



GRAYHILL

SERIES 68A

Hall Effect Encoder

FEATURES

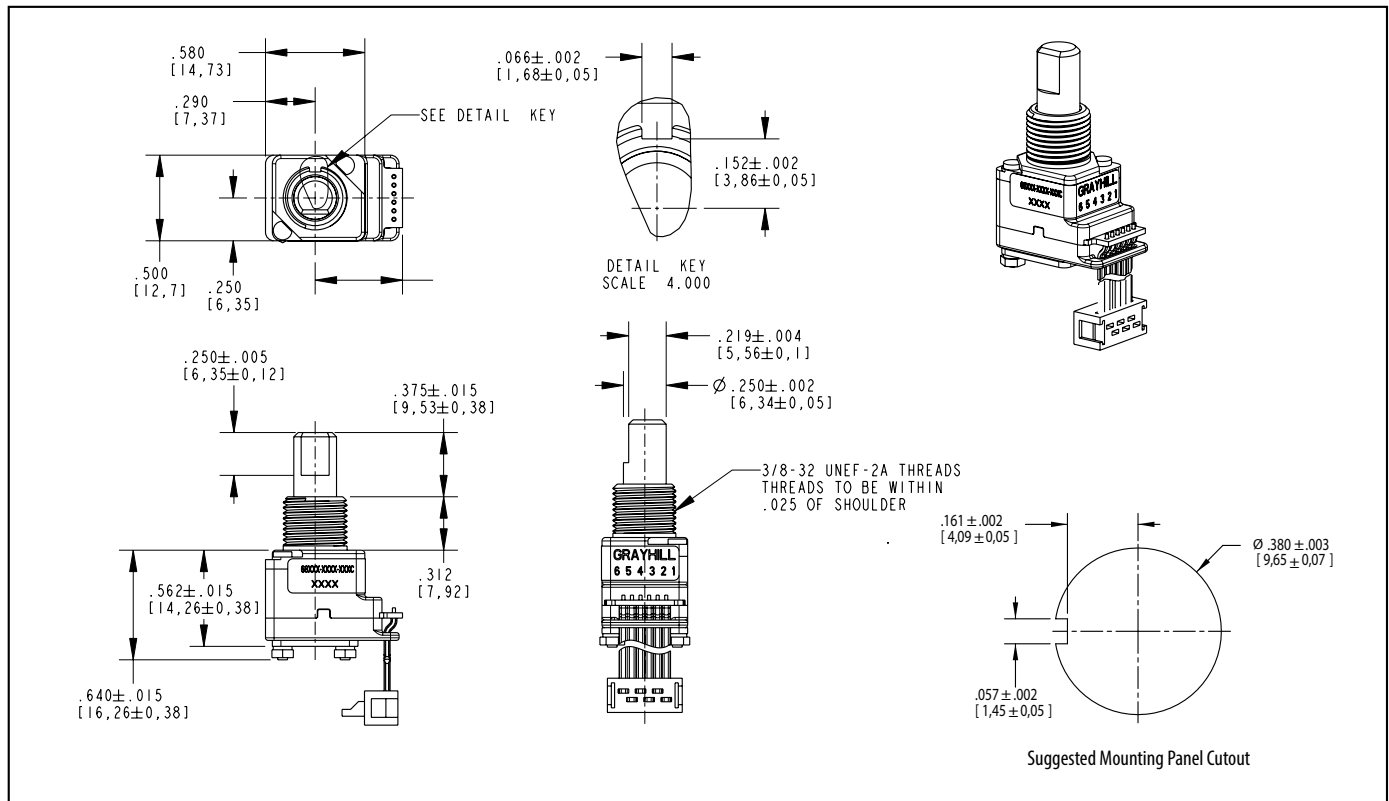
- Quadrature output - (push / pull type)
- Debris resistant hall effect sensor technology
- Over 1 million rotational cycles
- Optional integrated pushbutton
- Low power consumption
- Reverse voltage protection
- Choice of cable lengths and termination
- Available in 5Vdc and 3.3Vdc
- High torque version available

APPLICATIONS

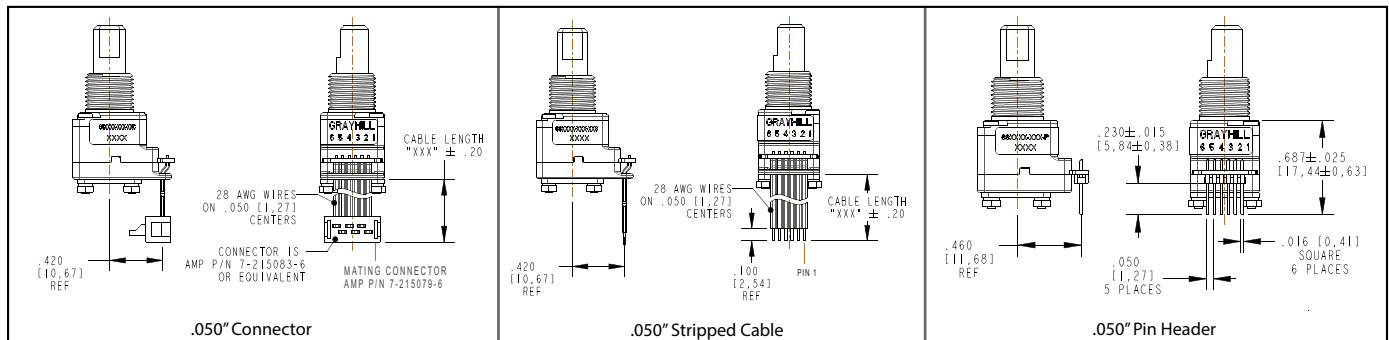
- Medical Equipment
- Test & Measurement
- Audio / Visual
- Agriculture & Construction Vehicles



DIMENSIONS in inches (and millimeters)



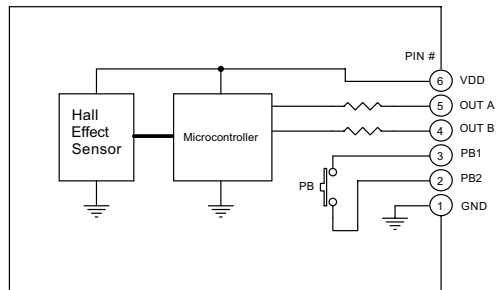
TERMINATION OPTIONS





SCHEMATICS, WAVEFORM, AND TRUTH TABLE

FIG. 1 - 68A ELECTRICAL CONNECTION DIAGRAM



*Customized electrical outputs are available. Contact Grayhill for additional details.

SPECIFICATIONS

Electrical Specifications

Operating Voltage: Minimum 3.0 V, maximum 3.6 V (3.3V Style); minimum 4.5 V, maximum 5.5 V (5V Style)

Absolute Maximum Voltage* on VDD pin: -4.0 V min., +4.0 V max (3.3V style); -6.5 V min., +6.5 V max (5V style)

Avg Supply Current for 3.3V Style: Typical: 1.2 mA, Maximum: 2.0 mA (at 3.30 V)

Peak Supply Current for 3.3V Style: 12 mA (at 3.30 V)

Avg Supply Current for 5V Style: Typical: 1.8 mA, Maximum: 3.0mA (at 5.00 V)

Peak Supply Current for 5.0V Style: 12 mA (at 5.00 V)

Output Low Voltage: 0.6V maximum for IOL = 3mA, VDD = 3.3V and for IOL = 3mA, VDD = 5.0V

Output High Voltage: 2.6V minimum for IOH = -1.5mA, VDD = 3.3V, 4.3V minimum for IOH = -2mA, VDD = 5.0V

Power-Up Time: A & B outputs valid 120 ms (max) after VDD reaches 3.0 V (3.3 V Style) or 4.5 V (5V Style).

Soldering Recommendation

Hand solder only per IPC J-STD-001

Mechanical Specifications

Mechanical Life: 1,000,000 cycles of operation. 1 cycle is a rotation through all positions and a full return

Average Rotational Torque:

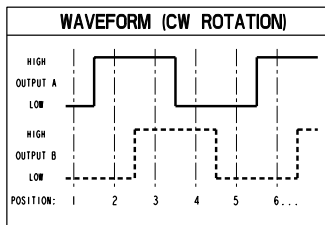
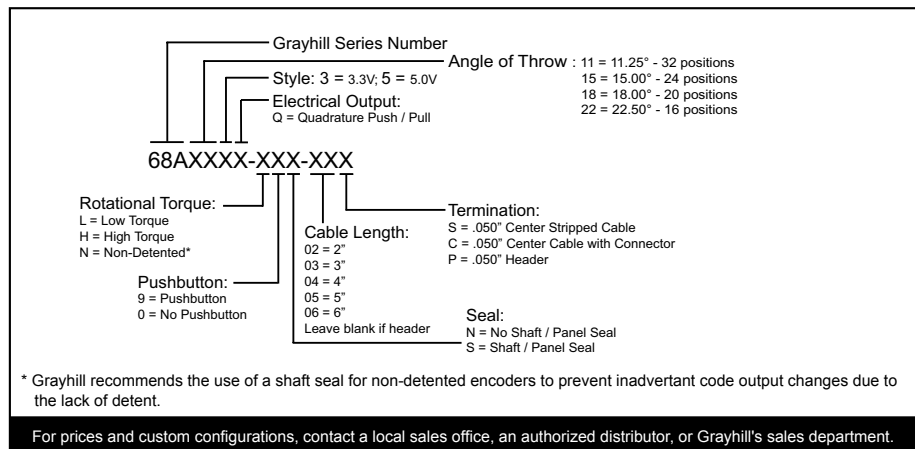
Low Detent = 2.0 ± 1.4 in-oz initially

High = 3.5 ± 1.4 in-oz initially

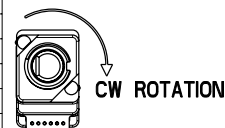
40% of initial value after 1 million cycles

Non-Detented: 1.5 in-oz maximum

ORDERING INFORMATION



TRUTH TABLE (CW ROTATION)		
POSITION	OUTPUT A	OUTPUT B
1		
2	○	
3	○	○
4		○
BLANK = LOGIC LOW ○ = LOGIC HIGH CODE REPEATS EVERY FOUR POSITIONS.		



Maximum rotational speed: 100 rpm

Mounting Torque: 15in-lbs. maximum

Shaft Pushout / Pullout Force: 45 lbs. / 45 lbs. minimum

Terminal Strength: 15 lbs. minimum. Cable or Header pullout force, MIL-STD-202, Method 211A, Test Condition A

Solderability: 95% free of pin holes & voids, MIL-STD-202, Method 208

Environmental Specifications

Operating Temperature: -40°C to 85°C, IEC 68-2-1, Test Aa and IEC 68-2-2, Test Aa

Storage Temperature: -55°C to 85°C, IEC 68-2-1, Method Aa and IEC 68-2-2, Method Ba

Humidity: 96 hours @ 90-95% humidity @ 40°C, MIL-STD-202, Method 103B

Mechanical Vibration: Harmonic motion with amplitude of 15g within a varied frequency of 10 to 2000 Hz for 12 hours, MIL-STD-202, Method 204, Test Condition B

Mechanical Shock:

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

Test 2: 100g for 6 ms sawtooth wave with a velocity change of 9.7 ft/s, MIL-STD-202, Method 213, Test Condition C and I

Seal: IP67, Meets IEC 60529

Pushbutton Electrical and Mechanical Specifications

Electrical Ratings: 6.0 V max, 10 mA, Resistive

Absolute Maximum Voltage* on Pins 2 & 3: 6.0 V

Contact Resistance: <10 Ω

Contact Bounce: <4 mS make,

<10mS break

Actuation Force:

Sealed = 1650 ± 300 g

Unsealed = 1150 ± 300 g

Pushbutton Travel: .016 ± .008in

Pushbutton Life Expectancy: 1 million actuations minimum

Materials and Finishes

Bushing: Zinc

Shaft: Aluminum

Lockwasher: Spring steel, zinc plate with clear trivalent chromate finish

Cable: Copper stranded with topcoat in PVC insulation (Cable version only), 28 AWG

Header Pins: Tin plated phosphor bronze

Hex Nut: Nickel plated brass

ROHS Compliant.

EMC Ratings

Radiated Immunity: Meets ANSI/ASAE EP455 5.16 (100 V/m, 0.014-1000 MHz, 3 orientations)

Conducted Immunity: Meets IEC 61000-4-6, Level 3

Radiated Emissions: Meets ISO 14982, Sec 6.4 (Broadband), Sec 6.5 (Narrowband) limits

Conducted Emissions: Meets CISPR 25, Class 3

Electrostatic Discharge: Meets ANSI/ASAE EP455 5.12, surface: 25KV, connector: 15KV

Power Frequency Magnetic Field: Meets IEC 61000-4-8, 100 V/m

* Exceeding the Absolute Maximum Voltage may result in permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operation listings of this specification is not implied.

MOUNTING PANEL RECOMMENDATIONS FOR PANEL SEAL VERSION:

1. Panel thickness should not exceed 0.157".
2. Mounting hole diameter to be per recommended dimensions.
3. 0.470" X 0.020" counter bore required for proper sealing.
4. Anti-rotation feature is recommended. Feature should be designed to lock into bushing keyway.