

# Optical Encoders

## Series 62F 1/2" Package, Lighted Shaft



### FEATURES

- Integrated Self-Lighting System for Knob Illumination
- 1 Million Rotational Cycles
- 1/2" Package
- Compatible with CMOS, TTL and HCMOS Logic
- Optional Integral Pushbutton
- Choices of Cable Length and Terminations
- Other Customized Solutions Available

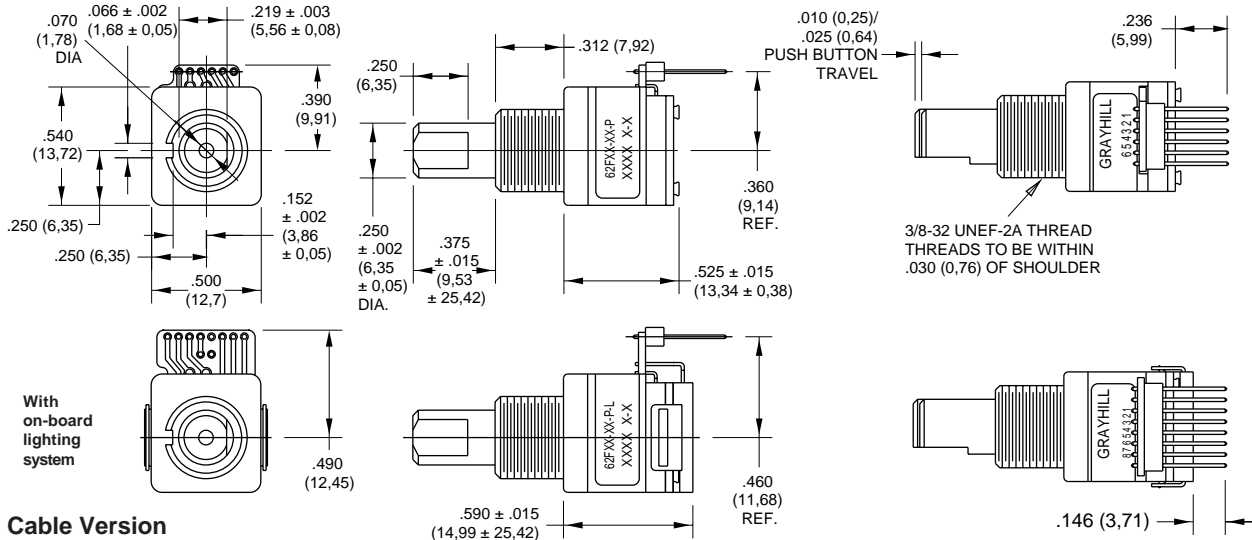
### APPLICATIONS

- Global Positioning/Drive Information Systems
- Medical Equipment
- Cockpit Controls
- Mixing Boards

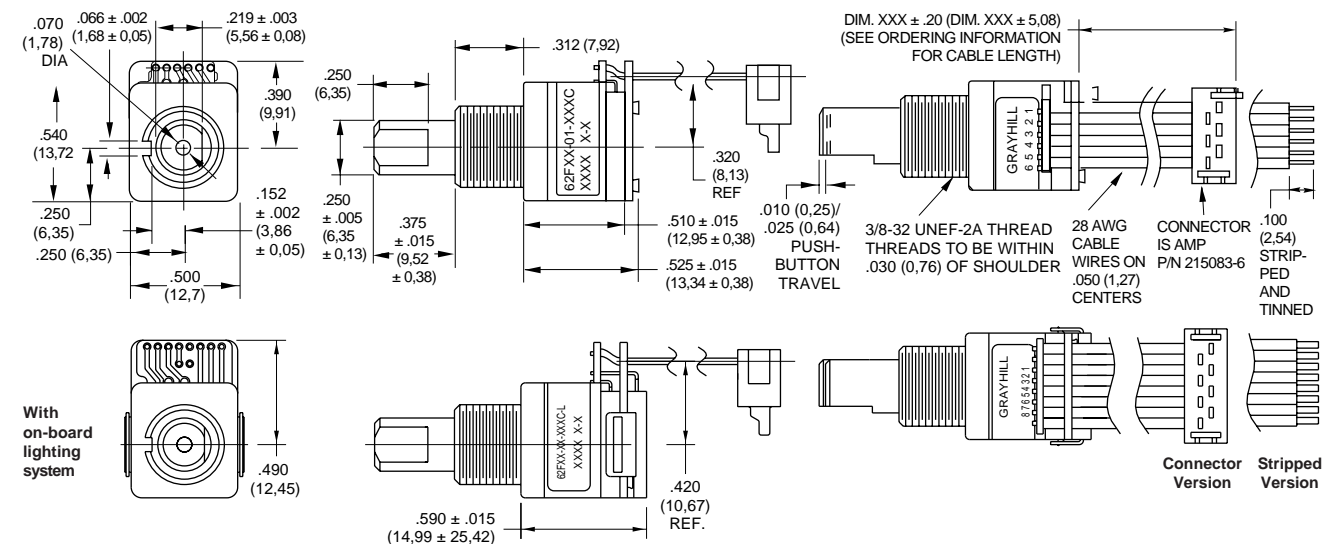


### DIMENSIONS In inches (and millimeters)

#### Pin Version



#### Cable Version



Unless otherwise specified, standard tolerance is  $\pm .010$  (0,25).

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

OUTPUT A

OUTPUT B

POSITION NUMBER

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 (pins 4 & 5) connections.

#### 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:** Phospher 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.	<b>Non-detent</b>
15 = 15° or 24 positions	01 = 11.25° or 32 positions
18 = 18° or 20 pos.	05 = 15° or 24 positions
22 = 22.5° or 16 positions	08 = 18° or 20 positions
	02 = 22.5° or 16 positions

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

**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.