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.

Ex 2/22   c UL us   RoHS   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 . X X 2 X . 2 1 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 = 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)

ⓔ Fieldbus profile
21 = CANopen

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

Optional on request
- Ex 2/22 [3]
- 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.

Standard optical

Sendix 5858 / 5878 (shaft / hollow shaft)

CANopen

Order code Hollow shaft	8.5878 . XX2X . 211X

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*
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</u> = 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"]
<u>4</u> = 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*
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.: 8.5878.542B.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 [1]
- 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.
Cylindrical pin, long for flange with spring element (flange type 1 + 2)	with fixing thread	**8.0010.4700.0000**

Connection technology		Order no.
Cordset, pre-assembled	M12 female connector with coupling nut for bus in , 5-pin 5 m [16.40'] PVC cable	**05.00.6091.A211.005M**
	M12 male connector with external thread for bus out, 5-pin 5 m [16.40'] PVC cable	**05.00.6091.A411.005M**
Connector, self-assembly (straight)	M12 female connector with coupling nut for bus in , 5-pin	**8.0000.5116.0000**
	M12 male connector with external thread for bus out, 5-pin	**8.0000.5111.0000**

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.

[1] For the cable connection type, cable material PUR.

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

Technical data

Mechanical characteristics

Maximum speed

IP65 up to 70°C [158°F]	9000 min^{-1}, 7000 min^{-1} (continuous)
IP65 up to T$_{max}$	7000 min^{-1}, 4000 min^{-1} (continuous)
IP67 up to 70°C [158°F]	8000 min^{-1}, 6000 min^{-1} (continuous)
IP67 up to T$_{max}$	6000 min^{-1}, 3000 min^{-1} (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^{-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

Working temperature range	-40°C ... +80°C [-40°F ... +176°F] [1]

Material	shaft/hollow shaft	stainless steel
	flange	aluminum
	housing	zinc die-cast
	cable	PVC (PUR for Ex 2/22)

Shock resistance acc. to EN 60068-2-27	2500 m/s^2, 6 ms

Vibration resistance acc. to 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	yes
UL approval	file no. E224618
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU

Interface characteristics CANopen

Resolution	1 ... 65536 (16 bit), scalable default: 8192 (13 bit)
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 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 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.

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^{-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.


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

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

SET button (zero or defined value, option)

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

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

Green, red, yellow LEDs
Fault-free operation immediately
visible on the bus.

Diagnostic LED (yellow)

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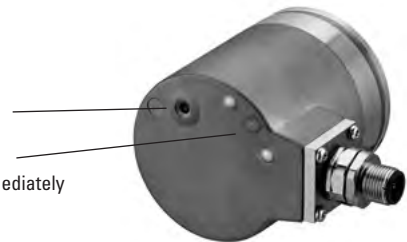
Terminal assignment

Interface	Type of connection	Cable gland (bus terminal cover with terminal box)									
			Bus OUT					Bus IN			
2	1	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 cores individually before initial start-up)					
			Bus IN				
2	A, B	Signal:	0 V power supply	+V power supply	CAN_L	CAN_H	CAN_GND
		Core color:	WH	BN	YE	GN	GY

Interface	Type of connection	2 x M12 connector, 5-pin						
			Bus OUT					
		Signal:	0 V power supply	+V power supply	CAN_L	CAN_H	CAN_GND	
2	2, F	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, 5-pin					
			Bus IN				
2	E	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, 12-pin						
			Bus OUT					
		Signal:	0 V power supply	+V power supply	CAN_L	CAN_H	CAN_GND	
2	J	Pin:	10	12	2	7	3	2 x
			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, 12-pin					
			Bus IN				
2	I	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)
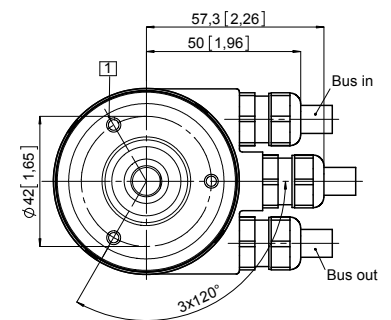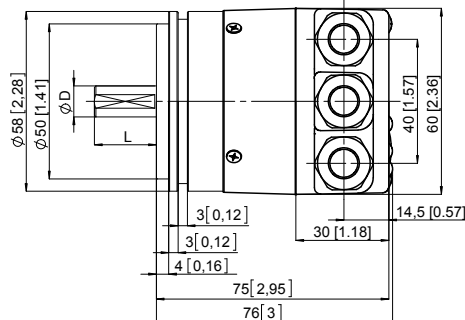
1️⃣ 3 x M3, 6 [0.24] deep
2️⃣ 3 x M4, 8 [0.32] deep
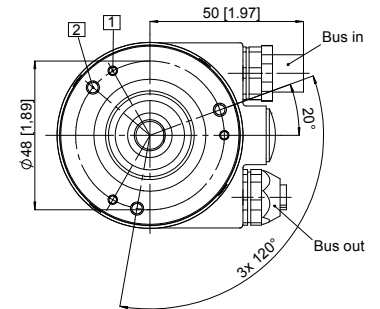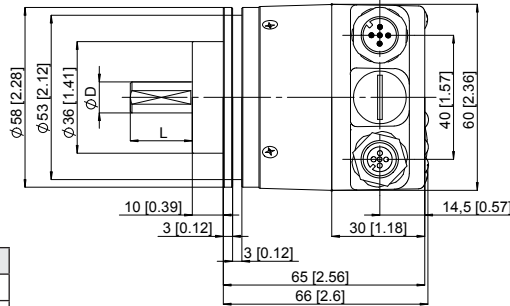
D	Fit	L
6 [0.24]	h7	10 [0.39]
10 [0.39]	f7	20 [0.79]
1/4"	h8	7/8"
3/8"	h8	7/8"

Synchro flange, ø 58 [2.28]
Flange type 2 and 4
(drawing with cable)

1️⃣ 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, ☐ 63.5 [2.5]
Flange type 5 and 7
(drawing with cable)
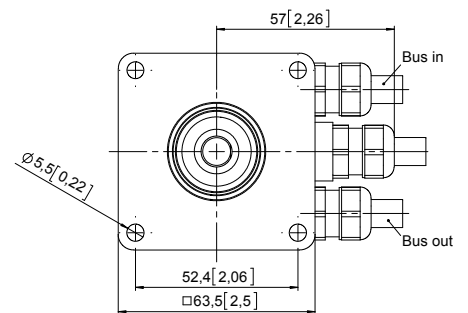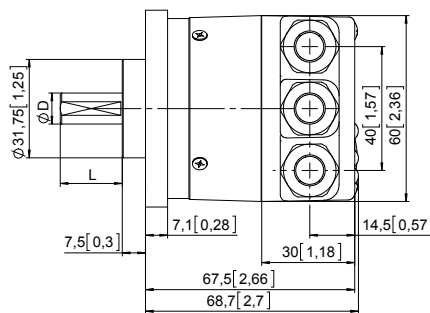
D	Fit	L
6 [0.24]	h7	10 [0.39]
10 [0.39]	f7	20 [0.79]
1/4"	h8	7/8"
3/8"	h8	7/8"

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 with cable)

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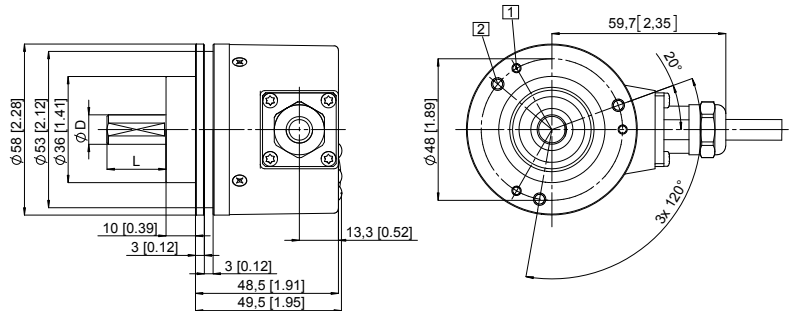
(drawing with M12 connector)
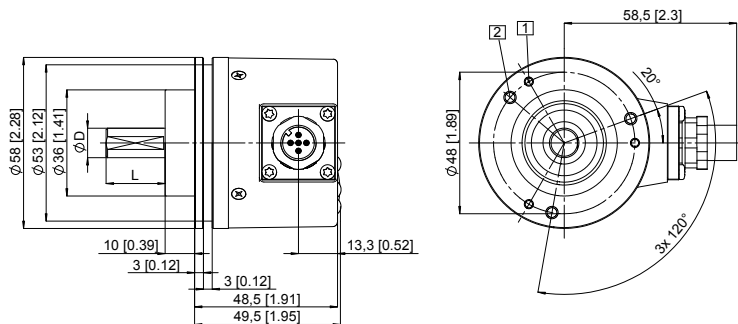
1 3 x M3, 6 [0.24] deep
2 3 x M4, 8 [0.32] deep

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, ø 58 [2.28]
Flange type 2 and 4
(drawing with M23 connector)

1 3 x M4, 6 [0.24] deep
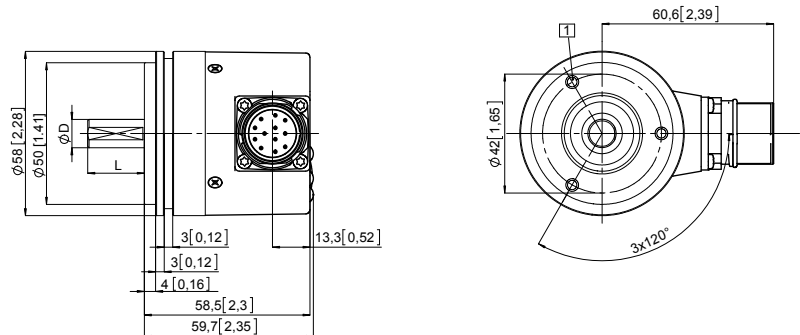
(drawing with M12 connector)

1 3 x M4, 6 [0.24] deep
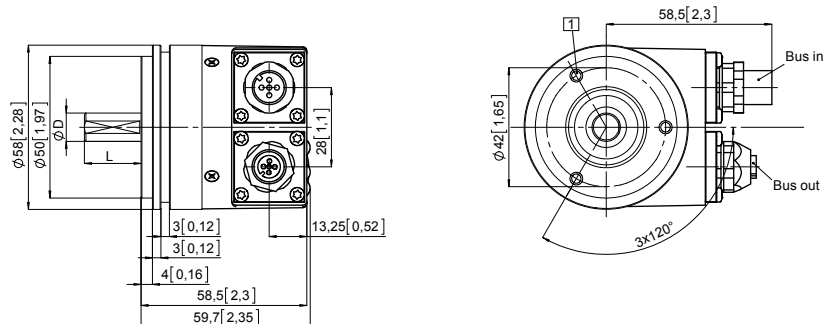
D	Fit	L
6 [0.24]	h7	10 [0.39]
10 [0.39]	f7	20 [0.79]
1/4"	h8	7/8"
3/8"	h8	7/8"

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

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"
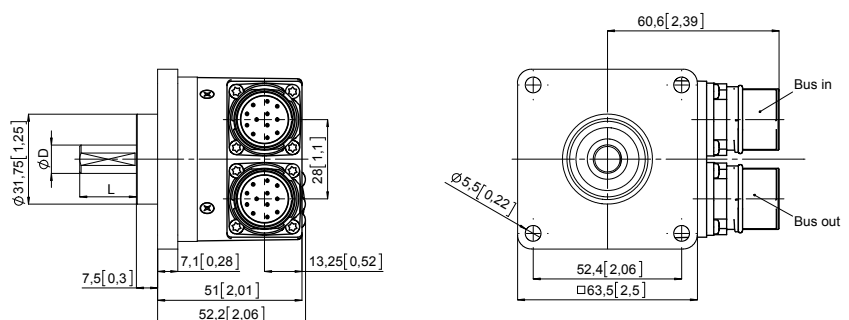
Standard optical	Sendix 5858 / 5878 (shaft / hollow shaft)	CANopen

Dimensions hollow shaft version (blind hollow shaft), with removable bus terminal cover
Dimensions in mm [inch]

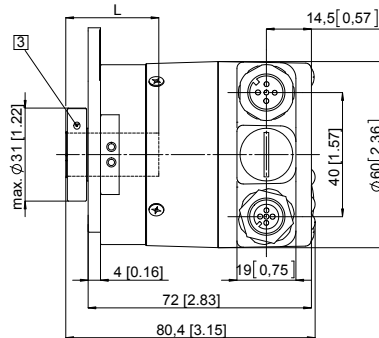### Flange with spring element, long
Flange type 1 and 2
(drawing with 2 x M12 connector)

1 Slot spring element,
recommendation:
cylindrical pin DIN 7, ø 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		
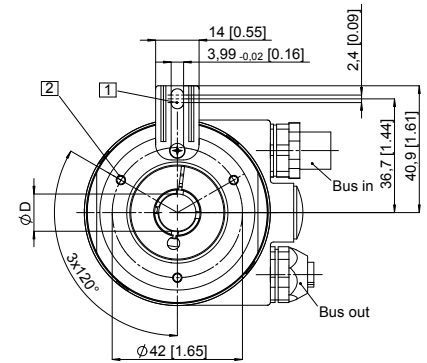
Flange with stator coupling, ø 63 [2.48]
Flange type 5 and 6
Pitch circle diameter for fixing screws
63 [2.48]
(drawing with cable)

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

2 Recommended torque for the
clamping ring 0.6 Nm

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		
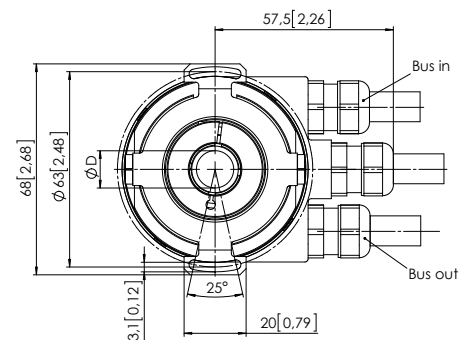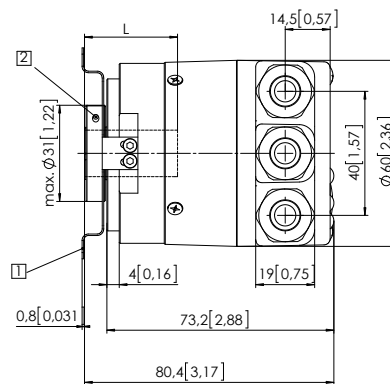
Flange with stator coupling, ø 65 [2.56]
Flange type 3 and 4
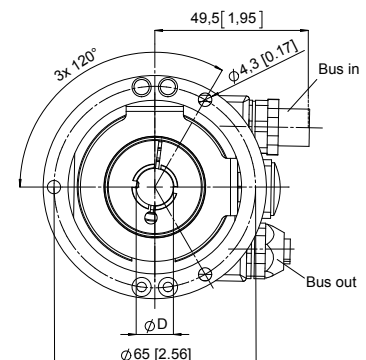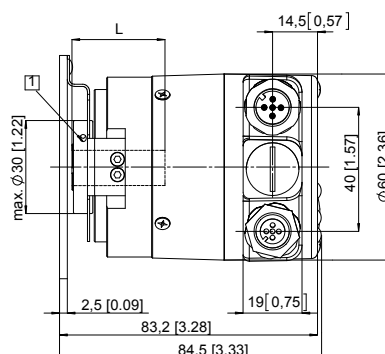Pitch circle diameter for fixing screws
65 [2.56]
(drawing with 2 x M12 connector)

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		

Absolute encoders - singleturn

| 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, ø 4 [0.16]

2 3 x M3, 5.5 [0.22] deep

3 Recommended torque for the
clamping ring 0.6 Nm
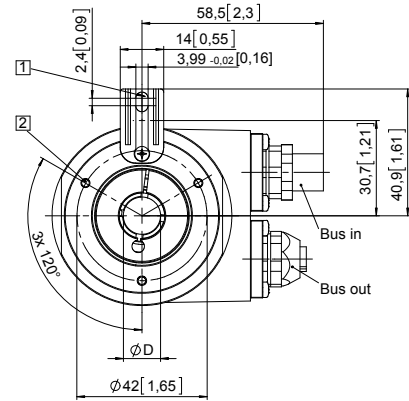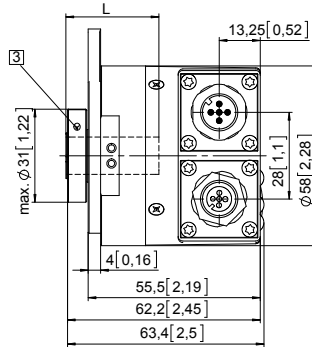
D	Fit	L
10 [0.39]	H7	30 [1.18]
12 [0.47]	H7	30 [1.18]
14 [0.55]	H7	30 [1.18]
15 [0.59]	H7	30 [1.18]
3/8"	H7	30 [1.18]
1/2"	H7	30 [1.18]
L = insertion depth max. blind hollow shaft		

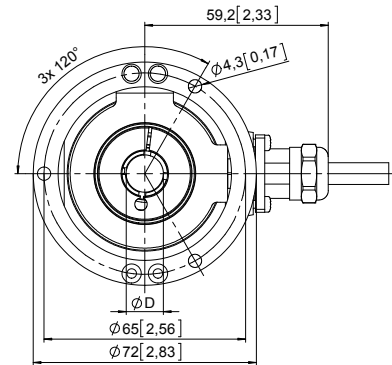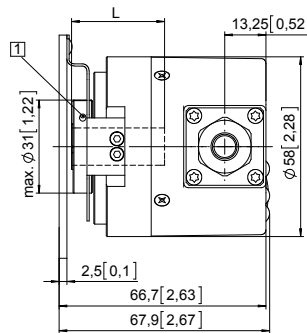**Flange with stator coupling, ø 65 [2.56]**
Flange type 3 and 4
Pitch circle diameter for fixing screws
65 [2.56]
(drawing with cable)

1 Recommended torque for the
clamping ring 0.6 Nm

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		