



# LIGHT DUTY ENCODERS GUIDE

## DYNAPAR 2010

Light duty encoders are commonly referred to as “commercial duty” due to their frequent use in commercial or office automation products. Typically these devices reside in fairly benign environments with little temperature variation, are fairly clean, and not generally subjected to high shock loading or moisture.

Dynapar light duty encoders are especially suited for applications using small motors and actuators in relatively clean environments such as office printers, copiers, and laboratory equipment. Although intended for use in commercial applications, these encoders are manufactured with industrial features such as:

- Metal housings
- O-ring seals
- Precision bearings

Their compact dimensions and advanced circuitry make them well-suited for many applications too small to accept “standard” encoders such as desk top and bench top testing equipment and precision actuators.

High performance feedback with some of the shortest lead times in the industry is the benchmark of the Dynapar product line. Most models are manufactured right here in the USA in Gurnee, IL using the advanced cellular manufacturing concept, ensuring Just-In-Time delivery to meet your needs.



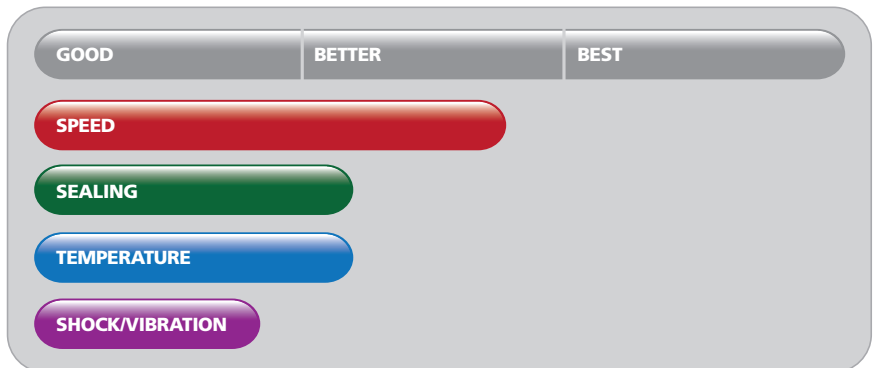


**OPTICAL - INCREMENTAL**

Product	E12	E14	E23	EC23	E14H (Hubshaft)	E14IC (Integral Coupling)
Shaft/Bore Sizes	1/8"	1/8" or 1/4"	1/4"	1/4"	1/4" to 5/8", 6mm to 14mm	1/4" or 3/8"
Available Resolutions (PPR)	100 to 1024	100 to 2540	1 to 2540	3000 to 5000	100 to 2540	100 to 2540
Input Voltage (VDC)	5, 12, 15	5, 12, 15	5-26	5-26	5, 12, 15	5, 12, 15
Operating Temperature (°C)	0 to +70	0 to +70	0 to +70	0 to +70	0 to +70	0 to +70
Enclosure Rating	NEMA 12/IP54	NEMA 12/IP54	NEMA 12/IP54	NEMA 12/IP54	NEMA 12/IP54	NEMA 12/IP54
Special Features	Sub-Compact 1.2" diameter	Rugged Metal Housing	Screw terminal connections	High 5000PPR capability	Hubshaft with flex tether	Integrated coupling
Page Number	4.02	4.04	4.06	4.08	4.10	4.12



**LIGHT DUTY ENCODER GENERAL PERFORMANCE DATA**



E14 Pictured

# SERIES E12

**Dynapar™ brand**

## Miniature Encoder

### Key Features

- Rugged Metal Housing
- Sub-Compact 1.2" Diameter
- Up to 1024PPR with Optional Index



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental  
**Resolution:** 100 to 1024 PPR (pulses/ revolution)  
**Format:** Two channel quadrature (AB) with optional Index (Z) outputs  
**Phase Sense:** A leads B for CW shaft rotation as viewed from the shaft end of the encoder  
**Accuracy:**  $\pm 3 \times (360^\circ \div \text{PPR})$  or  $\pm 2.5$  arc-min worst case pulse to any other pulse, whichever is less  
**Quadrature Phasing:**  $90^\circ \pm 36^\circ$  electrical  
**Symmetry:**  $180^\circ \pm 18^\circ$  electrical  
**Index:**  $90^\circ \pm 25^\circ$  (gated with A and B high)  
**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

### ELECTRICAL

**Input Power:** 5 VDC  $\pm 5\%$  at 80 mA max.; 12 or 15 VDC  $\pm 10\%$  at 80 mA max.; not including output loads  
**Outputs:** 7272 line driver (or equivalent), 40 mA sink and source  
**Frequency Response:** 100 kHz min.

### ENVIRONMENTAL

**Operating Temperature:** 0 to +70 °C  
**Storage Temperature:** -25 to +70 °C  
**Humidity:** to 98% without condensation  
**Enclosure Rating:** NEMA12/IP54 (dirt tight, splashproof)

### Electrical Connections

Function (If Used)	Wire Color Code
Supply	Red
Common	Black
Signal A	White
Signal B	Green
Signal Z	Orange
Floating	Shield

### MECHANICAL

**Mechanical Bearing Life:**  $16 \times 10^6$  revolutions at max. load  
**Shaft Loading:** 1 lb. radial, 1 lb. axial max.  
**Shaft Speed:** 5,000 RPM max.  
**Starting Torque:**  
 Shielded Bearing: 0.1 oz-in max. at 25 °C  
 Sealed Bearing: 0.3 oz-in max. at 25 °C  
**Running Torque:**  
 Shielded Bearing: 0.08 oz-in max. at 25 °C;  
 Sealed Bearing: 0.2 oz-in max. at 25 °C  
**Moment of Inertia:**  $1.13 \times 10^{-5}$  oz-in-sec<sup>2</sup>  
**Weight:** 3.0 oz. max.



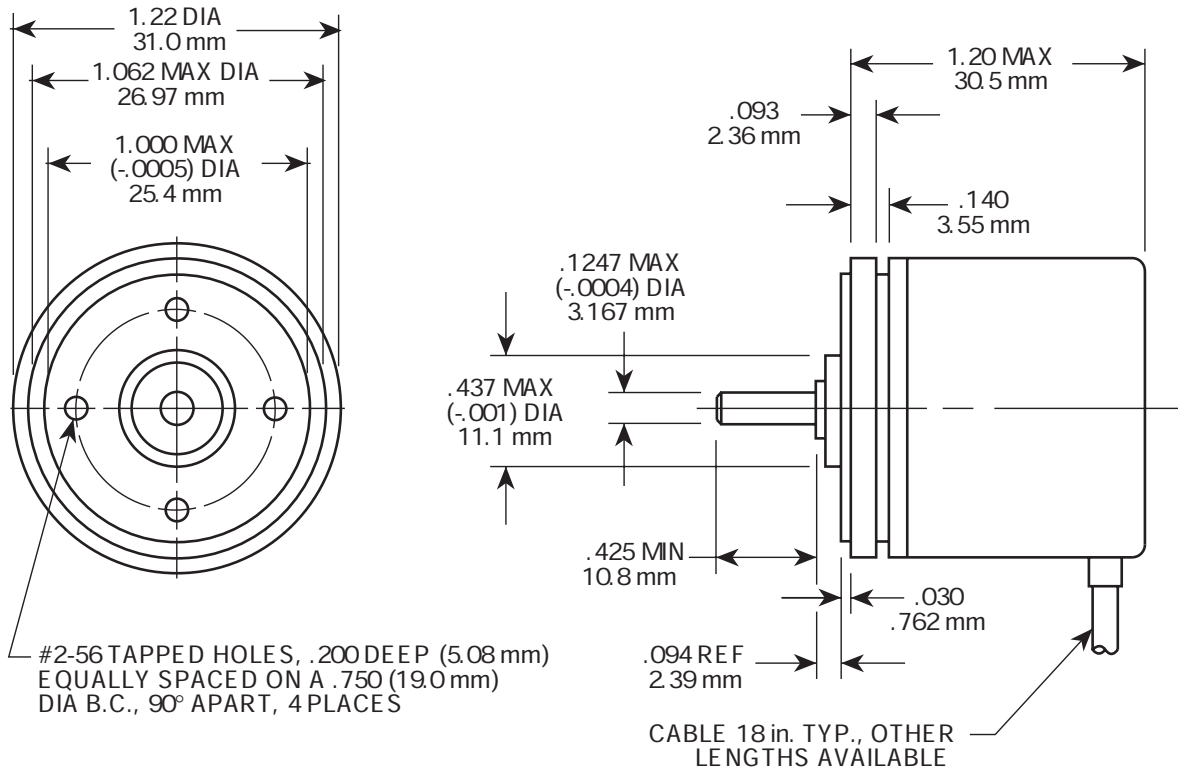
# SERIES E12

### Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: Pulses/Rev	Code 3: Mechanical	Code 4: Output	Code 5: Voltage	Code 6: Termination
<b>E 12</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>E12</b> Size 12, Light Duty Enclosed	<b>0100</b> <b>0250</b> <b>0256</b> <b>0360</b> <b>0500</b> <b>0600</b> <b>1000</b> <b>1024</b>	<b>0</b> Sealed Bearing <b>1</b> Shielded Bearing	<b>0</b> Unidirectional <b>2</b> Bidirectional, no Index <b>3</b> Bidirectional, with Index	<b>0</b> 5 VDC <b>1</b> 12 VDC <b>2</b> 15 VDC	<b>0</b> 18" Cable <b>1</b> 3' Cable <b>2</b> 6' Cable <b>3</b> 10' Cable <b>4</b> 15' Cable

### Dimensions (inches/mm)



# SERIES E14

**Dynapar™ brand**

## Miniature Encoder

### Key Features

- Rugged Metal Housing
- Optional Differential Line Driver Outputs
- Up to 2540PPR with Optional Index



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental  
**Resolution:** 100 to 2540 PPR (pulses/revolution)  
**Format:** Two channel quadrature (AB) with optional Index (Z) outputs  
**Phase Sense:** A leads B for CW shaft rotation as viewed from the shaft end of the encoder  
**Accuracy:**  $\pm 3 \times (360^\circ \div \text{PPR})$  or  $\pm 2.5$  arc-min worst case pulse to any other pulse, whichever is less  
**Quadrature Phasing:**  $90^\circ \pm 36^\circ$  electrical  
**Symmetry:**  $180^\circ \pm 18^\circ$  electrical  
**Index:**  $90^\circ \pm 25^\circ$  (gated with A and B high)  
**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

### ELECTRICAL

**Input Power:** 5 VDC  $\pm 5\%$  at 80 mA max.; 12 or 15 VDC  $\pm 10\%$  at 80 mA max.; not including output loads  
**Outputs:** 7272 (or equivalent) line driver, 40 mA sink and source  
**Frequency Response:** 100 kHz min.

### MECHANICAL

**Bearing Life:**  $(16 \times 10^6 \div \text{RPM})$  hours at max. load  
**Shaft Loading:** 5 lb. radial, 3 lb. axial max.  
**Shaft Speed:** 5,000 RPM max.  
**Starting Torque:**

Shielded Bearing: 0.1 oz-in max. at 25 °C  
 Sealed Bearing: 0.43 oz-in max. at 25 °C

### Running Torque:

Shielded Bearing: 0.08 oz-in max. at 25 °C  
 Sealed Bearing: 0.42 oz-in max. at 25 °C

**Moment of Inertia:**  $3.8 \times 10^{-5}$  oz-in-sec<sup>2</sup>

**Weight:** 3.0 oz. max.

### ENVIRONMENTAL

**Operating Temperature:** 0 to +70 °C  
**Storage Temperature:** -25 to +70 °C  
**Humidity:** to 98% without condensation  
**Enclosure Rating:** NEMA12/IP54 (dirt tight, splashproof)

### Electrical Connections

Wire Color Code	Function		
	Standard Outputs 5, 12, or 15VDC	w/Line Driver Outputs	
		Unidirectional	Bidirectional
Red	Power Source	Power Source	Power Source
Black	Common	Common	Common
White	Signal A	Signal A	Signal A
Green	Signal B (if used)	Signal $\bar{A}$	Signal B
Orange	Signal Z (if used)	No Connection	Signal $\bar{B}$
Blue	No Connection	No Connection	Signal $\bar{A}$
Shield	Floating	Floating	Floating
White/Black	—	—	Signal Z (if used)
Red/Black	—	—	Signal $\bar{Z}$ (if used)



# SERIES E14

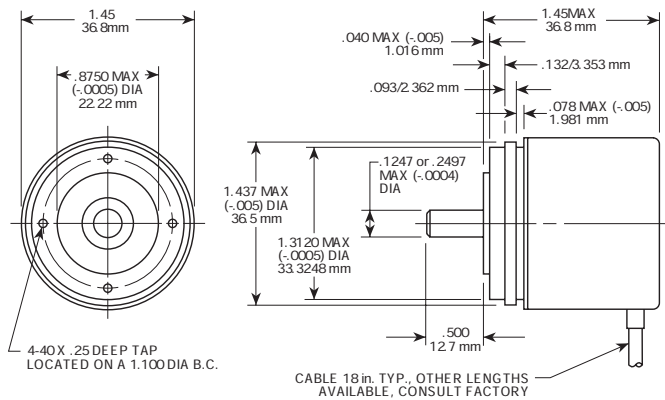
## Ordering Information

To order, complete the model number with code numbers from the table below.

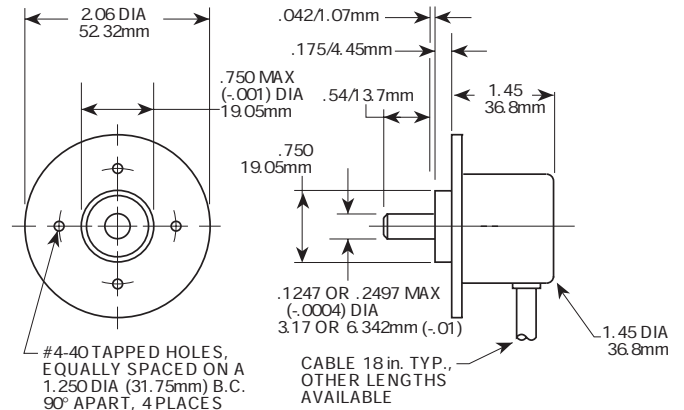
Code 1: Model	Code 2: Pulses/Rev	Code 3: Mounting	Code 4: Mechanical	Code 5: Output	Code 6: Electrical	Code 7: Termination	
<b>E 14</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>E14</b> Size 14, Light Duty Enclosed	<b>0100</b> <b>0200</b> <b>0240</b> <b>0250</b> <b>0256</b> <b>0300</b> <b>0360</b> <b>0400</b> <b>0500</b> <b>0600</b> <b>0720</b> <b>0750</b> <b>0900</b>	<b>1000</b> <b>1024</b> <b>1250</b> <b>1500</b> <b>2000</b> <b>2048</b> <b>2500</b> <b>2540</b>	<b>0</b> Size E14 <b>1</b> Size E20 Servo <b>2</b> Size E20 Flange  Available when code 4 is 2 <b>3</b> Size EC80 Flange	<b>0</b> 1/4" Shaft, Sealed Bearing <b>1</b> 1/8" Shaft, Sealed Bearing <b>2</b> 1/4" Shaft, Shielded Bearing <b>3</b> 1/8" Shaft, Shielded Bearing	<b>0</b> Single Ended, Unidirectional <b>2</b> Single Ended, Bidirectional, no Index <b>3</b> Single Ended, Bidirectional, with Index <b>4</b> Differential, Unidirectional <b>6</b> Differential, Bidirectional, no Index <b>7</b> Differential, Bidirectional, with Index	<b>0</b> 5 VDC <b>1</b> 12 VDC <b>2</b> 15 VDC	<b>0</b> 18" Cable <b>1</b> 3' Cable <b>2</b> 6' Cable <b>3</b> 10' Cable <b>4</b> 15' Cable

## Dimensions (inches/mm)

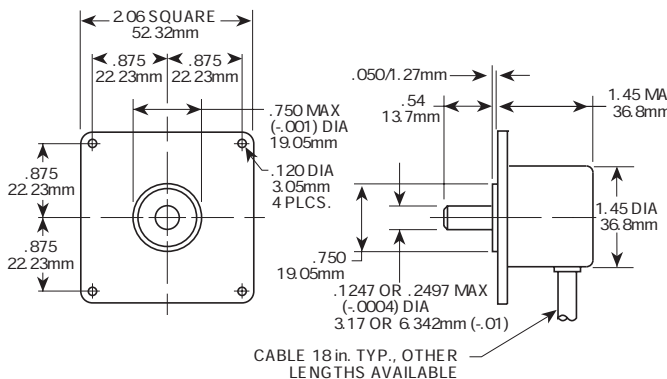
Code 3: 0



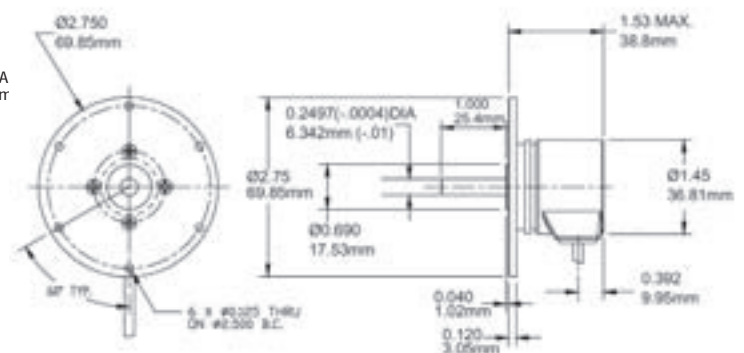
Code 3: 1



Code 3: 2



Code 3: 3





# SERIES E23

**Dynapar™ brand**

## Miniature Encoder

### Key Features

- Up to 2540PPR with Optional Index
- Optional Screw Terminal Connections
- Standard Size 23 (2.3" diameter)



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental

**Resolution:** 1 to 2540 PPR (pulses/revolution)

**Accuracy:** (Worst case any edge to any other edge)  $\pm 2.5$  arc-min.

**Format:** Two channel quadrature (AB) with optional Index (Z) outputs

**Phase Sense:** A leads B for CW or CCW shaft rotation as viewed from the shaft end of the encoder, see Ordering Information

**Quadrature Phasing:**  $90^\circ \pm 18^\circ$  electrical

**Symmetry:**  $180^\circ \pm 9^\circ$  electrical

**Index:**  $180^\circ \pm 9^\circ$  electrical, gated with B

**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

### ELECTRICAL

#### Input Power:

Open Collector or Totem Pole outputs: 4.5 VDC min. to 26 VDC max. at 200 mA max.;

Line Driver: 4.5 VDC min. to 26 VDC max. at 80 mA max.

#### Outputs:

Open Collector 7273:

$V_{OH}$ : 30 V max.;  $V_{OL}$ : 0.4 V max. at 20 mA sink

Totem Pole, Line Driver 7272:

40 mA min. sink or source

4469 Differential Line Driver: 100 mA, sink or source

**Frequency Response:** 100 kHz min.

### MECHANICAL

**Shaft Loading:** 5 lbs. max. radial and axial

**Shaft Speed:** 5,000 RPM max.

**Starting Torque:** 0.2 oz-in max. at 25 °C

**Moment of Inertia:**  $3.7 \times 10^{-4}$  oz-in-sec<sup>2</sup>

**Weight:** 13 oz. max.

### ENVIRONMENTAL

**Operating Temperature:** 0 to +70 °C

**Storage Temperature:** -40 to +80 °C

**Humidity:** to 98% without condensation

**Shock:** 50 G's for 11 msec duration

**Vibration:** 5 to 2000 Hz at 2 G's

**Enclosure Rating:** NEMA12/IP54 (dirt tight, splashproof)

### ELECTRICAL CONNECTIONS

Note: Wire color codes are referenced here for models that are specified with pre-wired cable.

Single Ended		
Term	Function (If Used)	Wire Color Code
A	Signal A	BRN
B	Signal B	ORN
C	Signal Z	YEL
D	Power Source	RED
E	No Connection	—
F	Common	BLK
G	Case	GRN

Differential		
Term	Function (If Used)	Wire Color Code
A	Signal A	BRN
B	Signal B	ORN
C	Signal Z	YEL
D	Power Source	RED
E	No Connection	—
F	Common	BLK
G	Case	GRN
H	Signal $\bar{A}$	BRN/WH
I	Signal $\bar{B}$	ORN/WH
J	Signal $\bar{Z}$	YEL/WH



# SERIES E23

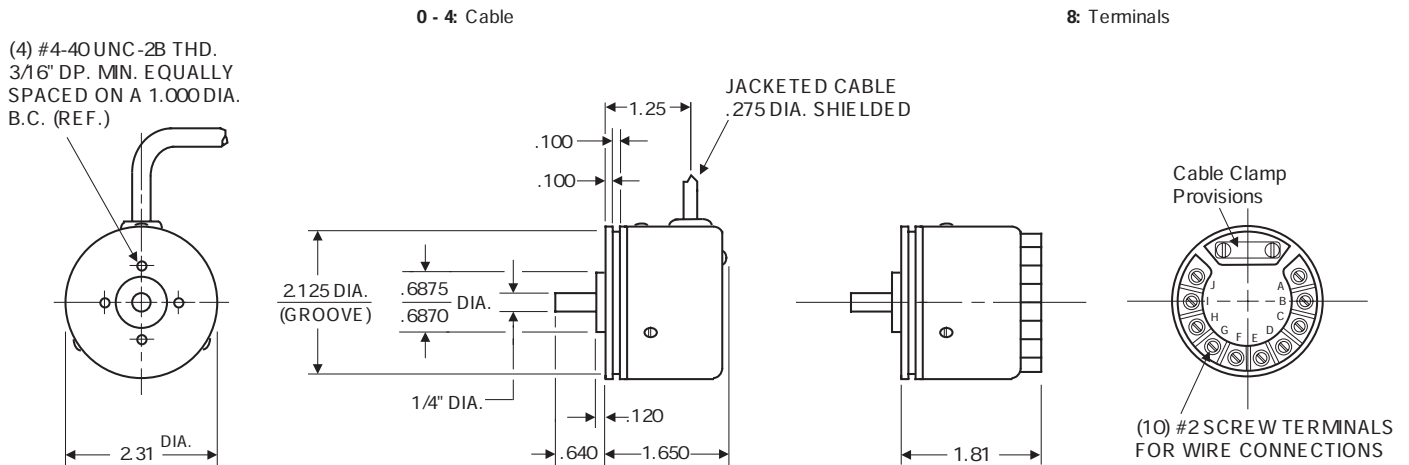
## Ordering Information

To order, complete the model number with code numbers from the table below.

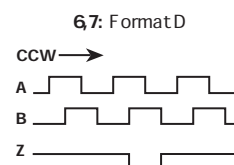
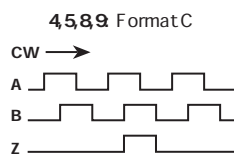
Code 1: Model	Code 2: Pulses/Rev	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination
<b>E 23</b>	□ □ □ □	□	□	□	□
<b>E23</b> Size 23 Enclosed	<b>0001 0300 1024</b> <b>0005 0344 1200</b> <b>0010 0360 1250</b> <b>0012 0400 1270</b> <b>0050 0500 1500</b> <b>0060 0512 1600</b> <b>0100 0600 1800</b> <b>0120 0625 1968</b> <b>0150 0635 2000</b> <b>0180 0720 2048</b> <b>0200 0800 2400</b> <b>0240 0900 2500</b> <b>0250 1000 2540</b> <b>0256</b> For Resolutions above 2540, see Series EC23	<b>0</b> 1/4" Shaft, Shielded Bearings <b>1</b> 1/4" Shaft, Sealed Bearings	<b>4</b> Single Ended, with Index, Format C <b>5</b> Differential, with Index, Format C <b>6</b> Single Ended, with Index, Format D <b>7</b> Differential, with Index, Format D <b>8</b> Single Ended, no Index, Format C <b>9</b> Differential, no Index, Format C	<b>0</b> 5-26V in; 5-26V Open Collector w/2.2kΩ Pullup out <b>1</b> 5-26V in; 5-26V Open Collector out <b>2</b> 5-26V in; 5V TTL Totem Pole out <b>3</b> 5-26V in; 5V Line Driver out (7272) <b>4</b> 5-26V in; 5-26V Line Driver out (7272) <b>5</b> 5-26V in, 5V Differential Line Driver out (4469) <b>6</b> 5-15V in, 5-15V Differential Line Driver out (4469)	<b>0</b> 18" Cable <b>1</b> 3' Cable <b>2</b> 6' Cable <b>3</b> 10' Cable <b>4</b> 15' Cable <b>8</b> Screw Terminals

### Dimensions (inches/mm)

### Code 6: Termination



### Code 4: Output





# SERIES EC23

**Dynapar™ brand**

## Miniature Encoder

### Key Features

- High 5000PPR Capability
- Optional Screw Terminal Connections
- Standard Size 23 (2.3" diameter)



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental

**Resolution:** 3000 to 5000 PPR (pulses/revolution)

**Accuracy:** (Worst case any edge to any other edge)  $\pm 10.8^\circ$ /PPR

**Format:** Two channel quadrature (AB) with optional Index (Z) and complementary outputs

**Phase Sense:** A leads B for CW or CCW shaft rotation as viewed from the shaft end of the encoder; see Ordering Information

**Quadrature Phasing:**  $90^\circ \pm 25^\circ$  electrical

**Symmetry:**  $180^\circ \pm 25^\circ$  electrical

**Index:**  $90^\circ \pm 25^\circ$  electrical, gated with B

**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pF

### ELECTRICAL CONNECTIONS

Note: Wire color codes are referenced here for models that are specified with pre-wired cable.

Single Ended		
Term.	Function (If Used)	Wire Color Code
A	Signal A	BRN
B	Signal B	ORN
C	Signal Z	YEL
D	Power Source	RED
E	No Connection	—
F	Common	BLK
G	Case	GRN

Differential		
Term.	Function (If Used)	Wire Color Code
A	Signal A	BRN
B	Signal B	ORN
C	Signal Z	YEL
D	Power Source	RED
E	No Connection	—
F	Common	BLK
G	Case	GRN
H	Signal $\bar{A}$	BRN/WH
I	Signal $\bar{B}$	ORN/WH
J	Signal $\bar{Z}$	YEL/WH

### ELECTRICAL

**Input Power:** 4.5 min. to 26 VDC max. at 80 mA max., not including output loads

**Outputs:**  
7273 Open Collector: 30 VDC max., 40 mA sink max.  
7272 Push-Pull and Differential Line Driver: 40 mA sink or source

**Frequency Response:** 250 kHz min.

**Electrical Protection:** Overvoltage, reverse voltage and output short circuit protected

**Noise Immunity:** Tested to EN50082-2 (Heavy Industrial) for Electro Static Discharge, Radio Frequency Interference, Electrical Fast Transients, Conducted and Magnetic Interference

**Cable:** PVC jacket, 105 °C rated, overall foil shield; 3 twisted pairs 26 AWG (output signals), plus 2 twisted pairs 24 AWG (input power)

### MECHANICAL

**Bearing Life:**  $1 \times 10^9$  revolutions at max. load

**Shaft Loading:** 5 lbs. max radial and axial

**Shaft Runout:** 0.001" max. TIR

**Shaft Speed:** 10,000 RPM max. mechanical

**Shaft Tolerance:** Nominal  $-0.0004/-0.0007$ "

**Starting Torque:**  
Shielded bearings: 0.1 oz-in max.;  
Sealed bearings: 0.2 oz-in max.

**Moment of Inertia:**  $2.83 \times 10^{-4}$  oz-in-sec<sup>2</sup>

**Weight:** 13 oz. max.

### ENVIRONMENTAL

**Operating Temperature:**  
Standard: 0 to +70 °C

**Storage Temperature:** -40 to +90 °C

**Shock:** 50 G's for 11 milliseconds duration

**Vibration:** 5 to 2000 Hz at 20 G's

**Humidity:** to 98% without condensation

**Enclosure Rating:** NEMA12/IP54 (dirt tight, splashproof)

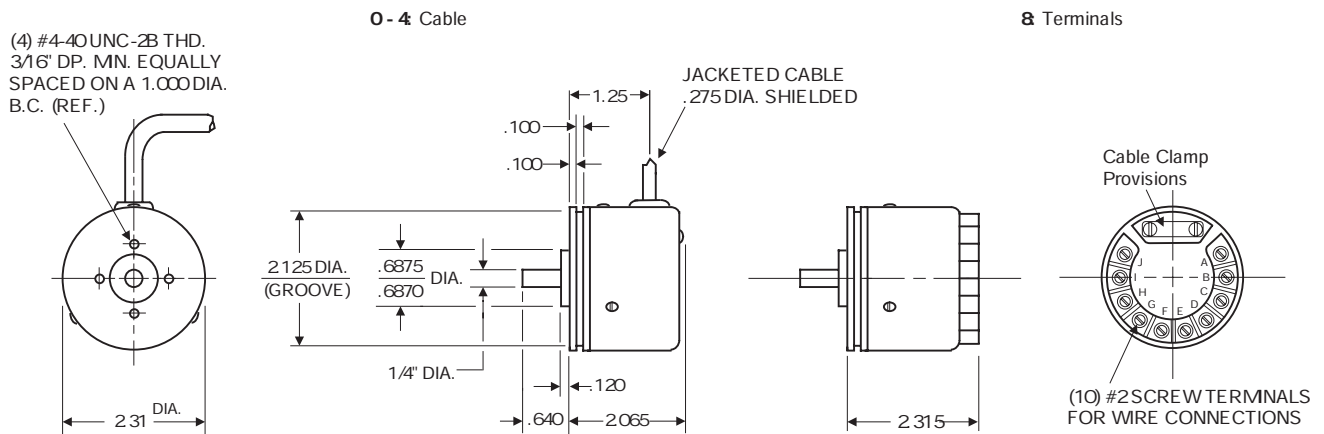
### Ordering Information

To order, complete the model number with code numbers from the table below:

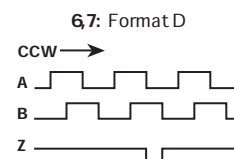
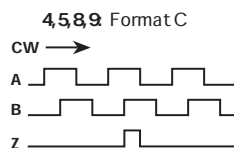
Code 1: Model	Code 2: Pulses/Rev	Code 3: Mechanical	Code 4: Output	Code 5: Electrical	Code 6: Termination
<b>EC23</b>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ordering Information					
<b>EC23</b> Size 23 Enclosed	<b>3000</b> 3,000 <b>3600</b> 3,600 <b>4096</b> 4,096 <b>5000</b> 5,000	<b>0</b> 1/4" Shaft, Shielded Bearings, 2.31" Dia. Servo Mount w/ 4-Hole Face Mount  <b>1</b> 1/4" Shaft, Sealed Bearings, 2.31" Dia. Servo Mount w/ 4-Hole Face Mount	<b>4</b> Single Ended, with Index, Format C <b>5</b> Differential, with Index, Format C <b>6</b> Single Ended, with Index, Format D <b>7</b> Differential, with Index, Format D <b>8</b> Single Ended, No Index, Format C <b>9</b> Differential, No Index, Format C	<b>0</b> 5-26V in, 5-26V Open Collector w/2.2k $\Omega$ Pullups out <b>1</b> 5-26V in, 5-26V Open Collector out <b>2</b> 5-26V in; 5V out, Push-Pull out <b>3</b> 5-26V in; 5V Line Driver out <b>4</b> 5-26V in, 5-26V Line Driver out	<b>0</b> 18" Cable, Side Exit <b>1</b> 3' Cable, Side Exit <b>2</b> 6' Cable, Side Exit <b>3</b> 10' Cable, Side Exit <b>4</b> 15' Cable, Side Exit <b>8</b> Screw Terminals

### Dimensions (inches/mm)

### Code 6 Termination



### Code 4 Output



# SERIES E14H

**Dynapar™ brand**

## Miniature Encoder

### Key Features

- Hubshaft with flex tether for simplified installation
- Up to 2540PPR with optional index
- Rugged metal housing



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental  
**Resolution:** 100 to 2540 PPR (pulses/revolution)  
**Format:** Two channel quadrature (AB) with optional Index (Z) outputs  
**Phase Sense:** A leads B for CW shaft rotation as viewed from the shaft end of the encoder  
**Accuracy:**  $\pm 3 \times (360^\circ \div \text{PPR})$  or  $\pm 2.5$  arc-min worst case pulse to any other pulse, whichever is less  
**Quadrature Phasing:**  $90^\circ \pm 36^\circ$  electrical  
**Symmetry:**  $180^\circ \pm 18^\circ$  electrical  
**Index:**  $90^\circ \pm 25^\circ$  (gated with A and B high)  
**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

### ELECTRICAL

**Input Power:**  
 5 VDC  $\pm 5\%$  at 80 mA max.;  
 12 or 15 VDC  $\pm 10\%$  at 80 mA max.; not including output loads  
**Outputs:**  
 7272 line driver (or equivalent), 40 mA sink and source  
**Frequency Response:** 100 kHz min.

### MECHANICAL

**Bearing Life:**  $(16 \times 10^6 \div \text{RPM})$  hours at max. load  
**Shaft Speed:** 5,000 RPM max.  
**Hub Dia. Tolerance:** nominal  $-0/+0.0005"$  (0.013mm)  
**Mating Shaft Length:** 0.25" (6 mm) min.; 0.50" (12 mm) max.

**Mating Shaft Runout:** 0.008" (0.2 mm) max. TIR  
**Mating Shaft Endplay:**  $\pm 0.010"$  (0.25 mm) max.  
**Starting Torque:** 0.9 oz-in max. at 25 °C  
**Running Torque:** 0.8 oz-in max. at 25 °C  
**Moment of Inertia:**  
 6 to 10 mm hub:  $6.03 \times 10^{-5}$  oz-in-sec<sup>2</sup>  
 12 mm to 5/8" hub:  $2.4 \times 10^{-4}$  oz-in-sec<sup>2</sup>  
**Weight:**  
 6 to 10 mm hub: 3.5 oz. max.  
 12 mm to 5/8" hub: 4.5 oz. max.

### ENVIRONMENTAL

**Operating Temperature:** 0 to +70 °C  
**Storage Temperature:** -25 to +70 °C  
**Humidity:** to 98% without condensation  
**Enclosure Rating:** NEMA12/IP54 (dirt tight, splashproof)

### Electrical Connections

Wire Color Code	Function		
	Single-Ended Outputs	Differential Outputs	
		Unidirectional	Bidirectional
Red	Power Source	Power Source	Power Source
Black	Common	Common	Common
White	Signal A	Signal A	Signal A
Green	Signal B (if used)	Signal $\bar{A}$	Signal B
Orange	Signal Z (if used)	No Connection	Signal $\bar{B}$
Blue	No Connection	No Connection	Signal $\bar{A}$
Shield	Floating	Floating	Floating
White/Black	—	—	Signal Z (if used)
Red/Black	—	—	Signal $\bar{Z}$ (if used)

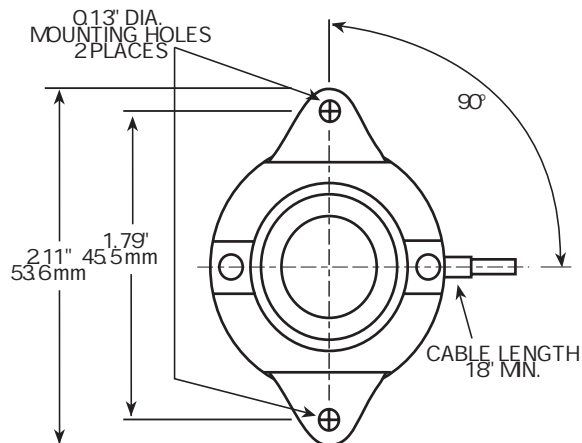
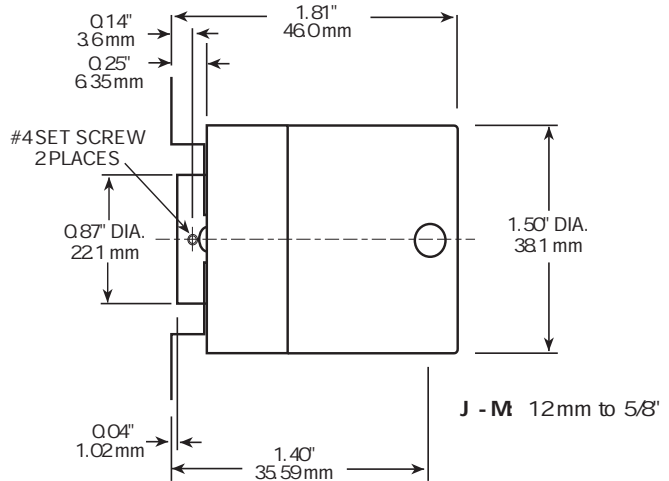
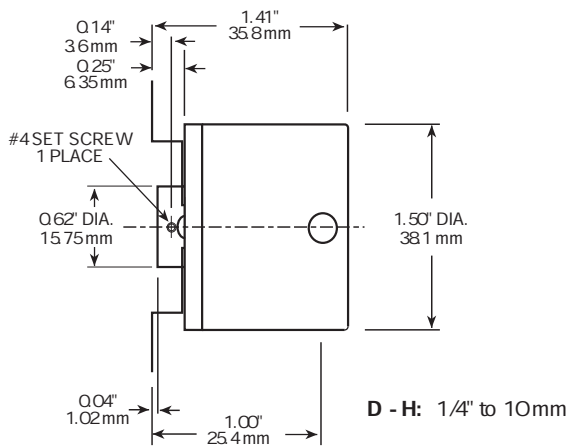
### Ordering Information

To order, complete the model number with code numbers from the table below.

Code 1: Model	Code 2: Pulses/Rev	Code 3: Mounting	Code 4: Mechanical	Code 5: Output	Code 6: Electrical	Code 7: Termination
<b>E14</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>E14</b> Size 14, Hub Shaft	<b>0100 1000</b> <b>0200 1024</b> <b>0240 1250</b> <b>0250 1500</b> <b>0256 2000</b> <b>0300 2048</b> <b>0360 2500</b> <b>0400 2540</b> <b>0500</b> <b>0600</b> <b>0720</b> <b>0750</b> <b>0900</b>	<b>0</b> Size E14	Hub I.D. <b>D</b> 6 mm <b>E</b> 1/4" <b>F</b> 5/16" <b>G</b> 3/8" <b>H</b> 10 mm <b>J</b> 12 mm <b>K</b> 1/2" <b>L</b> 14 mm <b>M</b> 5/8" <b>N</b> 8 mm	<b>0</b> Single Ended, Unidirectional <b>2</b> Single Ended, Bidirectional, no Index <b>3</b> Single Ended, Bidirectional, with Index <b>4</b> Differential, Unidirectional <b>6</b> Differential, Bidirectional, no Index <b>7</b> Differential, Bidirectional, with Index	<b>0</b> 5 VDC <b>1</b> 12 VDC <b>2</b> 15 VDC	<b>0</b> 18' Cable <b>1</b> 3' Cable <b>2</b> 6' Cable <b>3</b> 10' Cable <b>4</b> 15' Cable

### Dimensions (inches/mm)

### Code 4 Mechanical



# SERIES E14IC

**Dynapar™ brand**

## Miniature Encoder

### Key Features

- **Integrated coupling and "top-hat" for simple installation**
- **Compatible with NEMA size 23 and 24 motors**
- **Optional differential line driver outputs**



## SPECIFICATIONS

### STANDARD OPERATING CHARACTERISTICS

**Code:** Incremental  
**Resolution:** 100 to 2540 PPR (pulses/revolution)  
**Format:** Two channel quadrature (AB) with optional Index (Z) outputs  
**Phase Sense:** A leads B for CW shaft rotation as viewed from the shaft end of the encoder; Reverse phasing available, see Ordering Information  
**Accuracy:**  $\pm 3 \times (360^\circ \div \text{PPR})$  or  $\pm 2.5$  arc-min worst case pulse to any other pulse, whichever is less  
**Quadrature Phasing:**  $90^\circ \pm 36^\circ$  electrical  
**Symmetry:**  $180^\circ \pm 18^\circ$  electrical  
**Index:**  $90^\circ \pm 25^\circ$  (gated with A and B high)  
**Waveforms:** Squarewave with rise and fall times less than 1 microsecond into a load capacitance of 1000 pf

### ELECTRICAL

**Input Power:** 5 VDC  $\pm 5\%$  at 80 mA max.; 12 or 15 VDC  $\pm 10\%$  at 80 mA max.; not including output loads  
**Outputs:** 7272 line driver (or equivalent), 40 mA sink and source  
**Frequency Response:** 100 kHz min.

### MECHANICAL

**Bearing Life:**  $(16 \times 10^6 \div \text{RPM})$  hours min.  
**Shaft Speed:** 5,000 RPM max.  
**Starting Torque:** 0.1 oz-in max. at 25 °C  
**Running Torque:** 0.08 oz-in max. at 25 °C  
**Moment of Inertia:**  $3.8 \times 10^{-5}$  oz-in-sec<sup>2</sup>  
**Weight:** 7.0 oz. max.

### ENVIRONMENTAL

**Operating Temperature:** 0 to +70 °C  
**Storage Temperature:** -25 to +70 °C  
**Humidity:** to 98% without condensation  
**Enclosure Rating:** NEMA12/IP54 (dirt tight, splashproof)

### Electrical Connections

Wire Color Code	Function			DB 25 Connector Pin Number
	Single Ended Outputs	Differential Outputs		
		Unidirectional	Bidirectional	
Red	Power Source	Power Source	Power Source	23
Black	Common	Common	Common	14
White	Signal A	Signal A <sub>-</sub>	Signal A	1
Green	Signal B (if used)	Signal A <sub>-</sub>	Signal B <sub>-</sub>	3
Orange	Signal Z (if used)	No Connection	Signal B <sub>-</sub>	4
Blue	No Connection	No Connection	Signal A <sub>-</sub>	2
Shield	Floating	Floating	Floating	8
White/Black	—	—	Signal Z (if used)	5
Red/Black	—	—	Signal Z (if used)	6

**Ordering Information**

To order, complete the model number with code numbers from the table below:

Code 1: Model	Code 2: Pulses/Rev	Code 3: Mounting	Code 4: Mechanical	Code 5: Output	Code 6: Electrical	Code 7: Termination
<b>E 14</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>E14</b> Size 14, with Integral Shaft Coupling	<b>0100</b> <b>1000</b> <b>0200</b> <b>1024</b> <b>0240</b> <b>1250</b> <b>0250</b> <b>1500</b> <b>0256</b> <b>2000</b> <b>0300</b> <b>2048</b> <b>0360</b> <b>2500</b> <b>0400</b> <b>2540</b> <b>0500</b> <b>0600</b> <b>0720</b> <b>0750</b> <b>0900</b>	<b>0</b> Size E14	<b>A</b> NEMA Size 23 Flange Mount with 1/4" Motor Shaft Coupling <b>B</b> NEMA Size 23 Flange Mount with 3/8" Motor Shaft Coupling <b>C</b> NEMA Size 34 Flange Mount with 3/8" Motor Shaft Coupling	<b>0</b> Single Ended, Unidirectional <b>2</b> Single Ended, Bidirectional, no Index <b>3</b> Single Ended, Bidirectional, with Index <b>4</b> Differential, Unidirectional <b>6</b> Differential, Bidirectional, no Index <b>7</b> Differential, Bidirectional, with Index <b>8</b> Differential, Bidirectional, with Index, Reversed Phasing	<b>0</b> 5 VDC <b>1</b> 12 VDC <b>2</b> 15 VDC	<b>0</b> 18" Cable <b>1</b> 3' Cable <b>2</b> 6' Cable <b>3</b> 10' Cable <b>4</b> 15' Cable  available when Code 5 = 7 or 8: <b>5</b> 10' Cable, DB25 Connector <b>7</b> 25' Cable, DB25 Connector

**Flange Adapter Ordering Codes**

Factory Option Code	Motor Frame Size	Motor Shaft Diameter	Model No. of Coupling Only
A	23	1/4"	605106-1
B	23	3/8"	605106-3
C	34	3/8"	605106-3

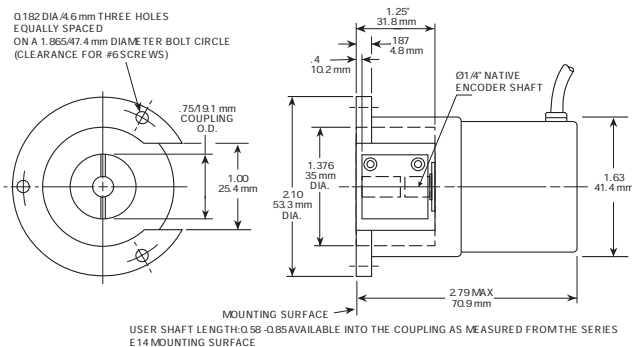
**Field Installed Kit**

Field installed kits are available by ordering either Model No. E14-N1 (integral housing and mounting hardware for NEMA size 23 motors) or Model No. E14-N2 (integral housing & mounting hardware for NEMA size 34 motors), and the appropriate coupling listed in the table left.

Other couplings available; consult factory.

**Dimensions (inches/mm)**

**E 14 for NEMA Size 23 Motors**



**E 14 for NEMA Size 34 Motors**

