



**SERIES 62A,V,D**  
1/2" Package

**FEATURES**

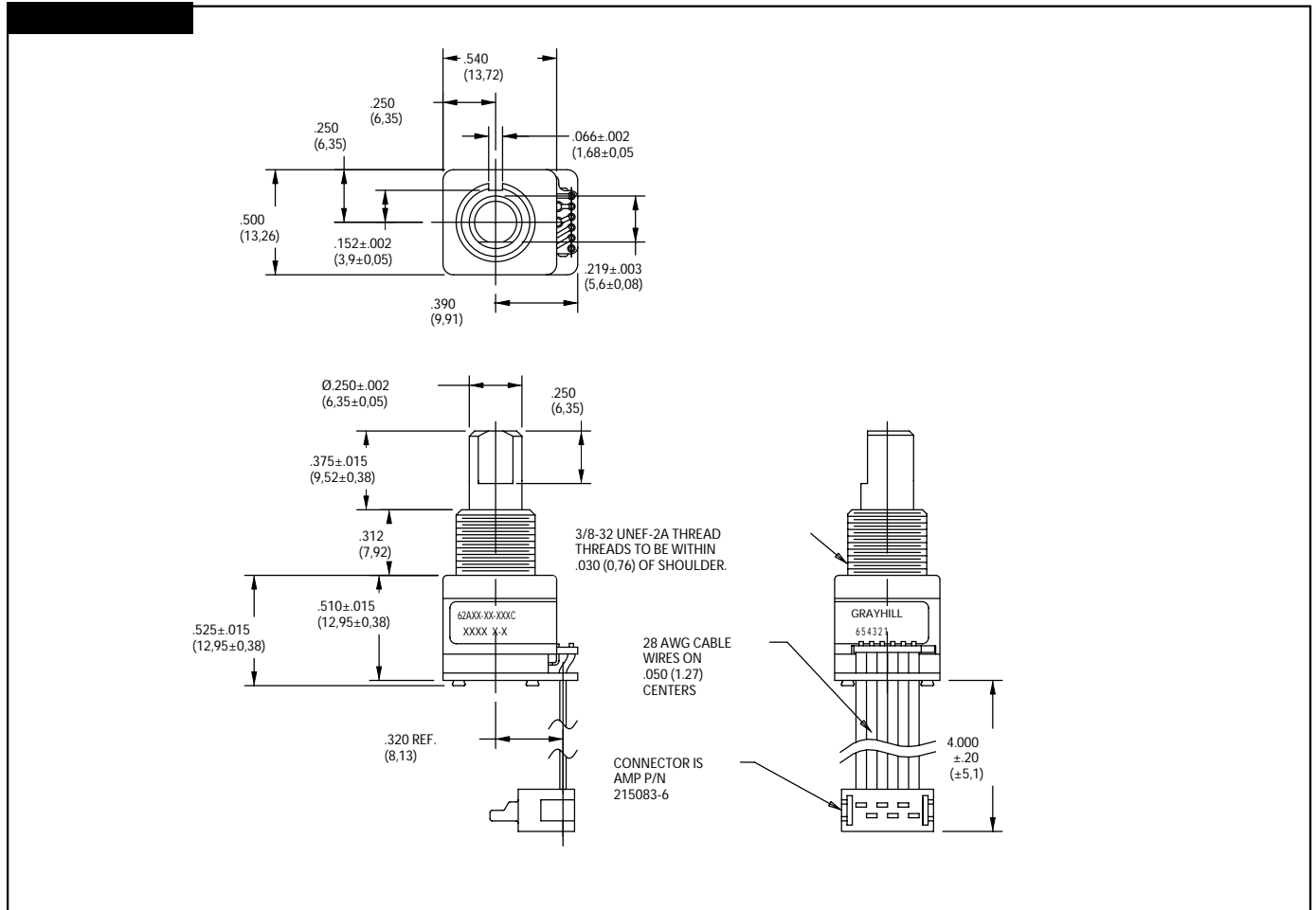
- Low Cost
- Long Life
- Available in 3.3 or 5.0 Vdc Operating Voltages
- High Torque Version to Emphasize Rotational Feel
- Economical Size
- Optically Coupled for More than a Million Cycles
- Optional Integral Pushbutton
- Compatible with CMOS, TTL and HCMOS Logic
- Available in 12, 16, 20, 24 and 32 Detent Positions (Non-detent Also Available)
- Choices of Cable Length and Terminations

**APPLICATIONS**

- Global Positioning/Driver Information Systems
- Medical Equipment



**DIMENSIONS** In inches (and millimeters)



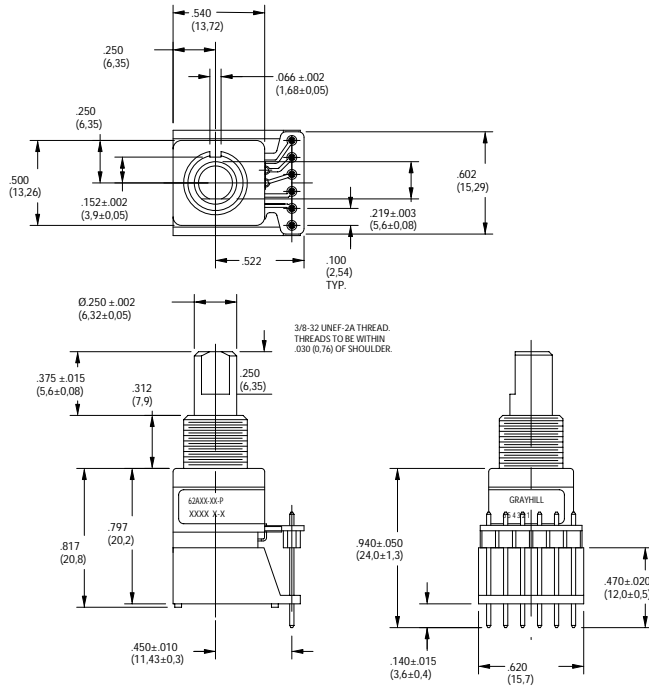
Optical and Mechanical Encoders



# Optical Encoders

## DIMENSIONS In inches (and millimeters)

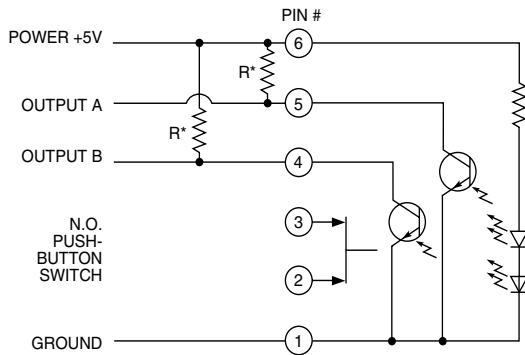
Unless otherwise specified, standard tolerance is  $\pm 0.010$  (0.25)



Optical and Mechanical Encoders

## CIRCUITRY, TRUTH TABLE, AND WAVEFORM Standard Quadrature 2-Bit Code

### Standard 5.0 Volt (Styles A and D)

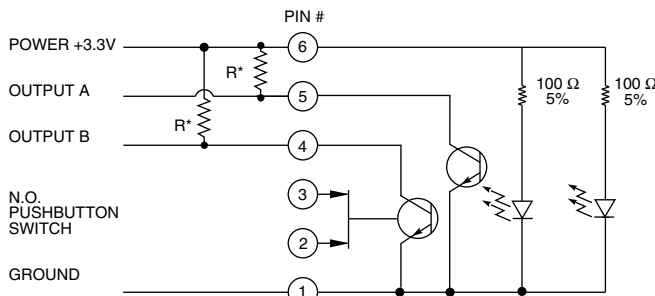


\* External pull-up resistors required for operation (2.2 kΩ).

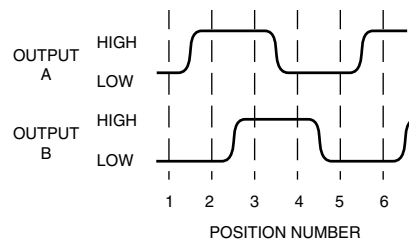
Clockwise Rotation		
Position	Output A	Output B
1		
2	●	
3	●	●
4		●

● Indicates logic high; blank indicates logic low. Code repeats every 4 positions.

### 3.3 Volt (Style V only)



\* External pull-up resistors required for operation (2.2k Ω)





**SPECIFICATIONS**

**Electrical and Mechanical Ratings**

**Rating:** 5 Vdc, 10 mA, resistive  
**Contact Resistance:** less than 10 ohms (TTL or CMOS compatible)  
**Pushbutton Life:** 3 million actuations minimum  
**Contact Bounce:** less than 4 mS at make and less than 10 mS at break  
**Actuation Force:** 1000 ±300 grams  
**Pushbutton Travel:** .010/.025 inch  
**Coding:** 2-bit quadrature coded output  
**Operating Voltage:** 5.0 ±.25 Vdc, 3.30±.125 Vdc (style V only)  
**Voltage Breakdown:** 250 Vac between mutually insulated parts  
**Supply Current:** 30 mA maximum  
**Logic Output Characteristics:**  
 Logic High: 3.8 Vdc (5.0 Vdc); 2.3 (3.3 Vdc) minimum  
 Logic Low: 0.8 Vdc maximum  
**Rotational Life:** 1,000,000 cycles minimum (One cycle is a rotation through all positions and a full return)  
**Minimum Sink Current:** 2.0 mA for 5 Vdc; 1.0 mA for 3.3 Vdc  
**Power Consumption:** 150 mW maximum for 5 Vdc; 80 mW for 3.3 Vdc  
**Optical Rise and Fall Times:** less than 30 mS maximum

**Operating Torque:**  
 Style A and V: 2.0 ±1.4 in-oz. initially  
 Style D: 3.5 ±1.4 in-oz initially  
 Non-detent: less than 1.5 in-oz initially  
**Shaft Push Out Force:** 45 lbs minimum  
**Mounting Torque:** 15 in-lbs maximum  
**Terminal Strength:** 15 lbs cable pull-out force minimum  
**Operating Speed:** 100 RPM maximum  
**Axial Shaft Play:** .010 maximum

**Environmental Ratings**

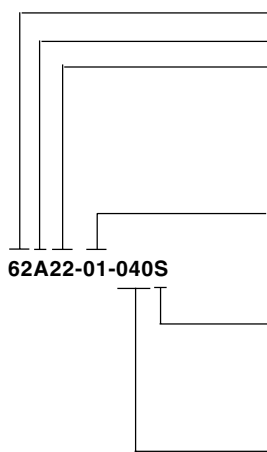
**Operating Temperature Range:** -40°C to 85°C  
**Storage Temperature Range:** -55°C to 100°C  
**Relative Humidity:** 90–95% at 40°C for 96 hours  
**Vibration Resistance:** Harmonic motion with amplitude of 15G, within a varied 10 to 2000 Hz frequency for 12 hours per MIL-STD-202, Method 204  
**Mechanical Shock:** Test 1: 100G for 6 mS, half sine, 12.3 ft/s; Test 2: 100G for 6 mS, sawtooth, 9.7 ft/s

**Materials and Finishes**

**Code Housing:** Reinforced thermoplastic  
**Shaft:** Zinc or aluminum  
**Bushing:** Zinc casting  
**Shaft Retaining Ring:** Stainless steel

**Detent Spring:** Stainless steel  
**Printed Circuit Boards:** NEMA grade FR-4 gold over nickel or palladium  
**Terminals:** Brass, tin-plated  
**Mounting Hardware:** One brass, nickel-plated nut and stainless steel lockwasher supplied with each switch. Nut is 0.094 inches thick by 0.562 inches across flats.  
**Rotor:** Thermoplastic  
**Code Housing:** Thermoplastic  
**Pushbutton Dome:** Stainless steel  
**Dome Retaining Disk:** Thermoplastic  
**Pushbutton Housing:** Thermoplastic  
**Phototransistor:** Planar Silicon NPN  
**Infrared Emitter:** Gallium aluminum arsenide  
**Pushbutton Contact:** Brass, nickel-plated  
**Flex Cable:** 28 AWG, stranded/top coated wire, PVC coated on .050 or .100" centers (cabled version)  
**Header Pins:** Phosphor bronze, tin-plated  
**Spacer:** ABS  
**Backplate/Strain Relief:** Stainless steel

**ORDERING INFORMATION**



**Series**  
**Style:** A = 1/2" package, 5.0 Vdc Input, D = high torque w/5.0 Vdc input, V = 3.3 Vdc input  
**Angle of Throw:**  

<b>Detent</b>	Non-detent (Styles A&V only)
11 = 11.25° or 32 positions	01 = 11.25° or 32 positions
15 = 15° or 24 positions	05 = 15° or 24 positions
18 = 18° or 20 positions	08 = 18° or 20 positions
22 = 22.5° or 16 positions	02 = 22.5° or 16 positions
30 = 30° or 12 positions	03 = 30° or 12 positions

**Pushbutton Option:** 01 = w/o pushbutton, 02 = with pushbutton  
**Termination:** S = Stripped cable; .050" centers  
 SH = Stripped cable; .100" centers  
 C = Connector; .050" centers  
 CH = Connector; .100" centers  
 P = Pin; .100" centers  
**Cable Length:** Cable Termination: 040 = 4.0in. Cable is terminated with Amp P/N 215083-6. See Amp Mateability Guide for Mating Connector details.  
*\*Eliminate cable length if ordering pins. (Ex: 62A22-02-P).*

These switches have Quadrature 2-bit code output and an optional shaft actuated pushbutton switch.

**Available from your local Grayhill Component Distributor.**  
 For prices and discounts, contact a local Sales Office, an authorized local Distributor, or Grayhill.