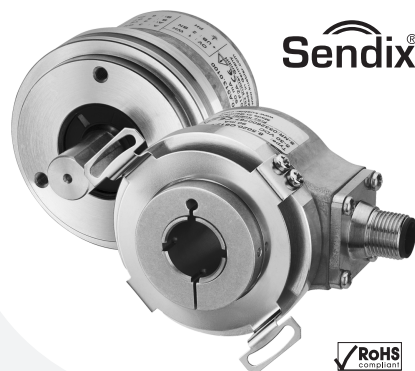


Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)



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 ¹⁾ :	max. 12,000 RPM	Weight:	approx. 0.9 lbs (0.4 kg)
Speed IP67 ²⁾ :	max. 6,000 RPM	Protection acc. to EN 60 529 without shaft sealing:	IP65
Rotor moment of inertia:	Shaft: approx. 0.098 oz-in ² (1.8 x 10 ⁻⁶ kgm ²)	Protection acc. to EN 60 529 with shaft sealing:	IP67
	Hollow shaft: approx. 0.328 oz-in ² (6.0 x 10 ⁻⁶ kgm ²)	Ex approval for hazardous areas:	optional zone 2 and 22
Starting torque:	< 1.4 oz-in (< 0.01 Nm), IP65 < 7 oz-in (< 0.05 Nm), IP67	Working temperature:	-40 to +185°F (-40 to +85°C)
Radial load capacity of the shaft:	18 lbs (80 N)	Shaft:	stainless steel
Axial load capacity of the shaft:	9 lbs (40 N)	Shock resistance acc. to EN 60068-2-27:	250 g (2,500 m/s ²), 6 ms
		Vibration resistance to EN 60068-2-6:	10 g (100 m/s ²), 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) ³⁾	Open collector (3) (7273) ³⁾
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 _r :	max. 200 ns	max. 200 ns	max. 1 μs	max. 1 μs	
Fall time t _f :	max. 200 ns	max. 200 ns	max. 1 μs	max. 1 μs	
Short-circuit proof outputs ¹⁾ :	yes ^{2) 4)}	yes ^{2) 4)}	yes	yes ^{2) 4)}	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

¹⁾ If supply voltage correctly applied

²⁾ 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.)

³⁾ Max. recommended cable length 30 m

⁴⁾ 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 ¹⁾ Sens	+V ²⁾ 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

¹⁾ 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.
²⁾ 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 *



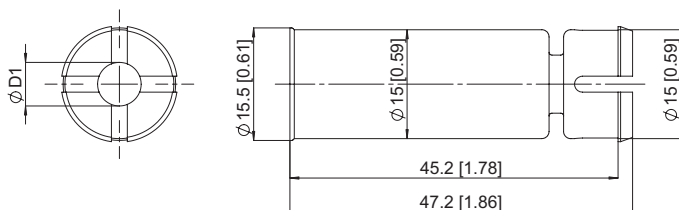
Thermal and electrical isolation of the encoders:

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.

Type	
Flange - 2" (50 mm)	1 = servo flange w/shaft seal (IP67) 2 = servo flange 3 = square flange w/shaft seal (IP67) 4 = square flange
Flange - 58 mm	7 = clamping flange w/shaft seal (IP67) 8 = clamping flange A = servo flange w/shaft seal (IP67) B = servo flange
Flange - 2.5" (63.5 mm) and euro (115 mm)	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) ²⁾
Shaft options for 2" 50 mm and 58 mm flange	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
Shaft options for 2.5" flange (63.5 mm) and euro (115 mm)	1 = Ø 6 mm x 10 mm 3 = Ø 10 mm x 20 mm 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 ³⁾

Optional cable length	0050 = 5 meters ¹⁾
Special connector pin configuration	See page E15
capacitor	0 = standard A = no bypass capacitor (vector motor) (only valid with output codes 1, 3, 4, 5)
Special output signal formats	See page E62
Pulse rate	See below
Connection type	1 = axial cable (1 meter) 2 = radial cable (1 meter) 3 = axial 8-pin M12 euromfast ® connector 4 = radial 8-pin M12 euromfast connector 7 = axial 12-pin M23 multifast ® connector 8 = radial 12-pin M23 multifast 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
Input / output circuit	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)

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

Part number key: 5020 hollow shaft version

T8.5020.XXXX.XXXX.PXXXX.XXXX

Options for special output only.

Type	
Flange - 2"	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)
Bore	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
Input / output circuit	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)

Optional cable length	0050 = 5 meters ¹⁾
Special connector pin configuration	See page E15
Capacitor	0 = standard A = no bypass capacitor (vector motor) (only valid with output codes 1, 3, 4, 5)
Special output signal formats	See page E62
Pulse rate	See below
Connection type	1 = radial cable (1 meter) 2 = radial 8-pin M12 euromfast connector 4 = radial 12-pin M23 multifast 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 euromfast connector

* Requires 4 mm torque pin
¹⁾ 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

Rotary Position Technology

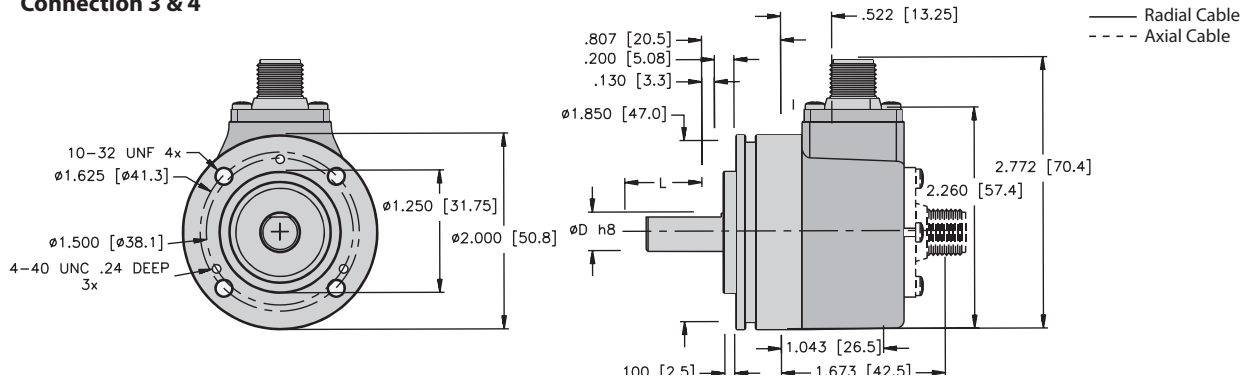
Incremental Encoders



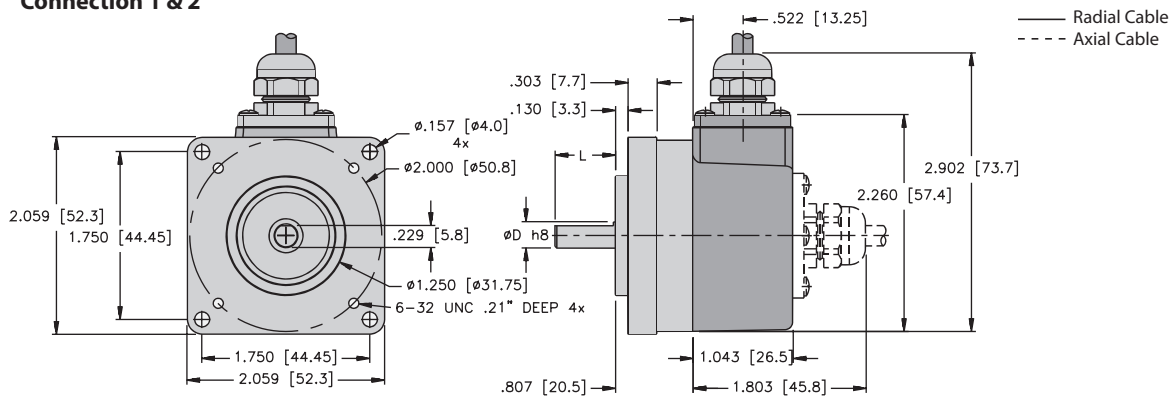
Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)

Dimensions: 5000 shaft version

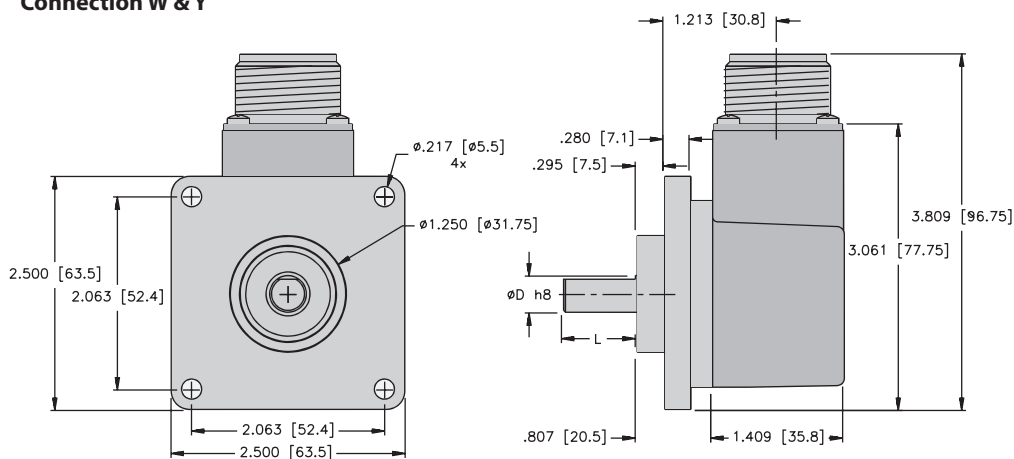
5000 flange 1 & 2
Connection 3 & 4



5000 flange 3 & 4
Connection 1 & 2



5000 flange C & D
Connection W & Y



Mounting advice:

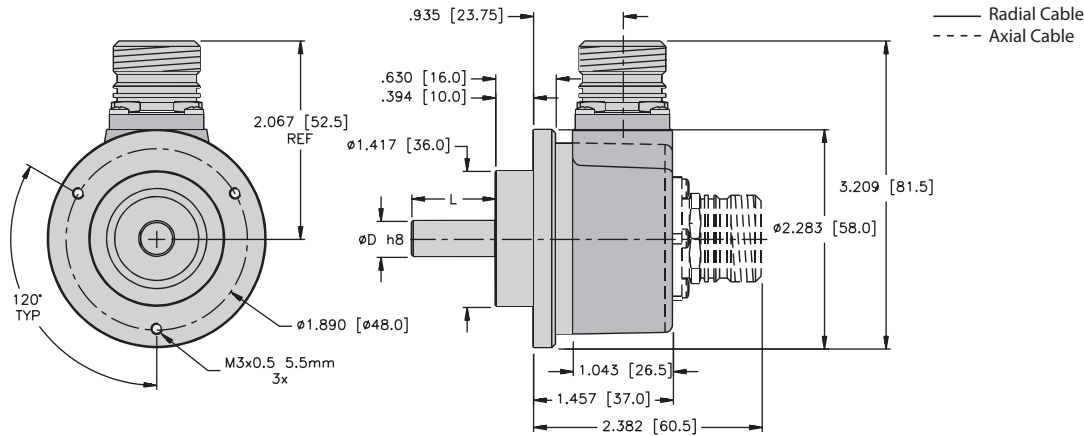
The flanges and shafts of the encoder and drive should not be rigidly coupled together at the same time. We recommend the use of suitable couplings (see page G1, Accessories).

Incremental Encoders

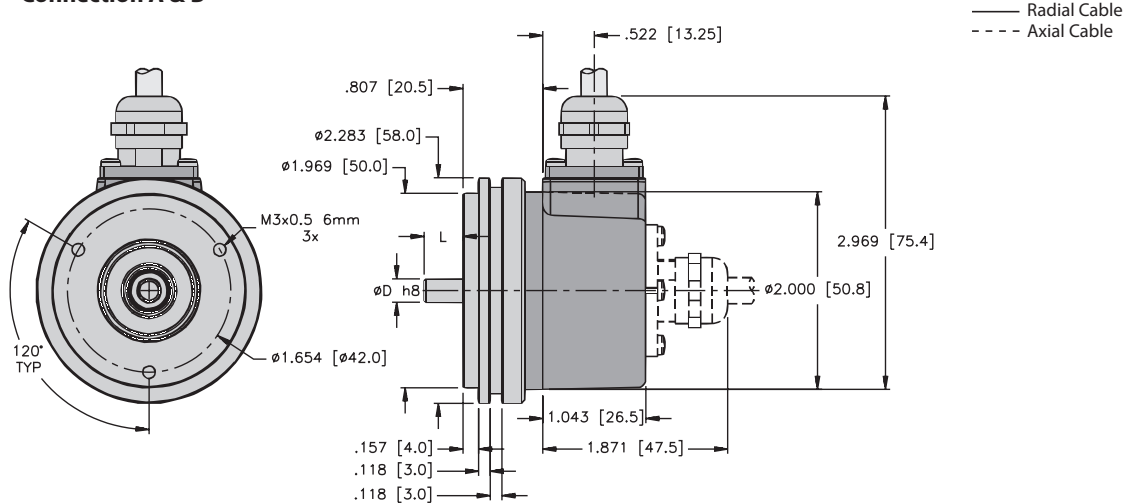
Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)

Dimensions: 5000 shaft version

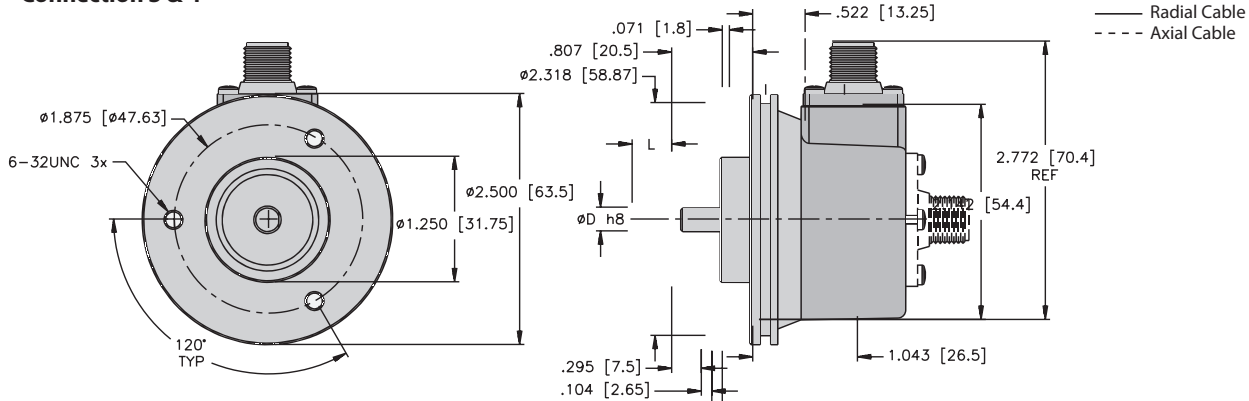
5000 flange 7 & 8
Connection 7 & 8



5000 flange A & B
Connection A & B



5000 flange E & F
Connection 3 & 4



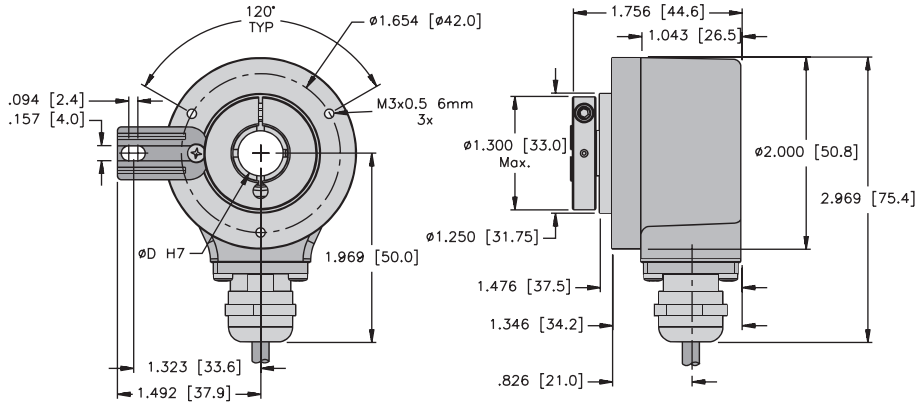
Mounting advice:

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).

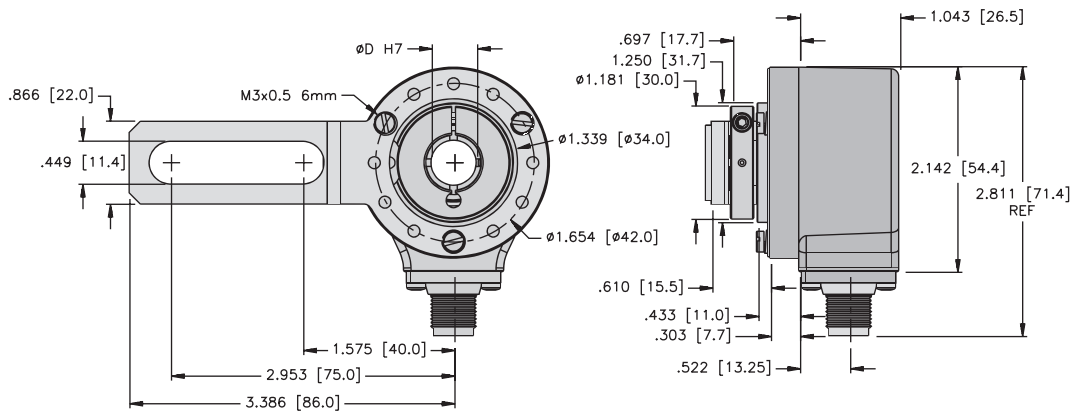
Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)

Dimensions: 5020 hollow shaft version

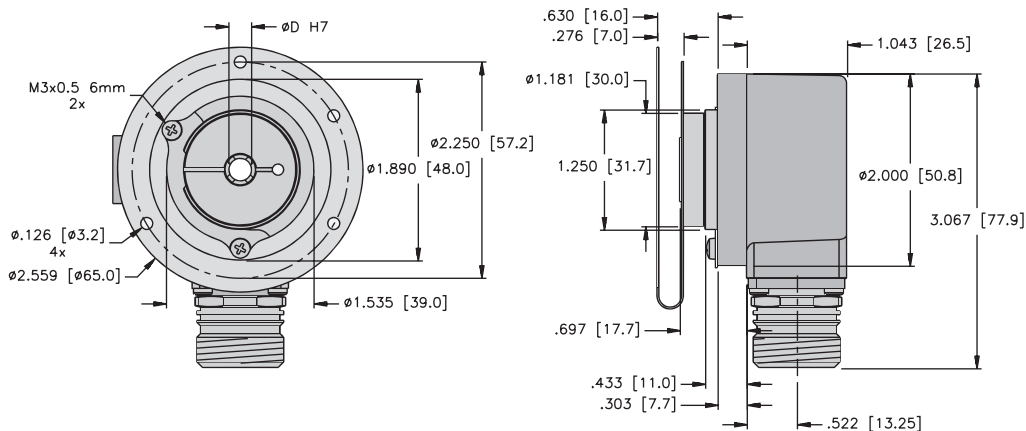
5020 flange 1 & 2 Connection 1



5020 flange 3 & 4 Connection 2



5020 flange 5 & 6 Connection 4

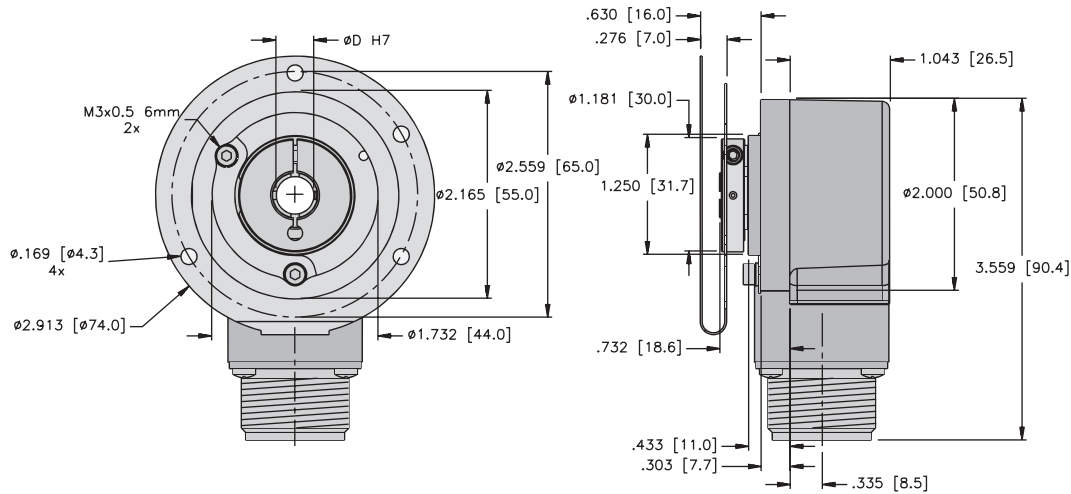


Incremental Encoders

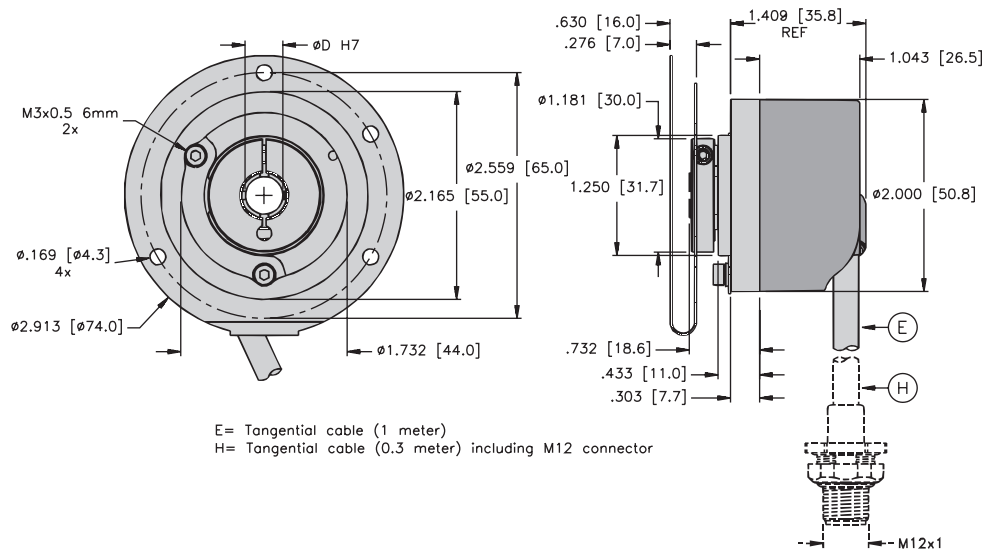
Sendix incremental type 5000 (shaft) / 5020 (hollow shaft)

Dimensions: 5020 hollow shaft version

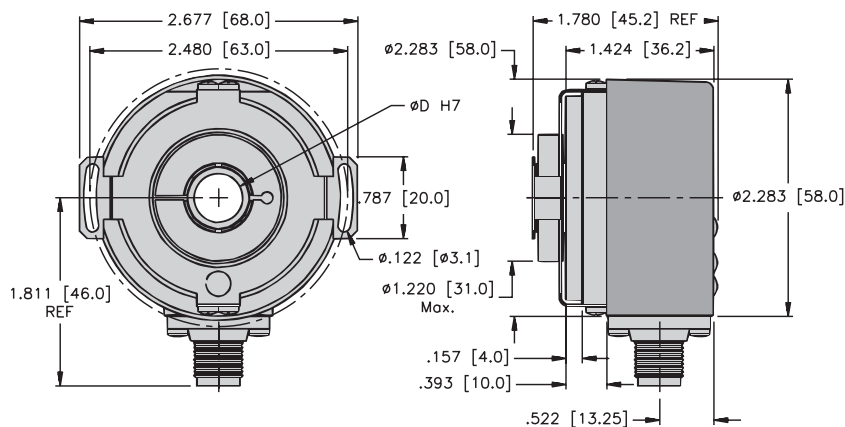
5020 flange 7 & 8
Connection 7



5020 flange 7 & 8
Connection E, H



5020 flange C & D
Connection 2



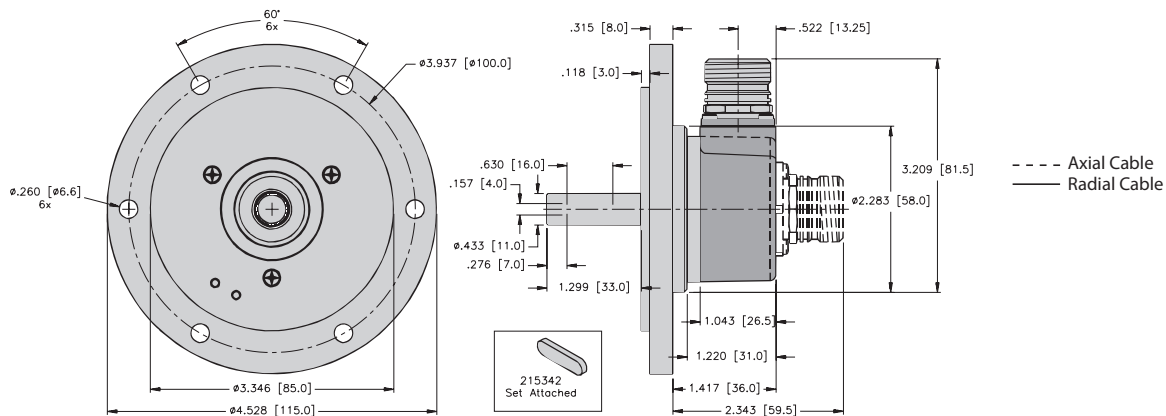
Rotary Position Technology Incremental Encoders



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

Dimensions: 5000 shaft version

5000 flange G
Connection 7 & 8



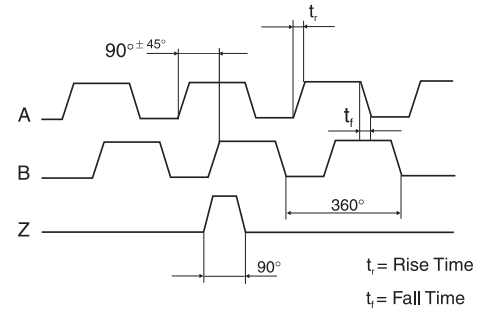
Incremental Encoders

Wave Forms

Outputs

All Kübler by TURCK encoders come standard with six channels where A leads B in the clockwise direction and the standard index is gated with A & B. The tolerance of the wave form affects the control and, in some cases, may affect the smoothness of system operation.

Wave Form Tolerances



<p>A leads B when the shaft is turned in the clockwise direction viewing the shaft or collet end.</p> <p>This is the Kübler by TURCK standard. This format applies to the pin key codes listed below.</p>		<p>B leads A when the shaft is rotated in the clockwise direction viewing the shaft or collet end.</p> <p>This format applies to the pin key codes listed below.</p>	
<p>A leads B, Z gated with A & B. This is the Kübler by TURCK standard. Z is 90° wide.</p>		<p>Code 04: B leads A, Z gated with A & B. Z is 90° wide.</p>	
<p>Code 01: A leads B, Z gated with B. Z is 180° wide.</p>		<p>Code 05: B leads A, Z gated with B. Z is 180° wide.</p>	
<p>Code 02: A leads B, Z gated with A. Z is 180° wide.</p>		<p>Code 06: B leads A, Z gated with A. Z is 180° wide.</p>	
<p>Code 03: A leads B, Z ungated. Z is 330° to 360° wide.</p>		<p>Code 07: B leads A, Z is ungated. Z is 330° to 360° wide.</p>	
<p>Code 08: A leads B, Z is 180° wide.</p>		<p>Code 09*: B leads A, Z gated with B. Z is 180° wide.</p>	
<p>Code 13*: A leads B, Z gated with B. Z is 180° wide.</p>		<p>Code 10: B leads A, Z is a negative marker gated with B. Z is 180° wide.</p>	
<p>Code 11: A leads B, Z is a minimum with of 270° (electrical degrees).</p>		<p>Code 12: B leads A. Z has a minimum width of 270°.</p>	

Note: * For 50XX encoders, Z is 160° Wide