E16 Features



- Push-on hub - spring loaded collet design
- Fits shaft diameters of 1.5mm (0.059 in.) and 2mm (0.079 in.)
- 250/256 to 4,000/4096 cycles per revolution (CPR)
- 1,000/1024 to 16000/16384 pulses per revolution (PPR)
- Single +5V supply

E16 Product Description

The E16 16mm micro optical encoder is designed to provide A, B and Index digital quadrature signals for high volume, restricted space applications. The E16 utilizes an innovative, push-on encoder disk which accepts shaft diameters of 1.5mm and 2mm.

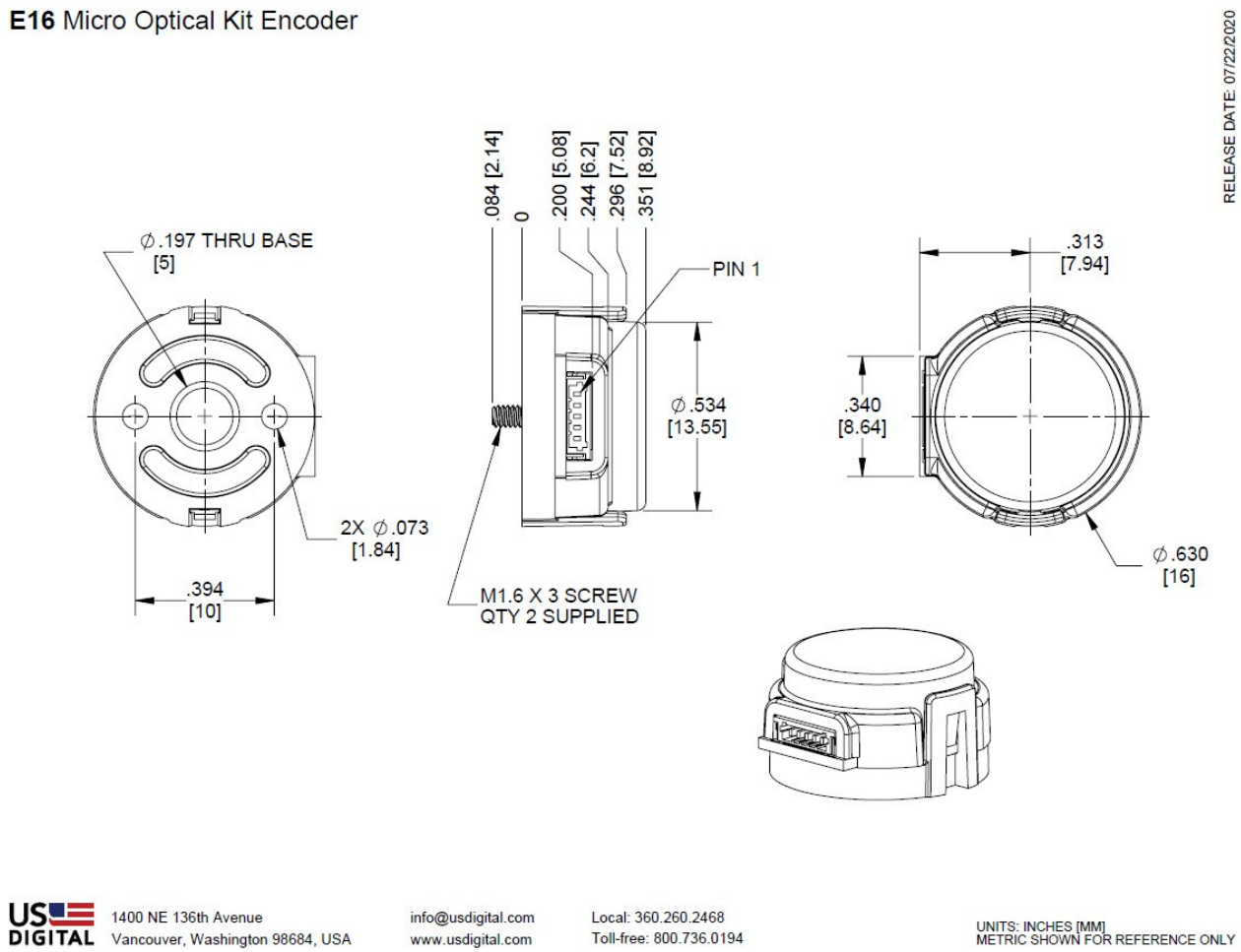
RoHS COMPLIANT

The E16 is designed to be a one-time installation micro optical encoder, the base provides mounting holes for two M1.6-0.35, length 3mm screws on a 10mm bolt circle. The encoder cover is easily snapped onto the base and is marked with the connector pin-out.

The E16 series encoder is connected using a 5-conductor, polarized, 0.8mm pitch connector (Hirose part number DF52-5P-0.8C). Mating cable (see the Cables web page) is not included and is available separately.

Please Note: Due to the E16's design, it is recommended for use as a one-time installation.

Mechanical Drawings



Specifications

ENVIRONMENTAL

PARAMETER	VALUE	UNITS
Operating Temperature	-40 to 100	C
Electrostatic Discharge, IEC 61000-4-2	±12	kV
Vibration (10Hz to 2kHz, sinusoidal)	20	G
Shock (6 milliseconds, half-sine	75	G

MECHANICAL

PARAMETER	VALUE	UNITS
Max. Shaft Axial Play	±0.010	in.
Max. Shaft Runout	0.002 T.I.R.	in.
Max. Acceleration	250000	rad/sec^2
Maximum RPM, CPR = 250/500/1000/2000	48000	RPM
Maximum RPM, CPR = 256/512/1024/2048	46875	RPM
Maximum RPM, CPR = 4000	27750	RPM
Maximum RPM, CPR = 4096	27099	RPM
Codewheel Moment of Inertia	2.8 x 10^{-7}	oz-in-s^2
Mounting Screw Size Default (D-option base)	 M1.6 x 3	mm
Screw Bolt Circle Diameter	10 ±0.13	mm
Minimum Shaft Length (1)	6	mm
Maximum Shaft Length (1)	7.75	mm
Mounting Screw Torque	1-2	in-lbs
Technical Bulletin TB1001 - Shaft and Bore Tolerances		Download *(https://www.usdigital.com/media/yyvb4qsy/tb_1001.pdf)*

(1) Including axial play.

ELECTRICAL

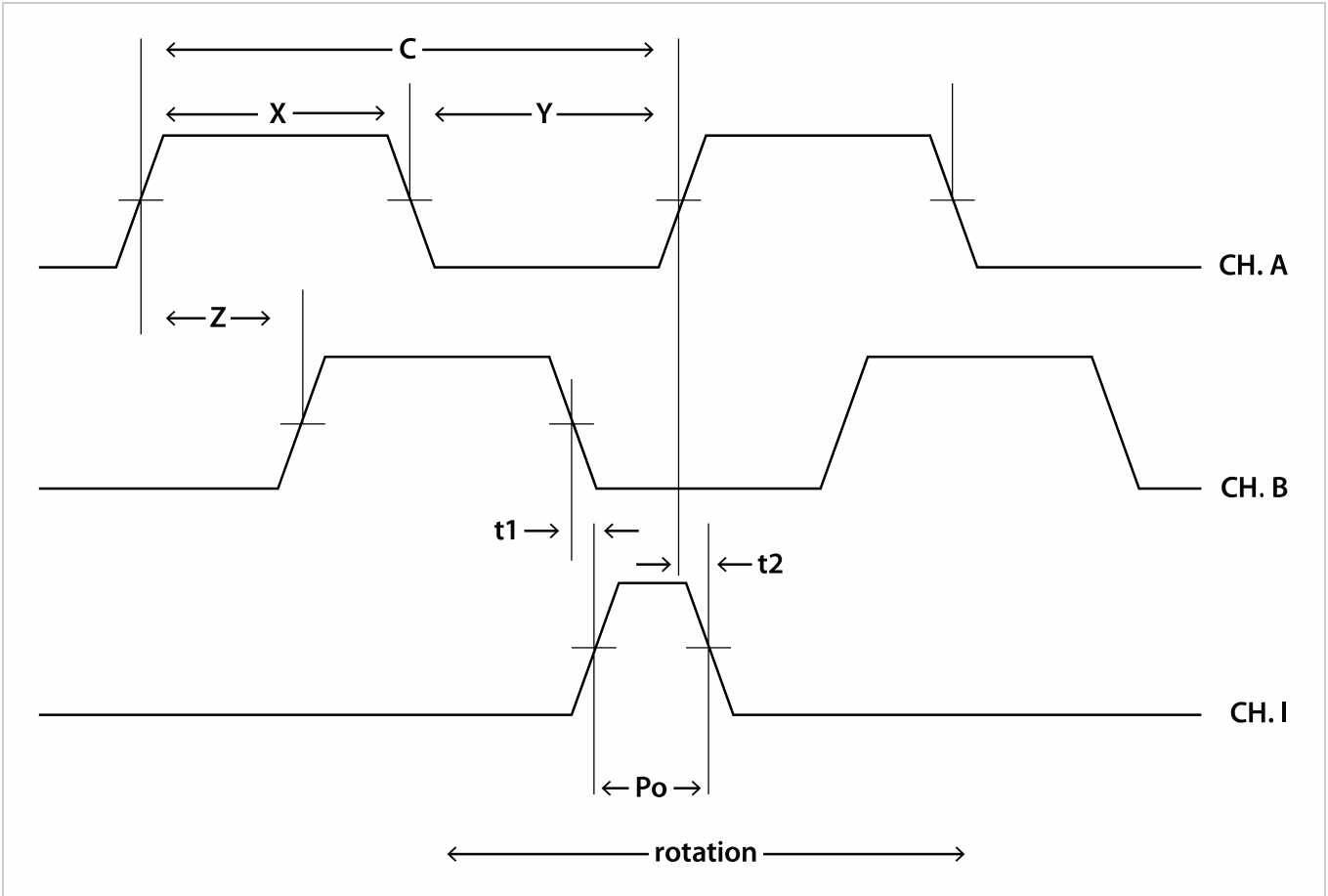
PARAMETER	MIN.	TYP.	MAX.	UNITS	NOTES
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		18	26	mA	no load
Low-level Output			0.4	V	I_{OL}= 4 mA, Vcc = 5V
		0.1		V	no load
High-level Output	4.7			V	I_{OH}= 4 mA, Vcc = 5V
		4.9		V	no load
Output Rise Time		80	135	ns	no load
Output Fall Time		80	135	ns	no load
Maximum Output Frequency					
250/256 CPR	0.2			MHz	
500/512 CPR	0.4			MHz	
1,000/1,024 CPR	0.8			MHz	
2,000/2,048 CPR	1.6			MHz	
4,000/4,096 CPR	1.85			MHz	

PHASE RELATIONSHIP

- Specifications apply over the entire operating temperature range.
- Values are for the worst error over full rotation.
- Refer to the timing diagram below.

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS
Symmetry	X, Y	150	180	210	°e *(https://www.usdigital.com/support/resources/glossary#glossary_e)*
Quadrature	Z	60	90	120	°e *(https://www.usdigital.com/support/glossary/#glossary_e)*
Index Pulse Width	Po	60	90	120	°e *(https://www.usdigital.com/support/glossary/#glossary_e)*
Ch. I Rise After Ch. B or Ch. A Fall	t1		10		ns
Ch. I Fall After Ch. B or Ch. A Rise	t2		10		ns

TIMING DIAGRAM



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

PIN-OUT

PIN	DESCRIPTION
1	Ground
2	Index
3	A channel
4	+5VDC power
5	B channel

ACCESSORIES

1. CENTERING TOOL*

Part #: CTOOL-E16-(Shaft Diameter)

Description: This reusable tool is used to accurately center the **E16** base on the shaft.

2. SPACER TOOL*

Part #: SPACER-E16

Description: This reusable tool is used to properly space the codewheel from the encoder.

*Both the CTOOL and SPACER-E16 tools are included with all packaging options.

3. SCREWS

Part #: SCREW-M16-3MM-PH

Description: Pan Head, Philips M1.6-0.35, length 3mm.
Use: Base Mounting
Quantity Required: 2
Screws are included

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

E16	-	CPR (Cycles Per Revolution)	-	Bore Size	-	Output	-	Cover	-	Base	-	Packaging
		250		059 (*1.5mm*)		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.*)
		256		079 (*2.0mm*)								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.*)
		500										2 (*Encoders packaged individually. Every order includes one centering tool and spacer tool per encoder.*)
		512										
		1000										
		1024										
		2000										
		2048										
		4000										
		4096										

PLEASE NOTE: This chart is for informational use only. Certain product configuration combinations are not available. Visit the E16 product page *(https://www.usdigital.com/products/E16)* for pricing and additional information.

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E6-2000-375-IE-S-D-D-3