

# Absolute Encoders - Singleturn

Compact, magnetic

Sendix M3658 / M3678 (Shaft / Hollow shaft)

SAE J1939



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 localisation.

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-Lock™  
(Shaft)



High rotational  
speed



-40° +85°

Temperature



High IP value



High shaft load  
capacity



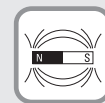
Shock / vibration  
resistant



Short-circuit  
proof



Reverse polarity  
protection



Magnetic sensor



Seawater-resistant  
version on request

## Safe Technology

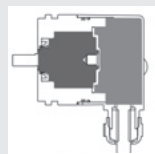
- Increased resistance against vibration and installation errors
- Sturdy bearing construction in Safety Lock™ Design
- Resistant die cast housing and protection up to IP69K

## 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-colour LED
- Fast, error-free start up with no need to set switches; with automatic Address Claiming (ACL)

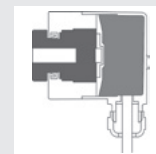
## Safety-Lockplus™

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 Shaft version

8.M3658 . 2XCX . 32 1X  
Type                    a b c d e f

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.



**a** Flange  
2 = synchro flange

**c** Output circuit / Power supply  
C = CAN Highspeed / 8 ... 30 V DC

**e** Fieldbus profile  
32 = J1939                    optional on request

**b** Shaft (ø x L), with flat  
3 = ø 6 x 12.5 mm  
5 = ø 6.35 (1/4") x 12.5 mm  
6 = ø 8 x 12.5 mm

**d** Type of connection  
2 = radial cable (1 m PUR)  
4 = M12 connector, radial

**f** Protection  
1 = IP67  
2 = IP69k

## Order code Hollow shaft

8.M3678 . XXCX . 32 1X  
Type                    a b c d e f

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.



**a** Flange  
2 = with torque stop set  
5 = with stator coupling

**c** Output circuit / Power supply  
C = CAN Highspeed / 8 ... 30 V DC

**e** Fieldbus profile  
32 = J1939                    optional on request

**b** Hollow shaft  
2 = ø 6 mm  
3 = ø 6.35 mm (1/4")  
4 = ø 8 mm  
6 = ø 10 mm

**d** Type of connection  
2 = radial cable (1 m PUR)  
4 = M12 connector, radial

**f** Protection  
1 = IP67  
2 = IP69k

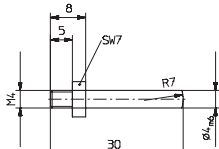
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## Mounting accessory for shaft encoders

<b>Coupling</b>	Bellows coupling $\varnothing$ 19 mm for shaft 6 mm	<b>8.0000.1101.0606</b>
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## Mounting accessory for hollow shaft encoders

<b>Cylindrical pin, long</b> for torque stops		With fixing thread	<b>8.0010.4700.0000</b>
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## Connection Technology

<b>Connector, self-assembly</b>	M12	<b>8.0000.5116.0000</b>
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<b>Cordset, pre-assembled with 2 m PVC cable</b>	M12	<b>8.0000.6V81.0002</b>
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Further accessories can be found in the Accessories section or in the Accessories area of our website at: [www.kuebler.com/accessories](http://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](http://www.kuebler.com/connection_technology).

Mechanical characteristics	
<b>Max. speed</b>	6000 min <sup>-1</sup>
<b>Starting torque</b>	< 0.06 Nm
<b>Load capacity of shaft</b>	radial 40 N axial 20 N
<b>Weight</b>	ca. 0.2 kg
<b>Protection EN 60 529/DIN 40050-9</b>	IP67 / IP69k
<b>EX approval for hazardous areas</b>	optional Zone 2 and 22
<b>Working temperature range</b>	-40°C ... +85°C
<b>Materials</b>	shaft/hollow shaft stainless steel flange aluminium housing zinc die-cast housing cable PUR
<b>Shock resistance acc. EN 60068-2-27</b>	5000 m/s <sup>2</sup> , 6 ms
<b>Vibration resistance acc. EN 60068-2-6</b>	300 m/s <sup>2</sup> , 10 ... 2000 Hz
<b>Permanent shock resistance acc. EN 60068-2-27</b>	1000 m/s <sup>2</sup> , 2 ms
<b>Vibration (broad-band random) EN 60068-2-64</b>	5 ... 2500 Hz, 100 m/s <sup>2</sup> - rms

Diagnostic LED (two-colour, red/green)	
<b>LED ON or blinking</b>	red error display green status display

General electrical characteristics	
<b>Power supply</b>	8 ... 30 V DC
<b>Current consumption (no load)</b>	max. 25 mA
<b>Reverse connection of the supply voltage (U<sub>B</sub>)</b>	yes
<b>Measuring range</b>	360°
<b>Linearity</b>	< 1°
<b>Repeat accuracy</b>	< 0.1°
<b>Data refresh rate</b>	400 $\mu$ s
<b>RoHS compliant acc. to</b>	EU guideline 2002/95/EG
<b>CE compliant acc. to</b>	EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3

Interface characteristics CANopen	
<b>Resolution</b>	1 ... 16384 (14 bit), scaleable: 1 ... 16384
<b>Default value</b>	16384 (14 bit)
<b>Code</b>	Binary
<b>Interface</b>	CAN High-Speed according to ISO 11898, Basic- and Full-CAN, CAN Specification 2.0 B
<b>Protocol</b>	SAE J1939
<b>Baud rate</b>	250 kbit/s
<b>Node address</b>	1 ... 255 (via address claiming)
<b>Termination</b>	software configurable

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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 decentralised 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 optimised 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 CMTD (Connection Mode Data Transfer). With BAM TP the transfer of data occurs as a broadcast.

### Encoder Implementation SAE J1939

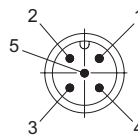
- PGNs that are adaptable to the customer's application
- Resolution of address conflicts -> Address Claiming (ACL)
- Continuous checking whether control addresses have been assigned twice within a network
- Change of control device addresses during run-time
- Unique identification of a control device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

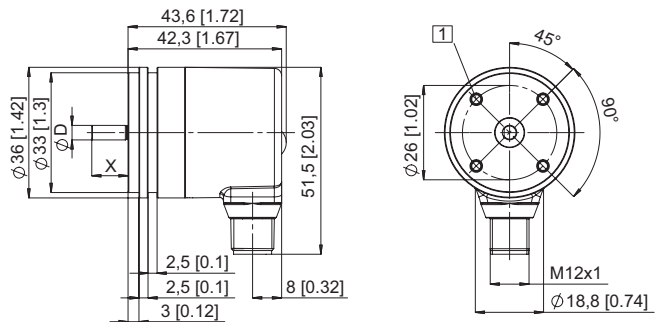
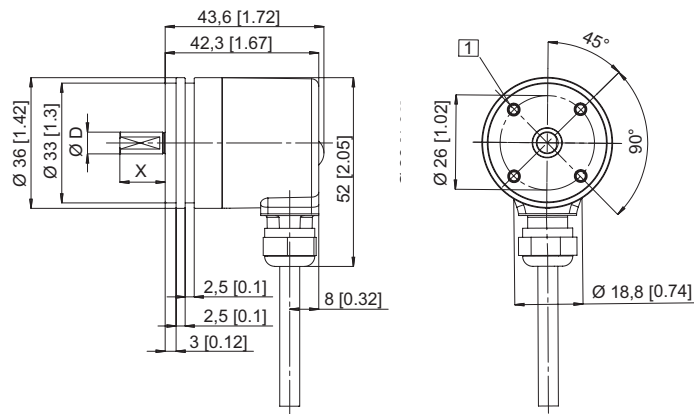
Signal	+U <sub>B</sub>	0 V	CAN GND	CAN High	CAN Low
M12 / Pin	2	3	1	4	5
Cable colour	BN	WH	GY	GN	YE



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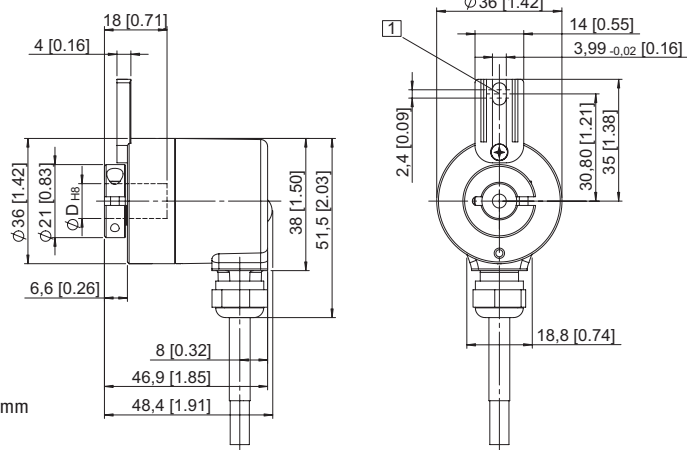
## Dimensions shaft version Synchro flange, ø 36 mm



1 M3, 6 [0.24] deep

## Dimensions hollow shaft version

With torque stop set, ø 36 mm



1 Torque stop slot,  
Recommendation: Cylindrical pin DIN7, ø 4 mm

With stator coupling, ø 36 mm

