

# Absolute encoders - singleturn

**Standard  
optical**

**Sendix 5858 / 5878 (shaft / hollow shaft)**

**EtherCAT**



**EtherCAT**  
Conformance tested

The singleturn encoders 5858 and 5878 with second-generation EtherCAT interface and optical sensor technology are ideal for use in all applications with an EtherCAT interface.

The data communication is based on CAN over EtherNet and ideally suited for use in real time applications.

These encoders are available with a solid shaft up to a maximum of 10 mm or a blind hollow shaft up to 15 mm.

Absolute encoders  
singleturn



## Reliable

- EtherCAT conformance tested.
- Integration of the latest slave – EtherCAT stack from Beckhoff, version 5.01.
- Ideally suited for use in harsh outdoor environments, thanks to IP67 protection and rugged housing construction.

## Flexible

- Use of CoE (CAN over EtherNet).
- Genuine new position information as a result of minimal cycle time of 62.5 µs in the DC mode.
- Faster, easier error-free connection thanks to M12 connectors.
- Supports Hot-Connect.

## Order code Shaft version

**8.5858** . **X** **X** **B** **2** . **B2** **12**  
Type      a   b   c   d   e

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

- 1 = clamping flange, IP65 ø 58 mm [2.28"]  
3 = clamping flange, IP67 ø 58 mm [2.28"]  
2 = synchro flange, IP65 ø 58 mm [2.28"]  
4 = synchro flange, IP67 ø 58 mm [2.28"]  
5 = square flange, IP65 □ 63.5 mm [2.5"]  
7 = square flange, IP67 □ 63.5 mm [2.5"]

### b Shaft (ø x L), with flat

- 1 = 6 x 10 mm [0.24 x 0.39"]<sup>1)</sup>  
2 = 10 x 20 mm [0.39 x 0.79"]<sup>2)</sup>  
3 = 1/4" x 7/8"  
4 = 3/8" x 7/8"

### c Interface / power supply

B = EtherCAT / 10 ... 30 V DC

### e Fieldbus profile

B2 = EtherCAT with CoE  
(CAN over EtherNet)

### d Type of connection

2 = 3 x M12 connector, 4-pin

Optional on request  
- Ex 2/22  
- surface protection  
salt spray tested

## Order code Hollow shaft

**8.5878** . **X** **X** **B** **2** . **B2** **12**  
Type      a   b   c   d   e

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

- 1 = with spring element, long, IP65  
2 = with spring element, long, IP67  
3 = with stator coupling, IP65 ø 65 mm [2.56"]  
4 = with stator coupling, IP67 ø 65 mm [2.56"]  
5 = with stator coupling, IP65 ø 63 mm [2.48"]  
6 = with stator coupling, IP67 ø 63 mm [2.48"]

### b Blind hollow shaft

- (insertion depth max. 30 mm [1.18"])  
3 = ø 10 mm [0.39"]  
4 = ø 12 mm [0.47"]  
5 = ø 14 mm [0.55"]  
6 = ø 15 mm [0.59"]  
8 = ø 3/8"  
9 = ø 1/2"

### c Interface / power supply

B = EtherCAT / 10 ... 30 V DC

### e Fieldbus profile

B2 = EtherCAT with CoE  
(CAN over EtherNet)

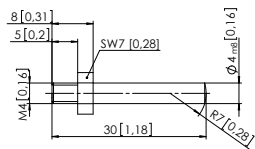
### d Type of connection

2 = 3 x M12 connector, 4-pin

Optional on request  
- Ex 2/22  
- surface protection  
salt spray tested

1) Preferred type only in conjunction with flange type 2.  
2) Preferred type only in conjunction with flange type 1.

## Absolute encoders - singleturn

|                                                                                       |                                                                                                                                                                                             |                                                            |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| <b>Standard optical</b>                                                               | <b>Sendix 5858 / 5878 (shaft / hollow shaft)</b>                                                                                                                                            | <b>EtherCAT</b>                                            |
| <b>Mounting accessory for shaft encoders</b>                                          |                                                                                                                                                                                             | <b>Order no.</b>                                           |
| <b>Coupling</b>                                                                       | bellows coupling ø 19 mm [0.75"] for shaft 6 mm [0.24"]<br>bellows coupling ø 19 mm [0.75"] for shaft 10 mm [0.39"]                                                                         | <b>8.0000.1102.0606</b><br><b>8.0000.1102.1010</b>         |
| <b>Mounting accessory for hollow shaft encoders</b>                                   |                                                                                                                                                                                             | <b>Order no.</b>                                           |
| <b>Cylindrical pin, long</b><br>for flange with spring element<br>(flange type 1 + 2) | with fixing thread<br>                                                                                     | <b>8.0010.4700.0000</b>                                    |
| <b>Connection technology</b>                                                          |                                                                                                                                                                                             | <b>Order no.</b>                                           |
| <b>Cordset, pre-assembled</b>                                                         | M12 male connector with external thread for port IN and port OUT, 4-pin<br>2 m [6.56'] PUR cable<br>M12 female connector with coupling nut for power supply, 4-pin<br>2 m [6.56'] PUR cable | <b>05.00.6031.4411.002M</b><br><b>05.00.6061.6211.002M</b> |
| <b>Connector, self-assembly (straight)</b>                                            | M12 male connector with external thread for port IN and port OUT, 4-pin<br>M12 female connector with coupling nut for power supply, 4-pin                                                   | <b>05.WASCSY4S</b><br><b>05.B8141-0</b>                    |

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).

Technical data

Mechanical characteristics

|                                           |                             |                                                              |
|-------------------------------------------|-----------------------------|--------------------------------------------------------------|
| Maximum speed                             | IP65 up to 70°C [158°F]     | 9000 min <sup>-1</sup> , 7000 min <sup>-1</sup> (continuous) |
|                                           | IP65 up to T <sub>max</sub> | 7000 min <sup>-1</sup> , 4000 min <sup>-1</sup> (continuous) |
|                                           | IP67 up to 70°C [158°F]     | 8000 min <sup>-1</sup> , 6000 min <sup>-1</sup> (continuous) |
|                                           | IP67 up to T <sub>max</sub> | 6000 min <sup>-1</sup> , 3000 min <sup>-1</sup> (continuous) |
| Starting torque - at 20°C [68°F]          | IP65                        | < 0.01 Nm                                                    |
|                                           | IP67                        | < 0.05 Nm                                                    |
| Mass moment of inertia                    |                             |                                                              |
|                                           | shaft version               | 3.0 x 10 <sup>-6</sup> kgm <sup>2</sup>                      |
|                                           | hollow shaft version        | 6.9 x 10 <sup>-6</sup> kgm <sup>2</sup>                      |
| Load capacity of shaft                    | radial                      | 80 N                                                         |
|                                           | axial                       | 40 N                                                         |
| Weight                                    |                             | approx. 0.50 kg [17.64 oz]                                   |
| Protection acc. to EN 60529               |                             |                                                              |
|                                           | housing side                | IP67                                                         |
|                                           | shaft side                  | IP65, opt. IP67                                              |
| Working temperature range                 |                             | -40°C ... +80°C [-40°F ... +176°F]                           |
| Material                                  | shaft/hollow shaft          | stainless steel                                              |
|                                           | flange                      | aluminum                                                     |
|                                           | housing                     | zinc die-cast                                                |
| Shock resistance acc. to EN 60068-2-27    |                             | 2500 m/s <sup>2</sup> , 6 ms                                 |
| Vibration resistance acc. to EN 60068-2-6 |                             | 100 m/s <sup>2</sup> , 55 ... 2000 Hz                        |

Electrical characteristics

|                                                 |                                                       |
|-------------------------------------------------|-------------------------------------------------------|
| Power supply                                    | 10 ... 30 V DC                                        |
| Power consumption (no load)                     | max. 110 mA                                           |
| Reverse polarity protection of the power supply | yes                                                   |
| UL approval                                     | file 224618                                           |
| CE compliant acc. to                            | EMC guideline 2014/30/EU<br>RoHS guideline 2011/65/EU |

Interface characteristics EtherCAT

|            |                                                          |
|------------|----------------------------------------------------------|
| Resolution | 1 ... 65535 (16 bit), scalable<br>default: 8192 (13 bit) |
| Code       | binary                                                   |
| Protocol   | EtherNet / EtherCAT                                      |

Diagnostic LED (red)

LED is ON with the following fault conditions:

Sensor error (internal code or LED error), low voltage, over-temperature

Run LED (green)

LED is ON with the following conditions:

Preop-, Safeop and Op-State (EtherCAT status machine)

2 x Link LEDs (yellow)

LED is ON with the following conditions (port IN and port OUT):

Link detected

Modes

Freerun, Distributed Clock

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## EtherCAT

### General information about CoE (CAN over EtherNet)

The EtherCAT encoders support the CANopen communication profile according to DS301. In addition device-specific profiles like the encoder profile DS406 are available.

Scaling, preset values, limit switch values and many other parameters can be programmed via the EtherCAT bus.

When switching the device on, all parameters are loaded from an EEPROM, where they were saved previously to protect them against power-failure.

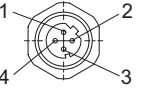
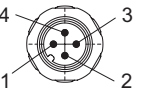
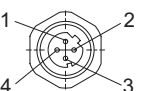
The following output values may be combined as PDO (PDO mapping): **position**, **speed**, **temperature values** and **working area state** as well as other process values.

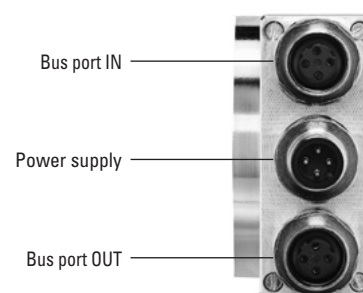
### CANopen encoder profile 3.2.10 CoE (CAN over EtherNet)

The following parameters are programmable:

- Position update time of 62.5 µs.
- EtherCAT certificate of conformity.
- Speed with sign.
- Four units for speed calculation: steps/sec, steps/100 ms, steps/10 ms, rotation/min.
- Time stamp as system time at the point in time when the position is read out.
- Two working area state registers.
- Along with the scaled position, the raw data – position as process value – is also mappable.
- Dynamic mapping.
- Gating time: setting of the time interval, via which the speed value can be interpolated.
- Sensor temperature in degrees Celsius.
- Comprehensive plausibility test when downloading parameters to the encoder.
- Alarm and warning messages.
- User interface with visual display of bus and fault status – 4 LEDs.
- Extended error management for position sensing with integrated temperature control.
- Implementation of the latest CANopen profile 3.2.10 from the 18th February 2011.
- Hot-Connect – Support for rapid change of Bus-topology.

### Terminal assignment bus

| Interface | Type of connection       | Function     | M12 connector, 4-pin |                |               |                 |                |                                                                                                  |
|-----------|--------------------------|--------------|----------------------|----------------|---------------|-----------------|----------------|--------------------------------------------------------------------------------------------------|
| B         | 2<br>(3 x M12 connector) | Bus port IN  | Signal:              | Transmit data+ | Receive data+ | Transmit data - | Receive data - | <br>D coded |
|           |                          |              | Abbreviation:        | TxD+           | RxD+          | TxD-            | RxD-           |                                                                                                  |
|           |                          |              | Pin:                 | 1              | 2             | 3               | 4              |                                                                                                  |
|           |                          | Power supply | Signal:              | Voltage +      | –             | Voltage –       | –              | <br>D coded |
|           |                          |              | Abbreviation:        | + V            | –             | 0 V             | –              |                                                                                                  |
|           |                          |              | Pin:                 | 1              | 2             | 3               | 4              |                                                                                                  |
|           |                          | Bus port OUT | Signal:              | Transmit data+ | Receive data+ | Transmit data - | Receive data - | <br>D coded |
|           |                          |              | Abbreviation:        | TxD+           | RxD+          | TxD-            | RxD-           |                                                                                                  |
|           |                          |              | Pin:                 | 1              | 2             | 3               | 4              |                                                                                                  |



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## EtherCAT

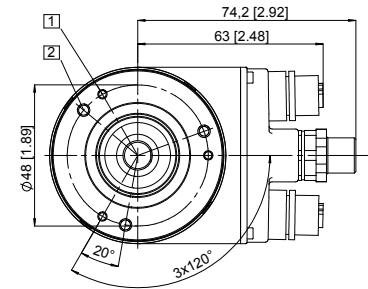
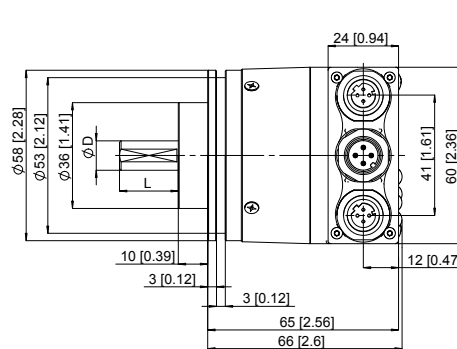
### Dimensions shaft version, with removable bus terminal cover

Dimensions in mm [inch]

#### Clamping flange, $\varnothing 58$ [2.28] Flange type 1 and 3

- 1 3 x M3, 6 [0.24] deep
- 2 3 x M4, 8 [0.32] deep

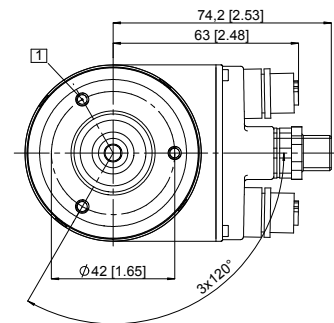
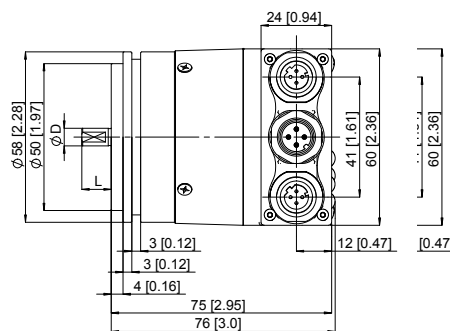
| D         | Fit | L         |
|-----------|-----|-----------|
| 6 [0.24]  | h7  | 10 [0.39] |
| 10 [0.39] | f7  | 20 [0.79] |
| 1/4"      | h8  | 7/8"      |
| 3/8"      | h8  | 7/8"      |



#### Synchro flange, $\varnothing 58$ [2.28] Flange type 2 and 4

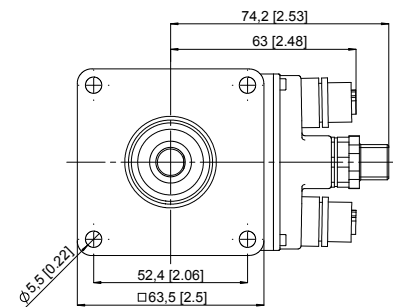
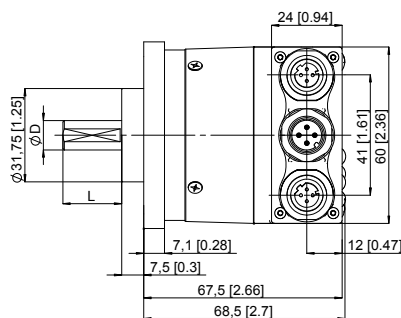
- 1 3 x M4, 6 [0.24] deep

| D         | Fit | L         |
|-----------|-----|-----------|
| 6 [0.24]  | h7  | 10 [0.39] |
| 10 [0.39] | f7  | 20 [0.79] |
| 1/4"      | h8  | 7/8"      |
| 3/8"      | h8  | 7/8"      |



#### Square flange, $\square 63.5$ [2.5] Flange type 5 and 7

| D         | Fit | L         |
|-----------|-----|-----------|
| 6 [0.24]  | h7  | 10 [0.39] |
| 10 [0.39] | f7  | 20 [0.79] |
| 1/4"      | h8  | 7/8"      |
| 3/8"      | h8  | 7/8"      |



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## Standard optical

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## EtherCAT

### Dimensions hollow shaft version (blind hollow shaft), with removable bus terminal cover

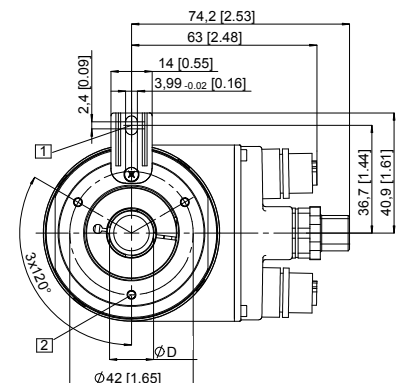
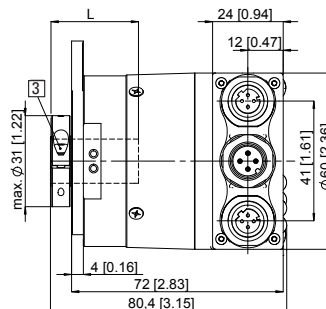
Dimensions in mm [inch]

#### Flange with spring element, long Flange type 1 and 2

- 1 Slot spring element, recommendation: cylindrical pin DIN 7,  $\varnothing 4$  [0.16]
- 2 3 x M3, 5.5 [0.22] deep
- 3 Recommended torque for the clamping ring 0.6 Nm

| D         | Fit | L         |
|-----------|-----|-----------|
| 10 [0.39] | H7  | 30 [1.18] |
| 12 [0.47] | H7  | 30 [1.18] |
| 14 [0.55] | H7  | 30 [1.18] |
| 15 [0.59] | H7  | 30 [1.18] |
| 3/8"      | H7  | 30 [1.18] |
| 1/2"      | H7  | 30 [1.18] |

L = insertion depth max. blind hollow shaft

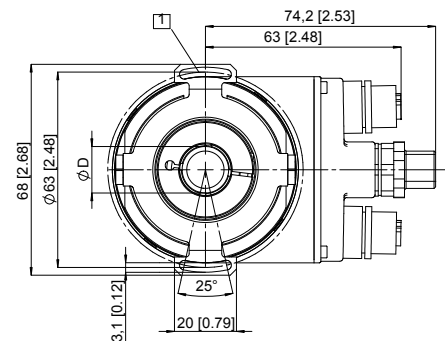
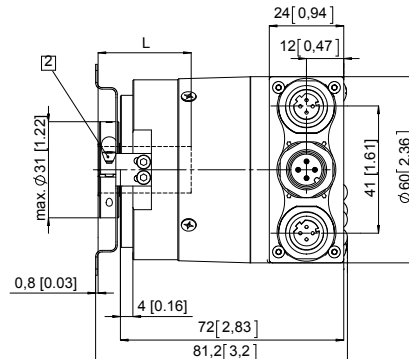


#### Flange with stator coupling, $\varnothing 63$ [2.48] Flange type 5 and 6

- 1 Fixing screws DIN 912 M3 x 8 (washer included in delivery)
- 2 Recommended torque for the clamping ring 0.6 Nm

| D         | Fit | L         |
|-----------|-----|-----------|
| 10 [0.39] | H7  | 30 [1.18] |
| 12 [0.47] | H7  | 30 [1.18] |
| 14 [0.55] | H7  | 30 [1.18] |
| 15 [0.59] | H7  | 30 [1.18] |
| 3/8"      | H7  | 30 [1.18] |
| 1/2"      | H7  | 30 [1.18] |

L = insertion depth max. blind hollow shaft



#### Flange with stator coupling, $\varnothing 65$ [2.56] Flange type 3 and 4

- 1 Recommended torque for the clamping ring 0.6 Nm

| D         | Fit | L         |
|-----------|-----|-----------|
| 10 [0.39] | H7  | 30 [1.18] |
| 12 [0.47] | H7  | 30 [1.18] |
| 14 [0.55] | H7  | 30 [1.18] |
| 15 [0.59] | H7  | 30 [1.18] |
| 3/8"      | H7  | 30 [1.18] |
| 1/2"      | H7  | 30 [1.18] |

L = insertion depth max. blind hollow shaft

