



Mechanical Encoders

510 Series



510 Series Mechanical Encoders

The 510 Series are manually operated, rotary encoders that supply a 2-bit gray code output for relative reference applications or a four-bit gray code output for absolute electrical reference applications. They combine the feel of a rotary switch with a digital output.

The “L” channel leads the “R” channel by 90° electrically in the clockwise position. This series has continuous electrical travel and has a rotational life of more than 100,000 shaft rotations with a positive detent feel.

These small encoders are commonly used in limited-space, panel-mounted applications where the need for costly, front-panel displays can be completely eliminated. Digital gray code outputs may eliminate the need for analog/digital converters.

Key Features and Benefits

- **High resolution:** Up to 36 positions for applications that require high resolution
- **Gray code digital voltage output:** May eliminate the need for analog to digital converters, contributes to a more cost-effective solution
- **Wide operating temperature range of -40 °C to 105 °C [-40 °F to 221 °F]:** Helps minimize thermal performance issues
- **Mounting flexibility:** Horizontal or vertical mounting terminations promote flexibility in the application

Potential Applications

INDUSTRIAL

- Audio/visual equipment
- Smoke detectors
- Irrigation controls
- Oscilloscopes
- Robotics

MEDICAL

- EKG and defibrillation machines

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Table 1. Electrical Specifications






Characteristic	Parameter				
	Termination B 3 Leads	Termination B 5 Leads	Termination C 3 Leads	Termination C 5 Leads	Termination D
					
Output	2-bit gray code, channel L leads channel R by 90° electrically CW	4-bit gray code, absolute electrical position output	2-bit gray code, channel L leads channel R by 90° electrically CW	4-bit gray code, absolute electrical position output	2-bit gray code, channel L leads channel R by 90° electrically CW
Closed circuit resistance	5 Ohm max.				
Open circuit resistance	100 kOhm min.				
Contact rating	250 mA at 28 Vdc max.				
Switching loads: 14 Vdc 115 Vac	150 mA 1.5 mA				
Dielectric	1000 Vac at sea level				
Rotational life	100,000 cycles at rated load, typ.				
Electrical travel	360%/continuous				

Table 2. Mechanical Specifications

Characteristic	Parameter				
	Termination B 2-bit	Termination B 4-bit	Termination C 2-bit	Termination C 4-bit	Termination D
Mechanical travel	360%/continuous				
Detent positions	16, 24, or 36 ¹	16	16, 24, or 36 ¹	16	16
Operating torque	21 mN m to 23 mN m [3 in-oz to 5 in-oz]				
Operating speed	50 rpm, max.				
Termination type	formed, C-30 type		straight, B-110 type		formed, C-30 type with mounting bracket
Material: housing, bushing, shaft terminals PCB	glass-reinforced thermoplastic tin-plated brass FR4				

¹See Order Guide Tables on pp. 5-7.

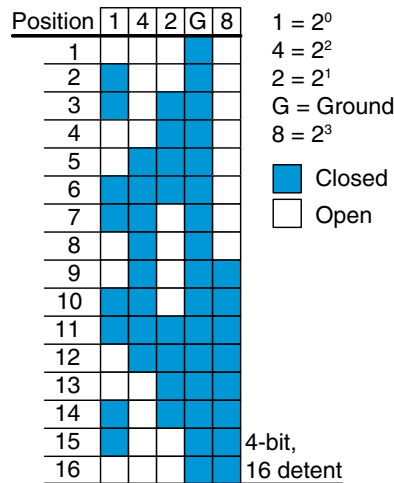
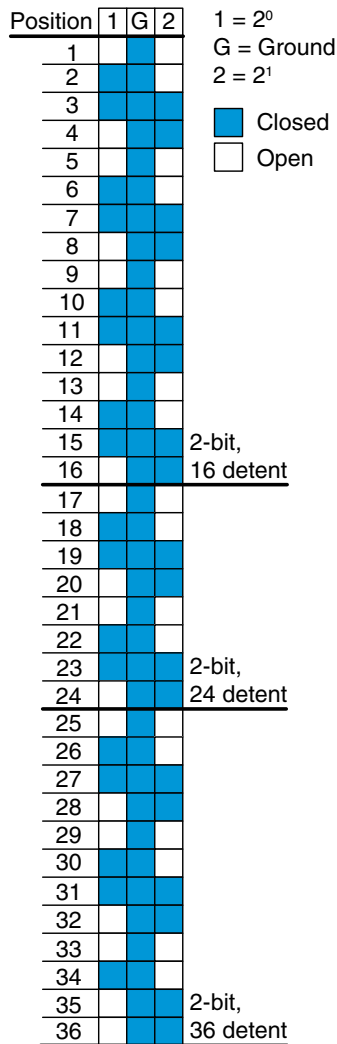
Table 3. Environmental Specifications

Characteristic	Parameter				
	Termination B 2-bit	Termination B 4-bit	Termination C 2-bit	Termination C 4-bit	Termination D
Operating temperature	-40 °C to 105 °C [-40 °F to 221 °F]				
Storage temperature	-55 °C to 120 °C [-67 °F to 248 °F]				
Sealing	Controls are not sealed for board washing. Consult Honeywell for details.				

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Figure 1. Output Information

Incremental Output Graphs (Clockwise Rotation)



Channel Graph

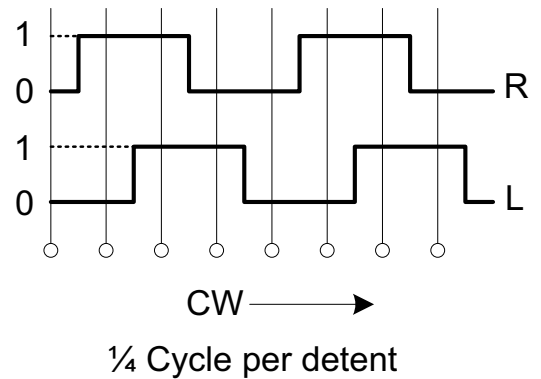
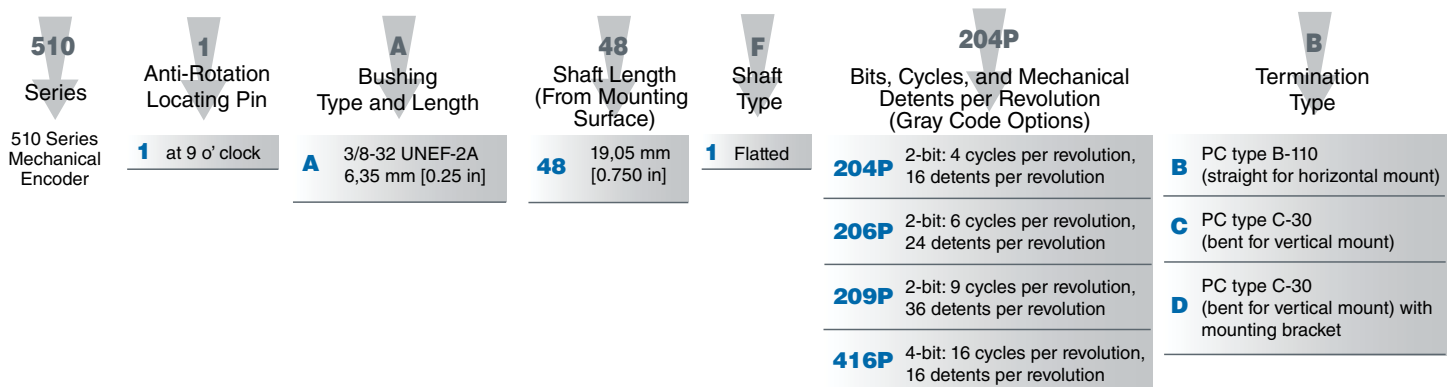


Figure 2. Nomenclature Tree

For example, **5101A48F204PB** defines a 510 Series Mechanical Encoder, anti-rotation locating pin at the 9 o' clock position, 3/8-32 UNEF-2A, 9,53 mm [0.25 in] bushing type and length, 19,05 mm [0.750 in] shaft length, flatted shaft, 2-bit: 4 cycles per revolution, 16 detents per revolution, PC type B-110 termination.



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Table 510-A Order Guide

Catalog Listing	Electrical	Mechanical	RoHS Compliant	Mounting Hardware
	Number of Bits	Detent Positions		
510E1A48F204PB	2	16	yes	none
510E1A48F206PB	2	24	yes	none
510E1A48F209PB	2	36	yes	none

Dimensional Drawing (For reference only: mm [in.]

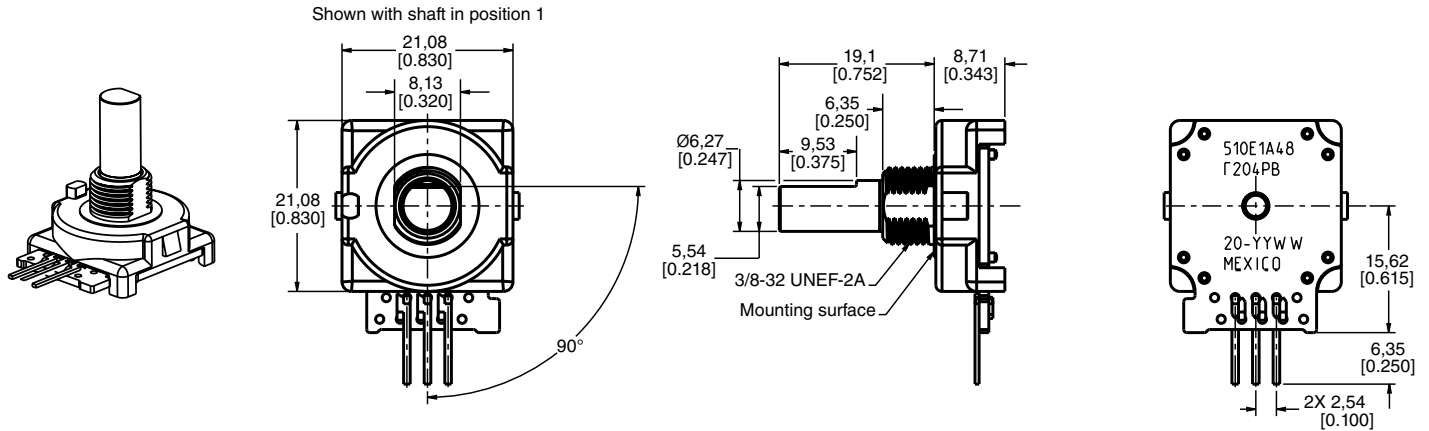
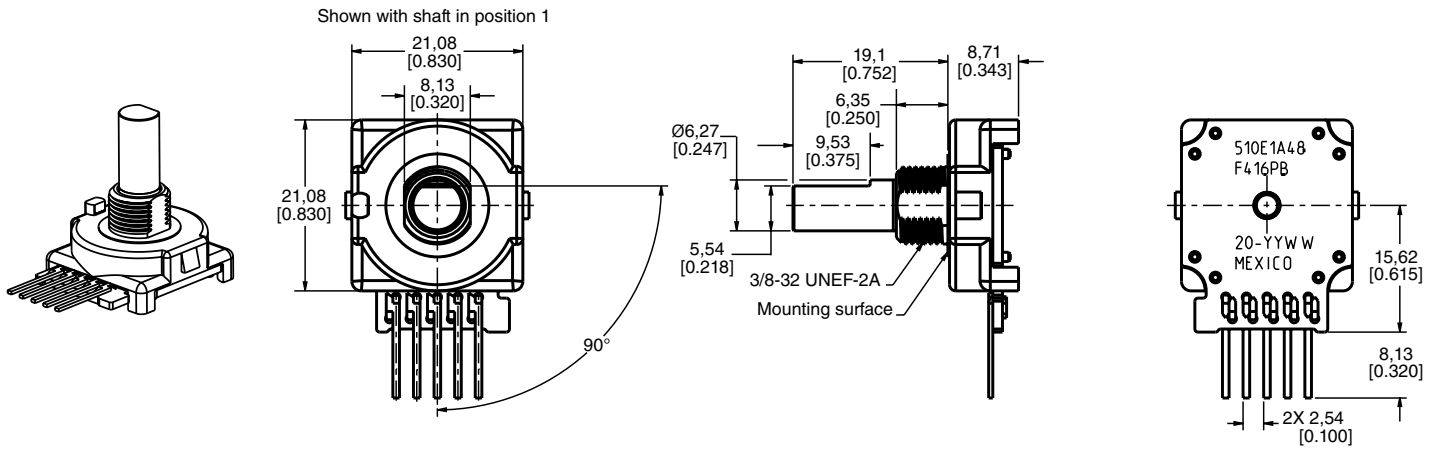


Table 510-B Order Guide

Catalog Listing	Electrical	Mechanical	RoHS Compliant	Mounting Hardware
	Number of Bits	Detent Positions		
510E1A48F416PB	4	16	yes	none

Dimensional Drawing (For reference only: mm [in.]



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Table 510-C Order Guide

Catalog Listing	Electrical	Mechanical	RoHS Compliant	Mounting Hardware
	Number of Bits	Detent Positions		
510E1A48F204PC	2	16	yes	none
510E1A48F206PC	2	24	yes	none
510E1A48F209PC	2	36	yes	none

Dimensional Drawing (For reference only: mm [in].)

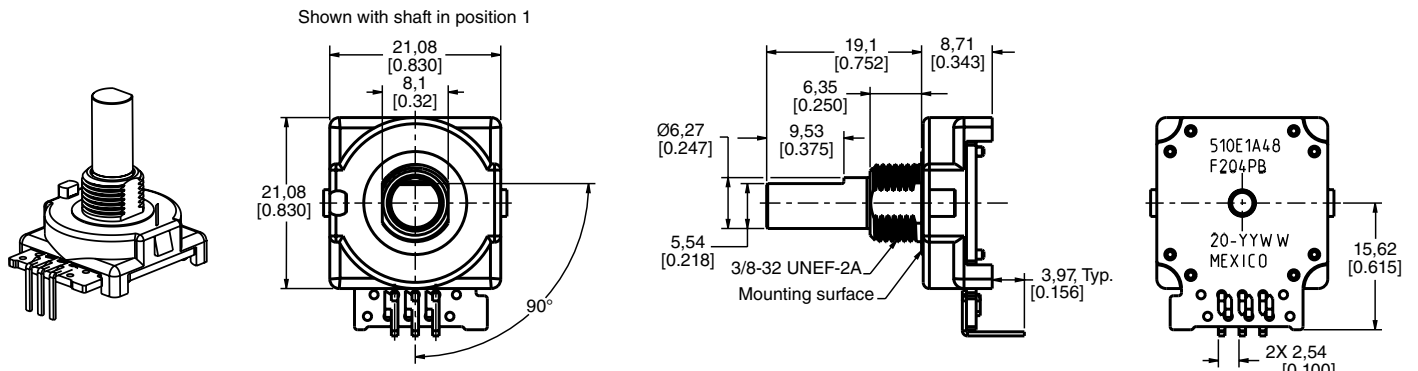
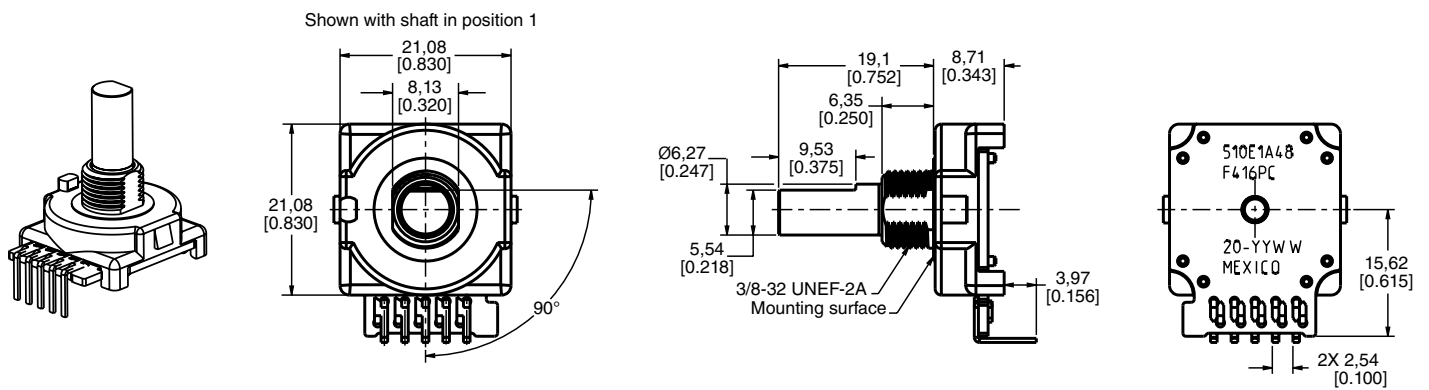


Table 510-D Order Guide

Catalog Listing	Electrical	Mechanical	RoHS Compliant	Mounting Hardware
	Number of Bits	Detent Positions		
510E1A48F416PC	4	16	yes	none

Dimensional Drawing (For reference only: mm [in].)



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Table 510-E Order Guide

Catalog Listing	Electrical	Mechanical	RoHS Compliant	Mounting Hardware
	Number of Bits	Detent Positions		
510E1A48F209PC	2	36	yes	mounting bracket

Dimensional Drawing (For reference only: mm [in].)

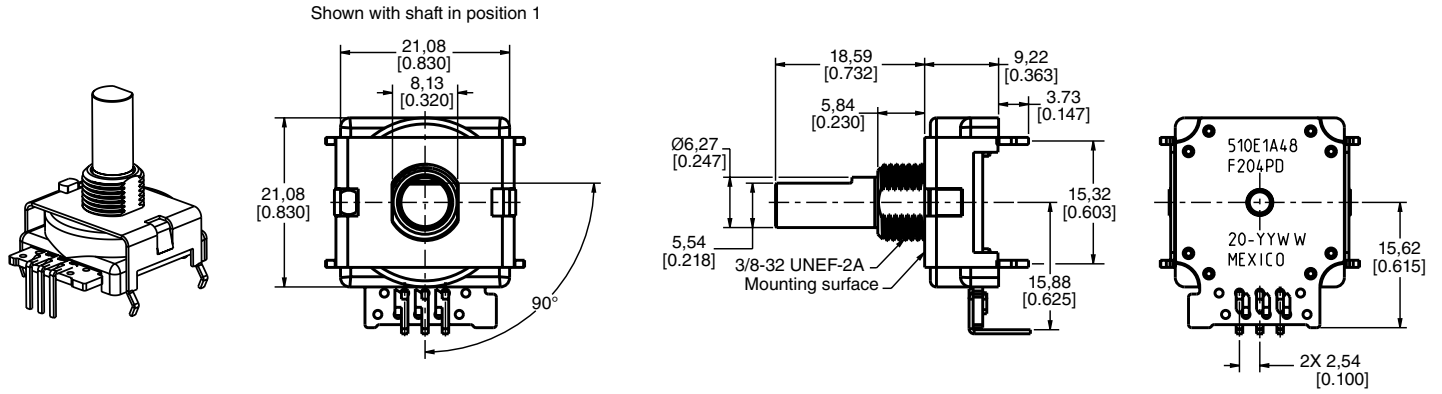
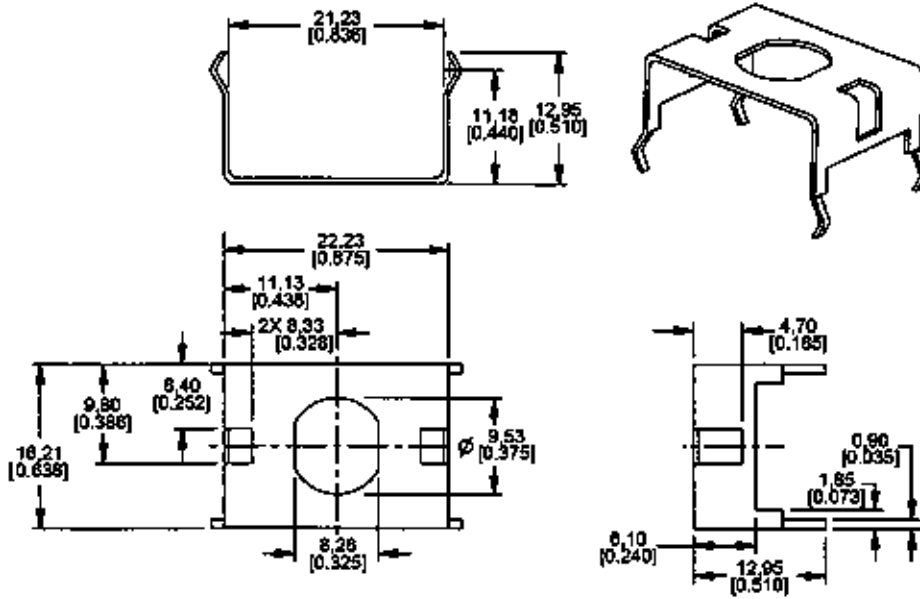


Figure 3. 510BKT Mounting Bracket (available separately)



ADDITIONAL INFORMATION

The following associated literature is available at sensing.honeywell.com:

- Product Range Guide
- Product Line Guide
- Installation Instructions

Find out more

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office.

To learn more about Honeywell's sensing and control products, call **+1-815-235-6847** or **1-800-537-6945**, visit **sensing.honeywell.com**, or e-mail inquiries to **info.sc@honeywell.com**

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DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

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