

E16 Features

- Miniature 16 mm kit version for mounting on a motor or other shaft
- Supports 1.5 mm (0.059 in.) and 2 mm (0.079 in.) shaft sizes
- For NEMA 6 and larger motors
- 10 Resolutions from 250 to 4,096 CPR (1,000 to 16,384 PPR)
- A/B/Index quadrature output
- Push-on hub for quick assembly
- Cable with polarized connector (sold separately)



US Digital E16 Motor Encoder Description

The E16 micro motor encoder is only 16 mm in diameter and mounts directly to a motor or other rotating shaft. This incremental encoder uses a specially patterned optical disk on a precision-machined aluminum hub.



This disk, in combination with a custom detector, creates a system highly tolerant to mechanical misalignment. A push-on hub design and a robust, glass-filled polymer housing provide easy installation in space-limited applications.

The E16 optical rotary encoder offers 10 resolutions and compatibility with two shaft sizes (1.5 mm and 2.0 mm). It comes standard with a two-channel quadrature output with index.

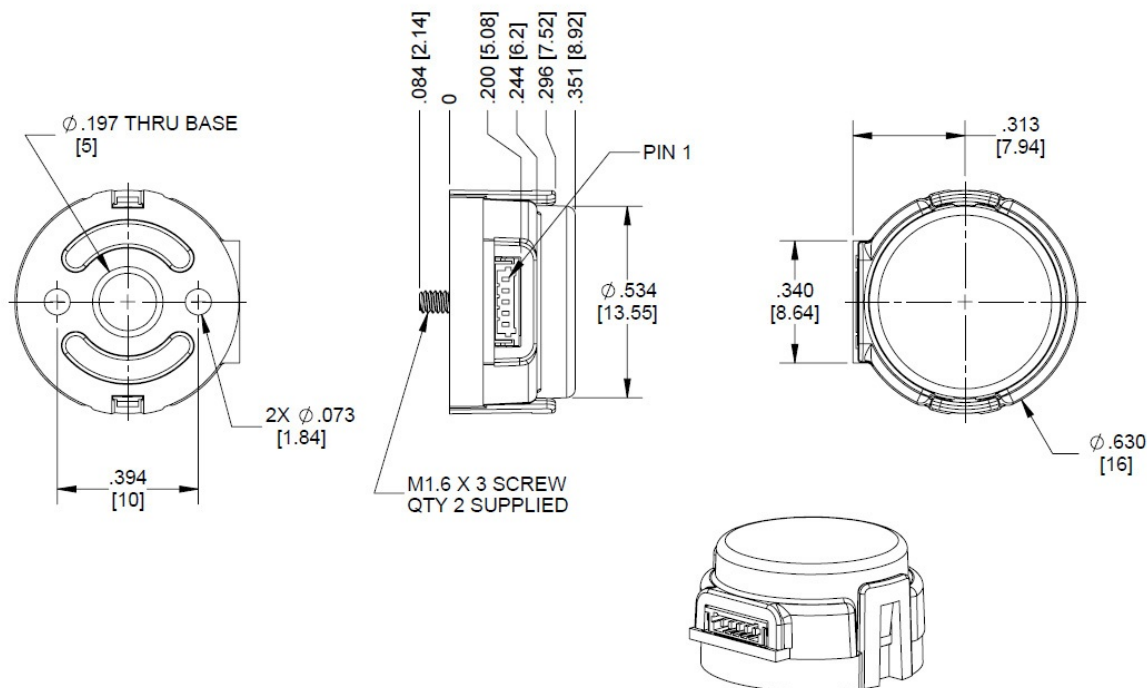
This optical rotary encoder is designed for use with a polarized connector. After making each selection in the Product Configurator, compatible cables will be displayed below and must be purchased separately.

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

Mechanical Drawings

E16 Micro Optical Kit Encoder

RELEASE DATE: 07/22/2020



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	-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

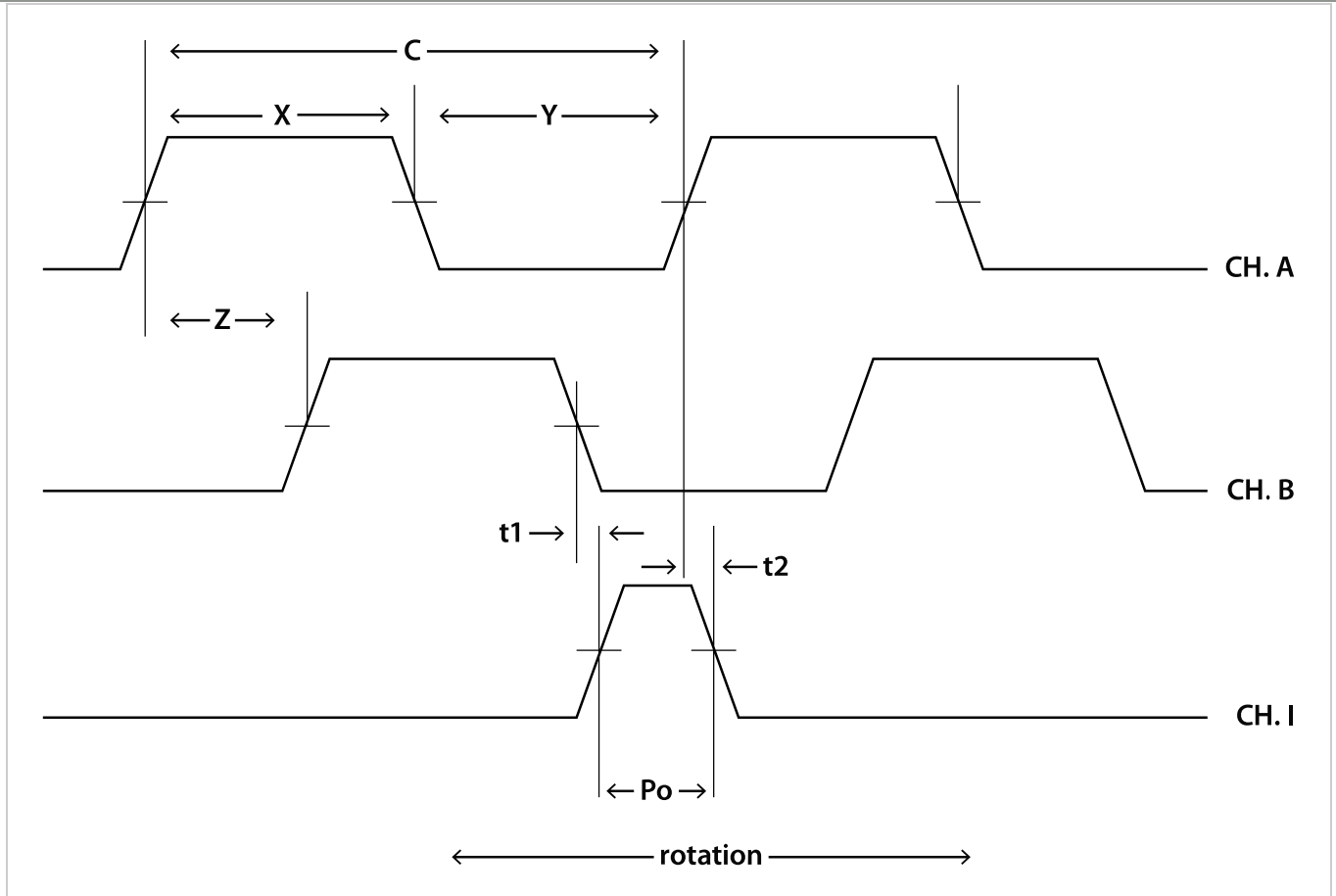
PARAMETER	MIN.	TYP.	MAX.	UNITS	NOTES
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		18	26	mA	no load
Low-level Output			0.4	V	$I_{OL} = 4 \text{ mA}$, $V_{CC} = 5V$
		0.1		V	no load
High-level Output	4.7			V	$I_{OH} = 4 \text{ mA}$, $V_{CC} = 5V$
		4.9		V	no load
Output Rise Time		80	135	ns	no load
Output 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/#electrical-degree-e)
Quadrature	Z	60	90	120	°e (https://www.usdigital.com/support/resources/glossary/#electrical-degree-e)
Index Pulse Width	Po	60	90	120	°e (https://www.usdigital.com/support/resources/glossary/#electrical-degree-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
		059 (1.5mm)	S (Single-Ended)	D (Default)	D (Default)	Bulk (B) - Includes one centering and spacer tool per order, plus an extra set per 100 encoders.
	250	079 (2.0mm)				
	256					
	500					Individual (1) - Includes one centering and spacer tool per order, plus an extra set per 100 encoders.
	512					
	1000					
	1024					Individual (2) - Includes one centering and spacer tool per encoder.
	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.

