

## SERIES 68A

### Hall Effect Encoder

#### FEATURES

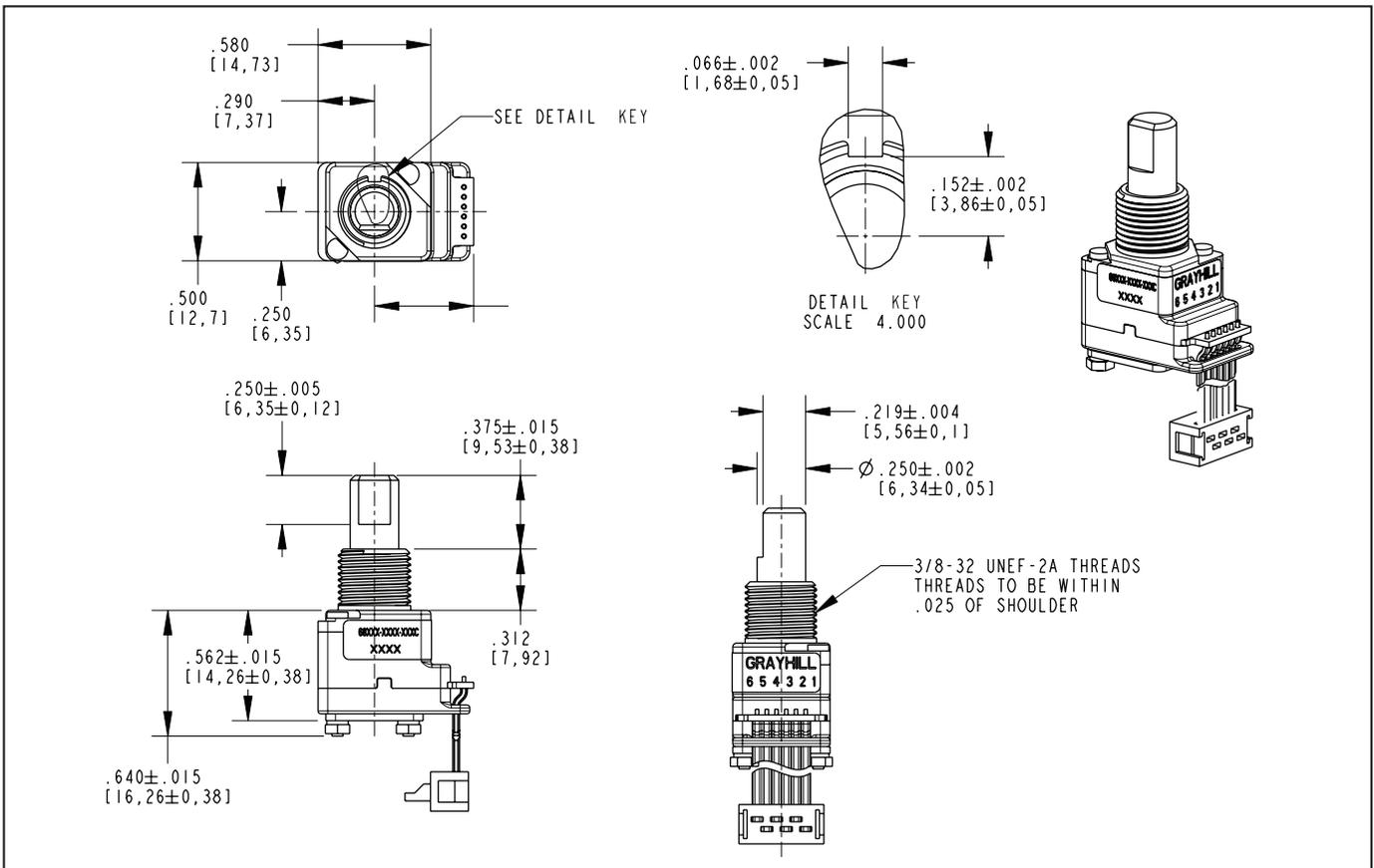
- Quadrature Output - choice of open collector or push / pull
- Debris resistant hall effect sensor technology
- Over 1 million rotational cycles
- Integrated pushbutton
- Low power consumption
- Reverse voltage protection
- Choice of cable lengths and termination
- Available in 5Vdc and 3.3Vdc
- High torque version available

#### APPLICATIONS

- Automotive
- Medical
- Test & Measurement
- Audio / Visual
- Agriculture & Construction

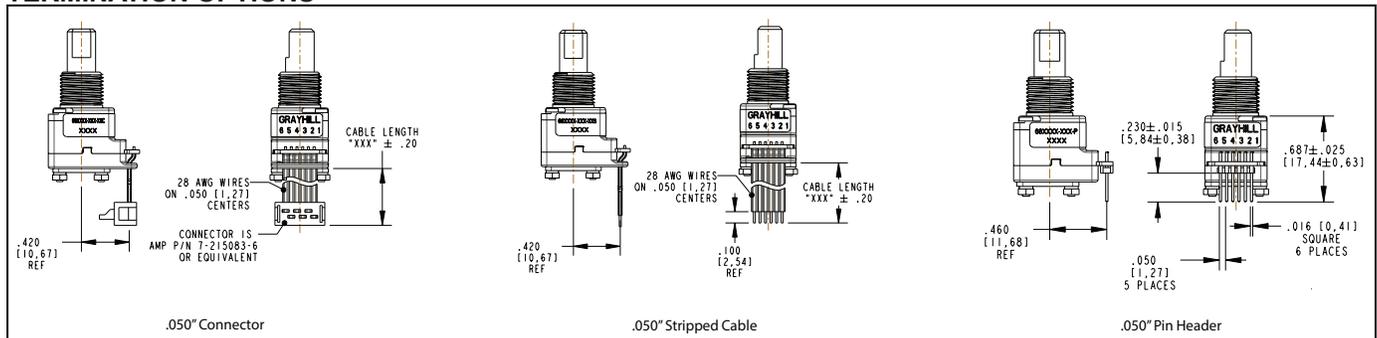


#### DIMENSIONS in inches (and millimeters)



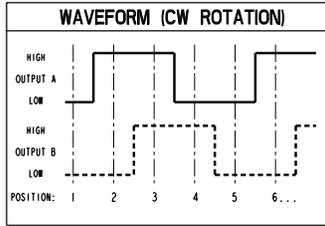
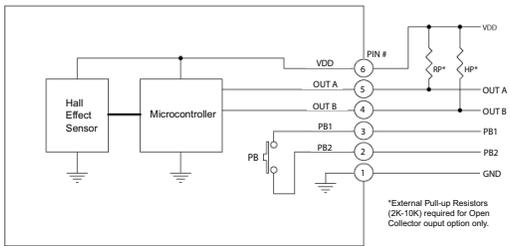
Hall Effect

#### TERMINATION OPTIONS



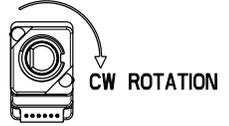
**SCHEMATICS, WAVEFORM, AND TRUTH TABLE**

FIG. 1 - 68A ELECTRICAL CONNECTION DIAGRAM



POSITION	OUTPUT A	OUTPUT B
1		
2	○	
3	○	○
4		○

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



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

**SPECIFICATIONS**

**Environmental Specifications**

- Operating Temperature:** -40°C to 85°C
- Storage Temperature:** -55°C to 100°C
- Humidity:** 96 hours @ 90-95% humidity@40°C
- Mechanical Vibration:** Harmonic motion with amplitude of 15g within a varied frequency of 10 to 2000 Hz for 12 hours
- 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.

**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:** Maximum 4.0V for 3.3V style, 6.5V for 5V style, minimum -0.3V for both styles
- VDD Rise Rate (min):** 0.05 V/ms (Ensures proper start-up at power-up).
- 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 = 4mA, VDD = 3.3V and for IOL = 4mA, VDD = 5.0V
- Output High Voltage (Push-Pull Outputs Only):** 2.6V minimum for IOH = -2mA, VDD = 3.3V, 4.3V minimum for IOH = -2mA, VDD = 5.0V

- Output Leakage Current:** Minimum -20µA, maximum 20µA
- Voltage on Pins 4 or 5 W/ Respect to Gnd:** Minimum -0.3V, maximum VDD + 0.3V
- 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).

**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
  - 50% of initial value after 1 million cycles
  - Non-Detented: 1.5 in-oz maximum
- 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
- Solderability:** 95% free of pin holes & voids

**Pushbutton Electrical and Mechanical Specifications**

- Electrical Ratings:** 6.0 V max, 10 mA, Resistive
- Contact Resistance:** <10 Ω
- Contact Bounce:** <4 mS make, <10mS break
- Actuation Force:** 5 = 1150 ± 300g
- Pushbutton Travel:** .017 ± .008in

- Pushbutton Life Expectancy:** 1 million actuations minimum
- Voltage on Pins 2 or 3 W/ Respect to Gnd:** Minimum -0.3V, maximum 6.0V

**Materials and Finishes**

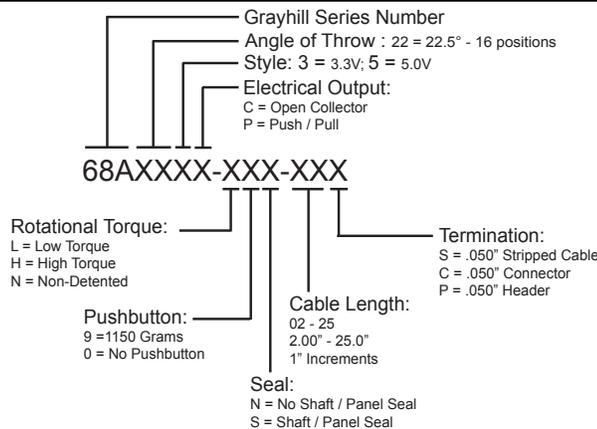
- Bushing:** Zamak 2
- Shaft:** Aluminum
- Detent Housing:** Zytel FR - 50; Glass Reinforced Nylon 6/6
- Studs:** Stainless steel
- Shaft & Panel Seal:** Silicone
- Lockwashers:** Stainless steel
- Cable:** Copper stranded with topcoat in PVC insulation (Cable version only)
- Header Pins:** Tin plated phospho bronze
- Hex Nut:** Nickel plated brass
- Backplate:** Stainless steel

**EMC Ratings**

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

Hall Effect

**ORDERING INFORMATION**



For prices and custom configurations, contact a local sales office, an authorized distributor, or Grayhill's sales department.