E4T Miniature Optical Kit Encoder

E4T Features

- Push-on hub - spring loaded collet design
- Minimum shaft length of .275 in.
- Fits shaft diameters of .079 in. to .250 in.
- 100 to 1,000 cycles per revolution (CPR)
- 400 to 4,000 pulses per revolution (PPR)
- Single +5V supply

E4T Product Description

The E4T miniature transmissive optical encoder is designed to provide digital quadrature encoder feedback for high volume, limited space applications. The E4T is designed to be a drop-in replacement for the E4P and offers higher maximum speed and increased output drive. The E4T utilizes an innovative, push-on encoder disk that accepts shaft diameters of 2.0mm to .250 in.

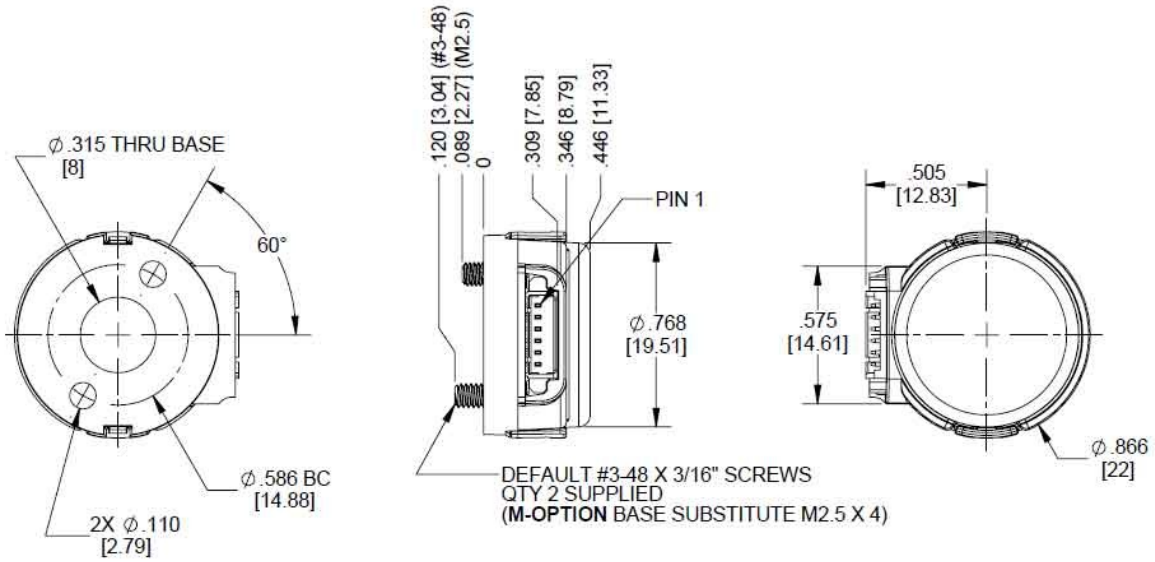
The single-ended output version is connected using a 4-conductor, high retention, polarized, 1.25mm pitch connector. The differential output version uses a similar 6-pin connector. Mating cables and connectors (see the Cables/Connectors web page) are not included and are available separately.

Please Note: Due to the E4T's push-on hub design, it is recommended for use as a one-time installation.

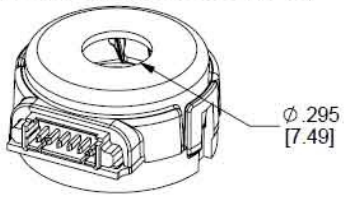
Mechanical Drawings

E4T Differential Optical Kit Encoder

RELEASE DATE: 07/30/2020

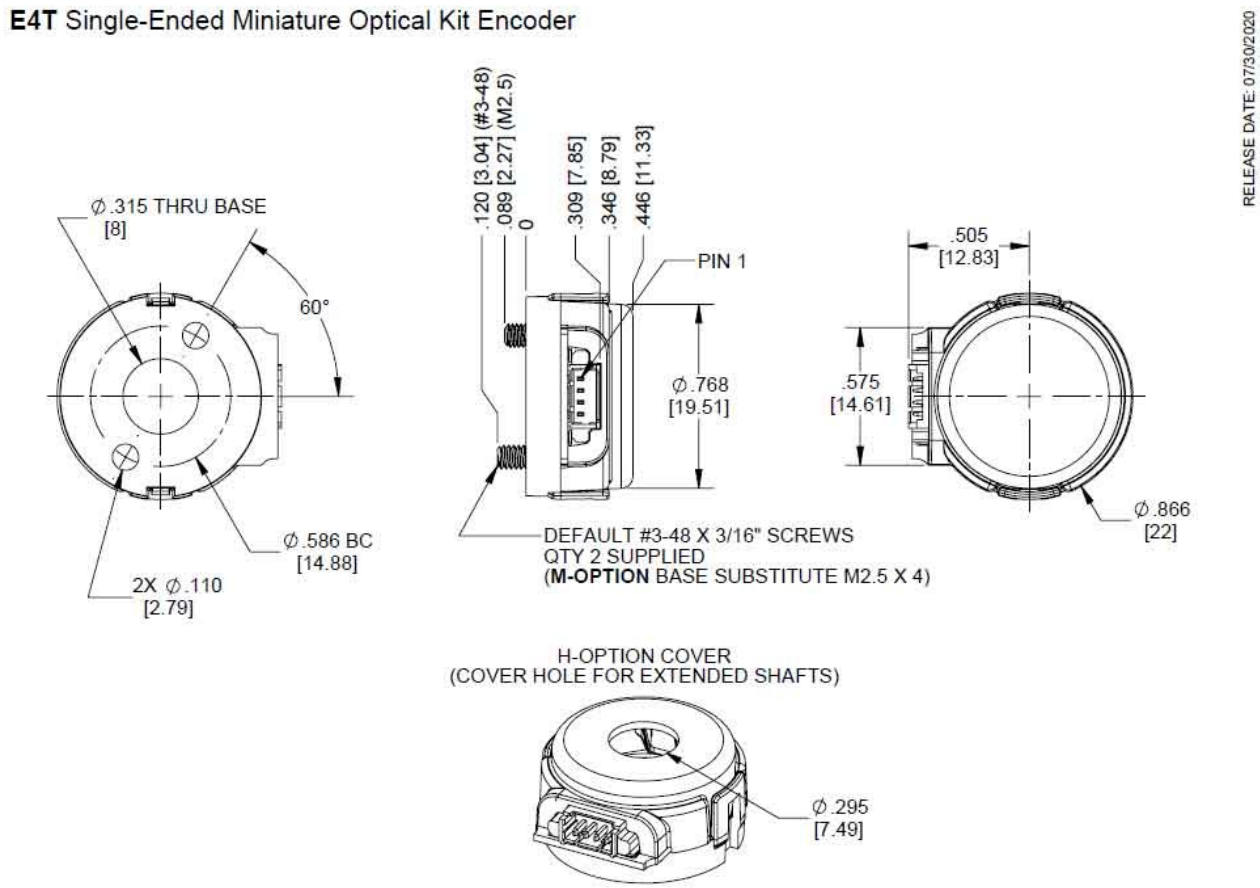


H-OPTION COVER
(COVER HOLE FOR EXTENDED SHAFTS)



US DIGITAL
1400 NE 136th Avenue
Vancouver, Washington 98684, USA
info@usdigital.com
www.usdigital.com
Local: 360.260.2468
Toll-free: 800.736.0194

UNITS: INCHES [MM]
METRIC SHOWN FOR REFERENCE ONLY



Specifications

ENVIRONMENTAL

PARAMETER	VALUE	UNITS
Operating Temperature	-20 to 100	C
Electrostatic Discharge, IEC 61000-4-2 Single-ended (-S option) Differential (-D option)	 ± 12 ± 7	 kV
Vibration (10Hz to 2kHz, sinusoidal)	20	G
Shock (6 milliseconds, half-sine)	75	G

MECHANICAL

PARAMETER	VALUE	UNITS
Max. Shaft Axial Play	± .010	in.
Max. Shaft Runout (TIR)	.002	in.
Max. Acceleration	250,000	rad/sec²
Maximum RPM (1)	minimum value of ((6 x 10^6)/CPR) and (60000)	RPM
Maximum A/B Frequency e.x. CPR = 200, Max. RPM = 30000	100	kHz
Max. Codewheel Moment of Inertia	5.1 x 10^-7	oz-in-s²
Mounting Screw Size Default (D-option base) Metric (M-option base)	#3-48 x 3/16" M2.5, length 4mm	
Screw Bolt Circle Diameter	.586 ±.005	in.
Minimum Shaft Length (2)	.275	in.
Maximum Shaft Length (2)	.395 (D option) / no limit (H option)	in.
Mounting Screw Torque	2-3	in-lbs
Technical Bulletin TB1001 - Shaft and Bore Tolerances		Download *(https://www.usdigital.com/support/resources/reference/technical-docs/technical-bulletins/shaft-and-bore-tolerances-tb1001/)*

(1) 60000 RPM is the maximum rpm due to mechanical considerations. The maximum RPM due to the module's maximum frequency response is dependent upon the module's resolution (CPR).

(2) Including axial play.

SINGLE-ENDED ELECTRICAL

SPECIFICATIONS	MIN.	TYP.	MAX.	UNITS	NOTES
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		25	30	mA	CPR ≤ 500, no load
		34	42	mA	CPR > 500, no load
Low-level Output			0.4	V	CPR ≤ 500, I_{OL}= 8 mA
					CPR > 500, I_{OL}= 5 mA
		0.035		V	no load
High-level Output	2.4			V	CPR ≤ 500, I_{OH}= -8 mA
					CPR > 500, I_{OH}= -5 mA
		4.0		V	no load
Output Rise Time		100		ns	no load
Output Fall Time		50		ns	no load

DIFFERENTIAL ELECTRICAL

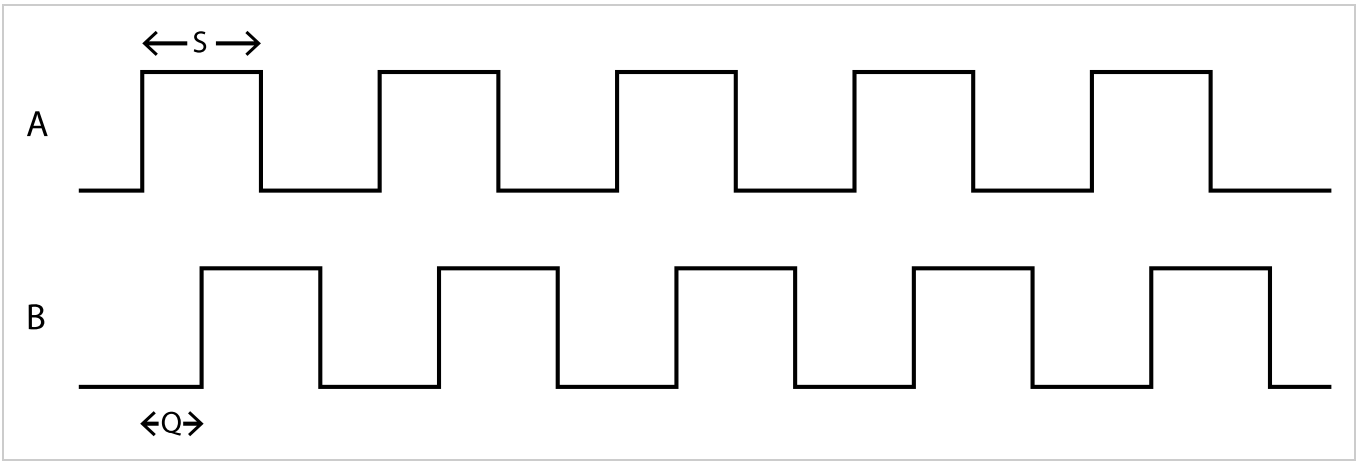
SPECIFICATIONS	MIN.	TYP.	MAX.	UNITS	NOTES
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		27	32	mA	CPR ≤ 500, no load
		36	44	mA	CPR > 500, no load
Single-Ended Output Voltage High	4.75	5.0		V	Min. @ 25mA load, Typ. @ no load
Single-Ended Output Voltage Low		0.25	0.60	V	Typ. @ no load, Max. @ 4.5mA load
Differential Output Voltage	3.0	3.8		V	RL = 100 ohm
Differential Output Rise/Fall Time			20	ns	

1400 NE 136th Ave.
Vancouver, WA 98684
USA

info@usdigital.com
sales@usdigital.com
support@usdigital.com

Toll Free: **800.736.0194**
Worldwide: **360.260.2468**
Support: **360.397.9999**

PHASE RELATIONSHIP



PARAMETER	MIN.	TYP.	MAX.	UNITS
Symmetry, S	105	180	255	electrical degrees
Quadrature Delay, Q	30	90	150	electrical degrees

(1) A leads B for clockwise shaft rotation, B leads A for counter clockwise shaft rotation viewed from the cover side of the encoder.

(2) Typical values represent the encoder performance at typical mounting alignment, whereas the maximum values represent the encoder performance across the range of recommended mounting tolerance.

PIN-OUT

4-PIN SINGLE-ENDED (1)		6-PIN DIFFERENTIAL (2)	
Pin	**Description**	**Pin**	**Description**
1	+5VDC power	1	Ground
2	A channel	2	A channel
3	Ground	3	A- channel
4	B channel	4	+5VDC power
		5	B channel
		6	B- channel

(1) 4-pin single-ended mating connector is CON-MIC4 *(https://www.usdigital.com/products/accessories/connectors/con-mic4/)*
(2) 6-pin differential mating connector is CON-MIC6 *(https://www.usdigital.com/products/accessories/connectors/con-mic6/)*

OPTIONS

H-OPTION (HOLE IN COVER)

The **H**-option adds a 0.295" diameter hole in the cover for the shaft to pass through.

M-OPTION (METRIC MOUNTING SCREWS)

Provides alternate metric M2.5, length 4mm screws. When **M**-option is NOT specified the default is #3-48 x 3/16" screws.

ACCESSORIES

1. Centering Tool*

Part #: MCTOOL - (Shaft Diameter)
Description: This reusable tool is used to accurately center the **E4T** base on the shaft.

2. Spacer Tool*

Part #: SPACER-E4T
Description: This reusable tool is used to properly space the codewheel from the encoder.

**Both the MCTOOL and SPACER-E4T tools are included with all packaging options.*

3. Screws

Part #: SCREW-348-188-PH
Description: Pan Head, Philips #3-48 UNC x 3/16"
Use: Base Mounting
Quantity Required: 2
Screws are included with default base option

Part #: SCREW-M25-4MM-BH
Description: Button Head Cap, M2.5 x 0.45 x 4mm
Use: Base Mounting
Quantity Required: 2
Screws are included with metric base option

Notes

- Cables and connectors are not included and must be ordered separately.
- US Digital® warrants its products against defects in materials and workmanship for two years. See complete warranty *(https://www.usdigital.com/company/warranty)* for details.

Configuration Options

E4T	-	CPR (Cycles Per Revolution)	-	Bore Size	-	Output	-	Cover	-	Base	-	Packaging
		100		079 (*2.0mm*)		S (*Single-Ended*)		D (*Default*)		D (*Default*)		B (*Encoders packaged in bulk. Every order includes one centering tool and spacer tool. An additional set of tools is included for each 100 encoders ordered.*)
		108		091 (*2.3mm*)		D (*Differential*)		H (*Through-Hole*)		M (*Metric Screws*)		1 (*Encoders packaged individually. Every order includes one centering tool and spacer tool. An additional set of tools is included for each 100 encoders ordered.*)
		120		098 (*2.5mm*)								2 (*Encoders packaged individually. Every order includes one centering tool and spacer tool per encoder.*)
		125		118 (*3.0mm*)								
		128		125 (*1/8"*)								
		144		156 (*5/32"*)								
		200		157 (*4.0mm*)								
		248		188 (*3/16"*)								
		250		197 (*5.0mm*)								
		256		236 (*6.0mm*)								
		296		250 (*1/4"*)								
		300										
		360										
		400										
		500										
		512										
		720										
		800										
		1000										

PLEASE NOTE: This chart is for informational use only. Certain product configuration combinations are not available. Visit the E4T product page *(https://www.usdigital.com/products/E4T)* for pricing and additional information.