

ENCODER

CANopen Multiturn



Series 8.5868, 8.5888

Key-Features:

- Solid shaft: maximum diameter 10 mm
- Blind hollow shaft: maximum diameter 15 mm
- Housing diameter 58 mm
- Interfaces: CANopen® and CANopen-Lift
- Protection class up to IP67
- Total resolution up to 28 Bit
- Maximum revolution speed 9000 turns/min
- Temperature range -40...+80°C

Content:

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**Standard
mechanical Multiturn, optical**

Sendix 5868 / 5888 (Shaft / Hollow shaft)

CANopen/CANopenLift



The Sendix multiturn encoders 5868 and 5888 with CANopen or CANopenLift interface and optical sensor technology are the right encoders for all CANopen or CANopenLift applications.

With a maximum resolution of 28 bits these encoders offer an optional additional RS422 incremental track with 2048 pulses.



Mechanical drive



Safety-Lock™



High rotational speed



Temperature range
-40... +80°C



High protection level
IP



High shaft load capacity



Shock / vibration resistant



Magnetic field proof



Reverse polarity protection



Optical sensor



Seawater-resistant version on request

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
- Universal Scaling Function

Order code

8.5868 . X X X X . X X 2 X
Type a b c d e f

Shaft version

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"]¹⁾**
- 2 = 10 x 20 mm [0.39 x 0.79"]²⁾**
- 3 = 1/4" x 7/8"
- 4 = 3/8" x 7/8"

c Interface / Power supply

- 2 = CANopen DS301 V4.02, 10 ... 30 V DC**
- 5 = CANopen DS301 V4.02, 10 ... 30 V DC mit 2048 ppr incremental track (TTL-compatible)³⁾**

d Type of connection

- removable bus terminal cover*
- 1 = cable gland radial
- 2 = 2 x M12 connector**
Fixed connection without bus terminal cover
- A = cable, radial, length 2 m [6.56'] PVC
- E = 1 x M12 connector, 5-pin, radial
- F = 2 x M12 connector, 5-pin, radial
- I = 1 x M23 connector, 12-pin, radial
- J = 2 x M23 connector, 12-pin, radial
- K = 1 x D-Sub connector, 9-pin

e Fieldbus profile⁴⁾

- 21 = CANopen Encoder-Profile DS406 V3.2**
- 22 = CANlift DS417 V1.01

f Options (Service)

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

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

1) Preferred type only in conjunction with flange type 2
2) Preferred type only in conjunction with flange type 1
3) Only in conjunction with connection type 2
4) CAN parameters can also be factory pre-set

**Standard
mechanical Multiturn, optical**

Sendix 5868 / 5888 (Shaft / Hollow shaft)

CANopen/CANopenLift

**Order code
Hollow shaft**

8.5888 . **X****X****X****X** . **XX****2****X**
Type **a** **b** **c** **d** **e** **f**

a Flange with torque stop

- 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

- 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"

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mit 2048 ppr incremental track (TTL-compatible) ¹⁾

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- 2 = no options
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- optional on request*
- Ex 2/22
 - seawater-resistant
 - special cable length

Mounting accessory for shaft encoders

Order No.

Coupling

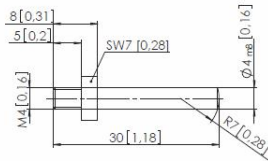
- Bellows coupling ø 19 mm [0.75"] for shaft 6 mm [0.24"]
- Bellows coupling ø 19 mm [0.75"] for shaft 10 mm [0.39"]

8.0000.1101.0606
8.0000.1101.1010

Mounting accessory for hollow shaft encoders

Cylindrical pin, long

for torque stops



With fixing thread

8.0010.4700.0000

Connection technology

Connector, self-assembly (straight)

- Coupling M12 for Bus in
- Connector M12 for Bus out

8.0000.5116.0000
8.0000.5111.0000

Cordset, pre-assembled

- M12, for Bus in, 6 m [19.68'] PVC cable
- M12, for Bus out, 6 m [19.68'] PVC cable

05.00.6091.A211.006M
05.00.6091.A411.006M

Programming set

- Including:
- Interface converter USB-CAN
 - Connection cable from interface converter to encoder
 - Power supply 90 ... 250 V AC
 - DVD with Ezturn[®] software

- Minimum system requirements:
- Operating system: WinXP SP3 or higher
 - Processor: 1 GHz
 - RAM: 512 MB
 - Required disk space: 500 MB

8.0010.9000.0015

1) Only in conjunction with connection type 2
2) CAN parameters can also be factory pre-set

**Standard
mechanical Multiturn, optical**
Sendix 5868 / 5888 (Shaft / Hollow shaft)
CANopen/CANopenLift
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	4.0 x 10 ⁻⁶ kgm ²
	Hollow shaft version	7.5 x 10 ⁻⁶ kgm ²
Load capacity of shaft	radial	80 N
	axial	40 N
Weight	with bus terminal cover	approx. 0.57 kg [20.11 oz]
	with fixed connection	approx. 0.52 kg [18.34 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. 100 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

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

2) Short circuit to 0 V or to output, only one channel at a time, power supply correctly applied

Interface characteristics CANopen/CANopenLift

Singleturn resolution	1 ... 65536 (16 bit), scaleable
Default value	8192 (13 bit)
Multiturn resolution	max. 4096 (12 bit) scalable only via the total resolution
Total resolution	1 ... 268 435 456 (28 bit) Default: 25 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 or CANLift Profile DS417 V1.1
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

Incremental track characteristics

Output driver	RS422 (TTL-compatible)	
Permissible load / channel	max. 20 mA	
Signal level	HIGH	typ. 3.8 V
	LOW	typ. 1.3 V
Short circuit proof outputs	yes ²⁾	
Resolution	2048 ppr	

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) too low voltage, over-temperature

General information about CANopen / CANopenLift

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 and DS417 V1.1 (for lift applications) 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.

Universal Scaling Function

At the end of the physical resolution of an encoder, **when scaling is active**, an error appears if the division of the physical limit (GP_U) by the programmed total resolution (TMR) does not produce an integer.

The Universal Scaling Function remedies this problem.

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 RPM)
- 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

CANopen Lift Profile DS417 V1.1


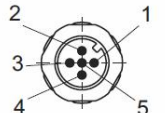

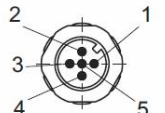
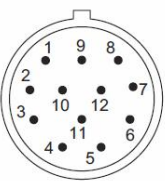
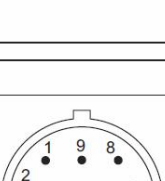
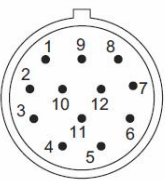
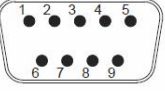
Among others, the following functionality is integrated:

- Car Position Unit
- 2 virtual devices
- 1 virtual device delivers the position in absolute measuring steps (steps)
- 1 virtual device delivers the position as an absolute travel information in mm
- Lift number programmable
- Independent setting of the node address in relation with the CAN identifier
- Factor for speed calculation (e.g. measuring wheel periphery)
- Integration time for speed value of 1...32
- 2 work areas with 2 upper and lower limits and the corresponding output states
- Variable PDO mapping for position, speed, acceleration, 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
- "Watchdog controlled" device

All profiles stated here: Key-features

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

Terminal assignment

Interface	Type of connection	Cable gland (Bus terminal cover with terminal box)										
2,5	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)										
2,5	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 (3 x M12 connector with interface 5)										
2,5	2,F	Bus OUT										
		Signal:	0 V power supply	+V power supply	CAN_L	CAN_H						CAN_GND
		Pin:	3	2	5	4	1					
		Signal:	0 V power supply	+V power supply	CAN_L	CAN_H	CAN_GND					
		Pin:	3	2	5	4	1					
		Incremental track										
5	2	Signal:	A	\bar{A}	B	\bar{B}	0 V					
		Pin:	1	2	3	4	5					
Interface	Type of connection	1 x M12 connector										
2,5	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										
2,5	J	Bus OUT										
		Signal:	0 V power supply	+V power supply	CAN_L	CAN_H						CAN_GND
		Pin:	10	12	2	7	3					
		Signal:	0 V power supply	+V power supply	CAN_L	CAN_H	CAN_GND					
		Pin:	10	12	2	7	3					
							2 x					
Interface	Type of connection	1 x M23 connector										
2,5	I	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	D-Sub connector										
2,5	K	Bus IN										
		Signal:	0 V power supply	+V power supply	CAN_L	CAN_H						CAN_GND
		Pin:	6	9	2	7						3

**Standard
mechanical Multiturn, optical**

Sendix 5868 / 5888 (Shaft / Hollow shaft)

CANopen/CANopenLift

Dimensions shaft version, with removable bus terminal cover

Dimensions in mm [inch]

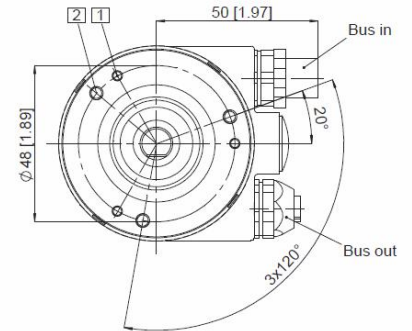
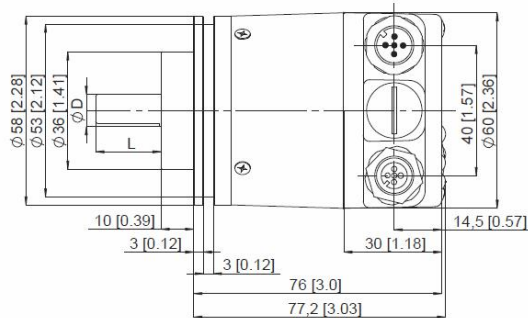
Clamping flange, \varnothing 58 [2.28]

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



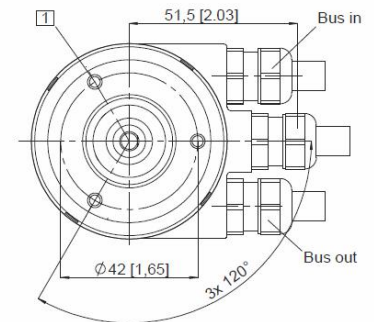
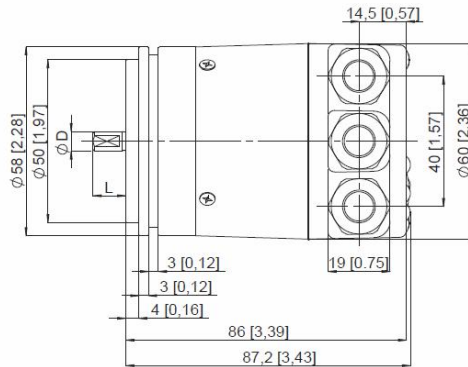
D	L	Fit
6 [0.24]	10 [0.39]	h7
10 [0.39]	20 [0.79]	f7
1/4"	7/8"	h7
3/8"	7/8"	h7

Synchro flange, \varnothing 58 [2.28]

Flange type 2 and 4

(Drawing with cable)

1 M4, 6 [0.24] deep

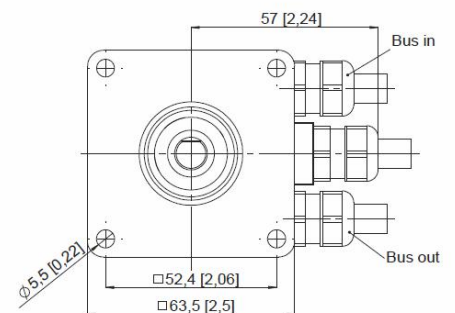
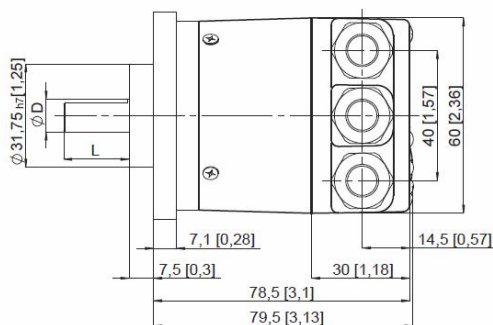


D	L	Fit
6 [0.24]	10 [0.39]	h7
10 [0.39]	20 [0.79]	f7
1/4"	7/8"	h7
3/8"	7/8"	h7

Square flange, \square 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

**Standard
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Sendix 5868 / 5888 (Shaft / Hollow shaft)

CANopen/CANopenLift

Dimensions shaft version, with fixed connection

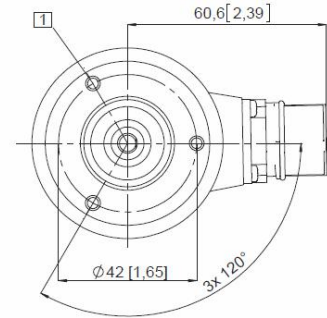
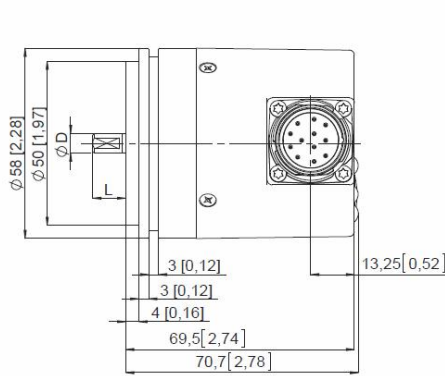
Dimensions in mm [inch]

Synchro flange, ø 58 [2.28]

Flange type 2 and 4

(Drawing with M23 connector)

1 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
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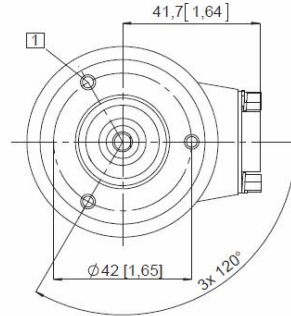
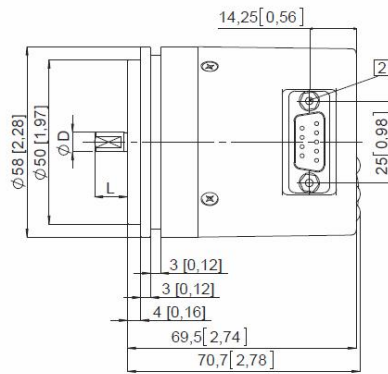
Synchro flange, ø 58 [2.28]

Flange type 2 and 4

(Drawing with D-Sub connector)

1 M4, 6 [0.24] deep

2 2 x 4/40 UNC; 3.0 [0.12] deep

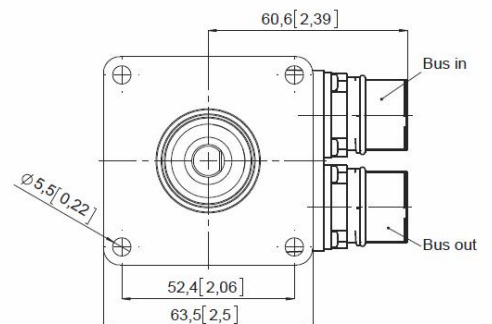
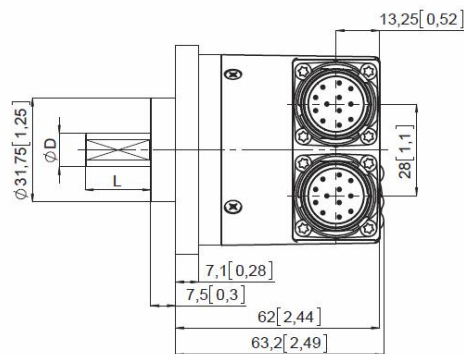


D	L	Fit
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10 [0.39]	20 [0.79]	f7
1/4"	7/8"	h7
3/8"	7/8"	h7

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
mechanical Multiturn, optical**

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CANopen/CANopenLift

Dimensions shaft version, with fixed connection

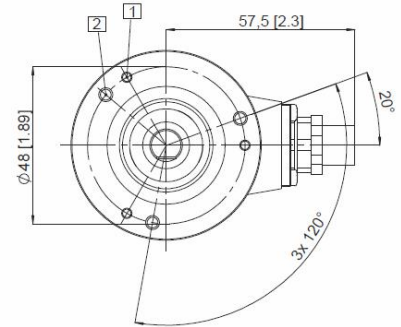
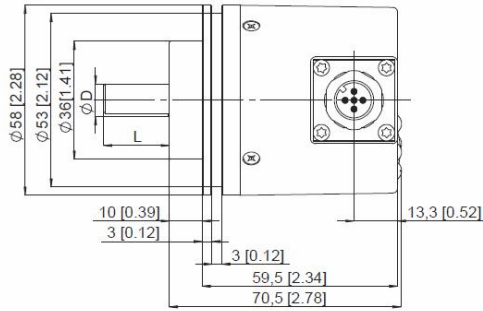
Dimensions in mm [inch]

Clamping flange, ø 58 [2.28]

Flange type 1 and 3

(Drawing with 1 x M12 connector)

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



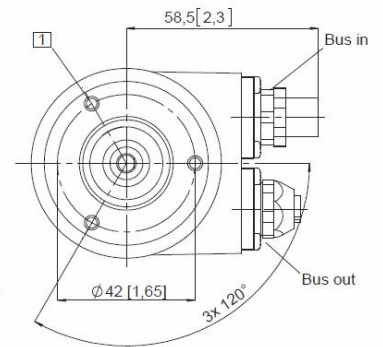
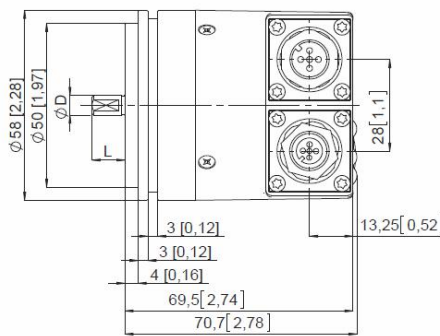
D	L	Fit
6 [0.24]	10 [0.39]	h7
10 [0.39]	20 [0.79]	f7
1/4"	7/8"	h7
3/8"	7/8"	h7

Synchro flange, ø 58 [2.28]

Flange type 2 and 4

(Drawing with M12 connector)

- 1 M4, 8 [0.32] deep



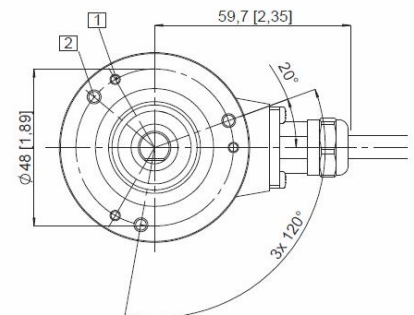
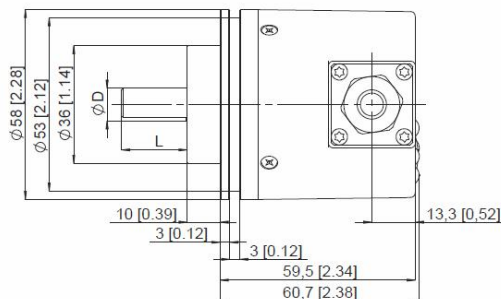
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1/4"	7/8"	h7
3/8"	7/8"	h7

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



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
mechanical Multiturn, optical**

Sendix 5868 / 5888 (Shaft / Hollow shaft)

CANopen/CANopenLift

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

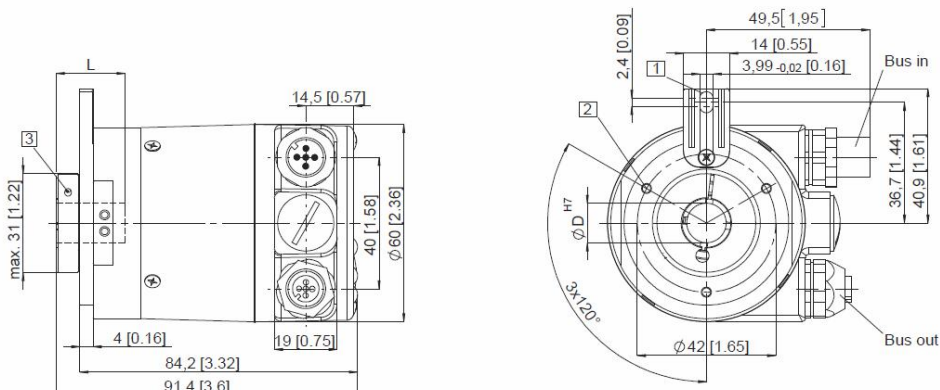
Dimensions in mm [inch]

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, ϕ 4 [0.16]
 - 2 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]



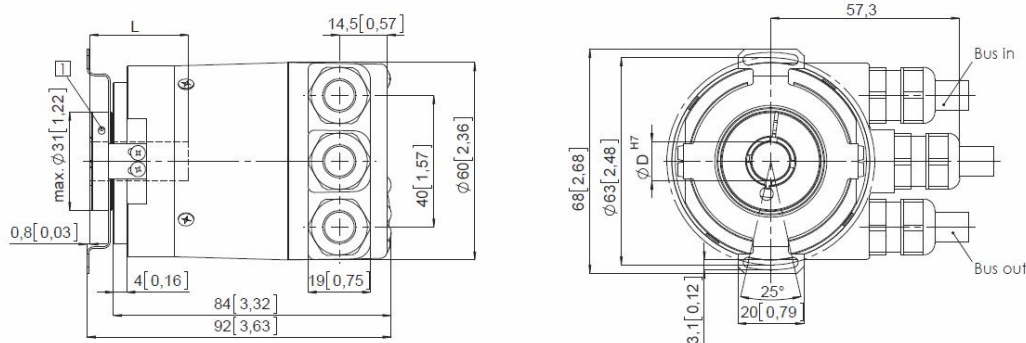
Flange with stator coupling, ϕ 63 [2.48]

Flange type 5 and 6

Pitch circle diameter for fixing screws 63 [2.48]

(Drawing with cable)

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



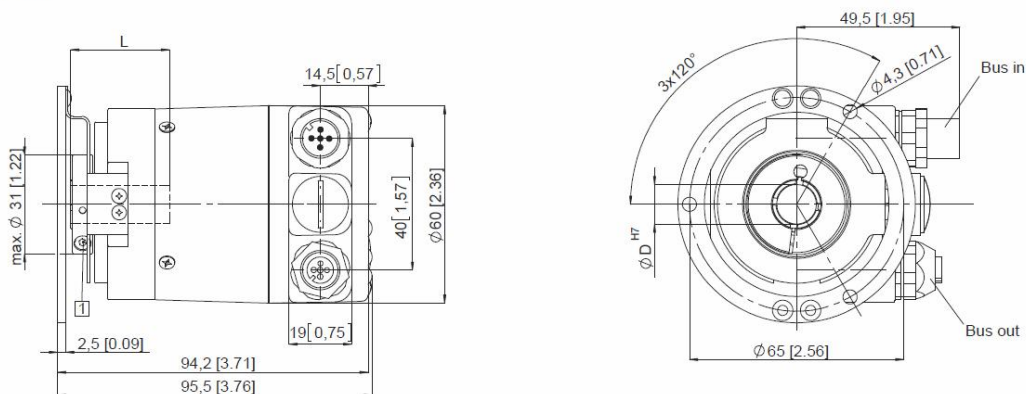
Flange with stator coupling, ϕ 65 [2.56]

Flange type 3 and 4

Pitch circle diameter for fixing screws 65 [2.56]

(Drawing with 2x M12 connector)

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



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

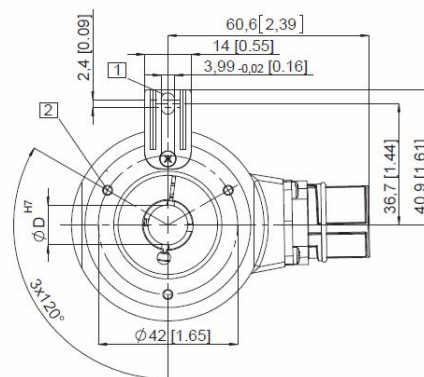
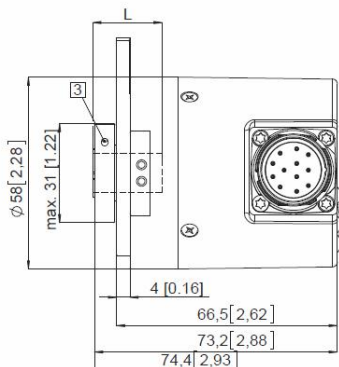
Dimensions in mm [inch]

Flange with spring element long

Flange type 1 and 2

(drawing with M23 connector)

- 1 Torque stop slot,
Recommendation:
Cylindrical pin DIN 7, ϕ 4 [0.16]
 - 2 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]

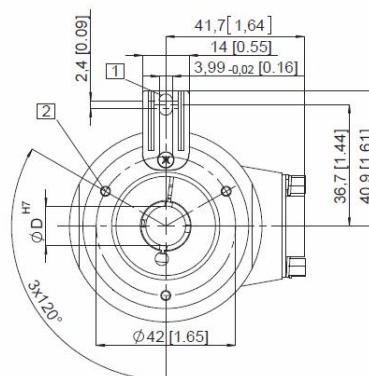
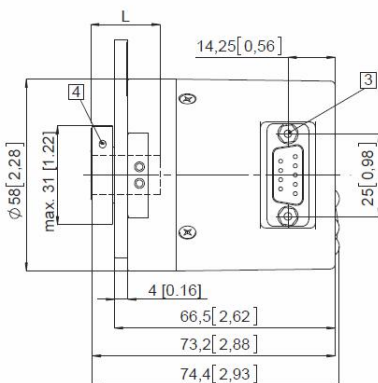


Flange with spring element long

Flange type 1 and 2

(drawing with D-Sub connector)

- 1 Torque stop slot,
Recommendation:
Cylindrical pin DIN 7, ϕ 4 [0.16]
 - 2 M3, 5.5 [0.21] deep
 - 3 2 x 4/40 UNC; 3.0 [0.21] deep
 - 4 Recommended torque for the
clamping ring 0.6 Nm
- L: Insertion depth for blind
hollow shaft: 30 [1.18]



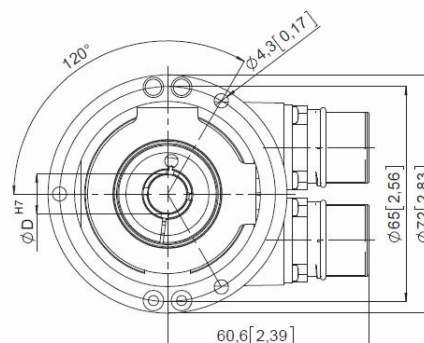
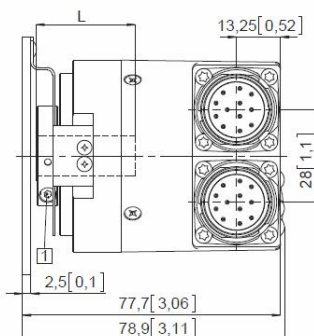
Flange with stator coupling, ϕ 65 [2.56]

Flange type 3 and 4

Pitch circle diameter for fixing screws 65 [2.56]

(drawing with 2 x M23 connector)

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



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

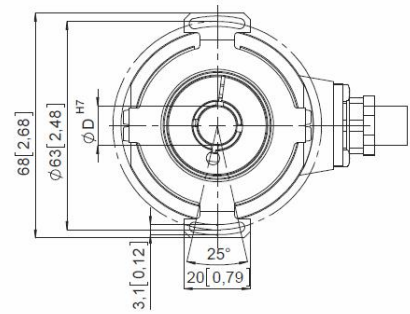
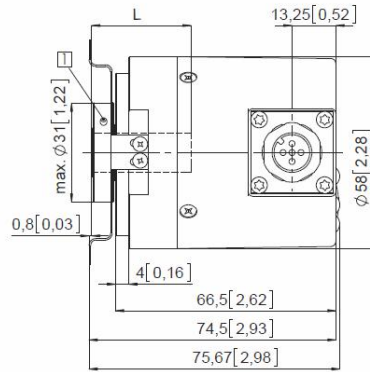
Dimensions in mm [inch]

Flange with stator coupling, ø 63 [2.48]

Flange type 5 and 6

Pitch circle diameter for fixing screws 63 [2.48]
(drawing with M12 connector)

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

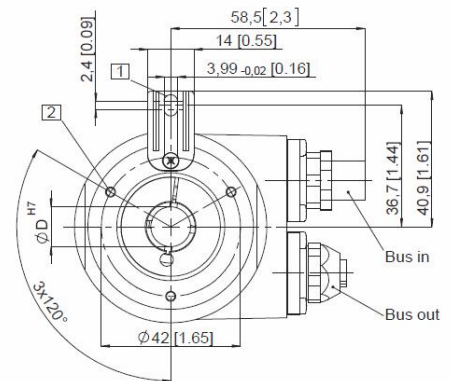
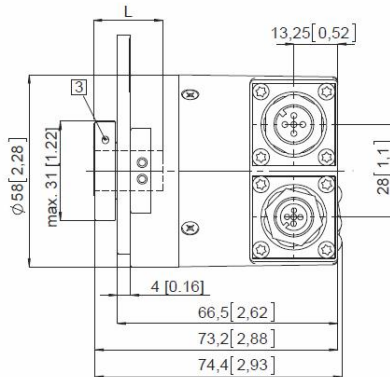


Flange with spring element long

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 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]

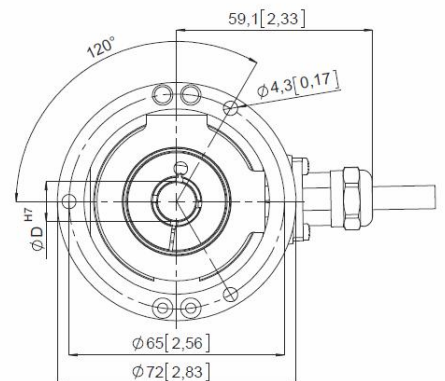
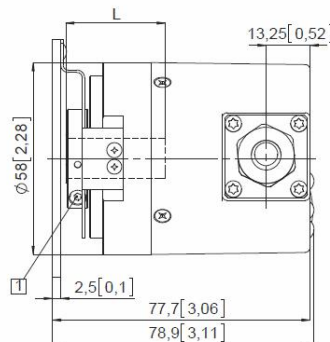


Flange with stator coupling, ø 65 [2.56]

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]



Subject to change without prior notice.