

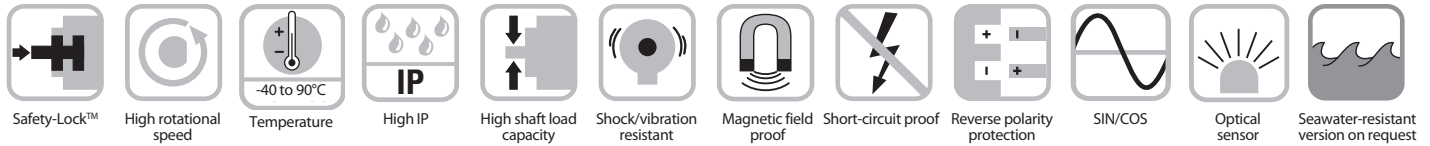
Rotary Position Technology

Absolute Encoders, Singleturn



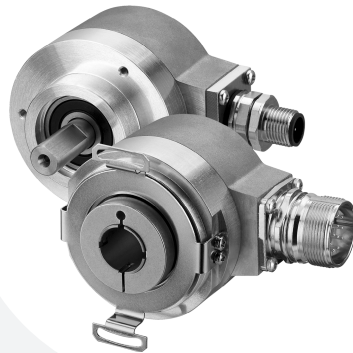
Sendix absolute, singleturn type 5853 (shaft) / 5873 (hollow shaft)

SSI/BiSS-C



Reliable

- **increased ability to withstand vibration and installation errors.** Sturdy Safety-Lock™ Design bearing structure eliminates machine downtime and repairs.
- **Fewer components and connection points increase the operational reliability.** TURCK OptoASIC technology with highest integration density (Chip-on-Board).
- Die cast housing and protection up to IP67: **Remains sealed even when subjected to harsh everyday use.**
- Wide temperature range of -40 to +194°F (-40 to +90°C).
- **Easy diagnosis in case of fault condition.** Status indication by means of LED, sensor, voltage and temperature monitoring.



Sendix® absolute



Fast

- **High accuracy:** Update rate of the whole position value above 100 kHz for a max. jitter of 1 μs (real-time).
- **High productivity due to very short regulation cycles:** Clock rate with SSI up to 2 MHz, with BiSS-C up to 10 MHz.
- **High-resolution feedback system achievable in real-time:** SinCos incremental outputs.

Versatile

- **Connections for every application:** Cable, M12 connector or M12 connector.
- **Open interfaces ensure flexibility and independence:** SSI or BiSS-C with Sine-Cosine-Option.
- Multiple mounting brackets for easy installation.
- **Only the functionality really needed by the user is implemented:** Status LED and set key are optional.
- **Fast and easy start-up:** Set key or preset by means of a control input.
- **Direct mounting on large diameter shafts** through hollow shaft up to 15 mm.

Mechanical characteristics:

Shaft version:

Max. speed without shaft sealing (IP65) up to 158°F (70°C):	12,000 RPM, continuous 10,000 RPM
Max. speed without shaft sealing (IP65) up to Tmax:	8,000 RPM, continuous 5,000 RPM
Max. speed with shaft sealing (IP67) up to 158°F (70°C):	11,000 RPM, continuous 9,000 RPM
Max. speed with shaft sealing (IP67) up to Tmax:	8,000 RPM, continuous 5,000 RPM

Hollow shaft version:

Max. speed without shaft sealing (IP65) up to 158°F (70°C):	9,000 RPM, continuous 6,000 RPM
Max. speed without shaft sealing (IP65) up to Tmax:	6,000 RPM, continuous 3,000 RPM
Max. speed with shaft sealing (IP67) up to 158°F (70°C):	8,000 RPM, continuous 4,000 RPM
Max. speed with shaft sealing (IP67) up to Tmax:	4,000 RPM, continuous 2,000 RPM

Starting torque without shaft sealing (IP65):	Shaft version: < 1.4 oz-in (< 0.01 Nm) Hollow shaft version: < 4.25 oz-in (< 0.03 Nm)
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Starting torque with shaft sealing (IP67):	< 7 oz-in (< 0.05 Nm)
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Moment of inertia:	Shaft version: 0.16 oz-in ² (3.0 x 10 ⁻⁶ kgm ²) Hollow shaft version: 0.328 oz-in ² (6.0 x 10 ⁻⁶ kgm ²)
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Radial load capacity of shaft:	18 lbs (80 N)
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Axial load capacity of shaft:	9 lbs (40 N)
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Weight:	approx. 0.77 lbs (0.35 kg)
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Protection acc. to EN 60 529:	Housing: IP67, Shaft: IP65, opt. IP67
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EX approval for hazardous areas:	optional zone 2 and 22
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Working temperature:	-40 to +194°F (-40 to +90°C) ¹⁾
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Materials:	Shaft/hollow shaft: stainless steel, Flange: aluminum, Housing: die cast zinc, Cable: PVC
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Shock resistance acc. to DIN-IEC 68-2-27:	> 250g (> 2,500 m/s ²), 6 ms
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Vibration resistance acc. to DIN-IEC 68-2-6:	> 10 g (>100 m/s ²), 55-2,000 Hz
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¹⁾ Cable versions: -22 to +167°F (-30 to +75°C)



Encoder with tangential cable outlet

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General electrical characteristics:

Supply voltage:	5 VDC + 5 % or 10-30 VDC
Current consumption (without output load):	5 VDC: max. 70 mA, 10-30 VDC: max. 45 mA
Reverse polarity protection at power supply (+V):	Yes (only 10-30 VDC)
UL certified:	File 224618
Conforms to CE requirements acc. to EN 61000-6-2, EN 61000-6-4 and EN 61000-6-3	
RoHS compliant acc. to EU guideline 2002/95/EG	

General interface characteristics:

Output driver:	RS485 Transceiver type
Permissible load/channel:	max. 20 mA
Signal level high:	typ. 3.8 V
Signal level low at $I_{load} = 20$ mA:	typ. 1.3 V
Short-circuit proof outputs:	Yes ²⁾

interface characteristics SSI:

Singleturn resolution:	10-14 bits and 17 bits ³⁾
Code:	Binary or Gray
SSI clock rate:	≤ 14 bit 50 kHz-2 MHz ≥ 15 bit 50 kHz-125 kHz
Monoflop time:	$\geq 15 \mu s$ ³⁾

Note:
If clock starts cycling within monoflop time, a second data transfer starts with the same data. If clock starts cycling after monoflop time, the data transfer starts with updated values. Maximum update rate is dependent on clock speed, data length and monoflop time.

Time jitter (data request to position latch):	$< 1 \mu s$ up to 14 bits, $4 \mu s$ at 15-17 bits
Status and Parity bit:	optional on request

interface characteristics BiSS-C:

Singleturn resolution:	10-14 bits and 17 bits customer programmable ³⁾
Code:	Binary
Interfaces:	RS485
Clock rate:	up to 10 MHz
Max. update rate:	$< 10 \mu s$, depending on clock speed and data length
Time jitter (data request to position latch):	$\leq 1 \mu s$

Note:
• Bidirectional, programmable parameters are: resolution, code, direction, alarms and warnings
• Multicycle data output, e.g. for temperature
• CRC data verification

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

³⁾ Other options upon request

SET (zero or defined value) and DiRection (CW/CCW) control inputs:

Input characteristics:	High active
Receiver type:	Comparator
Signal level high:	min. 60 % of V+ (Supply voltage), max: V+
Signal level low:	max. 25 % of V+ (Supply voltage)
Input current:	< 0.5 mA
Min. pulse duration (SET):	10 ms
Timeout after SET input:	14 ms
Reaction Time (DIR input):	1 ms

The encoder can be set to zero at any position by means of a HIGH signal on the SET input or by pressing the optional SET key. Other preset values can be factory-programmed. The SET input has a signal delay time of approximately 1 ms. Once the SET function has been triggered, the encoder requires an internal processing time of approximately 15 ms before the new position data can be read. During this time, the LED is ON and the status output is at LOW.

Status output and LED:

Output driver:	Open collector, internal pull up resistor 22 kOhm
Permissible load:	Max. 20 mA
Signal level high:	+V
Signal level low:	< 1 V
Active at:	Low

The optional LED (red) and the status output serve to display various alarm or error messages. In normal operation the LED is OFF and the status output is HIGH (open-collector with int. pull-up 22k).

If the LED is ON (status output LOW) this indicates:

- Sensor error, singleturn or multiturn (soiling, glass breakage etc.)
- LED error, failure or aging
- Over- or under-temperature

In the SSI mode, the fault indication can only be reset by switching off the power-supply to the device.

DiR input:

A HIGH signal switches the direction of rotation from the default clockwise to counter-clockwise. This inverted function can also be factory-programmed. If DIR is changed when the device is already switched on, then this will be interpreted as an error. The LED will come ON and the status output will switch to LOW.

Option incremental output (A/B), 2048 ppr:

	Sin/Cos	RS422 (TTL compatible)
-3dB frequency:	400 kHz	400 kHz
Signal level:	1 Vpp (± 20 %)	high: min. 2.5 V low: max. 0.5 V
Short-circuit proof:	Yes	Yes

power-on delay:

After Power-ON the device requires a time of approx. 150 ms before valid data can be read.

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pin configuration:

Output circuit 1 or 2 and (2 control inputs, 1 status output) (Connection 1,2,3 or 4)

Output:	Common (0 V)	+V	+Clock	-Clock	+Data	-Data	ST	DiR	Status	NC	NC	NC	pE
M23 pin:	1	2	3	4	5	6	7	8	9	10	11	12	PH
Color:	WH	BN	GN	YE	GY	PK	BU	RD	BK	-	-	-	Shield

Output circuit 5 and (2 control inputs, 1 status output, voltage monitor outputs) (Connection 1,2,3 or 4)

Output:	Common (0 V)	+V	+Clock	-Clock	+Data	-Data	ST	DiR	Status	NC	0 V Sens	+V Sens	pE
M23 pin:	1	2	3	4	5	6	7	8	9	10	11	12	PH
Color:	WH	BN	GN	YE	GY	PK	BU	RD	BK	-	GY/PK	RD/BU	Shield

Output circuit 3, 4, 7 or 8, and (2 control inputs or incremental track, sine/cosine) (Connection 1,2,3 or 4)

Output:	Common (0 V)	+V	+Clock	-Clock	+Data	-Data	ST	DiR	Sin A	Sin inv A-	Cos B	Cos inv B-	pE
M23 pin:	1	2	3	4	5	6	7	8	9	10	11	12	PH
Color:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY/PK	RD/BU	Shield

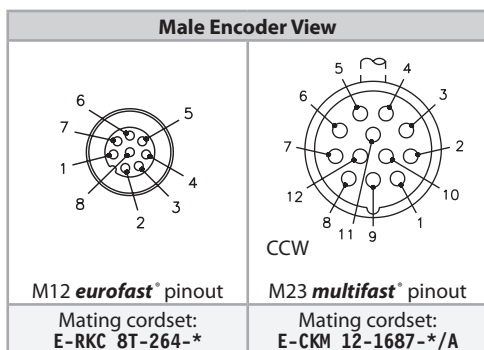
Output circuit 6 or 9, and (sine/cosine or incremental monitor, voltage outputs) (Connection 1,2,3 or 4)

Output:	Common (0 V)	+V	+Clock	-Clock	+Data	-Data	Sin A	Sin inv A-	Cos B	Cos inv B-	0 V Sens	+V Sens	pE
M23 pin:	1	2	3	4	5	6	7	8	9	10	11	12	PH
Color:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY/PK	RD/BU	Shield

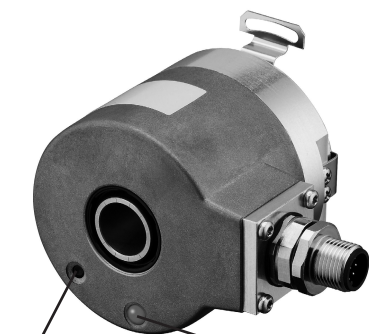
Output circuit 1 or 2, and (2 control inputs) (Connection 5 or 6)

Output:	Common (0 V)	+V	+Clock	-Clock	+Data	-Data	SET	DiR	Shield/pE
M12 pin:	1	2	3	4	5	6	7	8	PH

Wiring diagrams:

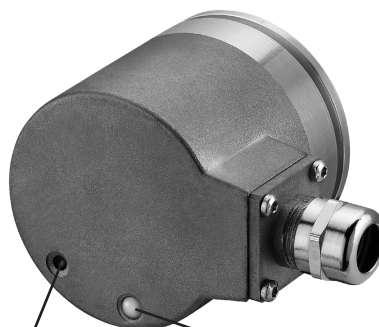


* Length in meters.



SET key:
For quick, simple on-site start-up.

LED:
Status indication for sensor, voltage and temperature monitoring.



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SSI/BiSS-C

part number key: **5853 shaft version**

T8.5853.XXXX.XX2X

Type
Flange
1 = clamping flange Ø 58 IP65 2 = servo flange Ø 58 mm, IP65 3 = clamping flange Ø 58 mm, IP67 4 = servo flange Ø 58 mm, IP67 5 = square flange 2.5" / 63.5 mm, IP65 7 = square flange 2.5" / 63.5 mm, IP67
Shaft (Ø x L)
1 = Ø 6 mm x 10 mm 2 = Ø 10 mm x 20 mm 3 = Ø 1/4" x 7/8" 4 = Ø 3/8" x 7/8"

Voltage supply and output
1 = 5 VDC, SSI or BiSS-C interface, 2 = 10-30 VDC, SSI or BiSS-C 3 = 5 VDC, SSI or BiSS-C, and 2048 ppr SinCos 4 = 10-30 VDC, SSI or BiSS-C, and 2048 ppr SinCos 5 = 5 VDC, SSI or BiSS-C, with supply voltage monitoring output 6 = 5 VDC, SSI or BiSS-C, and 2048 ppr SinCos, with supply voltage monitoring output 7 = 5 VDC, SSI or BiSS-C and 2048 ppr-incremental track RS422 (TTL-comp.) 8 = 10-30 VDC, SSI or BiSS-C and 2048 ppr-incremental track RS422 (TTL-comp.) 9 = 5 VDC, SSI or BiSS-C and 2048 ppr-incremental track RS422 (TTL-comp.) with supply voltage monitoring output

Options (service)
1 = no option 2 = status LED 3 = SET button and status LED
input/output ¹⁾
2 = SET, DIR inputs and additional status output
Resolution ¹⁾
A = 10 bit 3 = 13 bit 1 = 11 bit 4 = 14 bit 2 = 12 bit 7 = 17 bit
Code
B = SSI, binary C = BiSS-C, binary G = SSI, Gray

Type of connection
1 = axial cable (1 m PVC) 2 = radial cable (1 m PVC) 3 = axial 12-pin M23 multifast ® connector 4 = radial 12-pin M23 multifast connector 5 = axial 8-pin M12 eurofast ® connector (only with output circuits 1 & 2) 6 = radial 8-pin M12 eurofast connector (only with output circuits 1 & 2)

¹⁾ Resolution, preset value and counting direction factory-programmable

part number key: **5873 hollow shaft version**

T8.5873.XXXX.XX2X

Type
Flange
1 = flange with torque stop IP65 2 = flange with torque stop IP67 3 = flange with flex mount pitch circle Ø 65, IP65 4 = flange with flex mount pitch circle Ø 65, IP67 5 = flange with slotted flex mount pitch circle Ø 63, IP65 6 = flange with slotted flex mount pitch circle Ø 63, IP67
Hollow shaft
3 = Ø 10 mm 6 = Ø 15 mm 4 = Ø 12 mm 8 = Ø 9.52 mm [3/8"] 5 = Ø 14 mm 9 = Ø 12.7 mm [1/2"]
Voltage supply and output
1 = 5 VDC, SSI or BiSS-C interface, 2 = 10-30 VDC, SSI or BiSS-C 3 = 5 VDC, SSI or BiSS-C, and 2048 ppr SinCos 4 = 10-30 VDC, SSI or BiSS-C, and 2048 ppr SinCos 5 = 5 VDC, SSI or BiSS-C, with supply voltage monitoring output 6 = 5 VDC, SSI or BiSS-C, and 2048 ppr SinCos, with supply voltage monitoring output 7 = 5 VDC, SSI or BiSS-C and 2048 ppr-incremental track RS422 (TTL-comp.) 8 = 10-30 VDC, SSI or BiSS-C and 2048 ppr-incremental track RS422 (TTL-comp.) 9 = 5 VDC, SSI or BiSS-C and 2048 ppr-incremental track RS422 (TTL-comp.) with supply voltage monitoring output

Options (service)
1 = no option 2 = status LED 3 = SET button and status LED
input/output ¹⁾
2 = SET, DIR inputs additional status output
Resolution ¹⁾
A = 10 bits ST 3 = 13 bits ST 1 = 11 bits ST 4 = 14 bits ST 2 = 12 bits ST 7 = 17 bits ST
Code
B = SSI, binary C = BiSS-C, binary G = SSI, Gray

Type of connection
2 = radial cable (1 m PVC) 4 = radial 12-pin M23 multifast connector 6 = radial 8-pin M12 eurofast connector (only with output circuits 1 and 2) E = tangential cable outlet (1 m PVC cable)

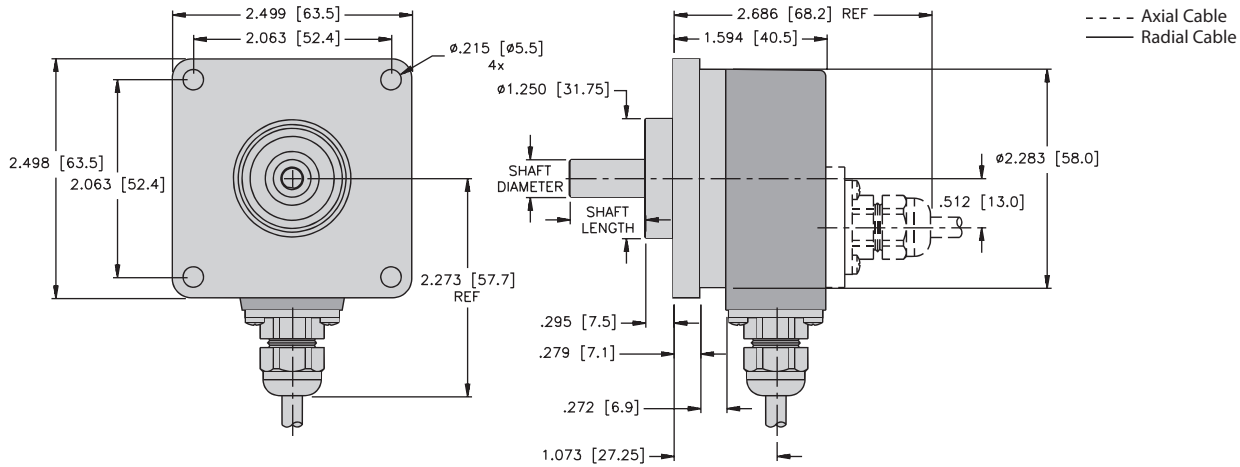
¹⁾ Resolution, preset value and counting direction factory-programmable

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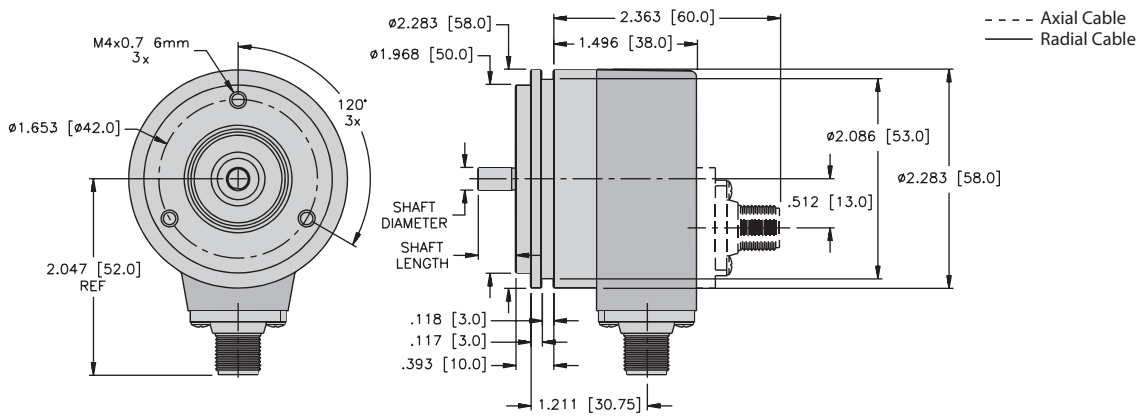
SSI/BiSS-C

Dimensions: 5853 shaft version

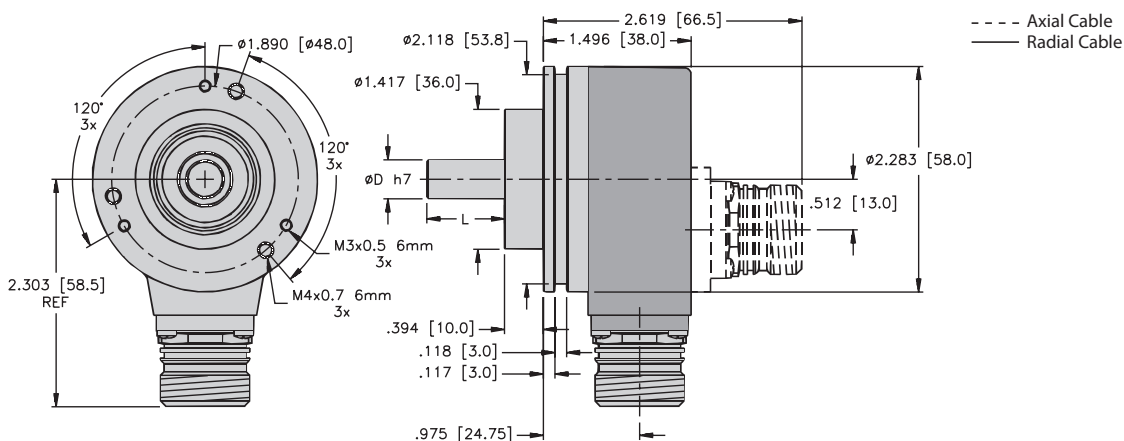
5853 flanges 5 &
Cable connection 1 & 2



5853 flanges 2 &
M12 eurofast® connection 5 & 6



5853 flanges 1 &
M23 multifast® connection 3 & 4

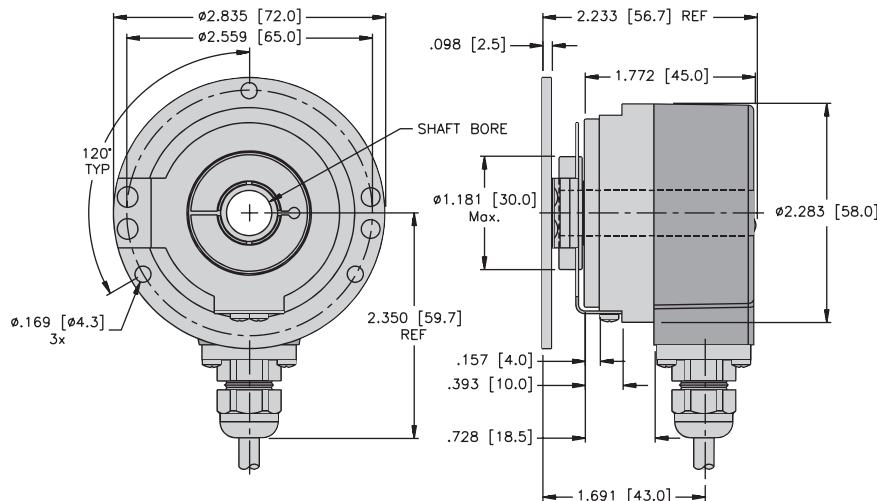


Sendix absolute, singleturn type 5853 (shaft) / 5873 (hollow shaft)

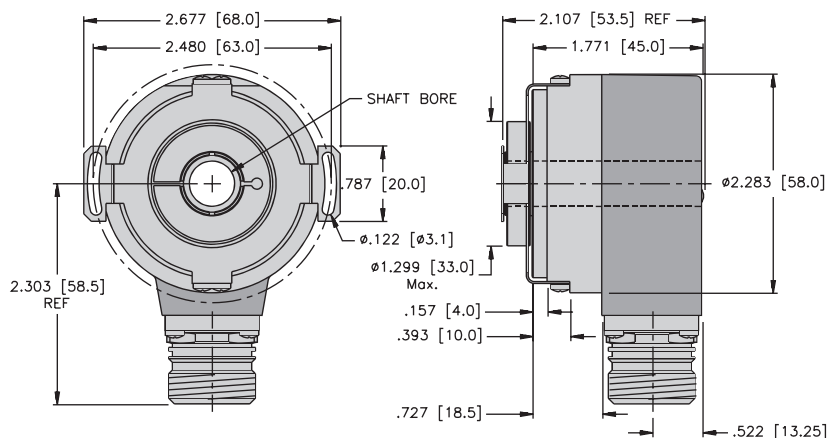
SSI/BiSS-C

Dimensions: 5873 hollow shaft version

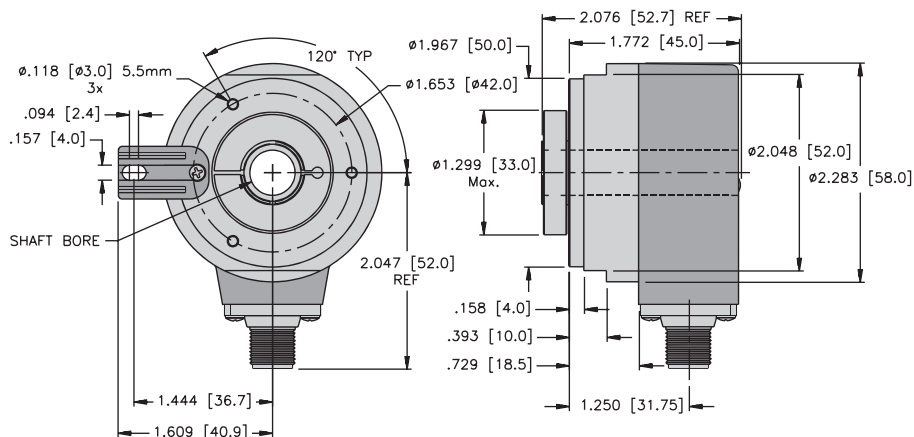
**5873 flanges 3 &
 Cable connection 2**



**5873 flanges 5 &
 M23 multifast® connection 4**



**5873 flanges 1 &
 M12 eurofast® connection 6**



Sendix absolute, singleturn type 5853 (shaft) / 5873 (hollow shaft) SSI/BiSS-C

Dimensions: 5873 hollow shaft version

5873 flanges 1 &
 Cable connection E

