

Order code Hollow shaft

8.M3678A	.	X	X	3	X	.	32	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 / supply voltage*
3 = SAE J1939 / 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.M3678A.243A.3222.0030 (for cable length 3 m)

e *Fieldbus profile*
32= SAE J1939

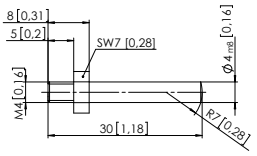
Optional on request
- Ex 2/22 (only for connection types 3 and 4)
- surface protection salt spray tested

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.
Torque pin, ø 4 mm for flange with spring element (flange type 3 + 6)	with fixing thread 	**8.0010.4700.0000**

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**
	M12 female connector with coupling nut, 5-pin, A coded, straight Deutsch connector DT04, Stift , 6-pin, straight 1 m [3.28'] PVC cable	Bus in	**05.00.6091.22C7.001M**
Connector	M12 female connector with coupling nut, 5-pin, A coded, straight (metal)	Bus in	**8.0000.5116.0000**

Further Kübler accessories can be found at: kuebler.com/accessories
Further Kübler cables and connectors can be found at: kuebler.com/connection-technology

Compact magnetic | **Sendix M3658A / M3678A (shaft / hollow shaft)** | **SAE J1939**

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	< 0.007 Nm
	with shaft seal (IP67	< 0.01 Nm
Shaft load capacity	radial	40 N
	axial	20 N
Weight		approx. 210 g [7.41 oz]
Protection acc. to EN 60529		IP65 or IP67
Working temperature range		-40°C ... +85°C [-40°F ... +185°F]
Materials	shaft / hollow shaft	stainless steel
	flange	aluminum
	housing	zinc die-cast
	cable	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

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 [1]

Interface characteristics SAE J1939

Resolution	1 ... 16.384 (14 bit), scalable default: 16.384 (14 bit)
Angular measurement deviation [2]	±0,5°
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)

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.

1) Short circuit proof to 0 V or to output when supply voltage correctly applied.
2) Over the whole temperature range.

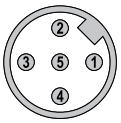
Compact magnetic | **Sendix M3658A / M3678A (shaft / hollow shaft)** | **SAE J1939**

Terminal assignment

Interface	Type of connection	Cable (isolate unused cores individually before initial start-up)					
3	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					
3	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



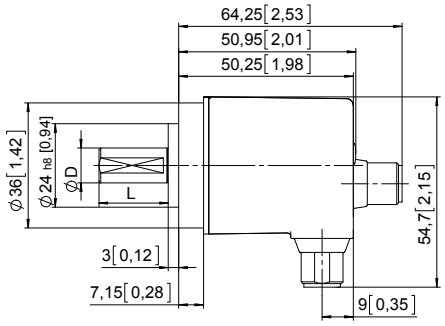
M12 connector, 5-pin

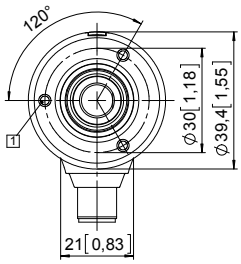
Dimensions shaft version

Dimensions in mm [inch]

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

1 3 x M3, 6 [0.24] deep

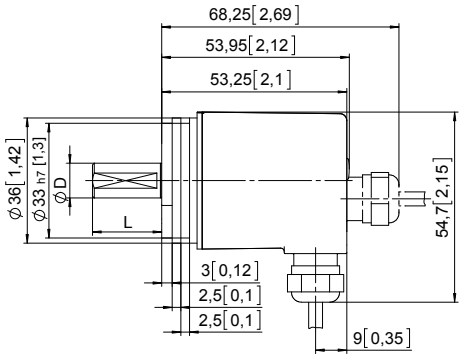


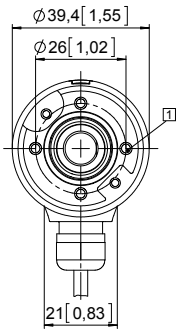


D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	15 [0.59]
10 [0.39]	f7	20 [0.79]
1/4“	h7	12.5 [0.49]

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 magnetic	Sendix M3658A / M3678A (shaft / hollow shaft)	SAE J1939

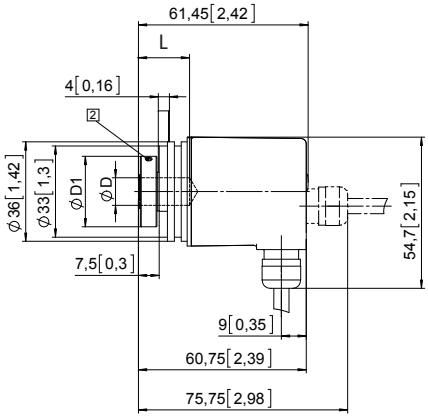
Dimensions hollow shaft version

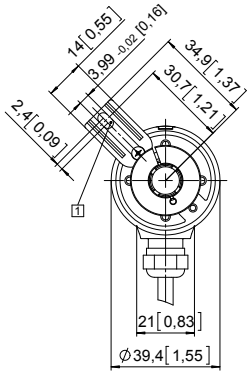
Dimensions in mm [inch]

Flange with spring element, long
Flange type 3 and 6

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

2 Recommended torque for the clamping ring 0.7 Nm

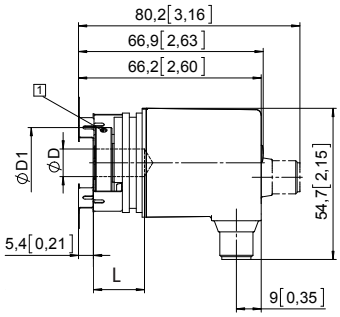


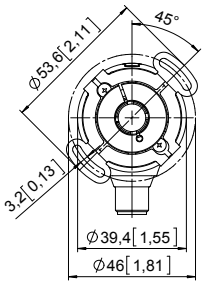


D	Fit	L	D1
6 [0.24]	H7	18.5 [0.73]	24 [0.94]
8 [0.32]	H7	18.5 [0.73]	25.5 [1.00]
10 [0.39]	H7	18.5 [0.73]	25.5 [1.00]
1/4"	H7	18.5 [0.73]	24 [0.94]
L = insertion depth max. blind hollow shaft			

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			