Absolute encoders - singleturn

Kübler

Standard Optical	Sendix 5858 / 5878 (shaft / hollow shaft)	CANopen

Ex 2/22 c**UL**us **RoHS** **CAN**open

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	Seawater-resistant version on request

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.

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 . X X 2 X . 21 1 X
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
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"]

ⓑ Shaft (ø x L), with flat
1 = 6 x 10 mm [0.24 x 0.39"] [1]
2 = 10 x 20 mm [0.39 x 0.79"] [2]
3 = 1/4" x 7/8"
4 = 3/8" x 7/8"

ⓒ Interface / Power supply
2 = CANopen DS301 V4.02 / 10 … 30 V DC

ⓓ Type of connection
removable bus terminal cover
1 = cable gland radial
2 = 2 x M12 connector
Fixed connection without bus terminal cover
A = cable outlet PVC, radial, length 2 m [6.56']
E = 1 x M12 connector, radial
F = 2 x M12 connector, radial
I = 1 x M23 connector, radial
J = 2 x M23 connector, radial

ⓔ Fieldbus profile [3]
21 = CANopen Encoder profile DS406 V3.2

ⓕ Options (Service)
2 = no options
3 = SET button

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

Order code Hollow shaft

8.5878 . X X 2 X . 21 1 X
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
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"]

ⓑ Blind hollow shaft
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"

ⓒ Interface / Power supply
2 = CANopen DS301 V4.02 / 10 … 30 V DC

ⓓ Type of connection
removable bus terminal cover
1 = cable gland radial
2 = 2 x M12 connector
Fixed connection without bus terminal cover
A = cable outlet PVC, radial, length 2 m [6.56']
E = 1 x M12 connector, radial
F = 2 x M12 connector, radial
I = 1 x M23 connector, radial
J = 2 x M23 connector, radial

ⓔ Fieldbus profile [3]
21 = CANopen Encoder profile DS406 V3.2

ⓕ Options (Service)
2 = no options
3 = SET button

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

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1) Preferred type only in conjunction with Flange type 2
2) Preferred type only in conjunction with Flange type 1
3) CAN parameters can also be factory pre-set

Absolute encoders - singleturn

Standard Optical	Sendix 5858 / 5878 (shaft / hollow shaft)	CANopen

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		Order no.
Cylindrical pin, long for torque stops	With fixing thread	8.0010.4700.0000

Connection technology		Order no.
Connector, self-assembly (straight)	Coupling M12 for Bus in	8.0000.5116.0000
	Connector M12 for Bus out	8.0000.5111.0000
Cordset, pre-assembled	M12, for Bus in, 6 m [19.68'] PVC cable	05.00.6091.A211.006M
	M12, for Bus out, 6 m [19.68'] PVC cable	05.00.6091.A411.006M

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	IP65 up to 70°C [158°F]	9 000 min^{-1}, 7 000 min^{-1} (continuous)
	IP65 up to T$_{max}$	7 000 min^{-1}, 4 000 min^{-1} (continuous)
	IP67 up to 70°C [158°F]	8 000 min^{-1}, 6 000 min^{-1} (continuous)
	IP67 up to T$_{max}$	6 000 min^{-1}, 3 000 min^{-1} (continuous)
Starting torque - at 20°C [68°F]	IP65	< 0.01 Nm
	IP67	< 0.05 Nm
Moment of inertia	Shaft version	3.0 x 10^{-6} kgm^2
	Hollow shaft version	6.0 x 10^{-6} kgm^2
Load capacity of shaft	radial	80 N
	axial	40 N
Weight	with bus terminal cover	approx. 0.53 kg [18.69 oz]
	with fixed connection	approx. 0.50 kg [17.64 oz]
Protection acc. to EN 60529	housing side	IP67
	shaft side	IP65, opt. IP67
EX approval for hazardous areas		optional Zone 2 and 22
Working temperature range		-40°C ... +80°C [1] [-40°F ... +176°F] [1]
Material	shaft/hollow shaft	stainless steel
	flange	aluminium
	housing	zinc die-cast housing
	cable	PVC
Shock resistance acc. EN 60068-2-27		2500 m/s^2, 6 ms
Vibration resistance acc. EN 60068-2-6		100 m/s^2, 55 ... 2000 Hz

Electrical characteristics

Power supply	10 ... 30 V DC
Power consumption (no load)	max. 90 mA
Reverse polarity protection of the power supply (+V)	yes
UL approval	File 224618
CE compliant acc. to	EMC guideline 2004/108/EC
RoHS compliant acc. to	guideline 2011/65/EU

SET button (zero or defined value, option)

Protection against accidental activation.
Button can only be operated with a ball-pen or pencil.

Diagnostic LED (yellow)

LED is ON with the following fault conditions	Sensor error (internal code or LED error), voltage too low, over-temperature

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

Standard Optical	Sendix 5858 / 5878 (shaft / hollow shaft)	CANopen

Interface characteristics CANopen

Singleturn resolution	1 ... 65536 (16 bit), scaleable
Default value	8192 (13 bit)
Code	Binary
Interface	CAN High-Speed acc. to ISO 11898, Basic- and Full-CAN CAN Specification 2.0 B
Protocol	CANopen Profile DS406 V3.2 with manufacturer-specific add-ons
Baud rate	10 ... 1000 kbit/s (can be set via DIP switches / software configurable)
Node address	1 ... 127 (can be set via rotary switches / software configurable)
Termination switchable	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. 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 power supply 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.

SET button
for fast, simple
on-site start-up

Green, red, yellow LEDs
Fault-free operation immediately
visible on the bus.
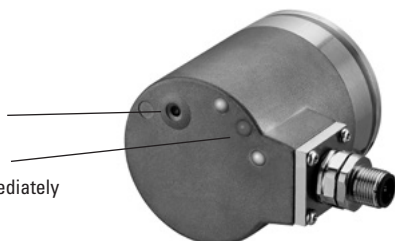
CANopen communication profile DS301 V4.02

Among others, the following functionality is integrated.

Class C2 functionality
• NMT Slave.
• Heartbeat Protocol.
• High Resolution Sync Protocol.
• Identity Object.
• Error Behaviour 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^{-1}).
• 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.

Standard Optical	Sendix 5858 / 5878 (shaft / hollow shaft)	CANopen

Terminal assignment

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

Interface	Type of connection	Cable (isolate unused wires individually before initial start-up)				
2	A		Bus IN			
		Signal:	0 V power supply	+V power supply	CAN_L	CAN_H	CAN_GND
		Cable colour:	WH	BN	YE	GN	GY

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

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

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

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

Standard Optical — **Sendix 5858 / 5878 (shaft / hollow shaft)** — **CANopen**

Dimensions shaft version, with removable bus terminal cover
Dimensions in mm [inch]

Clamping flange, ø 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	L	Fit
6 [0.24]	10 [0.39]	h7
10 [0.39]	20 [0.79]	f7
1/4"	7/8"	h7
3/8"	7/8"	h7
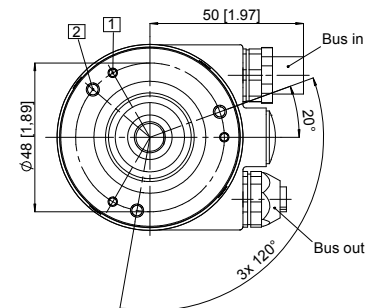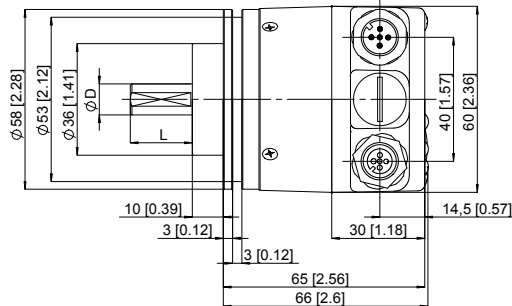
Synchro flange, ø 58 [2.28]
Flange type 2 and 4
(Drawing with cable)

1 3 x M4, 6 [0.24] deep

D	L	Fit
6 [0.24]	10 [0.39]	h7
10 [0.39]	20 [0.79]	f7
1/4"	7/8"	h7
3/8"	7/8"	h7
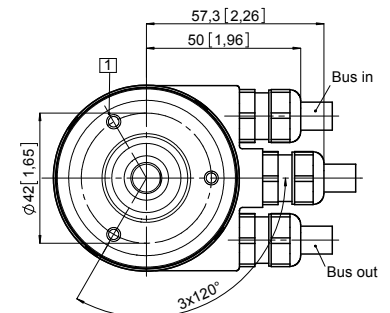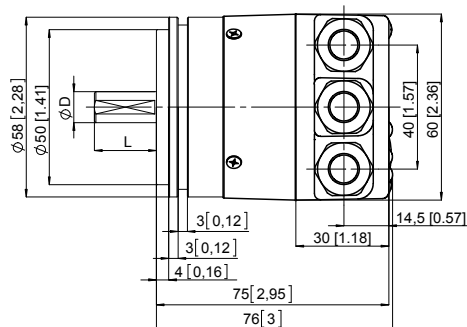
Square flange, ☐ 63.5 [2.5]
Flange type 5 and 7
(Drawing with cable)

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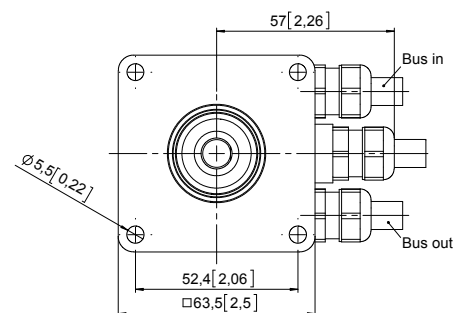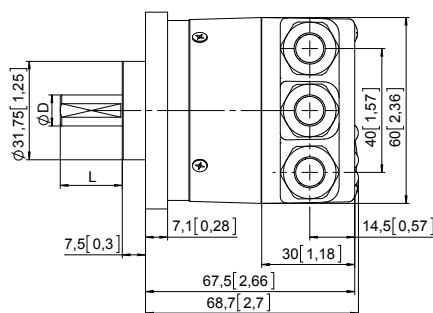
Absolute Encoders
Singleturn

Standard Optical	Sendix 5858 / 5878 (shaft / hollow shaft)	CANopen

Dimensions shaft version, with fixed connection
Dimensions in mm [inch]

Clamping flange, ø 58 [2.28]
Flange type 1 and 3
(Drawing cable)

1 3 x M3, 6 [0.24] deep
2 3 x M4, 8 [0.32] deep
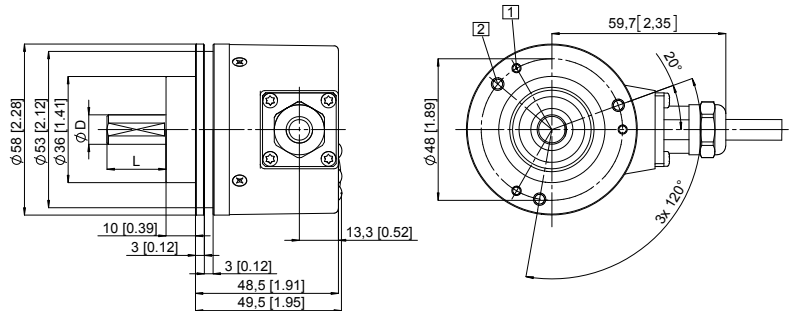
(Drawing with M12 connector)
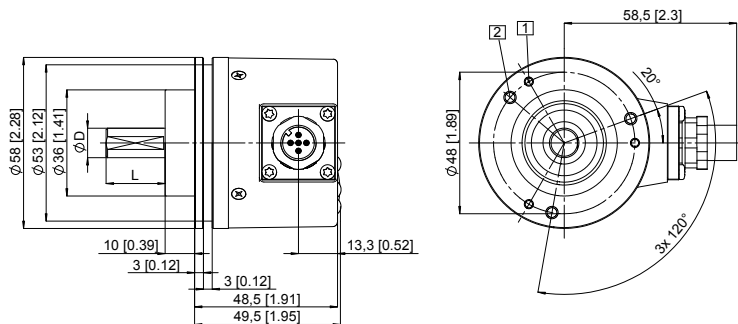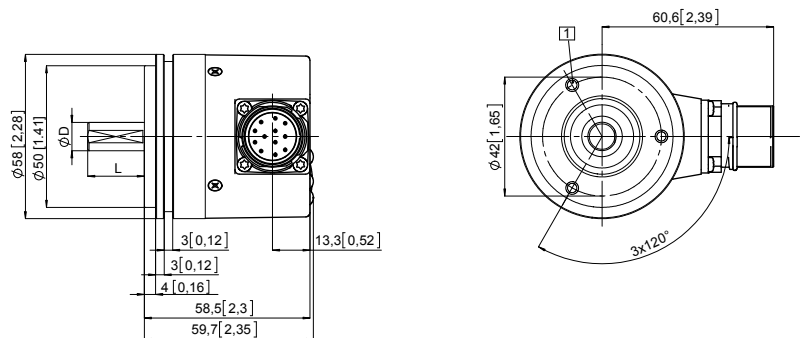
1 3 x M3, 6 [0.24] deep
2 3 x M4, 8 [0.32] deep

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

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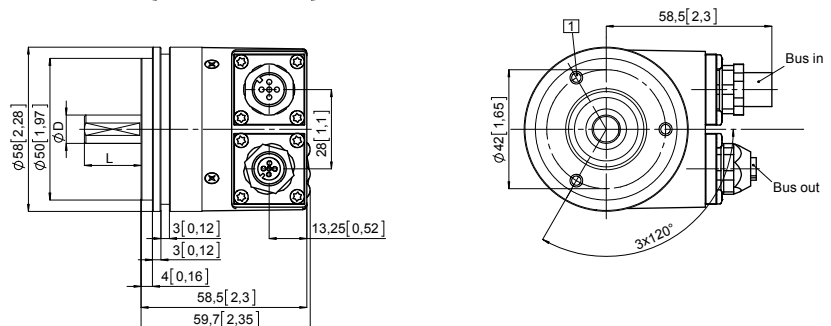
D	L	Fit
6 [0.24]	10 [0.39]	h7
10 [0.39]	20 [0.79]	f7
1/4"	7/8"	h7
3/8"	7/8"	h7

Square flange, ⬜ 63.5 [2.5]
Flange type 5 and 7
(Drawing with 2 x M23 connector)

D	L	Fit
6 [0.24]	10 [0.39]	h7
10 [0.39]	20 [0.79]	f7
1/4"	7/8"	h7
3/8"	7/8"	h7
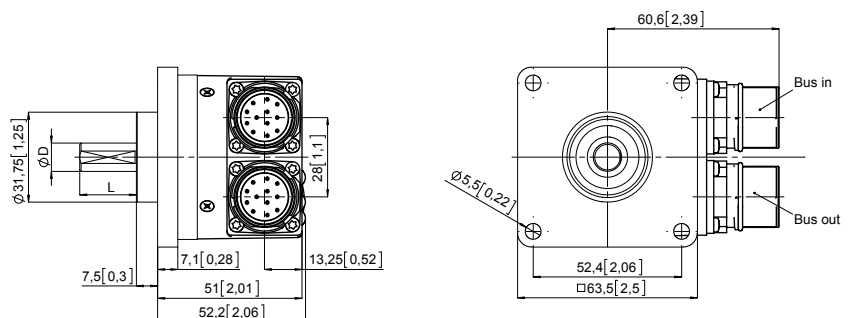
Standard Optical	Sendix 5858 / 5878 (shaft / hollow shaft)	CANopen

## 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)

1 Torque stop slot,
  Recommendation:
  Cylindrical pin DIN 7, ø 4 [0.16]

2 3 x M3, 5.5 [0.21] deep

3 Recommended torque for the
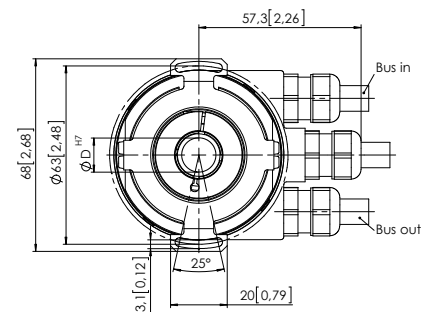 clamping ring 0.6 Nm
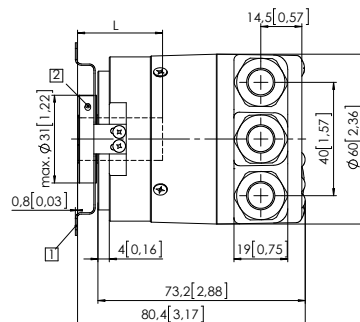
L: Insertion depth for blind hollow shaft: 30 [1.18]
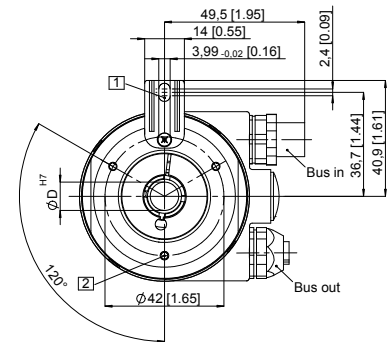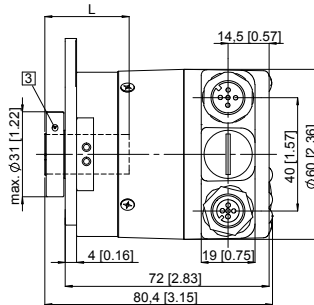
Flange with stator coupling, ø 63 [2.48]
Flange type 5 and 6
Pitch circle diameter for fixing screws 63 [2.48]
(Drawing with cable)

1 Fixing screws DIN 912 M3 x 8
  (Washer included in delivery)

2 Recommended torque for the
  clamping ring 0.6 Nm
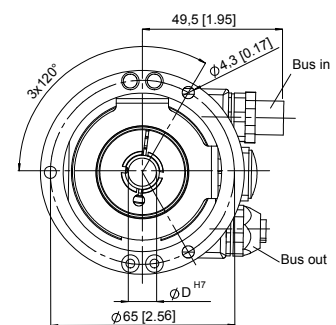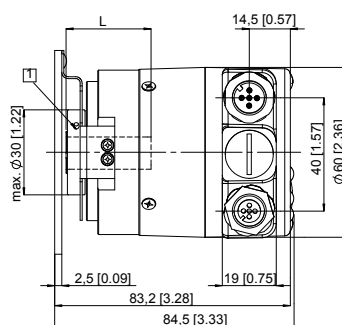
L: Insertion depth for blind hollow shaft: 30 [1.18]

Flange with stator coupling, ø 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

L: Insertion depth for blind hollow shaft: 30 [1.18]

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Standard Optical	Sendix 5858 / 5878 (shaft / hollow shaft)	CANopen

Dimensions hollow shaft version (blind hollow shaft), with fixed connection
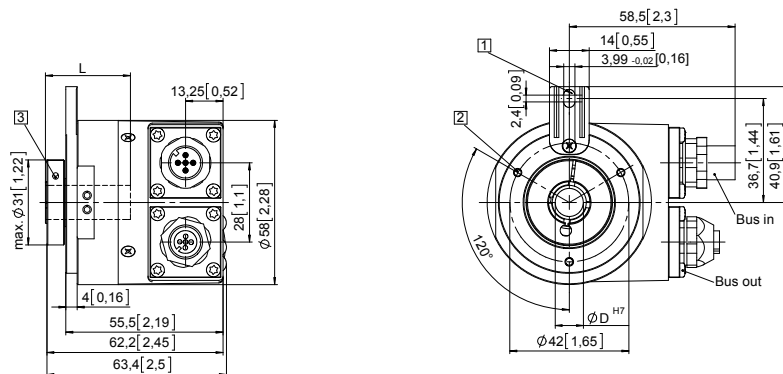Dimensions in mm [inch]

Flange with spring element long
Flange type 1 and 2
(drawing with 2 x M12 connector)

[1] Torque stop slot,
   Recommendation:
   Cylindrical pin DIN 7, ø 4 [0.16]

[2] 3 x M3, 5.5 [0.21] deep

[3] Recommended torque for the
   clamping ring 0.6 Nm

L: Insertion depth for blind hollow shaft: 30 [1.18]

Flange with stator coupling, ø 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

L: Insertion depth for blind hollow shaft: 30 [1.18]