



Optical Encoders

SERIES 61L Full Quadrature Cycle Per Detent

FEATURES

- .650 sq. inch package size
- Optically coupled for 1 million rotational cycles
- Optional integrated pushbutton
- Detented and non-detented versions available
- Available in 24 positions

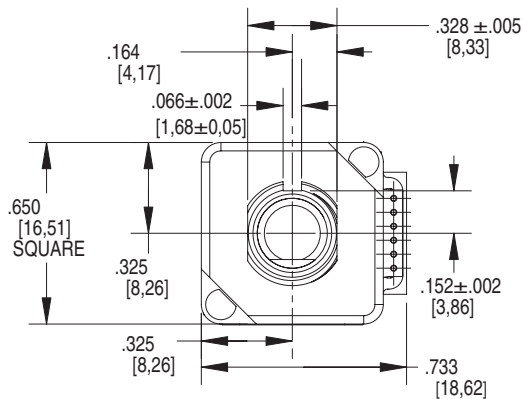
APPLICATIONS

- Medical Devices
- Test and Measurement Equipment
- Other Scroll and Select Applications

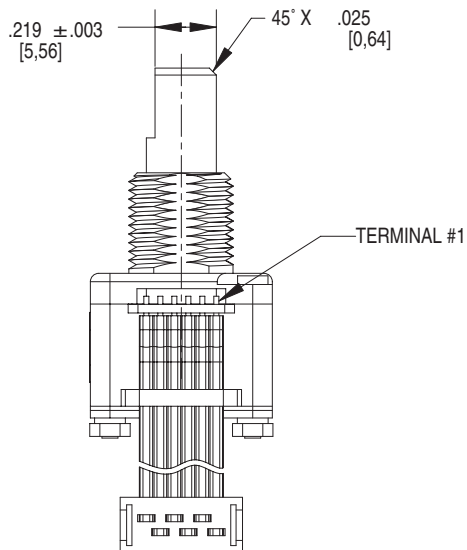
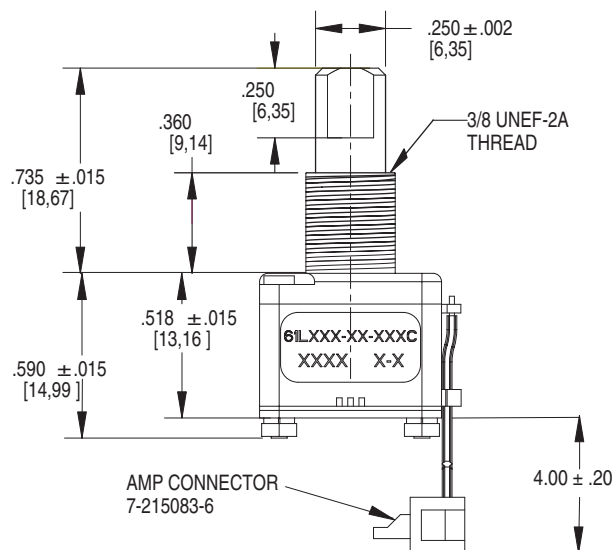
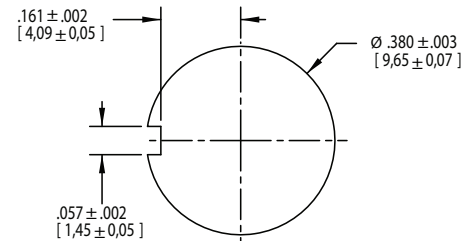


DIMENSIONS in inches (and millimeters)

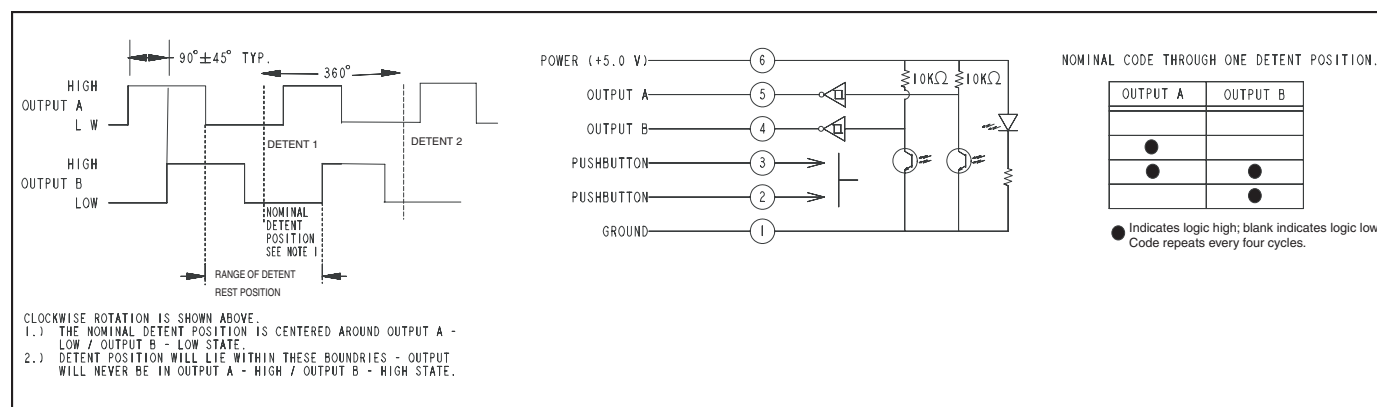
Unless otherwise specified, standard tolerances are:
 Linear $\pm .025$
 Diameter $\pm .010$
 Angle $\pm 2.0^\circ$



Suggested Mounting Panel Cutout



CIRCUITRY, WAVEFORM AND TRUTH TABLE



SPECIFICATIONS

Environmental Specifications

Operating Temperature Range: -40°C to 85°C**Storage Temperature Range:** -55°C to 100°C**Humidity:** 96 hours at 90-95% humidity at 40°C**Mechanical Vibration:** Harmonic motion with amplitude of 15g, within a varied frequency of 10 to 2000 Hz**Mechanical Shock:**

Test 1: 100g for 6 ms half-sine wave with a velocity change of 12.3 ft/sec

Test 2: 100g for 6 ms sawtooth wave with a velocity change of 9.7 ft/sec

Rotary Electrical and

Mechanical Specifications

Operating Voltage: 5.00±.25Vdc**Supply Current:** 30 mA maximum at 5Vdc**Output Code:** Two-bit quadrature, channel A leads channel B by 90° electrically during clockwise rotation of the shaft.**Logic Output Characteristics:**

Logic high signal shall be no less than 3.8 Vdc

Logic low signal shall be no greater than 0.8 Vdc

Minimum Sink Current: 2.0 mA**Power Consumption:** 150 mW maximum**Mechanical Life:** 1 million cycles of operation for Medium, Low and Non-Detent. 1/2 million cycles of operation for High. One cycle is a rotation through all positions and a full return.**Average Rotational Torque:** H= 6.0 ± 2.6

in-oz, M= 2.7 ± 1.8 in-oz, L= 1.4 ± 0.8 in-oz, N= <0.50 in-oz. Torque shall be within 50% of initial value throughout life.

Mounting Torque: 15 in-oz maximum**Shaft Push-Out Force:** 45 lbs minimum**Shaft Pull-Out Force:** 45 lbs minimum**Terminal Strength:** 15 lbs minimum terminal pull-out force for cable or header termination**Solderability:** 95% free of pinholes and voids**Pushbutton Electrical and Mechanical Specifications****Rating:** 50 mA at 12 Vdc**Contact Resistance:** <10Ω**Life:** 1/2 million actuations minimum**Contact Bounce:** <4 ms make, <10 ms break**Actuation Force:** 510 ± 150 grams**Shaft Travel:** .025 ± .015 inch**Materials and Finishes****Bushing:** Zinc**Shaft:** Aluminum**Retaining Ring:** Stainless Steel**Detent Spring:** Music Wire**Detent Ball:** High Carbon Chrome, Nickel finish**Code Housing:** Polyamide Polymer, Hiloy 610**Aperture:** Stainless Steel**Detent:** Polyamide Polymer, Hiloy 610**Rotor Hub:** Polyamide Polymer, Hiloy 610**Code Rotor:** Stainless Steel**Printed Circuit Boards:** Nema Grade FR4, Double Clad with Copper, Plated with Gold over Nickel**Infrared Light Emitting Diode Chips:** Gallium Aluminum Arsenide**Silicon Phototransistor Chips:** Gold and Aluminum Alloys**Resistor:** Metal Oxide on Ceramic Substrate**Solder Pins:** Brass, Plated with Tin**Tact Switch:** Cover - Stainless Steel, contact Disc - Phosphor Bronze with silver cladding, terminal - brass with silver cladding, base - UL94V-0 Nylon 19: High Temp**Back Plate:** Stainless Steel**Spacer:** Nomex Type 410**Cable:** Copper Standard with Topcoat in PVC Insulation**Connector:** Glass filled Polyester, Tin/Nickel Phosphor Bronze**Label:** TT406 Thermal Transfer Cast Film**Solder:** 96.5% tin / 3% silver / 0.5% copper, no clean**Lubricating Grease:** NYE Nyogel 774L**Studs:** Stainless Steel**Lockwasher:** Stainless Steel**Hex Nuts:** Stainless Steel**Series****Operating Voltage:** 3 = 3.3 Volts, 5 = 5 Volts**Angle of Throw:** 07 = 7.2° for complete quadrature cycle change and 50 detent positions
15 = 15° for complete quadrature cycle change and 24 detent positions**Rotational Torque:** N = Non-Detent, H=High Torque, M=Medium Torque, L=Low Torque**Pushbutton Option:** 0=Non-Pushbutton, 5=510 grams**Termination:** C = .050 Center ribbon Cable with connector**Cable Termination:** 040=4.0 inches. Cable is terminated with [Amp Connector P/N7-215083-6](#). See [Amp Mateability Guide](#) for Mating Connector details.