

## Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)



### Versatile

- **The right connection for every application:** Cable, M12 connector, M23 connector, and MIL Spec Connectors.
- **Wide variety of standard industrial mounting options:** Servo, square, clamping flanges.
- **Standardized designs for worldwide use:** Compatible with US and European standards; 5-30 V supplies; Various output options; Up to 5,000 ppr.



Sendix® incremental



### Compact

- **Small footprint:** Outer diameter 2"x 2"  
Can utilize 2" or 2.5" flanges.

### Rugged and Tough

- **High tolerance to vibration, shock and alignment issues:** Sturdy double bearing "Safety Lock Design".
- **Environmentally protected design:** Die-cast housings; butyl rubber shaft seals and o-rings; robust stainless steel hubs, flanges, and disc tables. Ratings up to IP67.
- **Wide temperature range:** -40 to +185°F (-40 to +85°C)
- Also available in seawater resistant version, certified acc. to salt-spray test IEC 68-2-11 ≥ 672 hours

### Mechanical characteristics:

Speed IP65 <sup>1)</sup> :	max. 12,000 RPM
Speed IP67 <sup>2)</sup> :	max. 6,000 RPM
Rotor moment of inertia:	Shaft: approx. 0.098 oz-in <sup>2</sup> (1.8 x 10 <sup>-6</sup> kgm <sup>2</sup> )
	Hollow shaft: approx. 0.328 oz-in <sup>2</sup> (6.0 x 10 <sup>-6</sup> kgm <sup>2</sup> )
Starting torque:	< 1.4 oz-in (< 0.01 Nm), IP65 < 7 oz-in (< 0.05 Nm), IP67
Radial load capacity of the shaft:	18 lbs (80 N)
Axial load capacity of the shaft:	9 lbs (40 N)

<sup>1)</sup> For continuous operation 6000 RPM

<sup>2)</sup> For continuous operation max. 3000 RPM

<sup>3)</sup> With connector: -40°F (-40°C), cable fixed: -22°F (-30°C), cable moved: -4°F (-20°C)

Weight:	approx. 0.9 lbs (0.4 kg)
Protection acc. to EN 60 529 without shaft sealing:	IP65
Protection acc. to EN 60 529 with shaft sealing:	IP67
Ex approval for hazardous areas:	optional zone 2 and 22
Working temperature:	-40 to +185°F (-40 to +85°C)
Shaft:	stainless steel
Shock resistance acc. to EN 60068-2-27:	250 g (2,500 m/s <sup>2</sup> ), 6 ms
Vibration resistance to EN 60068-2-6:	10 g (100 m/s <sup>2</sup> ), 10-2,000 Hz

### Electrical characteristics:

Output circuit: (key code)	RS 422 (1) (TTL compatible)	RS 422 (4) (TTL compatible)	Push-pull (5) (IC-DL)	Push-pull (8) (7272) <sup>3)</sup>	Open collector (3) (7273) <sup>3)</sup>
Supply voltage:	5-30 VDC	5 V ±5%	10-30 V DC	5-30 V DC	5-30 V DC
Power consumption (no load):	typ. 40 mA max. 90 mA	typ. 40 mA max. 90 mA	typ. 50 mA max. 100 mA	typ. 50 mA max. 100 mA	100 mA
Permissible load/channel:	max. ±20 mA	max. ±20 mA	max. ±20 mA	max. ±20 mA	20 mA sink@30 VDC
Pulse frequency:	max. 300 kHz	max. 300 kHz	max. 300 kHz	max. 300 kHz	max. 300 kHz
Signal level high:	min. 2.5 V	min. 2.5 V	min. +V -1.0 V	min. +V -2.0 V	n/a
Signal level low:	max. 0.5 V	max. 0.5 V	max. 0.5 V	max. 0.5 V	n/a
Rise time t <sub>r</sub> :	max. 200 ns	max. 200 ns	max. 1 μs	max. 1 μs	
Fall time t <sub>f</sub> :	max. 200 ns	max. 200 ns	max. 1 μs	max. 1 μs	
Short-circuit proof outputs <sup>1)</sup> :	yes <sup>2) 4)</sup>	yes <sup>2) 4)</sup>	yes	yes <sup>2) 4)</sup>	yes
Reverse connection protection at +V:	yes	no	yes	no	no

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

<sup>1)</sup> If supply voltage correctly applied

<sup>2)</sup> Only one channel allowed to be shorted-out: (If +V=5 V, short-circuit to channel, 0V, or +V is permitted.) (If +V=5-30 V, short-circuit to channel or 0V is permitted.)

<sup>3)</sup> Max. recommended cable length 30 m

<sup>4)</sup> Approximately one minute

## Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)

### Standard wiring / pin configuration: 1) 2)

Connection Type	Case Ground	Common (0V)	+V	A	$\bar{A}$	B	$\bar{B}$	Z	$\bar{Z}$	N/C	N/C	0V <sup>1)</sup> Sens	+V <sup>2)</sup> Sens
M23 <i>multifast</i> ®	Coupling nut	10	12	5	6	8	1	3	4	-	-	11	2
MS 6-pin	-	A	B	E	-	D	-	C	-	-	-		
MS 7-pin	G	F	D	A	-	B	-	C	-	-	-		E
MS 10-pin	J	F	D	A	G	B	H	C	I	-	-		E
M12 <i>eurofast</i> ®	Coupling nut	1	2	3	4	5	6	7	8	-	-		
Cable	Shield/drain	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY/PK	RD/BU

<sup>1)</sup> The sensor cables are connected to the supply voltage internally, if long feeder cables are involved they can be used to adjust or control the voltage at the encoder.  
<sup>2)</sup> Isolate unused outputs before initial startup.

### Special connector pin configuration:

Wiring Code	Connection Type	Case Ground	Common (0V)	+V	A	$\bar{A}$	B	$\bar{B}$	Z	$\bar{Z}$
7	M12 <i>eurofast</i>	Coupling nut	7	2	1	3	4	5	6	8
1	MS 6-pin	-	A, F	B	D	-	E	-	C	-
4	MS 7-pin	G	F	D	A	C	B	E	-	-
6	MS 10-pin	G	F	D	A	H	B	I	C	J

### Wiring diagrams:

Male Encoder View				
M12 <i>eurofast</i> pinout	M23 <i>multifast</i> pinout	MS pinout (6-pin)	MS pinout (7-pin)	MS pinout (10-pin)
Mating cordset: E-RKC 8T-930-*	Mating cordset: E-CKM 12-931-*	Mating cordset: E-MK 6-0-*	Mating cordset: E-MK 7-930-*	Mating cordset: E-MK 10-931-*

\* Length in meters.

## Sendix incremental type 5000 (shaft) / 5020 (hollow shaft) Accessories - Inserts

### Isolation/adapter inserts for hollow shaft encoders \*



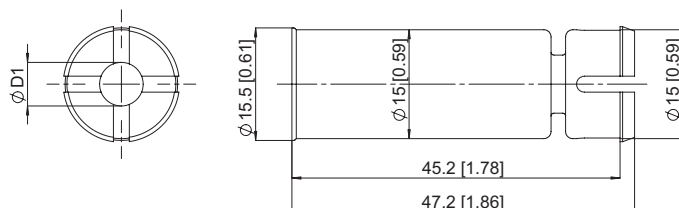
### Thermal and electrical isolation of the encoders:

Isolation inserts prevent currents from passing through the encoder bearings. These currents can occur when using inverter controlled three-phase or AC vector motors and considerably shorten the service life of the encoder bearings. In addition, the encoder is then not transfer the heat to the encoder.

### Tip:

By using these adapter inserts, you can achieve six different hollow shaft diameters, all on the basis of one 15 mm encoder.

### Dimensions:



Isolation insert	D1 [mm]	D1 [in]
8.0010.4021.0000	6	
8.0010.4022.0000	6.35	(1/4)
8.0010.4023.0000	10	
8.0010.4024.0000	9.53	(3/8)
8.0010.4025.0000	12	
8.0010.4026.0000	12.7	(1/2)

Note: Use with 15 mm bore size hollow shaft T8.5020 encoder.

## Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)

Part number key: 5000 shaft version

T8.5000.XXXX.XXXX.PXXXX.XXXX

Options for special output only.

<b>Type</b>
<b>Flange - 2" (50 mm)</b> 1 = servo flange w/shaft seal (IP67) 2 = servo flange 3 = square flange w/shaft seal (IP67) 4 = square flange
<b>Flange - 58 mm</b> 7 = clamping flange w/shaft seal (IP67) 8 = clamping flange A = servo flange w/shaft seal (IP67) B = servo flange
<b>Flange - 2.5" (63.5 mm) and euro (115 mm)</b> C = square flange w/shaft seal (IP67) D = square flange E = servo flange w/shaft seal (IP67) F = servo flange G = euro flange 115 mm (IP67) <sup>2)</sup>
<b>Shaft options for 2" 50 mm and 58 mm flange</b> 1 = Ø 6 mm x 10 mm 2 = Ø 1/4" x 5/8" 3 = Ø 10 mm x 20 mm 4 = Ø 3/8" x 5/8" 5 = Ø 12 mm x 20 mm 6 = Ø 8 mm x 15 mm
<b>Shaft options for 2.5" flange (63.5 mm) and euro (115 mm)</b> 1 = Ø 6 mm x 10 mm 2 = Ø 1/4" x 5/8" 3 = Ø 10 mm x 20 mm 4 = Ø 3/8" x 5/8" 5 = Ø 12 mm x 20 mm 6 = Ø 8 mm x 15 mm 7 = Ø 1/4" x 7/8" 8 = Ø 3/8" x 7/8" B = 11 mm x 33 mm, with feather slot <sup>3)</sup>

<b>Optional cable length</b> 0050 = 5 meters <sup>1)</sup>
<b>Special connector pin configuration</b> See page E15
<b>capacitor</b> 0 = standard A = no bypass capacitor (vector motor) (only valid with output codes 1, 3, 4, 5)
<b>Special output signal formats</b> See page E62
<b>Pulse rate</b> See below
<b>Connection type</b> 1 = axial cable (1 meter) 2 = radial cable (1 meter) 3 = axial 8-pin M12 <b>euromast</b> ® connector 4 = radial 8-pin M12 <b>euromast</b> connector 7 = axial 12-pin M23 <b>multifast</b> ® connector 8 = radial 12-pin M23 <b>multifast</b> connector 9 = radial MS, 6-pin W = radial MS, 7-pin Y = radial MS, 10-pin A = optional axial cable length B = optional radial cable length
<b>Input / output circuit</b> 1 = 5-30 VDC, TTL (26C31) 3 = 5-30 VDC, open collector (7273) 4 = 5 VDC, TTL (26C31) 5 = 10-30 VDC, line driver (IC-DL) 8 = 5-30 VDC, line driver (7272 without bypass capacitor)

<sup>1)</sup> Available with connection type A only.  
<sup>2)</sup> Available with shaft option B only.  
<sup>3)</sup> Available with flange option G only.

Part number key: 5020 hollow shaft version

T8.5020.XXXX.XXXX.PXXXX.XXXX

Options for special output only.

<b>Type</b>
<b>Flange - 2"</b> 1 = torque stop w/shaft seal (IP67)* 2 = torque stop (IP65)* 3 = single point tether w/shaft seal (IP67) 4 = single point tether (IP65) 5 = flex mount w/shaft seal, pitch circle Ø 57.2 mm (IP67) 6 = flex mount, pitch circle Ø 57.2 mm (IP65) 7 = flex mount w/shaft seal, pitch circle Ø 65 mm (IP67) 8 = flex mount, pitch circle Ø 65 mm (IP65) C = slotted flex mount w/shaft seal, pitch circle Ø 63 mm (IP67) D = slotted flex mount, pitch circle Ø 63 mm (IP65)
<b>Bore</b> 1 = Ø 6 mm 2 = Ø 1/4" 3 = Ø 10 mm 4 = Ø 3/8" 5 = Ø 12 mm 6 = Ø 1/2" 7 = Ø 5/8" 8 = Ø 15 mm 9 = Ø 8 mm A = Ø 14 mm
<b>Input / output circuit</b> 1 = 5-30 VDC, TTL (26C31) 3 = 5-30 VDC, open collector (7273) 4 = 5 VDC, TTL (26C31) 5 = 10-30 VDC, line driver (IC-DL) 8 = 5-30 VDC, line driver (7272 without bypass capacitor)

<b>Optional cable length</b> 0050 = 5 meters <sup>1)</sup>
<b>Special connector pin configuration</b> See page E15
<b>Capacitor</b> 0 = standard A = no bypass capacitor (vector motor) (only valid with output codes 1, 3, 4, 5)
<b>Special output signal formats</b> See page E62
<b>Pulse rate</b> See below
<b>Connection type</b> 1 = radial cable (1 meter) 2 = radial 8-pin M12 <b>euromast</b> connector 4 = radial 12-pin M23 <b>multifast</b> connector 7 = radial MS, 10-pin A = optional radial cable length E = tangential cable (1 meter) H = tangential cable (0.3 meter) including 8-pin M12 <b>euromast</b> connector

\* Requires 4 mm torque pin  
<sup>1)</sup> Available with connection type A only.

**Standard Pulse Rates (PPR):**

**Metal: 1, 4, 5, 10, 12, 20, 25, 30, 36, 50, 60, 80, 100, 125, 150, 180, 200, 240, 250, 256, 300, 342, 360, 375, 400, 500, 512, 600, 625, 720, 800, 900, 1000, 1024**  
**All 5000 series encoders, 1024 and below assembled in the USA**  
Glass: 1200, 1250, 2000, 2048, 2500, 3000, 3600, 4096, 5000 (Built in Germany)

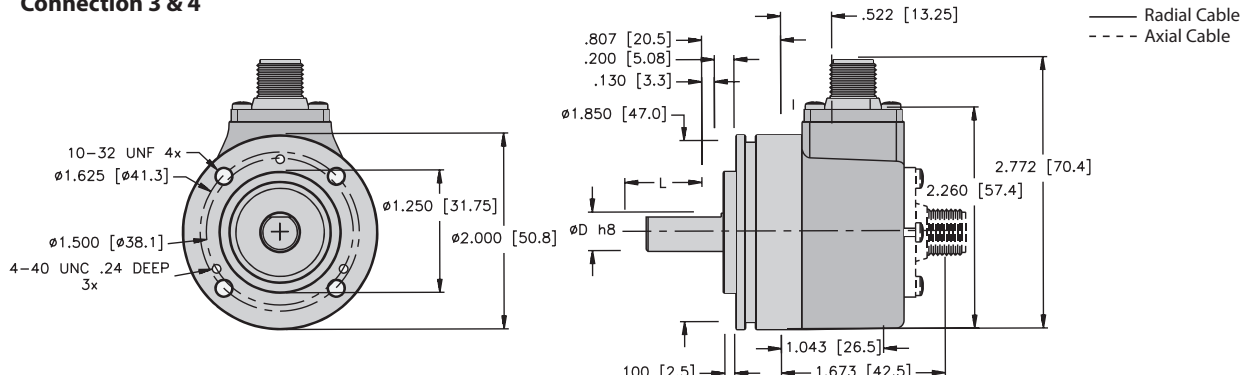
**Accessories:**

- See page J1, Connectivity, for cables and connectors
- See page G1, Accessories, for mounting attachments and couplings

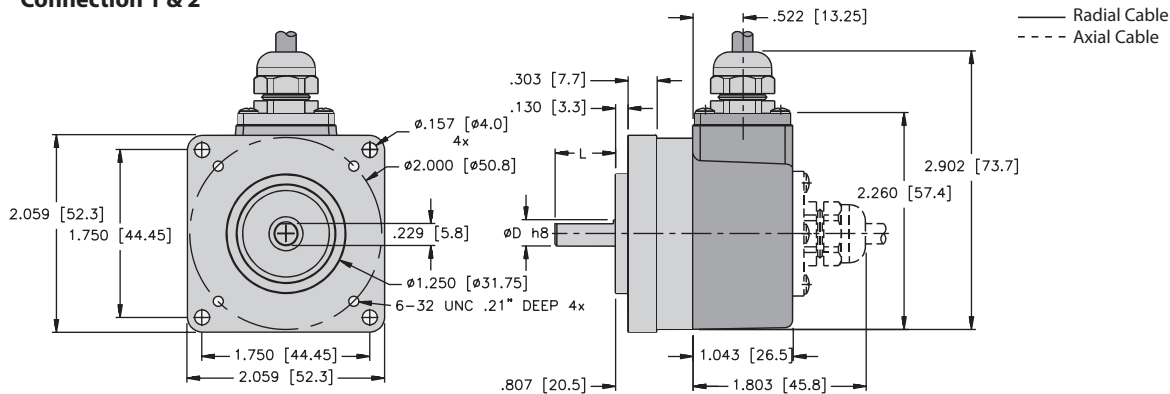
### Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)

Dimensions: 5000 shaft version

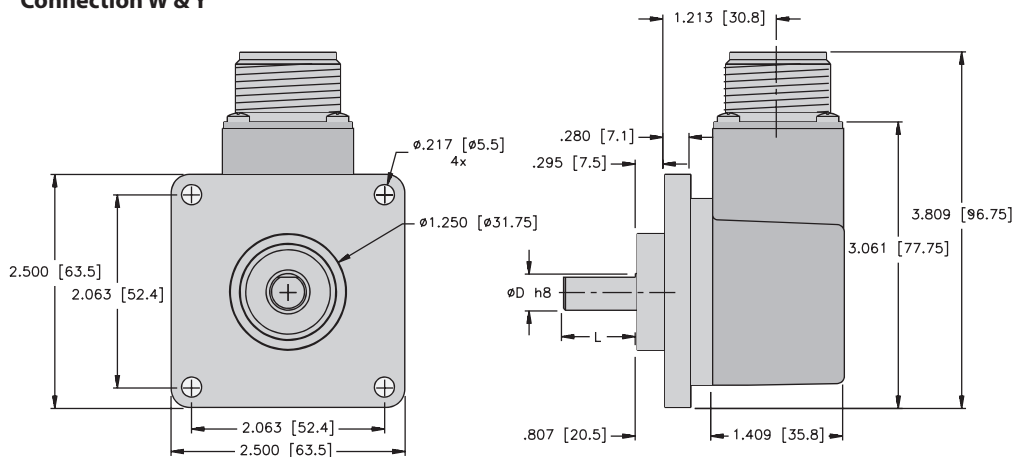
#### 5000 flange 1 & Connection 3 & 4



#### 5000 flange 3 & Connection 1 & 2



#### 5000 flange C & Connection W & Y



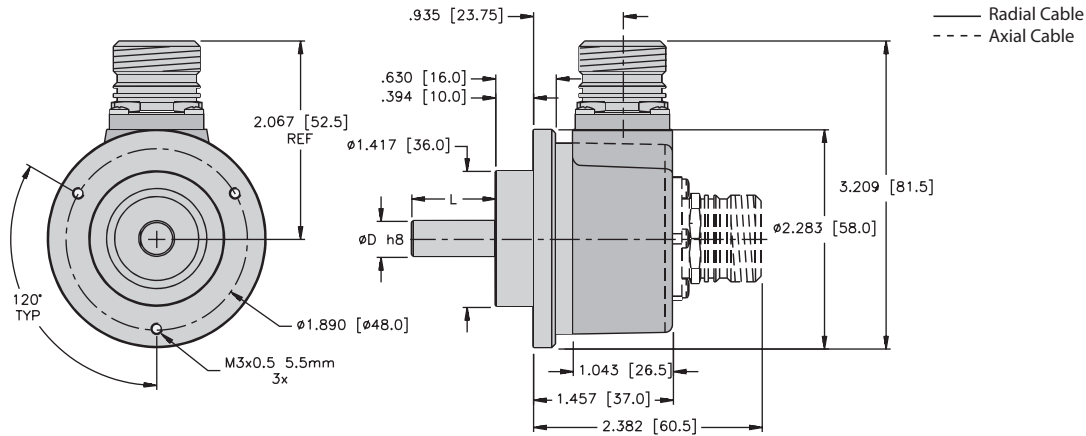
#### Mounting advice:

The flanges and shafts of the encoder and drive should not be rigidly coupled together at the same time. We recommend the use of suitable couplings (see page G1, Accessories).

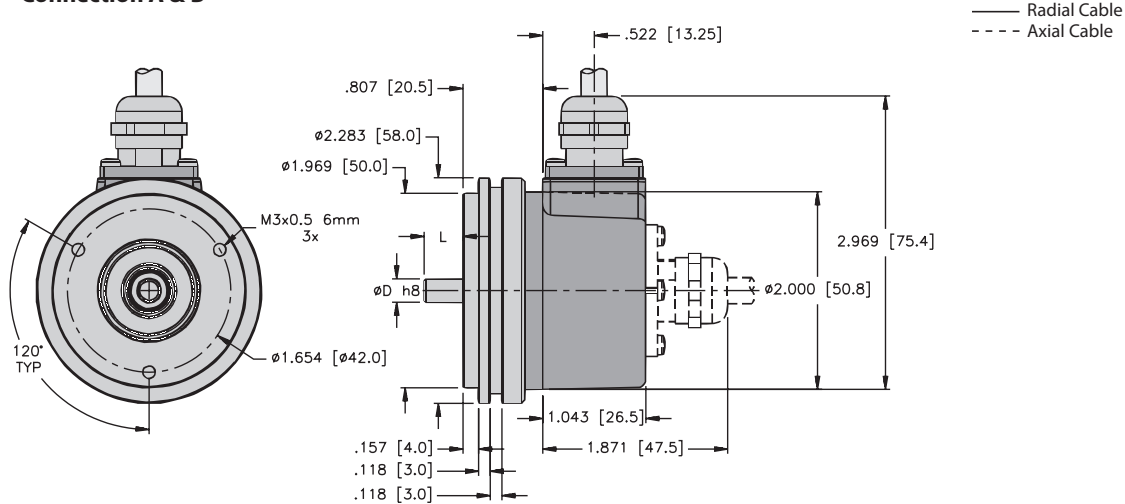
**Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)**

**Dimensions: 5000 shaft version**

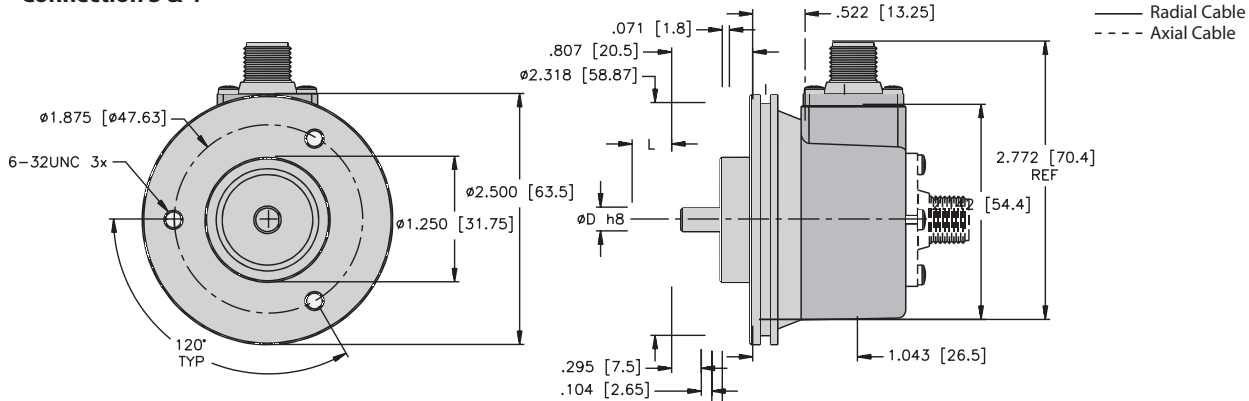
**5000 flange 7 & Connection 7 & 8**



**5000 flange A & Connection A & B**



**5000 flange E & Connection 3 & 4**



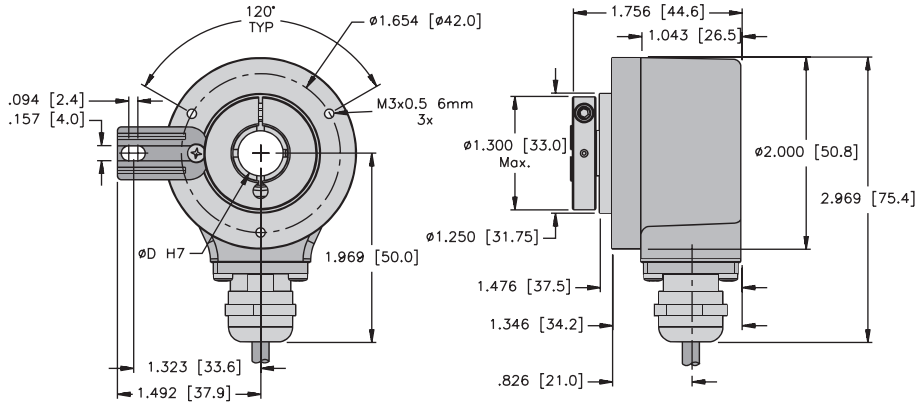
**Mounting advice:**

The flanges and shafts of the encoder and drive should not be rigidly coupled together at the same time. We recommend the use of suitable couplings (see page G1, Accessories).

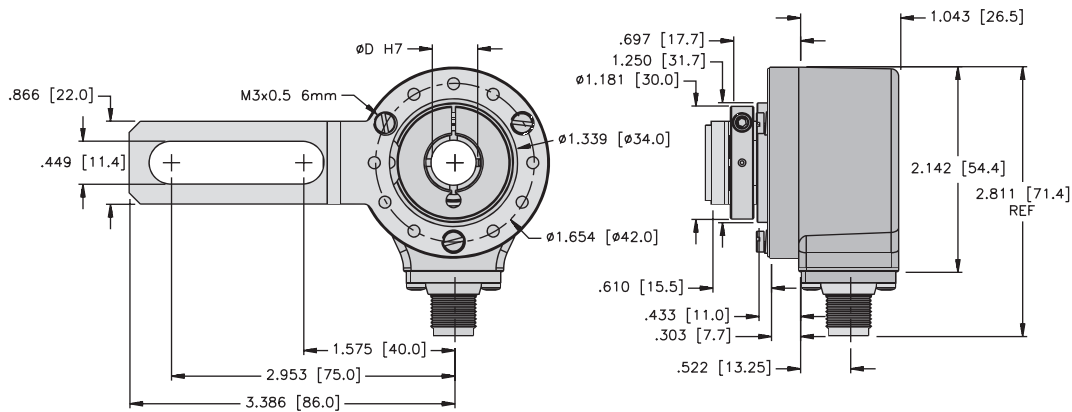
### Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)

Dimensions: 5020 hollow shaft version

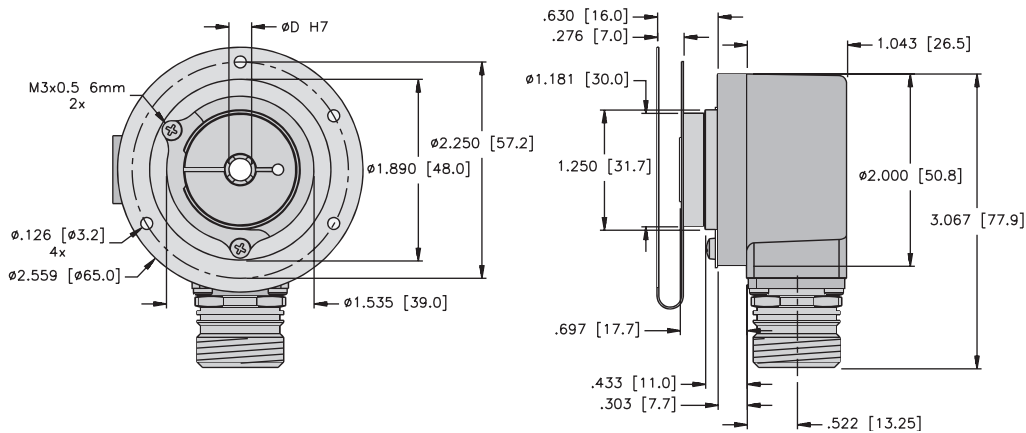
#### 5020 flange 1 & Connection 1



#### 5020 flange 3 & Connection 2



#### 5020 flange 5 & Connection 4

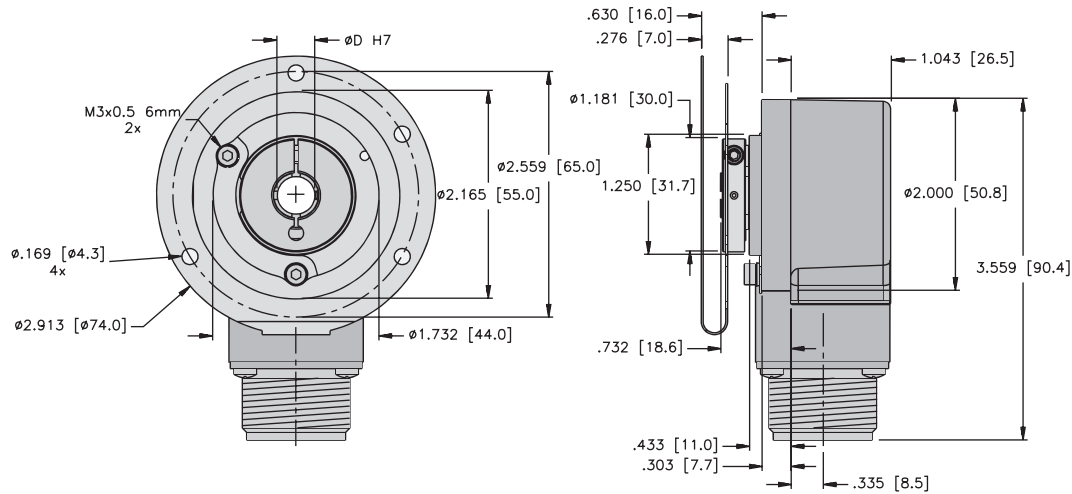


Incremental Encoders

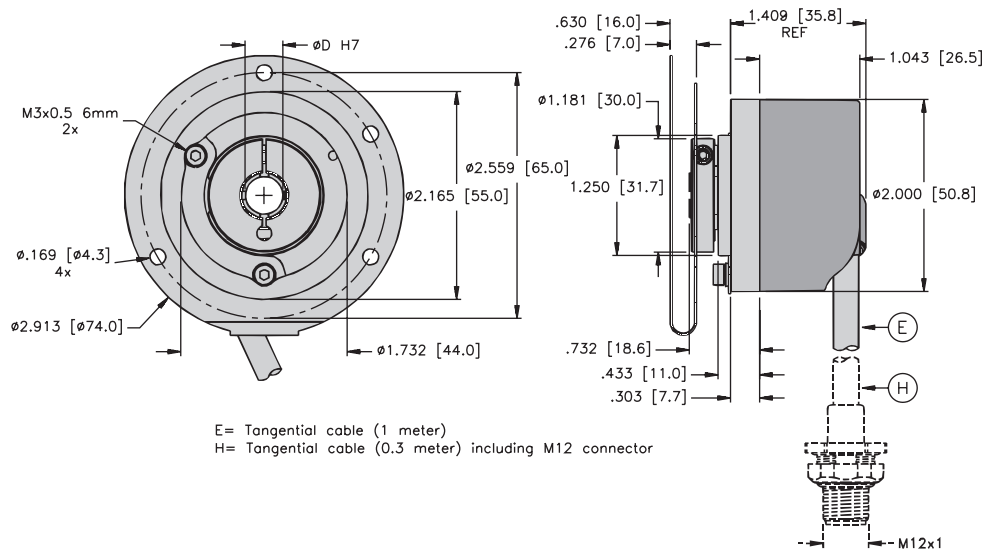
**Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)**

**Dimensions: 5020 hollow shaft version**

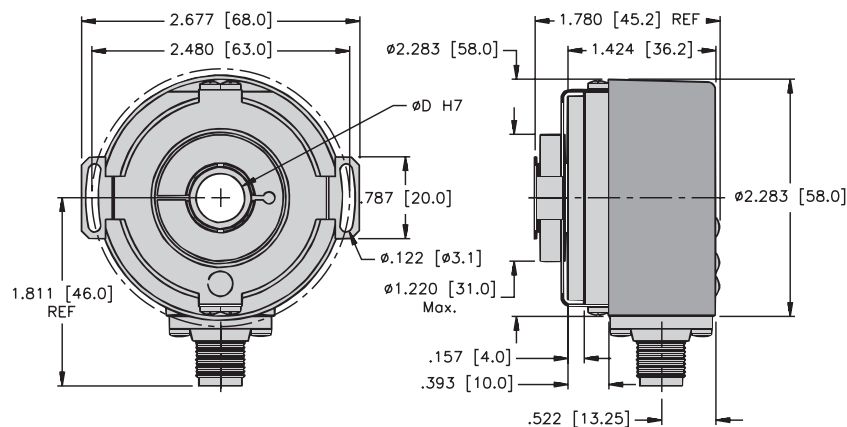
**5020 flange 7 & Connection 7**



**5020 flange 7 & Connection E, H**



**5020 flange C & Connection 2**



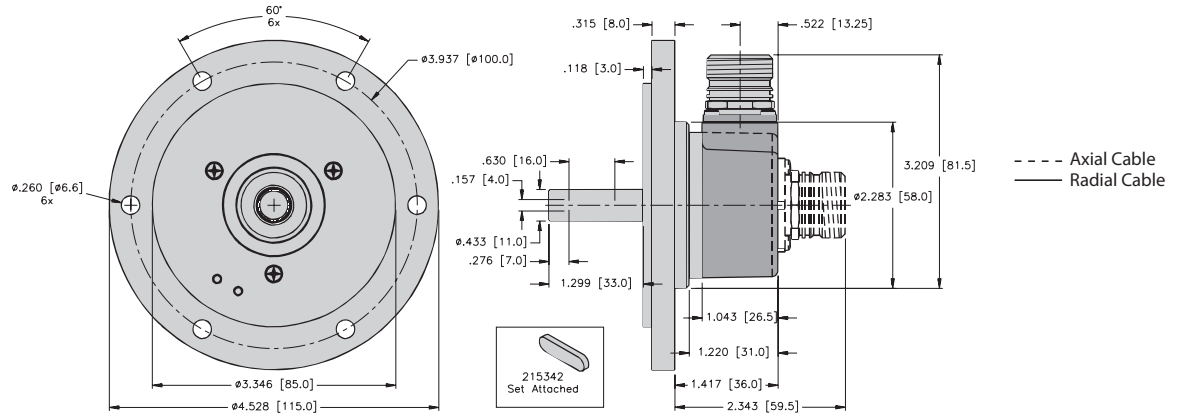
# Rotary Position Technology Incremental Encoders



## Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)

Dimensions: 5000 shaft version

5000 flange  
Connection 7 & 8



Incremental Encoders