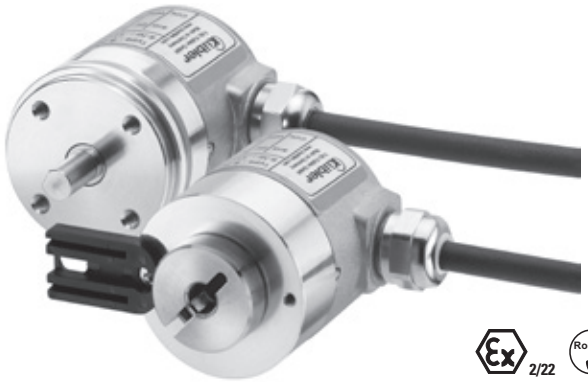
Compact Magnetic | **Sendix M3658 / M3678 (Shaft / Hollow shaft)** | **SAE J1939**



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).

Ex 2/22 RoHS SAE J1939

Safety-Lock™ (Shaft) | High rotational speed | Temperature range | High protection level | High shaft load capacity | Shock / vibration resistant | Short-circuit proof | Reverse polarity protection | Magnetic sensor | Seawater-resistant version on request

Safe technology

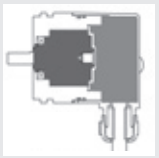
- Increased resistance against vibration and installation errors
- Sturdy bearing construction in Safety Lock™ Design
- Resistant die cast housing and protection up to IP69k

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)

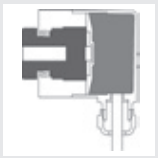
Safety-Lockplus™

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	.	2	X	C	X	.	32	1	X
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. 10 by 10

a *Flange*
2 = synchro flange, ø 36 mm [1.42"]

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"]

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

d *Type of connection*
2 = radial cable, 1 m [3.28] PUR
4 = M12 connector, 5-pin, radial

e *Fieldbus profile*
32 = J1939

f *Protection*
1 = IP67
2 = IP69k

optional on request
- Ex 2/22
- seawater-resistant
- special cable length

Order code Hollow shaft

8.M3678	.	X	X	C	X	.	32	1	X
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. 10 by 10

a *Flange*
2 = with spring element long
5 = with stator coupling, ø 46 mm [1.81"]

b *Hollow shaft*
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
4 = M12 connector, 5-pin, radial

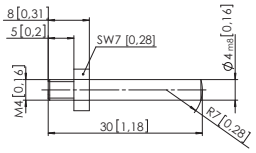
e *Fieldbus profile*
32 = J1939

f *Protection*
1 = IP67
2 = IP69k

optional on request
- Ex 2/22
- seawater-resistant
- special cable length

Compact Magnetic	Sendix M3658 / M3678 (Shaft / Hollow shaft)	SAE J1939

Mounting accessory for shaft encoders		Order No.
Coupling	Bellows coupling ø 19 mm [0.75"] for shaft 6 mm [0.24"]	**8.0000.1101.0606**

Mounting accessory for hollow shaft encoders		
Cylindrical pin, long for torque stops	 With fixing thread	**8.0010.4700.0000**

Connection technology		
Connector, self-assembly (straight)	M12 female connector with coupling nut	**8.0000.5116.0000**
Cordset, pre-assembled	M12 female connector with coupling nut, 6 m [19.69'] PVC cable	**05.00.6091.A211.006M**

Further accessories can be found in the accessories section or in the accessories area of our website at: 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

Technical data

Mechanical characteristics

Max. speed		6000 min^{-1}
Starting torque - at 20°C [68°F]		< 0.06 Nm
Load capacity of shaft	radial axial	40 N 20 N
Weight		approx. 0.2 kg [7.06 oz]
Protection acc. to EN 60529/DIN 40050-9		IP67 / IP69k
EX approval for hazardous areas		optional Zone 2 and 22
Working temperature range		-40°C ... +85°C [-40°F ... +185°F]
Material	shaft/hollow shaft flange housing cable	stainless steel aluminium zinc die-cast housing PUR
Shock resistance acc. EN 60068-2-27		5000 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		300 m/s^2, 10 ... 2000 Hz
Permanent shock resistance acc. EN 60068-2-27		1000 m/s^2, 2 ms
Vibration (broad-band random) acc. 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 (+V)	yes
Measuring range	360°
Absoulte 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 2004/108/EC
RoHS compliant acc. to	guideline 2002/95/EC

Interface characteristics CANopen

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

Diagnostic LED (two-colour, red/green)

LED ON or blinking

red	Error display
green	Status display

Compact Magnetic | **Sendix M3658 / M3678 (Shaft / Hollow shaft)** | **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 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

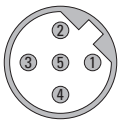
A two-colour LED, located on the rear of the encoder, signals the operating and fault status of the J1939 protocol, as well as the status of the internal sensor diagnostics.

Terminal assignment

Interface	Type of connection	Cable (Isolate unused wires individually before initial start-up)					
C	2	Signal:	+V	0 V	CAN_GND	CAN_H	CAN_L
		Cable colour:	BN	WH	GY	GN	YE

Interface	Type of connection	M12 connector					
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

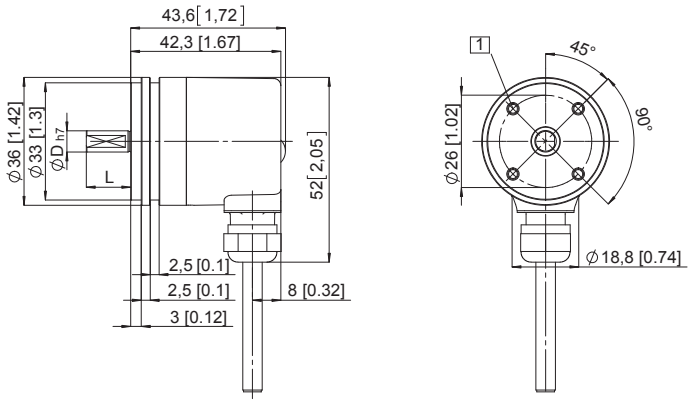
Compact Magnetic | **Sendix M3658 / M3678 (Shaft / Hollow shaft)** | **SAE J1939**

Dimensions shaft version

Dimensions in mm [inch]

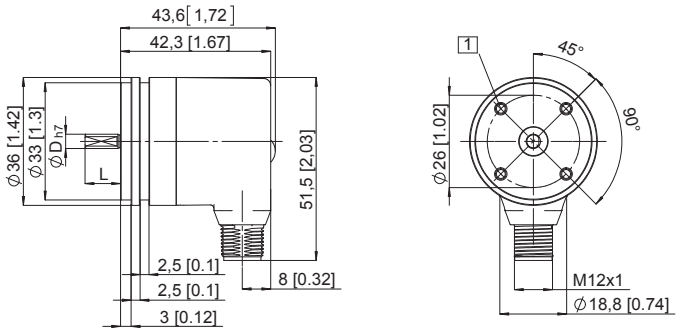
Synchro flange, ø 36 [1.42]
Flange type 2
(Drawing with cable)

1 4 x M3, 6 [0.24] deep



Synchro flange, ø 36 [1.42]
Flange type 2
(Drawing with M12 connector)

1 4 x M3, 6 [0.24] deep



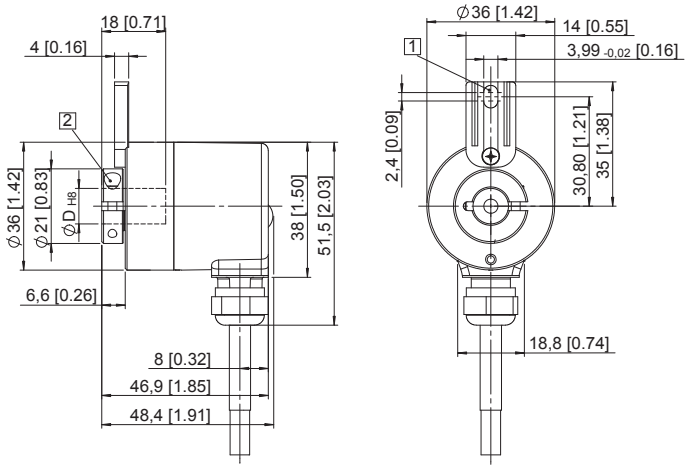
D	L	Fit
6 [0.24]	12.5 [0.49]	h7
8 [0.32]	12.5 [0.49]	h7
1/4“	12.5 [0.49]	h7

Dimensions hollow shaft version

Dimensions in mm [inch]

Flange with spring element long
Flange type 2

1 Torque stop slot,
Recommendation:
Cylindrical pin DIN 7, ø 4 [0.16]
2 Recommended torque for the
clamping ring 0.7 Nm



Flange with stator coupling, ø 46 [1.81]
Flange type 5

1 Recommended torque for the
clamping ring 0.7 Nm