AB Series ........................... C6
0.4VA Logic Level; Process Sealed
Straight, Right Angle, & Vertical PC

BB Series ........................... C12
Antistatic; 0.4VA Logic Level; Process Sealed
Straight, Right Angle, & Vertical PC

DB Series ........................... C18
0.4VA Logic Level
Threaded Bushing with Straight PC
Smooth Bushing with Straight, Right Angle, & Vertical PC

EB Series ........................... C24
3A Power Level & 0.4VA Logic Level
Solder Lug & Straight PC
Bushing Mount

EB Series ........................... C30
3A Power Level
Solder Lug & Straight PC
Snap-in Mount

FB Series ........................... C38
500mA Power Level & 0.4VA Logic Level
PC Turret
Bushing Mount
Pushbuttons

GB Series ........................................ C44
0.4VA Logic Level; Process Sealed
Straight, Right Angle, & Vertical PC

GB2 Series ................................. C48
0.4VA Logic Level
Straight & Right Angle PC

G3B Series ................................. C52
0.4VA Logic Level; Process Sealed
Gull Wing Terminals
Upright & Right Angle Mount

JP Series ................................. C58
10A or 16A Power Level
Solder Lug
Snap-in Mount

M2B Series ................................. C64
1A Power Level & 0.4VA Logic Level
Process Sealed
Straight, Right Angle, & Vertical PC

MB2000 Series ............................. C72
6A Power Level & 0.4VA Logic Level
Solder Lug, Quick Connect, Straight PC, & Wirewrap
Bushing Mount
MB2000 Series ..................... C80
6A Power Level & 0.4VA Logic Level
Straight, Right Angle, & Vertical PC
PCB Mount

MB2000 Series ..................... C87
6A Power Level & 0.4VA Logic Level
Solder Lug, Quick Connect, Straight PC, & Wirewrap
Large Bushing (12mm)

MB2400 Series ..................... C96
3A Power Level & 0.4VA Logic Level
Solder Lug, Straight PC, & Wirewrap
Bushing Mount

MB2400 Series ..................... C102
3A Power Level & 0.4VA Logic Level
Straight, Right Angle, & Vertical PC
PCB Mount

MB2400 Series ..................... C108
3A Power Level & 0.4VA Logic Level
Solder Lug, Straight PC, & Wirewrap
Snap-in Mount

MB2500 Series ..................... C116
3A Power Level & 0.4VA Logic Level
Solder Lug & Straight PC
Bushing Mount
MB2500 Series ...................... C121
3A Power Level & 0.4VA Logic Level
Solder Lug & Straight PC
PCB Mount

MB2500 Series ...................... C124
3A Power Level & 0.4VA Logic Level
Solder Lug
Snap-in Mount

SB Series ............................. C128
3A to 15A Power Level
Solder Lug & Screw Lug
Bushing Mount

SB4011 Series ......................... C38
3A Power Level
Solder Lug
Bushing Mount

SCB Series ........................... C131
15A & 1/2 HP Power Level
Quick Connect
Bushing Mount

WB Series ............................ C134
Environmentally Sealed
6A Power Level
Solder Lug, Screw Lug, & Wire Lead
Bushing Mount
General Specifications

Electrical Capacity (Resistive Load)
Logic Level: 0.4VA maximum @ 28V AC/DC maximum
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
Note: Find additional explanation of operating range in Supplement section.

Other Ratings
- Contact Resistance: 50 milliohms maximum
- Insulation Resistance: 500 megohms minimum @ 500V DC
- Dielectric Strength: 500V AC minimum for 1 minute minimum
- Mechanical Life: 50,000 operations minimum
- Electrical Life: 50,000 operations minimum
- Nominal Operating Force: 2.55N
- Contact Timing: Nonshorting (break-before-make)
  Travel: Pretravel .028” (0.7mm); Overtravel .016” (0.4mm); Total Travel .043” (1.1mm)

Materials & Finishes
- Plunger: Polyacetal
- Case Housing: Glass fiber reinforced polyamide
- Support Bracket: Tin plated phosphor bronze
- Movable Contact: Phosphor bronze with gold plating
- Stationary Contacts: Brass with gold plating
- Terminals: Brass with gold plating

Environmental Data
- Operating Temp Range: –30°C through +85°C (~22°F through +185°F)
- Humidity: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
- Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
- Shock: 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation
- Cap Installation Force: 49.03N (11.2 lbf) maximum downward force on actuator

PCB Processing
- Soldering: Wave Soldering Recommended: See Profile A in Supplement section.

Standards & Certifications
The AB Series pushbuttons have not been tested for UL recognition or CSA certification. These switches are designed for use in a low-voltage, low-current, logic-level circuit. When used as intended in a logic-level circuit, the results do not produce hazardous energy.
Distinctive Characteristics

Subminiature size (1/3 size of Series M switches) saves space on PC boards.

Specifically developed for logic-level applications.

Totally sealed body construction prevents contact contamination and allows time- and money-saving automated soldering and cleaning.

Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smoother, positive detent actuation, increased contact stability and unparalleled logic-level reliability. (Additional STC details in Terms & Acronyms; see Supplement section.)

Molded-in, epoxy sealed or ultrasonically welded terminals lock out flux, solvents, and other contaminants.

.100” x .100” (2.54mm x 2.54mm) terminal spacing conforms to standard PC board grid spacing.

Matching indicators available.
Series AB

Process Sealed Subminiature Pushbuttons

TYPICAL SWITCH ORDERING EXAMPLE

AB 2 5 A P H A

Poles

1 SPST SPDT
2 DPDT

Circuits

<table>
<thead>
<tr>
<th>Poles</th>
<th>1</th>
<th>OFF</th>
<th>(ON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>ON</td>
<td>(ON)</td>
<td></td>
</tr>
</tbody>
</table>

( ) = Momentary

PC Terminals

P | Straight
B | Straight with Bracket
B1 | Straight with Inline Bracket (SP only)
H | Right Angle with Bracket
V | Vertical with Bracket
V1 | Vertical with Inline Bracket (SP only)

Circuits

1 OFF (ON)
5 ON (ON)

Plungers

A | .213” (5.4mm) Long
*B | .183” (4.65mm) Long
*C | .080” (2.03mm) Long (cannot be used with cap)

* Available in single pole only

Caps

F | .201” (5.1mm) Diameter
H | .295” (7.5mm) Diameter

Cap Colors

A | Black
B | White
C | Red

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

AB25AP-HA

.213” (5.4mm) Long
White Plunger

Black .295” (7.5mm) Diameter Cap
DPDT
ON-(ON) Circuit

Straight PC Terminals
Process Sealed Subminiature Pushbuttons

### POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Plunger Position</th>
<th>Connected Terminals</th>
<th>Throw &amp; Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Normal Slot</td>
<td>Normal Slot</td>
<td>Note: Terminal numbers are not actually on the switch.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Down</td>
<td>Down</td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>AB11</td>
<td>OFF (ON)</td>
<td>OPEN 3-1</td>
<td>SPST</td>
</tr>
<tr>
<td>SP</td>
<td>AB15</td>
<td>ON (ON)</td>
<td>2-3 2-1</td>
<td>SPDT</td>
</tr>
<tr>
<td>DP</td>
<td>AB25</td>
<td>ON (ON)</td>
<td>2-3 5-6 2-1 5-4</td>
<td>DPDT</td>
</tr>
</tbody>
</table>

### PLUNGERS

**A**
- .213” (5.4mm) Long
- Material: Polyamide
- For use with plungers A & B only.

**B**
- .183” (4.6mm) Long (on SP only)
- Material: Polyamide
- For use with plungers A & B only.

**C**
- .080” (2.03mm) Long (on SP only)
- Material: Polyamide
- For use with plungers A & B only.

Standard Plunger Color: White
Contact factory for red or black options.

### PC TERMINALS

**P** Straight

**B** Straight with Bracket

**H** Right Angle with Bracket

**V** Vertical with Bracket

Use of a support bracket is recommended to increase PCB mounting strength and stability. B1 & V1 terminal dimensions appear on the pushbutton drawings which follow.

### SLIP-ON CAPS

**F**
- AT475 .201” (5.1mm) Diameter Cap
  - Material: Polyamide
  - For use with plungers A & B only.

**H**
- AT496 .295” (7.5mm) Diameter Cap
  - Material: Polyamide
  - For use with plungers A & B only.

Colors Available: A Black, B White, C Red
TYPICAL SWITCH DIMENSIONS

**Straight PC**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB15AP-FA</td>
<td>(6.0) .236 (5.84) .230</td>
</tr>
</tbody>
</table>

**Single Pole**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB11 model does not have terminal 2.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB25AP-FA</td>
<td>(6.0) .236</td>
</tr>
</tbody>
</table>

**Double Pole**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB25AB-FA</td>
<td>(6.0) .236 (5.84) .230</td>
</tr>
</tbody>
</table>

**Straight PC • Bracket**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB15AB-FA</td>
<td>(5.0) .197 (6.84) .230</td>
</tr>
</tbody>
</table>

**Single Pole**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB11AH-FA</td>
<td>(6.0) .236</td>
</tr>
</tbody>
</table>

**Double Pole**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB25AB-FA</td>
<td>(6.0) .236 (5.84) .230</td>
</tr>
</tbody>
</table>

**Right Angle PC**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB11AH-FA</td>
<td>(6.0) .236</td>
</tr>
</tbody>
</table>

**Single Pole (Single Throw)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB11AH-FA</td>
<td>(6.0) .236</td>
</tr>
</tbody>
</table>
TYPICAL SWITCH DIMENSIONS

Single Pole (Double Throw) Right Angle PC

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB15AH-FA</td>
<td></td>
</tr>
<tr>
<td>AB25AH-FA</td>
<td></td>
</tr>
</tbody>
</table>

Double Pole Right Angle PC

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB15AH-FA</td>
<td></td>
</tr>
<tr>
<td>AB25AH-FA</td>
<td></td>
</tr>
</tbody>
</table>

Single Pole Vertical PC • Inline Bracket

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB11AV1-FA</td>
<td></td>
</tr>
</tbody>
</table>

Single Pole Vertical PC

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB11AV-FA</td>
<td></td>
</tr>
</tbody>
</table>

Double Pole Vertical PC

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB15AV-FA</td>
<td></td>
</tr>
<tr>
<td>AB25AV-FA</td>
<td></td>
</tr>
</tbody>
</table>
Series BB     Process Sealed Subminiature Antistatic Pushbuttons

General Specifications

Electrical Capacity (Resistive Load)

Logic Level: 0.4VA maximum @ 28V AC/DC maximum
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
Note: Find additional explanation of operating range in Supplement section.

Other Ratings

- **Contact Resistance:** 50 milliohms maximum
- **Insulation Resistance:** 500 megohms minimum @ 500V DC
- **Dielectric Strength:** 500V AC minimum for 1 minute minimum
- **Mechanical Life:** 50,000 operations minimum (momentary)
  25,000 operations minimum (alternate action)
- **Electrical Life:** 50,000 operations minimum (momentary)
  25,000 operations minimum (alternate action)
- **Nominal Operating Force:** 2.55N (momentary); 2.94N (alternate action)
- **Contact Timing:** Nonshorting
- **Travel:**
  - Momentary: Pretravel .028” (0.7mm); Overtravel .016” (0.4mm); Total Travel .043” (1.1mm)
  - Alternate: Pretravel .039” (1.0mm); Overtravel .039” (1.0mm); Total Travel .079” (2.0mm)

Materials & Finishes

- **Plunger:** Polyacetal
- **Bushing:** Carbon blended polyamide
- **Case Housing:** Glass fiber reinforced polyamide
- **Support Bracket:** Tin plated phosphor bronze
- **Movable Contact:** Phosphor bronze with gold plating
- **Stationary Contacts:** Copper alloy with gold plating
- **Terminals:** Copper alloy with gold plating

Environmental Data

- **Operating Temp Range:** −30°C through +85°C (~−22°F through +185°F)
- **Humidity:** 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
- **Vibration:** 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
- **Shock:** 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation

- **Cap Installation Force:** 49.03N (11.2 lbf) maximum downward force on actuator;
  actuator must be in UP position to remove cap from alternate action models

PCB Processing

- **Soldering:** Wave Soldering Recommended: See Profile A in Supplement section.
- **Cleaning:** Automated cleaning. See Cleaning specifications in Supplement section.

Standards & Certifications

- **Flammability Standards:** UL94V-0 available
  The BB Series pushbuttons have not been tested for UL recognition or CSA certification.
  These switches are designed for use in a low-voltage, low-current, logic-level circuit.
  When used as intended in a logic-level circuit, the results do not produce hazardous energy.
Distinctive Characteristics

Subminiature size (1/3 size of Series M switches) saves space on PC boards.

Specifically developed for logic-level applications.

Available in momentary and maintained circuits.

Industry’s smallest alternate action (maintained) pushbutton with latchdown feature providing visible, audible, and tactile feedback.

Antistatic superstructure, consisting of the carbon impregnated bushing and the support bracket, prevents static discharge to the contacts. Static electricity from an operator’s touch travels from the actuator through the bushing and bracket to the PC board.

Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smoother, positive detent actuation, increased contact stability and unparalleled logic-level reliability. (Additional STC details in Terms & Acronyms; see Supplement section.)

Smooth, 6mm diameter bushing simplifies panel layout.

Totally sealed body construction prevents contact contamination and allows time- and money-saving soldering and cleaning.

.100” x .100” (2.54mm x 2.54mm) terminal spacing conforms to standard PC board grids.
Series BB
Process Sealed Subminiature Antistatic Pushbuttons

**TYPICAL SWITCH ORDERING EXAMPLE**

```
BB  1  5  A  H  F  A

<table>
<thead>
<tr>
<th>Poles</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SPDT</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>DPDT</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Circuits</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>ON</td>
<td>(ON)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| ( ) = Momentary

| 6 | ON | ON |

Alternate Action has Latchdown. BB16 has a Double Pole case.

<table>
<thead>
<tr>
<th>Plunger</th>
<th>Caps</th>
<th>Cap Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>F</td>
<td>A</td>
</tr>
<tr>
<td>.213” (5.4mm) Long</td>
<td>.201” (5.1mm) Diameter</td>
<td>Black</td>
</tr>
</tbody>
</table>

| |  |
| | H |
| | .295” (7.5mm) Diameter |

<table>
<thead>
<tr>
<th>caps</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PC Terminals</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| * Bracketed models are ESD protected |

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

BB15AH-FA

Black .201” (5.1mm)
Diameter Cap

.213” (5.4mm) Long
White Plunger

SPDT
ON-(ON) Circuit

Right Angle PC Terminals
Process Sealed Subminiature Antistatic Pushbuttons

**Series BB**

### POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Throw &amp; Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>BB15</td>
<td>ON</td>
<td>(ON)</td>
<td>2-3</td>
<td>SPDT</td>
</tr>
<tr>
<td></td>
<td>BB16</td>
<td>ON</td>
<td>(ON)</td>
<td>2-1</td>
<td></td>
</tr>
<tr>
<td>DP</td>
<td>BB25</td>
<td>ON</td>
<td>(ON)</td>
<td>2-3 5-6</td>
<td>DPDT</td>
</tr>
<tr>
<td></td>
<td>BB26</td>
<td>ON</td>
<td>(ON)</td>
<td>2-1 5-4</td>
<td></td>
</tr>
</tbody>
</table>

Note: Terminal numbers are not actually on the switch.

### PLUNGERS

**A**

.213” (5.4mm) Long

Standard Plunger Color: White

Contact factory for other colors and lengths.

### PC TERMINALS

Use of a support bracket is recommended to increase PCB mounting strength and stability.

Both single pole and double pole alternate action models have double pole bases.

See Typical Switch Dimensions for details.

### SLIP-ON CAPS

**F**

AT475

.201” (5.1mm) Diameter Cap

Material: Polyamide

Colors Available: A Black  B White  C Red

**H**

AT496

.295” (7.5mm) Diameter Cap

Material: Polyamide
# Series BB

## Process Sealed Subminiature Antistatic Pushbuttons

### Typical Switch Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>BB15AP-FA</th>
<th>BB25AP-FA</th>
<th>BB16AP</th>
<th>BB15AB-FA</th>
<th>BB16AB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Straight PC</strong></td>
<td><img src="bb15ap.png" alt="Image" /></td>
<td><img src="bb25ap.png" alt="Image" /></td>
<td><img src="bb16ap.png" alt="Image" /></td>
<td><img src="bb15ab.png" alt="Image" /></td>
<td><img src="bb16ab.png" alt="Image" /></td>
</tr>
<tr>
<td><strong>Single Pole</strong></td>
<td><img src="bb15ap.png" alt="Diagram" /></td>
<td><img src="bb25ap.png" alt="Diagram" /></td>
<td><img src="bb16ap.png" alt="Diagram" /></td>
<td><img src="bb15ab.png" alt="Diagram" /></td>
<td><img src="bb16ab.png" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Double Pole</strong></td>
<td><img src="bb15ap.png" alt="Diagram" /></td>
<td><img src="bb25ap.png" alt="Diagram" /></td>
<td><img src="bb16ap.png" alt="Diagram" /></td>
<td><img src="bb15ab.png" alt="Diagram" /></td>
<td><img src="bb16ab.png" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Momentary &amp; Alternate</strong></td>
<td><img src="bb15ap.png" alt="Diagram" /></td>
<td><img src="bb25ap.png" alt="Diagram" /></td>
<td><img src="bb16ap.png" alt="Diagram" /></td>
<td><img src="bb15ab.png" alt="Diagram" /></td>
<td><img src="bb16ab.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>

### Dimensions

- **Straight PC**
  - BB15AP-FA: 6.0 Dia 236
  - BB25AP-FA: 6.0 Dia 346

- **Single Pole**
  - BB16AP: 10.6 Dia 204
  - BB15AB-FA: 10.6 Dia 204

- **Double Pole**
  - BB16AB: 10.6 Dia 204

### Notes

- Dimensions are in millimeters (mm).
- **Dia**: Diameter
- **Typ**: Typical
- **CL**: Contact Location
- **COM**: Common
### TYPICAL SWITCH DIMENSIONS

#### Single Pole

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia Typ.</td>
<td>.024</td>
</tr>
<tr>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Dia</td>
<td>.236</td>
</tr>
<tr>
<td>Slot</td>
<td>110</td>
</tr>
<tr>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>248</td>
<td></td>
</tr>
<tr>
<td>5.46</td>
<td></td>
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</tbody>
</table>

#### Double Pole

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia Typ.</td>
<td>.024</td>
</tr>
<tr>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Dia</td>
<td>.236</td>
</tr>
<tr>
<td>Slot</td>
<td>110</td>
</tr>
<tr>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>248</td>
<td></td>
</tr>
<tr>
<td>5.46</td>
<td></td>
</tr>
</tbody>
</table>

#### Right Angle PC

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dia Typ.</td>
<td>.024</td>
</tr>
<tr>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Dia</td>
<td>.236</td>
</tr>
<tr>
<td>Slot</td>
<td>110</td>
</tr>
<tr>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>248</td>
<td></td>
</tr>
<tr>
<td>5.46</td>
<td></td>
</tr>
</tbody>
</table>

#### Momentary

<table>
<thead>
<tr>
<th>BB15AH-FA</th>
</tr>
</thead>
</table>

#### Momentary & Alternate

<table>
<thead>
<tr>
<th>BB25AH-FA</th>
</tr>
</thead>
</table>

#### Vertical PC

<table>
<thead>
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<th>Value</th>
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<td>.024</td>
</tr>
<tr>
<td>200</td>
<td></td>
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<tr>
<td>Dia</td>
<td>.236</td>
</tr>
<tr>
<td>Slot</td>
<td>110</td>
</tr>
<tr>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>248</td>
<td></td>
</tr>
<tr>
<td>5.46</td>
<td></td>
</tr>
</tbody>
</table>

#### Momentary

<table>
<thead>
<tr>
<th>BB15AV-FA</th>
</tr>
</thead>
</table>

#### Momentary & Alternate

<table>
<thead>
<tr>
<th>BB25AV-FA</th>
</tr>
</thead>
</table>
General Specifications

Electrical Capacity (Resistive Load)

Logic Level: 0.4VA maximum @ 28V AC/DC maximum
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)

Note: Find additional explanation of operating range in Supplement section.

Other Ratings

Contact Resistance: 50 milliohms maximum
Insulation Resistance: 1,000 megohms minimum @ 500V DC
Dielectric Strength: 1,000V AC minimum between contacts for 1 minute minimum;
1,500V AC minimum between contacts & case for 1 minute minimum
Mechanical Life: 200,000 operations minimum
Electrical Life: 100,000 operations minimum
Nominal Operating Force:
Single Pole: 1.96N
Double Pole: 2.94N
Travel: Pretravel .020” (0.5mm); Overtravel .020” (0.5mm); Total Travel .039” (1.0mm)

Materials & Finishes

Plunger: Brass with nickel plating
Bushing: Brass with nickel plating
Frame: Stainless steel
Case: Glass fiber reinforced polyamide
Movable Contacts: Copper with gold plating
Stationary Contacts: Phosphor bronze with gold plating
Terminals: Brass with gold plating

Environmental Data

Operating Temp Range: –10°C through +70°C (+14°F through +158°F)
Humidity: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning
in 1 minute; 3 right angled directions for 2 hours
Shock: 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation

Mounting Torque: 1.47Nm (13.0 lb-in) for double nut; 0.68Nm (6.0 lb-in) for single nut
Cap Installation Force: 78.5N (17.65 lbf) maximum downward force on actuator

PCB Processing

Soldering: Wave Soldering Recommended. See Profile A in Supplement section.
Cleaning: These devices are not process sealed. Hand clean locally using alcohol based solution.

Standards & Certifications

The DB Series pushbuttons have not been tested for UL recognition or CSA certification.
These switches are designed for use in low-voltage, low-current, logic-level circuit.
When used as intended in a logic-level circuit, the results do not produce hazardous energy.
Distinctive Characteristics

Both PCB and panel mounting options available.

Choice of cap sizes in .315” (8.0mm) and .394” (10.0mm) diameter cap design for simple, snap-on installation.

High torque bushing prevents rotation and separation from metal frame during installation.

Stainless steel frame resists corrosion.

Snap action contacts give smooth actuation, short stroke, light touch, and audible feedback. This mechanism also provides long mechanical life.

Molded-in terminals prevent entry of solder flux, dust, and other contaminants.

.100” x .100” (2.54mm x 2.54mm) terminal spacing conforms to standard PC board grid spacing. Round terminals for easier through-hole mounting on PC boards.
TYPICAL SWITCH ORDERING EXAMPLE

**DB25**

**Poles & Circuits**

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>DB2511</td>
<td>ON</td>
<td>(ON)</td>
</tr>
<tr>
<td>DP</td>
<td>DB2521</td>
<td>ON</td>
<td>(ON)</td>
</tr>
</tbody>
</table>

**PC Terminals**

- Threaded Bushing
  - P: Straight
  - B: Straight with Bracket
  - H: Right Angle with Bracket
  - V: Vertical with Bracket

**Description for Typical Ordering Example**

**DB2521B with AT443E Cap**

Yellow .315” (8.0mm) Diameter Cap

Smooth Bushing & Straight PC Terminals with Bracket

**POLES & CIRCUITS**

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Plunger Position</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(   ) = Momentary</td>
<td></td>
<td>Note: Terminal numbers are not actually on the switch.</td>
</tr>
<tr>
<td>SP</td>
<td>DB2511</td>
<td>Normal Keyway</td>
<td>3-1 3-2 SPDT</td>
<td></td>
</tr>
<tr>
<td>DP</td>
<td>DB2521</td>
<td>Normal Keyway</td>
<td>3-1 6-4 3-2 6-5 DPDT</td>
<td></td>
</tr>
</tbody>
</table>

Note: Terminal numbers are not actually on the switch.
Light Touch Miniature Pushbuttons

**TYPICAL SWITCH DIMENSIONS**

**Single Pole**

**Straight PC**

DB2511P with AT443C

**Double Pole**

**Straight PC**

DB2521P with AT442A

**Single Pole**

**Straight PC with Bracket**

DB2511B with AT442C

**Double Pole**

**Straight PC with Bracket**

DB2521B with AT443E
### TYPICAL SWITCH DIMENSIONS

#### Right Angle PC with Bracket

- **DB2511H with AT442B**

#### Single Pole

- **DB2511H with AT442B**

#### Double Pole

- **DB2511H with AT442B**

#### Right Angle PC with Bracket

- **DB2521H with AT442A**

#### Single Pole

- **DB2521H with AT442A**

#### Double Pole

- **DB2521H with AT442A**

#### Vertical PC with Bracket

- **DB2511V with AT443C**

#### Single Pole

- **DB2511V with AT443C**

#### Double Pole

- **DB2511V with AT443C**

- **DB2521V with AT443C**
**OPTIONAL CAPS & COLORS**

**AT443**
- **.315” (8.0mm) Diameter Snap-on Cap**
  - Cap Colors: A (Black), B (White), C (Red), E (Yellow), F (Green), G (Blue)
  - Cap Material: Polycarbonate
  - Finish: Glossy

**AT442**
- **.394” (10.0mm) Diameter Snap-on Cap**
  - Cap Colors: A (Black), B (White), C (Red), E (Yellow), F (Green), G (Blue)
  - Cap Material: Polycarbonate
  - Finish: Glossy

**HARDWARE**

**Standard Hardware**
- AT513M: Metric Hexagon Nut
  - Material: Brass with Nickel Plating
  - Face Nut: M6 P0.75
  - Locking Ring: (Optional)
  - Lockwasher: AT509
  - Lock Nut: (Optional)

**Optional Hardware**
- AT507M: Metric Locking Ring
  - Material: Steel with Zinc/Chromate
  - Locking Ring: (Optional)

- AT501M: Metric Knurled Face Nut
  - Material: Brass with Chrome Plating

**INSTALLATION/ASSEMBLY**

- 2 AT513M Metric Hexagon Nuts
- 1 AT509 Internal Tooth Lockwasher

**PANEL CUTOUTS & THICKNESSES**

**With Standard Hardware**
- Face Nut: M6 P0.75
- Lockwasher: AT509
- Lock Nut: (Optional)

**Without Bottom Hex Nut**
- Maximum Effective Panel Thickness: .118” (3.0mm)

**With Standard Hardware & Optional Locking Ring**
- Maximum Effective Panel Thickness: .185” (4.7mm)

Optional Hardware: AT507M Metric Locking Ring

Note: Cap must be snapped on after the switch is mounted into the panel.
**General Specifications**

**Electrical Capacity (Resistive Load)**

- **Power Level (silver):** 3A @ 125V AC for silver contacts
- **Logic Level (gold):** 0.4VA maximum @ 28V AC/DC maximum for gold contacts

(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)

Note: Find additional explanation of operating range in Supplement section.

**Other Ratings**

- **Contact Resistance:** 10 milliohms maximum for silver; 20 milliohms maximum for gold
- **Insulation Resistance:** 1,000 megohms minimum @ 500V DC
- **Dielectric Strength:** 1,000V AC minimum between contacts for 1 minute minimum; 1,500V AC minimum between contacts and case for 1 minute minimum
- **Mechanical Life:** 100,000 operations minimum
- **Electrical Life:** 25,000 operations minimum for silver; 50,000 operations minimum for gold
- **Nominal Operating Force:**
  - Single Pole: 2.35N for Momentary and 2.65N for Alternate Action
  - Double Pole: 2.94N for Momentary and 3.63N for Alternate Action
- **Travel:**
  - Momentary: Pretravel .047” (1.2mm); Overtravel .016” (0.4mm); Total Travel .063” (1.6mm)
  - Alternate: Pretravel .071” (1.8mm); Overtravel .016” (0.4mm); Total Travel .087” (2.2mm)

**Materials & Finishes**

- **Plunger:** Brass with chrome plating for Momentary; brass with nickel plating for Alternate Action
- **Bushing:** Brass with nickel plating
- **Frame:** Stainless steel
- **Case:** Melamine phenolic resin (UL94V-0)
- **Movable Contacts:** Copper with silver or gold plating
- **Stationary Contacts:** Silver with silver or gold plating
- **Terminals:** Copper with silver or gold plating

**Environmental Data**

- **Operating Temp Range:** -10°C through +70°C (+14°F through +158°F)
- **Humidity:** 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
- **Vibration:** 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
- **Shock:** 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

**Installation**

- **Mounting Torque:** 1.47Nm (13.0 lb-in) for double nut; 0.68Nm (6.0 lb-in) for single nut
- **Cap Installation Force:** 78.5N (17.65 lbf) maximum downward force on actuator
- **Soldering Time & Temp:** Wave Solder (Straight PC): See Profile B in Supplement section.
- **Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

**Standards & Certifications**

- **Flammability Standards:** UL94V-0 case
- **UL:** File No. E44145 - Recognized only when ordered with marking on switch.
  - Add “/U” or “/CUL” before first dash in part number to order UL recognized switch.
  - All single and double pole models recognized at 3A @ 125V AC.
- **CSA:** File No. 023535_0_000 - Certified only when ordered with marking on switch.
  - Add “/C” before first dash in part number to order CSA certified switch.
  - Single pole solder lug and PC models certified at 3A @ 125V AC; double pole PC models certified at 3A @ 125V AC.
Distinctive Characteristics

Power and logic level capabilities available to suit varying applications.

Bushing and snap-in mount versions available; snap-in models offer many style and color choices to enhance front panel appearance.

Light touch actuation.

High torque bushing prevents rotation and separation from metal frame during installation.

Stainless steel frame resists corrosion.

Case of heat resistant resin meets UL 94V-0 flammability rating.

Higher insulating barriers protect against crossover in double pole devices.

1,500V dielectric strength between contacts and case is accomplished by clinching the frame away from the terminals.

Epoxy sealed terminals prevent entry of solder flux and other contaminants.
**TYPICAL SWITCH ORDERING EXAMPLE**

**Poles & Circuits**

<table>
<thead>
<tr>
<th>No</th>
<th>Code</th>
<th>SPDT</th>
<th>SPDT</th>
<th>DPDT</th>
<th>DPDT</th>
</tr>
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<tbody>
<tr>
<td>11</td>
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<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td></td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
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<tr>
<td>61</td>
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<td>ON</td>
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<td></td>
</tr>
<tr>
<td>85</td>
<td></td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

( ) = Momentary

**Caps**

| B | .315” (8.0mm) Dia. |
| C | .394” (10.0mm) Dia. |

**Contacts, Ratings, & Terminals**

<table>
<thead>
<tr>
<th>No</th>
<th>Code</th>
<th>Contacts, Ratings, &amp; Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>G</td>
<td>Gold Contacts; Solder Lug Terminals 0.4VA max @ 28V AC/DC max</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td>Silver Contacts; Straight PC Terminals; 3A @ 125V AC</td>
</tr>
<tr>
<td></td>
<td>PG</td>
<td>Gold Contacts; Straight PC Terminals 0.4VA max @ 28V AC/DC max</td>
</tr>
</tbody>
</table>

**Colors**

| A  | Black   |
| B  | White   |
| C  | Red     |
| E  | Yellow  |
| F  | Green   |
| G  | Blue    |
| H  | Gray    |

**IMPORTANT:**

Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on the General Specifications page.

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

**EB2065-BF**

- Green .315” (8.0mm) Diameter Cap
- SPDT ON-ON Circuit
- Silver Contacts & Solder Lug Terminals with 3-Amp Rating
**Light Touch Miniature Pushbuttons**

**Series EB**

### POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>EB2011</td>
<td>ON</td>
<td>(ON)</td>
<td>2-3 2-1</td>
<td>SPDT</td>
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<tr>
<td></td>
<td>EB2065</td>
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<td>(ON)</td>
<td>2-3 2-1</td>
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</tr>
<tr>
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<td>EB2061</td>
<td>ON</td>
<td>(ON)</td>
<td>2-3 5-6 2-1 5-4</td>
<td>DPDT</td>
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<tr>
<td></td>
<td>EB2085</td>
<td>ON</td>
<td>(ON)</td>
<td>2-3 5-6 2-1 5-4</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Terminal numbers are not actually on the switch.*

### CONTACT MATERIALS, RATINGS, & TERMINALS

**No Code**
- **Solder Lug Silver Contacts**
  - **Power Level**: 3A @ 125V AC

**G**
- **Solder Lug Gold Contacts**
  - **Logic Level**: 0.4VA max @ 28V AC/DC max
  - Complete explanation of operating range in Supplement section.

**P**
- **Straight PC Silver Contacts**
  - **Power Level**: 3A @ 125V AC

**PG**
- **Straight PC Gold Contacts**
  - **Logic Level**: 0.4VA max @ 28V AC/DC max
  - Complete explanation of operating range in Supplement section.

### PCB Footprints

**Single Pole**

**Double Pole**

*Complete explanation of operating range in Supplement section.*
### Series EB

#### Light Touch Miniature Pushbuttons

#### CAPS & COLORS

<table>
<thead>
<tr>
<th>Caps</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>AT443 .315&quot; (8.0mm) Diameter Snap-on Cap</td>
</tr>
<tr>
<td>C</td>
<td>AT442 .394&quot; (10.0mm) Diameter Snap-on Cap</td>
</tr>
</tbody>
</table>

#### Cap Colors Available:

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Black</td>
</tr>
<tr>
<td>B</td>
<td>White</td>
</tr>
<tr>
<td>C</td>
<td>Red</td>
</tr>
<tr>
<td>D</td>
<td>Yellow</td>
</tr>
<tr>
<td>E</td>
<td>Blue</td>
</tr>
<tr>
<td>F</td>
<td>Green</td>
</tr>
<tr>
<td>G</td>
<td>Gray</td>
</tr>
</tbody>
</table>

- Cap Material: Polycarbonate  
- Finish: Glossy

#### Plunger Extension

Due to a difference in plunger lengths on the momentary and alternate action models, cap distance from top of bushing varies.

#### TYPICAL SWITCH DIMENSIONS

**Solder Lug**

- **Momentary Plunger Length**
- **Momentary Cap Location**

**Single Pole**

- **Alternate Plunger Length**
- **Alternate Cap Location**

**Tactile**

- **M6 P0.75**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8 (O.D) Dia 315</td>
<td>For Momentary Devices</td>
</tr>
</tbody>
</table>

**Solder Lug**

- **EB2011-BA**

**Double Pole**

- **EB2061-BA**

- **M6 P0.75**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1.1) x (2.0) Typ 043 x 0.79</td>
<td>For Momentary Devices</td>
</tr>
</tbody>
</table>

**Solder Lug**

- **EB2011-BA**

**Double Pole**

- **EB2061-BA**

- **M6 P0.75**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1.1) x (2.0) Typ 043 x 0.79</td>
<td>For Momentary Devices</td>
</tr>
</tbody>
</table>

---

C28  
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HARDWARE

Installation/Assembly

2 AT513M Metric Hexagon Nuts
1 AT509 Internal Tooth Lockwasher

AT513M
Metric Hexagon Nut

Material: Brass with Nickel Plating

AT509
Lockwasher

Material: Steel with Zinc/Chromate

Optional Hardware:
AT507M Metric Locking Ring

Note: Cap must be snapped on after the switch is mounted into the panel.

PANEL CUTOUTS & THICKNESSES

Optional Hardware: AT507M Metric Locking Ring

Material: Steel with Zinc/Chromate

Maximum Effective Panel Thickness:
.118" (3.0mm)

Maximum Effective Panel Thickness:
.055" (1.4mm)

Maximum Effective Panel Thickness:
.185" (4.7mm)

See Accessories & Hardware section for optional Conical Nuts:
AT512M used with cap AT443 and AT512CM used with cap AT442.
**TYPICAL SWITCH ORDERING EXAMPLES**

**EB20**

- **Contacts, Ratings, & Terminals**
  - **No Code**
  - Silver Contacts; Solder Lug Terminals
  - 3A @ 125V AC
  - Gold Contacts; Solder Lug Terminals
  - 0.4VA max @ 28V AC/DC max
  - Silver Contacts; Straight PC Terminals
  - 3A @ 125V AC
  - Gold Contacts; Straight PC Terminals
  - 0.4VA max @ 28V AC/DC max

- **Cap Colors**
  - A: Black
  - B: White
  - C: Red
  - E: Yellow
  - F: Green
  - G: Blue
  - H: Gray

- **Cap Extensions & Bezel Types**
  - Low Rise
  - High Rise
  - Momentary
  - Alternate
  - Momentary
  - Alternate
  - Description
  - J20: J30: J40: J50: Without Bezel
  - J21: J31: J41: J51: Bezel without LED
  - J22: J32: J42: J52: Bezel with 1 Round LED
  - J23: J33: J43: J53: Bezel with 2 Round LEDs
  - J24: J34: J44: J54: Bezel with 2 Rectangular LEDs

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE WITHOUT BEZEL**

**EB2011-A-J40**

- Black Cap with High Rise Extension
- Silver Contacts & Solder Lug Terminals with 3-Amp Rating

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE WITH BEZEL**

**EB2011-B-J23ACF**

- Black Bezel with 2 Round LEDs:
  - Top LED: Red
  - Bottom LED: Green
- White Cap with Low Rise Extension
- Silver Contacts & Solder Lug Terminals with 3-Amp Rating

**IMPORTANT:**

Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on General Specifications page.

* Wire harness & cable assemblies offered only in Americas.
## Series EB

### Light Touch Miniature Pushbuttons

### POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Keyway</th>
<th>Down</th>
<th>Keyway</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>EB2011 EB2065</td>
<td>ON</td>
<td>(ON)</td>
<td>ON</td>
<td>2-3</td>
<td>2-1</td>
<td>SPDT</td>
</tr>
<tr>
<td>DP</td>
<td>EB2061 EB2085</td>
<td>ON</td>
<td>(ON)</td>
<td>ON</td>
<td>2-3 5-6</td>
<td>2-1 5-4</td>
<td>DPDT</td>
</tr>
</tbody>
</table>

Note: Terminal numbers are not actually on the switch.

### CONTACT MATERIALS, RATINGS, & TERMINALS

- **No Code**
  - **Solder Lug**
  - Silver Contacts
  - Power Level: 3A @ 125V AC

- **G**
  - **Solder Lug**
  - Gold Contacts
  - Logic Level: 0.4VA maximum @ 28V AC/DC maximum
  - Complete explanation of operating range in Supplement section.

- **P**
  - **Straight PC**
  - Silver Contacts
  - Power Level: 3A @ 125V AC

- **PG**
  - **Straight PC**
  - Gold Contacts
  - Logic Level: 0.4VA maximum @ 28V AC/DC maximum
  - Complete explanation of operating range in Supplement section.

### PCB Footprints

#### Single Pole

#### Double Pole
Light Touch Miniature Pushbuttons

Series EB

**CAP COLORS**

Factory Assembled on the Switch:
Square snap-on cap AT465, snap-in mounter AT529, and optional bezels which follow.

- **Black**
- **White**
- **Red**
- **Yellow**
- **Green**
- **Blue**
- **Gray**

**CAP EXTENSIONS & BEZEL TYPES**

<table>
<thead>
<tr>
<th>Cap Extension without Bezel</th>
<th>J20</th>
<th>J30</th>
<th>J40</th>
<th>J50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Rise Momentary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Rise Alternate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Rise Momentary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Rise Alternate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**High Rise**

**Single Pole**

**EB2011-A-J40**

**Low Rise Double Pole**

EB2061-B-J21A

**AT207 Bezel without LED**

- **Black**
- **White**
- **Red**

**Material**: Polycarbonate

**Finish**: Glossy

Maximum Panel Thickness .039” ~ 1.57” (1.0mm ~ 4.0mm)
Cutout applies to SP & DP

**EB2011-A-J40**

**EB2061-B-J21A**

Dimensions in mm
Series EB  
Light Touch Miniature Pushbuttons

### CAP EXTENSIONS & BEZEL TYPES

**Cap Extension with Bezel**

**J22**  
Low Rise Momentary

**J32**  
Low Rise Alternate

**J42**  
High Rise Momentary

**J52**  
High Rise Alternate

**AT208 Bezel with 1 Round LED (AT70 LED)**

- **A** Black

- Material: Polycarbonate
- Finish: Glossy

Maximum Panel Thickness: 0.39" ~ 1.26" (1.0mm ~ 3.2mm)
Cutout applies to SP & DP

**AT212 Bezel with 2 Round LEDs (AT617 LEDs)**

- **A** Black

- Material: Polycarbonate
- Finish: Glossy

Maximum Panel Thickness: 0.39" ~ 1.26" (1.0mm ~ 3.2mm)
Cutout applies to SP & DP

**LED colors and specifications on next to last page of this EB section.**

---

**EB2011-B-J42AC**  
High Rise Single Pole

**EB2065-B-J33ACF**  
Low Rise Single Pole

---

**Maximum Panel Thickness**

- 0.39" ~ 1.26" (1.0mm ~ 3.2mm)

**Cutout applies to SP & DP**

---

**For Momentary Devices**

**For Alternate Devices**

**LED colors and specifications on next to last page of this EB section.**

---

**Material: Polycarbonate**

**Finish: Glossy**

---

**www.nkk.com**
**Light Touch Miniature Pushbuttons**

**Series EB**

**CAP EXTENSIONS & BEZEL TYPES**

<table>
<thead>
<tr>
<th>Cap Extension with Bezel</th>
<th>J24</th>
<th>J34</th>
<th>J44</th>
<th>J54</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Rise Momentary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Rise Alternate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Rise Momentary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Rise Alternate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AT213 Bezel with 2 Rectangular LEDs (AT618 LEDs)**

- **A** Black
- Material: Polycarbonate
- Finish: Glossy

Maximum Panel Thickness: .039" ~ .126" (1.0mm ~ 3.2mm)
Cutout applies to SP & DP

**LED colors and specifications on next page of this EB section.**

**High Rise**

For Alternate Devices

**Double Pole**

EB2085-B-J54ACF

**Maximum Panel Thickness**

**Material:** Polycarbonate

**Finish:** Glossy

**Cutout applies to SP & DP**

**For Alternate Devices**
**LED COLORS & SPECIFICATIONS**

### Bezel Orientation on Switch

<table>
<thead>
<tr>
<th>Bezel Orientation on Switch</th>
<th>AT070 LED</th>
<th>AT617 LED</th>
<th>AT618 LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Bezel AT208 with 1 LED</td>
<td>AT070 LED</td>
<td>AT617 LED</td>
<td>AT618 LED</td>
</tr>
<tr>
<td>AT070 LED</td>
<td>AT617 LED</td>
<td>AT618 LED</td>
<td></td>
</tr>
<tr>
<td>For Bezel AT212 with 2 Round LEDs</td>
<td>AT070 LED</td>
<td>AT617 LED</td>
<td>AT618 LED</td>
</tr>
<tr>
<td>For Bezel AT213 with 2 Rectangular LEDs</td>
<td>AT070 LED</td>
<td>AT617 LED</td>
<td>AT618 LED</td>
</tr>
</tbody>
</table>

Note: Lead lengths may differ from manufacturing lot to lot. The longer lead is the anode (+).

<table>
<thead>
<tr>
<th>Color</th>
<th>AT070</th>
<th>AT617</th>
<th>AT618</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>25mA</td>
<td>30mA</td>
<td>25mA</td>
</tr>
<tr>
<td>Green</td>
<td>30mA</td>
<td>30mA</td>
<td>30mA</td>
</tr>
<tr>
<td>Red</td>
<td>20mA</td>
<td>20mA</td>
<td>20mA</td>
</tr>
<tr>
<td>Yellow</td>
<td>30mA</td>
<td>30mA</td>
<td>30mA</td>
</tr>
<tr>
<td>Red</td>
<td>10mA</td>
<td>8mA</td>
<td>24mA</td>
</tr>
<tr>
<td>Yellow</td>
<td>30mA</td>
<td>24mA</td>
<td>24mA</td>
</tr>
<tr>
<td>Red</td>
<td>2.8V</td>
<td>2.0V</td>
<td>2.0V</td>
</tr>
<tr>
<td>Green</td>
<td>2.1V</td>
<td>2.1V</td>
<td>2.1V</td>
</tr>
<tr>
<td>Red</td>
<td>5V</td>
<td>5V</td>
<td>5V</td>
</tr>
<tr>
<td>Yellow</td>
<td>5V</td>
<td>5V</td>
<td>5V</td>
</tr>
<tr>
<td>Red</td>
<td>0.33mA/°C</td>
<td>0.40mA/°C</td>
<td>0.40mA/°C</td>
</tr>
<tr>
<td>Yellow</td>
<td>0.40mA/°C</td>
<td>0.40mA/°C</td>
<td>0.33mA/°C</td>
</tr>
<tr>
<td>Red</td>
<td>0.13mA/°C</td>
<td>0.40mA/°C</td>
<td>0.40mA/°C</td>
</tr>
<tr>
<td>Yellow</td>
<td>0.40mA/°C</td>
<td>0.40mA/°C</td>
<td>0.40mA/°C</td>
</tr>
</tbody>
</table>

### Ambient Temperature Range (when used with a bezel)
- AT070: -10° ~ +70°C
- AT617: -15° ~ +70°C
- AT618: -15° ~ +70°C

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is independent of switch operation. LED is colored in OFF state.

If the source voltage is greater than the rated voltage of the LED, a ballast resistor must be connected in series with the lamp. The ballast resistor calculation and more lamp detail are shown in the Supplement section.
LEGENDS

NKK Switches can provide custom legends for caps. Contact factory for more information.

**Suggested Printable Area for Cap**

**Recommended Print Method:**
Screen Print or Pad Print

Epoxy based ink is recommended.

---

**Shaded areas are printable areas.**

---

NKK Switches can provide custom legends for caps. Contact factory for more information.
## Series FB & SB

### General Specifications

#### FB Series

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical Capacity (Resistive Load)</strong></td>
<td></td>
</tr>
<tr>
<td>Power Level:</td>
<td>500mA @ 125V AC for silver</td>
</tr>
<tr>
<td>Logic Level:</td>
<td>0.4VA max. @ 28V AC/DC max. for gold</td>
</tr>
<tr>
<td>(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)</td>
<td></td>
</tr>
<tr>
<td><strong>Other Ratings</strong></td>
<td></td>
</tr>
<tr>
<td>Contact Resistance:</td>
<td>30 milliohms maximum for silver; 30 milliohms maximum for gold</td>
</tr>
<tr>
<td>Insulation Resistance:</td>
<td>100 megohms minimum @ 500V DC</td>
</tr>
<tr>
<td>Dielectric Strength:</td>
<td>1,000V AC minimum between contacts &amp; between contacts &amp; case for 1 minute minimum</td>
</tr>
<tr>
<td>Mechanical Life:</td>
<td>50,000 operations minimum</td>
</tr>
<tr>
<td>Electrical Life:</td>
<td>50,000 operations minimum</td>
</tr>
<tr>
<td>Nominal Operating Force:</td>
<td>2.16N</td>
</tr>
<tr>
<td>Travel:</td>
<td>Pretravel .043” (1.1mm)</td>
</tr>
<tr>
<td></td>
<td>Overtravel .022” (0.57mm)</td>
</tr>
<tr>
<td></td>
<td>Total Travel .065” (1.67mm)</td>
</tr>
<tr>
<td><strong>Materials &amp; Finishes</strong></td>
<td></td>
</tr>
<tr>
<td>Plunger:</td>
<td>Polyacetal</td>
</tr>
<tr>
<td>Bushing:</td>
<td>Brass with nickel plating</td>
</tr>
<tr>
<td>Case:</td>
<td>Phenolic resin</td>
</tr>
<tr>
<td>Movable Contactor:</td>
<td>Copper with silver or gold plating</td>
</tr>
<tr>
<td>Stationary Contacts:</td>
<td>Phosphor bronze with silver or gold plating</td>
</tr>
<tr>
<td>Terminals:</td>
<td>Phosphor bronze with silver or gold plating</td>
</tr>
<tr>
<td><strong>Environmental &amp; Installation Data</strong></td>
<td></td>
</tr>
<tr>
<td>Operating Temp Range:</td>
<td>–10°C through +70°C (+14°F through +158°F)</td>
</tr>
</tbody>
</table>

#### SB Series

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical Capacity (Resistive Load)</strong></td>
<td></td>
</tr>
<tr>
<td>Power Level:</td>
<td>3A @ 125V AC or 2A @ 250V AC or 2A @ 30V DC for silver</td>
</tr>
<tr>
<td>Logic Level:</td>
<td>0.4VA max. @ 28V AC/DC max. for gold</td>
</tr>
<tr>
<td>(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)</td>
<td></td>
</tr>
<tr>
<td><strong>Other Ratings</strong></td>
<td></td>
</tr>
<tr>
<td>Contact Resistance:</td>
<td>10 milliohms maximum for silver; 20 milliohms maximum for gold</td>
</tr>
<tr>
<td>Insulation Resistance:</td>
<td>200 megohms minimum @ 500V DC</td>
</tr>
<tr>
<td>Dielectric Strength:</td>
<td>1,000V AC minimum between contacts &amp; between contacts &amp; case for 1 minute minimum</td>
</tr>
<tr>
<td>Mechanical Life:</td>
<td>30,000 operations minimum</td>
</tr>
<tr>
<td>Electrical Life:</td>
<td>10,000 operations minimum</td>
</tr>
<tr>
<td>Nominal Operating Force:</td>
<td>4.90N</td>
</tr>
<tr>
<td>Travel:</td>
<td>Normally Open</td>
</tr>
<tr>
<td></td>
<td>Total Travel .088” (2.24mm)</td>
</tr>
<tr>
<td><strong>Materials &amp; Finishes</strong></td>
<td></td>
</tr>
<tr>
<td>Plunger:</td>
<td>Phenolic resin</td>
</tr>
<tr>
<td>Bushing:</td>
<td>Brass with nickel plating</td>
</tr>
<tr>
<td>Case:</td>
<td>Phenolic resin</td>
</tr>
<tr>
<td>Movable Contactor:</td>
<td>Copper with silver or gold plating</td>
</tr>
<tr>
<td>Stationary Contacts:</td>
<td>Copper with silver or gold plating</td>
</tr>
<tr>
<td>Terminals:</td>
<td>Copper with silver or gold plating</td>
</tr>
<tr>
<td><strong>Environmental &amp; Installation Data</strong></td>
<td></td>
</tr>
<tr>
<td>Operating Temp Range:</td>
<td>–10°C through +70°C (+14°F through +158°F)</td>
</tr>
</tbody>
</table>

#### Standards & Certifications

- UL: File No. E44145 - Recognized only when ordered with marking on switch. Add “/U” or “/CUL” before dash in part number to order UL recognized switch. Models rated 0.5A @ 125V AC Single pole; Momentary action circuit with solder lug terminations.
- CSA: File No. 023535_0_000 - Certified only when ordered with marking on switch. Add “/C” before dash in part number to order CSA certified switch. SB series rated 3A @ 125V AC & 2A @ 250V AC. Single pole: Momentary action circuit with solder lug terminations.
Distinctive Characteristics

Optional caps in different colors to vary appearance as needed.

Low operating force for ease of actuation.

Rear panel bushing mount with compact behind panel dimension.

Internal anti-jamming feature to protect the contacts from damage due to excessive force on the plunger.

Self-cleaning contacts make FB models highly reliable.

Low cost device of rugged one-piece bushing and housing construction.

Reliability of construction with an internal guide to maintain contact alignment.

Epoxy sealed terminals.
Series FB

.5 Amp Momentary Pushbuttons

TYPICAL SWITCH ORDERING EXAMPLE

FB 15AN EP 2 F A

Pole & Circuit
15AN | SPST | OFF (ON)
( ) = Momentary

Contact Materials & Ratings
2 Silver Contacts
500mA @ 125V AC
4 Gold Contacts
0.4VA max. @ 28V AC/DC max.

Cap Colors
A Black
B White
C Red

Terminals
EP Epoxy Sealed PC/Turret
P No Epoxy PC/Turret

IMPORTANT:
Switches are supplied without UL & cULus marking unless specified. UL & cULus recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on General Specifications page.

Caps
F .201" (5.1mm) Dia.
H .295" (7.5mm) Dia.

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

FB15ANEP2-FA

.201" (5.1mm) Diameter
Black Cap
Silver Contacts &
500-Milliamp Rating
Epoxy Sealed
PC/Turret Terminals

POLE & CIRCUIT

Plunger Position
( ) = Momentary

Connected Terminals

Throw & Switch Schematics
Note: Terminal numbers are not actually on the switch.

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Normal</th>
<th>Down</th>
<th>SPST</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>FB15AN</td>
<td>OFF</td>
<td>(ON)</td>
<td>OPEN</td>
<td>1-2</td>
<td></td>
</tr>
</tbody>
</table>
.5 Amp Momentary Pushbuttons

**TERMINALS**

- **EP** Epoxy Sealed PC/Turret Terminals
- **P** No Epoxy PC/Turret Terminals

**CONTACT MATERIALS & RATINGS**

- **2** Silver Contacts
  - Power Level: 500mA @ 125V AC
- **4** Gold Contacts
  - Logic Level: 0.4VA maximum @ 28V AC/DC maximum

Complete explanation of operating range in Supplement section.

**TYPICAL SWITCH DIMENSIONS**

Plunger is white polyacetal.

**SLIP-ON CAPS & COLORS**

- **F** AT475 .201” (5.1mm) Diameter
  - Material: Polyamide
  - Finish: Glossy
- **H** AT496 .295” (7.5mm) Diameter
  - Material: Polyamide
  - Finish: Glossy

Colors Available:

- **A** Black
- **B** White
- **C** Red

**STANDARD HARDWARE & PANEL CUTOUT**

- **AT536** Hex Nut
  - Material: Brass with nickel plating
- **Panel Thickness:** .110” (2.8mm) maximum
### Important:

Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on General Specifications page.

## Typical Switch Ordering Example

**SB40**

### Pole & Circuits

<table>
<thead>
<tr>
<th>Model</th>
<th>SPST</th>
<th>Normally Open</th>
<th>Normally Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB4011NO</td>
<td>OFF</td>
<td>(ON)</td>
<td>OPEN</td>
</tr>
<tr>
<td>SB4011NC</td>
<td>ON</td>
<td>(OFF)</td>
<td>1-2 OPEN</td>
</tr>
</tbody>
</table>

### Plunger Colors

- No Code: Black
- C: Red

### Contact Materials & Ratings

- No Code: Silver Contacts 3A @ 125V AC or 2A @ 250V DC
- G: Gold Contacts 0.4V A max. @ 28V AC/DC max.

### Bushings

- M: Metric Threaded M12 P1
- H: Inch Threaded 15/32-32 NS

### Slip-On Cap & Colors

- No Code: Without Cap
- 2A: Black
- 2B: White
- 2C: Red
- 2E: Yellow
- 2F: Green
- 2G: Blue

### Description for Typical Ordering Example

**SB4011NOM**

- Standard Black Plunger without Slip-on Cap
- Metric Threaded Bushing
- Silver Contacts with 3-Amp Rating

### Pole & Circuits

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Plunger Position</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>SB4011NO</td>
<td>OFF (ON)</td>
<td>OPEN</td>
<td>SPST NO NC</td>
</tr>
<tr>
<td>SP</td>
<td>SB4011NC</td>
<td>ON (OFF)</td>
<td>1-2 OPEN</td>
<td></td>
</tr>
</tbody>
</table>

Note: Terminal numbers are not actually on the switch.
TYPICAL SWITCH DIMENSIONS

Panel Thickness: .157" (4.0mm) Details in Hardware & Accessories section.

SLIP-ON CAP & COLORS

AT422
.394" (10.0mm) Diameter Cap

Material: Polyethylene
Finish: Matte

Hardware provided:
1 AT504 Knurled Face Nut
1 AT508 Lockwasher
1 AT527M Hex Mounting Nut

Details in Hardware & Accessories section.
Series GB

Process Sealed Ultra-Miniature Pushbuttons

General Specifications

Electrical Capacity (Resistive Load)

Logic Level: 0.4VA maximum @ 28V AC/DC maximum
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
Note: Find additional explanation of operating range in Supplement section.

Other Ratings

- Contact Resistance: 80 milliohms maximum
- Insulation Resistance: 500 megohms minimum @ 500V DC
- Dielectric Strength: 500V AC minimum for 1 minute minimum
- Mechanical Life: 50,000 operations minimum
- Electrical Life: 50,000 operations minimum
- Nominal Operating Force: 1.70N
- Travel: Pretravel .035” (0.9mm); Overtravel .008” (0.2mm); Total Travel .043” (1.1mm)

Materials & Finishes

- Actuator: Polyacetal
- Case: Glass fiber reinforced polyamide
- Sealing Rings: Nitrile butadiene rubber
- Movable Contacts: Phosphor bronze with gold plating
- Stationary Contacts: Phosphor bronze with gold plating
- Base: Glass fiber reinforced polyamide
- Mounting Bracket: Phosphor bronze with tin plating
- Terminals: Phosphor bronze with gold plating

Environmental Data

- Operating Temp Range: -30°C through +85°C (-22°F through +185°F)
- Humidity: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
- Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
- Shock: 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation

- Cap Installation Force: 39.1N (8.8 lbf) maximum downward force on actuator

PCB Processing

- Soldering: Wave Soldering Recommended: See Profile A in Supplement section.

Standards & Certifications

The GB Series pushbuttons have not been tested for UL recognition or CSA certification. These switches are designed for use in a low-voltage, low-current, logic-level circuit. When used as intended in a logic-level circuit, the results do not produce hazardous energy.
Distinctive Characteristics

Ultra-miniature size allows high density mounting, and extremely light weight of 0.25 gram makes these switches ideal for handheld equipment.

Totally sealed body construction prevents contact contamination and allows time- and money-saving automated soldering and cleaning.

Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smoother, positive detent actuation, increased contact stability and unparalleled logic-level reliability. (Additional STC details in Terms & Acronyms; see Supplement section.)

.100” x .100” (2.54mm x 2.54mm) terminal spacing conforms to standard PC board grid-spacing. Round terminals facilitate easier through-hole mounting on PC boards.

Matching indicators available.
Series GB

Process Sealed Ultra-Miniature Pushbuttons

TYPICAL SWITCH ORDERING EXAMPLE

**GB**

<table>
<thead>
<tr>
<th>Poles</th>
<th>Circuits</th>
<th>PC Terminals</th>
<th>Cap Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 SPDT</td>
<td>5 ON (ON)</td>
<td>P Straight</td>
<td>A Black</td>
</tr>
<tr>
<td>2 DPDT</td>
<td>( ) = Momentary</td>
<td>H Right Angle</td>
<td>B White</td>
</tr>
</tbody>
</table>

**Plunger**

A .130" (3.3mm) Long

**Slip-on Cap**

X .157" (4.0mm) Diameter

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

GB15AH-XC

.130" (3.3mm) Long Plunger with .157" (4.0mm) Diameter Red Cap

POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal Slot</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Note: Terminal numbers are not actually on the switch.</th>
<th>Throw &amp; Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>GB15</td>
<td>ON ON (ON)</td>
<td>5-6</td>
<td>5-4</td>
<td>SPDT</td>
<td><img src="image" alt="SPDT Schematic" /></td>
</tr>
<tr>
<td>DP</td>
<td>GB25</td>
<td>ON ON (ON)</td>
<td>5-6  2-3</td>
<td>5-4  2-1</td>
<td>DPDT</td>
<td><img src="image" alt="DPDT Schematic" /></td>
</tr>
</tbody>
</table>

PLUNGER

A .130" (3.3mm) Long Plunger

PC TERMINALS

<table>
<thead>
<tr>
<th>P</th>
<th>Straight</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>H</th>
<th>Right Angle</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>V</th>
<th>Vertical</th>
</tr>
</thead>
</table>

C46 www.nkk.com
Series GB

SLIP-ON CAP & COLORS

AT4063
.157" (4.0mm) Diameter Slip-on Cap

Material: Polyamide
Finish: Glossy

Cap Colors Available: A Black  B White  C Red

TYPICAL SWITCH DIMENSIONS

Single & Double Pole

Slot

Straight PC

GB25AP-XC

Single & Double Pole

Slot

Right Angle PC

GB25AH-XC

Single & Double Pole

Vertical PC

GB25AV-XC

On single pole switches terminals 1 & 3 are support pins.
General Specifications

Electrical Capacity (Resistive Load)

Logic Level: 0.4VA maximum @ 28V AC/DC maximum
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
Note: Find additional explanation of operating range in Supplement section.

Other Ratings

- Contact Resistance: 80 milliohms maximum
- Insulation Resistance: 500 megohms minimum @ 500V DC
- Dielectric Strength: 500V AC minimum for 1 minute minimum
- Mechanical Life: 50,000 operations minimum
- Electrical Life: 50,000 operations minimum
- Nominal Operating Force: 1.0N
  Travel: Pretravel .020" (0.5mm); Overtravel .023 (0.6mm); Total Travel .043" (1.1mm)

Materials & Finishes

- Actuator: Glass fiber reinforced polyamide (UL94V-0)
- Case: Glass fiber reinforced polyamide (UL94V-0)
- Movable Contacts: Phosphor bronze with gold plating
- Stationary Contacts: Brass with gold plating
- Base: Glass fiber reinforced polyamide (UL94V-0)
- Mounting Bracket: Phosphor bronze with tin plating
- Terminals: Brass with gold plating

Environmental Data

- Operating Temperature Range: –25°C through +70°C (–13°F through +158°F)
- Humidity: 90 ~ 95% humidity for 240 hours @ 40°C (104°F)
- Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
- Shock: 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

PCB Processing

- Soldering: Wave Soldering Recommended: See Profile A in Supplement section.
  Manual Soldering: See Profile A in Supplement section.
- Cleaning: These devices are not process sealed. Hand clean locally using alcohol based solution.

Standards & Certifications

Flammability Standards: UL94V-0 actuator, case, & base

The GB2 Series pushbuttons have not been tested for UL recognition or CSA certification. These switches are designed for use in a low-voltage, low-current, logic-level circuit. When used as intended in a logic-level circuit, the results do not produce hazardous energy.
Distinctive Characteristics

Unique, off-center actuator allows high density setup and easy actuation while avoiding accidental operation in compact environments.

Side-by-side, block mounting can be achieved by use of bracket AT546 on straight PC mounting types.

Off-Momentary On Circuit.

Black, white, and red snap-on caps available.

Extremely thin size allows high density PCB mounting and makes these switches ideal for handheld equipment.

Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smoother, positive detent actuation, increased contact stability and unparalleled logic-level reliability. (Additional STC details in Terms & Acronyms; see Supplement section.)

Molded-in, epoxy sealed terminals lock out flux and other contaminants.

.100” x .100” (2.54mm x 2.54mm) terminal spacing conforms to standard PC board grid spacing for straight and angle mounting.
Series GB2 Ultimate Thin Pushbuttons

**TYPICAL SWITCH ORDERING EXAMPLE**

**GB2**

<table>
<thead>
<tr>
<th>Pole</th>
<th>Circuit</th>
<th>Plunger</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 SPST</td>
<td>5 OFF (ON)</td>
<td>A Standard</td>
</tr>
</tbody>
</table>

**Cap Colors**

- With P, B, or H Terminals for Single Switches
  - A Black
  - B White
  - C Red

- With Terminal Code 2H for 2 Right Angle Switches
  - Upper
    - A Black
    - B White
    - C Red
  - Lower
    - A Black
    - B White
    - C Red

*Nearest to PC Board*

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

**GB215AB**

- Standard Plunger
- SPST OFF-(ON) Circuit
- Straight PC Terminals with Bracket

**POLE & CIRCUIT**

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Throw &amp; Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pole</td>
<td>Model</td>
<td>Normal</td>
<td>Down</td>
<td>Normal</td>
<td>Down</td>
</tr>
<tr>
<td>SP</td>
<td>GB215</td>
<td>OFF</td>
<td>(ON)</td>
<td>OPEN</td>
<td>1-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-4</td>
</tr>
</tbody>
</table>

**TYPICAL SWITCH DIMENSIONS**

**Straight PC**

- GB215AP

**Single Pole**

- GB215AB
**TYPICAL SWITCH DIMENSIONS**

Single Pole

Straight PC with Bracket

---

**SNAP-ON CAP & MOUNTING BRACKET**

- **A** AT4137 Rectangular Snap-on Cap
  - Black

- **B** AT4137 Rectangular Snap-on Cap
  - White

- **C** AT4137 Rectangular Snap-on Cap
  - Red

  Material: PBT
  Finish: Glossy

---

**GB215AB**

**GB215AH**

**GB215A2H**

---

**Material:** Phosphor Bronze with Tin Plating

---

**AT4137 Rectangular Snap-on Cap**

- Actual Size

---

**AT546 Mounting Bracket for Block Mounting**

---

**AT546**

Material: Phosphor Bronze with Tin Plating

---

**www.nkk.com**
Series G3B Ultra-Miniature Process Sealed SMT Pushbuttons

General Specifications

Electrical Capacity (Resistive Load)

<table>
<thead>
<tr>
<th>Logic Level:</th>
<th>0.4VA maximum @ 28V AC/DC maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)</td>
</tr>
</tbody>
</table>

Note: Find additional explanation of operating range in Supplement section.

Other Ratings

<table>
<thead>
<tr>
<th>Contact Resistance:</th>
<th>80 milliohms maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation Resistance:</td>
<td>500 megohms minimum @ 500V DC</td>
</tr>
<tr>
<td>Dielectric Strength:</td>
<td>500V AC minimum for 1 minute minimum</td>
</tr>
<tr>
<td>Mechanical Life:</td>
<td>50,000 operations minimum</td>
</tr>
<tr>
<td>Electrical Life:</td>
<td>50,000 operations minimum</td>
</tr>
<tr>
<td>Nominal Operating Force:</td>
<td>2.0N</td>
</tr>
<tr>
<td>Travel:</td>
<td>Pretravel: .024&quot; (0.6mm); Overtravel: .019&quot; (0.5mm); Total Travel: .043&quot; (1.1mm)</td>
</tr>
</tbody>
</table>

Materials & Finishes

| Actuator: | Polyphenylene sulfide (UL94V-0) |
| Case: | Polyphenylene sulfide (UL94V-0) |
| Sealing Rings: | Nitrile butadiene rubber |
| Movable Contacts: | Phosphor bronze with gold plating |
| Stationary Contacts: | Phosphor bronze with gold plating |
| Base: | Polyphenylene sulfide (UL94V-0) |
| Terminals: | Phosphor bronze with gold plating |

Environmental Data

| Operating Temperature Range: | -30°C through +85°C (-22°F through +185°F) |
| Humidity: | 90 ~ 95% humidity for 96 hours @ 40°C (104°F) |
| Vibration: | 10 ~ 500Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours |
| Shock: | 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction) |

Installation

| Mounting: | It is recommended that the body of models for upright mounting without bracket be fastened to a panel or similar support for protection of solder joints from mechanical stress. |
| Coplanarity: | See specifications in Terms & Acronyms in Supplement section. |

Processing

| Soldering: | Reflow Soldering Recommended. See Profile B in Supplement section. |

Standards & Certifications

| Flammability Standard: | UL94V-0 actuator, case & base |

The G3B Series pushbuttons have not been tested for UL recognition or CSA certification. These switches are designed for use in a low-voltage, low-current, logic-level circuit. When used as intended in a logic-level circuit, the results do not produce hazardous energy.
Ultra-Miniature Process Sealed SMT Pushbuttons

Distinctive Characteristics

Ultra-miniature size allows high density mounting, and extremely light weight of 0.6 gram makes these switches ideal for handheld equipment.


Heat resistant resin used for housing, base, and plunger allows vapor phase and infrared convection reflow soldering.

Combination of design features achieves total seal and allows automated processing techniques, including flux cleaning procedures: one-piece bushing and housing, rubber seals surrounding actuator and base, epoxy at joint of case and base, and molded-in, epoxy-sealed terminals.

Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smoother, positive detent actuation, increased contact stability and unparalleled logic-level reliability. (Additional STC details in Terms & Acronyms; see Supplement section.)

Gull-wing terminals provide mechanical stability during soldering and simplified solder joint inspection.

Coplanarity: all considered surfaces must lie between two parallel planes that area maximum distance apart of .0059” (0.15mm). (Additional coplanarity details in Terms and Acronyms in the Supplement section.)
## Series G3B

### Ultra-Miniature Process Sealed SMT Pushbuttons

### TYPICAL SWITCH ORDERING EXAMPLE

<table>
<thead>
<tr>
<th>Poles</th>
<th>Terminals</th>
<th>Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 SPDT</td>
<td>Gull Wing for Upright Mount</td>
<td>A Black</td>
</tr>
<tr>
<td>2 DPDT</td>
<td>Gull Wing for Upright with Bracket</td>
<td>B White</td>
</tr>
</tbody>
</table>

#### Plungers
- A .130” (3.3mm) Long

#### Circuits
- 5 ON (ON)

#### Packaging
- No Code: Partitioned Tray for Upright & Right Angle - Any Quantity
- R: Tape-Reel for Right Angle Only 500 Pieces/Reel
- S: Stick-Tube for Upright Mount 50 Pieces/Stick

#### Packaging details at end of G3B Series

### Optional Caps
- X: Slip-on Cap .157” (4.0mm) Diameter (For installation after processing only)
- Y: Process Compatible Cap .157” (4.0mm) Diameter (Combines with R or S packaging only)

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

<table>
<thead>
<tr>
<th>Model</th>
<th>Pole</th>
<th>Normal</th>
<th>Connected Terminals</th>
<th>Throw &amp; Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3B15</td>
<td>SP</td>
<td>ON (ON)</td>
<td>5-6 5-4 SPDT</td>
<td>Note: Terminal numbers are not actually on the switch.</td>
</tr>
<tr>
<td>G3B25</td>
<td>DP</td>
<td>ON (ON)</td>
<td>5-6 2-3 5-4 2-1 DPDT</td>
<td></td>
</tr>
</tbody>
</table>

### POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Plunger Position</th>
<th>Connected Terminals</th>
<th>Throw &amp; Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>( ) = Momentary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Ultra-Miniature Process Sealed SMT Pushbuttons

**Series G3B**

**PLUNGER & OPTIONAL CAPS**

![Image of plunger and caps]

- **A**.130" (3.3mm) Long Plunger
- **X** AT4063 Slip-on Cap .157” (4.0mm) Diameter
- **Y** Process Compatible Cap .157” (4.0mm) Diameter

Available with bulk packaging only. Cap must be installed after processing.

Material: Polyamide
Finish: Glossy

Factory assembled. Available with tape-reel or stick-tube packaging only.

Caution: Pulling force specification for this cap is not warranted after reflow processing.

Material: Polyamide
Finish: Glossy

Cap Colors Available: **A** Black, **B** White, **C** Red

**TYPICAL SWITCH DIMENSIONS**

### Single & Double Pole

![Diagram of single and double pole switch dimensions]

### Upright Mounting

- **G3B25AP**

### Upright Mounting with Bracket

- **G3B15AB**

### Right Angle Mounting

- **G3B15AH**

Cap Colors Available: **A** Black, **B** White, **C** Red

**Actual Size**

**Support Legs**

**Material:** Polyamide
**Finish:** Glossy
Pad Layouts for Surface Mount Terminals

Upright Mounting

Upright Mounting with Bracket

Right Angle Mounting

Partitioned Tray for Upright & Right Angle

Any quantity

If the G3 upright models are ordered in less than 50-piece increments or the right angle models in less than 500-piece increments, the switches are packaged in a partitioned tray. No code is required.

Tape-Reel for Right Angle

500 pieces per reel

Switches must be ordered in 500-piece increments when tape-reel packaging is selected.

This packaging meets EIA-481-D Standard for “16mm and 24mm Embossed Carrier Taping of Surface Mount Components for Automatic Handling.”
Tape-Reel Packaging for Right Angle Mount

Each tape-reel of 550 pockets contains 500 switches.

Minimum Leader Length: 7.87” (200mm)  Minimum Trailer Length: 1.97” (50mm)

---

Stick-Tube Packaging for Upright Mount

Each stick-tube contains 50 switches.

\[ L = \text{Length} \]

- G3B Upright (code P)
  18.31” (465mm)

- G3B Upright with Bracket (code B)
  21.26” (540mm)
Series JP
Internationally Approved Pushbuttons

General Specifications

Electrical Capacity (Resistive Load)

- **Power Level**: 10A @ 125/250V AC for JPM models & 16A @ 125/250V AC for JPL models

Other Ratings

- **Contact Resistance**: 20 milliohms maximum
- **Insulation Resistance**: 1,000 megohms minimum @ 500V DC
- **Dielectric Strength**: 2,000V AC minimum between contacts for 1 minute minimum; 4,000V AC minimum between contacts & case for 1 minute minimum
- **Mechanical Life**: 25,000 operations minimum
- **Electrical Life**: 25,000 operations minimum

- **Nominal Operating Force**: JPM Single Pole 3.53N & Double Pole 6.47N
  JPL Single Pole 4.51N & Double Pole 9.02 N
- **Contact Timing**: Nonshorting (break before make)
- **Latchdown**: Normal position - flush with barrier; latchdown position - .079” (2.0mm) below normal
- **Travel**: Pretravel .059” (1.5mm); Overtravel .071” (1.8mm); Total Travel .130” (3.3mm)

Materials & Finishes

- **Housing/Frame & Barrier**: Polyamide (UL94V-0)
- **Interior Seal**: Polyphenylene sulfide (UL94V-0)
- **Case/Base**: Melamine (UL94V-0)
- **Movable Contacts**: Silver alloy
- **Stationary Contacts**: Silver alloy
- **Terminals**: Brass with silver plating

Environmental Data

- **Operating Temp Range**: –10°C through +70°C (+14°F through +158°F)
- **Humidity**: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
- **Vibration**: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
- **Shock**: 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)
- **Process Seal**: Dust resistant inner seal

Installation

- **Soldering Time & Temp**: Manual Soldering: See Profile A in Supplement section.

Standards & Certifications

- **Flammability Standards**: UL94V-0 for housing/frame, barrier, interior seal, & case/base
- **TV Ratings for UL**: JPM [TV-5] Overload Test @ 125V AC for 50 operations:
  - Steady State Current (rms) 7.5A; Minimum Inrush Current (peak) 111A
  - JPM [TV-5] Endurance Test @ 125V AC for 25,000 operations:
  - Steady State Current (rms) 5A; Minimum Inrush Current (peak) 78A
  - JPL [TV-8] Overload Test @ 125V AC for 50 operations:
  - Steady State Current (rms) 12A; Minimum Inrush Current (peak) 163A
  - JPL [TV-8] Endurance Test @ 125V AC for 25,000 operations:
  - Steady State Current (rms) 8A; Minimum Inrush Current (peak) 117A
- **UL**: File No. E44145 - Recognized only when ordered with marking on switch.
  Add “/U” or “/CUL” before dash in part number to order UL recognized switch.
  All JPM models certified at 10A @ 125V AC, TV5 & JPL models at 16A @ 125V AC, TV8.
- **VDE**: License No. 113494 - Approved only when ordered with marking on switch.
  Add “/V” before dash in part number to order VDE approved switch.
  All JPM models approved at steady state 5A, inrush 80A, resistive 10A, & motor load 6A all at 250V AC.
  License No. 097579
  All JPL models approved at steady state 8A, inrush 128A, resistive 16A, & motor load 8A all at 250V AC.
Distinctive Characteristics

Industry’s first molded pushbutton with TV rating. Designed to handle large inrush current. JPM models certified for TV-5 rating and JPL models for TV-8 rating.

Prominent external insulating barriers increase insulation resistance and dielectric strength.

Constructed for dust resistance with interior seal of polyphenylene sulfide (PPS) between actuator and contact area.

Specially designed to break light contact welds.

Snap-action contact mechanism.

Terminals are molded in and epoxy sealed to lock out flux, dust, and other contaminants.

Outer case of heat resistant resin meet UL’s 94V-0 flammability standard.
TYPICAL SWITCH ORDERING EXAMPLE

**JP** **M** **2** **6** **B** **H**

### Ratings

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M</strong></td>
<td>TV-5 Rated 10A @ 125/250V AC</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>TV-8 Rated 16A @ 125/250V AC</td>
</tr>
</tbody>
</table>

### Actuators

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B</strong></td>
<td>Flat Cap with Barrier Flange</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>Plunger with Flat Flange; cap not supplied with plunger</td>
</tr>
</tbody>
</table>

### Poles

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>SPST</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>DPST</td>
</tr>
</tbody>
</table>

### Circuit

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6</strong></td>
<td>OFF ON</td>
</tr>
</tbody>
</table>

(Alternate Action with Latchdown)

### Cap Colors

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>Black</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Ivory</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Red</td>
</tr>
<tr>
<td><strong>H</strong></td>
<td>Gray</td>
</tr>
</tbody>
</table>

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

**JPM26B-H**

Gray Flat Cap with Barrier Flange

TV-5 Rated 10A @ 125/250V AC

DPST OFF-ON Circuit

**IMPORTANT:**

Specific models & ratings for international approvals noted on General Specifications page.

Note: Wire harness & cable assemblies offered only in Americas.
Internationally Approved Pushbuttons

Series JP

RATINGS

<table>
<thead>
<tr>
<th></th>
<th>TV-5 Rated</th>
<th>Power Level</th>
<th>TV-8 Rated</th>
<th>Power Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10A @ 125/250V AC</td>
<td></td>
<td>16A @ 125/250V AC</td>
</tr>
</tbody>
</table>

Note: See General Specifications page to find complete explanation of TV ratings.

POLES & CIRCUIT

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Throw &amp; Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>JPM16</td>
<td>OFF</td>
<td>ON</td>
<td>OPEN</td>
<td>1-1a</td>
</tr>
<tr>
<td></td>
<td>JPL16</td>
<td></td>
<td></td>
<td></td>
<td>SPST</td>
</tr>
<tr>
<td>DP</td>
<td>JPM26</td>
<td>OFF</td>
<td>ON</td>
<td>OPEN</td>
<td>1-1a 2-2a</td>
</tr>
<tr>
<td></td>
<td>JPL26</td>
<td></td>
<td></td>
<td></td>
<td>DPST</td>
</tr>
</tbody>
</table>

Note: Terminal numbers are actually on the switch.

ACTUATORS

B Flat Cap with Barrier Flange

The barrier is an integral part of the switch. This housing is black, molded polyamide matte finish material.

Cap details below.

P Plunger with Flat Flange

The flange is an integral part of the switch. This housing is black, molded polyamide matte finish material.

No cap supplied.

CAP COLORS

AT3021 Flat Cap for Actuator Type B with Barrier Flange

Cap Material: Polyphenylene Oxide
Finish: Matte

Cap Colors Available:

A Black  B Ivory  C Red  H Gray

The cap is flush with the barrier in normal position and .079" (2.0mm) below that in latchdown position.

The latchdown feature on this alternate action device provides visible, audible, and tactile feedback. This design gives smooth, responsive operation.
Panel Thickness Range applies to both JPM & JPL models.

.039” ~ .157”
(1.0mm ~ 4.0mm)

JPM & JPL Solder Lug/.187”(4.75mm) Quick Connect Terminals

This switch assembly, when used with connectors, is not CSA approved.

**TYPICAL SWITCH DIMENSIONS**

<table>
<thead>
<tr>
<th>Flat Cap with Barrier Flange</th>
<th>JPM &amp; JPL Single &amp; Double Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPM26B-H</td>
<td></td>
</tr>
</tbody>
</table>

**Panel Cutout & Terminals**

- **JPM & JPL Solder Lug**
- .187”(4.75mm) Quick Connect Terminals

**Panel Thickness Range**

- Applies to both JPM & JPL models.
- 0.039” ~ 0.157”
- (1.0mm ~ 4.0mm)

**Single pole model does not have terminals 2 & 2a.**

**Flat Cap with Barrier Flange**

- **Part No.**
- JPM26B-H

**Plunger with Flat Flange**

- **Part No.**
- JPL16P

**Single pole model does not have terminals 2 & 2a.**
General Specifications

Electrical Capacity (Resistive Load)
- Power Level (silver): 1A @ 125V AC or 1A @ 30V DC
- Logic Level (gold): 0.4VA maximum @ 28V AC/DC maximum
- Logic/Power Level: Combines silver & gold ratings

Note: Find additional explanation of dual rating & operating range in Supplement section.

Other Ratings
- Contact Resistance: 20 milliohms maximum for silver; 30 milliohms maximum for gold
- Insulation Resistance: 1,000 megohms minimum @ 500V DC
- Dielectric Strength: 1,000V AC minimum between contacts for 1 minute minimum;
  1,500V AC minimum between contacts & case for 1 minute minimum
- Mechanical Life: 200,000 operations minimum
- Electrical Life: 25,000 operations minimum for silver; 100,000 operations minimum for gold
- Nominal Operating Force: Single pole 2.94N & double pole 4.90N
- Contact Timing: Nonshorting (break-before-make)
- Travel: Pretravel .023” (0.6mm); Overtravel .016” (0.4mm); Total Travel .039” (1.0mm)

Materials & Finishes
- Plunger: Brass with nickel plating
- Support Bracket: Brass with tin plating
- Bushing/Housing: Glass fiber reinforced polyamide (UL94V-0)
- Sealing Ring: Nitrile butadiene rubber
- Base: Glass fiber reinforced polyamide (UL94V-0)
- Movable Contacts: Silver alloy with silver plating (code W); copper with gold plating (code G);
  or silver alloy with gold plating (code A)
- Stationary Contacts: Silver alloy with silver plating (code W); copper with gold plating (code G);
  or silver alloy with gold plating (code A)
- Terminals: Brass with silver or gold plating

Environmental Data
- Operating Temp Range: –30°C through +85°C (-22°F through +185°F)
- Humidity: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
- Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning
  in 1 minute; 3 right angled directions for 2 hours
- Shock: 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation
- Cap Installation Force: 49.0N (11.0 lbf) for plunger A & 79.4N (17.9 lbf) for plunger B

PCB Processing
- Soldering: Wave Soldering Recommended: See Profile B in Supplement section.

Standards & Certifications
- Flammability Standards: UL94V-0 rated bushing/housing & base
- UL: File No. E44145 - Recognized only when ordered with marking on switch.
  Add “/U” or “/CUL” before dash in part number to order UL recognized switch.
  All models recognized at 1A @ 125V AC, 1A @ 30V DC, or 0.4A @ 28V DC.
- CSA: File No. 023535_0_000 - Certified only when ordered with marking on switch.
  Add “/C” before dash in part number to order CSA certified switch.
  All models certified at 1A @ 125V AC, 1A @ 30V DC, or 0.4A @ 28V DC.
Distinctive Characteristics

Snap-acting contact mechanism gives short travel, sensitive actuation, light touch, smooth feel, audible feedback, and a longer electrical life.

Single unit construction of the bushing and top of the housing gives protection from cleaning fluids or other liquids.

O-ring surrounding actuator at top of bushing interior prevents liquids from reaching switch mechanism.

Ultrasonic welding of upper and lower housing seals out contaminants and allows automated soldering and cleaning.

Terminals are epoxy sealed to prevent entry of flux, solvents, and other contaminants.

Bracketed models have crimped bracket legs to ensure secure PC mounting and prevent dislodging during automated soldering.

Logic level and power capabilities are available to suit varying applications.
Series M2

Process Sealed Miniature Pushbuttons

TYPICAL SWITCH ORDERING EXAMPLE

M2B 15 A A5 G 30 — F C

Poles & Circuits

<table>
<thead>
<tr>
<th>Pole</th>
<th>Type</th>
<th>Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>SPDT</td>
<td>ON-(ON)</td>
</tr>
<tr>
<td>25</td>
<td>DPDT</td>
<td>ON-(ON)</td>
</tr>
</tbody>
</table>

( ) = Momentary

Contact Materials & Ratings

<table>
<thead>
<tr>
<th>Letter</th>
<th>Material</th>
<th>Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Silver;</td>
<td>Rated 1A @ 125V AC &amp; 1A @ 30V DC</td>
</tr>
<tr>
<td>G</td>
<td>Gold;</td>
<td>Rated 0.4A maximum @ 28V AC/DC maximum</td>
</tr>
<tr>
<td>A</td>
<td>Gold over Silver; Rated 1A @ 125V AC &amp; 0.4VA max @ 28V AC/DC max</td>
<td></td>
</tr>
</tbody>
</table>

Plungers

<table>
<thead>
<tr>
<th>Plunger</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>.282” (7.16mm) Long for cap codes F &amp; H</td>
</tr>
<tr>
<td>B</td>
<td>.307” (7.8mm) Long for cap codes B &amp; C</td>
</tr>
</tbody>
</table>

Bushing

<table>
<thead>
<tr>
<th>Bushing</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5</td>
<td>.250” (6.35mm) Double Flatted</td>
</tr>
</tbody>
</table>

PC Terminals

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>Straight</td>
</tr>
<tr>
<td>13</td>
<td>Straight with .460” (11.7mm) Bracket</td>
</tr>
<tr>
<td>30</td>
<td>.150” (3.81mm) Right Angle</td>
</tr>
<tr>
<td>40</td>
<td>.150” (3.81mm) Vertical</td>
</tr>
</tbody>
</table>

Snap-on Caps

For Plunger A

<table>
<thead>
<tr>
<th>Letter</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>.201” (5.1mm) Diameter</td>
</tr>
<tr>
<td>H</td>
<td>.295” (7.5mm) Diameter</td>
</tr>
</tbody>
</table>

For Plunger B

<table>
<thead>
<tr>
<th>Letter</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>.315” (8.0mm) Diameter</td>
</tr>
<tr>
<td>C</td>
<td>.394” (10.0mm) Diameter</td>
</tr>
</tbody>
</table>

Cap Colors

<table>
<thead>
<tr>
<th>Letter</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Black</td>
</tr>
<tr>
<td>B</td>
<td>White</td>
</tr>
<tr>
<td>C</td>
<td>Red</td>
</tr>
<tr>
<td>E</td>
<td>Yellow</td>
</tr>
<tr>
<td>F</td>
<td>Green</td>
</tr>
<tr>
<td>G</td>
<td>Blue</td>
</tr>
<tr>
<td>H</td>
<td>Gray</td>
</tr>
</tbody>
</table>

* For cap codes B & C only

IMPORTANT:

Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on General Specifications page.

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

M2B15AA5G30-FC

.250” (6.35mm) Bushing with Double Flat
Red .201” (5.1mm) Diameter Cap on .282” (7.16mm) Long Plunger

SPDT ON-(ON) Circuit
Right Angle PC Terminals
Gold Contacts with 0.4VA Rating
Process Sealed Miniature Pushbuttons

POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal Plunger Position ( ) = Momentary</th>
<th>Connected Terminals</th>
<th>Throw &amp; Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>M2B15</td>
<td>ON</td>
<td>1-3 1-2</td>
<td>SPDT</td>
</tr>
<tr>
<td>DP</td>
<td>M2B25</td>
<td>ON</td>
<td>1-3 4-6 1-2 4-5</td>
<td>DPDT</td>
</tr>
</tbody>
</table>

Note: Terminal numbers are not actually on the switch.

PLUNGERS

A .282" (7.16mm) Long
For cap codes F & H
Material: Chrome over brass

B .307" (7.8mm) Long
For cap codes B & C
Material: Chrome over brass

BUSHING

A5 .250" (6.35mm) Double Flatted

CONTACT MATERIALS & RATINGS

W Silver over Silver
Power Level
1A @ 125V AC & 1A @ 30V DC

G Gold over Brass or Copper
Logic Level
0.4VA maximum @ 28V AC/DC maximum
Complete explanation of operating range in Supplement section.

A Gold over Silver
Power Level
1A @ 125V AC
or Logic Level
or 0.4VA maximum @ 28V AC/DC maximum
Note: This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section for complete explanation of dual rating and operating range.
## Series M2

### Process Sealed Miniature Pushbuttons

#### PC TERMINALS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Dimensions</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>Straight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Straight with .460” (11.7mm) Bracket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>.150” (3.81mm) Right Angle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>.150” (3.81mm) Vertical</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### SNAP-ON CAPS

**For Plunger Type A**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Material</th>
<th>Colors Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>AT475 .201” (5.1mm) Diameter</td>
<td>Polyamide</td>
<td>A, B, C</td>
</tr>
<tr>
<td>H</td>
<td>AT496 .295” (7.5mm) Diameter</td>
<td>Polyamide</td>
<td>A, B, C</td>
</tr>
</tbody>
</table>

**For Plunger Type B**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Material</th>
<th>Colors Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>AT443 .315” (8.0mm) Diameter</td>
<td>Polycarbonate</td>
<td>A, B, C, E, F, G, H</td>
</tr>
<tr>
<td>C</td>
<td>AT442 .394” (10.0mm) Diameter</td>
<td>Polycarbonate</td>
<td>A, B, C, E, F, G, H</td>
</tr>
</tbody>
</table>

**Cap Colors Codes:**

- A: Black
- B: White
- C: Red
- E: Yellow
- F: Green
- G: Blue
- H: Gray
TYPICAL SWITCH DIMENSIONS

**Single Pole**

**Straight PC**

M2B15AA5G03-FC

**Double Pole**

**Straight PC**

M2B25AA5G03-FC

**Single & Double Pole**

**Straight PC • Bracket**

M2B15AA5G13-FC
Series M2

Process Sealed Miniature Pushbuttons

TYPICAL SWITCH DIMENSIONS

Right Angle PC

Single Pole

M2B15AA5G30-FC

Right Angle PC

Double Pole

M2B25AA5G30-FC

Vertical PC

Single Pole

M2B15AA5G40-FC

Vertical PC

Double Pole

M2B25AA5G40-FC
Series MB2000

General Specifications

Electrical Capacity (Resistive Load)
- Power Level (silver): 6A @ 125V AC & 3A @ 250V AC or 3A @ 30V DC
- Logic Level (gold): 0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
- Logic/Power Level: Combines silver & gold ratings

Note: Find additional explanation dual rating & operating range in Supplement section.

Other Ratings
- Contact Resistance: 10 milliohms maximum for silver; 20 milliohms maximum for gold
- Insulation Resistance: 1,000V AC minimum between contacts for 1 minute minimum;
  1,500V AC minimum between contacts & case for 1 minute minimum
- Dielectric Strength: 1,000V AC minimum between contacts for 1 minute minimum;
  1,500V AC minimum between contacts & case for 1 minute minimum
- Mechanical Life: 50,000 operations minimum for splashproof models; 100,000 for all other models
- Electrical Life: 25,000 operations minimum for silver; 50,000 operations minimum for gold
  50,000 operations minimum for silver at 3A @ 125V AC
- Nominal Operating Force: Momentary Action: 1-pole 9.32N; 2-pole 16.18N; 4-pole 25.54N;
  Alternate Action: 1-pole 4.41N; 2-pole 7.06N; 4-pole 11.77N
- Contact Timing: Slow make, slow break
- Plunger Travel: Screw-on Cap (Mom.) 0.028" (0.71mm) 0.110" (2.80mm) 0.125" (3.19mm)
  Screw-on Cap (Alt.) 0.043" (1.09mm) 0.043" (1.10mm) 0.050" (1.26mm)
  Snap-on Cap (Mom. & Alt.)
  .071" (1.80mm) .153" (3.90mm) .175" (4.45mm)

Materials & Finishes
- Plunger: Brass w/nickel plating; polyacetal w/B1 bushing
- Frame: Stainless steel
- Movable Contactor: Phosphor bronze with silver or gold plating
- Movable Contacts: Silver alloy (code W); copper with gold plating (code G); or silver alloy with gold plating (code A)
- Stationary Contacts: Silver with silver plating (code W); copper or brass with gold plating (code G); or silver with gold plating (code A)
- Terminals: Copper or brass with silver plating; copper or brass with gold plating

Environmental Data
- Operating Temp Range: -30°C through +85°C (-22°F through +185°F)
- Humidity: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
- Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
- Shock: 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)
- Sealing: B3 & D3 bushing options equivalent to IP67

Installation
- Mounting Torque: 1.5Nm (13.0 lb-in) for double nut; 0.7Nm (6.0 lb-in) for single nut
- Cap Installation Force: 80.0N (18.0 lbf) maximum downward force on actuator
  Manual Soldering: See Profile A in Supplement section.
- Process Seal: These devices are not process sealed. Hand clean locally using alcohol based solution

Standards & Certifications
- Flammability Standards: UL94V-0 case
- UL: File No. E44145 - Recognized only when ordered with marking on switch.
  Add “/U” or “/CUL” before dash in part number to order UL recognized switch.
  All models recognized at 6A @ 125V AC or 3A @ 250V AC or 0.4VA max. @ 28V DC max.
- CSA: File No. 023535_0_000 - Certified only when ordered with marking on switch.
  Add “/C” before dash in part number to order CSA certified switch.
  All models certified at 6A @ 125V AC or 3A @ 250V AC or 0.4VA max. @ 28V max.
Distinctive Characteristics

Guide interlocked with actuator block prevents window locking and maintains correct plunger alignment to assure contact stability.

Employs an over-center actuator mechanism, which diminishes sparking and increases operating life in AC circuits.

High torque bushing construction prevents rotation or separation from frame during installation.

Splashproof option (D3 and B3 bushing codes) features an o-ring within the bushing and one under the face nut to protect from splashed, sprayed, or spilled liquids.

High insulating barriers, formed in the molded diallyl phthalate case, increase isolation of circuits in multipole devices.

Prominent external insulating barriers increase insulation resistance and dielectric strength.

Epoxy sealed terminals prevent entry of solder flux and other contaminants.

Clinching of the frame to the case well above the base and terminals provides 1,500V dielectric strength.
## Series MB2000

### Bushing Mount Miniature Pushbuttons

#### TYPICAL SWITCH ORDERING EXAMPLE

<table>
<thead>
<tr>
<th>MB</th>
<th>2011</th>
<th>S</th>
<th>S1</th>
<th>W</th>
<th>01</th>
<th>C</th>
<th>A</th>
</tr>
</thead>
</table>

**Poles & Circuits**

- **2011**: SPDT ON (ON)
- **2065**: SPDT ON ON
- **2061**: DPDT ON (ON)
- **2085**: DPDT ON ON
- **2181**: 4PDT ON (ON)
- **2185**: 4PDT ON ON

( ) = Momentary

**Contact Materials & Ratings**

- **W**: Silver
  - Rated 6A @ 125V AC & 3A @ 250V AC
- **G**: Gold
  - Rated 0.4VA max @ 28V AC/DC max
  - Gold over Silver
  - Rated 6A @ 125V AC & 0.4VA max @ 28V AC/DC max
- **A**: Gold over Silver
  - Rated 6A @ 125V AC & 0.4VA max @ 28V AC/DC max

**Caps**

- **B**: .315” (8.0mm) Diameter
- **C**: .394” (10.0mm) Diameter

**Cap Colors**

- **A**: Black
- **B**: White
- **C**: Red
- **E**: Yellow
- **F**: Green
- **G**: Blue
- **H**: Gray

**Bushings**

- **S1**: .335” (8.5mm) Threaded with Keyway
- **S2**: .335” (8.5mm) Smooth with Keyway
- **S4**: .335” (8.5mm) Metric Threaded with Keyway
- **D1**: .335” (8.5mm) Threaded with D-Flat
- **D3**: .335” (8.5mm) Threaded Splashproof without Keyway

**Plunger Types**

- **S**: Plunger for Screw-on Caps
- **L**: Plunger for Snap-on Caps

**Terminals**

- **01**: Solder Lug
- **02**: Quick Connect
- **03**: .250” (6.35mm) Straight PC
- **05**: .425” (10.8mm) Wirewrap
- **06**: .750” (19.05mm) Wirewrap
- **07**: .964” (24.5mm) Wirewrap
- **08**: 1.062” (27.0mm) Wirewrap

### IMPORTANT:

Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on the General Specifications page.

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**MB2011SS1W01-CA**

- Black .394” (10.0mm) Diameter Cap
  - Plunger for Screw-on Caps
- .335” (8.5mm) Threaded Bushing with Keyway
  - Silver Contacts with 6-Amp Rating
  - Solder Lug Terminals
# Bushing Mount Miniature Pushbuttons

## Series MB2000

### POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal Plunger Position</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>MB2011</td>
<td>ON</td>
<td>(ON)</td>
<td>SPDT</td>
</tr>
<tr>
<td></td>
<td>MB2065</td>
<td>ON</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>DP</td>
<td>MB2061</td>
<td>ON</td>
<td>(ON)</td>
<td>DPDT</td>
</tr>
<tr>
<td></td>
<td>MB2085</td>
<td>ON</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>4P</td>
<td>MB2181</td>
<td>ON</td>
<td>(ON)</td>
<td>4PDT</td>
</tr>
<tr>
<td></td>
<td>MB2185</td>
<td>ON</td>
<td>ON</td>
<td></td>
</tr>
</tbody>
</table>

**Terminal numbers are not actually on the switch.**

### PLUNGER TYPES

On alternate action models, after transferring circuit, the plunger returns to its original position and does not latch down.

#### Plunger for Screw-on Caps

<table>
<thead>
<tr>
<th>Momentary Plunger Length</th>
<th>Momentary Cap Location</th>
<th>Alternate Plunger Length</th>
<th>Alternate Cap Location</th>
</tr>
</thead>
</table>

#### Plunger for Snap-on Caps

<table>
<thead>
<tr>
<th>Momentary &amp; Alternate Plunger Length</th>
<th>Momentary &amp; Alternate Cap Location</th>
</tr>
</thead>
</table>
### BUSHINGS

<table>
<thead>
<tr>
<th>S1</th>
<th>.335&quot; (8.5mm) Threaded with Keyway</th>
<th>S2</th>
<th>.335&quot; (8.5mm) Smooth with Keyway</th>
<th>S4</th>
<th>.335&quot; (8.5mm) Metric Threaded with Keyway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum Panel Thickness with Standard Hardware: .154&quot; (3.9mm)</td>
<td></td>
<td>Maximum Panel Thickness with Standard Hardware: .154&quot; (3.9mm)</td>
<td></td>
<td>Maximum Panel Thickness with Standard Hardware: .154&quot; (3.9mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D1</th>
<th>.335&quot; (8.5mm) Threaded with D Flat</th>
<th>D3</th>
<th>.335&quot; (8.5mm) Threaded Splashproof without Keyway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum Panel Thickness with Standard Hardware: .154&quot; (3.9mm)</td>
<td></td>
<td>Maximum Panel Thickness with Standard Hardware: .240&quot; (6.1mm)</td>
</tr>
</tbody>
</table>

### Panel Cutouts

- For S1, S2, or S4 Bushing with Keyway
- For S1 or S4 Bushing with Optional Locking Ring
- For D1 Bushing with D Flat
- For D3 Bushing without Keyway

Standard hardware for bushings S1, S4, & D1 includes 2 hex nuts & 1 lockwasher; D3 bushing has 1 hex nut & 1 o-ring. Standard & optional hardware are illustrated following the Typical Switch Dimension drawings.

### CONTACT MATERIALS & RATINGS

<table>
<thead>
<tr>
<th>W</th>
<th>Silver over Silver</th>
<th>Power Level</th>
<th>6A @ 125V AC &amp; 3A @ 250V AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Gold over Brass or Copper</td>
<td>Logic Level</td>
<td>0.4VA maximum @ 28V AC/DC maximum</td>
</tr>
<tr>
<td></td>
<td>Note: Complete explanation of operating range in Supplement section.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Gold over Silver</td>
<td>Power Level or Logic Level</td>
<td>6A @ 125V AC &amp; 3A @ 250V AC or 0.4VA maximum @ 28V AC/DC maximum</td>
</tr>
<tr>
<td></td>
<td>Note: This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section for complete explanation of dual rating and operating range.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## TERMINALS

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Diameter</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Solder Lug</td>
<td>.250”</td>
<td>Dimensions A = terminal lengths as shown beside the terminal codes at the left.</td>
</tr>
<tr>
<td>02</td>
<td>.062” (1.57mm) Wide Quick Connect</td>
<td>.250”</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>.250” (6.35mm) Straight PC</td>
<td>.250”</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>.425” (10.8mm) Wirewrap or Extended PC</td>
<td></td>
<td>If using as extended PC terminal, refer to the above footprints.</td>
</tr>
<tr>
<td>06</td>
<td>.750” (19.05mm) Wirewrap or Extended PC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>.964” (24.5mm) Wirewrap or Extended PC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>1.062” (27.0mm) Wirewrap or Extended PC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CAPS & CAP COLORS

<table>
<thead>
<tr>
<th>Cap Material:</th>
<th>PBT</th>
<th>Polycarbonate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cap Color:</td>
<td>Black</td>
<td>White</td>
</tr>
</tbody>
</table>

For use with Plunger Code S

For use with Plunger Code L

Cap Material: PBT
Finish: Glossy

Cap Material: Polycarbonate
Finish: Glossy

For use with Plunger Code S

For use with Plunger Code L

Cap Material: PBT
Finish: Glossy

Cap Material: Polycarbonate
Finish: Glossy

Cap Colors Available: A Black B White C Red E Yellow F Green G Blue H Gray
Series MB2000

Bushing Mount Miniature Pushbuttons

TYPICAL SWITCH DIMENSIONS

Solder Lug

Single Pole

MB2011SS1W01-CA

Solder Lug

Double Pole

MB2061SS1W01-CA

Solder Lug

Four Pole

MB2181SS1W01-CA
HARDWARE

Standard Hardware

AT513H for Inch
AT513M for Metric
Hexagon Nut

AT509
Lockwasher

AT516
O-ring for
Splashproof Bushing

Optional Hardware

AT507H for Inch
AT507M for Metric
Locking Ring

Material:
Steel with Zinc/Chromate

O-ring for
Splashproof Bushing

1 included with each splashproof model

Material:
Nitrile butadiene rubber

Material:
Brass with Nickel plating

2 included with each switch
(1 with splashproof models)

Material:
Brass with Nickel plating

M6 P0.75

Material:
Steel with Zinc/Chromate

AT507H for Inch
AT507M for Metric
Locking Ring

Material:
Steel with Zinc/Chromate

AT512H for Inch
AT512M for Metric
Conical Nut

Used with .315” (8.0mm)
Diameter Cap (cap code B)
Material: Brass with chrome plating

AT512CH for Inch
AT512CM for Metric
Conical Nut

Used with .394” (10.0mm)
Diameter Cap (cap code C)
Material: Brass with chrome plating

AT4041H for Inch
AT4041M for Metric
Boot for Momentary

Material: Silicone rubber

AT4042H for Inch
AT4042M for Metric
Boot for Alternate

Material: Silicone rubber

Optional Mounting Collars/Conical Nuts

AT513H for Inch
AT513M for Metric
Hexagon Nut

Material:
Brass with Nickel plating

AT509
Lockwasher

AT516
O-ring for
Splashproof Bushing

Material:
Nitrile butadiene rubber

Material:
Steel with Zinc/Chromate

Material:
Brass with nickel plating

Optional Splashproof Boots for S Plunger

AT512H for Inch
AT512M for Metric
Conical Nut

Used with .315” (8.0mm)
Diameter Cap (cap code B)
Material: Brass with chrome plating

AT512CH for Inch
AT512CM for Metric
Conical Nut

Used with .394” (10.0mm)
Diameter Cap (cap code C)
Material: Brass with chrome plating

AT4041H for Inch
AT4041M for Metric
Boot for Momentary

Material: Silicone rubber

AT4042H for Inch
AT4042M for Metric
Boot for Alternate

Material: Silicone rubber

Optional Splashproof Boots for S Plunger

AT512H for Inch
AT512M for Metric
Conical Nut

Used with .315” (8.0mm)
Diameter Cap (cap code B)
Material: Brass with chrome plating

AT512CH for Inch
AT512CM for Metric
Conical Nut

Used with .394” (10.0mm)
Diameter Cap (cap code C)
Material: Brass with chrome plating

AT4041H for Inch
AT4041M for Metric
Boot for Momentary

Material: Silicone rubber

AT4042H for Inch
AT4042M for Metric
Boot for Alternate

Material: Silicone rubber

Dimension A = Cap Height

.091” (2.3mm) for Momentary with Plunger Code S
.157” (4.0mm) for Alternate with Plunger Code S
.142” (3.6mm) for Momentary & Alternate with Plunger Code L

Operating Life 100,000

Boots for momentary devices are accompanied by a threaded adaptor which extends the length of the plunger.

Operating Life 30,000
TYPICAL SWITCH ORDERING EXAMPLE

MB 2011 S S2 G 13 — C A

Poles & Circuits

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Poles</th>
<th>Circuit</th>
<th>2011</th>
<th>SPDT</th>
<th>ON</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>2065</td>
<td>SPDT</td>
<td>ON ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2061</td>
<td>DPDT</td>
<td>ON (ON)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2085</td>
<td>DPDT</td>
<td>ON ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2181</td>
<td>4PDT</td>
<td>ON (ON)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2185</td>
<td>4PDT</td>
<td>ON ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

( ) = Momentary
4-pole not for use with right angle terminals

Contact Materials & Ratings

<table>
<thead>
<tr>
<th>Cap Color</th>
<th>Material</th>
<th>Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Silver</td>
<td>Rated 6A @ 125V AC &amp; 3A @ 250V AC</td>
</tr>
<tr>
<td>G</td>
<td>Gold</td>
<td>Rated 0.4VA max @ 28V AC/DC max</td>
</tr>
<tr>
<td>A</td>
<td>Gold over Silver</td>
<td>Rated 6A @ 125V AC &amp; 0.4VA max @ 28V AC/DC max</td>
</tr>
</tbody>
</table>

Caps

<table>
<thead>
<tr>
<th>Cap Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>B .315” (8.0mm) Diameter</td>
</tr>
<tr>
<td>C .394” (10.0mm) Diameter</td>
</tr>
</tbody>
</table>

Cap Colors

<table>
<thead>
<tr>
<th>Color</th>
<th>Cap Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Black</td>
</tr>
<tr>
<td>B</td>
<td>White</td>
</tr>
<tr>
<td>C</td>
<td>Red</td>
</tr>
<tr>
<td>E</td>
<td>Yellow</td>
</tr>
<tr>
<td>F</td>
<td>Green</td>
</tr>
<tr>
<td>G</td>
<td>Blue</td>
</tr>
<tr>
<td>H</td>
<td>Gray</td>
</tr>
</tbody>
</table>

Bushings

<table>
<thead>
<tr>
<th>Bushing Type</th>
<th>Diameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2</td>
<td>.335” (8.5mm)</td>
<td>Smooth with Keyway</td>
</tr>
<tr>
<td>S1</td>
<td>.335” (8.5mm)</td>
<td>Threaded with Keyway</td>
</tr>
<tr>
<td>A2</td>
<td>.200” (5.08mm)</td>
<td>Smooth with Keyway</td>
</tr>
</tbody>
</table>

Terminals

<table>
<thead>
<tr>
<th>Terminal Type</th>
<th>Diameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>.250” (6.35mm)</td>
<td>Straight PC with Bracket</td>
</tr>
<tr>
<td>40</td>
<td>.150” (3.81mm)</td>
<td>Vertical PC</td>
</tr>
<tr>
<td>45</td>
<td>.100” (2.54mm)</td>
<td>Vertical PC</td>
</tr>
<tr>
<td>30</td>
<td>Right Angle PC with .646” (16.4mm) Support to Terminals Available in 1- &amp; 2-pole only</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Right Angle PC with .500” (12.7mm) Support to Terminals Available in 1-pole only</td>
<td></td>
</tr>
</tbody>
</table>

IMPORTANT:

Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on General Specifications page.

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MB2011SS2G13-CA

Black .394” (10.0mm) Diameter Cap

.335” (8.5mm) Smooth Bushing with Keyway

SPDT ON-(ON) Circuit

.250” (6.35mm) Straight PC Terminals with Bracket
### POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal Keyway</th>
<th>Normal Keyway</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>MB2011</td>
<td>ON</td>
<td>(ON)</td>
<td>2-3</td>
<td>SPDT</td>
</tr>
<tr>
<td></td>
<td>MB2065</td>
<td>ON</td>
<td>ON</td>
<td>2-1</td>
<td></td>
</tr>
<tr>
<td>DP</td>
<td>MB2061</td>
<td>ON</td>
<td>(ON)</td>
<td>2-3 5-6</td>
<td>DPDT</td>
</tr>
<tr>
<td></td>
<td>MB2085</td>
<td>ON</td>
<td>ON</td>
<td>2-1 5-4</td>
<td></td>
</tr>
<tr>
<td>4P</td>
<td>MB2181</td>
<td>ON</td>
<td>(ON)</td>
<td>2-3 5-6 8-9 11-12</td>
<td>4PDT</td>
</tr>
<tr>
<td></td>
<td>MB2185</td>
<td>ON</td>
<td>ON</td>
<td>2-1 5-4 8-7 11-10</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Terminal numbers are not actually on the switch.

### PLUNGER TYPE

On alternate action models, after transferring circuit, the plunger returns to its original position and does not latch down.

**Plunger for Screw-on Caps**

- **Momentary Plunger Length**
- **Momentary Cap Location**
- **Alternate Plunger Length**
- **Alternate Cap Location**

### BUSHINGS

- **S2** .335” (8.5mm) Smooth with Keyway
- **S1** .335” (8.5mm) Threaded with Keyway
- **A2** .200” (5.08mm) Smooth with Keyway

**Standard hardware:** 2 hex nuts (AT513H) & 1 lockwasher (AT509)

**Optional hardware:** Locking ring (AT507)

**Only available in part numbers** MB2011SA2W31 & MB2011SA2G31

### Panel Cutouts

- **For S2, S1, or A2 Bushing with Keyway**
- **With Optional Locking Ring**
- **Maximum Panel Thickness with Standard Hardware:** .154” (3.9mm)
Series MB2000 Bracket PC Mount Miniature Pushbuttons

CONTACT MATERIALS & RATINGS

**W** Silver over Silver

Power Level
6A @ 125V AC & 3A @ 250V AC

**G** Gold over Brass or Copper

Logic Level
0.4VA maximum @ 28V AC/DC maximum

Note: Complete explanation of operating range in Supplement section.

**A** Gold over Silver

Power Level or Logic Level
6A @ 125V AC & 3A @ 250V AC or 0.4VA maximum @ 28V AC/DC maximum

Note: This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section for complete explanation of dual rating and operating range.

TERMINALS

**13** .250" (6.35mm) Straight PC with Bracket

**40** .150" (3.81mm) Vertical PC

**45** .100" (2.54mm) Vertical PC

**30** Right Angle PC with .646" (16.4mm) Support to Terminal

**31** Right Angle PC with .500" (12.7mm) Support to Terminal

Note: Full dimensioned drawings appear on the following pages.

CAPS & CAP COLORS

**B** AT413

.315" (8.0mm) Diameter Screw-on Cap

Cap Material: PBT
Finish: Glossy

**C** AT407

.394" (10.0mm) Diameter Screw-on Cap

Cap Material: PBT
Finish: Glossy

Cap Colors Available:  
A Black  B White  C Red  E Yellow  F Green  G Blue  H Gray

Note: This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section for complete explanation of dual rating and operating range.
**Series MB2000**

**Bracket PC Mount Miniature Pushbuttons**

**TYPICAL SWITCH DIMENSIONS**

### Single Pole

![Single Pole Diagram](image)

### Straight PC with Bracket

![Straight PC with Bracket Diagram](image)

### Double Pole

![Double Pole Diagram](image)

### Straight PC with Bracket

![Straight PC with Bracket Diagram](image)

### Four Pole

![Four Pole Diagram](image)

### Straight PC with Bracket

![Straight PC with Bracket Diagram](image)

---

**MB2011SS2G13-CA**

**MB2061SS2G13-CA**

**MB2181SS2G13-CA**

---

www.nkk.com
**Bracket PC Mount Miniature Pushbuttons**

**Series MB2000**

**TYPICAL SWITCH DIMENSIONS**

**Single Pole**

<table>
<thead>
<tr>
<th>.100” (2.54mm) Vertical PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB2011SS2G45-CA</td>
</tr>
</tbody>
</table>

**Double Pole**

<table>
<thead>
<tr>
<th>.100” (2.54mm) Vertical PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB2061SS2G45-CA</td>
</tr>
</tbody>
</table>

**Four Pole**

<table>
<thead>
<tr>
<th>.100” (2.54mm) Vertical PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB2181SS2G45-CA</td>
</tr>
</tbody>
</table>

**Specifications**

- **Keyway**: 6.2 Dia 244
- **Dia**: .394
- **Typ**: .100
- **(1.6) Typ**: .646
- **(1.8) Dia Typ**: .073
- **(2.54) Typ**: .100
- **(1.8) Dia**: .311
- **(2.54) Typ**: .100
- **(1.8) Dia**: .311
- **(2.54) Typ**: .100

**Dimensions**

- Single Pole: .100” (2.54mm) Vertical PC
- Double Pole: .100” (2.54mm) Vertical PC
- Four Pole: .100” (2.54mm) Vertical PC

**Images**

- MB2011SS2G45-CA
- MB2061SS2G45-CA
- MB2181SS2G45-CA
Series MB2000
Bracket PC Mount Miniature Pushbuttons

TYPICAL SWITCH DIMENSIONS

Right Angle PC

Single Pole

Right Angle PC

Double Pole

Right Angle PC

with .500" (12.7mm) Support to Terminal

MB2011SS2G30-CA

MB2061SS2G30-CA

MB2011SA2G31-CA
## TYPICAL SWITCH ORDERING EXAMPLE

### MB 2011 S B1 W 01 D A

<table>
<thead>
<tr>
<th>Poles &amp; Circuits</th>
<th>Contact Materials &amp; Ratings</th>
<th>Caps</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 SPDT ON (ON)</td>
<td>W Silver Rated 6A @ 125V AC &amp; 3A @ 250V AC</td>
<td>B .315” (8.0mm) Diameter</td>
</tr>
<tr>
<td>2065 SPDT ON ON</td>
<td>G Gold Rated 0.4VA max @ 28V AC/DC max</td>
<td>C .394” (10.0mm) Diameter</td>
</tr>
<tr>
<td>2061 DPDT ON ON</td>
<td></td>
<td>D .520” (13.2mm) Diameter</td>
</tr>
<tr>
<td>2085 DPDT ON ON</td>
<td></td>
<td>E .748” (19.0mm) Diameter</td>
</tr>
<tr>
<td>2181 4PDT ON ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2185 4PDT ON ON</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

( ) = Momentary

### Plunger Type

- S Plunger for Screw-on Caps

### Bushings

- B1 .472” (12.0mm) Threaded with Keyway
- B3 .472” (12.0mm) Threaded w/Splashproof

### Terminal Types

- 01 Solder Lug*
- 02 Quick Connect
- 03 .250” (6.35mm) Straight PC
- 05 .425” (10.8mm) Wirewrap
- 06 .750” (19.05mm) Wirewrap
- 07 .964” (24.5mm) Wirewrap
- 08 1.062” (27.0mm) Wirewrap

### Caps

- A Black
- B White
- C Red
- D Amber
- E Yellow
- F Green
- G Blue
- H Gray

* Not available with cap code E

### Cap Colors

* Wire harness & cable assemblies offered only in Americas

### IMPORTANT:

Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on General Specifications page.

---

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**MB2011SB1W01-DA**

- Black .520” (13.2mm) Diameter Cap
- Plunger for Screw-on Caps
- .472” (12.0mm) Diameter Threaded Bushing with Keyway
- Silver Contacts with 6-Amp Rating
- SPDT ON-(ON) Circuit
- Solder Lug Terminals
# Series MB2000

## Large Bushing Miniature Pushbuttons

### POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Plunger Position</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>MB2011 ON</td>
<td>Normal Keyway</td>
<td>2-3</td>
<td>SPDT</td>
</tr>
<tr>
<td></td>
<td>MB2065 ON</td>
<td>Normal Keyway</td>
<td>2-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MB2065 (ON)</td>
<td>Down Keyway</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MB2085 ON</td>
<td>Normal Keyway</td>
<td>2-3 5-6</td>
<td></td>
</tr>
<tr>
<td>DP</td>
<td>MB2061 ON</td>
<td>Normal Keyway</td>
<td>2-1 5-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MB2085 ON</td>
<td>Normal Keyway</td>
<td>2-3 5-6 8-9 11-12</td>
<td></td>
</tr>
<tr>
<td>4P</td>
<td>MB2181 ON</td>
<td>Normal Keyway</td>
<td>2-1 5-4 8-7 11-10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MB2185 ON</td>
<td>Normal Keyway</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Terminal numbers are not actually on the switch.*

### PLUNGER TYPE

- **S**: Plunger for Screw-on Caps
  - Plunger is plastic for B1 bushing.
  - Plunger is metal for B3 bushing.
  
- **On alternate action models, after transferring circuit, the plunger returns to its original position, and does not latch down.**

### BUSHINGS

- **B1**: .472” (12.0mm) Diameter Threaded with Keyway
  - Maximum Panel Thickness with Standard Hardware: .217” (5.5mm)

- **B3**: .472” (12.0mm) Diameter Threaded Splashproof
  - Maximum Panel Thickness with Standard Hardware: .217” (5.5mm)

### CONTACT MATERIALS & RATINGS

<table>
<thead>
<tr>
<th></th>
<th>Type</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Silver over Silver</td>
<td>Power Level 6A @ 125V AC &amp; 3A @ 250V AC</td>
</tr>
<tr>
<td>G</td>
<td>Gold over Brass or Copper</td>
<td>Logic Level 0.4VA maximum @ 28V AC/DC maximum</td>
</tr>
</tbody>
</table>

*Note: Complete explanation of operating range in Supplement section.*
### Series MB2000

#### Large Bushing Miniature Pushbuttons

**TERMINALS**

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Footprint</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Solder Lug</td>
<td><img src="image" alt="Solder Lug Footprint" /></td>
</tr>
<tr>
<td>02</td>
<td>.062” (1.57mm) Wide Quick Connect</td>
<td><img src="image" alt="Quick Connect Footprint" /></td>
</tr>
<tr>
<td>03</td>
<td>.250” (6.35mm) Straight PC</td>
<td><img src="image" alt="Straight PC Footprint" /></td>
</tr>
<tr>
<td>05</td>
<td>.425” (10.8mm) Wirewrap or Extended PC</td>
<td><img src="image" alt="Extended PC Footprint" /></td>
</tr>
<tr>
<td>06</td>
<td>.750” (19.05mm) Wirewrap or Extended PC</td>
<td><img src="image" alt="Extended PC Footprint" /></td>
</tr>
<tr>
<td>07</td>
<td>.964” (24.5mm) Wirewrap or Extended PC</td>
<td><img src="image" alt="Extended PC Footprint" /></td>
</tr>
<tr>
<td>08</td>
<td>1.062” (27.0mm) Wirewrap or Extended PC</td>
<td><img src="image" alt="Extended PC Footprint" /></td>
</tr>
</tbody>
</table>

**CAPS & CAP COLORS**

<table>
<thead>
<tr>
<th>Color Code</th>
<th>Cap Color</th>
<th>Material</th>
<th>Finish</th>
<th>Colors Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Black</td>
<td>Polystyrene</td>
<td>Glossy</td>
<td>A B C E F G H</td>
</tr>
<tr>
<td>B</td>
<td>White</td>
<td>Polystyrene</td>
<td>Glossy</td>
<td>A B C E F G H</td>
</tr>
<tr>
<td>C</td>
<td>Red</td>
<td>Polystyrene</td>
<td>Glossy</td>
<td>A B C E F G H</td>
</tr>
<tr>
<td>D</td>
<td>Amber</td>
<td>PBT</td>
<td>Glossy</td>
<td>A B C D E F G H</td>
</tr>
<tr>
<td>E</td>
<td>Yellow</td>
<td>Polystyrene</td>
<td>Glossy</td>
<td>A B C F</td>
</tr>
<tr>
<td>F</td>
<td>Green</td>
<td>Polystyrene</td>
<td>Glossy</td>
<td>A B C</td>
</tr>
<tr>
<td>G</td>
<td>Blue</td>
<td>Polystyrene</td>
<td>Glossy</td>
<td>A B C</td>
</tr>
<tr>
<td>H</td>
<td>Gray</td>
<td>Polystyrene</td>
<td>Glossy</td>
<td>A B C</td>
</tr>
</tbody>
</table>

**TERMINALS**

- **01 Solder Lug**
  - Epoxy Seal: (0.8) Dia Typ (4.8) Thk = (0.8) Dia Typ (4.8) Thk
  - Dimension A = terminal lengths as shown beside the terminal codes at the left.
  - If using as extended PC terminal, refer to the above footprints.

- **02 .062” (1.57mm) Wide Quick Connect**
  - Epoxy Seal: (6.35) Dia Typ (6.35) Thk = (6.35) Dia Typ (6.35) Thk
  - Thk = (0.8) Dia Typ (0.8) Thk

- **03 .250” (6.35mm) Straight PC**
  - Epoxy Seal: (4.8) Dia Typ (4.8) Thk = (4.8) Dia Typ (4.8) Thk
  - Single Pole
  - Double Pole
  - Four Pole

- **05 .425” (10.8mm) Wirewrap or Extended PC**
  - Epoxy Seal: (11.79) Dia Typ (11.79) Thk = (11.79) Dia Typ (11.79) Thk
  - Material: Polystyrene
  - Finish: Glossy
  - Colors Available: A B C E F G H

- **06 .750” (19.05mm) Wirewrap or Extended PC**
  - Epoxy Seal: (19.05) Dia Typ (19.05) Thk = (19.05) Dia Typ (19.05) Thk
  - Material: Polystyrene
  - Finish: Glossy
  - Colors Available: A B C E F G H

- **07 .964” (24.5mm) Wirewrap or Extended PC**
  - Epoxy Seal: (24.5) Dia Typ (24.5) Thk = (24.5) Dia Typ (24.5) Thk
  - Material: Polystyrene
  - Finish: Glossy
  - Colors Available: A B C E F G H

- **08 1.062” (27.0mm) Wirewrap or Extended PC**
  - Epoxy Seal: (27.0) Dia Typ (27.0) Thk = (27.0) Dia Typ (27.0) Thk
  - Material: Polystyrene
  - Finish: Glossy
  - Colors Available: A B C E F G H

For more information, visit www.nkk.com
Series MB2000

Large Bushing Miniature Pushbuttons

TYPICAL SWITCH DIMENSIONS

Solder Lug

Solder Lug

Solder Lug

Solder Lug

Single Pole

Double Pole

Four Pole

MB2011SB1W01-DA

MB2061SB1W01-DA

MB2181SB1W01-DA
Large Bushing Miniature Pushbuttons

HARDWARE

Standard Hardware for B1 Bushing

**AT503M**
Hex Face Nut

Material:
Brass with Chrome plating

**AT508**
Lockwasher

Material:
Steel with Zinc/Chromate

**AT527M**
Hex Nut

Material:
Steel with Nickel plating

**AT506M**
Locking Ring

Material:
Steel with Zinc/Chromate

Standard Hardware for B3 Bushing

**AT503M**
Hex Face Nut

Material:
Brass with Chrome plating

**AT401P**
O-ring

Material:
Nitrile butadiene rubber

Optional Splashproof Boot for B1 Bushing

**AT4043**
Splashproof Boot

Material: Silicone Rubber
Operating Life: 10,000 for momentary
30,000 for alternate action

When using a splashproof boot, no cap is required.
The MB2000 pushbutton series offers flexibility to accommodate a variety of applications. Using a basic large bushing model, different accessories can be assembled onto the switch to achieve the mounting variations shown on the following two pages.

These switches have:
- 12mm diameter threaded bushing with keyway
- Silver contacts
- 6-Amp rating
- Solder lug terminals

Other 12mm bushing options can be used; see details in preceding Large Bushing Ordering tables.

### CUSTOM ASSEMBLY ORDERING EXAMPLE

<table>
<thead>
<tr>
<th>Poles &amp; Circuits</th>
<th>Mounter Shapes For Shroud</th>
<th>Cap Colors For Shroud</th>
<th>Mounter Colors For Shroud</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 SPDT ON (ON)</td>
<td>4 Round</td>
<td>A Black</td>
<td>A Black</td>
</tr>
<tr>
<td>2065 SPDT ON ON</td>
<td></td>
<td>B White</td>
<td>B White</td>
</tr>
<tr>
<td>2061 DPDT ON (ON)</td>
<td>5 Rectangular</td>
<td>C Red</td>
<td>C Red</td>
</tr>
<tr>
<td>2085 DPDT ON ON</td>
<td></td>
<td>F Green</td>
<td>F Green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G Blue</td>
<td>H Gray</td>
</tr>
</tbody>
</table>

( ) = Momentary

Cap Colors For Snap-In
- A Black
- B White
- C Red
- F Green

Mounter Shapes For Shroud
- 4 Round
- 5 Rectangular

Mounter Colors For Shroud
- A Black
- B White
- C Red
- H Gray

See custom assemblies on following pages.

**Round Shroud**
MB2011SB1W01-4C-A

**Rectangular Shroud**
MB2011SB1W01-5C-A
**Large Bushing Miniature Pushbuttons**

**Series MB2000**

### MOUNTER SHAPES FOR SHROUDS

4. **AT455 Round**
   - Material: Polycarbonate
   - Colors: A, B, H

5. **AT453 Rectangular**
   - Material: Polycarbonate
   - Colors: A, B, H

### CAPS & CAP COLORS FOR SHROUDS

- **AT454 Round Insert Cap**
  - Material: Polycarbonate

- **AT452 Rectangular Insert Cap**
  - Material: Polycarbonate

- **AT080 Screw Adaptor for Insert Caps**
  - Material: Brass

### Color Codes:

- **A** Black
- **B** White
- **C** Red
- **F** Green
- **G** Blue
- **H** Gray
Series MB2000

Large Bushing Miniature Pushbuttons

CUSTOM ASSEMBLY WITH ROUND SHROUD

MB2011SB1W01-4C-A

Single Pole

Double Pole

Effective Panel Thickness: .217" (5.5mm) maximum

CUSTOM ASSEMBLY WITH RECTANGULAR SHROUD

MB2011SB1W01-5C-A

Single Pole

Double Pole

Effective Panel Thickness: .217" (5.5mm) maximum
Series MB2400

Snap-Action Pushbuttons

General Specifications

Electrical Capacity (Resistive Load)

Power Level (silver): 3A @ 125V AC
Logic Level (gold): 0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
Logic/Power Level: Combines silver & gold ratings
(gold over silver) Note: Find additional explanation of dual rating & operating range in Supplement section.

Other Ratings

Contact Resistance: 20 millionms maximum for silver; 30 millionms maximum for gold
Insulation Resistance: 1,000 megohms minimum @ 500V DC
Dielectric Strength: 1,000V AC minimum between contacts for 1 minute minimum;
1,500V AC minimum between contacts & case for 1 minute minimum
Mechanical Life: 200,000 operations minimum
Electrical Life: 25,000 operations minimum for silver; 100,000 operations minimum for gold
Nominal Operating Force: Single pole 2.45N; double pole 3.92N
Travel Pretravel .024” (0.6mm); Overtravel .016” (0.4mm); Total Travel .039” (1.0mm)

Materials & Finishes

Plunger: Brass with nickel plating
Bushing: Brass with nickel plating
Frame: Stainless steel
Case: Polybutylene terephthalate (PBT) (UL94V-0)
Base: Diallyl phthalate resin (UL94V-0)
Movable Contactor: Phosphor bronze with silver or gold plating
Movable Contacts: Silver alloy (code W); copper with gold plating (code G); or silver alloy with gold plating (code A)
Stationary Contacts: Silver alloy with silver plating (code W); copper or brass with gold plating (code G); or silver with gold plating (code A)
Terminals: Copper or brass with silver plating; copper or brass with gold plating

Environmental Data

Operating Temp Range: –30°C through +85°C (–22°F through +185°F)
Humidity: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
Shock: 50G (490m/s²) acceleration (tested in 6 right angled directions, with 3 shocks in each direction)

Installation

Mounting Torque: 1.5Nm (13.0 lb-in) for double nut; 0.7Nm (6.0 lb-in) for single nut
Cap Installation Force: 80.0N (18.0 lbf) maximum downward force on actuator
Cleaning: These devices are not process sealed. Hand clean locally using alcohol based solution.
See Cleaning Specifications in Supplement section.

Standards & Certifications

Flammability Standards: UL94V-0 case & base
UL: File No. E41445 - Recognized only when ordered with marking on switch.
Add “/U” or “/CUL” before dash in part number to order UL recognized switch.
All single and double pole models recognized at 3A @ 125V AC or 0.4VA max. @ 28V DC max.
CSA: File No. 023535_0_000 - Certified only when ordered with marking on switch.
Add “/C” before dash in part number to order CSA certified switch.
Single pole models with PC, solder lug, or Wirewrap terminals & double pole with PC or Wirewrap terminals certified at 3A @ 125V AC or 0.4VA @ 28V maximum.
Distinctive Characteristics

Snap-acting mechanism gives smooth actuation, short stroke, light touch, and audible feedback. This mechanism also provides long mechanical life.

High torque bushing construction prevents rotation or separation from frame during installation.

Antijamming design protects contacts from damage due to excessive downward force on the actuator.

Compatible companions with M series toggles. Body, bushing, and footprint dimensions ideal for mounting MB2400 pushbuttons and M toggles next to one another.

Stainless steel frame resists corrosion.

Longer center solder lug terminal simplifies wiring and soldering.

Silver contacts of specially composed alloy for hardness.

Epoxy sealed terminals prevent entry of solder flux and other contaminants.

Prominent external insulating barriers increase insulation resistance and dielectric strength.
Series MB2400
Snap-Action Bushing Mount Pushbuttons

TYPICAL SWITCH ORDERING EXAMPLE

| MB24 | 11 | E1 | W | 01 | F | A |

Poles & Circuits

<table>
<thead>
<tr>
<th>Pole</th>
<th>Circuit</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>SPDT ON (ON)</td>
<td></td>
</tr>
<tr>
<td>61</td>
<td>DPDT ON (ON)</td>
<td></td>
</tr>
</tbody>
</table>

( ) = Momentary

Contact Materials & Ratings

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Silver Rated 3A @ 125V AC</td>
</tr>
<tr>
<td>G</td>
<td>Gold Rated 0.4VA max @ 28V AC/DC max</td>
</tr>
<tr>
<td>A</td>
<td>Gold over Silver Rated 3A @ 125V AC &amp; 0.4VA max @ 28V AC/DC max</td>
</tr>
</tbody>
</table>

Bushings

<table>
<thead>
<tr>
<th>Bushing</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>.285&quot; (7.24mm) Threaded with D Flat</td>
</tr>
<tr>
<td>E2</td>
<td>.285&quot; (7.24mm) Smooth with D Flat</td>
</tr>
<tr>
<td>A1</td>
<td>.280&quot; (7.1mm) Threaded with Keyway</td>
</tr>
<tr>
<td>A2</td>
<td>.280&quot; (7.1mm) Smooth with Keyway</td>
</tr>
<tr>
<td>S1</td>
<td>.350&quot; (8.9mm) Threaded with Keyway</td>
</tr>
<tr>
<td>S2</td>
<td>.350&quot; (8.9mm) Smooth with Keyway</td>
</tr>
</tbody>
</table>

Caps

<table>
<thead>
<tr>
<th>Diameter</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>.201&quot; (5.1mm)</td>
</tr>
<tr>
<td>H</td>
<td>.295&quot; (7.5mm)</td>
</tr>
</tbody>
</table>

Cap Colors

<table>
<thead>
<tr>
<th>Color</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Black</td>
</tr>
<tr>
<td>B</td>
<td>White</td>
</tr>
<tr>
<td>C</td>
<td>Red</td>
</tr>
</tbody>
</table>

Terminals

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Solder Lug*</td>
</tr>
<tr>
<td>03</td>
<td>.250&quot; (6.35mm) Straight PC</td>
</tr>
<tr>
<td>05</td>
<td>.425&quot; (10.8mm) Wirewrap</td>
</tr>
<tr>
<td>06</td>
<td>.750&quot; (19.05mm) Wirewrap</td>
</tr>
<tr>
<td>07</td>
<td>.964&quot; (24.5mm) Wirewrap</td>
</tr>
</tbody>
</table>

TERMINALS

<table>
<thead>
<tr>
<th>TERMINAL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solder Lug*</td>
<td></td>
</tr>
<tr>
<td>.250&quot; (6.35mm) Straight PC</td>
<td></td>
</tr>
<tr>
<td>.425&quot; (10.8mm) Wirewrap</td>
<td></td>
</tr>
<tr>
<td>.750&quot; (19.05mm) Wirewrap</td>
<td></td>
</tr>
<tr>
<td>.964&quot; (24.5mm) Wirewrap</td>
<td></td>
</tr>
</tbody>
</table>

WIRE HARNESS & CABLE ASSEMBLIES

<table>
<thead>
<tr>
<th>TYPE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPDT ON-(ON) Circuit</td>
<td></td>
</tr>
</tbody>
</table>

IMPORTANT:

Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, ordering instructions are noted on General Specifications page.

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MB2411E1W01-FA

Black .201" (5.1mm) Diameter Cap
SPDT ON-(ON) Circuit
Silver Contacts with 3-Amp Rating
.285" (7.24mm) Threaded Bushing with D Flat
Solder Lug Terminals
## POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Normal</th>
<th>Down</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>MB2411</td>
<td>ON</td>
<td>(ON)</td>
<td>1-3  1-2</td>
<td></td>
<td></td>
<td>SPDT</td>
</tr>
<tr>
<td>DP</td>
<td>MB2461</td>
<td>ON</td>
<td>(ON)</td>
<td>1-3  4-6  1-2  4-5</td>
<td></td>
<td></td>
<td>DPDT</td>
</tr>
</tbody>
</table>

Note: Terminal numbers are not actually on the switch.

### BUSHINGS

Note: Plunger selection is not required for MB2400 pushbuttons. The plunger can be used with or without a cap.

- **E1** .285” (7.24mm) Threaded with D Flat
- **A1** .280” (7.1mm) Threaded with Keyway
- **S1** .350” (8.9mm) Threaded with Keyway

Maximum Panel Thickness with Standard Hardware: .068” (1.74mm)

- **E2** .285” (7.24mm) Smooth with D Flat
- **A2** .280” (7.1mm) Smooth with Keyway
- **S2** .350” (8.9mm) Smooth with Keyway

Maximum Panel Thickness with Standard Hardware: .134” (3.40mm)

### Panel Cutouts

For A1, A2, S1, or S2 Bushing with Keyway

For E1 or E2 Bushing with D Flat

With Optional Locking Ring

Standard hardware includes 2 hex nuts & 1 lockwasher.

Hardware is illustrated following the Typical Switch Dimension drawings.
Series MB2400  Snap-Action Bushing Mount Pushbuttons

**CONTACT MATERIALS & RATINGS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Level</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Silver over Silver</td>
<td>Power Level</td>
<td>3A @ 125V AC</td>
</tr>
<tr>
<td>G</td>
<td>Gold over Brass or Copper</td>
<td>Logic Level</td>
<td>0.4VA maximum @ 28V AC/DC maximum</td>
</tr>
</tbody>
</table>

Note: Complete explanation of operating range in Supplement section.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Level</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Gold over Silver</td>
<td>Power Level</td>
<td>3A @ 125V AC</td>
</tr>
<tr>
<td></td>
<td>or Logic Level</td>
<td></td>
<td>or 0.4VA maximum @ 28V AC/DC maximum</td>
</tr>
</tbody>
</table>

Note: This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section for complete explanation of dual rating and operating range.

**TERMINALS**

- **01 Solder Lug**
- **03 .250” (6.35mm) Straight PC**
- **05 .425” (10.8mm)**
- **06 .750” (19.05mm)**
- **07 .964” (24.5mm)**

Refer to footprints if using as extended PC terminal.

Dimension A = terminal lengths as shown beside the code boxes at left.

Single Pole  Double Pole

**CAPS & CAP COLORS**

- **F AT475 .201” (5.1mm) Diameter Cap**
  - Material: Polyamide
  - Finish: Glossy
- **H AT496 .295” (7.5mm) Diameter Cap**
  - Material: Polyamide
  - Finish: Glossy

Cap Colors Available: A Black  B White  C Red
**TYPICAL SWITCH DIMENSIONS**

**Single Pole**

**Solder Lug**

**Double Pole**

**Solder Lug**

**HARDWARE**

### Standard Hardware

**AT513H Inch Threaded Hexagon Nut**

- 2 included with each switch
- Material: Brass with Nickel Plating

**AT509 Lockwasher**

- 1 included with each switch
- Material: Steel with Zinc/Chromate

### Optional Hardware

**AT507H Locking Ring for A1 or S1 Bushing**

- Material: Steel with Zinc/Chromate

**AT515 Locking Ring for E1 Bushing**

- Material: Steel with Zinc/Chromate
Series MB2400
Snap-Action Bracket PC Mount Pushbuttons

TYPICAL SWITCH ORDERING EXAMPLE

MB24 11 A2 G 40 F A

Poles & Circuits

<table>
<thead>
<tr>
<th>Poles</th>
<th>Circuits</th>
<th>W</th>
<th>G</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>SPDT ON (ON)</td>
<td>Silver Rated 3A @ 125V AC</td>
<td>Gold Rated 0.4VA max @ 28V AC/DC max</td>
<td>Gold over Silver Rated 3A @ 125V AC &amp; 0.4VA max @ 28V AC/DC max</td>
</tr>
<tr>
<td>61</td>
<td>DPDT ON (ON)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bushings

<table>
<thead>
<tr>
<th>Bushing</th>
<th>Diameter</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>.280” (7.1mm)</td>
<td>Smooth with Keyway</td>
</tr>
<tr>
<td>A1</td>
<td>.280” (7.1mm)</td>
<td>Threaded with Keyway</td>
</tr>
<tr>
<td>E2</td>
<td>.285” (7.24mm)</td>
<td>Smooth with D Flat</td>
</tr>
<tr>
<td>E1</td>
<td>.285” (7.24mm)</td>
<td>Threaded with D Flat</td>
</tr>
<tr>
<td>S2</td>
<td>.350” (8.9mm)</td>
<td>Smooth with Keyway</td>
</tr>
<tr>
<td>S1</td>
<td>.350” (8.9mm)</td>
<td>Threaded with Keyway</td>
</tr>
</tbody>
</table>

Caps

<table>
<thead>
<tr>
<th>Cap</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>.201” (5.1mm) Dia.</td>
</tr>
<tr>
<td>H</td>
<td>.295” (7.5mm) Dia.</td>
</tr>
</tbody>
</table>

Cap Colors

A: Black | B: White | C: Red

Contact Materials & Ratings

Contact Materials:
- Silver: Rated 3A @ 125V AC
- Gold: Rated 0.4VA max @ 28V AC/DC max
- Gold over Silver: Rated 3A @ 125V AC & 0.4VA max @ 28V AC/DC max

Caps

W: .201” (5.1mm) Dia.
H: .295” (7.5mm) Dia.

Terminals

With Bracket

- 13: .250” (6.35mm) Straight PC with .465” (11.8mm) Bracket
- 15: .425” (10.8mm) Straight PC with .630” (16.0mm) Bracket
- 17: .964” (24.5mm) Straight PC with 1.150” (29.2mm) Bracket

With Reinforced Bracket

- 23: .250” (6.35mm) Straight PC with .465” (11.8mm) Bracket
- 25: .425” (10.8mm) Straight PC with .630” (16.0mm) Bracket
- 26: .750” (19.05mm) Straight PC with .953” (24.2mm) Bracket

With Terminal Support

- 30: Right Angle PC
- 40: Vertical PC

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MB2411A2G40-FA

.280” (7.1mm) Smooth Bushing with Keyway
Black .201” (5.1mm) Diameter Cap
SPDT ON-(ON) Circuit
Vertical PC Terminals
Gold Contacts with 0.4VA Rating
POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Normal</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>*MB2411</td>
<td>ON</td>
<td>(ON)</td>
<td>1-3</td>
<td>1-2</td>
<td>DPDT</td>
<td>SPDT</td>
</tr>
<tr>
<td>DP</td>
<td>MB2461</td>
<td>ON</td>
<td>(ON)</td>
<td>1-3 4-6</td>
<td>1-2 4-5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Terminal numbers are not actually on the switch. *When using terminal code 32, connected terminals and schematic are reversed.

**BUSHINGS**

Note: Plunger selection is not required for MB2400 pushbuttons. The plunger can be used with or without a cap.

**A2** .280” (7.1mm) Smooth with Keyway

**E2** .285” (7.24mm) Smooth with D Flat

**S2** .350” (8.9mm) Smooth with Keyway

**A1** .280” (7.1mm) Threaded with Keyway

**E1** .285” (7.24mm) Threaded with D Flat

**S1** .350” (8.9mm) Threaded with Keyway

Maximum Panel Thickness with Standard Hardware: .068” (1.74mm)

Maximum Panel Thickness with Standard Hardware: .068” (1.74mm)

Maximum Panel Thickness with Standard Hardware: .134” (3.40mm)

**Panel Cutouts**

For A1, A2, S1, or S2 Bushing with Keyway

For E1 or E2 Bushing with D Flat

With Optional Locking Ring

Standard hardware includes 2 hex nuts & 1 lockwasher. Hardware is illustrated following the Typical Switch Dimension drawings.
## Series MB2400
Snap-Action Bracket PC Mount Pushbuttons

### CONTACT MATERIALS & RATINGS

<table>
<thead>
<tr>
<th>Code</th>
<th>Contact Material</th>
<th>Power Level</th>
<th>Logic Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Silver over Silver</td>
<td>3A @ 125V AC</td>
<td>0.4VA maximum @ 28V AC/DC maximum</td>
</tr>
<tr>
<td>G</td>
<td>Gold over Brass or Copper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Gold over Silver</td>
<td>3A @ 125V AC or Logic Level</td>
<td>0.4VA maximum @ 28V AC/DC maximum</td>
</tr>
</tbody>
</table>

Note: This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section for complete explanation of dual rating and operating range.

### TERMINALS

**Straight PC Mount with Bracket**

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Diameter (mm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>.250” (6.35mm)</td>
<td>.425” (10.8mm) Terminal with .630” (16.0mm) Bracket</td>
</tr>
<tr>
<td>15</td>
<td>.465” (11.8mm)</td>
<td>.964” (24.5mm) Terminal with 1.150” (29.2mm) Bracket</td>
</tr>
<tr>
<td>23</td>
<td>.250” (6.35mm)</td>
<td>.425” (10.8mm) Terminal with .630” (16.0mm) Bracket</td>
</tr>
<tr>
<td>25</td>
<td>.425” (10.8mm)</td>
<td>.630” (16.0mm) Terminal with .953” (24.2mm) Bracket</td>
</tr>
<tr>
<td>26</td>
<td>.750” (19.05mm)</td>
<td>.953” (24.2mm) Terminal with .953” (24.2mm) Bracket</td>
</tr>
</tbody>
</table>

**Straight PC Mount with Reinforced Bracket**

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Diameter (mm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>.250” (6.35mm)</td>
<td>.425” (10.8mm) Terminal with .630” (16.0mm) Bracket</td>
</tr>
</tbody>
</table>

**Right Angle PC**

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Diameter (mm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>.750” (19.05mm)</td>
<td>.953” (24.2mm) Terminal with .953” (24.2mm) Bracket</td>
</tr>
</tbody>
</table>

**Vertical PC**

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Diameter (mm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>.250” (6.35mm)</td>
<td>.425” (10.8mm) Terminal with .630” (16.0mm) Bracket</td>
</tr>
</tbody>
</table>

PCB footprints are on the following Typical Switch Dimension pages.

### CAPS & CAP COLORS

- **AT475**
  - Diameter Cap: .201” (5.1mm)
  - Material: Polyamide
  - Finish: Glossy
  - Cap Colors Available:
    - A Black
    - B White
    - C Red

- **AT496**
  - Diameter Cap: .295” (7.5mm)
  - Material: Polyamide
  - Finish: Glossy

Note: Complete explanation of operating range in Supplement section.
TYPICAL SWITCH DIMENSIONS

Straight PC • Bracket

<table>
<thead>
<tr>
<th>Terminal Code</th>
<th>Terminal Length:</th>
<th>Bracket Length:</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>.250 (6.35mm)</td>
<td>.465 (11.8mm)</td>
</tr>
<tr>
<td>15</td>
<td>.425 (10.8mm)</td>
<td>.630 (16.0mm)</td>
</tr>
<tr>
<td>17</td>
<td>.964 (24.5mm)</td>
<td>1.150 (29.2mm)</td>
</tr>
</tbody>
</table>

Straight PC • Reinforced Bracket

<table>
<thead>
<tr>
<th>Terminal Code</th>
<th>Terminal Length:</th>
<th>Bracket Length:</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>.250 (6.35mm)</td>
<td>.465 (11.8mm)</td>
</tr>
<tr>
<td>25</td>
<td>.425 (10.8mm)</td>
<td>.630 (16.0mm)</td>
</tr>
<tr>
<td>26</td>
<td>.750 (19.05mm)</td>
<td>.953 (24.2mm)</td>
</tr>
</tbody>
</table>
### TYPICAL SWITCH DIMENSIONS

#### Right Angle PC

**MB2411A2G30-FA**

**Single Pole**

**Double Pole**

#### Right Angle PCB

**MB2411A2G32-FA**

**Single Pole • Reverse Circuit**

#### Vertical PC

**MB2411A2G40-FA**

**Single Pole**

**Double Pole**
**HARDWARE**

**Standard Hardware**

**AT513H Inch Threaded Hexagon Nut**

2 included with each switch

- Material: Brass with Nickel Plating

**AT509 Lockwasher**

1 included with each switch

- Material: Steel with Zinc/Chromate

---

**Optional Hardware**

**AT507H Locking Ring for A1 or S1 Bushing**

- Material: Steel with Zinc/Chromate

**AT515 Locking Ring for E1 Bushing**

- Material: Steel with Zinc/Chromate
**Series MB2400 Snap-Action Snap-in Mount Pushbuttons**

**TYPICAL SWITCH**

**ORDERING EXAMPLE**

**Poles & Circuits**

| 11 | SPDT | ON | (ON) |
| 61 | SPDT | ON | (ON) |
| J  | Snap-in Frame |

**Contact Materials & Ratings**

- W: Silver Rated 3A @ 125V AC
- G: Gold Rated 0.4VA max @ 28V AC/DC max
- A: Gold over Silver Rated 3A @ 125V AC & 0.4VA max @ 28V AC/DC max

**Cap & Cap Colors**

- A: Black
- B: White
- C: Red
- E: Yellow
- F: Green
- G: Blue
- H: Gray

**Mounting Frame**

- J: Snap-in Frame

**Terminals**

- 01: Solder Lug
- 03: 250" (6.35mm) Straight PC
- 05: 425" (10.8mm) Wirewrap
- 06: 750" (19.05mm) Wirewrap
- 07: 964" (24.5mm) Wirewrap

**IMPORTANT:**

Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on the General Specifications page.

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

MB2411JW01-C

Red Cap
SPDT ON-(ON) Circuit
Silver Contacts with 3-Amp Rating
Solder Lug Terminals

LED Colors

- 1 LED
  - A: Black
  - C: Red
  - E: Yellow
  - F: Green

2 LEDs
  - Top LED
    - C: Red
  - Bottom LED
    - C: Red

**Bezel Colors**

- A: Black
- B: White
- C: Red
- E: Yellow
- F: Green
- G: Blue
- H: Gray

**Optional Bezels**

- 1: Bezel without LEDs
- *2: Bezel with 1 Round LED
- *3: Bezel with 2 Round LEDs
- *4: Bezel with 2 Rectangular LEDs

* Available in Black color only

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

MB2411JW01-C-3A-CF

Red Cap
Snap-in Frame
SPDT ON-(ON) Circuit
Silver Contacts with 3-Amp Rating
Solder Lug Terminals

1 Red LED
1 Green LED
Black Bezel with 2 Round LEDs

**Supplement**

C108  www.nkk.com

**Series MB2400**
Series MB2400
Snap-Action Snap-in Mount Pushbuttons

POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>MB2411</td>
<td>ON</td>
<td>(ON)</td>
<td>1-3 1-2</td>
<td>SPDT</td>
</tr>
<tr>
<td>DP</td>
<td>MB2461</td>
<td>ON</td>
<td>(ON)</td>
<td>1-3 4-6 1-2 4-5</td>
<td>DPDT</td>
</tr>
</tbody>
</table>

Note: Terminal numbers are not actually on the switch.

MOUNTING FRAME

- **Panel Cutout for Single Pole without Bezel**
- **Panel Cutout for Double Pole without Bezel**

Panel Thickness without Bezel: 0.039” ~ 0.157” (1.0mm ~ 4.0mm)
Panel Thickness with Bezel: 0.039” ~ 0.126” (1.0mm ~ 3.2mm)

CONTACT MATERIALS & RATINGS

<table>
<thead>
<tr>
<th>W</th>
<th>Silver over Silver</th>
<th>Power Level</th>
<th>3A @ 125V AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Gold over Brass or Copper</td>
<td>Logic Level</td>
<td>0.4VA maximum @ 28V AC/DC maximum</td>
</tr>
<tr>
<td>A</td>
<td>Gold over Silver</td>
<td>Power Level</td>
<td>3A @ 125V AC</td>
</tr>
<tr>
<td></td>
<td>or Logic Level</td>
<td>or 0.4VA maximum @ 28V AC/DC maximum</td>
<td></td>
</tr>
</tbody>
</table>

TERMINALS

- **Solder Lug** 01
- **0.250” (6.35mm) Straight PC** 03
- **0.425” (10.8mm)** 05
- **0.750” (19.05mm)** 06
- **0.964” (24.5mm)** 07

Wirewrap or Extended PC

Refer to footprints if using as extended PC terminal.
Dimension A = terminal lengths as shown beside the code boxes at left.

Single Pole | Double Pole
### Series MB2400

**CAP & CAP COLORS**

<table>
<thead>
<tr>
<th>Material: Polycarbonate</th>
<th>Finish: Glossy</th>
<th>Contact factory for matte finish.</th>
<th>Legend details at end of this section.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT465</td>
<td>.453&quot; (11.5mm)</td>
<td>Square Cap</td>
<td>A Black</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>B White</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C Red</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>E Yellow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F Green</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>G Blue</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>H Gray</td>
</tr>
</tbody>
</table>

**OPTIONAL SNAP-IN BEZELS & BEZEL COLORS**

1. **AT207 Bezel**
   - Material: Polycarbonate
   - Finish: Glossy
   - Contact factory for matte finish.

2. **AT208 Bezel**
   - Material: Polycarbonate
   - Finish: Glossy
   - Contact factory for matte finish.

3. **AT212 Bezel**
   - Material: Polycarbonate
   - Finish: Semi-glossy

4. **AT213 Bezel**
   - Material: Polycarbonate
   - Finish: Semi-glossy

**Bezel Assembly**

1. Pry out tab on bezel to a 45° angle.
2. Insert switch frame under tab and snap on the bezel.
3. Push tab back into place.
4. Snap assembled bezel and switch into panel.

**Contact factory**

- for matte finish.

**LED colors & specifications on next page.**
LED COLORS & SPECIFICATIONS

Bezel Orientation on Switch

Note: Lead lengths may differ from manufacturing lot to lot. The longer lead is the anode (+).

<table>
<thead>
<tr>
<th>Color</th>
<th>AT070</th>
<th>AT17</th>
<th>AT618</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>F</td>
<td>C</td>
</tr>
<tr>
<td>Forward Peak Current I_{FPM}</td>
<td>25mA</td>
<td>50mA</td>
<td>30mA</td>
</tr>
<tr>
<td>Typical Forward Current I_{F}</td>
<td>20mA</td>
<td>30mA</td>
<td>20mA</td>
</tr>
<tr>
<td>Forward Voltage V_{F}</td>
<td>2.8V</td>
<td>2.1V</td>
<td>2.0V</td>
</tr>
<tr>
<td>Reverse Peak Voltage V_{RPM}</td>
<td>4V</td>
<td>5V</td>
<td>5V</td>
</tr>
<tr>
<td>Current Reduction Rate above 25°C ΔI_{F}</td>
<td>0.33 mA/°C</td>
<td>0.40 mA/°C</td>
<td>0.40 mA/°C</td>
</tr>
<tr>
<td>Ambient Temperature Range (when used with a bezel)</td>
<td>-10° ~ +70°C</td>
<td>-15° ~ +70°C</td>
<td>-15° ~ +70°C</td>
</tr>
</tbody>
</table>

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is independent of switch operation. LED is colored in OFF state.

If the source voltage is greater than the rated voltage of the LED, a ballast resistor must be connected in series with the LED. The ballast resistor calculation and more lamp detail are shown in the Supplement section.

TYPICAL SWITCH DIMENSIONS

Solder Lug

Single Pole

Double Pole

MB2411JW01-C
**LEGENDS**

NKK Switches can provide custom legends for caps. Contact factory for more information.

---

**Suggested Printable Area for Cap**

**Recommended Print Method:**
Screen Print or Pad Print

Epoxy based ink is recommended.

AT465

AT465

Shaded areas are printable areas.
Series MB2500

Snap-Action Pushbuttons

General Specifications

Electrical Capacity (Resistive Load)

- **Power Level (code W):** 3A @ 125V AC
- **Logic Level (code G):** 0.4VA maximum @ 28V AC/DC maximum
  (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
- **Logic/Power Level (code A):** Combines W & G ratings
  Note: See Supplement section to find explanation of operating range.

Other Ratings

- **Contact Resistance:** 20 milliohms maximum for silver; 30 milliohms maximum for gold
- **Insulation Resistance:** 1,000 megohms minimum @ 500V DC
- **Dielectric Strength:** 1,000V AC minimum between contacts for 1 minute minimum;
  1,500V AC minimum between contacts & case for 1 minute minimum
- **Mechanical Life:** 200,000 operations minimum
- **Electrical Life:** 25,000 operations minimum for silver; 100,000 operations minimum for gold
- **Nominal Operating Force:** Single pole 2.45N; double pole 3.92N
- **Travel:** Pretravel .024" (0.6mm); Overtravel .016" (0.4mm); Total Travel .039" (1.0mm)

Materials & Finishes

- **Plunger:** Brass with nickel plating
- **Bushing:** Brass with nickel plating
- **Mounting & Body Frames:** Stainless steel
- **Support Bracket:** Brass with tin plating
- **Case:** Glass fiber reinforced polyester (UL94V-0)
- **Base:** Diallyl phthalate resin
- **Movable Contactor:** Phosphor bronze with silver or gold plating
- **Movable Contacts:** Silver alloy (code W); copper with gold plating (code G)
- **Stationary Contacts:** Silver with silver plating (code W); copper or brass with gold plating (code G)
- **Terminals:** Copper with silver plating; copper or brass with gold plating

Environmental Data

- **Operating Temp Range:** –30°C through +85°C (–22°F through +185°F)
- **Humidity:** 90 ~ 95% humidity for 100 hours @ 40°C (104°F)
- **Vibration:** 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning
  in 1 minute; 3 right angled directions for 2 hours
- **Shock:** 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation

- **Mounting Torque:** 1.5Nm (13 lb-in) for double nut; 0.7Nm (6 lb-in) for single nut
- **Cap Installation Force:** 80N (18 lbf) maximum downward force on actuator

Processing

- **Soldering:** Wave Soldering Recommended: See Profile B in Supplement section.
- **Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

Standards & Certifications

- **Flammability Standards:** UL94V-0 Case
  - UL: File No. E44145 - Recognized only when ordered with marking on switch.
    Add “/U” or “/CUL” before dash in part number to order UL recognized switch.
    All single & double pole models recognized at 3A @ 125V AC or 0.4VA max. @ 28V AC/DC max.
- **CSA:** File No. 023535_0_000 - Certified only when ordered with marking on switch.
  Add “/C” before dash in part number to order CSA certified switch.
  Single pole & double pole models certified at 3A @ 125V AC or 0.4VA max. @ 28V AC/DC max.
Distinctive Characteristics

Short stroke and light touch.

Antijamming design protects contacts from damage due to excessive downward force on the actuator.

High torque bushing construction prevents rotation or separation from frame during installation.

Stainless steel frame resists corrosion.

Longer center solder lug terminal simplifies wiring and soldering.

Patented silver contacts of specially composed alloy for hardness.

Epoxy sealed terminals prevent entry of solder flux and other contaminants.

Snap-acting mechanism gives smooth actuation and audible feedback.

Prominent external insulating barriers increase insulation resistance and dielectric strength.
**Series MB2500**

**Snap-Action Bushing Mount Pushbuttons**

**TYPICAL SWITCH ORDERING EXAMPLE**

**MB25**

**Poles & Circuits**

<table>
<thead>
<tr>
<th></th>
<th>SPDT</th>
<th>ON</th>
<th>(ON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

( ) = Momentary

**Contact Materials & Ratings**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Silver Rated 3A @ 125V AC</td>
</tr>
<tr>
<td>G</td>
<td>Gold Rated 0.4VA max @ 28V AC/DC max</td>
</tr>
</tbody>
</table>

**Caps**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>.315” (8.0mm) Diameter</td>
</tr>
<tr>
<td>C</td>
<td>.394” (10.0mm) Diameter</td>
</tr>
</tbody>
</table>

**Caps**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Black</td>
</tr>
<tr>
<td>B</td>
<td>White</td>
</tr>
<tr>
<td>C</td>
<td>Red</td>
</tr>
<tr>
<td>E</td>
<td>Yellow</td>
</tr>
<tr>
<td>F</td>
<td>Green</td>
</tr>
<tr>
<td>G</td>
<td>Blue</td>
</tr>
</tbody>
</table>

**Bushing**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S4</td>
<td>.315” (8.0mm) Threaded with Keyway</td>
</tr>
</tbody>
</table>

**Terminals**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Solder Lug</td>
</tr>
<tr>
<td>03</td>
<td>.250” (6.35mm) Straight PC</td>
</tr>
</tbody>
</table>

**IMPORTANT:**

Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on the General Specifications page.

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

MB2511S4W01-BC

- Red .315” (8.0mm) Diameter Cap
- .315” (8.0mm) Threaded Bushing with Keyway
- SPDT ON-(ON) Circuit
- Silver Contacts with 3-Amp Rating
- Solder Lug Terminals
Snap-Action Bushing Mount Pushbuttons

**Series MB2500**

### POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal Keyway</th>
<th>Down Keyway</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>MB2511</td>
<td>ON</td>
<td>(ON)</td>
<td>3-1</td>
<td>SPDT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-2</td>
<td></td>
</tr>
<tr>
<td>DP</td>
<td>MB2521</td>
<td>ON</td>
<td>(ON)</td>
<td>3-1 6-4</td>
<td>DPDT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3-2 6-5</td>
<td></td>
</tr>
</tbody>
</table>

Note: Terminal numbers are not actually on the switch.

### BUSHING

- **.315” (8.0mm)**
  - Threaded with Keyway

### Panel Cutouts

- **Without Keyway**
  - (6.5) Dia
  - 0.256

- **With Keyway**
  - (6.5) Dia
  - 0.256

- **With Optional Locking Ring**
  - (6.5) Dia
  - 0.256

Maximum Panel Thickness with Standard Hardware: .134” (3.4mm)

### Standard Hardware

- **AT513M Threaded Hex Nut**
  - 2 included with each switch
  - Brass with nickel plating

### Optional Hardware

- **AT507M Locking Ring**
  - Steel with zinc/chromate
  - 1 included with each switch

### CONTACT MATERIALS & RATINGS

- **W** Silver over Silver
  - Power Level 3A @ 125V AC

- **G** Gold over Brass or Copper
  - Logic Level 0.4VA maximum @ 28V AC/DC maximum

Note: Complete explanation of operating range in Supplement section.
Series MB2500
Snap-Action Bushing Mount Pushbuttons

TERMINALS

01 Solder Lug

03 .250” (6.35mm) Straight PC

Single Pole Double Pole

CAPS & CAP COLORS

B AT443 .315” (8.0mm) Diameter Cap

Material: Polycarbonate
Finish: Glossy

C AT442 .394” (10.0mm) Diameter Cap

Material: Polycarbonate
Finish: Glossy

Cap Colors Available: A Black B White C Red E Yellow F Green G Blue

TYPICAL SWITCH DIMENSIONS

Solder Lug

Single Pole

MB2511S4W01-BC

Solder Lug

Double Pole

MB2521S4W01-BC
Snap-Action Bracket PC Mount Pushbuttons

Series MB2500

**TYPICAL SWITCH ORDERING EXAMPLE**

- **MB25**
- **11**
- **S2**
- **G**
- **13**
- **B**
- **C**

**Poles & Circuits**
- **11** SPDT ON (ON)
- **21** DPDT ON (ON)

( ) = Momentary

**Contact Materials & Ratings**
- **W** Silver
  - Rated 3A @ 125V AC
- **G** Gold
  - Rated 0.4VA max @ 28V AC/DC max

**Caps**
- **B** .315” (8.0mm) Diameter
- **C** .394” (10.0mm) Diameter

**Bushing**
- **S2** .300” (7.6mm)
  - Smooth with Keyway

**Terminals**
- **13** .250” (6.35mm) Straight PC with Bracket
- **30** Right Angle (Single Pole only)
- **45** Vertical PC

**Caps Colors**
- **A** Black
- **B** White
- **C** Red
- **E** Yellow
- **F** Green
- **G** Blue

**TYPICAL SWITCH ORDERING EXAMPLE**

**MB2511S2G13-BC**

- **Red** .315” (8.0mm) Diameter Cap
- **SPDT** ON-(ON) Circuit
- **Gold Contacts with 0.4VA Rating**
- **.300” (7.6mm) Smooth Bushing with Keyway**
- **.250” (6.35mm) Straight PC Terminals with Bracket**

**IMPORTANT:**
Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on the General Specifications page.

**DESCRIPTION FOR TYPICAL ORDERING EXAMPLE**

**MB2511S2G13-BC**

- **Red** .315” (8.0mm) Diameter Cap
- **SPDT** ON-(ON) Circuit
- **Gold Contacts with 0.4VA Rating**
- **.300” (7.6mm) Smooth Bushing with Keyway**
- **.250” (6.35mm) Straight PC Terminals with Bracket**
## POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal Keyway</th>
<th>Down Keyway</th>
<th>Connected Terminals</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>MB2511</td>
<td>ON (ON)</td>
<td></td>
<td>3-1 3-2</td>
<td>SPDT</td>
</tr>
<tr>
<td>DP</td>
<td>MB2521</td>
<td>ON (ON)</td>
<td></td>
<td>3-1 6-4 3-2 6-5</td>
<td>DPDT</td>
</tr>
</tbody>
</table>

Note: Terminal numbers are not actually on the switch.

### BUSHING

**S2** .300” (7.6mm) Smooth with Keyway

### CONTACT MATERIALS & RATINGS

- **W** Silver over Silver  
  Power Level  
  3A @ 125V AC

- **G** Gold over Brass or Copper  
  Logic Level  
  0.4VA maximum @ 28V AC/DC maximum

Note: Complete explanation of operating range in Supplement section.

### TERMINALS

- **13** .250” (6.35mm) Terminal with .465” (11.8mm) Bracket
- **30** Right Angle PC  
  Single Pole only
- **45** Vertical PC
**Series MB2500**

**CAPS & CAP COLORS**

| Material: Polycarbonate | Finish: Glossy |

**Cap Colors Available:**

- **A** Black
- **B** White
- **C** Red
- **E** Yellow
- **F** Green
- **G** Blue

**TYPICAL SWITCH DIMENSIONS**

**Single Pole**

<table>
<thead>
<tr>
<th>Keyway</th>
<th>Single Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MB2511S2G13-BC</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Double Pole**

<table>
<thead>
<tr>
<th>Keyway</th>
<th>Double Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MB2511S2G30-BC</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Straight PC • Bracket**

<table>
<thead>
<tr>
<th>Keyway</th>
<th>Straight PC • Bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MB2511S2G45-BC</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Single Pole**

<table>
<thead>
<tr>
<th>Keyway</th>
<th>Single Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MB2511S2G13-BC</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Right Angle PC**

<table>
<thead>
<tr>
<th>Keyway</th>
<th>Right Angle PC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MB2511S2G30-BC</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Vertical PC**

<table>
<thead>
<tr>
<th>Keyway</th>
<th>Vertical PC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MB2511S2G45-BC</strong></td>
<td></td>
</tr>
</tbody>
</table>
Series MB2500

Snap-Action Snap-in Mount Pushbuttons

TYPICAL SWITCH ORDERING EXAMPLE

MB25 11 J W 01 - A

Poles & Circuits

<table>
<thead>
<tr>
<th>Pole</th>
<th>Type</th>
<th>On/Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>SPDT</td>
<td>ON (ON)</td>
</tr>
<tr>
<td>21</td>
<td>DPDT</td>
<td>ON (ON)</td>
</tr>
</tbody>
</table>

( ) = Momentary

Contact Materials & Ratings

<table>
<thead>
<tr>
<th>Contact Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Silver Rated 3A @ 125V AC</td>
</tr>
<tr>
<td>G</td>
<td>Gold Rated 0.4VA max @ 28V AC/DC max</td>
</tr>
</tbody>
</table>

Cap & Cap Colors

<table>
<thead>
<tr>
<th>Cap Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Black</td>
</tr>
<tr>
<td>B</td>
<td>White</td>
</tr>
<tr>
<td>C</td>
<td>Red</td>
</tr>
<tr>
<td>E</td>
<td>Yellow</td>
</tr>
<tr>
<td>F</td>
<td>Green</td>
</tr>
<tr>
<td>G</td>
<td>Blue</td>
</tr>
<tr>
<td>H</td>
<td>Gray</td>
</tr>
</tbody>
</table>

Mounting Frame

J Snap-in Frame

Terminals

01 Solder Lug

IMPORTANT:

Switches are supplied without UL, cULus & CSA marking unless specified. UL, cULus & CSA recognized only when ordered with marking on the switch. Specific models, ratings, & ordering instructions are noted on the General Specifications page.

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MB2511JW01-A

- Black Cap
- SPDT ON-(ON) Circuit
- Silver Contacts with 3-Amp Rating
- Snap-in Frame
- Solder Lug Terminals
Snap-Action Snap-in Mount Pushbuttons  
Series MB2500

POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Down</th>
<th>Throw &amp; Switch Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>MB2511</td>
<td>ON</td>
<td>(ON)</td>
<td>3-1</td>
<td>3-2</td>
<td>SPDT</td>
</tr>
<tr>
<td>DP</td>
<td>MB2521</td>
<td>ON</td>
<td>(ON)</td>
<td>3-1 6-4</td>
<td>3-2 6-5</td>
<td>DPDT</td>
</tr>
</tbody>
</table>

Note: Terminal numbers are not actually on the switch.

MOUNTING FRAME

Panel Thickness without Bezel: .039” ~ .157” (1.0mm ~ 4.0mm)
Panel Thickness with Bezel: .039” ~ .126” (1.0mm ~ 3.2mm)

CONTACT MATERIALS & RATINGS

W  Silver over Silver  Power Level  3A @ 125V AC

G  Gold over Brass or Copper  Logic Level  0.4VA maximum @ 28V AC/DC maximum

TERMINALS

01  Solder Lug

CAP & CAP COLORS

AT465  .453” (11.5mm) Square Cap

Material: Polycarbonate  Finish: Glossy

Cap Colors Available:

- A Black
- B White
- C Red
- E Yellow
- F Green
- G Blue
- H Gray

Contact factory for matte finish.
## TYPICAL SWITCH DIMENSIONS

### Solder Lug

**MB2511JW01-A**

### Single Pole

**MB2521JW01-C**

### Solder Lug

### Double Pole

### OPTIONAL SNAP-IN BEZELS & BEZEL COLORS

**AT207 Bezel**
- Material: Polycarbonate
- Finish: Glossy
- Colors: Black, White, Red, Yellow, Green, Blue, Gray
- Contact factory for matte finish.

**AT208 Bezel for AT070 LED**
- Material: Polycarbonate
- Finish: Glossy
- Color: Black
- Contact factory for matte finish.

**AT212 Bezel for AT617 LED**
- Material: Polycarbonate
- Finish: Semi-glossy
- Color: Black
**OPTIONAL SNAP-IN BEZELS & BEZEL COLORS**

**AT213 Bezel for AT618 LED**
- **Material:** Polycarbonate
- **Finish:** Semi-glossy
- **Color:** Black

---

**Bezel Assembly**

1. Pry out tab on bezel to a 45° angle.
2. Insert switch frame under tab and snap on the bezel.
3. Push tab back into place.
4. Snap assembled bezel and switch into panel.

**LED COLORS & SPECIFICATIONS**

**Bezel Orientation on Switch**

**AT070 LED**
- For Bezel AT208 with 1 LED
- **Circuit Mark This Side**
- Top LED
- Bottom LED

**AT617 LED**
- For Bezel AT212 with 2 Round LEDs
- **Circuit Mark This Side**
- Top LED
- Bottom LED

**AT618 LED**
- For Bezel AT213 with 2 Rectangular LEDs
- **Circuit Mark This Side**
- Top LED
- Bottom LED

*Note: Lead lengths may differ from manufacturing lot to lot. The longer lead is the anode (+).*

<table>
<thead>
<tr>
<th></th>
<th><strong>AT070</strong></th>
<th><strong>AT617</strong></th>
<th><strong>AT618</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color</strong></td>
<td><strong>C</strong> Red</td>
<td><strong>C</strong> Red</td>
<td><strong>C</strong> Red</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td><strong>F</strong> Green</td>
<td><strong>F</strong> Yellow</td>
<td><strong>F</strong> Green</td>
</tr>
<tr>
<td><strong>Forward Peak Current</strong> $I_{FM}$</td>
<td>25mA</td>
<td>30mA</td>
<td>25mA</td>
</tr>
<tr>
<td><strong>Typical Forward Current</strong> $I_{F}$</td>
<td>20mA</td>
<td>20mA</td>
<td>20mA</td>
</tr>
<tr>
<td><strong>Forward Voltage</strong> $V_F$</td>
<td>2.8V</td>
<td>2.0V</td>
<td>1.9V</td>
</tr>
<tr>
<td><strong>Reverse Peak Voltage</strong> $V_{RM}$</td>
<td>4V</td>
<td>5V</td>
<td>5V</td>
</tr>
<tr>
<td><strong>Current Reduction Rate Above 25°C</strong> $\Delta I$</td>
<td>0.33 mA/°C</td>
<td>0.40 mA/°C</td>
<td>0.33 mA/°C</td>
</tr>
<tr>
<td><strong>Ambient Temperature Range</strong> (when used with a bezel)</td>
<td>$-10° \sim +70°C$</td>
<td>$-15° \sim +70°C$</td>
<td>$-15° \sim +70°C$</td>
</tr>
</tbody>
</table>

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is independent of switch operation. LED is colored in OFF state.

If the source voltage is greater than the rated voltage of the LED, a ballast resistor must be connected in series with the LED. The ballast resistor calculation and more lamp detail are shown in the Supplement section.
Series SB

Low/Medium Capacity Pushbuttons

## GENERAL SPECIFICATIONS FOR SB25, SB60s, SB221s, SB265

### Electrical Capacity (Resistive Load)

**Power Level:** Shown in the following tables

### Other Ratings

- **Contact Resistance:** 10 milliohms maximum
- **Insulation Resistance:** 200 megohms minimum @ 500V DC for SB221s, SB25, & SB265; 1,000 megohms minimum @ 500V DC for SB60s.
- **Dielectric Strength:** 1,500V AC minimum for SB265 & SB25 for 1 minute minimum; 2,000V AC minimum between contacts for SB221s & SB60s for 1 minute minimum; 1,500V AC minimum between contacts & case for SB221s & SB60s for 1 minute minimum
- **Mechanical Life:** 50,000 operations minimum for SB221s; 30,000 operations minimum for SB25, SB60s, SB265
- **Electrical Life:** 10,000 operations minimum
- **Total Travel:** SB221s .116" (2.95mm); SB60s .094" (2.4mm); SB265 .213" (5.4mm); SB25 .195" (4.95mm)
- **Operating Temp Range:** –10°C through +70°C (+14°F through +158°F)

### Materials & Finishes

- **Cap:** Polybutylene terephthalate (PBT) (AT414)
- **Plunger:** Polyacetal or brass with nickel plating
- **Bushing:** Brass with nickel plating
- **Case:** Phenolic resin or melamine phenolic resin
- **Case Cover:** Steel with zinc plating
- **Movable & Stationary Contacts:** Copper with silver plating for SB221s; silver alloy with silver plating for SB25, SB60s, & SB265
- **Terminals:** Copper with tin plating for SB25 & SB60s; copper with silver plating for SB265

### Installation

- **Soldering Time & Temp:** Manual Soldering (Solder Lug): See Profile A in Supplement section.

### Standards & Certifications

- **UL:** File No. E44145 - Recognized only when ordered with marking on switch. Add "/U" or "/CUL" to end of part number to order UL recognized switch. UL or cULus recognition designated beside part numbers on following pages. See Supplement section to find UL or cULus rating details.
- **CSA:** File No. 023535_0_000 - Certified only when ordered with marking on switch. Add "/C" to end of part number to order CSA certified switch. CSA certification designated beside part numbers on following pages. See Supplement section to find CSA rating details.
### SINGLE POLE WITH SOLDER LUG * OR SCREW LUG

* UL, cULus & CSA recognized only when ordered with marking on switch (see General Specs)

<table>
<thead>
<tr>
<th>Model</th>
<th>*Approvals</th>
<th>Pole &amp; Throw</th>
<th>Pushbutton Position/Connected Terminals ( ) = Momentary</th>
<th>Electrical Capacity (Resistive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB221NO</td>
<td></td>
<td>SPST</td>
<td>Normal: Keyway: OFF</td>
<td>AC 125V 3A</td>
</tr>
<tr>
<td>SB221NC</td>
<td>✓</td>
<td>SPST</td>
<td>Down: Keyway: ON</td>
<td>AC 125V 3A</td>
</tr>
<tr>
<td>SB221TNO</td>
<td></td>
<td>SPST</td>
<td>Normal: Keyway: ON</td>
<td>AC 125V 3A</td>
</tr>
<tr>
<td>SB221TNC</td>
<td>✓</td>
<td>SPST</td>
<td>Down: Keyway: ON</td>
<td>AC 125V 3A</td>
</tr>
</tbody>
</table>

Suffix T = Throw & Schematic: SB221NO

**Notes:** Standard Hardware: AT504M Knurled Nut, AT508 Lockwasher, AT527M Hex Backup Nut. See Accessories & Hardware section.

* Wire harness & cable assemblies offered only in Americas.

### DOUBLE POLE WITH SOLDER LUG *

* UL & cULus recognized only when ordered with marking on switch (see General Specs)

<table>
<thead>
<tr>
<th>Model</th>
<th>*Approvals</th>
<th>Pole &amp; Throw</th>
<th>Pushbutton Position/Connected Terminals ( ) = Momentary</th>
<th>Electrical Capacity (Resistive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB61A</td>
<td>✓</td>
<td>DPDT</td>
<td>Normal: Keyway: 2-3-5-6</td>
<td>AC 125V 10A</td>
</tr>
<tr>
<td>SB61B</td>
<td></td>
<td>DPDT</td>
<td>Down: Keyway: (ON)</td>
<td>AC 125V 3A</td>
</tr>
<tr>
<td>SB63A</td>
<td></td>
<td>DPDT</td>
<td>Down: Keyway: (ON) or Lockdown</td>
<td>AC 125V 10A</td>
</tr>
</tbody>
</table>

Lockdown for SB63A is achieved by actuating and then turning the button clockwise.

**Notes:** Standard Hardware: AT504M Knurled Nut, AT508 Lockwasher, AT527M Hex Backup Nut. See Accessories & Hardware section.

* Wire harness & cable assemblies offered only in Americas.

### Dimensions
- Panel Thickness: .193" (4.9mm)
- Dimension A: .185" (4.7mm) for NO model & .150" (3.8mm) for NC model.
- Dimension B Plunger Extension: .197" (5.0mm) for NO model & .161" (4.1mm) for NC model.
### Series SB

**Low/Medium Capacity Pushbuttons**

#### DOUBLE POLE WITH SOLDER LUG *

* UL, cULus & CSA recognized only when ordered with marking on switch (see General Specs)

<table>
<thead>
<tr>
<th>Model</th>
<th>Approvals</th>
<th>Pole &amp; Throw</th>
<th>Normal Keyway</th>
<th>Down Keyway</th>
<th>Electrical Capacity (Resistive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB25</td>
<td>✔ ✔ ✔</td>
<td>DPDT</td>
<td>ON 2-3 5-6</td>
<td>ON 2-1 5-4</td>
<td>15A 9A</td>
</tr>
</tbody>
</table>

**Pushbutton Position/Connected Terminals**

- ( ) = Momentary
- Resistor

**Panel Thickness**

- .193” (4.9mm)

**Notes:**
- Standard Hardware: AT504M Knurled Nut, AT508 Lockwasher, AT527M Hex Backup Nut. See Accessories & Hardware section.
- Wire harness & cable assemblies offered only in Americas.

---

#### SINGLE POLE WITH SOLDER LUG *

* UL, cULus & CSA recognized only when ordered with marking on switch (see General Specs)

<table>
<thead>
<tr>
<th>Model</th>
<th>Approvals</th>
<th>Pole &amp; Throw</th>
<th>Normal Keyway</th>
<th>Down Keyway</th>
<th>Electrical Capacity (Resistive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB265</td>
<td>✔ ✔ ✔</td>
<td>SPST</td>
<td>ON 1-4</td>
<td>OFF</td>
<td>6A 3A</td>
</tr>
</tbody>
</table>

**Pushbutton Position/Connected Terminals**

- ( ) = Momentary
- Resistor

**Panel Thickness**

- .291” (7.4mm)

**Notes:**
- Standard Hardware: AT504M Knurled Nut, AT508 Lockwasher, AT527M Hex Backup Nut. See Accessories & Hardware section.
- Wire harness & cable assemblies offered only in Americas.
**Series SCB**

**GENERAL SPECIFICATIONS**

**Electrical Capacity**
- **Resistive Load:** 1.5A & ½ HP @ 125 or 250V AC for high capacity models
- **Lamp Load:** 5A @ 125V AC

**Other Ratings**
- **Contact Resistance:** 1.5 milliohms maximum
- **Insulation Resistance:** 100 megohms minimum @ 500V DC
- **Dielectric Strength:** 1,000V AC minimum between contacts for 1 minute minimum;
  1,500V AC minimum between contacts & case for 1 minute minimum
- **Mechanical Life:** 1,000,000 operations minimum
- **Electrical Life:** 50,000 operations minimum
- **Travel:** Pretravel .047” (1.19mm); Overtravel .040” (1.01mm); Differential .011” (0.27mm)
- **Operating Temp Range:** -40°C through +85°C (-40°F through +185°F)

**Materials & Finishes**
- **Caps & Shrouds:** Polycarbonate with glossy finish or PBT
- **Plunger:** Polyacetal or brass with nickel plating
- **Bushing:** Steel with zinc plating or glass fiber reinforced polyamide
- **Case:** Polyester
- **Movable & Stationary Contacts:** Silver alloy
- **Terminals:** Brass with silver plating

**Standards & Certifications**
- **UL:** Internal snap switch is UL recognized.
- **CSA:** Internal snap switch is CSA certified.

**TYPICAL SWITCH ORDERING EXAMPLE**

**SCB**

<table>
<thead>
<tr>
<th>Poles</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SPDT</td>
</tr>
<tr>
<td>2</td>
<td>DPDT</td>
</tr>
</tbody>
</table>

**Circuits**

<table>
<thead>
<tr>
<th>5</th>
<th>ON</th>
<th>(ON)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

( ) = Momentary

**Bushings**

<table>
<thead>
<tr>
<th>P</th>
<th>Plastic (with momentary only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Steel</td>
</tr>
</tbody>
</table>

**Rating**

| 15 | 15A |

**Terminals**

- **A** .187” (4.75mm) Quick Connect
- **B** .250” (6.35mm) Quick Connect

Note: Contact factory for availability of screw lug and solder lug models.

- Available in Americas only

**Caps & Shrouds**

- **For Momentary**
  - **3** .520” (13.2mm) Diameter Cap

- **For Momentary & Alternate Action**
  - **4** Round Cap & Shroud (AT454 & AT455)
  - **5** Rectangular Cap & Shroud (AT452 & AT453)

**Colors**

<table>
<thead>
<tr>
<th>Caps</th>
<th>Shrouds</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Black</td>
</tr>
<tr>
<td>B</td>
<td>White</td>
</tr>
<tr>
<td>C</td>
<td>Red</td>
</tr>
<tr>
<td>F</td>
<td>Green</td>
</tr>
<tr>
<td>G</td>
<td>Blue</td>
</tr>
<tr>
<td>H</td>
<td>Gray</td>
</tr>
</tbody>
</table>

**Description for Typical Ordering Example**

**SCB25P15A-4CA**

- Round Red Cap with Black Shroud
- Plastic Bushing
- .187” (4.75mm) Quick Connect Terminals
- 15A Rating

Note: Standard hardware is provided with caps. See Bushing detail for more information.

www.nkk.com C131
**Series SCB**  
Snap Switch Pushbuttons

### POLES & CIRCUITS

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Normal</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Throw &amp; Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>SCB15</td>
<td>ON</td>
<td>(ON)</td>
<td>1-2</td>
<td>1-3</td>
<td>SPDT</td>
<td>Note: Terminal numbers are actually on the switch.</td>
</tr>
<tr>
<td></td>
<td>SCB16</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DP</td>
<td>SCB25</td>
<td>ON</td>
<td>(ON)</td>
<td>1-2 1-2</td>
<td>1-3 1-3</td>
<td>SP with 2 switches</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SCB26</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### BUSHINGS

<table>
<thead>
<tr>
<th>Plastic</th>
<th>Steel</th>
</tr>
</thead>
</table>
| "A" = 11.2mm  
15.5mm  
Alternate Action |

Maximum Effective Panel Thickness:
- .165" (4.2mm) without Shroud
- .157" (4.0mm) with Shroud

Maximum Effective Panel Thickness:
- .177" (4.5mm) without Shroud
- .157" (4.0mm) with Shroud

Alternate Action: .354" (9.0mm)

Standard Hardware Provided with Caps
- Cap Option 3: AT504M Knurled Face Nut, AT508 Lockwasher, AT527M Hex Mounting Nut
- Cap Options 4 & 5: AT508 Lockwasher & AT527M Hex Mounting Nut

### TERMINALS

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>.187&quot; (4.75mm)</td>
<td>.250&quot; (6.35mm)</td>
</tr>
<tr>
<td>Quick Connect</td>
<td>Quick Connect</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
</table>
| .385 (9.85)  
3.18 (83.0)  
1.25 (32.7)  |
| 10.16 (260)  
1.75 (45.7)  |
| Thk = .020 (0.81) |

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
</table>
| .330 (8.38)  
6.06 (153)  
1.50 (38.1)  |
| 10.54 (267)  
2.50 (63.5)  |
| Thk = .032 (0.81) |
TYPICAL SWITCH DIMENSIONS

.520” (13.2mm) Dia. Cap • .187” (4.75mm) Quick Connect

Round Cap & Shroud • .187” (4.75mm) Quick Connect

Rectangular Cap & Shroud • .250” (6.35mm) Quick Connect
Series WB

Environmentally Sealed Pushbuttons

General Specifications

Electrical Capacity (Resistive Load)

- Power Level: 6A @ 125V AC & 3A @ 250V AC or 6A @ 30V DC

Other Ratings

- Contact Resistance: 10 milliohms maximum for solder lug & screw terminal models
  30 milliohms maximum for wire lead terminal models
- Insulation Resistance: 200 megohms minimum @ 500V DC
- Dielectric Strength: 1,500V AC minimum for 1 minute minimum
- Mechanical Life: 30,000 operations minimum
- Electrical Life: 15,000 operations minimum
- Contact Timing: Break before make
- Total Travel: Alternate Action .177" (4.5mm); Momentary Action .110" (2.8mm)

Materials & Finishes

- Plunger: Brass with nickel plating
- Bushing & Outer Case: Fiberglass reinforced polyamide (UL94V-0 outer case)
- Inner Case: Melamine
- Inner Sealing Ring: Silicone rubber
- Outer Sealing Ring: Natural rubber
- Movable Contactor: Copper with silver plating
- Movable Contacts: Silver alloy with silver plating
- Stationary Contacts: Silver alloy with silver plating
- Terminals: Brass with silver plating for screw lug models; brass with tin plating for solder lug & wire lead models
- Wire Lead Covers: Heat resistant polyvinyl chloride (Leads are AWG 16.)

Environmental Data

- Operating Temp Range: –30°C through +70°C (–22°F through +158°F)
- Humidity: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
- Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
- Shock: 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation

- Mounting Torque: 1.5Nm (13 lb•in)

Standards & Certifications

- Flammability Standards: UL94V-0 outer case
- Wiring Material Standards: UL AWM 1015 Recognized at Flammability VW-1;
  Temperature Range –20°C ~ +105°C, Maximum Load 600V; AWG 16
  CSA TEW 105 Certified at Temperature Range –20°C ~ +105°C;
  Maximum Load 600V
Distinctive Characteristics

Single unit construction of the bushing and case gives added protection from environmental elements.

Specially designed contact mechanism for breaking light welds.

Minimal contact bounce is achieved with specially designed interlocked switching mechanism.

Outer housing of heat resistant resin meets UL 94V-0 flammability standard and provides high arc and tracking resistance.

Solder lug and screw terminal models meet IP67 of IEC60529 Standards at front panel (dust tight and water protected for temporary immersion). Behind panel standard is IP60 (dust tight but not water protected).

Wire lead models conform fully to IP67 of IEC60529 Standards at front and behind panel (dust tight and water protected for temporary immersion). These models are epoxy sealed at the switch base and covered by an outer case for further protection from dust and water (not operable under water).
Series WB

Environmentally Sealed Pushbuttons

TYPICAL SWITCH ORDERING EXAMPLE

<table>
<thead>
<tr>
<th>Pole</th>
<th>Model</th>
<th>Normal</th>
<th>Down</th>
<th>Connected Terminals</th>
<th>Throw &amp; Schematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>WB12</td>
<td>ON</td>
<td>ON</td>
<td>1-1b</td>
<td>SPDT</td>
</tr>
<tr>
<td>SP</td>
<td>WB15</td>
<td>ON</td>
<td>(ON)</td>
<td>1-1b</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>( ) = Momentary</td>
<td></td>
<td></td>
<td>Note: Terminal numbers are not actually on wire lead models.</td>
</tr>
</tbody>
</table>

STANDARD WIRE COLOR SCHEME

<table>
<thead>
<tr>
<th>Terminal Numbers &amp; Wire Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models</td>
</tr>
<tr>
<td>WB12L, WB15L</td>
</tr>
</tbody>
</table>

TYPICAL SWITCH DIMENSIONS

Solder Lug

Panel Thickness .157” (4.0mm)
Environmentally Sealed Pushbuttons

TYPICAL SWITCH DIMENSIONS

Screw Lug

WB12T-DA

Panel Thickness .157” (4.0mm)

Wire Lead

WB12L-DA

Panel Thickness .157” (4.0mm)

CAPS & CAP COLORS

D AT414 .520” (13.2mm) Diameter

Colors Available: A B C D E F G H

Material: PBT Finish: Glossy

E AT412 .748” (19.0mm) Diameter

Colors Available: A B C F

Material: Polystyrene Finish: Glossy

Cap Color Codes: A Black B White C Red D Amber E Yellow F Green G Blue H Gray

STANDARD HARDWARE

AT503M Hex Face Nut

Material: Brass with chrome plating

1 supplied with each switch

AT508 Internal Tooth Lockwasher

Material: Steel with zinc/chromate

1 supplied with each switch

AT401P O-ring

Material: Nitrile butadiene rubber

1 supplied with each switch