



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

**Clockwise Rotation**

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

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

\* EXTERNAL PULL-UP RESISTORS REQUIRED FOR OPERATION (2.2k).  
 \*\* Circuit shown with on-board lighting system. Versions without on-board lighting system do not have LED power connections. Refer to standard 62A series for circuitry.

**SPECIFICATIONS**

**Pushbutton Switch 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:** 500 ±300 grams
- Pushbutton Travel:** .010/.025 inch

**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
- Logic Output Characteristics:**
- Logic High:** 3.8 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
- Power Consumption:** 150mW maximum
- Optical Rise and Fall Times:** less than 30 mS maximum

**Operating Torque:**

- Detent: 2.0 ±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's, 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:** 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

**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

**Lockwasher:** Stainless steel

**Light Pipe:** Thermoplastic

**LED Housing:** Thermoplastic

**OPTIONS**

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

**ORDERING INFORMATION**

**Series**

**Angle of Throw: Detent**

- 11 = 11.25° or 32 pos.
- 15 = 15° or 24 positions
- 18 = 18° or 20 pos.
- 22 = 22.5° or 16 positions

**Non-detent**

- 01 = 11.25° or 32 positions
- 05 = 15° or 24 positions
- 08 = 18° or 20 positions
- 02 = 22.5° or 16 positions

**Pushbutton Option:** 01 = w/o pushbutton, 02 = with pushbutton

**LED:** blank = no LED, L = supplied with LED

**Termination:** S = Stripped cable; S-L = Stripped cable, LED; C = Connector; C-L = Connector, LED; P = Pin; P-L = Pin, LED

**Cable Length:** 020 = 2.0 inches minimum to 250 = 25.0 inches maximum. Provided in increments of 1/2 inch. Example 035 = 3.5", 060 = 6.0".

\*Eliminate cable length if ordering pins. (Ex: 62A22-02-P)

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

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

Optical and Mechanical Encoders