| Standard, optical | Sendix 5868 / 5888 (Shaft / Hollow shaft) | CANopen/CANlift |

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

With a maximum resolution of 28 bits these encoders offer an optional additional RS422 incremental track with 2048 pulses.
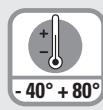
Ex 2/22   c(UL)us   RoHS   CANopen   CANopen LIFT ® CiA
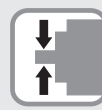
| Mechanical drive | Safety-Lock™ | High rotational speed | Temperature -40° +80° | High IP value IP | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Reverse polarity protection | Optical sensor | Seawater-resistant version on request |

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

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Order code Shaft version

8.5868 . XXXX . XX1X
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 = clamping flange, ø 58 mm, IP65
2 = synchro flange, ø 58 mm, IP65
3 = clamping flange, ø 58 mm, IP67
4 = synchro flange, ø 58 mm, IP67
5 = square flange, 63.5 mm (2.5"), IP65
7 = square flange, 63.5 mm (2.5"), IP67

b *Shaft (ø x L), with flat*
1 = 6 x 10 mm [1]
2 = 10 x 20 mm [2]
3 = 6,35 x 22,2 mm (1/4" x 7/8")
4 = 9,5 x 22,2 mm (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 connectors
Fixed connection without bus terminal cover
A = cable outlet PVC, radial, 2m
E = 1 x M12 connector, radial
F = 2 x M12 connector, radial
I = 1 x M23 connector, radial
J = 2 x M23 connector, radial
K = 1 x SUB-D connector, 9 pin

e *Fieldbus profile* [4]
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

Order code Hollow shaft

8.5888 . XXXX . XX1X
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 torque stop set, IP65
2 = with torque stop set, IP67
3 = with stator coupling, ø 65, IP65
4 = with stator coupling, ø 65, IP67
5 = with stator coupling, ø 63, IP65
6 = with stator coupling, ø 63, IP67

b *Blind hollow shaft*
3 = ø 10 mm
4 = ø 12 mm
5 = ø 14 mm
6 = ø 15 mm
8 = ø 9.5 mm [3/8"]
9 = ø 12.7 mm [1/2"]

c *Interface / Power supply*
2 = CANopen DS301 V4.02 / 10 ... 30 V DC
5 = CANopen DS301 V4.02 / 10 ... 30 V DC with 2048 ppr incremental track (TTL-compatible) [3]

d *Type of connection removable bus terminal cover*
1 = cable gland radial
2 = 2 x M12 connectors
Fixed connection without bus terminal cover
A = cable outlet PVC, radial, 2m
E = 1 x M12 connector, radial
F = 2 x M12 connector, radial
I = 1 x M23 connector, radial
J = 2 x M23 connector, radial
K = 1 x SUB-D connector, 9 pin

e *Fieldbus profile* [4]
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 2
4) CAN parameters can also be factory pre-set

Kübler

Standard, optical	Sendix 5868 / 5888 (Shaft / Hollow shaft)	CANopen/CANlift

Mounting accessory for shaft encoders

Coupling

| | Bellows coupling ø 19 mm for shaft 6 mm | 8.0000.1101.0606 |
| | Bellows coupling ø 19 mm for shaft 10 mm | 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 | 8.0000.5116.0000 |
| | Connector M12 for Bus out | 8.0000.5111.0000 |

Cordset, pre-assembled with 2 m PVC cable

| | M12 for Bus in | 8.0000.6V81.0005 |
| | M12 for Bus out | 8.0000.6V88.0005 |

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:		8.0010.9000.0015
Operating system:	Windows XP SP3 or higher	
	Win7 in preparation	
Processor:	1 GHz	
RAM :	512 MB	
Required disk space:	500 MB	

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.

Mechanical characteristics

Max. speed

without shaft seal (IP65) up to 70°C	9 000 min^{-1}, 7 000 min^{-1} (continuous)
without shaft seal (IP65) up to T$_{max}$	7 000 min^{-1}, 4 000 min^{-1} (continuous)
with shaft seal (IP67) up to 70°C	8 000 min^{-1}, 6 000 min^{-1} (continuous)
with shaft seal (IP67) up to T$_{max}$	6 000 min^{-1}, 3 000 min^{-1} (continuous)

Starting torque

without shaft seal (IP65)	< 0.01 Nm
with shaft seal (IP67)	< 0.03 Nm

Rotor 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	ca. 0.57 kg
with fixed connection	ca. 0.52 kg

Protection EN 60 529

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]

Materials

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

General electrical characteristics

Power supply	10 ... 30 V DC
Power consumption (no load)	max. 100 mA
Reverse connection of the supply voltage (U$_B$)	yes
UL-certified	File 224618
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4, EN 61000-6-3
RoHS compliant acc. to	EU-guideline 2002/95/EG

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

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

[1] Cable version: -30°C ... + 75°C
[2] Short circuit to 0 V or to output, only one channel at a time, supply voltage correctly applied

Standard, optical	Sendix 5868 / 5888 (Shaft / Hollow shaft)	CANopen/CANlift

Interface characteristics CANopen/CANlift:

Singleturn resolution	1 ... 65536 (16 bit), scaleable
Default value	8192 (13 bit)
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

General information about CAN/CANlift

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 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, which have been saved on an EEPROM to protect them against power failure, are loaded again.

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 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 postiton in absolute measuring steps (steps)
- 1 virtual device delivers the postiton 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

All profiles stated here: Key-features
The object 6003h "Preset" is assigned to an integrated key, accessible from the outside
 "Watchdog controlled" device

Standard, optical	Sendix 5868 / 5888 (Shaft / Hollow shaft)	CANopen/CANlift

Terminal assignment

Bus terminal cover with terminal box (type of connection 1)

Direction	OUT					IN				
Signal	CAN Ground	CAN_Low (-)	CAN_High (+)	0 Volt power supply	+U_B power supply	0 V power supply	+U_B power supply	CAN_Low (-)	CAN_High (+)	CAN Ground
Abbreviation	CG	CL	CH	0 V	+V	0 V	+V	CL	CH	CG

Cable connection (type of connection A) and SUB-D-9 connector (type of connection K)

Direction	IN				
Signal	0 Volt power supply	+U_B power supply	CAN_Low (-)	CAN_High (+)	CAN Ground
Abbreviation	0 V	+V	CL	CH	CG
Cable colour	WH	BN	YE	GN	GY
SUB-D 9:	6	9	2	7	3

Bus terminal cover with Connectors 2 x M12 (type of connection 2, F or J)

Direction	OUT					IN				
Signal	CAN Ground	CAN_Low (-)	CAN_High (+)	0 Volt power supply	+U power supply	0 V power supply	+U_B power supply	CAN_Low (-)	CAN_High (+)	CAN Ground
Abbreviation	CG	CL	CH	0 V	+V	0 V	+V	CL	CH	CG
M23 PIN assignment	3	2	7	10	12	10	12	2	7	3
M12 PIN-assignment	1	5	4	3	2	3	2	5	4	1

Connector M23 (type of connection I) or M12 (type of connection E)

Direction	IN				
Signal	0 Volt power supply	+U_B power supply	CAN_Low (-)	CAN_High (+)	CAN Ground
Abbreviation	0 V	+V	CL	CH	CG
M23 PIN assignment	10	12	2	7	3
M12 PIN assignment	3	2	5	4	1

Bus in and out M23:
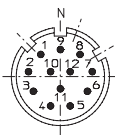
Bus out M12:
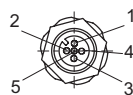
Bus in M12:
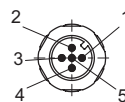
Terminal assignment incremental track

Signal	A	$\overline{A}$	B	$\overline{B}$	0 V
PIN-	1	2	3	4	5
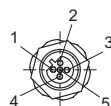
Absolute Encoders Multiturn

Standard, optical	Sendix 5868 / 5888 (Shaft / Hollow shaft)	CANopen/CANlift

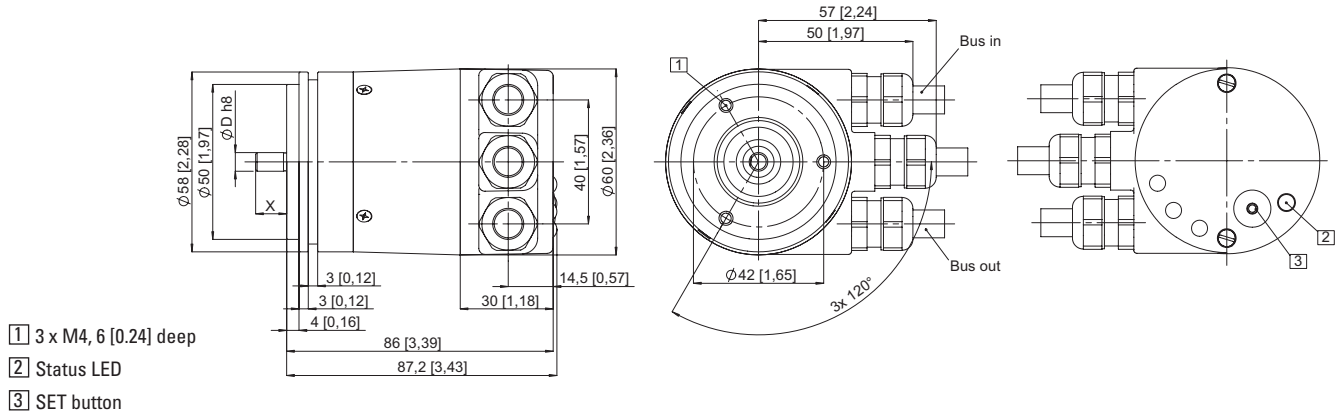**Dimensions shaft version, with removable bus terminal cover**

Synchro flange, ø 58 mm
Flange type 2 and 4

(Drawing with cable)
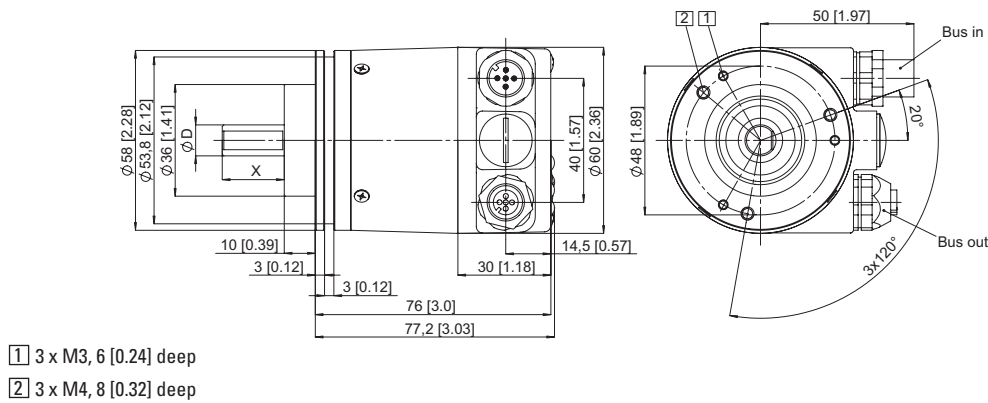
1 3 x M4, 6 [0.24] deep
2 Status LED
3 SET button

Clamping flange, ø 58 mm
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

Square flange, □ 63.5 mm

Flange type 5 and 7
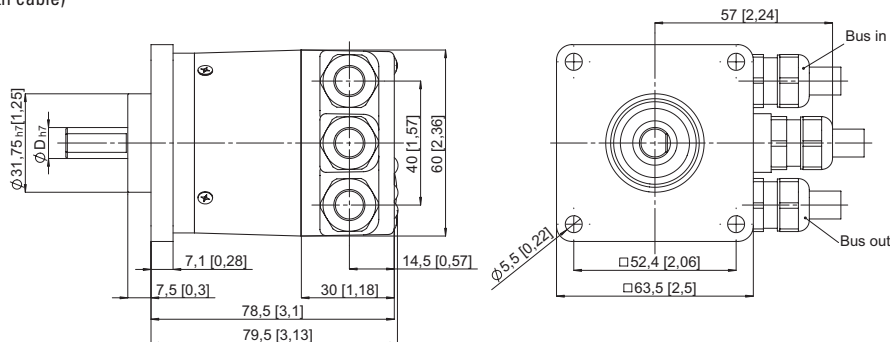
(Drawing with cable)

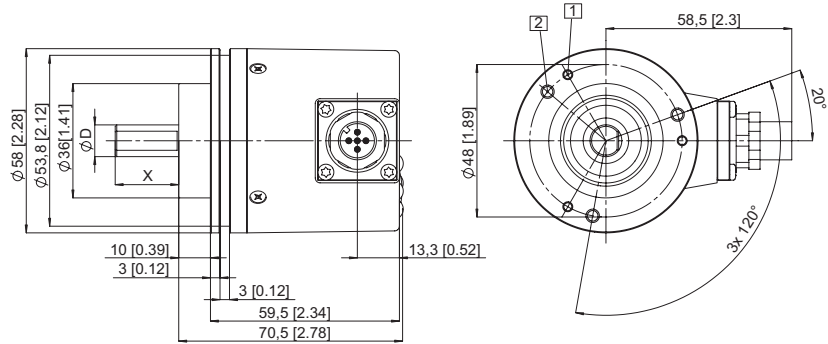| Standard, optical	Sendix 5868 / 5888 (Shaft / Hollow shaft)	CANopen/CANlift

Dimensions shaft version, with fixed connection

Synchro flange, ø 58 mm
Flange type 2 and 4
(Drawing with M23 connector)

1 3 x M4, 6 [0.24] deep

13,3 [0,52]   58,5 [2,3]
ø 58 [2,28]   ø 50 [1,97]   ø D h8
3 [0,12]
3 [0,12]
4 [0,16]
69,5 [2,74]
70,7 [2,78]
ø 42 [1,65]
3x 120°
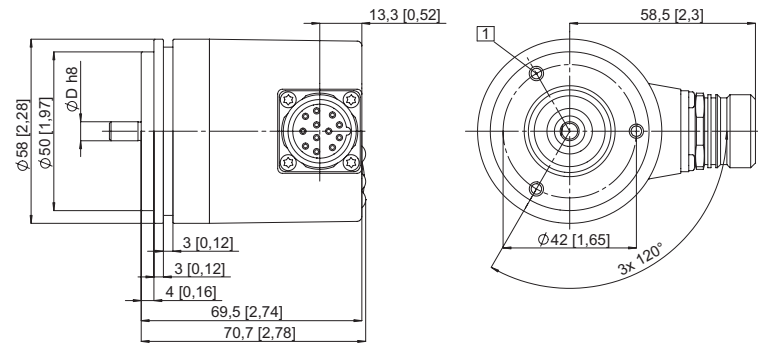
Synchro flange, ø 58 mm
Flange type 2 and 4
(Drawing with SUB-D connector)

1 3 x M4, 8 [0.32] deep
2 2 x 4/40 UNC; 3.0 [0.12] deep

14,25 [0,56]   41,7 [1,64]
ø 58 [2,28]   ø 50 [1,97]   ø D h8
25 [0,98]
3 [0,12]
3 [0,12]
4 [0,16]
69,5 [2,74]
70,7 [2,78]
ø 42 [1,65]
3x 120°
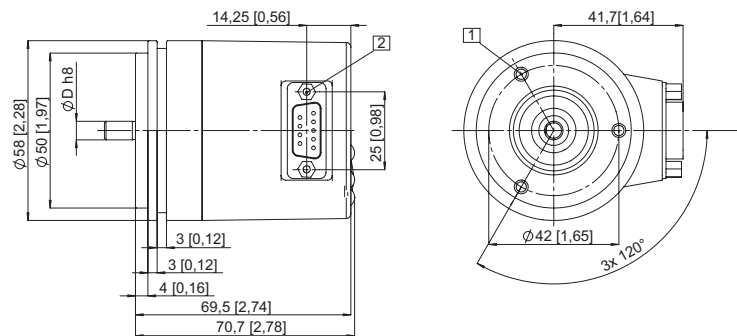
Square flange, ☐ 63.5 mm
Flange type 5 and 7
(Drawing with 2 x M23 connector)

13,3 [0,52]   58,5 [2,3]
ø 31,75 [1,25]   ø D h8
X
28 [1,1]
Bus in
Bus out
7,1 [0,28]
7,5 [0,3]
62 [2,44]
63,2 [2,48]
ø 5,5 [0,22]
52,4 [2,06]
63,5 [2,5]

Absolute Encoders – Multiturn

Dimensions shaft version, with fixed connection

Clamping flange, ø 58 mm
Flange type 1 and 3
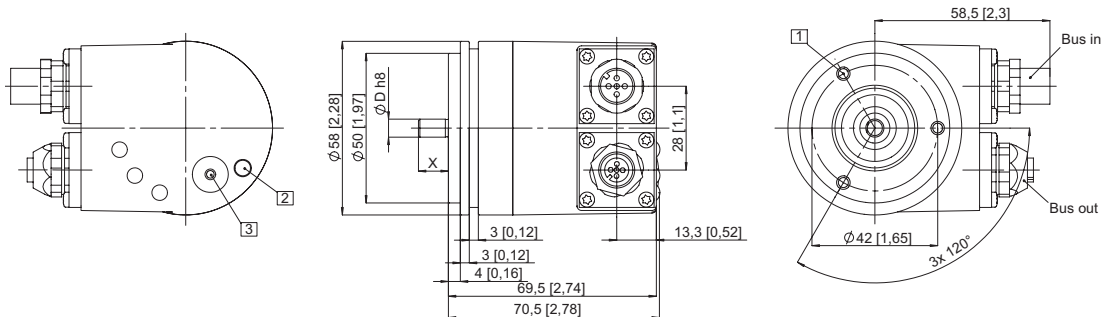(Drawing with M12 connector)

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

58,5 [2.3], 20°, 3x 120°
Ø 58 [2.28], Ø 53,8 [2.12], Ø 36 [1.41], Ø D, X, Ø 48 [1.89]
10 [0.39], 3 [0.12], 3 [0.12], 59,5 [2.34], 70,5 [2.78], 13,3 [0.52]

Synchro flange, ø 58 mm
Flange type 2 and 4
(Drawing with M12 connector)

1 3 x M4, 6 [0.24] deep
2 Status LED
3 SET button

58,5 [2,3], Bus in, Bus out, 3x 120°, Ø 42 [1,65]
Ø 58 [2.28], Ø 50 [1.97], Ø D h8, X, 28 [1,1]
3 [0,12], 3 [0,12], 4 [0,16], 69,5 [2,74], 70,5 [2,78], 13,3 [0,52]

Clamping flange, ø 58 mm
Flange type 1 and 3
(Drawing with cable)

1 3 x M3, 6 [0.24] deep
2 3 x M4, 8 [0.32] deep
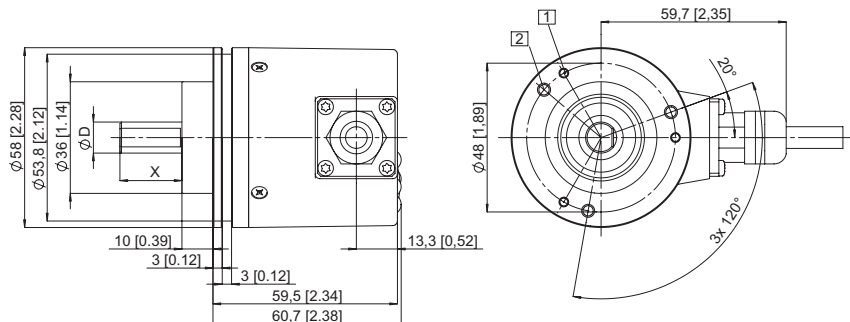
59,7 [2,35], 20°, 3x 120°
Ø 58 [2.28], Ø 53,8 [2.12], Ø 36 [1.14], Ø D, X, Ø 48 [1.89]
10 [0.39], 3 [0.12], 3 [0.12], 59,5 [2.34], 60,7 [2.38], 13,3 [0,52]

| Standard, optical | Sendix 5868 / 5888 (Shaft / Hollow shaft) | CANopen/CANlift |

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

Flange with torque stop set long, ø 58 mm
Flange type 1 and 2

(Drawing with 2 x M12 connector)

1 Torque stop slot,
Recommendation: Cylindrical pin DIN7, ø 4 mm
2 3 x M3, 5.5 [0.21] deep
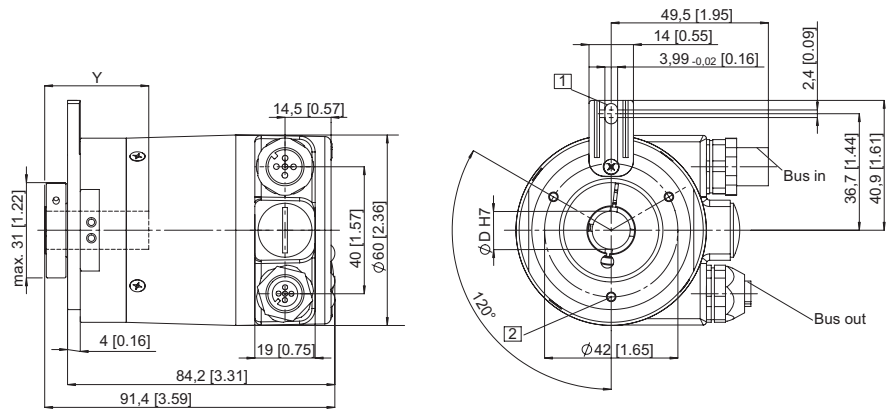
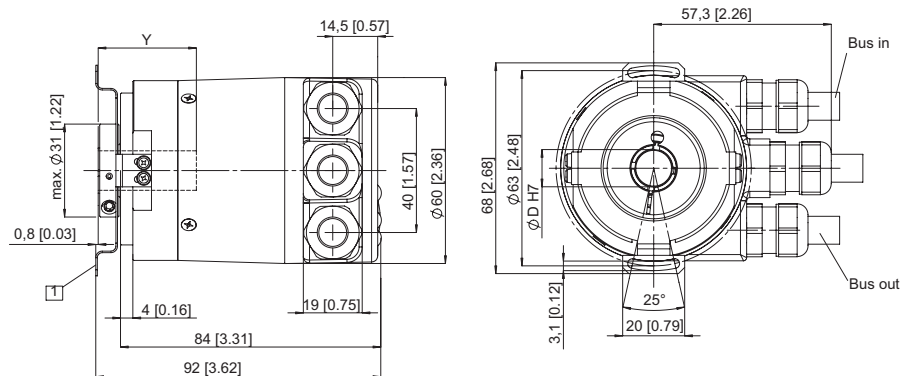**Flange with stator coupling, ø 58 mm**
Flange type 5 and 6

Pitch circle diameter for fixing screws 63 mm
(Drawing with cable)

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

With stator coupling, ø 58 mm
Flange type 3 and 4

Pitch circle diameter for fixing screws 65 mm
(Drawing with 2 x M12 connector)
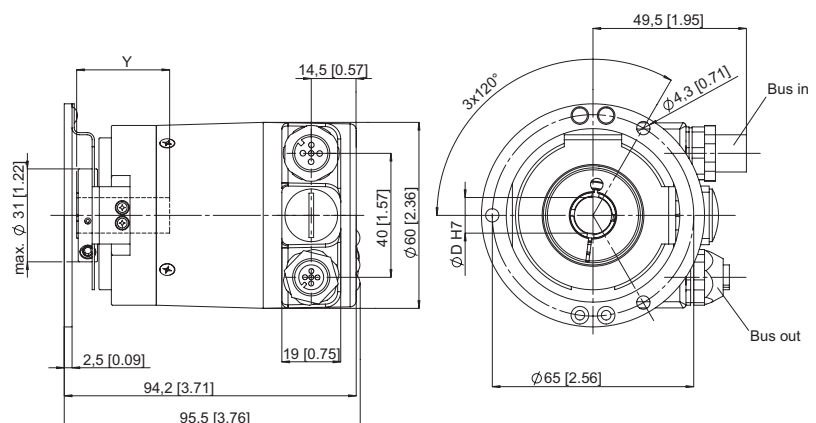
Y: Insertion depth for blind hollow shaft: 30 mm

Absolute Encoders
Multiturn

Absolute Encoders – Multiturn

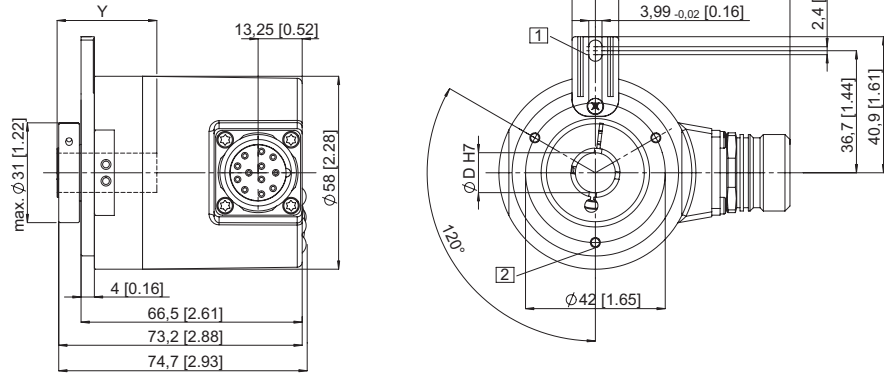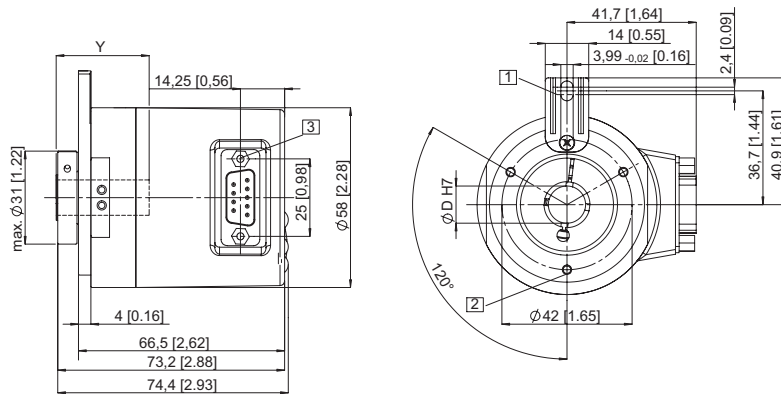| Standard, optical	Sendix 5868 / 5888 (Shaft / Hollow shaft)	CANopen/CANlift

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

Flange with torque stop set long, ø 58 mm
Flange type 1 and 2

(Drawing with M23 connector)

1 Torque stop slot,
Recommendation:
Cylindrical pin DIN7, ø 4 mm
2 3 x M3, 5.5 [0.21] deep

Flange with torque stop set long, ø 58 mm
Flange type 1 and 2

(Drawing with SUB-D connector)

1 Torque stop slot,
Recommendation:
Cylindrical pin DIN7, ø 4 mm
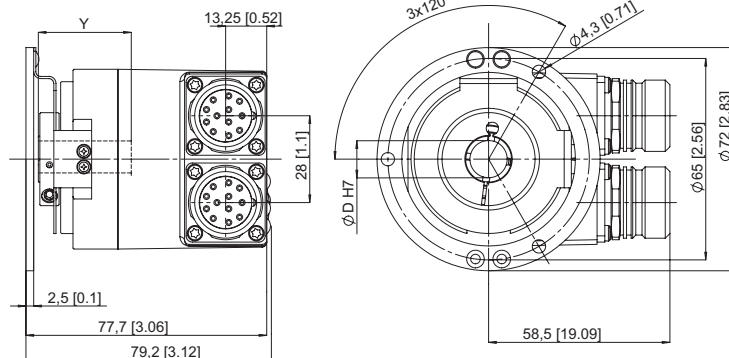2 3xM3, 6 [0.24] deep
3 2 x 4/40 UNC; 3.0 [0.21] deep

Flange with stator coupling, ø 58 mm
Flange type 3 and 4

Pitch circle diameter for fixing screws 65 mm
(Drawing with 2x M23-connectors)

Y: Insertion depth for blind hollow shaft: 30 mm

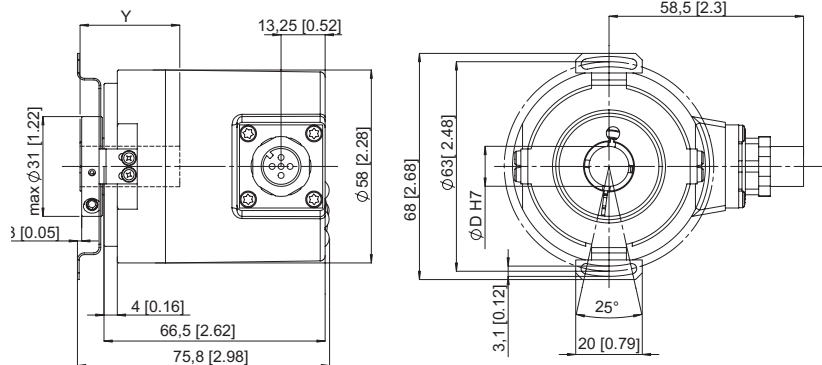| Standard, optical	Sendix 5868 / 5888 (Shaft / Hollow shaft)	CANopen/CANlift

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

Flange with stator coupling, ø 58 mm
Flange type 5 and 6

Pitch circle diameter for fixing screws 63 mm
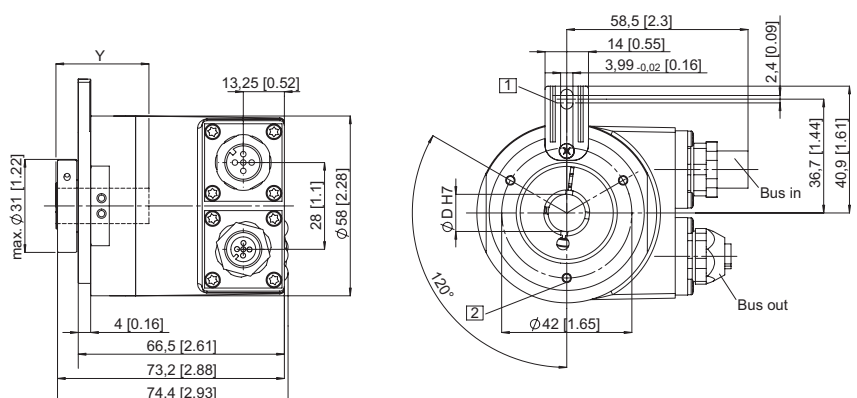(Drawing with M12 connector)

Flange with torque stop set long, ø 58 mm
Flange type 1 and 2

(Drawing with 2 x M12 connector)

1 Torque stop slot,
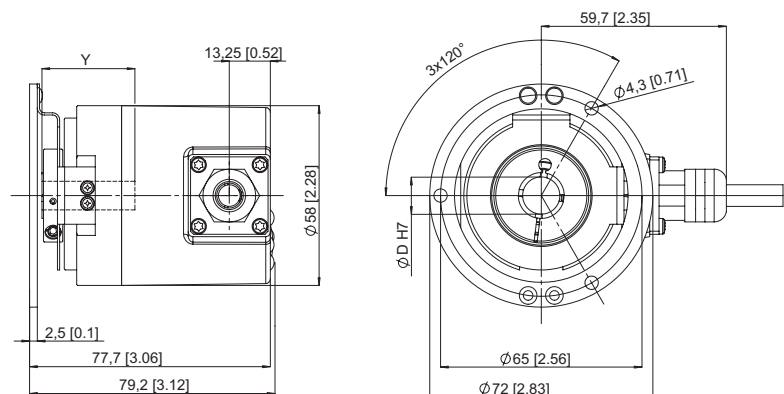   Recommendation: Cylindrical pin DIN7, ø 4 mm
2 3xM3, 6 [0.24] deep

Flange with stator coupling, ø 58 mm
Flange type 3 and 4

Pitch circle diameter for fixing screws 65 mm
(Drawing with cable)

Y: Insertion depth for blind hollow shaft: 30 mm

Absolute Encoders
Multiturn