Kübler

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 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).

Ex 2/22   RoHS   **SAE J1939**

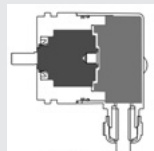|									
Safety-Lockplus™	High rotational speed	-40°...+85°C Temperature range	IP High protection level	High shaft load capacity	Shock / vibration resistant	Short-circuit proof	Reverse polarity protection	Magnetic sensor	Surface protection salt spray-tested optional

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).
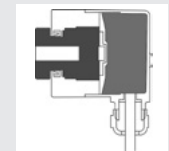
Safety-Lockplus™

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
Shaft version

8.M3658 . 2XCX . 321X
Type ⓐⓑⓒⓓ ⓔ ⓕ

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

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

ⓑ 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"]

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

ⓓ 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.M3658.23CB.3211.0030 (for cable length 3 m)

ⓔ Fieldbus profile
32 = J1939

ⓕ Protection
1 = IP67
2 = IP69k

Optional on request
- Ex 2/22 (only for type of connection 4)
- surface protection salt spray tested

Kübler

Absolute encoders - singleturn

Compact magnetic	Sendix M3658 / M3678 (shaft / hollow shaft)	SAE J1939

Order code Hollow shaft

8.M3678 . XXCX . 321X
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 *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

Optional on request
- 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	Dimensions in mm [inch]	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**
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: 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

Maximum speed		6000 min⁻¹
Starting torque at 20°C [68°F]		< 0.06 Nm
Shaft load capacity	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	shaft / hollow shaft	stainless steel
	flange	aluminum
	housing	zinc die-cast
	cable	PUR
Shock resistance acc. to EN 60068-2-27		5000 m/s², 6 ms
Vibration resistance acc. to EN 60068-2-6		300 m/s², 10 ... 2000 Hz
Permanent shock resistance acc. to EN 60068-2-27		1000 m/s², 2 ms
Vibration (broad-band random) acc. to EN 60068-2-64		5 ... 2500 Hz, 100 m/s² - 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	red	error display
	green	status display

The absolute encoder mounting pin technical drawing shows dimensions: 8 [0.31], 5 [0.2], SW7 [0.28], ø4 m8 [0.16], M4 [0.16], 30 [1.18], R7 [0.28]

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Compact magnetic	Sendix M3658 / M3678 (shaft / hollow shaft)	SAE J1939

Interface characteristics CANopen

Resolution	1 ... 16384 (14 bit), scalable default: 16384 (14 bit)
Code	binary
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 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.

Terminal assignment

Interface	Type of connection	Cable (isolate unused wires individually before initial start-up)				
C	2, B	Signal:	+V	0 V	CAN_GND	CAN_H	CAN_L
		Cable 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
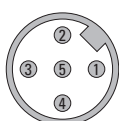
M12 connector, 5-pin

Compact magnetic	Sendix M3658 / M3678 (shaft / hollow shaft)	SAE J1939

Dimensions shaft version
Dimensions in mm [inch]

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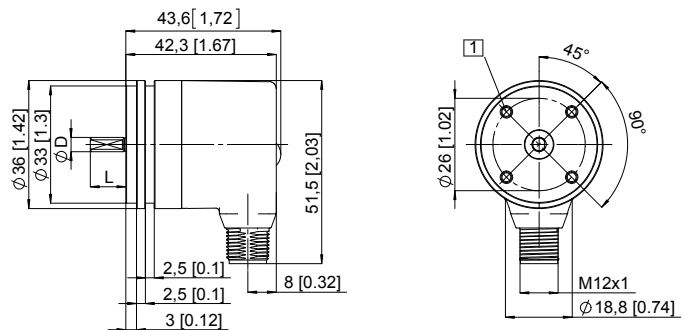**Flange type 2**
(drawing with cable)

1 4 x M3, 6 [0.24] deep
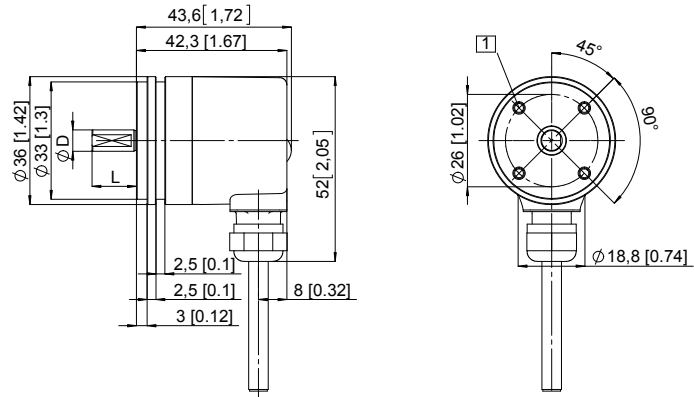
D	Fit	L
6 [0.24]	h7	12.5 [0.49]
8 [0.32]	h7	12.5 [0.49]
1/4"	h7	12.5 [0.49]

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]

| Compact magnetic	Sendix M3658 / M3678 (shaft / hollow shaft)	SAE J1939

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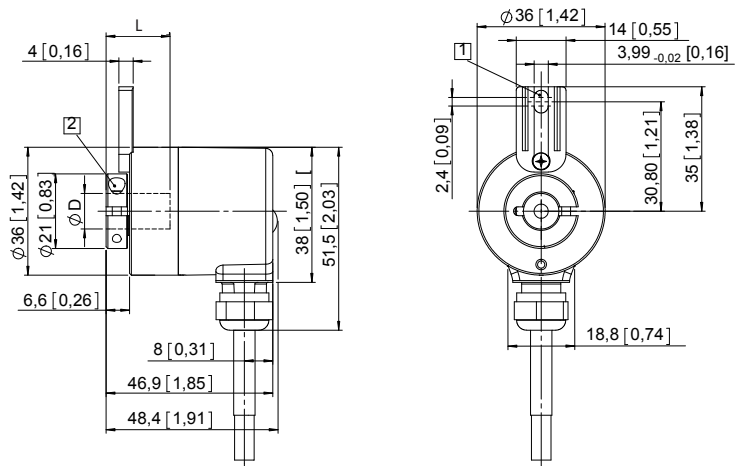
Flange with stator coupling, ø 46 [1.81]
Flange type 5

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		