SERIES 68B
Hall Effect Rocker Switch

FEATURES
• Choice of ratiometric analog or PWM outputs
• Sealed to IP67 dynamic - even during actuation
• Rugged industrial design suited for outdoor use
• Provides positive tactile feedback in any environment
• Long operational life
• Redundant output for safety
• Available with 26°detent and 36° latching, friction hold, or spring return (no detent)
• Choices of cable length
• Choices of accent color

APPLICATIONS
• Dash-panel and armrest controls
• Hydraulic fluid flow control
• Engine speed control
• Heavy duty industrial equipment
• Remote control belly boxes

DIMENSIONS in inches, [mm]

MOUNTING PANEL OPTIONS

MOUNTING PANEL RECOMMENDATIONS:
1. FASTENERS SHOULD BE #4 THREAD FORMING SCREWS FOR PLASTIC.
2. MOUNTING TORQUE TO BE 3-5 IN.LBS, 8 IN.LBS MAXIMUM.
3. DIAMETER OF MOUNTING HOLES IN CUSTOMER PANEL TO BE 0.130" [3.30mm].
4. DIAMETER OF MOUNTING HOLES IN SWITCH ARE 0.100" [2.54mm].
5. LENGTH OF MOUNTING SCREWS TO BE: (PANEL THICKNESS) + 0.140" [3.56mm] OR LESS.
6. MINIMUM SPACING BETWEEN TWO UNITS IS 1.080" [27.43 mm] FROM CENTERLINE TO CENTERLINE.
**ANALOG OUTPUT WAVEFORM**

VDD = 5.00V

(FOR REFERENCE ONLY)

**PWM OUTPUT WAVEFORM**

(FOR REFERENCE ONLY)

**FAILURE INDICATIONS***

<table>
<thead>
<tr>
<th>FAILURE MODE</th>
<th>PWM FREQUENCY</th>
<th>DUTY CYCLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENSOR ERROR</td>
<td>50% ± 37.5 Hz</td>
<td>85% OR 95%</td>
</tr>
<tr>
<td>OVERVOLTAGE</td>
<td>50% ± 37.5 Hz</td>
<td>75%</td>
</tr>
<tr>
<td>UNDervoltAge</td>
<td>50% ± 37.5 Hz</td>
<td>100%</td>
</tr>
</tbody>
</table>

* IN CASE OF ERROR THE SENSOR CHANGES THE PWM FREQUENCY TO 50% OF THE NORMAL OPERATING FREQUENCY

**POSITIVE/NEGATIVE DIRECTION REFERENCE**

DUTY CYCLE DEFINED AS THE RATIO BETWEEN THE HIGH TIME (S) AND THE PERIOD (D) OF THE PWM SIGNAL AS SHOWN IN FIGURE ABOVE.
### Specifications

**Electrical Specifications**

- **Operating Voltage on Pin 1 (VDD):** 5.0V ± 0.5V
- **Absolute Maximum Voltage** on Pin 1 (VDD): -18V min., +18V max. (t < 1 h)
- **Operating Current:** 15 mA typ., 20 mA, max.

**Analog**

- **Output Voltage is Analog (Ratio-metric to Operating Voltage):**
  - **Output at Center Position:** 50% VDD
  - **Output at Full Travel:** 10% VDD or 90% VDD depending on configuration
- **Output Voltage Tolerance:**
  - ±3% VDD at full travel
  - ±5% VDD at center position
- **Recommended Load:** 10 K Ohm pull-down resistor.
- **Sensor Error:** When a sensor error occurs, the output goes to < 4% of operating voltage (VDD)
  
  *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.

**PWM**

- **Time from Power-up to Signal Out:** 8mS Max
- **PWM Frequency Tolerance:** ± 15%
- **Center Position Duty Cycle:** 50 ± 5%
- **End Position 1 Duty Cycle:** 10 ± 3%
- **End Position 2 Duty Cycle:** 90 ± 3%
- **VOL:** 0.5V typ. (t < 5mA; VDD = 5.00V)
- **VOH:** 4.9V typ. (t < -1.2mA; VDD = 5.00V)
- **Recommended Load:** 1.0 K Ohm pull-up resistor.

**Physical & Mechanical Ratings**

- **Vibration:** Random, meets MIL-STD-810G, Method 514.6, Procedure I
- **Mechanical Shock:** Meets MIL-STD 202, Method 213B Test Condition A
- **Transit Drop:** Meets MIL-STD-810G, Method 516.6, Procedure II
- **Terminal Strength:** 10 lbs. minimum, tested per MIL-STD-202, Method 211A
- **Push-Out Force:** 45 lbs. minimum
- **Pull-Out Force:** 45 lbs. minimum
- **Paddle Impact:** 0.5 lbs. weight dropped 3x

- **PWM Frequency Tolerance:** ± 15%
- **End Position 1 Duty Cycle:** 50 ± 5%
- **End Position 2 Duty Cycle:** 90 ± 3%

**Environmental Ratings**

- **Seal:** IP67 as mounted
- **Altitude:** Meets MIL-STD-810G, Method 500.4, Procedure I
- **Thermal Shock:** Meets MIL-STD-810G, Method 503.4, Procedure I
- **Operating High Temperature:** +85°C, Meets IEC 68-2-21, Test Aa
- **Operating Low Temperature:** -40°C, Meets IEC 68-2-21, Test Aa
- **Storage High Temperature:** +100°C, Meets IEC 68-2-21, Test Aa
- **Storage Low Temperature:** -55°C, Meets IEC 68-2-21, Test Aa

**Electrostatic Discharge**

- **Conducted Emissions (30MHz - 1GHz):**
  - **B (30-1000 MHz) and ISO13766, level 6db**
- **Radiated Emissions:**
  - **3 (150kHz - 54MHz), CISPR 16.2.3, Class 5**
  - **1MHz-400MHz)**

**Conducted Immunity:**

- **1MHz-400MHz:**
  - **Meets CISPR25, Class B (30-1000 MHz) and ISO13766, level 6db (30MHz - 1GHz)**
- **Radiated Emissions:**
  - **Meets CISPR25, Class B (30-1000 MHz) and ISO13766, level 6db (30MHz - 1GHz)**

**RoHS Compliant**

**EMC Ratings**

- **Radiated Immunity:** At 3 orientations, meets ISO11452-5 (140 V/M, 10KHz-2MHz), ANSI/ASAE EP455 5.16 (100 V/M, 2-200MHz), ISO 11452-2 (140 V/M, 200MHz-1GHz), and ISO 11452-2 (50 V/M, 1GHz-2.7GHz).

**Conducted Immunity:** Bulk Current Injection meets ISO11452-4, SAE J1113-4 (120 mA, 1MHz,400MHz)

**Radiated Emissions:** Meets CISPR25, Class 3 (150kHz - 54MHz), CISPR 16.2.3, Class B (30-1000 MHz) and ISO13766, level 6db (30MHz - 1GHz)

**Conducted Emissions:** Meets CISPR 25, Class 5

**Electrostatic Discharge:** Meets ANSI/ASAE EP455 5.12, Level 1

**Power Frequency Magnetic Field:** Meets IEC 61000-4-8, 30 A/m

### Ordering Information

**Accent Color**

1 = Black
2 = Blue
3 = Purple
4 = Yellow
5 = Green
6 = Red

**Supply Voltage**

5 = Analog, 5.0V Supply, Dual Inverse Outputs
A = PWM, 5.0V Supply, FREQ. = 500 Hz, Dual Inverse Outputs
B = PWM, 5.0V Supply, FREQ. = 2 kHz, Dual Inverse Outputs

*Output Voltage is Proportional to VDD*

**Paddle Function**

0 = No detent or latching
1 = 26° detent + 36° latching
2 = Friction hold

(Custom options available, contact Grayhill)

**Termination**

0 = No Connector; 8” wires with stripped ends
4 = 4.00” Cable with Deutsch Connector
6 = 6.00” Cable with Deutsch Connector
8 = 8.00” Cable with Deutsch Connector

**Grayhill, Inc.**

561 Hillgrove Avenue • LaGrange, Illinois  60525-5997 • USA • Phone: 708-354-1040 • Fax: 708-354-2820 • www.grayhill.com