**Absolute Singleturn Encoders** | **Sendix absolut** | **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).**


Safety-Lock™ (Wellen) | High rotational speed | Temperature | High IP value | High shaft load capacity | Shock / vibration resistant | Short-circuit proof | Reverse polarity protection

## Safe Technology

- Increased resistance against vibration and installation errors
- Sturdy bearing construction in Safety Lock™ Design
- Fewer components and connection points increase the operational reliability
- OptoASIC technology with highest integration density (Chip-on-Board)
- Resistant die cast housing and protection up to IP 69K

## Versatile Applications

- Up-to-the-minute Fieldbus performance in the application: SAE J1939 with CAN-Highspeed to ISO 11898
- Suitable connection variant for every specific case
- Bus cover with M12 connector or cable connection
- Fast determination oft he 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 . XXXX . 32 XX
Type ❶❷❸❹ ❺ ❻❼

10 by 10

**❶ Flange**
**2** = Synchro flange

**❷ Shaft** (ø x L)
**3** = ø 6 x 12,5 mm
5 = ø 6,35 (1/4") x 12,5 mm
6 = ø 8 x 12,5 mm

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

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

**❺ Fieldbus profile**
**32** = J1939

**❻ Option 2**
**1** = Standard

**❼ Option 1**
**1** = IP67
2 = IP69k

**Preferred types** are underlined

**Corresponding mating connector:**
05.B-8151-0/9

Seawater resistant version on request

## Order code Hollow shaft

8.M3678 . XXXX . 32 XX
Type ❶❷❸❹ ❺ ❻❼

10 by 10

**❶ Flange**
2 = with long torque stop
**5** = with stator coupling

**❷ Hollow shaft**
**2** = ø 6 mm
3 = ø 6,35 (1/4")
**4** = ø 8 mm
6 = ø 10 mm

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

**Type of connection**
**❹** = cable radial (1 m PUR)
**4** = M12 connector radial

**❺ Fieldbus profile**
**32** = J1939

**❻ Option 2**
**1** = Standard

**❼ Option 1**
**1** = IP67
2 = IP69k

**Preferred types** are underlined

**Corresponding mating connector:**
05.B-8151-0/9

Seawater resistant version on request

**Accessories:**
– Cables and connectors, also pre-assembled, can be found in the chapter Connection Technology
– Mounting attachments and couplings can be found in the chapter Accessories

## Absolute Singleturn Encoders | Sendix absolut | M3658 / M3678 (Shaft / Hollow shaft) | SAE J1939

### Mechanical characteristics

| | | |
|---|---|---|
| **Max. speed** | | 6000 min$^{-1}$ |
| **Starting torque** | | < 0,06 Nm |
| **Shaft load capacity** | radial<br>axial | 40 N<br>20 N |
| **Weight** | | ca. 0,2 kg |
| **Protection to** EN 60 529/DIN 40050-9 | | IP 67/IP 69k |
| **EX approval for hazardous areas** | | optional Zone 2 und 22 |
| **Working temperature range** | | -40 °C ... +85 °C |
| **Materials** | Shaft / Hollow shaft<br>Flange<br>Housing<br>Cable | stainless steel<br>Aluminium<br>Zinc die-cast<br>PUR |
| **Shock resistance** acc. to DIN-IEC 68-2-27 | | 5000 m/s$^2$, 6 ms |
| **Vibration resistance** acc. to DIN-IEC 68-2-6 | | 300 m/s$^2$, 10 ... 2000 Hz |
| **Permanent shock resistance** acc. to DIN-IEC 68-2-29 | | 1000 m/s$^2$, 2 ms |
| **Vibration** (broad-band random) acc. to DIN-IEC 68-2-64 | | 5 ... 2500 Hz, 100 m/s$^2$ - rms |

### Diagnostic LED (two-colour, red/green)

| | | |
|---|---|---|
| **LED ON or blinking** | **red**<br>**green:** | Error display<br>Status display |

### General electrical characteristics

| | |
|---|---|
| **Supply voltage** | 8 ... 30 V DC |
| **Current consumption**, 24 V DC, (no load) | < 25 mA |
| **Reverse connection of the supply voltage (Ub)** | yes |
| **Measurement range** | 360° |
| **Linearity** | < 1° |
| **Repeat accuracy** | < 0,1° |
| **Data refresh** | 400 µs |
| **RoHS compliant** acc. to | EG-guideline 2002/95/EG |
| **CE compliant** acc. to | EN 61000-6-2,<br>EN 61000-6-4 and<br>EN 61000-6-3 |

### 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,<br>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 |

### 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.

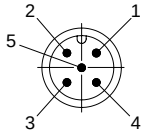
### Encoder Implementation SAE J1939

- 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.

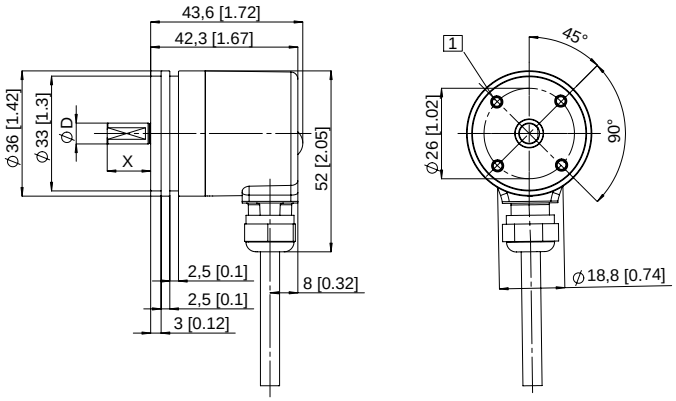

### Terminal assignment

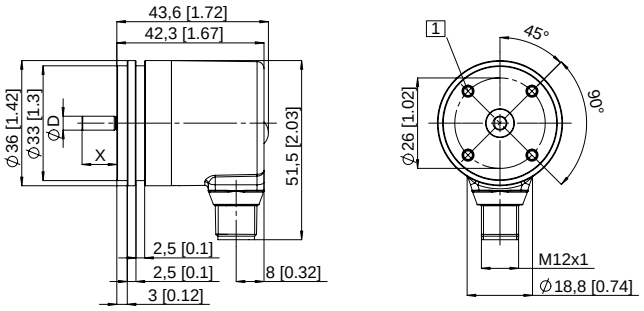
| Signal: | +Ub | 0 V | CAN GND | CAN High | CAN Low |
|---|---|---|---|---|---|
| M12/Pin: | 2 | 3 | 1 | 4 | 5 |
| cable colour: | BN | WH | GY | GN | YE |



**Dimensions shaft version:**

ø 36 mm, Synchro flange

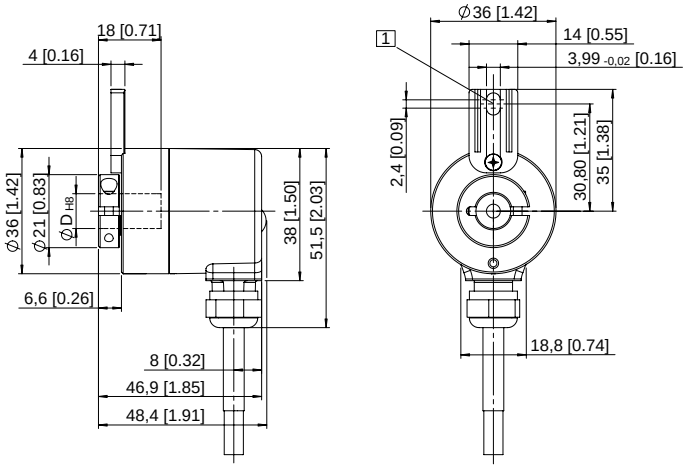



1 M3, 6 [0.24] deep

**Dimensions hollow shaft version:**

ø 36 mm, Flange with long torque stop




1 Torque stop slot,
Recommendation: cyl. pin. acc. DIN 7 ø4

ø 36 mm, Stator coupling