

SPECIFICATIONS

Pushbutton Switch Ratings

Electrical Rating: at 24 Vdc max, 10 mA, resistive
Contact Resistance: less than 10 ohms
Pushbutton Life Expectancy: 1 million actuations minimum
Contact Bounce: less than 4 mS at make and less than 10 mS at break
Actuation Force: 5 = 455 ±140 g
Pushbutton Travel: .019±.008 in

Encoder Ratings

Coding: 2-bit quadrature coded output
Operating Voltage: NG5: 5.0 ±.25 Vdc, NG3: 3.3 ±.125 Vdc
Supply Current: NG5: 30 mA maximum @5.0 Vdc, NG3: 30 mA maximum @3.3 Vdc
Logic Output Characteristics:
Logic High: NG5: 3.0 Vdc minimum, NG3: 2.0 Vdc minimum
Logic Low: NG5: 1.0 Vdc maximum, NG3: 1.0 Vdc maximum
Mechanical Life: 1,000,000 cycles (one cycle is a rotation through all positions and a full return)
Max Rotational Speed: 100 RPM

Shaft Pushout / Pullout Force: 45 lbs/45 lbs minimum
Mounting Torque: 15 in-lbs maximum
Terminal Strength: 15 lbs minimum cable or header pullout force, MIL-STD-202, Method 211A, Test Condition A
Solderability: 95% free of pin holes and voids, MIL-STD-202, Method 208

Environmental Ratings

Operating Temperature Range: -40°C to 85°C, IEC 68-2-1, Test Aa and IEC 68-2-2, Test Aa
Storage Temperature Range: -40°C to 85°C, IEC 68-2-1, Method Aa and IEC 68-2-2, Method Ba
Mechanical Shock: Test 1: 100G, 6 mS, half sine, 12.3 ft/s; Test 2: 100G, 6 mS, sawtooth, 9.7 ft/s, MIL-STD-202, Method 213, Test Condition C and I
Relative Humidity: 90–95% at 40°C for 96 hours, MIL-STD-202, Method 103B
Mechanical Vibration: Harmonic motion with amplitude 15G within a varied 10 - 2000Hz frequency for 12 hours, MIL-STD-202, Method 204, Test Condition B

Materials and Finishes

Shafts: Zinc
Bushing: Zinc
Header Pins: Tin-plated phosphor bronze
Hex Nut: Nickel plated brass
Lockwasher: Spring steel, zinc plate with clear trivalent chromate finish
Cable: Copper stranded with topcoat in PVC insulation (cable version only)

EMC Ratings

Radiated Immunity: Meets IEC 61000-4-3, level 3
Conducted Immunity: Meets IEC 61000-4-6, level 3
Radiated Emissions: Meets ANSI C63.4
Conducted Emissions: Meets EN 55022
Electrostatic Discharge: Meets IEC 61000-4-2
Power Frequency Magnetic Field: Meets IEC 61000-4-8

| INITIAL AVERAGE ROTATIONAL TORQUE (IN-OZ) | | | | |
|---|----------------------|-----------------------|------------------------|-------------------------|
| 50% OF INITIAL TORQUE THROUGHOUT LIFE | | | | |
| | LOW LEAF SPRING (LL) | HIGH LEAF SPRING (LH) | LOW BALL & SPRING (BL) | HIGH BALL & SPRING (BH) |
| 16 POSITION | 2.00±1.40 | 3.50±1.40 | 0.90±0.45 | 1.60±0.90 |
| 20 POSITION | 2.00±1.40 | 3.50±1.40 | 0.80±0.40 | 1.60±0.90 |
| 24 POSITION | 2.00±1.40 | 3.50±1.40 | 0.70±0.40 | 1.60±0.90 |
| 32 POSITION | 2.00±1.40 | 3.50±1.40 | 0.60±0.40 | 1.15±0.65 |

CIRCUITRY, TRUTH TABLE, AND WAVEFORM

•EXTERNAL 10kΩ PULL-UP RESISTORS REQUIRED FOR OPERATION
 ••NOISE FILTERING CAPACITOR, LESS THAN 1000pF

(CW ROTATION)

| (CW ROTATION) | | |
|---------------|----------|----------|
| POSITION | OUTPUT A | OUTPUT B |
| 1 | | |
| 2 | ● | |
| 3 | ● | ● |
| 4 | | ● |

BLANK = LOGIC LOW ● = LOGIC HIGH
 CODE REPEATS EVERY FOUR POSITIONS.

CW ROTATION

ORDERING INFORMATION

Grayhill Series Number
 Voltage: 5 = 5.0V; 3 = 3.3V
 Angle of Throw : 11 = 11.25° - 32 positions
 15 = 15.00° - 24 positions
 18 = 18.00° - 20 positions
 22 = 22.50° - 16 positions

62NGXXX-XXX-XXX

Detent Style:
 L = Leaf Spring
 B = Ball & Spring

Rotational Torque:
 L = Low Torque
 H = High Torque

Cable Length:
 02 = 2.00" Cable
 03 = 3.00" Cable
 04 = 4.00" Cable
 05 = 5.00" Cable
 06 = 6.00" Cable
 Leave blank if header or RAC

Termination:
 S = .050" Stripped Cable
 C = .050" Connector
 P = .050" Header
 RAC = Shrouded Header

Pushbutton:
 5 = 455±150 g

BALL & SPRING DETENT STYLE

LEAF SPRING DETENT STYLE

Optical and Mechanical Encoders