## Optical Encoders

Series 62HS High Torque
Grayhall

## FEATURES

- High Rotational Torque Provides Positive Tactile Feedback
- Optically Coupled for More than a Million Cycles
- Optional Integral Pushbutton
- Compatible with CMOS, TTL and HCMOS Logic
- Available in 8,12 and 16 Detent Positions
- Choice of Cable Length and Terminations


## APPLICATIONS

- Avionics


DIMENSIONS In inches (and millimeters)


## WAVEFORM AND TRUTH TABLE



| Clockwise Rotation |  |  |
| :---: | :---: | :---: |
| Position | Output A | Output B |
| 1 |  |  |
| 2 | $\bullet$ |  |
| 3 | $\bullet$ | $\bullet$ |
| 4 |  | $\bullet$ |

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


## CIRCUITRY



## SPECIFICATIONS

## Pushbutton Switch Ratings

Rating: at $5 \mathrm{Vdc}, 10 \mathrm{~mA}$, resistive
Contact Resistance: less than 10 ohms
(TTL or CMOS compatible)
Pushbutton Life: 3 million actuations

## minimum

Voltage Breakdown: 250 Vac between mutually insulated parts
Contact Bounce: less than 4 mS at make and less than 10 mS at break
Actuation Force: $1100 \pm 300 \mathrm{~g}$

## Encoder Ratings

Coding: 2-bit quadrature coded output
Operating Voltage: $5.0 \pm .25 \mathrm{Vdc}$
Supply Current: 30 mA maximum @ 5.0 Vdc
Logic Output Characterisitics:
Logic High: 3.0 Vdc minimum
Logic Low: 1.0 Vdc maximum
Mechanical Life: $1,000,000$ cycles minimum (One cycle is a rotation through all positions and a full return)
Minimum Sink Current: 2.0 mA for 5 Vdc Power Consumption: 150 mW maximum Output: open collector phototransistor Logic Rise and Fall: less than 30 mS max

Operating Torque: 5.0 in-oz +/- 1.5 in-oz initial
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

## Environmental Ratings

Operating Temperature Range: $-40^{\circ} \mathrm{C}$ to $85^{\circ} \mathrm{C}$
Storage Temperature Range: $-55^{\circ} \mathrm{C}$ to $100^{\circ} \mathrm{C}$
Vibration Resistance: Harmonic motion with amplitude of 15G, within a varied 10 to 2000 Hz frequency for 12 hours
Mechanical Shock: Test 1: 100G, 6 mS , half sine, $12.3 \mathrm{ft} / \mathrm{s}$; Test 2: 100G, 6 mS , sawtooth, $9.7 \mathrm{ft} / \mathrm{s}$
Relative Humidity: $90-95 \%$ at $40^{\circ} \mathrm{C}$ for 96 hours

## Materials and Finishes

Code Housing: Reinforced thermoplastic
Shaft: Stainless Steel

Bushing: Zinc casting
Shaft Retaining Ring: Stainless steel
Detent Spring: Stainless steel
Detent Ball: Stainless steel
Detent Section: Hiloy 610
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
Pushbutton Dome: Stainless steel
Phototransistor: Planar Silicon NPN
Infrared Emitter: Gallium aluminum

## arsenide

Flex Cable: 28 AWG, stranded/top coated wire, PVC coated on .050 " centers (cabled version)
Header Pins: Brass, tin-plated
Spacer: Hiloy 610
Shim: Stainless Steel
Backplate/Strain Relief: Stainless steel

## ORDERING INFORMATION



