

# Absolute encoders - singleturn

**Standard  
optical**

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

**CANopen**



The singleturn encoders 5858 and 5878 with CANopen interface and optical sensor technology are ideal for use in all CANopen applications.

They offer a maximum resolution of 16 bits, divided over 360°. These encoders are available with blind hollow shaft up to 15 mm.



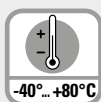
**CANopen**



Safety-Lock™



High rotational speed



Temperature range  
-40°...+80°C



High protection level  
IP



High shaft load capacity



Shock / vibration resistant



Magnetic field proof



Magnetic field proof



Reverse polarity protection



Optical sensor



Surface protection salt spray-tested optional

## Reliable

- Tried-and-tested in applications with the highest demands, such as in mobile automation or medical technology.
- Ideal for use outdoors thanks to IP67 protection and wide temperature range from -40 °C up to +80 °C.

## Flexible

- Node address can be set via rotary switches or software.
- Baud rate and termination can be set via DIP switches or software.
- With bus terminal cover or fixed connection, as well as M12 connectors or cable connection.

## Order code Shaft version

**8.5858**

Type

**. XX 2X . 21 1 X**

### 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 / supply voltage

- 2** = CANopen DS301 V4.02 / 10 ... 30 V DC

### d Type of connection

removable bus terminal cover

- 1 = radial cable gland
- 2** = 2 x M12 connector, 5-pin
- Fixed connection without bus terminal cover
- A = radial cable, 2 m [6.56'] PVC
- B = radial cable, special length PVC \*)
- E = 1 x radial M12 connector, 5-pin
- F = 2 x radial M12 connector, 5-pin
- I = 1 x radial M23 connector, 12-pin
- J = 2 x radial M23 connector, 12-pin

\*) Available special lengths (connection type B):  
3, 5, 8, 10, 15 m [9.84, 16.40, 26.25, 32.80, 49.21']  
order code expansion .XXXX = length in dm  
ex.: 8.5858.112B.2113.0030 (for cable length 3 m)

### e Fieldbus profile

**21 = CANopen**

### f Options (service)

- 2 = no options
- 3** = SET button

Optional on request

- Ex 2/22<sup>3)</sup>
- 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.

3) For the cable connection type, cable material PUR.

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Standard optical	Sendix 5858 / 5878 (shaft / hollow shaft)	CANopen
Order code Hollow shaft	8.5878 . XX2X . 211X Type a b c d e i	
<b>a Flange</b> 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"] <u>5 = with stator coupling, IP65 ø 63 mm [2.48"]</u> 6 = with stator coupling, IP67 ø 63 mm [2.48"]  <b>b Blind hollow shaft</b> (insertion depth max. 30 mm [1.18"]) 3 = ø 10 mm [0.39"] <u>4 = ø 12 mm [0.47"]</u> 5 = ø 14 mm [0.55"] 6 = ø 15 mm [0.59"] 8 = ø 3/8" 9 = ø 1/2"  <b>c Interface / supply voltage</b> <u>2 = CANopen DS301 V4.02 / 10 ... 30 V DC</u>	<b>d Type of connection</b> removable bus terminal cover 1 = radial cable gland <u>2 = 2 x M12 connector, 5-pin</u> Fixed connection without bus terminal cover A = radial cable, 2 m [6.56'] PVC B = radial cable, special length PVC *) E = 1 x radial M12 connector, 5-pin F = 2 x radial M12 connector, 5-pin I = 1 x radial M23 connector, 12-pin J = 2 x radial M23 connector, 12-pin  *) Available special lengths (connection type B): 3, 5, 8, 10, 15 m [9.84, 16.40, 26.25, 32.80, 49.21'] order code expansion .XXXX = length in dm ex.: 8.5878.542B.2113.0030 (for cable length 3 m)	<b>e Fieldbus profile</b> <u>21 = CANopen</u>  <b>i Options (service)</b> 2 = no options <u>3 = SET button</u>  Optional on request - Ex 2/22 <sup>1)</sup> - 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
	bellows coupling ø 19 mm [0.75"] for shaft 10 mm [0.39"]	8.0000.1102.1010
Mounting accessory for hollow shaft encoders Dimensions in mm [inch]		Order no.
<b>Torque pin, ø 4 mm</b> for flange with spring element (flange type 1)	with fixing thread 	8.0010.4700.0000
Cables and connectors		Order no.
Preassembled cables	M12 female connector with coupling nut, 5-pin, A coded, straight – Bus in single-ended 5 m [16.40'] PVC cable	05.00.6091.A211.005M
	M12 male connector with external thread, 5-pin, A coded, straight – Bus out single-ended 5 m [16.40'] PVC cable	05.00.6091.A411.005M
Connectors	M12 female connector with coupling nut, 5-pin, A coded, straight (metal) – Bus in	8.0000.5116.0000
	M12 male connector with external thread, 5-pin, A coded, straight (metal) – Bus out	8.0000.5111.0000

Further Kübler accessories can be found at: [kuebler.com/accessories](http://kuebler.com/accessories)  
 Further Kübler cables and connectors can be found at: [kuebler.com/connection-technology](http://kuebler.com/connection-technology)

1) For the cable connection type, cable material PUR.

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<b>Standard optical</b>	<b>Sendix 5858 / 5878 (shaft / hollow shaft)</b>	<b>CANopen</b>
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## Technical data

Mechanical characteristics			Electrical characteristics	
<b>Maximum speed</b>			<b>Supply voltage</b>	10 ... 30 V DC
	IP65 up to 70 °C [158 °F]	9000 min <sup>-1</sup> , 7000 min <sup>-1</sup> (continuous)	<b>Power consumption (no load)</b>	max. 90 mA
	IP65 up to T <sub>max</sub>	7000 min <sup>-1</sup> , 4000 min <sup>-1</sup> (continuous)	<b>Reverse polarity protection of the supply voltage</b>	yes
	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)		
<b>Starting torque - at 20 °C [68 °F]</b>				
	IP65	< 0.01 Nm		
	IP67	< 0.05 Nm		
<b>Mass moment of inertia</b>				
	shaft version	3.0 x 10 <sup>-6</sup> kgm <sup>2</sup>		
	hollow shaft version	6.0 x 10 <sup>-6</sup> kgm <sup>2</sup>		
<b>Load capacity of shaft</b>				
	radial	80 N		
	axial	40 N		
<b>Weight</b>				
	with bus terminal cover	approx. 0.53 kg [18.69 oz]		
	with fixed connection	approx. 0.50 kg [17.64 oz]		
<b>Protection acc. to EN 60529</b>				
	housing side	IP67		
	shaft side	IP65, opt. IP67		
<b>Working temperature range</b>				
		-40 °C ... +80 °C [-40 °F ... +176 °F] <sup>1)</sup>		
<b>Material</b>				
	shaft/hollow shaft	stainless steel		
	flange	aluminum		
	housing	zinc die-cast		
	cable	PVC (PUR for Ex 2/22)		
<b>Shock resistance acc. to EN 60068-2-27</b>				
		2500 m/s <sup>2</sup> , 6 ms		
<b>Vibration resistance acc. to EN 60068-2-6</b>				
		100 m/s <sup>2</sup> , 55 ... 2000 Hz		

## Interface characteristics CANopen

<b>Resolution</b>	1 ... 65536 (16 bit), scalable default: 8192 (13 bit)
<b>Interface</b>	CAN high-speed acc. to ISO 11898, Basic- and Full-CAN CAN specification 2.0 B
<b>Protocol</b>	CANopen profile DS406 V3.2 with manufacturer-specific add-ons
<b>Baud rate</b>	10 ... 1000 kbit/s can be set via DIP switches, software configurable
<b>Node address</b>	1 ... 127 can be set via rotary switches, software configurable
<b>Termination switchable</b>	can be set via DIP switches, software configurable

## General information about CANopen

The CANopen encoders support the latest CANopen communication profile according to DS301 V4.02. In addition, device specific profiles such as encoder profile DS406 V3.2 are available.

The following operating modes may be selected: Polled Mode, Cyclic Mode, Sync Mode and a High Resolution Sync Protocol. Moreover, scale factors, preset values, limit switch values and many other additional parameters can be programmed via the CAN 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 in a freely variable way as PDO (PDO mapping): **position, speed, acceleration** as well as the **status of the working area**.

As competitively priced alternatives, encoders are also available with a connector or a cable connection, where the device address and baud rate can be changed and configured by means of the software. The models with bus terminal cover and integrated T-coupler allow for extremely simple installation: the bus and supply voltage can be easily connected via M12 connectors. The device address can be set via 2 rotary hex switches. Furthermore, another DIP switch allows for the setting of the baud rate and switching on a termination resistor. Three LEDs located on the back indicate the operating or fault status of the CAN bus, as well as the status of an internal diagnostic.

## CANopen communication profile DS301 V4.02

Among others, the following functionality is integrated.

Class C2 functionality

- NMT slave.
- Heartbeat protocol.
- High resolution sync protocol.
- Identity object.
- Error behavior object.
- Variable PDO mapping self-start programmable (power on to operational), 3 Sending PDO's.
- Node address, baud rate and CANbus.
- Programmable termination.

## CANopen encoder profile DS406 V3.2

The following parameters can be programmed:

- Event mode.
- Units for speed selectable (steps/sec or min<sup>-1</sup>).
- Factor for speed calculation (e.g. circumference of measuring wheel).
- Integration time for the speed value from 1 ... 32.
- 2 working areas with 2 upper and lower limits and the corresponding output states.
- Variable PDO mapping for position, speed, work area status.
- Extended failure management for position sensing with integrated temperature control.
- User interface with visual display of bus and failure status - 3 LED's.
- Optional - 32 CAMs programmable.
- Customer-specific memory - 16 Bytes.
- "Watchdog controlled" device.

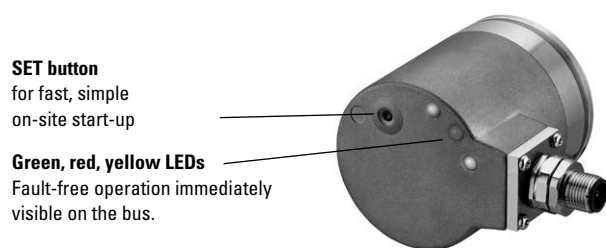
All profiles stated here: key-features

The object 6003h "Preset" is assigned to an integrated key, accessible from the outside.

1) Cable version: -30 °C ... +75 °C [-22 °F ... +167 °F].

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<b>SET button (zero or defined value, option)</b> Protection against accidental activation. Button can only be operated with a ball-pen or pencil.		
<b>Diagnostic LED (yellow)</b> <b>LED is ON with the following fault conditions</b> sensor error (internal code or LED error), voltage too low, over-temperature		
<b>Approvals</b> <b>UL compliant</b> in accordance with      File no. E224618 <b>CE compliant</b> in accordance with EMC Directive      2014/30/EU RoHS Directive      2011/65/EU ATEX Directive      2014/34/EU (for Ex 2/22 variants)		



# Absolute encoders - singleturn

<b>Standard optical</b>	<b>Sendix 5858 / 5878 (shaft / hollow shaft)</b>	<b>CANopen</b>
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## Terminal assignment

Interface	Type of connection	Cable gland (bus terminal cover with terminal box)									
2	1	Signal:	Bus OUT					Bus IN			
			CAN_GND	CAN_L	CAN_H	0 V supply voltage	+V supply voltage	0 V supply voltage	+V supply voltage	CAN_L	CAN_H
		Abbreviation:	CG	CL	CH	0 V	+V	0 V	+V	CL	CH

Interface	Type of connection	Cable (isolate unused cores individually before initial start-up)									
2	A, B	Signal:	Bus IN								
			0 V supply voltage	+V supply voltage	CAN_L	CAN_H	CAN_GND				
		Core color:	WH	BN	YE	GN	GY				

Interface	Type of connection	2 x M12 connector, 5-pin									
2	2, F	Signal:	Bus OUT								
			0 V supply voltage	+V supply voltage	CAN_L	CAN_H	CAN_GND				
		Pin:	3	2	5	4	1				
		Signal:	Bus IN								
			0 V supply voltage	+V supply voltage	CAN_L	CAN_H	CAN_GND				
		Pin:	3	2	5	4	1				

Interface	Type of connection	1 x M12 connector, 5-pin									
2	E	Signal:	Bus IN								
			0 V supply voltage	+V supply voltage	CAN_L	CAN_H	CAN_GND				
		Pin:	3	2	5	4	1				

Interface	Type of connection	2 x M23 connector, 12-pin									
2	J	Signal:	Bus OUT								
			0 V supply voltage	+V supply voltage	CAN_L	CAN_H	CAN_GND				
		Pin:	10	12	2	7	3				
		Signal:	Bus IN								
			0 V supply voltage	+V supply voltage	CAN_L	CAN_H	CAN_GND				
		Pin:	10	12	2	7	3				

Interface	Type of connection	1 x M23 connector, 12-pin									
2	I	Signal:	Bus IN								
			0 V supply voltage	+V supply voltage	CAN_L	CAN_H	CAN_GND				
		Pin:	10	12	2	7	3				

# Absolute encoders - singleturn

## Standard optical

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

## CANopen

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

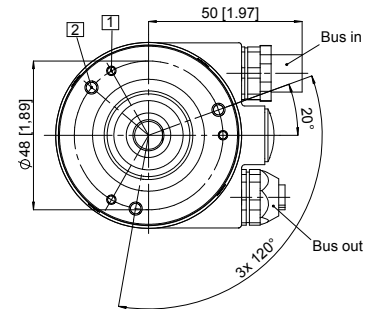
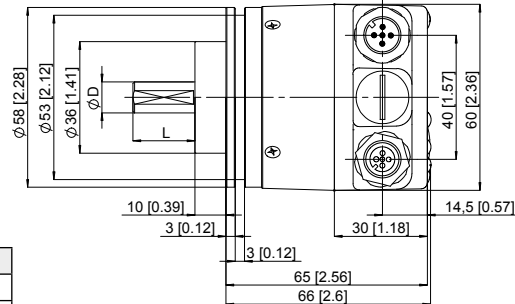
Dimensions in mm [inch]

#### Clamping flange, $\varnothing 58$ [2.28]

#### Flange type 1 and 3

(drawing with 2 x M12 connector)

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



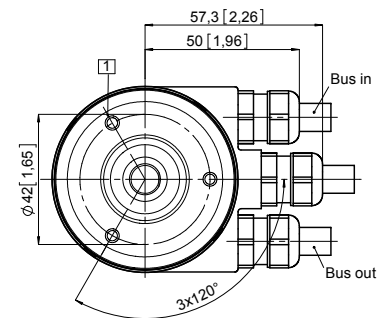
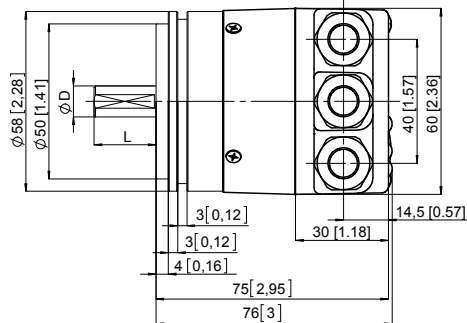
D	Fit	L
6 [0.24]	h7	10 [0.39]
10 [0.39]	f7	20 [0.79]
1/4"	h8	7/8"
3/8"	h8	7/8"

#### Synchro flange, $\varnothing 58$ [2.28]

#### Flange type 2 and 4

(drawing with cable)

- 1 3 x M4, 6 [0.24] deep

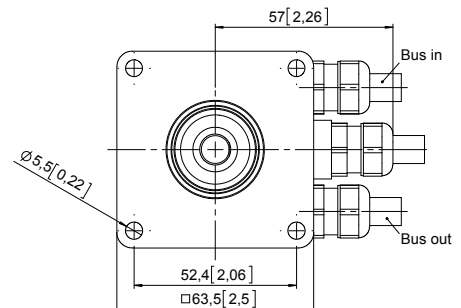
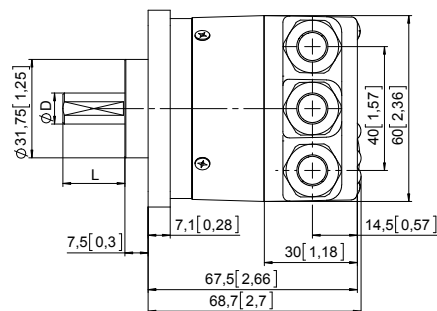


D	Fit	L
6 [0.24]	h7	10 [0.39]
10 [0.39]	f7	20 [0.79]
1/4"	h8	7/8"
3/8"	h8	7/8"

#### Square flange, $\square 63.5$ [2.5]

#### Flange type 5 and 7

(drawing with cable)



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	Sendix 5858 / 5878 (shaft / hollow shaft)	CANopen
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## Dimensions shaft version, with fixed connection

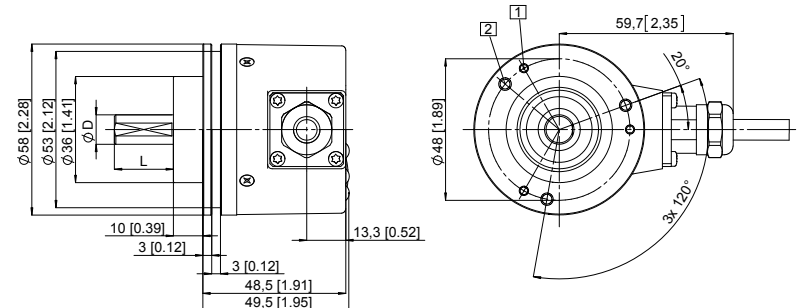
Dimensions in mm [inch]

### Clamping flange, $\varnothing 58$ [2.28]

#### Flange type 1 and 3

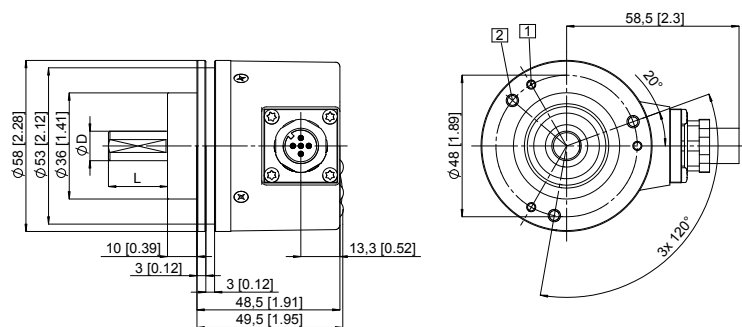
(drawing with cable)

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



(drawing with M12 connector)

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



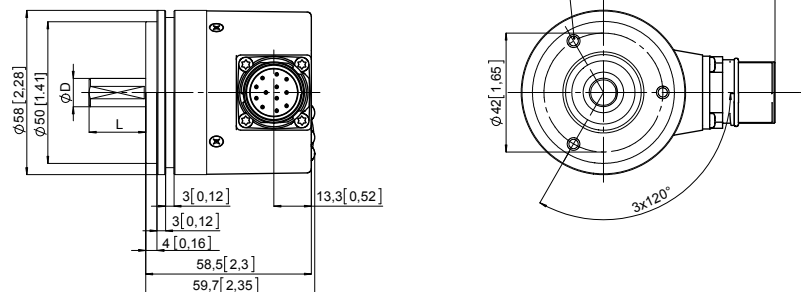
D	Fit	L
6 [0.24]	h7	10 [0.39]
10 [0.39]	f7	20 [0.79]
1/4"	h8	7/8"
3/8"	h8	7/8"

### Synchro flange, $\varnothing 58$ [2.28]

#### Flange type 2 and 4

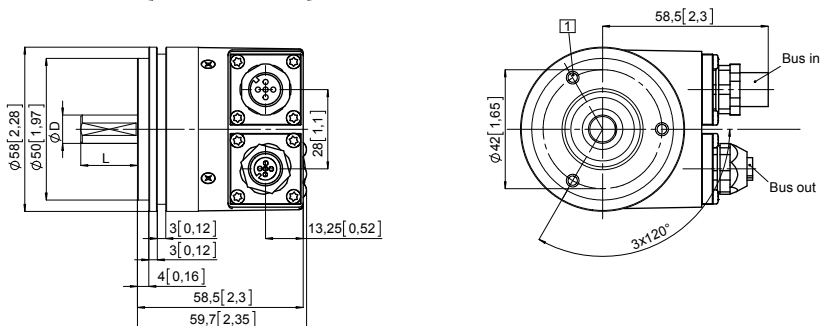
(drawing with M23 connector)

- 1 3 x M4, 6 [0.24] deep



(drawing with M12 connector)

- 1 3 x M4, 6 [0.24] deep



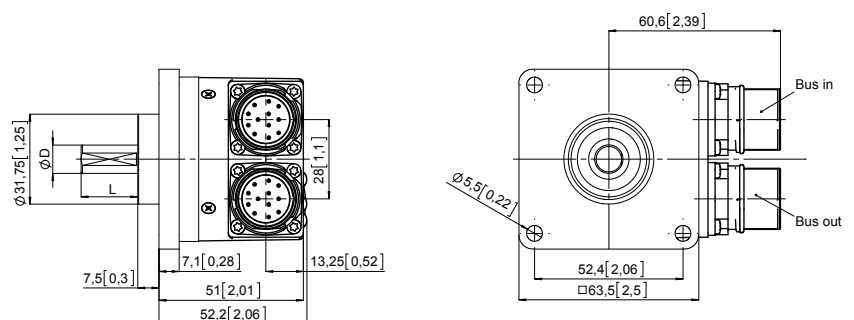
D	Fit	L
6 [0.24]	h7	10 [0.39]
10 [0.39]	f7	20 [0.79]
1/4"	h8	7/8"
3/8"	h8	7/8"

### Square flange, $\square 63.5$ [2.5]

#### Flange type 5 and 7

(drawing with 2 x M23 connector)

- 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"

# Absolute encoders - singleturn

Standard optical	Sendix 5858 / 5878 (shaft / hollow shaft)	CANopen
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## Dimensions hollow shaft version (blind hollow shaft), with removable bus terminal cover

Dimensions in mm [inch]

### Flange with spring element, long

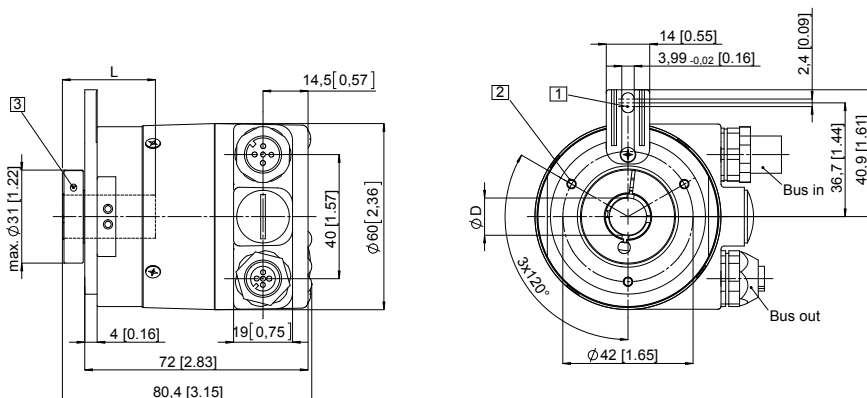
#### Flange type 1 and 2

(drawing with 2 x M12 connector)

- Slot spring element, recommendation: torque pin DIN 7,  $\varnothing 4$  [0.16]
- 3 x M3, 5.5 [0.22] deep
- 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

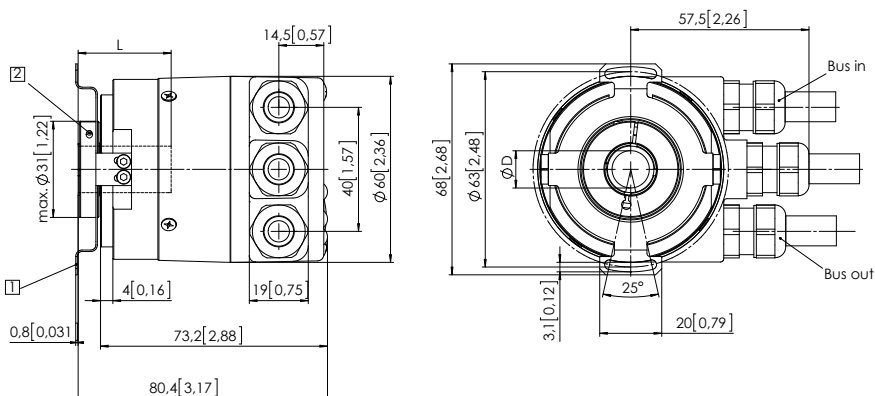
Pitch circle diameter for fixing screws 63 [2.48]

(drawing with cable)

- Fixing screws DIN 912 M3 x 8 (washer included in delivery)
- 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

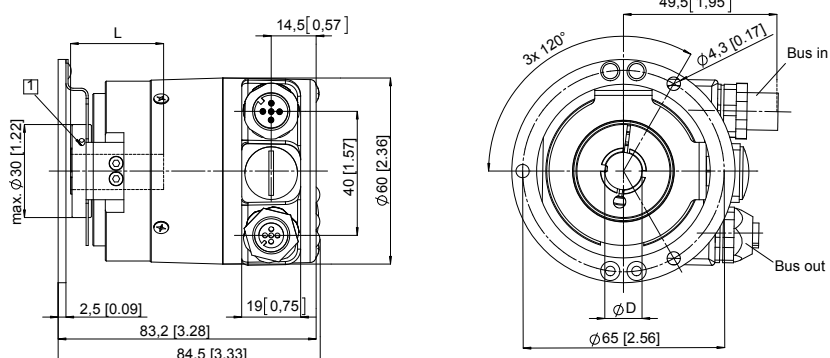
Pitch circle diameter for fixing screws 65 [2.56]

(drawing with 2 x M12 connector)

- 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



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## Standard optical

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

## CANopen

### Dimensions hollow shaft version (blind hollow shaft), with fixed connection

Dimensions in mm [inch]

#### Flange with spring element, long

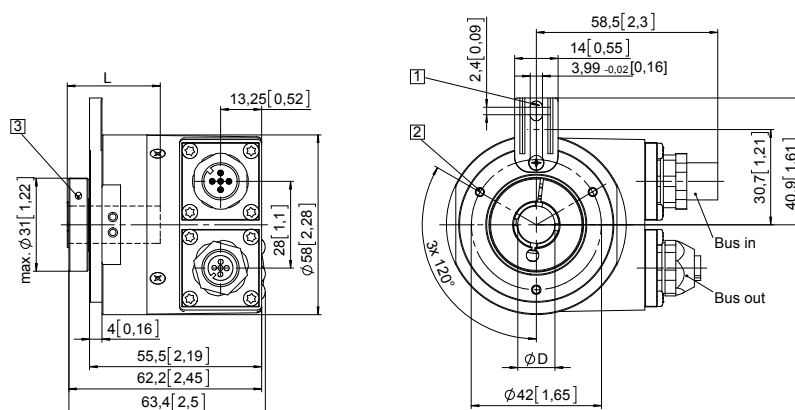
#### Flange type 1 and 2

(drawing with 2 x M12 connector)

- 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, $\varnothing 65$ [2.56]

#### Flange type 3 and 4

Pitch circle diameter for fixing screws

65 [2.56]

(drawing with cable)

- 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

