SERIES 61C
16 or 32 Position with Pushbutton

FEATURES
• Competitively Priced to Similar Electromechanical Switches
• Optically Coupled For More Than A Million Trouble-Free Rotations
• Has Data Entry Pushbutton Switch Activated By Switch Shaft
• Compatible With CMOS, TTL and HCMOS Logic
• Operationally Used to Move Display Icon and Input Data
• Used to Set Radio Frequency, Drill Depth, RPM, etc.

DIMENSIONS In inches (and millimeters)

Unless otherwise indicated, tolerances are ± .010 (0.25).
CIRCUITRY, TRUTH TABLE, AND WAVEFORM: Standard Quadrature 2-Bit Code

**Position Output A Output B**

<table>
<thead>
<tr>
<th>Position</th>
<th>Output A</th>
<th>Output B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>4</td>
<td>●</td>
<td></td>
</tr>
</tbody>
</table>

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

*External pull-up resistors required for operation. 8.2 kΩ is suggested for TTL; 3.3 kΩ is suggested for CMOS.

**SPECIFICATIONS**

**Pushbutton Switch Ratings**
- **Rating:** 5 Vdc, 10 mA, resistive
- **Contact Resistance:** less than 10 ohms (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 330 grams and a minimum actuation force of 250 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 for CMOS and 2.7V for TTL 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:** 1.5 in-oz ± 30% initial (1.0 in-oz ± 50% after life for 32 position only)
- **Rotational Life:** more than 1,000,000 cycles of operation (1 cycle = 360° rotation and return)
- **Shaft Push Out Force:** 20 lbs minimum
- **Mounting Torque:** 10 in-lbs 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, within a varied 10 to 2000 Hz frequency for 12 hours per MIL-STD-202, Method 204
- **Shock Resistance:** Test 1: Tested at 100g for 6 mS, half sine, 12.3 ft/s Test 2: 100g for 6 mS, sawtooth, 9.7 ft/s

**Materials and Finishes**
- **Bushings:** Reinforced thermoplastic
- **Shaft:** Reinforced thermoplastic
- **Detent Balls:** Steel, nickel-plated
- **Detent and Pushbutton Springs:** Tinned music wire
- **Printed Circuit Boards:** NEMA grade FR-4
- **Pushbutton Contact:** Stainless steel, gold-plated
- **Board Terminals:** Phosphor bronze, tin-plated
- **Mounting Hardware:** One brass, cadmium-plated nut and lockwasher supplied with each switch. Nut is 0.094 inches thick by 0.562 inches across flats.
- **Rotor:** Reinforced thermoplastic
- **Aperture/Dome Retainer:** Lexan 141, Polycarbonate

**ORDERING INFORMATION**

**Series**
- **Style:** C = Standard
- **Angle of Throw:** 00 = No detent
- 11 = 11.25° or 32 Positions
- 22 = 22.25° or 16 Positions
- **Coding:** 01 = Quadrature

**Pushbutton Option:**
- 01 = Without pushbutton, 02 = With pushbutton

**Number of Changes per Revolution:**
- 04 for no detent and 22.25° angle of throw
- 08 for no detent and 11.25° angle of throw

Custom knobs available, see page I-57.

**ACCESSORIES**
See page I-41.

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