

# Series 48EM



## 12MM MINIATURE SEALED ELECTRO-MECHANICAL

This rugged multi-option sealed pushbutton series offers the utmost in choices of mounting styles, colors, terminations, bezels, lighting and momentary or alternate-action switching. The Series 48 offers all these options in one compact package size.



### APPLICATIONS

- Office equipment
- Medical equipment
- Industrial machinery
- Outdoor controls
- Mass transportation
- Food processing equipment

### KEY FEATURES:

- Momentary or maintained action
- Gold contacts
- Many button colors
- Choice of LED colors (or non-lighted versions)
- Long life
- Solder, PC terminals or Wireleads
- Panel sealed to IP 67

ACTUAL SIZE

### ORDERING INFORMATION:

Switch Function	Switch Termination	Module Type	Bezel Type	LED Color †	Button Color	Mounting Type	Voltage Resistor
Momentary	Solder Tabs	<b>48-1</b>	<b>RB</b> - Round, Black	<b>N</b> - None	<b>RD</b> - Red	<b>B</b> - Bushing	If Blank*
Maintained	Solder Tabs	<b>48-2</b>	<b>SB</b> - Square, Black	<b>R</b> - Red	<b>GR</b> - Green	<b>S</b> - Snap-fit	<b>05</b> - 5V forward
Momentary	PC	<b>48-5</b>	<b>RC</b> - Round, Chrome	<b>G</b> - Green	<b>BK</b> - Black		<b>12</b> - 12V forward **
Maintained	PC	<b>48-6</b>	<b>SC</b> - Square, Chrome	<b>Y</b> - Yellow	<b>BL</b> - Blue		<b>24</b> - 24V forward **
Momentary	Wire Leads	<b>48-A</b>		<b>A</b> - Amber	<b>YL</b> - Yellow		
Maintained	Wire Leads	<b>48-B</b>		<b>B</b> - Blue	<b>OR</b> - Orange		
				<b>W</b> - White	<b>CR</b> - Chrome		
				<b>RB</b> - Red / Blue	<b>PK</b> - Black with Standby Symbol		
				<b>RG</b> - Red / Green	<b>WH</b> - White		

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† Lighted switches come with wires on LEDs to protect from solder heat.

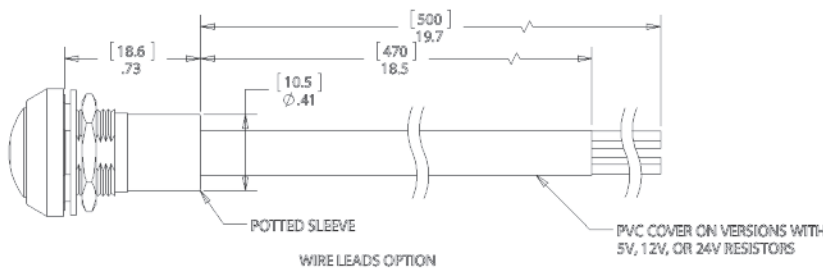
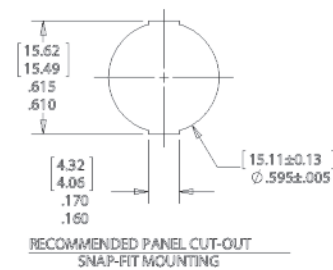
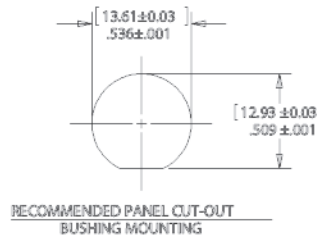
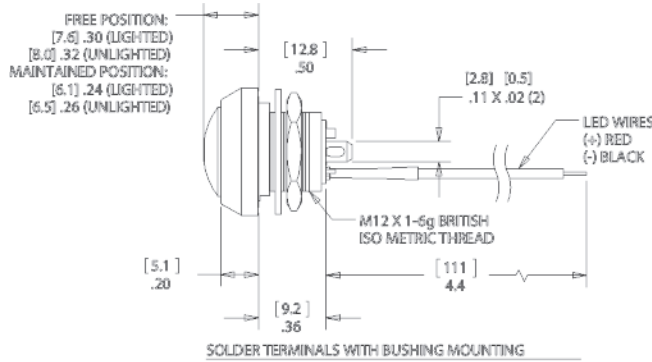
\* Current limiting resistor is required to limit LED forward current to 20 mA (not included).

\*\* 12 and 24 V resistors are available with wirelead versions only.

### STANDARDS / AGENCY / RATINGS:



PRODUCT DRAWINGS



[MILLIMETERS]  
 [INCHES]

MECHANICAL CHARACTERISTICS

- CIRCUIT:** SPST-NO-DB (FORM X)
- BUTTON TRAVEL (NOM):** [2.3] .09
- OPERATING FORCE (NOM):** [3N] 306g
- CONTACT BOUNCE (NOM):** 1 ms
- PANEL THICKNESS:** BUSHING MOUNTING: [0.5-3.0] .02-.12  
 SNAP-FIT MOUNTING: [1.3-3.0] .05-.12
- NUT TORQUE (MAX):** [11.5 kgf/cm] 10 lb/in
- HARDWARE:** BUSHING MOUNTING: BULK PACKAGED SEALING WASHER AND HEX NUT ARE INCLUDED.

ENVIRONMENTAL SPECIFICATIONS

- ACTUATOR INGRESS PROTECTION:** IP67
- OPERATING TEMPERATURE:** [-40 C to +85 C] -40 F to +185 F

ELECTRICAL SPECIFICATIONS

- CURRENT RATING (resistive):** 250mA @ 12VDC, 100K CYCLES  
 150mA @ 28VDC, 150K CYCLES (MOMENTARY)  
 100mA @ 48VDC, 100K CYCLES  
 10mA @ 12VDC, 1 MILLION CYCLES (MOMENTARY)
- DIELECTRIC STRENGTH:** 1,000 VAC
- INSULATION RESISTANCE:** 1G OHM
- CONTACT RESISTANCE:** 50m OHMS
- WIRE LEADS:** UL STYLE 1007  
 26 AWG, STRANDED

## Series 48SS

### 12MM MINIATURE HALL-EFFECT SEALED

This rugged sealed pushbutton switch uses a Hall-Effect sensor to achieve extremely long life, up to 1,000,000 cycles momentary. This switch is suited for harsh environments where long life and reliability are needed.



### APPLICATIONS

- Communications
- Data entry
- Hand-held control modules
- Outdoor controls
- Mass transport controls
- Instrumentation

### KEY FEATURES:

- 1,000,000 cycles momentary
- Momentary and maintained action
- Hall-Effect technology
- Choice of LED colors (or non-lighted versions)
- Panel sealed to IP67
- Variety of Button colors
- Square and round versions available
- Solder, PC terminals or Wireleads

ACTUAL SIZE

### ORDERING INFORMATION:

Switch Function	Switch Termination	Module Type	Bezel Type	LED Color †	Button Color	Mounting Type	Voltage Resistor
Momentary	Solder Tabs	<b>48-3</b>	<b>RB</b> - Round, Black	<b>N</b> - None	<b>RD</b> - Red	<b>B</b> - Bushing	If Blank*
Maintained	Solder Tabs	<b>48-4</b>	<b>SB</b> - Square, Black	<b>R</b> - Red	<b>GR</b> - Green	<b>S</b> - Snap-fit	<b>05</b> - 5V forward
Momentary	PC	<b>48-7</b>	<b>RC</b> - Round, Chrome	<b>G</b> - Green	<b>BK</b> - Black		<b>12</b> - 12V forward **
Maintained	PC	<b>48-6</b>	<b>SC</b> - Square, Chrome	<b>Y</b> - Yellow	<b>BL</b> - Blue		<b>24</b> - 24V forward **
Momentary	Wire Leads	<b>48-C</b>		<b>A</b> - Amber	<b>YL</b> - Yellow		
Maintained	Wire Leads	<b>48-D</b>		<b>B</b> - Blue	<b>OR</b> - Orange		
				<b>W</b> - White	<b>CR</b> - Chrome		
				<b>RB</b> - Red / Blue	<b>PK</b> - Black with Standby Symbol		
				<b>RG</b> - Red / Green	<b>WH</b> - White		

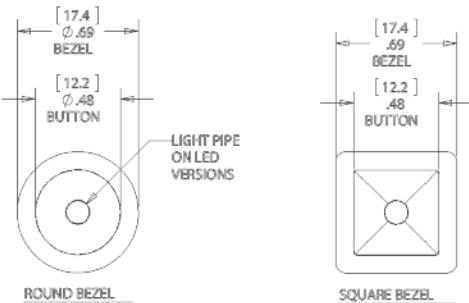
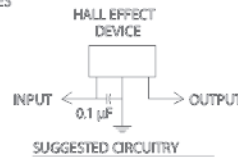
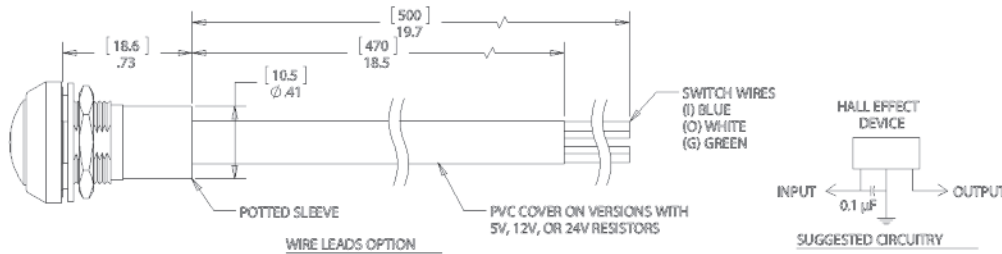
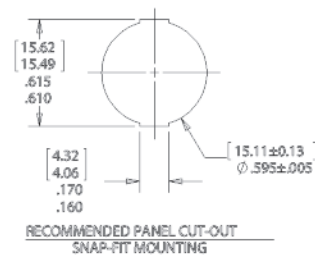
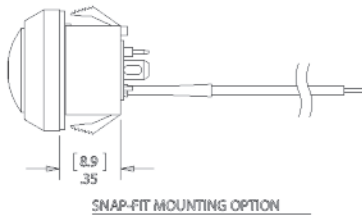
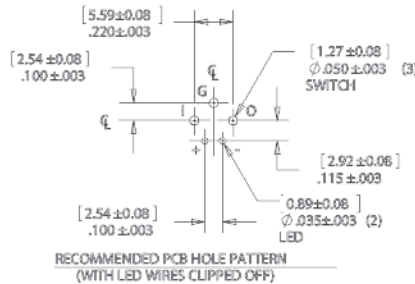
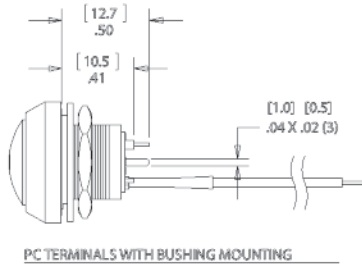
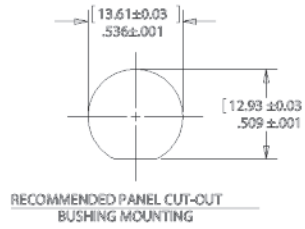
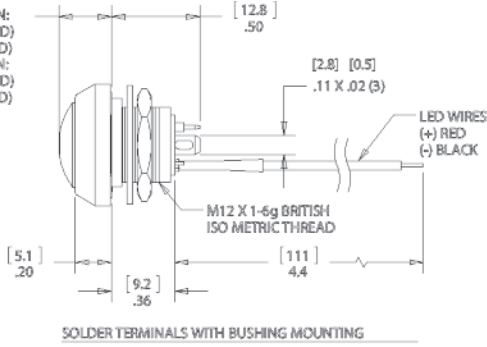
† Lighted switches come with wires on LEDs to protect from solder heat.  
 \* Current limiting resistor is required to limit LED forward current to 20 mA (not included).  
 \*\* 12 and 24 V resistors are available with wirelead versions only.

### STANDARDS / AGENCY / RATINGS:



## PRODUCT DRAWINGS

FREE POSITION:  
[7.6] .30 (LIGHTED)  
[8.0] .32 (UNLIGHTED)  
MAINTAINED POSITION:  
[6.1] .24 (LIGHTED)  
[6.5] .26 (UNLIGHTED)



(MILLIMETERS)  
INCHES

## MECHANICAL CHARACTERISTICS

**CIRCUIT:**  
SPST-NO-DB (FORM X)

**BUTTON TRAVEL (NOM):**  
[2.3] .09

**OPERATING FORCE (NOM):**  
[3N] 306g

**PANEL THICKNESS:**  
BUSHING MOUNTING: [0.5-3.0] .02-.12  
SNAP-FIT MOUNTING: [1.3-3.0] .05-.12

**NUT TORQUE (MAX):**  
[11.5 kgf/cm] 10 lb/in

**HARDWARE**  
BUSHING MOUNTING BULK PACKAGED SEALING WASHER AND HEX NUT ARE INCLUDED.

## ENVIRONMENTAL SPECIFICATIONS

**ACTUATOR INGRESS PROTECTION:**  
IP67

**OPERATING TEMPERATURE:**  
[-40 C to +85 C] -40 F to +185 F

## ELECTRICAL SPECIFICATIONS

**SUPPLY VOLTAGE:**  
4.2V TO 24V, 26.5 MAX

**SUPPLY CURRENT:**  
B<Brp, Vcc=12V:  
3mA TYP to 8mA MAX  
B>Bop, Vcc=12V:  
4mA TYP to 8mA MAX

**OUTPUT LOAD:**  
SINKING (I out MAX = 25mA)

**REVERSE BATTERY VOLTAGE:**  
-30V MAX

**REVERSE OUTPUT CURRENT:**  
-50mA MAX

**SWITCH LIFE:**  
MOMENTARY: 1,000,000 CYCLES  
MAINTAINED: 50,000 CYCLES

**WIRE LEADS:**  
UL STYLE 1007  
26 AWG, STRANDED