



Optical Encoders

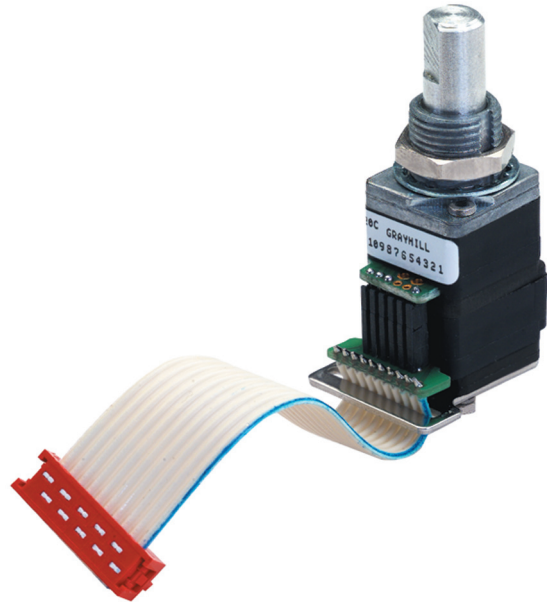
**SERIES 62R**  
1/2" Package, Redundant Circuitry

**FEATURES**

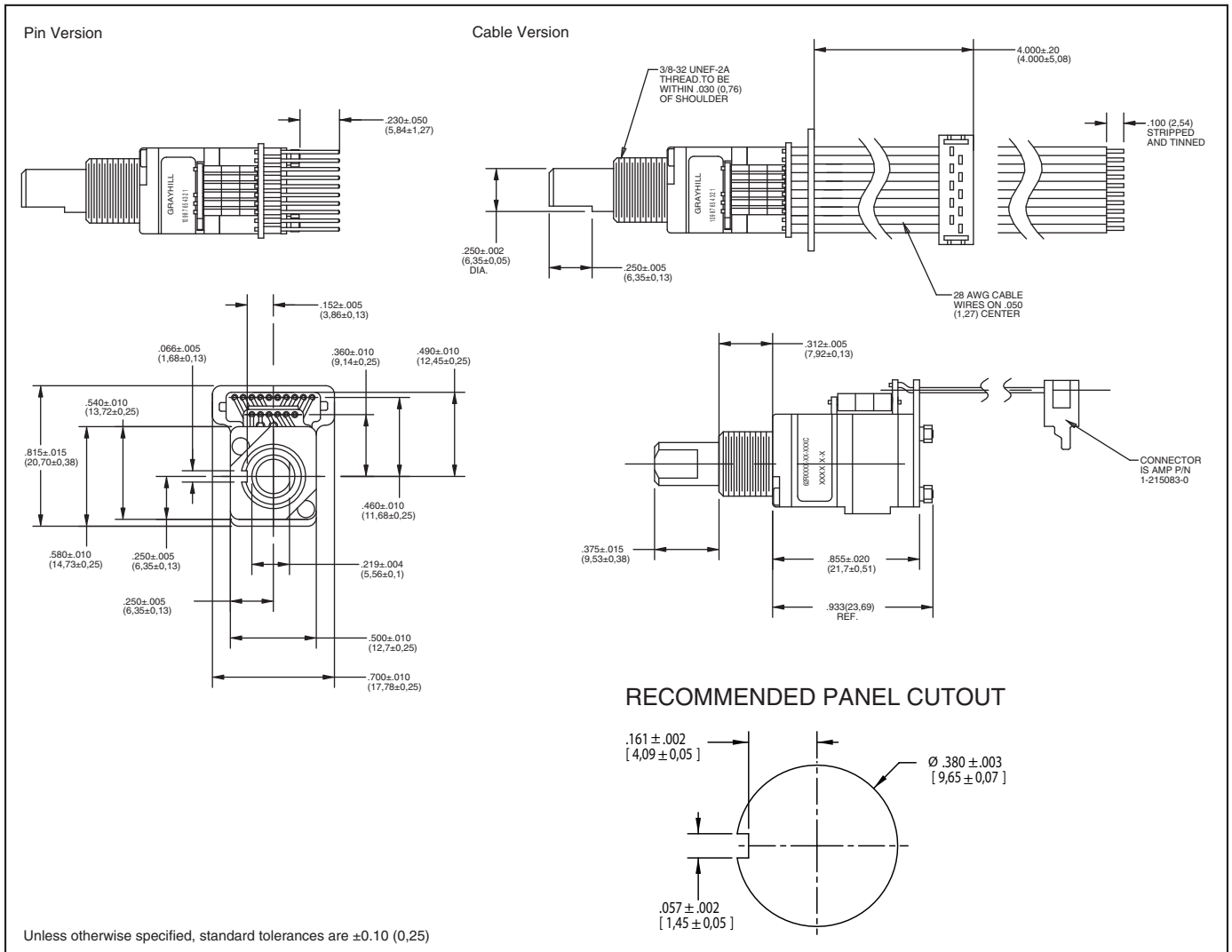
- Redundant Circuitry
- 1 Million Rotational Cycles
- Compatible with CMOS, TTL and HCMOS Logic
- Optional Integral Pushbutton
- Available in 12, 16, and 24 Detent Positions
- Choices of Cable Length and Terminations
- Ideal for Critical Applications

**APPLICATIONS**

- Cockpit Controls
- Medical Equipment



**DIMENSIONS** in inches (and millimeters)



Optical and Mechanical Encoders

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

**Switch Schematic**

\* 2.2k EXTERNAL PULL-UP RESISTORS REQUIRED FOR OPERATION

**Truth Table (CW Rotation)**

POSITION	DECK A		DECK B	
	OUTPUT 'A'	OUTPUT 'B'	OUTPUT 'A'	OUTPUT 'B'
1				
2	●		●	
3	●	●	●	●
4		●		●

● INDICATES LOGIC HIGH. BLANK INDICATES LOGIC LOW. CODE REPEATS EVERY 4 POSITIONS

**Wave Form (CW Rotation)**

**SPECIFICATIONS**

**Pushbutton Switch Ratings**

**Pushbutton Rating:** 10 mA, 5 Vdc, resistive  
**Contact Resistance:** less than 10 ohms (TTL or CMOS compatible)  
**Pushbutton Life:** 3 million actuations min.  
**Contact Bounce:** less than 4 mS at make and less than 10 mS at break  
**Actuation Force:** 1000 ±300 grams  
**Pushbutton Travel:** .010/.025"

**Switch Ratings**

**Coding:** 2-bit quadrature coded output  
**Operating Voltage:** 5.0 ±.25 Vdc  
**Voltage Breakdown:** 250 Vac between mutually insulated parts  
**Supply Current:** 30 mA maximum@5.0 Vdc (per deck)  
**Logic Output Characteristics:**  
 Logic High: 3.5 Vdc minimum  
 Logic Low: 1.5 Vdc maximum  
**Mechanical Life:** 1,000,000 cycles minimum (One cycle is a rotation through all positions and a full return)  
**Minimum Sink Current:** 2.0 mA  
**Power Consumption:** 150mW max. (per deck)  
**Output:** open collector phototransistor  
**Optical Rise and Fall Times:** less than 30 mS maximum

**Operating Torque:** 3.5 ±1.4 in-oz initially  
**Shaft Push Out Force:** 45 lbs minimum  
**Mounting Torque:** 15 in-lbs max.  
**Terminal Strength:** 15 lbs cable pull-out force min.  
**Operating Speed:** 100 RPM max.

**Environmental Ratings**

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

**Materials and Finishes**

**Shaft:** 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 zinc-plated spring steel with clear trivalent chromate finish lockwasher supplied with each switch. (Nut is 0.094 inches thick by 0.433 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, halogen-free polyolefin insulation on .050" centers (cabled version)  
**Header Pins:** Phosphor bronze, tin-plated  
**Spacer:** Zinc casting  
**Backplate/Strain Relief:** Stainless steel  
**Studs:** Stainless steel

**OPTIONS**

Contact Grayhill for custom terminations, shaft and bushing configurations, and resolutions. Control knobs are also available.

Optical and Mechanical Encoders

**ORDERING INFORMATION**

62R22-01-040S

**Series**  
 Angle of Throw: 15 = 15° or 24 pos, 22 = 22.5° or 16 positions, 30 = 30° or 12 Positions  
 Pushbutton Option: 01 = w/o pushbutton, 02 = with pushbutton

**Termination:** .050" centers; S = Stripped cable, C = Connector, P = Pin  
**Cable Length:** 040 = 4.0 inches. Cable is terminated with Amp Connector P/N 215083-8. See Amp Mateability Guide for mating connector details.  
 \*Eliminate cable length if ordering pins. (Ex: 62R22-02-P)

Custom materials, styles, colors, and markings are available. Control knobs available.

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

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