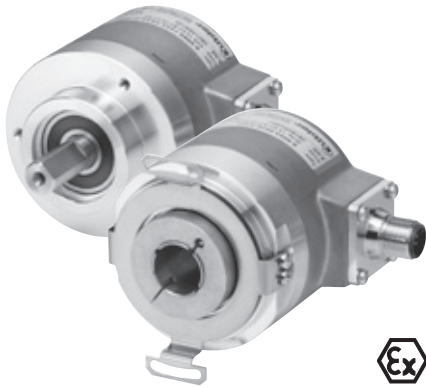# Absolute Encoders – Multiturn

Standard, optical, electronical multiturn | **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.
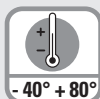
Ex 2/22   c UL us pending   RoHS   CANopen

16 bit MT Multiturn Resolution	Safety-Lock™	High rotational speed	- 40° + 80° 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)

Order code Shaft version | 8.F5868 . XX2X . 21 2X
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

(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 V4.2, 10 ... 30 V DC

(d) Type of connection
A = 1 x cable PVC, radial, length 2 m
E = 1 x M12 connector, radial
F = 2 x M12 connector, radial

(e) Fieldbus profile [5]
21 = CANopen Encoder-Profil DS406 V3.2

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

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

Order code Hollow shaft | 8.F5888 . XX2X . 21 2X
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) Hollow shaft
3 = ø 10 mm
4 = ø 12 mm
5 = ø 14 mm
6 = ø 15 mm
B = ø 12 mm, blind hollow shaft [3]

(c) Interface / Power supply
2 = CANopen DS301 V4.2, 10 ... 30 V DC

(d) Type of connection
E = 1 x M12 connector, radial
F = 2 x M12 connector, radial [4]
L = 1 x cable PVC, tangential, length 2 m

(e) Fieldbus profile [5]
21 = CANopen Encoder-Profil DS406 V3.2

(f) Options (Service)
2 = no option
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 be combined only with type of connection F
[4] Can be combined only with blind hollow shaft ø12 mm
[5] CAN parameters can also be factory pre-set

Standard, optical, electronical multiturn | **Sendix F5868 / F5888 (Shaft / Hollow shaft)** | **CANopen**

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

	Bus in	05.00.6091.A211.002M
	Bus out	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:		8.0010.9000.0015
Operating system:	Windows XP SP3 or higher	
	Win7 - 32 bit	
	Win7 - 64 bit, in preparation	
Processor:	1 GHz	
RAM:	512 MB	
Required disk space:	500 MB	

Mechanical characteristics

Max. speed, shaft version

without shaft seal (IP65) up to 70°C	12 000 min^{-1}, 10 000 min^{-1} (continuous)
without shaft seal (IP65) up to T_{max}	8 000 min^{-1}, 5 000 min^{-1} (continuous)
with shaft seal (IP67) up to 70°C	11 000 min^{-1}, 9 000 min^{-1} (continuous)
with shaft seal (IP67) up to T_{max}	8 000 min^{-1}, 5 000 min^{-1} (continuous)

Max. speed, hollow shaft version

without shaft seal (IP65) up to 65°C	9 000 min^{-1}, 6 000 min^{-1} (continuous)
without shaft seal (IP65) up to 75°C	6 000 min^{-1}, 3 000 min^{-1} (continuous)
with shaft seal (IP67) up to 65°C	8 000 min^{-1}, 4 000 min^{-1} (continuous)
with shaft seal (IP67) up to 75°C	4 000 min^{-1}, 2 000 min^{-1} (continuous)

Starting torque, without shaft seal (IP65)

shaft version	< 0.01 Nm
hollow shaft version	< 0.03 Nm

Starting torque, with shaft seal (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	approx. 0.45 kg

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]

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

[1] Cable version -30°C ... +75°C

General electrical characteristics

Power supply	10 ... 30 V DC
Current consumption (no load)	max. 80 mA
Reverse polarity protection of the power supply (U_B)	yes
UL approval	File 224618
RoHS compliant acc. to	EU guideline 2002/95/EC
CE compliant acc. to	EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3

Interface characteristics CANopen

Singleturn resolution	1 ... 65536 (16 bit), scaleable: 1 ... 65536
Default value Singleturn	8192 (13 bit)
Gesamtauflösung	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 Profil DS406 V3.2 mit hersteller-spezifischen Ergänzungen, 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

Diagnostic LED (two-colour, red/green)

LED ON or blinking	**red**	Error display
	green	Status display
	combination red / green	Error code

Absolute Encoders – Multiturn

General information about CAN/CANlift
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.

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), 3 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)

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.

Terminal assignment

Interface	Type of connection	Function	Cable						
2	A, L	Bus IN	Signal:	0 V power supply	+V power supply	CAN_Low (-)	CAN_High (+)	CAN Ground	
			Abbreviation:	0 V	+V	CL	CH	CG	
			Cable colour:	WH	BN	YE	GN	GY	

Interface	Type of connection	Function	2 x M12 connectors						
2	F	Bus IN	Signal:	0 V power supply	+V power supply	CAN_Low (-)	CAN_High (+)	CAN Ground	
			Abbreviation:	0 V	+V	CL	CH	CG	
			Pin:	3	2	5	4	1	
		Bus OUT	Signal:	CAN Ground	CAN_Low (-)	CAN_High (+)	0 V power supply	+V power supply	
			Abbreviation:	CG	CL	CH	0 V	+V	
			Pin:	1	5	4	3	2	

Interface	Type of connection	Function	1 x M12 connector						
2	E	Bus IN	Signal:	0 V power supply	+V power supply	CAN_Low (-)	CAN_High (+)	CAN Ground	
			Abbreviation:	0 V	+V	CL	CH	CG	
			Pin:	3	2	5	4	1	

Absolute Encoders – Multiturn

Dimensions shaft version

Synchro flange, ø 58 mm
Flange type 2 and 4

(Drawing with M12 connector)
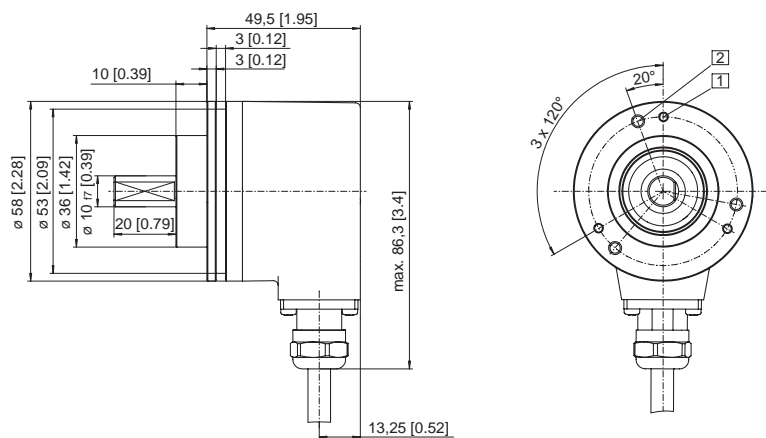
[1] 3 x M4, 6 [0.24] deep
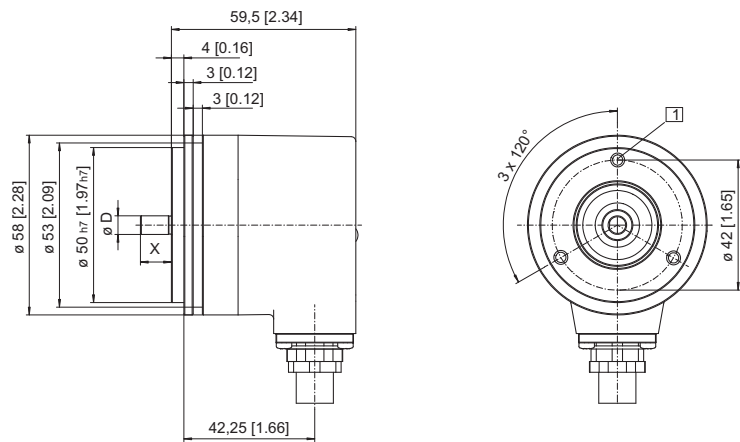
Clamping flange, ø 58 mm
Flange type 1 and 3
(Drawing with cable outlet)

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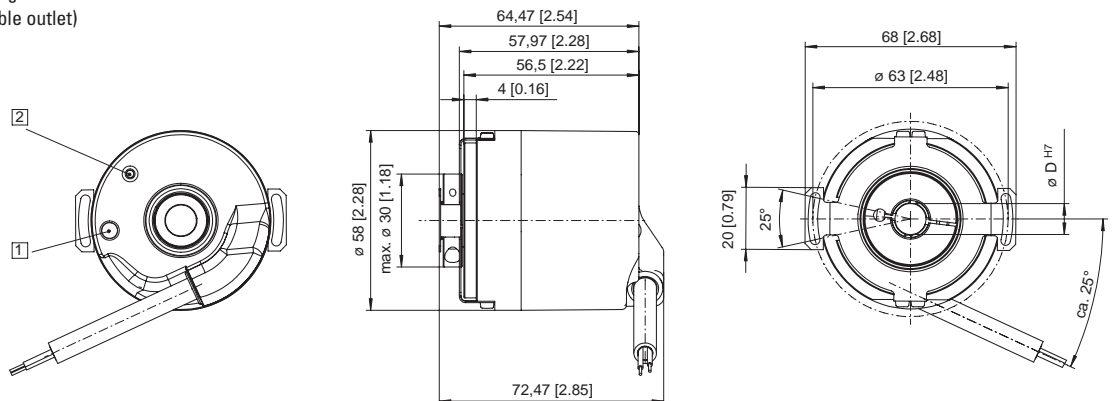[2] 3 x M4, 8 [0.32] deep

Dimensions hollow shaft version

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

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

[1] Status-LED
[2] SET button

Dimensions in mm [inch]