SERIES 61B
16, 24, or 32 Position, Optional Pushbutton

FEATURES
- Positions Screen Cursor
- More Friendly than Keyboards
- Permits Visual Concentration
- Economic Touchscreen Alternative
- Pushbutton for Entry Function
- Detent for Tactile Feedback and Minimal Backlash
- Optical Coupled for Long Life
- Rugged Construction

APPLICATIONS
Display Input
The Series 61 rotary encoder switch can move cursor or icon on a display. Use the rotary and pushbutton switch to simply select a menu item and enter it, or write more elaborate display software. Use the Series 61 to input limit settings for a monitored function. Change an item on a checklist to a new value while viewing the remainder of the list.

Incremental Input
Use the Series 61 with an interface chip to provide step by step input for setting radio frequency, drill depth, RPM, etc. These changes are usually a few steps, and you need not turn the switch several revolutions for the desired value. Some examples are as follows:
- Robot Position
- Volume Setting
- Limit Setting
- Motor Control

DIMENSIONS In inches (and millimeters)

Diagram illustrates a 16-position switch with integral pushbutton switch.

Unless otherwise indicated, tolerances are ± .010 (0.25).
### SPECIFICATIONS

#### Pushbutton Switch Ratings
- **Rating:** 5 Vdc, 10 mA, Resistive
- **Contact Resistance:** less than 10 (TTL or CMOS Compatible)
- **Voltage Breakdown:** 250 Vac between mutually insulated parts.
- **Contact Bounce:** Less than 4 milliseconds at make and less than 10 milliseconds at break
- **Actuation Life:** 3,000,000 operations
- **Actuation Force:** Maximum actuation force of 615 grams and a minimum actuation force of 415 grams.

#### Encoder Ratings
- **Coding:** 2-bit quadrature coded output
- **Operating Voltage:** 5 ± 0.25 Vdc
- **Supply Current:** 30 mA maximum at 5 Vdc
- **Logic High:** 3.8V minimum
- **Logic Low:** 0.8V maximum
- **Logic Rise and Fall Times:** Rise Time less than 30 mS at 16.6 RPM. Fall Time less than 30 mS at 16.6 RPM.

#### Operating Torque:
- 2.0 ± .75 in-oz

#### Rotational Life:
- more than 1,000,000 cycles of operation (1 cycle = 360° rotation and return)

#### Shaft Push Out Force:
- 50 lbs minimum

#### Mounting Torque:
- 15 in-lbs maximum

#### 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, within a varied 10 to 2000 Hz frequency for 12 hours per MIL-STD-202, Method 204
- **Shock Resistance:** Test 1: 100g for 6 mS half sine wave with velocity change of 12.3 ft/s. Test 2: 100g for 6 mS, sawtooth wave with velocity change of 9.7 ft/s.
- **Relative Humidity:** 90–95% at 40°C for 96 hours

#### Materials and Finishes
- **Detent Cover:** Thermosetting plastic
- **Bushing:** Zinc casting, cadmium-plated per QQP–416, Class 2, Type II
- **Shaft:** Reinforced thermoplastic Note: Earlier versions may have electropolished stainless steel shafts (still available in customs only).
- **Detent Balls:** Passivated, stainless steel
- **Detent Spring:** Tinned music wire
- **Printed Circuit Boards:** NEMA Grade FR-4
- **Board Terminals:** Copper alloy, CDA No. 725
- **Through Bolts:** Stainless steel, unplated
- **Through Bolt Nuts:** Stainless steel
- **Switch Assembly Cover and Code Rotor:** PBT polyester thermoplastic
- **Mounting Hardware:** One brass, cadmium-plated nut and lockwasher supplied with each switch. Nut is 0.094" thick by 0.562" across flats.
- **Strain Relief:** PBT polyester thermoplastic (cable version only)
- **Cable:** 26 AWG, stranded/tinned wire, PVC coated on .100 (2,54) centers (cable version only)

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

**CIRCUIT Diagram:**

- **POWER +5V**
- **OUTPUT A**
- **OUTPUT B**
- **N.O. PUSHBUTTON SWITCH**
- **GROUND**

**Truth Table:**

<table>
<thead>
<tr>
<th>PIN#</th>
<th>R*</th>
<th>150Ω</th>
<th>R*</th>
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</tbody>
</table>

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

**Waveform Diagram:**

- **OUTPUT A**
- **OUTPUT B**
- **HIGH**
- **LOW**

### ORDERING INFORMATION

- **Series**
  - **Style:** B = Standard, unsealed
  - **Angle of Throw:**
    - 11 = 11.25° or 32 Positions
    - 15 = 15° or 24 Positions
    - 22 = 22.25° or 16 Positions
  - **Coding:** 01 = Quadrature
  - **Pushbutton Option:** 01 = Without pushbutton, 02 = With pushbutton

- **Termination:** Blank (no dash or numbers) = pins as described in drawing
  - Cable Termination 020 = 2.0 inches minimum to 250 = 25 inches maximum. Provided in increments of 1/2 inch. Example 035 = 3.5”, 060 = 6 inches. Cable is terminated with standard Amp Connector 640442-6. Use any 6 position, .100 center header to mate with the cable assembly. Contact Grayhill I-20

Custom shaft and bushing lengths, shaft/panel seal, and additional supply voltages are available through Grayhill only. Control knobs available, see page I-57.

### ACCESSORIES

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

See page I-41.