

Description:

The **E4P** miniature encoder is designed to provide digital quadrature encoder feedback for high volume applications with limited space constraints. The **E4P** version utilizes an innovative push-on hub disk assembly which accepts shaft diameters of 1.5mm to .250".

The **E4P** encoder is the leader for high quantity OEM applications, but the **E4** is the ideal choice when a set-screw hub disk assembly encoder is required (see the **E4** data sheet).

The **E4P** miniature encoder base provides mounting holes for two 3-48 x 1/4" or two 2.5mm x 6mm screws on a .586" bolt circle. When mounting holes are not available, a pre-applied transfer adhesive (with peel-off backing) is available for "stick-on" mounting.

The internal components consist of a precision machined aluminum hub and an encoder circuit board module.

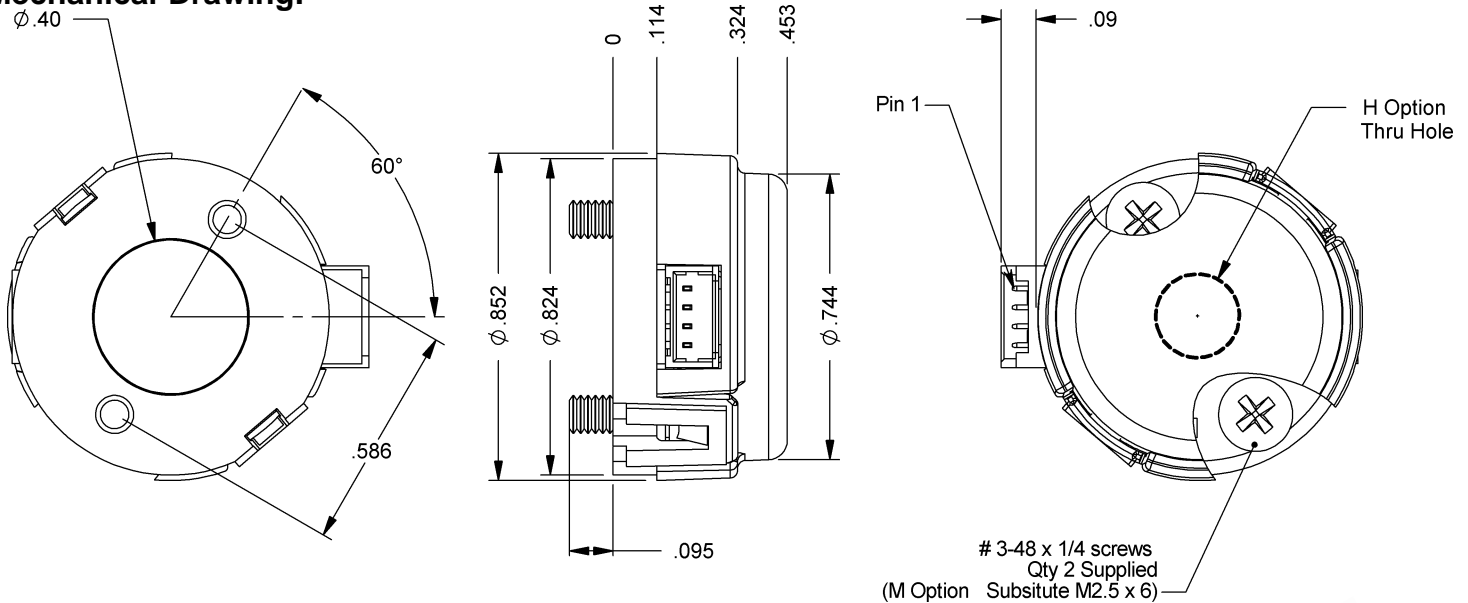
The encoder cover is easily snapped onto the base and is embossed with the connector pin-out.

The **E4P** series encoder can be connected by using a (high retention 4-conductor snap-in polarized 1.25mm pitch) connector. Mating cables and connectors (see the **Cables / Connectors** data sheet) are not included and are available separately.

Features:

- Low cost
- Miniature size
- Push-on hub - spring loaded collet design
- Minimum shaft length of .375"
- Fits shaft diameters of .059" to .250" (1.5mm to 1/4")
- High retention snap-in polarized connector
- Accepts ±.020" (±.5mm) axial shaft play
- Off-axis mounting tolerance of .010"
- Tracks from 0 to 60,000 cycles/sec
- 120 to 300 cycles per revolution (CPR)
- 480 to 1200 pulses per revolution (PPR)
- 2 channel quadrature TTL squarewave outputs
- -10° to +85°C operating temperature
- Single +5V supply
- Low power strobe option available
- Adhesive option available
- US Digital warrants its products against defects in materials and workmanship for two years. See complete warranty for details.

Mechanical Drawing:



Options:

H-option (Hole In Cover):

The H-option adds a hole in the cover for the shaft to pass through:

- For shaft diameters of 1.5mm to 2.5mm, a 0.143" hole is supplied.
- For shaft diameters of 3mm and 1/8", a 0.170" hole is supplied.
- For shaft diameters of 5/32" to 5mm, a 0.242" hole is supplied.
- For shaft diameters of 6mm and 1/4", a 0.295" hole is supplied.

M-option (Metric Mounting Screws):

Provides alternate metric 2.5mm x 6mm screws. When M-option is NOT specified the default is 3-48 x 1/4" screws.

L-option (Low Power Strobe):

To reduce the average power requirements, the L-option version of the E4 power can be strobed on just long enough to sample outputs A and B. This option is the same as our standard E4, except the internal power bypass capacitor is not installed. The outputs settling time is typically 200 to 400 nano seconds after power up. The minimum sample frequency must be less than the maximum RPM X the CPR / 10.

T-option (Transfer Adhesive):

When mounting holes are not available, a pre-applied transfer adhesive (with peel-off backing) is available for "stick-on" mounting. Use the centering tool to position the base. T-option specifies transfer adhesive.

Mechanical Specifications:

Parameter	Dimension	Units
Moment of Inertia	3.0 x 10 ⁻⁶	oz-in-s ²
Mounting Screw Size	#3-48 x 1/4"	
M-option Screw Size	2.5mm x 6mm	
Screw Bolt Circle Diameter	.586 ±.002	in.
Required Shaft Length*	.375 to .395	in.
Axial Length Hub / Disk Assembly	.270	in.

* Includes axial play.

Electrical Specifications:

For complete details see the AEDR data sheet.

Phase Relationship:

A leads B for clockwise shaft rotation, and B leads A for counterclockwise rotation viewed from the cover/label side of the encoder (see the AEDR data sheet).

Absolute Maximum Ratings:

Parameter	Min.	Max.	Units
Vibration (5 to 2kHz)	-	20	g
Shaft Axial Play	-	±.020	in.
Off-Axis Mounting Tolerance	-	.010	in.
Acceleration	-	250,000	rad/sec ²
Storage Temperature	-40°	85°	°C
Relative Humidity	-	90	%

Torque Specifications:

Parameter	Torque
Base to Mounting Surface	2-3 in.-lbs.

Compatible Cables / Connectors:

4-pin Micro:	
CON-MIC4	Connector
CA-3285-1FT	Connector on one end with 4 12" wires
CA-3286-6FT	Connector on one end of a 6' round twisted pair cable

Attention:

- Specify cable length when ordering.
- Custom cable lengths are available. See the **Cables / Connectors** data sheet for more information.
- The connector built into the encoder is Molex# 53048-0410.
- The mating connector is made up of housing (Molex# 51021-0400) and 4 individual crimp-on pins (Molex# 50079-8100).
- Special crimp tool (Molex# 50079) is needed to install connector pins.

Pin-out:

Pin	Description
1	+5VDC power
2	A channel
3	Ground
4	B channel

Accessories:

Spacer Tool:

Description: This reusable tool is used to properly space the hub / disk assembly from the encoder base. Provides air gap of 0.07" ±0.03".

Material: Aluminum.

SPACER-E4P Price: \$0.53 ea.

Please note: Each order includes At least one spacer tool per 100 encoders.



Centering Tool:

Description: This reusable tool provides a simple method for accurately centering the E4 base onto the shaft.

Material: Aluminum.

Please note: A centering tool is highly recommended when using the T-option transfer adhesive.



Installation Tool:

Description: This optional installation tool is an alternative to the SPACER-E4P. The design of the tool allows for easy grip assembly in high volume applications. This tool *will NOT work* with T-option (transfer adhesive) applied encoders. This tool *is NOT* RoHS compliant. Provides air gap of 0.07" ±0.03".

Material: Aluminum.

HTOOL-E4P Price: \$5.25 ea.



MCTOOL -

Price
\$5.25 ea.

Shaft Diameter:	
Code	Size
059	1.5mm
079	2mm
091	2.3mm
098	2.5mm
118	3mm
125	1/8"
156	5/32"
157	4mm
187	3/16"
197	5mm
237	6mm
250	1/4"

Ordering Information:

Price:

\$19.95 / 1
\$17.33 / 10
\$15.44 / 50
\$14.07 / 100
\$12.92 / 500
\$11.97 / 1K
\$11.18 / 5K
\$10.00 / 10K

Cost Modifiers:

- Add 15% for T-option.
- Add \$3 for PKG1-option.
- Add \$4 for PKG2-option.
- Add \$7 for PKG3-option.

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CPR:

100
108
120
125
128
200
250
256
300

Shaft Diameter:

Code	Size
059	1.5mm
079	2mm
091	2.3mm
098	2.5mm
118	3mm
125	1/8"
156	5/32"
157	4mm
187	3/16"
197	5mm
237	6mm
250	1/4"

Options: (specify in order shown)

L = Low power strobe.
H = Adds hole in cover to allow the shaft to pass through.
T = Adds transfer adhesive.*
M = Provides alternate metric 2.5mm x 6mm screws.**

Packaging Options:

Blank (default) = Base, screws and PCBs are packaged separately in bulk. One spacer tool per 100 encoders.
PKG1 = Each encoder packaged individually. One spacer tool per 100 encoders packaged in bulk.
PKG2 = One spacer tool individually packaged together with each encoder.
PKG3 = One spacer tool, and one centering tool individually packaged together with each encoder.

Important: When a centering tool is needed it may be most cost effective to use the default packaging option and to order a centering tool separately. This is especially true when ordering a single encoder.

Notes:

- * A centering tool is highly recommended when using this option.
- ** When M-option is NOT specified the default is 3-48 x 1/4" screws.

Technical Data, Rev. 06.26.07, June 2007
All information subject to change without notice.