

## SERIES 67B

### Hall Effect Joystick

#### FEATURES

- Proportional output joystick, pushbutton, & momentary rotary select in one device
- Shaft and panel seal to IP67
- Rugged and compact: 1.25 inch diameter
- Long operational life
- RoHS compliant
- i<sup>2</sup>c output (see [www.grayhill.com](http://www.grayhill.com) for User Manual)

#### APPLICATIONS

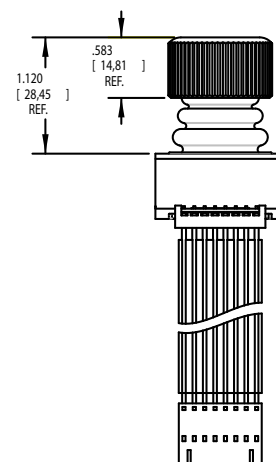
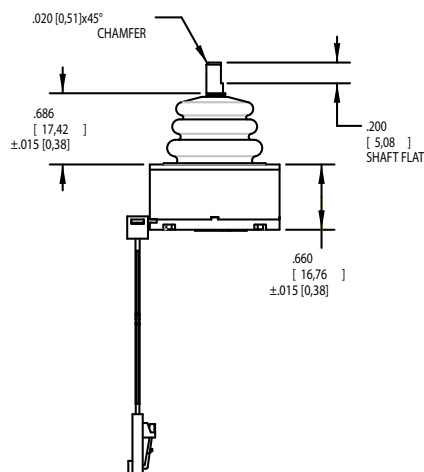
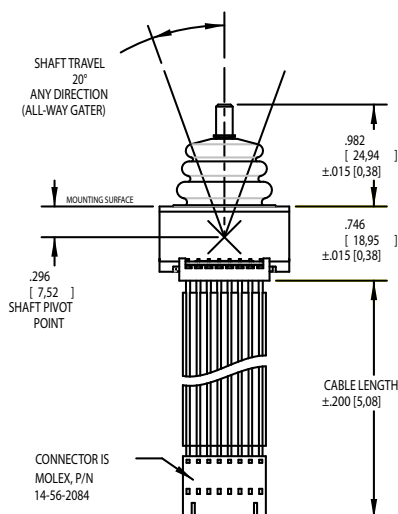
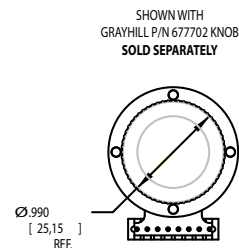
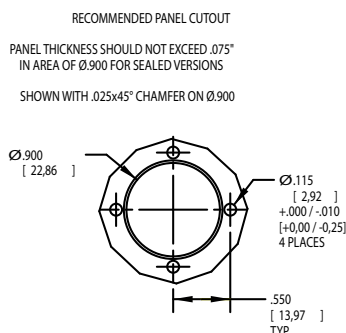
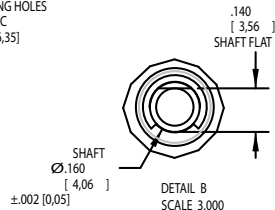
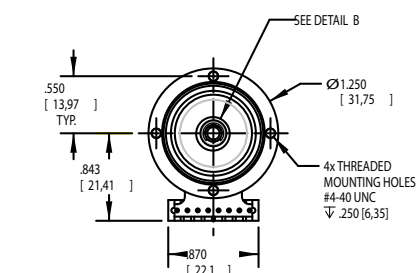
- Medical imaging - X-ray, CT scanner, MRI patient tables
- Military vehicles - display navigation
- Handheld remote control devices
- Material handling equipment and crane operations



Actual Size

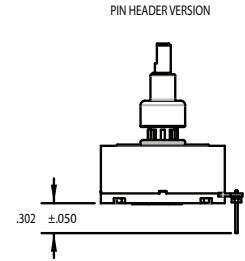
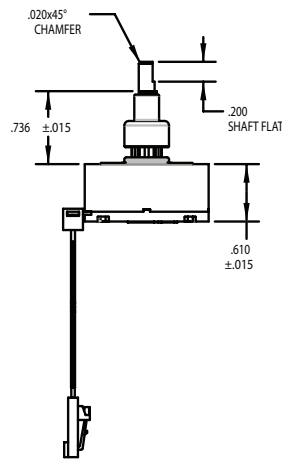
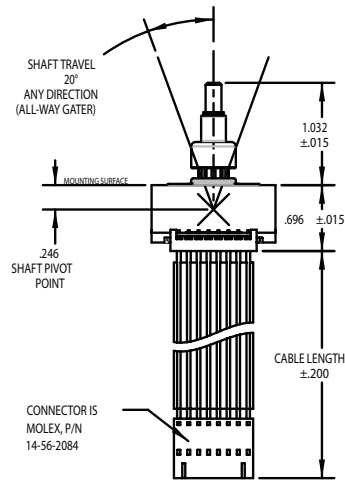
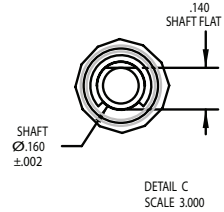
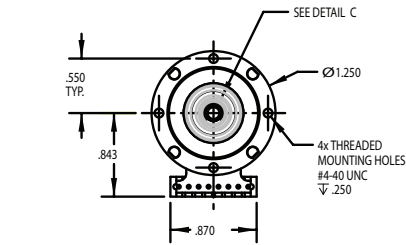
#### DIMENSIONS in inches [millimeters]

##### with sealing boot



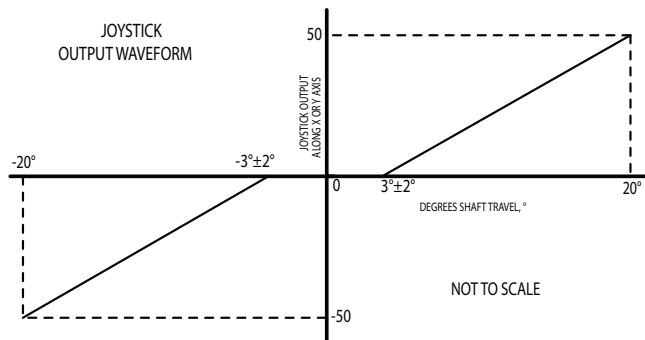
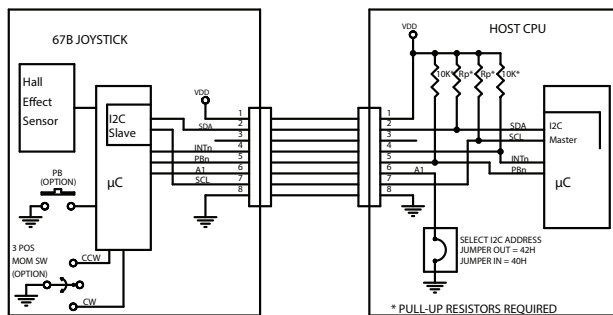
**DIMENSIONS** in inches [millimeters]

**without sealing boot**

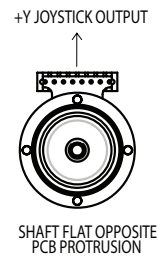
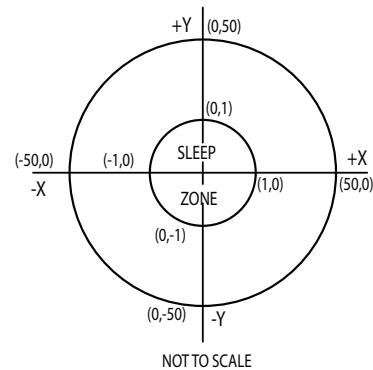


**BLOCK DIAGRAM & JOYSTICK OUTPUT WAVEFORM**

**BLOCK DIAGRAM**



**JOYSTICK OPERATIONAL LIMITS**  
SIDE OF PRINTED CIRCUIT BOARD PROTRUSION INDICATES +Y DIRECTION FOR JOYSTICK OUTPUT



## SPECIFICATIONS

### Electrical Ratings

**Supply Voltage (VVD):** 3.3V  $\pm$  0.3V  
**High Level Input Voltage (VIH, Min):** 0.7\*VDD on SCL & SDA / 0.25\*VDD+0.8 on AI  
**Low Level Input Voltage (VIL, Max):** 0.3\*VDD on SCL & SDA / 0.15\*VDD on AI  
**Current Draw In Active Mode (IDD1):** 3mA Maximum @ VDD = 3.3V (J & P options only)  
**Current Draw In Sleep Mode (IDD2):** 100uA Maximum @ VDD = 3.3V (J & P options only)  
**Current Draw in Active Mode (IDD3):** 4mA Maximum @ VDD = 3.3V (R option has active mode only)  
**Typical Operating Current:** 4.0 mA at Vcc = 3.3V, T = 25°C  
**Maximum Operating Current:** 7.0 mA over 3.0  $\leq$  Vcc  $\leq$  3.6V, -40°C  $\leq$  T  $\leq$  85°C  
**Maximum Current Sunk By Any I/O Pin:** 25mA  
**Leakage Current:**  $\pm$ 5 nA Typ.,  $\pm$ 125 nA Max  
**Low Level Output Voltage (VOL):** 0.6V On INTn & SDA @ IOL = 6mA, @ VDD = 3.3V  
**Measurement Frequency (Active Mode):** 50 Samples/Sec  
**Response Time, Active Mode (T1):** 20ms\*  
**Response Time, Sleep Mode (T2):** 80ms\*  
**Output @ Maximum Joystick Deflection (XMax, YMax):** 50 Units  
**Output With Joystick Shaft Released (Center Position):** (0,0)  
**Nominal Startup Time (TP, W):** 300ms

### Physical & Mechanical Ratings

**Vibration:** Random, Meets MIL-STD-810G, Method 514.6, Procedure I  
**Mechanical Shock:** Meets per MIL-STD 202, Method 213B Test Condition A  
**Transit Drop:** Meets per MIL-STD-810G, Method 516.6, Procedure II  
**Impact Strength:** 227 grams, dropped from 40cm, 3 times

**Terminal Strength:** 10 lbs. Minimum, Tested per MIL-STD-202, Method 211A  
**Push-Out Force:** 60 lbs. Minimum  
**Pull-Out Force:** 60 lbs. Minimum  
**Shaft Side-Load:** 45 lbs. Minimum  
**Mounting Torque:** 3-5 in-lbs recommended, 8 in-lbs. Maximum  
**Joystick Actuation Force:** 300g Peak  $\pm$  25%  
**Joystick Life:** 1 million cycles minimum\*\*  
**Pushbutton Life:** 1 million actuations, minimum  
**Rotational Life:** 1 million turns, minimum in each direction

### Materials and Finishes

**Housing:** Thermoplastic  
**Backplate:** Thermoplastic  
**Lockwashers:** 304 Stainless Steel  
**Hex Nuts:** 303 Stainless Steel  
**Shim Washers:** 304 Stainless Steel  
**Shaft:** 303 Stainless Steel  
**Cable Assembly:** 26 AWG Stranded Copper Conductors  
**Connector Body:** Thermoplastic  
**Terminals:** Phosphor Bronze  
**O-Rings:** Fluorosilicone  
**Sealing Boot:** Silicone Rubber Molded over Thermoplastic Insert

### Environmental Ratings

**Seal:** IP67, Meets IEC 60529 (sealed version only)  
**Altitude:** Tested per MIL-STD 202, Method 105C  
**Thermal Shock:** Meets MIL-STD 202, Method 107G  
**Operating High Temperature:** +85°C, Tested per IEC 68-2-14, Test Na

**Operating Low Temperature:** -40°C, Tested per IEC 68-2-14, Test Na  
**Storage High Temperature:** +100°C, Tested per IEC 68-2-2, Method Ba  
**Storage Low Temperature:** -55°C, Tested per IEC 68-2-1, Method Aa  
**Humidity:** Meets MIL-STD 202, Method 103B  
**Humidity, 85/85:** 500 hours tested per MIL-STD 202, Method 103B  
**Solar Radiation:** Tested per MIL-STD 810G, Method 505.5, Procedure II  
**Chemical Resistance:** Meets ISO 16750-5  
**Dielectric:** Meets MIL-STD 202G, Method 301  
**Insulation Resistance:** Tested per MIL-STD 202G, Method 302

### EMC Ratings

**Radiated Immunity:** Meets IEC 61000-4-3, 10 V/m, 80 MHz-1000 MHz  
**Conducted Immunity:** Meets IEC 61000-4-6, 10 V RMS, 150 KHz to 80 MHz  
**Radiated Emissions:** Meets ANSI C63.4, Class B  
**Conducted Emissions:** Meets EN 55022, Class B  
**Electrostatic Discharge:** Meets IEC 61000-4-2, 8 kV contact/15 kV air discharge  
**Power Frequency Magnetic Field:** Meets IEC 61000-4-8, 30 A/m

\*Response time is the time from joystick movement to when new X,Y position data is available.

\*\*One cycle is defined as a complete revolution of the shaft around the fixed perimeter, or one actuation in each of the 4 main directions, with return to center between each actuation.

## ORDERING INFORMATION

Grayhill Series Number  
 Available Functions: J = Joystick Only, P = Joystick + Pushbutton, R = Joystick + Pushbuttons + Momentary Turn  
 Joystick Shaft Limiting: 2 = 2-Way 20° Either Direction, 4 = 4-Way 20° in 4 Main Directions, A = All-Way 20° in Any Direction

67B - PA - 3C - S - 03C

Termination: C = Cable with Connector, P = Pin Header  
 Cable Length: 02 = 2.0 inches through 06 = 6.0 inches. 1 inch increments.  
 Leave blank if pinned. Example: 67B-PA-3C-S-P  
 Seal Option: S = With Sealing Boot, U = Without Sealing Boot  
 Interface: C = I<sup>2</sup>C  
 Voltage: 3 = 3.3V



Pictured with knob, p/n: 677702

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