

Description

The E5 Series rotary encoder has a molded polycarbonate enclosure with either a 5-pin or 10-pin latching connector. This optical incremental encoder is designed to easily mount to and dismount from an existing motor shaft to provide digital feedback information.

The E5 Series is easy to add to existing applications and only consists of five main components: base, cover, hubdisk, optical encoder module and internal differential line driver (differential version only).

The single-ended output version (S-option) is typically used with cables of 10 feet or less. For longer cable lengths, the differential output version (D-option) is recommended.

The base and cover are both constructed of a rugged 20% glass filled polycarbonate. Attachment of the base to a surface may be accomplished by utilizing one of several machine screw bolt circle options. Positioning of the base to the centerline of a shaft is ensured by use of a centering tool (sold separately). The cover is securely attached to the base with two 4-40 flat head screws to provide a resilient package protecting the internal components.

The internal components consist of a mylar disk mounted to a precision machined aluminum hub and an encoder module. The module consists of a highly collimated solid state light source and monolithic phased array sensor, which together provide a system extremely tolerant to mechanical misalignments.

A secure connection to the E5 Series encoder is made through a 5-pin (single-ended versions) or 10-pin (differential versions) latching connector (sold separately). The mating connectors are available from US Digital with several cable options and lengths.

Avago Replacements:

US Digital's E5 encoder may now be used as a replacement for Avago HEDL-5500, HEDL-5600.

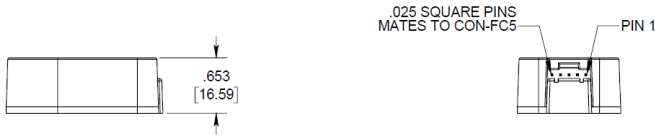


Features

- ▶ Quick, simple assembly and disassembly
- ▶ Rugged screw-together housing
- ▶ Positive latching connector
- ▶ Accepts .010" axial shaft play
- ▶ 32 to 5000 cycles per revolution (CPR)
- ▶ 128 to 20000 pulses per revolution (PPR)
- ▶ 2 channel quadrature TTL squarewave outputs
- ▶ Optional index (3rd channel)
- ▶ Mounting compatibility with HEDS-5500

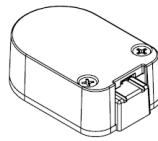
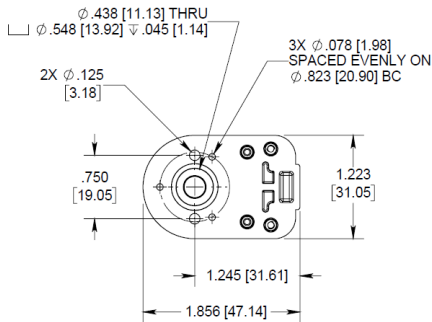
Single-Ended

E5 Optical Kit Encoder



RELEASE DATE: 7/11/2017

DEFAULT BASE & COVER OPTIONS SHOWN



US DIGITAL 1400 NE 136th Avenue
Vancouver, Washington 98684, USA

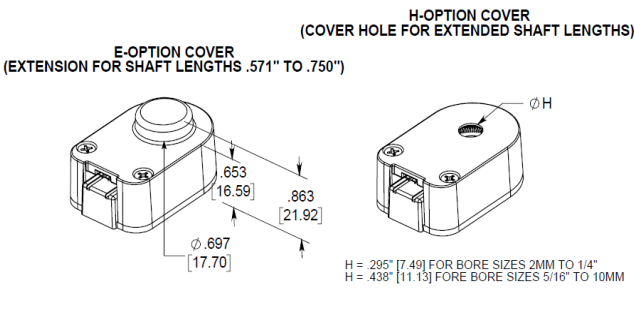
info@usdigital.com
www.usdigital.com

Local: 360.260.2468
Toll-free: 800.736.0194

UNITS: INCHES [MM]
METRIC SHOWN FOR REFERENCE ONLY

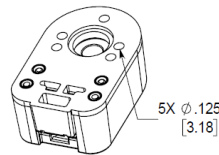
Base & Cover Options

E5 Optical Kit Encoder Base & Cover Options

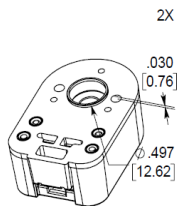


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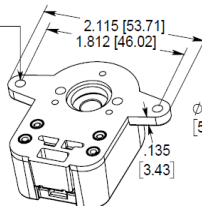
3-OPTION BASE
(LARGER MOUNTING HOLES)



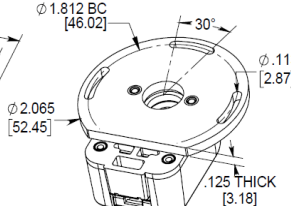
A-OPTION BASE
(ALIGNMENT BOSS)



G-OPTION BASE
(1.812\"/>

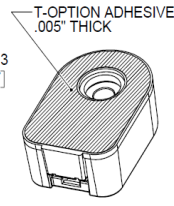


R-OPTION BASE
(ROTATIONAL MOUNTING)



*REQUIRES ADDITIONAL .125\"/>

T-OPTION BASE
(ADHESIVE MOUNTING)



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UNITS: INCHES [MM]
METRIC SHOWN FOR REFERENCE ONLY

Environmental

Parameter	Value	Units
Operating Temperature, CPR < 2000	-40 to 100	C
Operating Temperature, CPR ≥ 2000	-25 to 100	C
Vibration (5Hz to 2kHz)	20	G
Electrostatic Discharge Single-ended (-S version), IEC 61000-4-2 Differential (-D, -L version), Human Body Model	± 4 ± 2	kV

Mechanical

Parameter	Value	Units
Max. Shaft Axial Play	±0.010	in.
Max. Shaft Eccentricity Plus Radial Play (1)	0.004	in.
Max. Acceleration	250000	rad/sec ²

Parameter	Value	Units
For CPR < 2000 Max. RPM (2) (300 kHz) e.x. CPR=1250, max. rpm=14400 e.x. CPR=100, max. rpm=60000	minimum value of ((18 x 10 ⁶) / CPR) and (60000)	rpm
Typical Product Weight Single-ended (S-option) Differential (D-option, L-option)	0.82 0.91	oz.
Codewheel Moment of Inertia	8.0 x 10 ⁻⁶	oz-in-s ²
Hub Set Screw	#4-48	
Hex Wrench Size	0.050	in.
Encoder Base Plate Thickness	0.135	in.
3 Mounting Screw Size	#0-80	
2 Mounting Screw Size	#2-56 or #4-40	

Parameter	Value	Units
3 Screw Bolt Circle Diameter	0.823 ± 0.005	in.
2 Screw Bolt Circle Diameter	0.750 ± 0.005	in.
Required Shaft Length (3)	0.445 to 0.570	in.
With E-option (3)	0.445 to 0.750	
With H-option (3)	> 0.445	
Index Alignment to Hub Set Screw	180 Typical	mechanical degrees
Technical Bulletin TB1001 - Shaft and Bore Tolerances		Download

(1) Position inaccuracy is proportional to shaft radial play.

(2) 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). For resolutions of 32 to 1999 CPR the frequency response is 300 kHz, 2000 to 3999 CPR the frequency response is 360 kHz and 4000 CPR and greater the frequency response is 720 kHz.

(3) Add 0.125" to the required shaft length when using R-option.

Torque Specifications

Parameter	Torque
Hub Set Screw to Shaft	2-3 in-lbs
Cover (4-40 screws through cover into base)	2-4 in-lbs
Base to Mounting Surface	4-6 in-lbs
Base to Mounting Adapter Plate	4-6 in-lbs
Adapter Plate to Mounting Surface	4-6 in-lbs
Module to Base	3.5-4 in-lbs

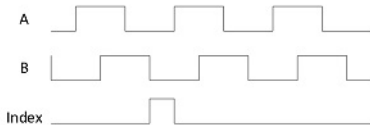
Phase Relationship

Single-Ended (S) / Differential (D) Option:

A leads B for clockwise shaft rotation, and B leads A for counterclockwise rotation as viewed from the cover/label side of the encoder.

Output Waveforms

SINGLE-ENDED



Single-ended Electrical

Specifications apply over entire operating temperature range.

Typical values are specified at $V_{cc} = 5.0V_{dc}$ and $25^{\circ}C$.

For complete details, see the EM1 or EM2 product pages.

Parameter	Min.	Typ.	Max.	Units	Conditions
Supply Voltage	4.5	5.0	5.5	V	
Supply Current		27	33	mA	CPR < 500, no load
		54	62	mA	CPR ≥ 500 and <2000, no load
		72	85	mA	CPR ≥ 2000, no load
Low-level Output			0.5	V	IOL = 8mA max., CPR < 2000
			0.5	V	IOL = 5mA max., CPR ≥ 2000
		0.25		V	no load, CPR ≥ 2000
High-level Output	2.0			V	IOH = -8mA max. and CPR < 2000
	2.0			V	IOH = -5mA max. and CPR ≥ 2000
		4.8		V	no load and CPR < 2000
		3.5		V	no load and CPR ≥ 2000
Output Current Per Channel	-8		8	mA	CPR < 2000
	-5		5	mA	CPR ≥ 2000
Output Rise Time		110		nS	CPR < 2000
		50		nS	CPR ≥ 2000, ± 5mA load
Output Fall Time		100		nS	CPR < 2000
		50		nS	CPR ≥ 2000, ± 5mA load

Pin-outs

5-pin Single-Ended (1)

Pin	Description
1	Ground
2	NC (Index not Used)
3	A channel
4	+5VDC power
5	B channel

(1) 5-pin single ended mating connector is CON-FC5.