

Absolute encoders - singleturn

Compact magnetic	Sendix M3658 / M3678 (shaft / hollow shaft)	SAE J1939
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The absolute Sendix encoders M3658 and M3678 with SAE J1939 interface support all common requirements of the special protocol for utility vehicles and make a considerable contribution to the comprehensive system diagnostics or to fast fault localization.

The encoders offer fast, error-free start-up with no need to set switches; the encoder address is assigned automatically via Address Claiming (ACL).



SAE J1939

Safety-Lockplus™	High rotational speed	Temperature range	High protection level	High shaft load capacity	Shock / vibration resistant	Short-circuit proof	Reverse polarity protection	Magnetic sensor	Surface protection salt spray-tested optional

Robust technology

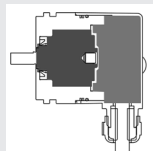
- Increased resistance against vibration and installation errors.
- Sturdy bearing construction in Safety-Lockplus™ Design.
- Resistant die cast housing and protection up to IP69k.

Versatile applications

- 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, error-free start up with no need to set switches; with automatic address claiming (ACL).

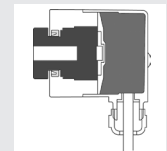
Safety-Lockplus™

IP69k protection on the flange side, robust bearing assemblies with interlocking bearings, mechanically protected shaft seal.



Sensor-Protect™

Fully encapsulated electronics, separate mechanical bearing assembly.



Order code	8.M3658 . 2XCX . 32 1X						
Shaft version	Type	a	b	c	d	e	f
a Flange		2 = synchro flange, ø 36 mm [1.42"]	c Interface / Power supply	C = CAN Highspeed / 8 ... 30 V DC	e Fieldbus profile	32 = J1939	f Protection
b Shaft (ø x L), with flat		3 = ø 6 x 12.5 mm [0.24 x 0.49"] 6 = ø 8 x 12.5 mm [0.32 x 0.49"] 5 = ø 1/4" x 12.5 mm [0.49"]	d Type of connection	2 = radial cable, 1 m [3.28] PUR B = radial cable, special length PUR *) 4 = radial M12 connector, 5-pin	1 = IP67 2 = IP69k	<i>Optional on request</i> - Ex 2/22 (only for type of connection 4) - surface protection salt spray tested	
		*) Available special lengths (connection type B): 2, 3, 5, 8, 10, 15 m [6.56, 9.84, 16.40, 26.25, 32.80, 49.21'] order code expansion .XXXX = length in dm ex.: 8.M3658.23CB.3211.0030 (for cable length 3 m)					

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Order code	8.M3678	.XXCX.	321X						
Hollow shaft	Type	<table border="1" style="font-size: 8px; border-collapse: collapse;"> <tr> <td style="text-align: center;">a</td> <td style="text-align: center;">b</td> <td style="text-align: center;">c</td> <td style="text-align: center;">d</td> <td style="text-align: center;">e</td> <td style="text-align: center;">f</td> </tr> </table>	a	b	c	d	e	f	
a	b	c	d	e	f				
a Flange 2 = with spring element, long 5 = with stator coupling, ø 46 mm [1.81"]	b Blind hollow shaft (insertion depth max. 18 mm [0.71"]) 2 = ø 6 mm [0.24"] 4 = ø 8 mm [0.32"] 6 = ø 10 mm [0.39"] 3 = ø 1/4"	c Interface / Power supply C = CAN Highspeed / 8 ... 30 V DC	d Type of connection 2 = radial cable, 1 m [3.28] PUR B = radial cable, special length PUR *) 4 = radial M12 connector, 5-pin *) Available special lengths (connection type B): 2, 3, 5, 8, 10, 15 m [6.56, 9.84, 16.40, 26.25, 32.80, 49.21'] order code expansion .XXXX = length in dm ex.: 8.M3678.52CB.3211.0030 (for cable length 3 m)						
		e Fieldbus profile 32 = J1939	f Protection 1 = IP67 2 = IP69k <i>Optional on request</i> - Ex 2/22 (only for type of connection 4) - surface protection salt spray tested						

Mounting accessory for shaft encoders	Order no.
Coupling bellows coupling ø 19 mm [0.75"] for shaft 6 mm [0.24"]	8.0000.1102.0606
Mounting accessory for hollow shaft encoders	Order no.
Cylindrical pin, long with fixing thread	8.0010.4700.0000
for flange with spring element (flange type 2)	
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 M12 female connector with coupling nut, 5-pin 1 m [3.28'] PVC cable Deutsch connector, 6-pin, DT04 05.00.6091.22C7.001M
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: kuebler.com/accessories.
 Additional connectors can be found in the connection technology section or in the connection technology area of our website at: kuebler.com/connection_technology.

Technical data									
Mechanical characteristics									
Maximum speed	6000 min ⁻¹								
Starting torque at 20°C [68°F]	< 0.06 Nm								
Shaft load capacity	<table style="font-size: 8px;"> <tr> <td style="padding: 2px;">radial</td> <td style="padding: 2px;">40 N</td> </tr> <tr> <td style="padding: 2px;">axial</td> <td style="padding: 2px;">20 N</td> </tr> </table>	radial	40 N	axial	20 N				
radial	40 N								
axial	20 N								
Weight	approx. 0.2 kg [7.06 oz]								
Protection acc. to EN 60529/DIN 40050-9	IP67 / IP69k								
Working temperature range	-40°C ... +85°C [-40°F ... +185°F]								
Materials	<table style="font-size: 8px;"> <tr> <td style="padding: 2px;">shaft / hollow shaft</td> <td style="padding: 2px;">stainless steel</td> </tr> <tr> <td style="padding: 2px;">flange</td> <td style="padding: 2px;">aluminum</td> </tr> <tr> <td style="padding: 2px;">housing</td> <td style="padding: 2px;">zinc die-cast</td> </tr> <tr> <td style="padding: 2px;">cable</td> <td style="padding: 2px;">PUR</td> </tr> </table>	shaft / hollow shaft	stainless steel	flange	aluminum	housing	zinc die-cast	cable	PUR
shaft / hollow shaft	stainless steel								
flange	aluminum								
housing	zinc die-cast								
cable	PUR								
Shock resistance acc. to EN 60068-2-27	5000 m/s ² , 6 ms								
Vibration resistance acc. to EN 60068-2-6	300 m/s ² , 10 ... 2000 Hz								
Permanent shock resistance acc. to EN 60068-2-27	1000 m/s ² , 2 ms								
Vibration (broad-band random) acc. to EN 60068-2-64	5 ... 2500 Hz, 100 m/s ² - rms								
Electrical characteristics									
Power supply	8 ... 30 V DC								
Current consumption (no load)	max. 25 mA								
Reverse polarity protection of the power supply	yes								
Measuring range	360°								
Absolute accuracy , 25°C [77°F]	±1°								
Repeat accuracy , 25°C [77°F]	±0.2°								
Data refresh rate	400 µs								
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU								
Diagnostic LED (two-color, red/green)									
LED ON or blinking	<table style="font-size: 8px;"> <tr> <td style="padding: 2px;">red</td> <td style="padding: 2px;">error display</td> </tr> <tr> <td style="padding: 2px;">green</td> <td style="padding: 2px;">status display</td> </tr> </table>	red	error display	green	status display				
red	error display								
green	status display								

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Interface characteristics CANopen	
Resolution	1 ... 16384 (14 bit), scalable default: 16384 (14 bit)
Interface	CAN high-speed acc. to ISO 11898, Basic- and Full-CAN, CAN specification 2.0 B
Protocol	SAE J1939
Node address	1 ... 255 via address claiming
Baud rate	250 kbit/s
Termination	software configurable

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 CDMT (connection mode data transfer). With BAM TP the transfer of data occurs as a broadcast.

Encoder implementation SAE J1939

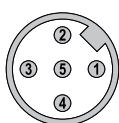
- PGNs that are adaptable to the customer's application.
- Resolution of address conflicts -> Address Claiming (ACL).
- Continuous checking whether control addresses have been assigned twice within a network.
- Change of control device addresses during run-time.
- Unique identification of a control device 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)					
C	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					
C	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

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SAE J1939

Dimensions shaft version

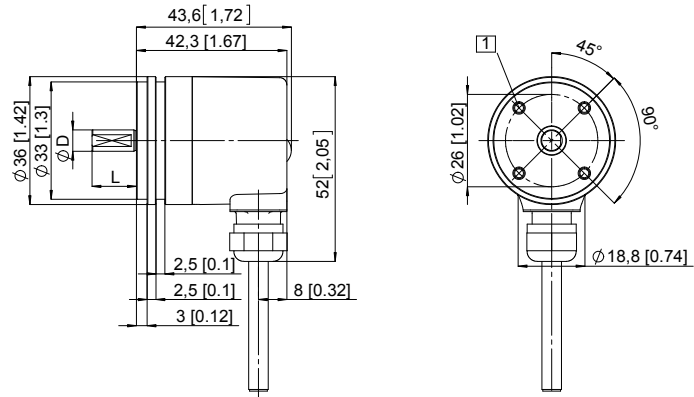
Dimensions in mm [inch]

Synchro flange, ø 36 [1.42]

Flange type 2

(drawing with cable)

1 4 x M3, 6 [0.24] deep



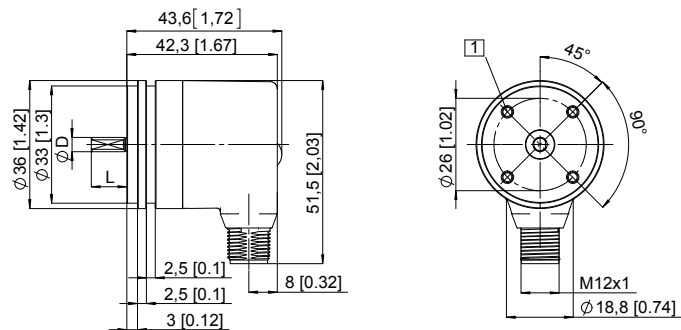
D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	12.5 [0.49]
1/4"	h7	12.5 [0.49]

Synchro flange, ø 36 [1.42]

Flange type 2

(drawing with M12 connector)

1 4 x M3, 6 [0.24] deep



D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	12.5 [0.49]
1/4"	h7	12.5 [0.49]

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Dimensions hollow shaft version

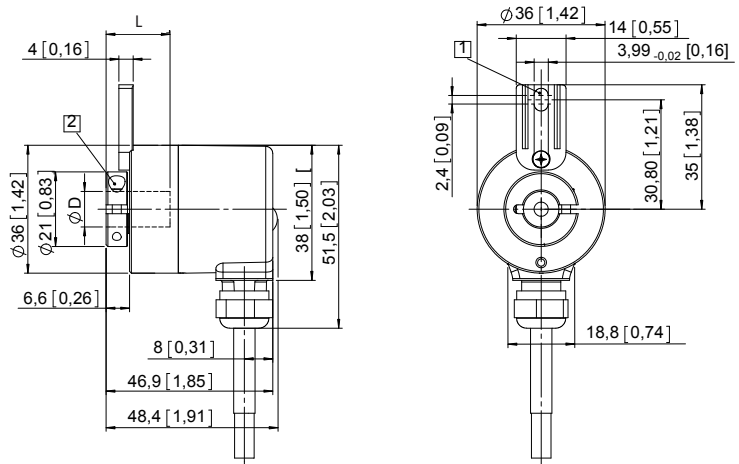
Dimensions in mm [inch]

Flange with spring element, long Flange type 2

- 1 Slot spring element, recommendation: cylindrical pin DIN 7, \varnothing 4 [0.16]
- 2 Recommended torque for the clamping ring 0.7 Nm

D	Fit	L
6 [0.24]	H7	18 [0.71]
8 [0.32]	H7	18 [0.71]
10 [0.39]	H7	18 [0.71]
1/4"	H7	18 [0.71]

L = insertion depth blind hollow shaft



Flange with stator coupling, \varnothing 46 [1.81] Flange type 5

- 1 Recommended torque for the clamping ring 0.7 Nm

D	Fit	L
6 [0.24]	H7	18 [0.71]
8 [0.32]	H7	18 [0.71]
10 [0.39]	H7	18 [0.71]
1/4"	H7	18 [0.71]

L = insertion depth blind hollow shaft

