

Absolute encoders – singleturn

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).



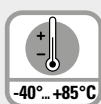
SAE J1939



Safety-Lock™



High rotational speed



Temperature range
-40°C ... +85°C



High protection level
IP



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

Type

.XX3X.3222

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

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Order code	8.M3678A.XX3X.3222
Hollow shaft	Type
a Flange	c Interface / supply voltage
2 = with stator coupling, IP65, ø 46 mm [1.81"]	3 = SAE J1939 / 10 ... 30 V DC
3 = with spring element, long, IP65	
5 = with stator coupling, IP67, ø 46 mm [1.81"]	d Type of connection
6 = with spring element, long, IP67	1 = axial cable, 1 m [3.28'] PVC
b Blind hollow shaft	A = axial cable, special length PVC *)
(insertion depth max. 18.5 mm [0.73"])	2 = radial cable, 1 m [3.28'] PVC
1 = ø 6 mm [0.24"]	B = radial cable, special length PVC *)
3 = ø 8 mm [0.32"]	3 = axial M12 connector, 5-pin
4 = ø 10 mm [0.39"]	4 = radial M12 connector, 5-pin
2 = ø 1/4"	
	e Fieldbus profile
	32 = SAE J1939
	Optional on request
	- Ex 2/22 (only for connection types 3 and 4)
	- surface protection salt spray tested
	*) 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)

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		Order no.
Torque pin, ø 4 mm	with fixing thread	8.0010.4700.0000
for flange with spring element (flange type 3 + 6)		

Cables and connectors		Order no.
Preassembled cables	M12 female connector with coupling nut, 5-pin, A coded, straight open ended	05.00.6091.A211.005M
	5 m [16.40'] PVC cable	
	M12 female connector with coupling nut, 5-pin, A coded, straight	05.00.6091.22C7.001M
	Deutsch connector DT04, Stift, 6-pin, straight	
	1 m [3.28'] PVC cable	
Connector	M12 female connector with coupling nut, 5-pin, A coded, straight (metal)	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

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Technical data

Mechanical characteristics			Interface characteristics SAE J1939	
Maximum speed			Resolution	1 ... 16.384 (14 bit), scalable default: 16.384 (14 bit)
shaft or blind hollow shaft version without shaft seal (IP65)	6000 min ⁻¹ 3000 min ⁻¹ (continuous)		Angular measurement deviation ²⁾	±0,5°
shaft or blind hollow shaft version with shaft seal (IP67)	4000 min ⁻¹ 2000 min ⁻¹ (continuous)		Repeat accuracy	±0.2°
Starting torque at 20°C [68°F]			Interface	CAN high-speed acc. to ISO 11898, CAN specification 2.0 B
	without shaft seal < 0.007 Nm with shaft seal (IP67) < 0.01 Nm		Protocol	SAE J1939
Shaft load capacity			Power-ON time	< 1200 ms
	radial 40 N axial 20 N		Baud rate	250 kbit/s switchable by software to 500 kbit/s
Weight			Node address	software configurable
Protection acc. to EN 60529			Termination	software configurable
Working temperature range			Approvals	
Materials			E1 compliant in accordance with	ECE guideline
shaft / hollow shaft	stainless steel		UL compliant in accordance with	File no. E224618
flange	aluminum		CE compliant in accordance with	
housing	zinc die-cast		EMC Directive	2014/30/EU
cable	PVC		RoHS Directive	2011/65/EU
			ATEX Directive	2014/34/EU (for Ex 2/22 variants)
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⁾				

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.

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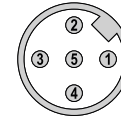
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Terminal assignment

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

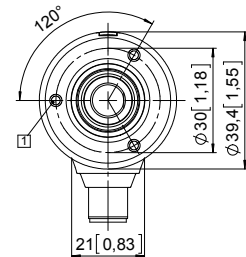
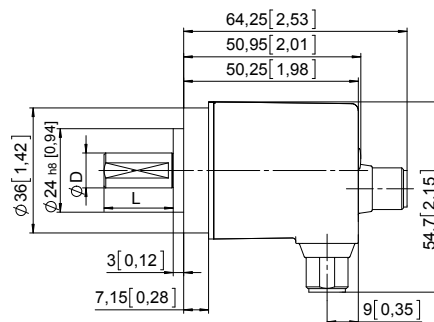
Dimensions in mm [inch]

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]

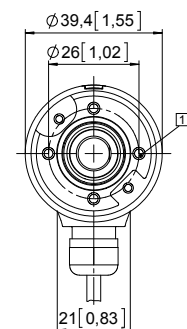
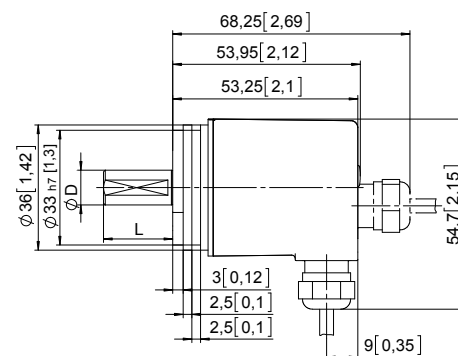


Synchro flange, ø 36 [1.42]

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]



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Dimensions hollow shaft version

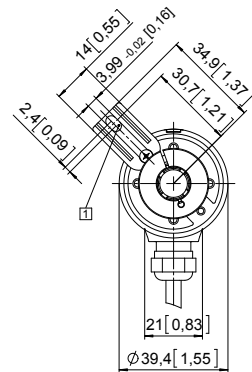
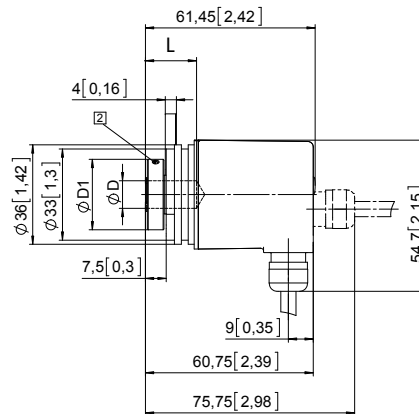
Dimensions in mm [inch]

Flange with spring element, long Flange type 3 and 6

- 1 Slot spring element, recommendation: torque pin DIN 7, \varnothing 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, \varnothing 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

