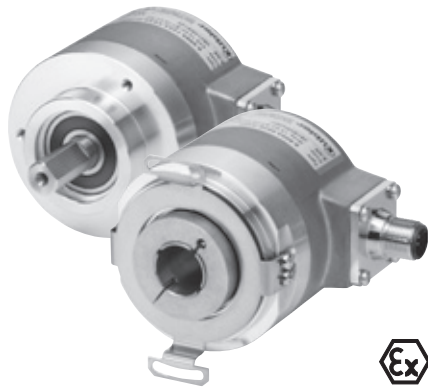


Absolute Encoders – Multiturn

| | | |
|---|--|----------------|
| Standard electronic Multiturn, optical | Sendix F5868 / F5888 (Shaft / Hollow shaft) | CANopen |
|---|--|----------------|



The Sendix F58 multiturn with patented Intelligent Scan Technology™ is a particularly high resolution optical multiturn encoder without gears and with 100 percent magnetic insensitivity.

32 bits total resolution, through hollow shaft up to 15 mm and CANopen functionalities according to up-to-date Encoder Profile.



| | | | | | | | | | | |
|--|---------------------|------------------------------|--|------------------------------------|---------------------------------|------------------------------------|-----------------------------|------------------------------------|---------------|--|
| 16 bit MT Multiturn Resolution | Safety-Lock™ | High rotational speed | -40°...+80°C Temperature range | IP High protection level | High shaft load capacity | Shock / vibration resistant | Magnetic field proof | Reverse polarity protection | SinCos | Seawater-resistant version on request |
|--|---------------------|------------------------------|--|------------------------------------|---------------------------------|------------------------------------|-----------------------------|------------------------------------|---------------|--|

Reliable and insensitive

- Sturdy bearing construction in Safety-Lock™ Design for resistance against vibration and installation errors
- Ideal for use outdoors thanks to IP67 protection and wide temperature range from -40°C up to +80°C
- Patented Intelligent Scan Technology™ with all singleturn and multiturn functions on one single OptoASIC - offering the highest reliability, a high resolution up to 32 bits and 100% magnetic field insensitivity

Up-to-the-minute Fieldbus performance

- CANopen with current encoder profile
- LSS services for configuration of the node address and baud rate
- Variable PDO mapping in the memory
- Universal Scaling Function
- 32 bits total resolution (16 bit MT + 16 bit ST)

 Absolute Encoders
Multiturn

| | | | | |
|---------------------------------|--|--|--|--|
| Order code Shaft version | 8.F5868 Type | .XX2X.212X 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, 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"] | 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" | d Type of connection A = 1 x cable PVC, radial, length 2 m [6.56"] E = 1 x M12 connector, radial, 5-pin F = 2 x M12 connector, radial, 5-pin | f Options (Service) 2 = no option 3 = SET button optional on request - Ex 2/22 - seawater-resistant - special cable length |
| | c Interface / Power supply 2 = CANopen DS301 V4.02 / 10 ... 30 V DC | e Fieldbus profile⁵⁾ 21 = CANopen Encoder-Profile DS406 V3.2 | | |

| | | | | |
|--------------------------------|---|---|--|--|
| Order code Hollow shaft | 8.F5888 Type | .XX2X.212X 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"] 5 = with stator coupling, IP65 ø 63 mm [2.48"] 6 = with stator coupling, IP67 ø 63 mm [2.48"] | b Hollow shaft 3 = ø 10 mm [0.39"] 4 = ø 12 mm [0.47"] B = ø 12 mm, blind hollow shaft ³⁾ 5 = ø 14 mm [0.55"] 6 = ø 15 mm [0.59"] | d Type of connection E = 1 x M12 connector, radial, 5-pin F = 2 x M12 connector, radial, 5-pin ⁴⁾ L = 1 x cable PVC, tangential, length 2 m [6.56"] | f Options (Service) 2 = no option 3 = SET button optional on request - Ex 2/22 - seawater-resistant - special cable length |
| | c Interface / Power supply 2 = CANopen DS301 V4.02 / 10 ... 30 V DC | e Fieldbus profile⁵⁾ 21 = CANopen Encoder-Profile DS406 V3.2 | | |

1) Preferred type only in conjunction with flange type 2
 2) Preferred type only in conjunction with flange type 1
 3) Can be combined only with type of connection F
 4) Can be combined only with blind hollow shaft ø12 mm [0.47"]
 5) CAN parameters can also be factory pre-set

Absolute Encoders – Multiturn

| | | |
|--|---|-----------------------------|
| Standard electronic Multiturn, optical | Sendix F5868 / F5888 (Shaft / Hollow shaft) | CANopen |
| Mounting accessory for shaft encoders | | Order No. |
| Coupling | Bellows coupling \varnothing 19 mm [0.75"] for shaft 6 mm [0.24"] | 8.0000.1101.0606 |
| | Bellows coupling \varnothing 19 mm [0.75"] for shaft 10 mm [0.39"] | 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 | M12, for Bus in, 2 m [6.56'] PVC cable | 05.00.6091.A211.002M |
| | M12, for Bus out, 2 m [6.56'] PVC cable | 05.00.6091.A411.002M |
| 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 |

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 | | | Electrical characteristics | | |
|---|--|--|---|----------------|--|
| Max. speed shaft version | | | Power supply | | |
| IP65 up to 70°C | | 12 000 min ⁻¹ , 10 000 min ⁻¹ (continuous) | 10 ... 30 V DC | | |
| IP65 up to T _{max} | | 8 000 min ⁻¹ , 5 000 min ⁻¹ (continuous) | Power consumption (no load) | | |
| IP67 up to 70°C | | 11 000 min ⁻¹ , 9 000 min ⁻¹ (continuous) | max. 80 mA | | |
| IP67 up to T _{max} | | 8 000 min ⁻¹ , 5 000 min ⁻¹ (continuous) | Reverse polarity protection of the power supply (+V) | | |
| Max. speed hollow shaft version | | | yes | | |
| IP65 up to 70°C | | 9 000 min ⁻¹ , 6 000 min ⁻¹ (continuous) | UL approval | | |
| IP65 up to T _{max} | | 6 000 min ⁻¹ , 3 000 min ⁻¹ (continuous) | File 224618 | | |
| IP67 up to 70°C | | 8 000 min ⁻¹ , 4 000 min ⁻¹ (continuous) | CE compliant acc. to | | |
| IP67 up to T _{max} | | 4 000 min ⁻¹ , 2 000 min ⁻¹ (continuous) | EMC guideline 2004/108/EC | | |
| Starting torque at 20°C [68°F] | | | RoHS compliant acc. to | | |
| IP65 | | < 0.01 Nm | guideline 2002/95/EC | | |
| IP67 | | < 0.05 Nm | | | |
| Moment of inertia | | | Diagnostic LED (two-colour, red/green) | | |
| shaft version | | 3.0 x 10 ⁻⁶ kgm ² | LED ON or blinking | | |
| hollow shaft version | | 6.0 x 10 ⁻⁶ kgm ² | red | Error display | |
| Load capacity of shaft | | | green | Status display | |
| radial | | 80 N | combination red / green | | |
| axial | | 40 N | Error code | | |
| Weight | | | | | |
| approx. 0.45 kg [15.87 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 | | | | | |

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

Absolute Encoders – Multiturn

| | | |
|---|--|----------------|
| Standard electronic Multiturn, optical | Sendix F5868 / F5888 (Shaft / Hollow shaft) | CANopen |
|---|--|----------------|

| Interface characteristics CANopen | |
|-----------------------------------|---|
| Singleturn resolution | 1 ... 65536 (16 bit), scalable |
| Default value Singleturn | 8192 (13 bit) |
| Multiturn resolution | max. 65536 (16 bit) scalable only via the total resolution |
| Total resolution | 1 ... 4.294.967.296 (32 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, LSS-Service DS305 V2.0 |
| Baud rate | 10 ... 1000 kbit/s (software configurable) |
| Node address | 1 ... 127 (software configurable) |
| Termination switchable | software configurable |
| LSS Protocol | CIA LSS protocol DS305, Global command support for node address and baud rate. Selective commands via attributes of the identity object |

General information about CANopen

The CANopen encoders support the latest CANopen communication profile according to DS301 V4.2. In addition, device specific profiles such as encoder profile DS406 V3.2 and DS305 (LSS) 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, temperature** as well as the **status of the working area**.

The encoders are available with a connector or a cable connection.

The device address and baud rate can be set/modified by means of the software.

The two-colour LED located on the back indicates the operating or fault status of the CAN bus, as well as the status of the internal diagnostics.

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 V4.2

Among others, the following functionality is integrated. Class C2 functionality:

- NMT Slave
- Identity Object
- Error Behaviour Object
- Variable PDO Mapping self-start programmable (Power on to operational), 4 Sending PDO's
- Node address, baud rate and CANbus / Programmable termination
- Producer / Consumer Heartbeat

CANopen Encoder Profile DS406 V3.2

The following parameters can be programmed:

- Event mode
- 2 working areas with 2 upper and lower limits and the corresponding output states
- Variable PDO mapping for position, speed, work area status, error message, raw data
- Extended failure management for position sensing
- User interface with visual display of bus and failure status
- Customer-specific memory 16 Byte
- Customer-specific protocol
- Universal Scaling Function (USF)
- "Watchdog controlled" device
- Extended diagnostic modes

LSS Layer Setting Services DS305 V2.0

- Global support of Node-ID and baud rate
- Selective protocol via identity object (1018h)

Absolute Encoders – Multiturn

| | | |
|---|--|----------------|
| Standard electronic Multiturn, optical | Sendix F5868 / F5888 (Shaft / Hollow shaft) | CANopen |
|---|--|----------------|

Terminal assignment

| Interface | Type of connection | Function | Cable (Bus terminal cover with terminal box) | | | | | |
|-----------|--------------------|----------|--|---------------------|--------------------|-------|-------|---------|
| 2 | A, L | Bus IN | Signal: | 0 V power supply | +V power supply | CAN_L | CAN_H | CAN_GND |
| | | | Abbreviation: | 0 V | +V | CL | CH | CG |
| | | | Cable colour: | WH | BN | YE | GN | GY |

| Interface | Type of connection | Function | 2 x M12 connector | | | | | | |
|-----------|--------------------|----------|-------------------|---------------------|--------------------|-------|-------|---------|--|
| 2 | F | Bus IN | Signal: | 0 V power supply | +V power supply | CAN_L | CAN_H | CAN_GND | |
| | | | Abbreviation: | 0 V | +V | CL | CH | CG | |
| | | | Pin: | 3 | 2 | 5 | 4 | 1 | |
| | | Bus OUT | Signal: | 0 V power supply | +V power supply | CAN_L | CAN_H | CAN_GND | |
| | | | Abbreviation: | CG | CL | CH | 0 V | +V | |
| | | | Pin: | 3 | 2 | 5 | 4 | 1 | |

| Interface | Type of connection | Function | 1 x M12 connector | | | | | | |
|-----------|--------------------|----------|-------------------|---------------------|--------------------|-------|-------|---------|--|
| 2 | E | Bus IN | Signal: | 0 V power supply | +V power supply | CAN_L | CAN_H | CAN_GND | |
| | | | Abbreviation: | 0 V | +V | CL | CH | CG | |
| | | | Pin: | 3 | 2 | 5 | 4 | 1 | |

Dimensions shaft version

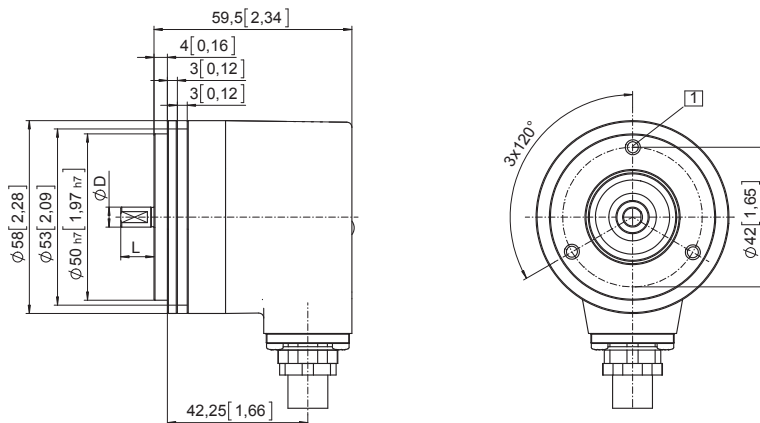
Dimensions in mm [inch]

Synchro flange, ø 58 [2.28]

Flange type 2 and 4

(Drawing with 12 connector)

- 1 M4, 6 [0.24] deep



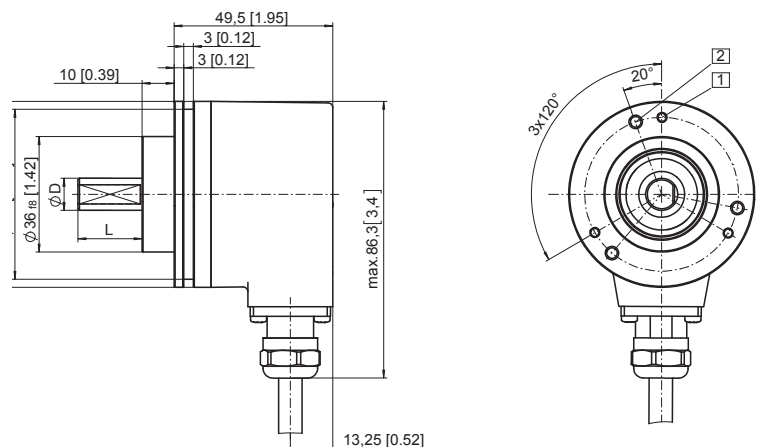
| D | L | Fit |
|-----------|-----------|-----|
| 6 [0.24] | 10 [0.39] | h7 |
| 10 [0.39] | 20 [0.79] | f7 |
| 1/4" | 7/8" | h7 |
| 3/8" | 7/8" | h7 |

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



| 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 – Multiturn

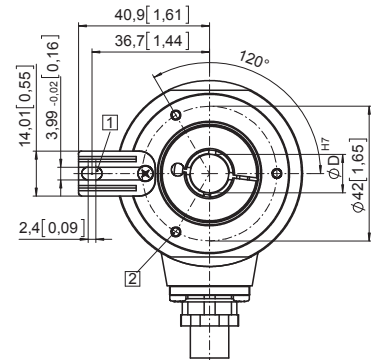
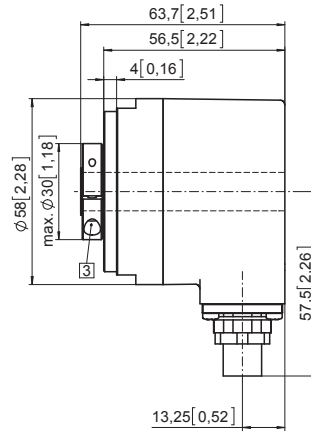
| | | |
|---|--|----------------|
| Standard electronic Multiturn, optical | Sendix F5868 / F5888 (Shaft / Hollow shaft) | CANopen |
|---|--|----------------|

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 cable)

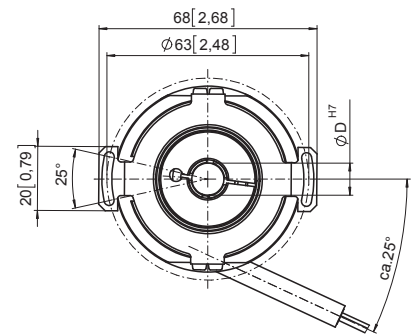
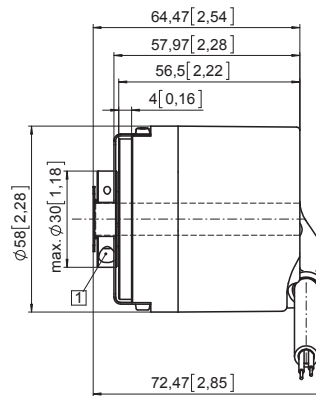
- 1 M3, 6 [0.24] deep
- 2 Torque stop slot, Recommendation: Cylindrical pin DIN 7, \varnothing 4 [0.16]
- 3 Recommended torque for the clamping ring 0.6 Nm



Flange with stator coupling, \varnothing 63 [2.48] Flange type 5 and 6

Pitch circle diameter for fixing screws 63 [2.48]
(Drawing with tangential cable)

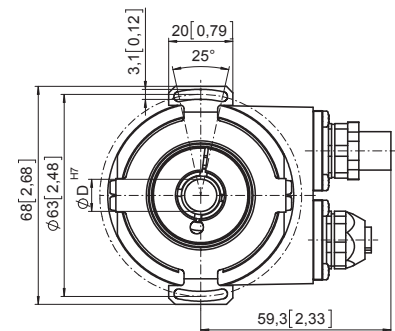
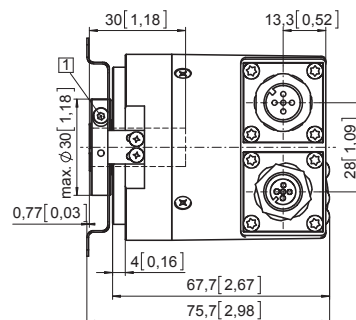
- 1 Fixing screws DIN7985 M2.5x6
- 2 Recommended torque for the clamping ring 0.6 Nm



Flange with stator coupling, \varnothing 63 [2.48] Flange type 5 and 6

Pitch circle diameter for fixing screws 63 [2.48]
(Drawing with 2 x M12 connector)

- 1 Recommended torque for the clamping ring 0.6 Nm



Absolute Encoders
Multiturn