

# Contents Illuminated Pushbuttons

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement



## FPO1 Series ..... D4

Photo Interrupter  
3 Million Actuations  
6-pin Connector  
Snap-in Mount



## GB Series ..... D8

Ultra-miniature Fully Illuminated Plunger  
0.4VA Logic Level  
Process Sealed; Straight, Right Angle & Vertical PC



## HB Series Illum & Nonillum ..... D12

0.1A Power Level; Full Face & Spot Illumination  
Solder Lug  
Rear Panel Threaded Mounting



## HB2 Series ..... D18

Audio/Video Quiet Actuation; 0.4VA Logic Level  
Bicolor LED  
PCB Mounting



## KB Series Illum & Nonillum ..... D22

1A Power Level & 0.4VA Logic Level  
Full Face & Spot Illumination  
Solder Lug; Bushing & Snap-in Mount



## KP Series ..... D36

Audio/Video with Silent & Audible Options  
100mA Low Level  
Bicolor LED & Custom RGB  
Custom Rectangular Cap Assembly & Home Keys  
PCB Mounting



## LB Series Illum & Nonillum ..... D46

Snap-in Mount  
3A Power Level & 0.4VA Logic Level  
Full Face & Spot Illumination; Super Bright & Bright LEDs  
Solder Lug/Quick Connect



**LB Series Illum & Nonillum .....D57**

Panel Seal  
 3A Power Level & 0.4VA Logic Level  
 Full Face & Spot Illumination; Super Bright & Bright LEDs  
 Solder Lug/Quick Connect



**LP01 Series .....D66**

Secured Cap Design; 3A Power Level  
 Full Face Illumination  
 Solder Lug/Quick Connect



**NP01 Series Illum & Nonillum....D72**

Soft Touch, Smooth Actuation  
 0.4VA Logic Level  
 Alternating Legend Options  
 PCB Mounting



**UB Series Illum & Nonillum .....D78**

5A Power Level & 0.4VA Logic Level  
 Full Face & Spot Illumination  
 Solder Lug & Straight PC  
 PCB & Snap-in Mount



**UB2 Series Illum & Nonillum .....D88**

5A Power Level & 0.4VA Logic Level  
 Variety of Illumination Effects; Alternating Legends  
 Bright, Super Bright, & Bicolor LEDs  
 Solder Lug & Straight PC; PCB & Snap-in Mount



**YB Series Illum & Nonillum ..... D100**

3A Power Level & 0.4VA Logic Level  
 Full Face & Spot Illumination  
 Incandescent & Multi-element LEDs  
 Solder Lug/Quick Connect & Straight PC  
 Bushing & Snap-in Mount



**YB2 Series Illum & Nonillum .... D114**

22mm Flush Mount Panel Seal  
 3A Power Level & 0.4VA Logic Level  
 Cap Option with Illumination Ring  
 Solder Lug/Quick Connect

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**D** Illuminated PB

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## Distinctive Characteristics

Brilliant illumination for highly visible status indication with LEDs and caps in red, green, or amber; subdued illumination for low light requirements with white cap over red, green, or amber LEDs.

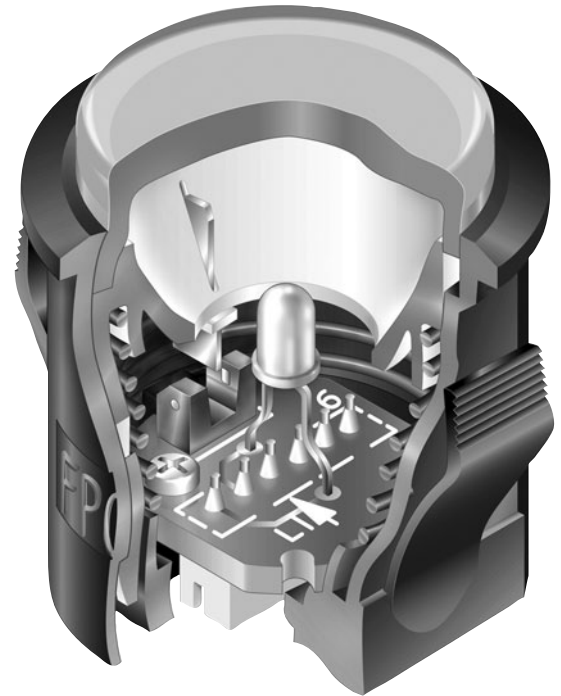
Photo interrupter, rather than contacts, ensures high reliability and long life of 3 million operations minimum.

Rugged construction and smooth actuation allow repeated, rapid actuation force anywhere on cap surface.

Snap-in mounting for easy installation.

Connector socket with 6 pins for simple connection.

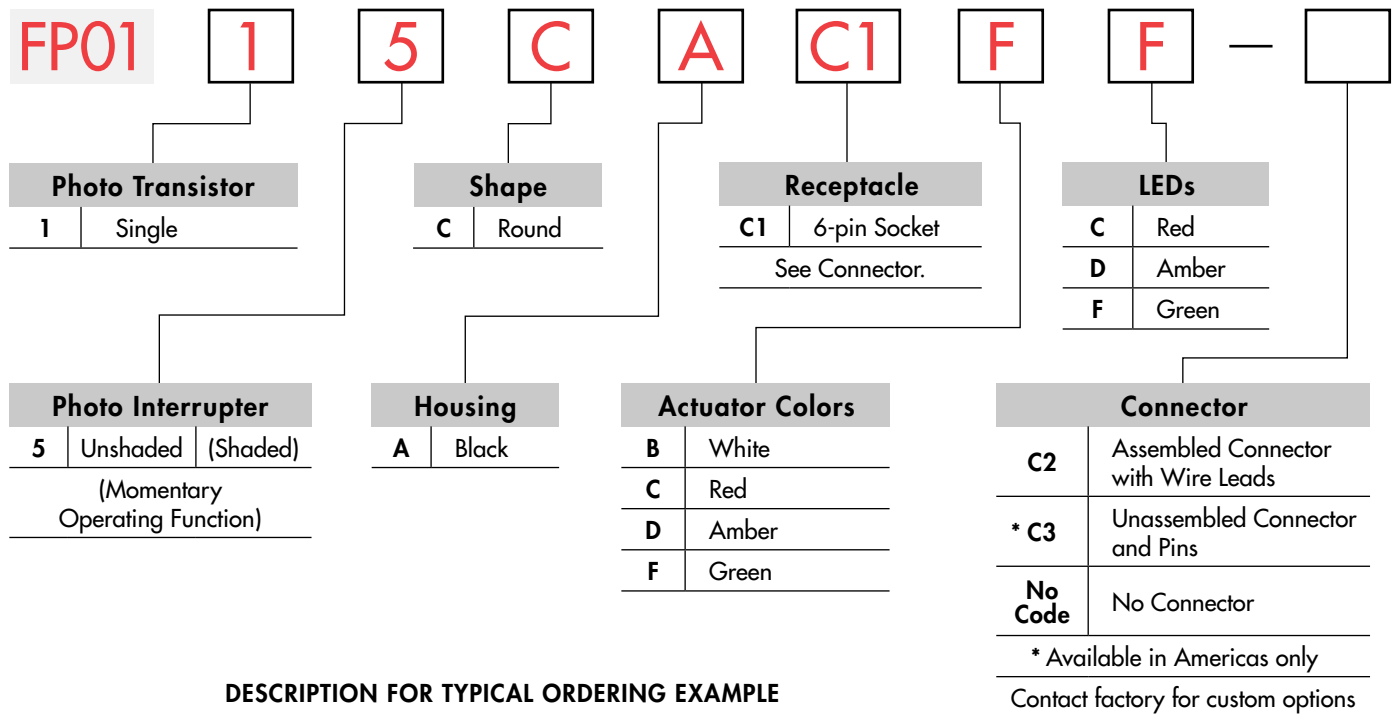
Well suited for gaming and vending machines, as well as equipment exposed to corrosive gases used in environments such as chemical or steel manufacturing plants.



Actual Size



TYPICAL SWITCH ORDERING EXAMPLE



DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**FP0115CAC1FF**



ACTUATOR & INTERRUPTER

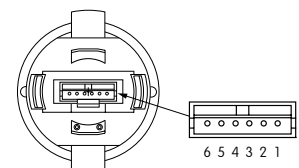
		Actuator Position		Photo Interrupter		Schematics
Model	<b>1</b>	Normal 	Down 	Unshaded <b>5</b>	Shaded Normally Unshaded with Momentary Shaded status	LED connector pins are 5 & 6; interrupter connector pins are 3-4 & 1-2.
<b>FP0115</b>	Single Photo Transistor	When shaded, the photo transistor momentarily activates electrical function which signals the external device to change its state.				

HOUSING SHAPE & COLOR

**C** Round Shape      **A** Black Housing

RECEPTACLE

**C1** 6-pin Socket



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## SWITCH SPECIFICATIONS

	Actuator Up	Actuator Down
Status of Photo Interrupter:	Unshaded	Shaded
Collector Current $I_C$ :	0.8mA minimum	10 $\mu$ A maximum
Status of Photo Transistor:	On	Off
Output Condition of Photo Transistor:	$I_F = 20\text{mA}$ & $V_{CE} = 5\text{V}$	

## MECHANICAL SPECIFICATIONS

Total Travel:	.079" (2.0mm)
Operating Force:	0.75 N (.169 lbf)
Mechanical Life:	3,000,000 operations minimum
Operating Temperature Range:	-25°C through +50°C (-13°F through +122°F)

## MATERIALS

Actuator: Polyacetal    Housing: Polyamide

## PHOTO INTERRUPTER SPECIFICATIONS

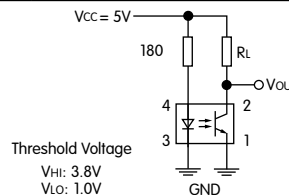
(Temperature @ 25°C)

Electrical & Optical Characteristics	Typical	Maximum	Condition
<b>Input</b>			
Forward Voltage $V_F$ :	1.3V	1.6V	$I_F = 50\text{mA}$
Reverse Current $I_R$ :		10 $\mu$ A	$F_R = 5\text{V}$
<b>Transmission</b>			
Collector-Emitter Saturation Voltage $V_{CE\text{ sat}}$ :		0.4V	$I_F = 20\text{mA}$ & $I_C = 0.1\text{mA}$
<b>Absolute Maximum Ratings</b>			
<b>Input LED</b>		<b>Output Photo Transistor</b>	
Forward Current $I_F$ :	50mA	Collector-Emitter Voltage $V_{CEO}$ :	30V
Reverse Voltage $V_R$ :	5V	Emitter-Collector Voltage $V_{ECO}$ :	4.5V
Power Dissipation $P_D$ :	80mW	Collector Current $I_C$ :	30mA
		Collector Dissipation $P_C$ :	80mW

### Circuit Design Considerations

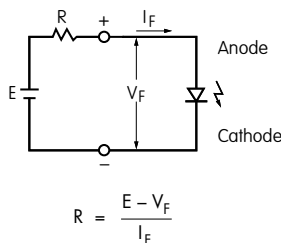
Output of the infrared LED in the photo interrupter decreases approximately 50% after 100,000 hours.

Recommended load resistance ( $R_L$ ) is 40k ~ 120k $\Omega$  for the illustrated circuit.



## LED COLORS & SPECIFICATIONS

LEDs are an integral part of the switch and not available separately. The electrical specifications shown are determined at a basic temperature of 25°C.



Where: R = Resistor Value (Ohms)  
 E = Source Voltage (V)  
 $V_F$  = Forward Voltage (V)  
 $I_F$  = Forward Current (A)

If the source voltage exceeds the rated voltage, a ballast resistor is required.

Single Element LED	Color	<b>C</b> Red	<b>D</b> Amber	<b>F</b> Green
Forward Peak Current	$I_{FM}$	30mA	25mA	25mA
Typical Forward Current	$I_F$	20mA	20mA	20mA
Forward Voltage	$V_F$	1.85V	2.0V	2.25V
Reverse Peak Voltage	$V_{RM}$	5V	5V	5V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.38mA /°C	0.28mA /°C	0.40mA /°C
Ambient Temperature Range		-25° ~ +50°C		

ACTUATOR COLORS



White



Red



Amber



Green

CONNECTOR OPTIONS



**AT021**  
Assembled Connector  
with Wire Leads

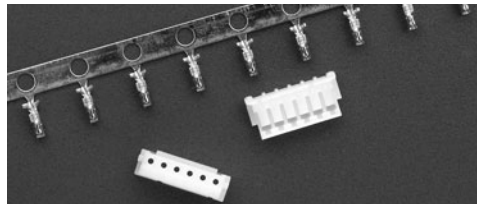
Connector body: JST model ZHR-6  
Crimp connector pins: JST model SZH-002T-P0.5  
Wire leads: 28-26AWG; 12-inch, unstripped;  
Blue for Pin 1



**AT022**  
Unassembled Connector  
and Pins

1 connector and 8 crimp connector pins  
only (no wire leads provided).

Matching wire leads: 28-26AWG

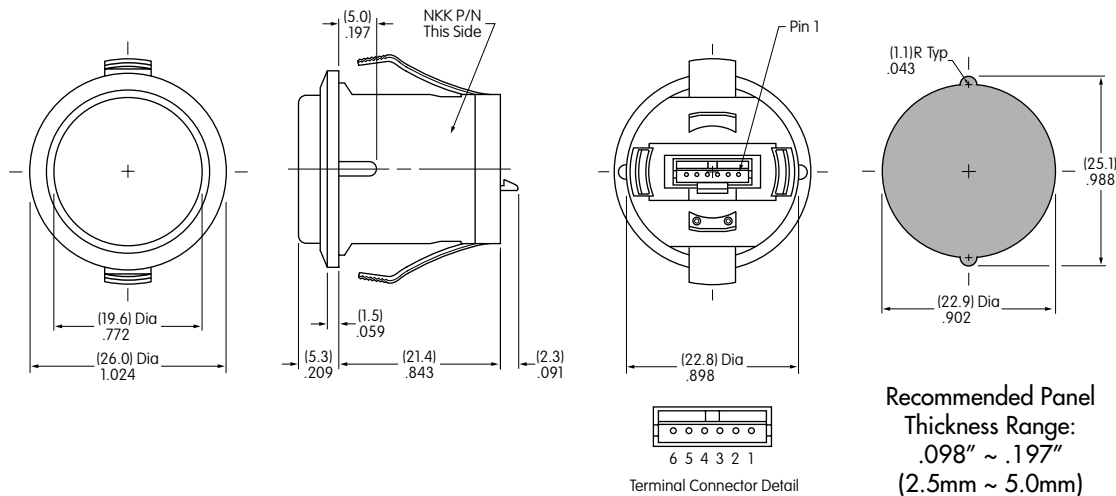


**No Connector**

Recommended connector  
for assembly:  
JST model number ZHR-6

Recommended crimp  
connector pins:  
JST model SZH-002T-P0.5  
for 28-26AWG wire leads  
or SZH-003T-P0.5  
for 32-28AWG wire leads.

TYPICAL SWITCH DIMENSIONS



Recommended Panel  
Thickness Range:  
.098" ~ .197"  
(2.5mm ~ 5.0mm)

FP0115CAC1FF

LEGENDS

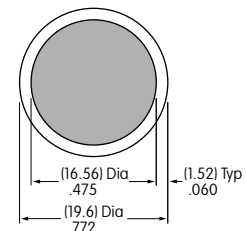
NKK Switches can provide custom legends for caps. Contact factory for more information.

Suggested Printable Area for FP01 Cap



Recommended Methods:

Screen Print on cap.  
Epoxy based ink is recommended.



Shaded area is printable area.

# 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

**Plunger:** Polyamide  
**Case:** Glass fiber reinforced polyamide  
**Sealing Rings:** Nitrile butadiene rubber  
**Movable Contact:** Phosphor bronze with gold plating  
**Stationary Contacts:** Phosphor bronze with gold plating  
**Base:** Glass fiber reinforced polyamide  
**Switch Terminals:** Phosphor bronze with gold plating  
**Lamp Terminals:** Phosphor bronze with gold plating

## Environmental Data

**Operating Temperature Range:** -25°C through +55°C (-13°F through +131°F)  
**Humidity:** 90 ~ 95% humidity for 240 hours @ 40°C (104°F)  
**Vibration:** 10 ~ 500Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 15 minutes; 3 right angled directions for 2 hours  
**Shock:** 50G (490m/s<sup>2</sup>) 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:** Automated alcohol based cleaning recommended, 5 minutes maximum. Do not use high-purity alcohol (50% alcohol or more) or organic solvent. High alcohol solution can damage clear plastic. See Cleaning specifications in Supplement section.

## Standards & Certifications

The GB Series illuminated 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

Fully illuminated plunger for highly visible status indication with single color LED in red, green, or amber.

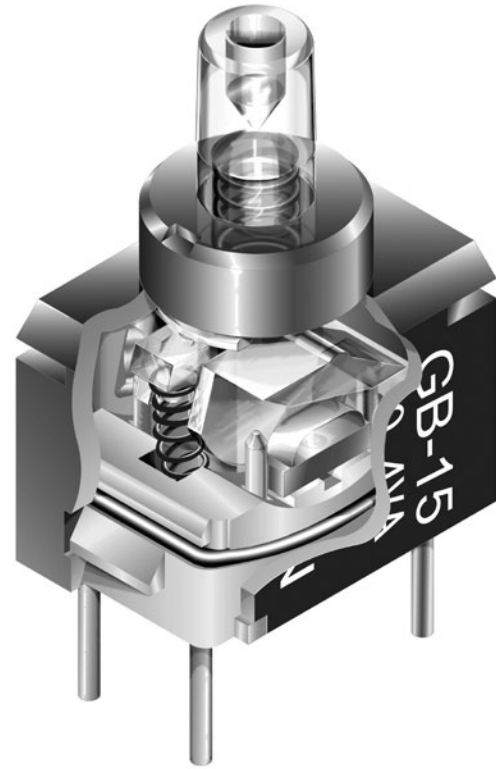
Ultra-miniature size allows high density mounting, and extremely light weight makes these switches ideal for handheld equipment.

Totally sealed body construction prevents contact contamination and allows time- and money-saving automated soldering and cleaning. Insert-molded terminals lock out flux, solvents, and other contaminants.

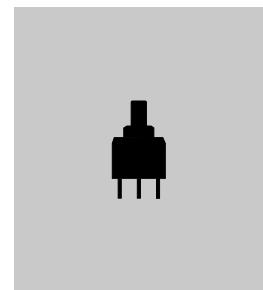
Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smooth, positive detent actuation, increased contact stability, and unparalleled logic-level reliability. (Additional STC details in Terms & Acronyms; see Supplement section.)

.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.

Nonilluminated pushbuttons available and shown in the Pushbutton section.

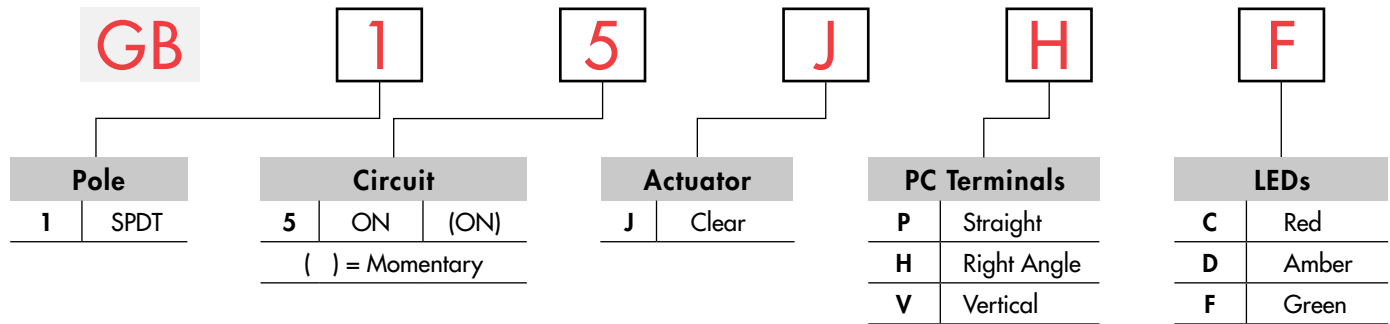


Actual Size



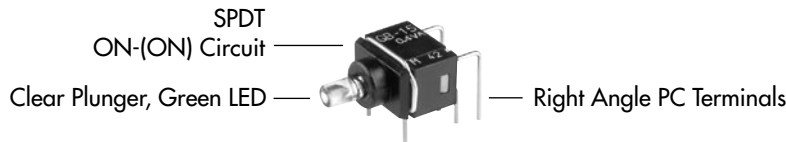
- Supplement
- Accessories
- Indicators
- Touch
- Tilt
- Tactiles
- Slides
- Rotaries
- Keylocks
- Programmable
- D Illuminated PB**
- Pushbuttons
- Rockers
- Toggles

### TYPICAL SWITCH ORDERING EXAMPLE



### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**GB15JHF**

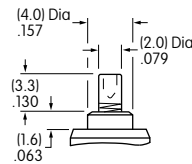


### POLE & CIRCUIT

Pole	Model	Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
		Normal	Down	Normal	Down	
SP	GB15	ON	(ON)	5-6	5-4	Note: Terminal numbers are not actually on the switch. LED circuit is isolated and requires an external power source. 

### ACTUATOR

**J** Clear Plunger



### LED COLORS & SPECIFICATIONS

LEDs are an integral part of the switch and not available separately. The electrical specifications shown are determined at a basic temperature of 25°C.

If the source voltage exceeds the rated voltage, a ballast resistor is required.

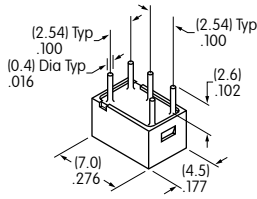
The resistor value can be calculated by using the formula in the Supplement section.

		<b>C</b>	<b>D</b>	<b>F</b>
	Colors	Red	Amber	Green
Forward Peak Current	$I_{FM}$	30mA	30mA	25mA
Typical Forward Current	$I_F$	20mA	20mA	20mA
Forward Voltage	$V_F$	1.9V	1.9V	2.1V
Reverse Peak Voltage	$V_{RM}$	5V	5V	5V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.43mA/°C	0.43mA/°C	0.36mA/°C
Ambient Temperature Range		-25° ~ +55°C		

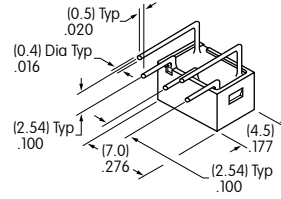
## PC TERMINALS



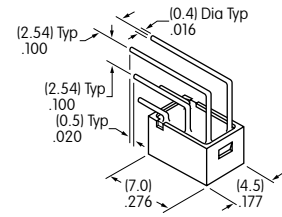
**Straight**



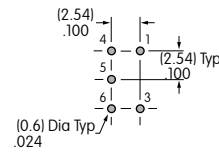
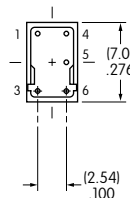
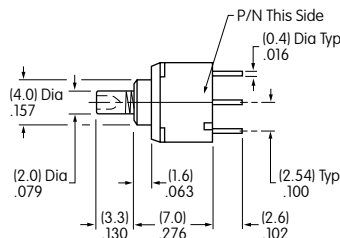
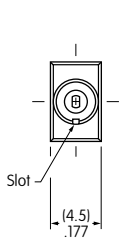
**Right Angle**



**Vertical**



## TYPICAL SWITCH DIMENSIONS



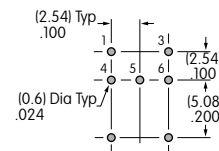
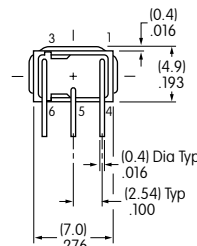
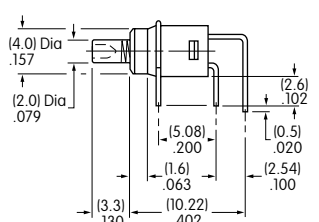
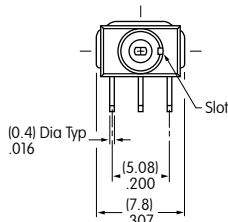
**Straight PC**



Terminals 1 & 3 are lamp terminals.

**GB15JPD**

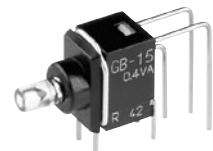
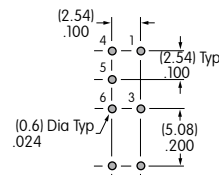
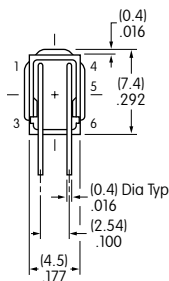
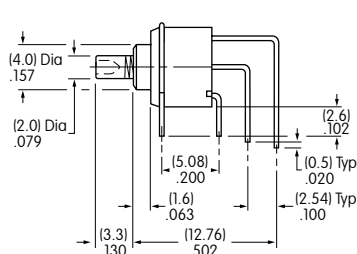
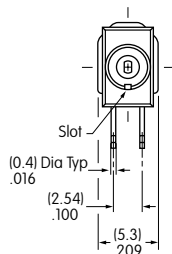
**Right Angle PC**



Terminals 1 & 3 are lamp terminals.

**GB15JHF**

**Vertical PC**



Terminals 1 & 3 are lamp terminals.

**GB15JV**

Toggle  
Rockers  
Pushbuttons  
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# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 0.1A maximum @ 30V AC/DC

## Other Ratings

**Contact Resistance:** 50 milliohms maximum  
**Insulation Resistance:** 100 megohms minimum @ 500V DC  
**Dielectric Strength:** 500V AC minimum for 1 minute minimum  
**Mechanical Life:** 100,000 operations minimum  
**Electrical Life:** 50,000 operations minimum  
**Nominal Operating Force:** 3.43N  
**Contact Timing:** Nonshorting (break before make)  
**Travel:** Pretravel .087" (2.2mm); Overtravel .031" (0.8mm); Total Travel .118" (3.0mm)

## Materials & Finishes

**Housing:** Glass fiber reinforced polyamide  
**Base:** Glass fiber reinforced polyamide  
**Movable Contact:** Phosphor bronze with silver plating  
**Stationary Contacts:** Phosphor bronze with silver plating  
**Common Terminal:** Phosphor bronze with silver plating  
**End Terminals:** Phosphor bronze with silver plating  
**Lamp Terminals:** Phosphor bronze with silver plating

## Environmental Data

**Operating Temperature Range:** -25°C through +50°C (-13°F through +122°F) for Illuminated  
 -25°C through +70°C (-13°F through +158°F) for Nonilluminated  
**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/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Installation

**Mounting Torque:** 0.49Nm (4.34 lb•in) maximum for round mounting nut  
**Cap Installation Force:** 9.8N (2.2 lbf) maximum downward force on cap  
**Soldering Time & Temperature:** Manual Soldering: See Profile A in Supplement section.

## Standards & Certifications

**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 models recognized at 0.1A @ 30V AC/DC.

# Distinctive Characteristics

Full face and spot illumination available. Front panel relamping.

Choice of super bright LEDs in white, green, and blue in addition to bright red, amber, and green LEDs.

Compact front panel design with 9mm square or round bezel options.

Rear panel threaded mounting. Behind panel depth of less than one inch. 8mm body diameter fits common size panel cutout.

Latchdown feature gives indication of circuit status. Audible and tactile feedback with smooth and responsive operation.

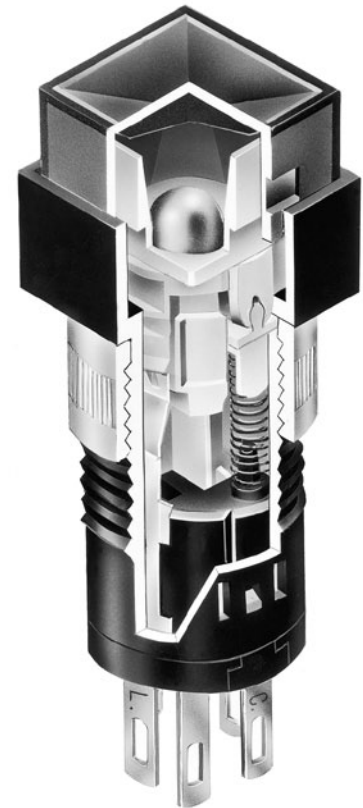
Dual, sliding contacts with self-cleaning action provide contact stability, high reliability, and increased operating life.

Solder lug terminals have spacing of .100" (2.54mm) for choice of mounting.

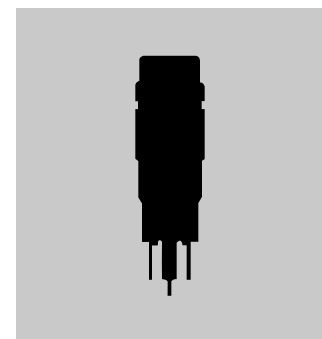
Longer normally closed terminal facilitates wiring and soldering.

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

Matching indicators available.



Actual Size



Toggles

Rockers

Pushbuttons

**D**  
Illuminated PB

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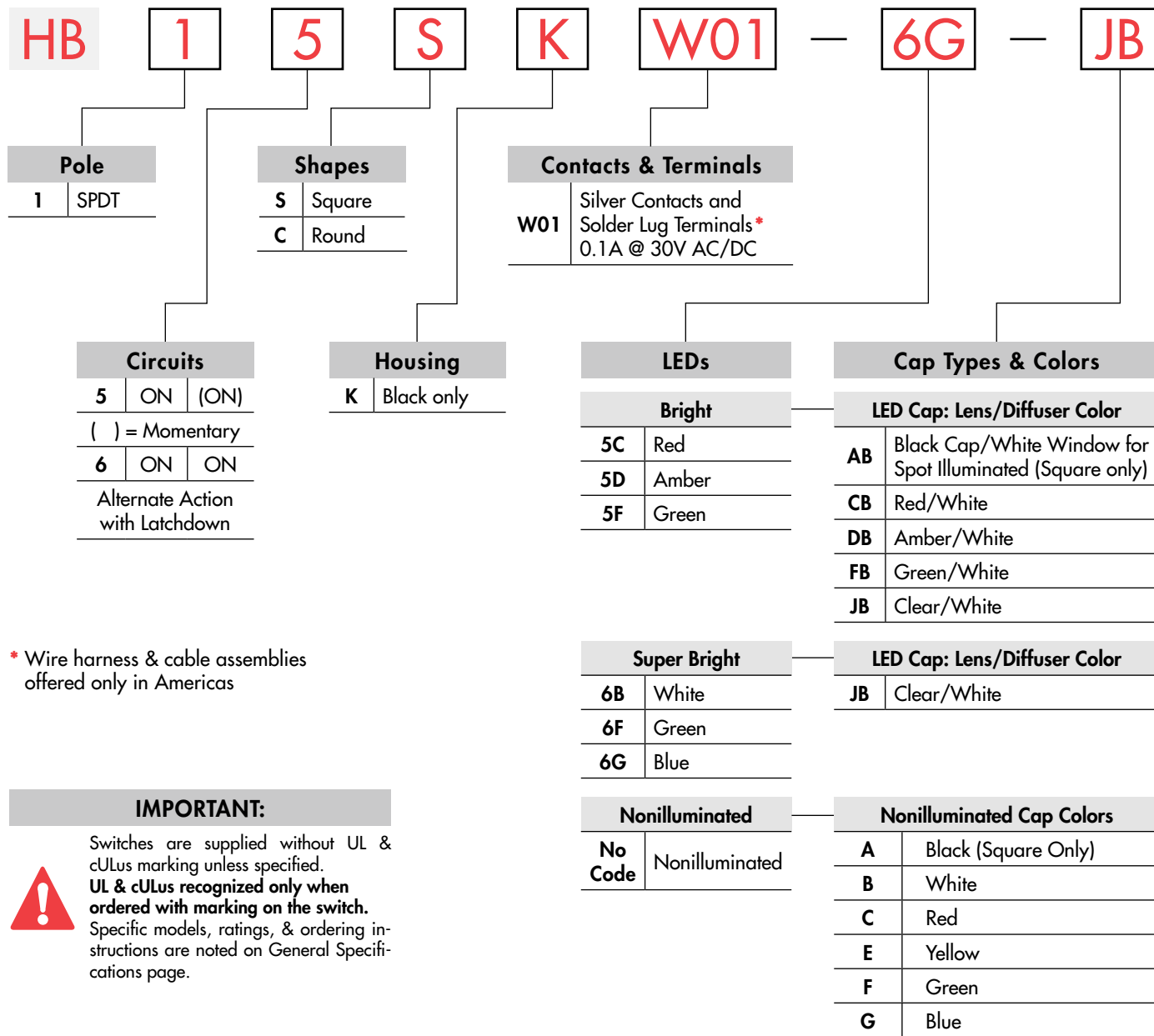
Touch

Indicators

Accessories

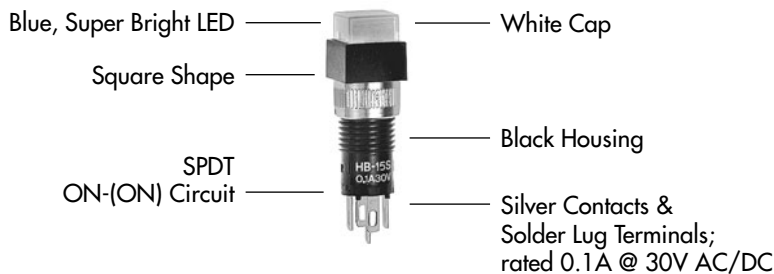
Supplement



### TYPICAL SWITCH ORDERING EXAMPLE



### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**HB15SKW01-6G-JB**



POLES & CIRCUITS						
		Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
Pole	Model	Normal	Down	Normal	Down	Notes: Switch is marked with NO, NC, C, L. LED circuit is isolated and requires external power source.
SP	HB15 *HB16	ON ON	(ON) ON	1-3	1-2	SPDT  

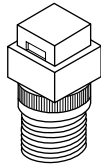
\* When in latchdown position for the alternate circuit, cap position is .051" (1.3mm) above the built-in bezel.

## SHAPES & PANEL CUTOUT

**S**

.354" (9.0mm) Square

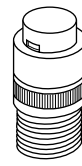
The bezel is an integral part of the switch body.



**C**

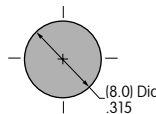
.354" (9.0mm) Round

The bezel is an integral part of the switch body.



### Panel Cutout & Mounting

Recommended Panel Thickness:  
.020 ~ .197" (0.5 ~ 5.0mm)



Overtightening the mounting nut AT073 may damage the switch housing.

## HOUSING

**K**

Housing available in black only.

## CONTACT MATERIALS, RATINGS, & TERMINALS

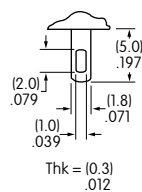
**W01**

Silver Contacts

Power Level

0.1A maximum @ 30V AC/DC

Solder Lug






PCB Mounting

Solder lug terminals are spaced .100" x .200" (2.54mm x 5.08mm). This enables PCB mounting which can be accomplished by elongating PC board holes to .080" (2.03mm).

Toggles  
Rockers  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

## LED COLORS & SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C.  
 LED circuit is isolated and requires external power source. Single element LED is colored in OFF state.  
 If the source voltage exceeds the rated voltage, a ballast resistor is required.  
 The resistor value can be calculated by using the formula in the Supplement section.

Bright AT633		Note for Super Bright: 	Bright			Super Bright			Unit	
			5C	5D	5F	6B	6F	6G		
Super Bright		Color	Red	Amber	Green	White	Green	Blue		
AT624G Blue		Forward Peak Current	$I_{FM}$	30	30	25	30	30	30	mA
AT629B White		Typical Forward Current	$I_F$	20	20	20	20	20	20	mA
AT630F Green		Forward Voltage	$V_F$	1.85	2.0	2.2	3.6	3.5	3.6	V
		Reverse Peak Voltage	$V_{RM}$	5	5	5	5	5	5	V
		Current Reduction Rate Above 25°C	$\Delta I_F$	0.40	0.42	0.38	0.50	0.50	0.50	mA/°C
T-1 Bi-pin	Ambient Temperature Range		-25° ~ +50°C			-25° ~ +50°C				

**No Code**

No Lamp

## CAP TYPES & COLORS

Color Codes: A Black B White C Red D Amber E Yellow F Green G Blue J Clear

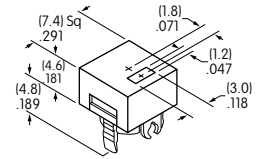
### Cap Colors Available:

**AB** Black Cap with Translucent White Window for LED Display

### Colored Cap for Bright LEDs

Square only  
 Material: Polycarbonate  
 Finish: Matte

**AT4052**  
 Spot Illuminated



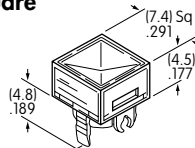
### Lens/Diffuser Colors Available:

**CB** Red/White

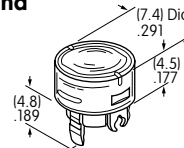
**DB** Amber/White

**FB** Green/White

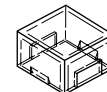
**AT4166**  
 Square



**AT4167**  
 Round



Material: Polycarbonate Finish: Glossy



Transparent Colored Lens



Translucent White Diffuser



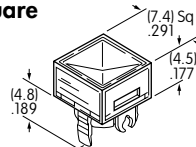
Colored LED AT633

### White Cap for Bright & Super Bright LEDs

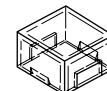
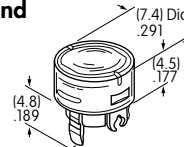
**JB** Clear Lens/White Diffuser

Material: Polycarbonate  
 Finish: Glossy

**AT4031**  
 Square



**AT4032**  
 Round



Transparent Clear Lens



Translucent White Diffuser



Colored LEDs AT624, AT629, AT630, or AT633

### Nonilluminated Caps

#### Cap Colors Available:

**A** Black (Square Only)

**B** White

**C** Red

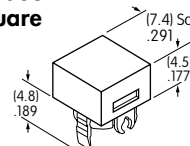
**E** Yellow

**F** Green

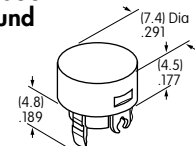
**G** Blue

Material: Polycarbonate Finish: Glossy

**AT4035**  
 Square

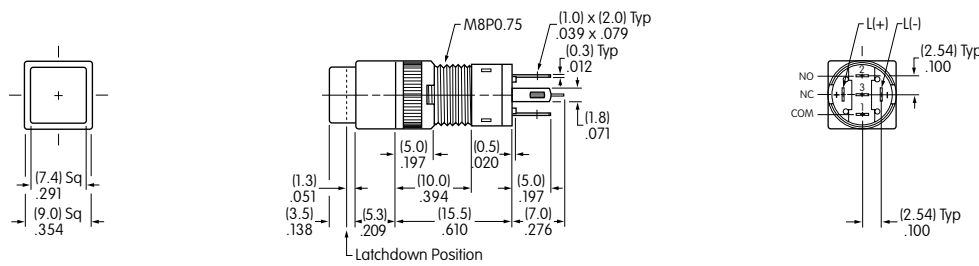


**AT4036**  
 Round



## TYPICAL SWITCH DIMENSIONS

### Single Pole

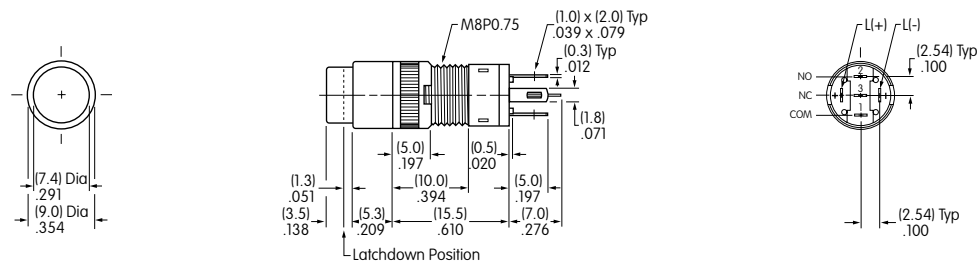


### Square



HB155KW01-5C-CB

### Single Pole



### Round

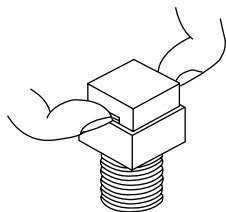


HB166KW01-5C-CB

## ASSEMBLY INSTRUCTIONS

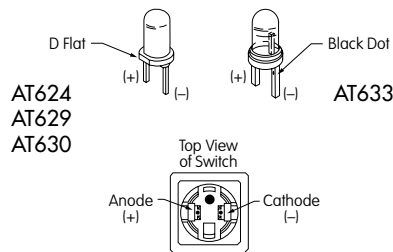
### Cap Removal

1. Have cap in extended position (not latchdown) for alternate action models.
2. Use the grip slots on the sides of the cap and pull it out of the switch.



### LED Polarity & Orientation in Lamp Socket

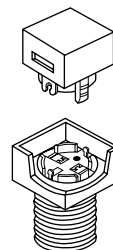
For AT624, AT629, AT630: Insert the LED with the D flat opposite the black dot molded inside the switch lamp socket. For AT633: Insert the LED with the Black Dot on the terminal to the right.



Super Bright LEDs AT624, AT629, & AT630 are electrostatic sensitive.

### Cap Replacement

1. Match the prongs on the cap base with the projections in the switch, at the same time aligning the spring clips on the cap with the indentations in the switch.
2. Press firmly in place.



### AT111 Lamping Tool

Lamping Tool AT111 may be used to remove and replace LED.



### AT110 Socket Wrench

Socket Wrench AT110 may be used to tighten the mounting nut.



# General Specifications

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

## Electrical Capacity (Resistive Load)

**Logic Level (gold):** 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:** 100,000 operations minimum for momentary;  
**Electrical Life:** 100,000 operations minimum  
**Nominal Operating Force:** 1.8N  
**Travel:** Pretravel .051" (1.3mm); Overtravel .020" (0.5mm); Total Travel .071" (1.8mm)

## Materials & Finishes

**Housing:** Glass fiber reinforced polyamide  
**Base:** Glass fiber reinforced polyamide  
**Movable Contact:** Phosphor bronze with gold plating  
**Switch Terminals:** Phosphor bronze with gold plating  
**Lamp Terminals:** Steel with silver plating

## Environmental Data

**Operating Temperature Range:** -25°C through +50°C (-13°F through +122°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/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Installation

**Cap Installation Force:** 15.0N (3.37 lbf) maximum downward force on cap

## PCB Processing

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

## Standards & Certifications

The HB2 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

Quiet actuation combined with crisp tactile feedback suited for broadcast equipment.

Full face illumination with choice of red/green or red/yellow bicolor LEDs, as well as simultaneous bicolor illumination which produces amber.

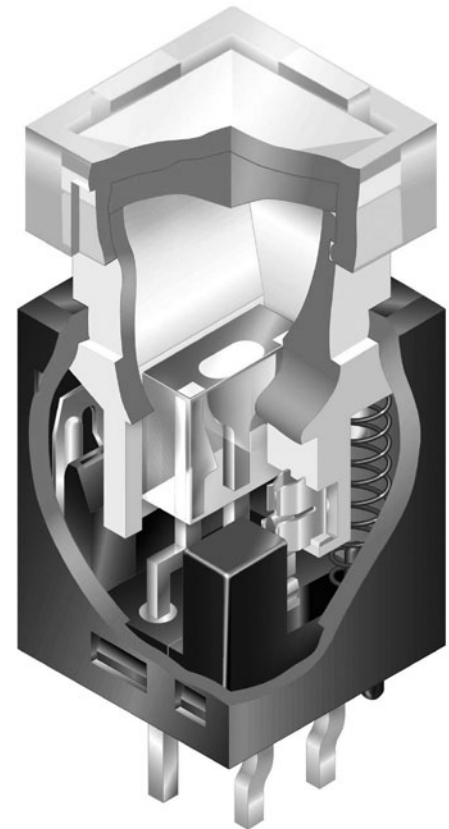
Option of legends on caps or film insert.

Compact design with short body .669" (17.0mm) from PCB to top of cap and .295" (7.5mm) square cap.

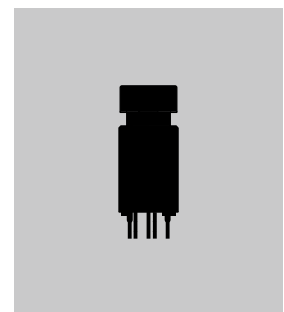
Sliding Twin Crossbar (STC) mechanism provides unequalled logic-level reliability, contact stability, smooth positive detent actuation, and long life.

Crimped power terminals ensure secure PCB mounting and prevent dislodging during soldering.

Suitable applications include broadcast, telecommunication, and medical equipment, as well as measuring instruments, etc.

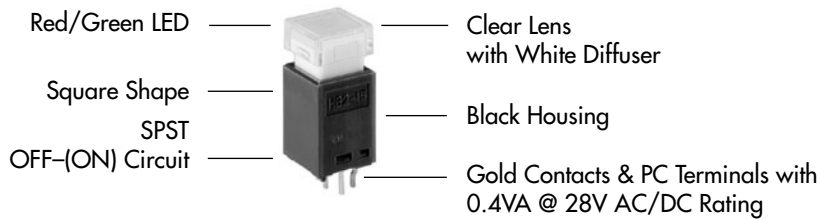
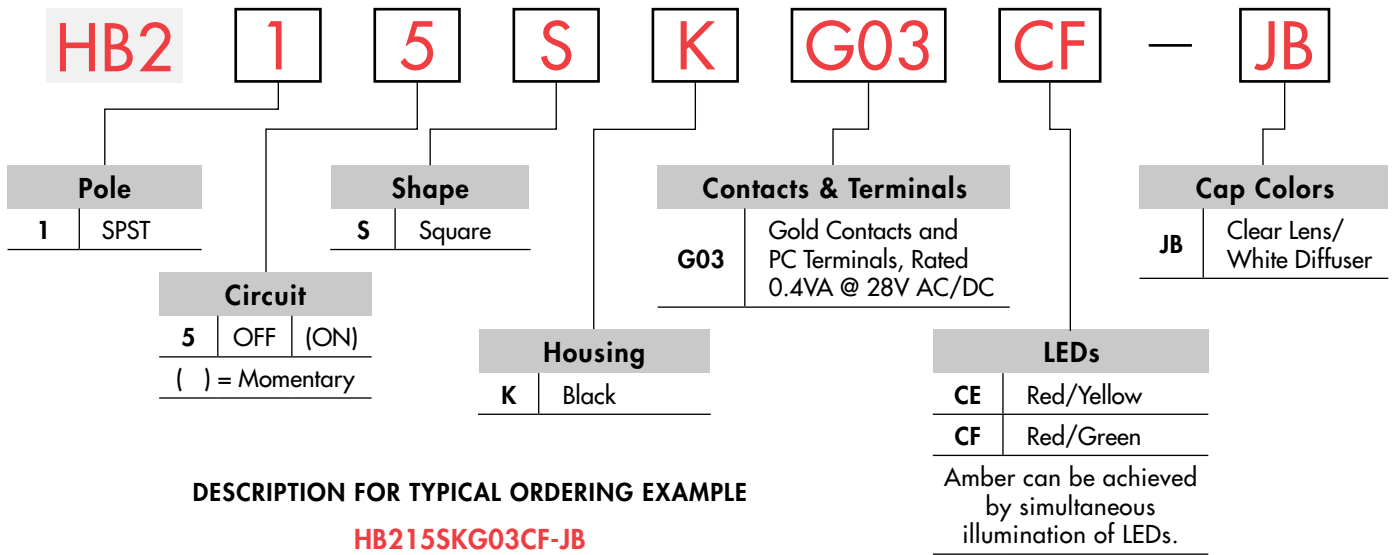


Actual Size



- Supplement
- Accessories
- Indicators
- Touch
- Tilt
- Tactiles
- Slides
- Rotaries
- Keylocks
- Programmable
- D Illuminated PB**
- Pushbuttons
- Rockers
- Toggles

### TYPICAL SWITCH ORDERING EXAMPLE



### POLE & CIRCUIT

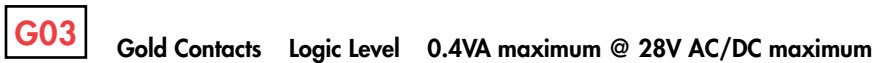
Pole	Model	Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
		Normal	Down	Normal	Down	
SP	HB215	OFF	(ON)	OPEN	1-2	SPST

Notes: Switch terminals are not marked on the switch. Red LED terminal is marked with "R". Lamp circuit is isolated and requires external power source.

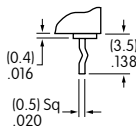
### HOUSING SHAPE & COLOR



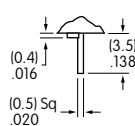
### CONTACT MATERIALS, RATINGS & TERMINALS



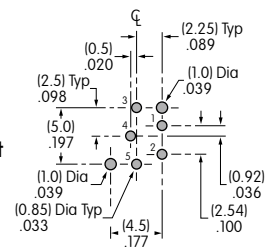
Switch Terminal



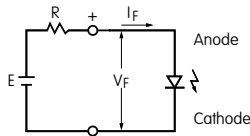
Lamp Terminal



PCB Footprint



## BICOLOR LEDS & SPECIFICATIONS



$$R = \frac{E - V_F}{I_F}$$

Where: R = Resistor Value (Ohms)  
 E = Source Voltage (V)  
 V<sub>F</sub> = Forward Voltage (V)  
 I<sub>F</sub> = Forward Current (A)

		<b>CE</b>	<b>CF</b>	
LED is an integral part of the switch.	Color	Red/Yellow	Red/Green	Unit
Forward Peak Current	I <sub>FM</sub>	30/30	30/30	mA
Typical Forward Current	I <sub>F</sub>	20/20	20/20	mA
Forward Voltage	V <sub>F</sub>	2.0/2.1	2.0/2.1	V
Reverse Peak Voltage	V <sub>RM</sub>	4/4	4/4	V
Current Reduction Rate Above 25°C	ΔI <sub>F</sub>	0.33/0.33	0.33/0.33	mA/°C
Ambient Temperature Range		-25° ~ +50°C		

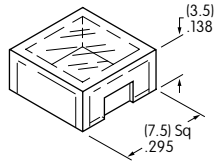
The electrical specifications shown are determined at a basic temperature of 25°C.  
 LED circuit is isolated and requires external power source.  
 If the source voltage exceeds the rated voltage, a ballast resistor is required.  
 The resistor value can be calculated by using the formula in the Supplement section.

## CAP COLORS



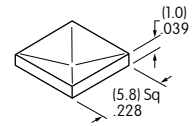
**Clear Transparent Lens**

**AT3081  
Square Lens**



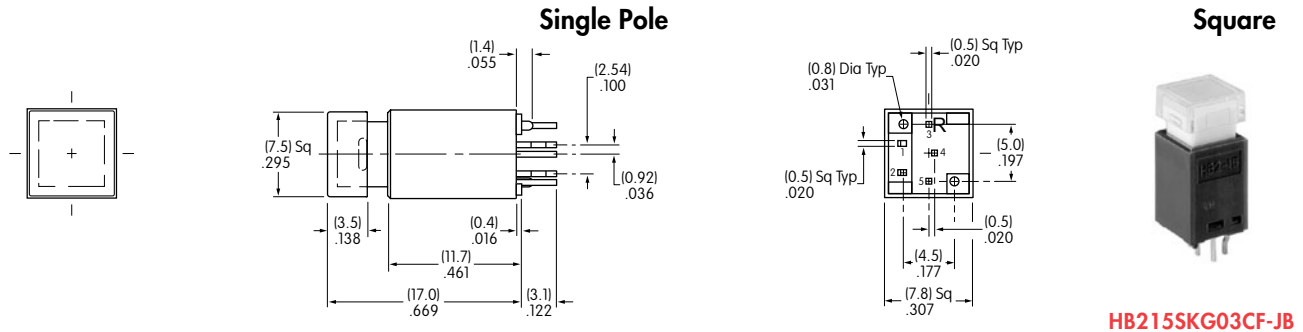
**White Translucent Diffuser**

**AT3082  
Square Diffuser**



Lens & Diffuser Material: Polycarbonate    Lens Finish: Glossy    Diffuser Finish: Frosted

## TYPICAL SWITCH DIMENSIONS



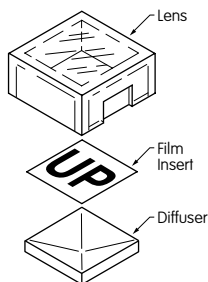
**HB215SKG03CF-JB**

## LEGENDS

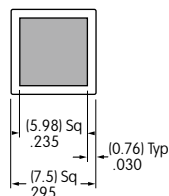
NKK Switches can provide custom legends for caps. Contact factory for more information.

### Suggested Printable Area for HB2 Lens & Film Insert

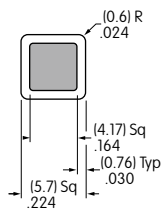
**Recommended Methods:** Screen Print or Pad Print on Lens; Laser Print on Film Insert.  
 Epoxy based ink is recommended.  
 Film Insert: Clear Polyester, 4 mil max. thickness



Lens



Film Insert



Shaded areas are printable areas.

# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 1A @ 125/250V AC or 1A @ 30V DC  
**Logic Level (gold):** 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:** For Silver: 1,000V AC minimum between contacts for 1 minute minimum & 1,500V AC minimum between contacts & case for 1 minute minimum;  
 For Gold: 750V AC minimum between contacts for 1 minute minimum & 1,500V AC minimum between contacts & case for 1 minute minimum  
**Mechanical Life:** 100,000 operations minimum  
**Electrical Life:** 50,000 operations minimum for silver; 100,000 operations minimum for gold  
**Nominal Operating Force:** Single pole 0.98 ~ 2.45N for maintained & 0.98 ~ 1.96N for momentary;  
 Double pole 1.47 ~ 3.43N for maintained & 1.47 ~ 2.94N for momentary  
**Contact Timing:** Nonshorting (break-before-make)  
**Travel:** Pretravel .087" (2.2mm); Overtravel .031" (0.8mm); Total Travel .118" (3.0mm)

## Materials & Finishes

**Housing:** Polyamide (UL94V-0)  
**Movable Contact:** Silver for power circuit; copper with gold plating for logic level circuit  
**Stationary Contacts:** Silver for power circuit; copper with gold plating for logic level circuit  
**Housing Base:** Polyamide (UL94V-0)  
**Terminal Base:** Polyester  
**Common Terminals:** Phosphor bronze with silver flash plating for power circuit;  
 Phosphor bronze with gold flash plating for logic level circuit  
**End Terminals:** Brass with silver flash plating for power circuit;  
 Brass with gold flash plating for logic level circuit  
**Lamp Terminals:** Phosphor bronze with nickel flash plating

## Environmental Data

**Operating Temperature Range:** -25°C through +50°C (-13°F through +122°F) for Illuminated  
 -25°C through +70°C (-13°F through +158°F) for Nonilluminated  
**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/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 3 shocks in each direction)

## Installation

**Mounting Torque:** 0.78Nm (6.9 lb•in) maximum  
**Cap Installation Force:** 4.51N (1.0 lbf) maximum downward force on cap  
**Soldering Time & Temperature:** Manual Soldering: See Profile A in Supplement section.

## Standards & Certifications

**Flammability Standards:** UL94V-0 housing & housing base  
**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.  
 Single & double pole models recognized at 1A @ 125/250V AC, 1A @ 30V DC, & 0.4VA @ 28V DC.  
**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 & double pole models recognized at 1A @ 125/250V AC, 1A @ 30V DC, & 0.4VA @ 28V DC.

# Distinctive Characteristics

Bright illumination with numerous color variations. Spot illumination available. Square, rectangular, and round shaped caps.

Front panel relamping.

Choice of bright or super bright LEDs in red, amber, green, white, and blue.

Latchdown feature gives indication of circuit status. Audible and tactile feedback with smooth and responsive operation.

Snap-action mechanism for long life.

Stainless steel frame on snap-in models has a specially designed projection, which prevents rotation and correctly orients switch in panel.

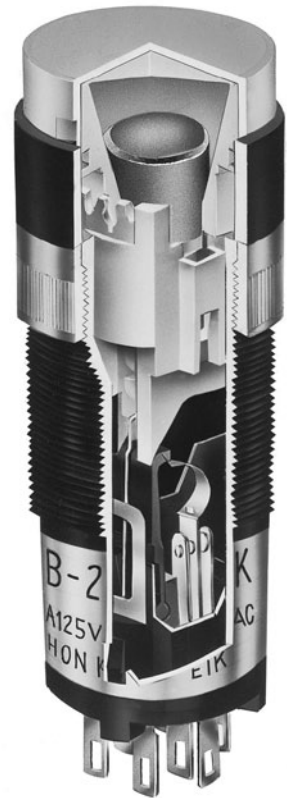
12mm body diameter.

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

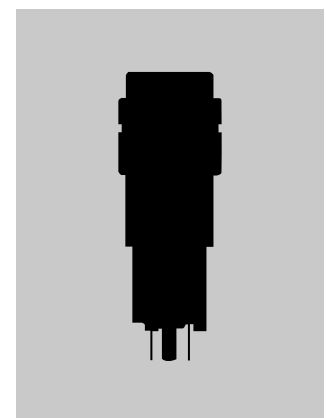
8mm panel thickness capability. Rear panel bushing or snap-in mounting.

Optional PCB adaptors in straight and right angle types.

Matching indicators available.

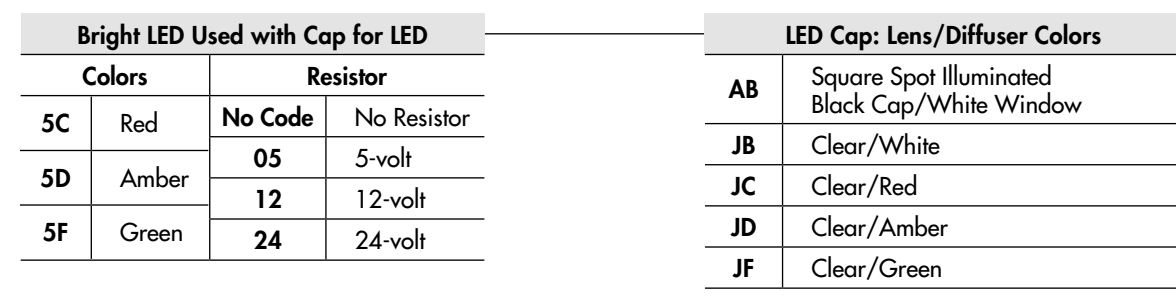
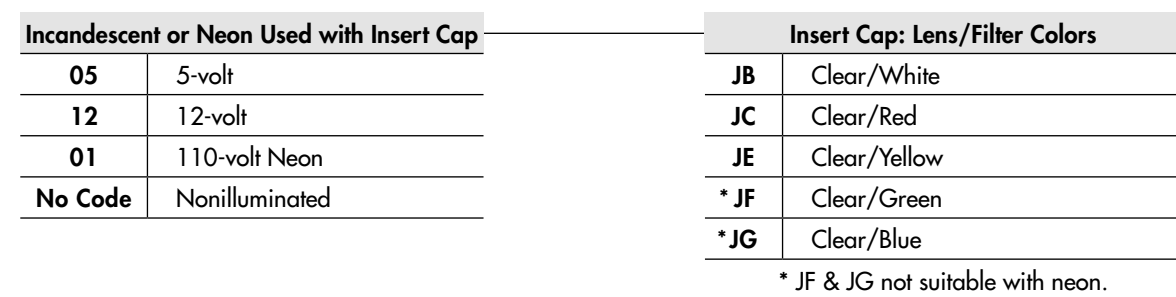
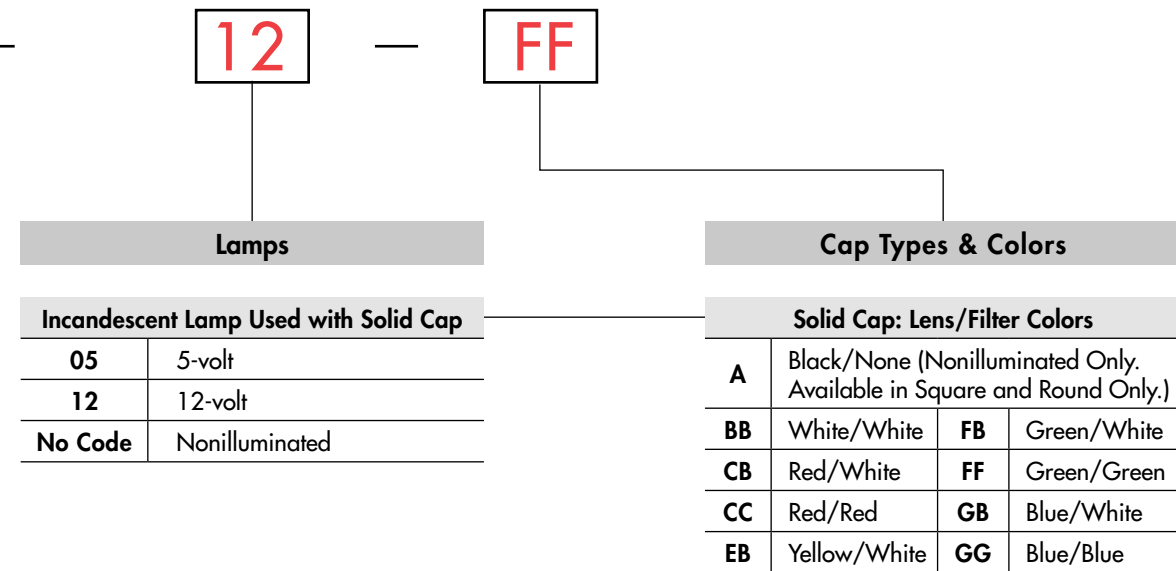
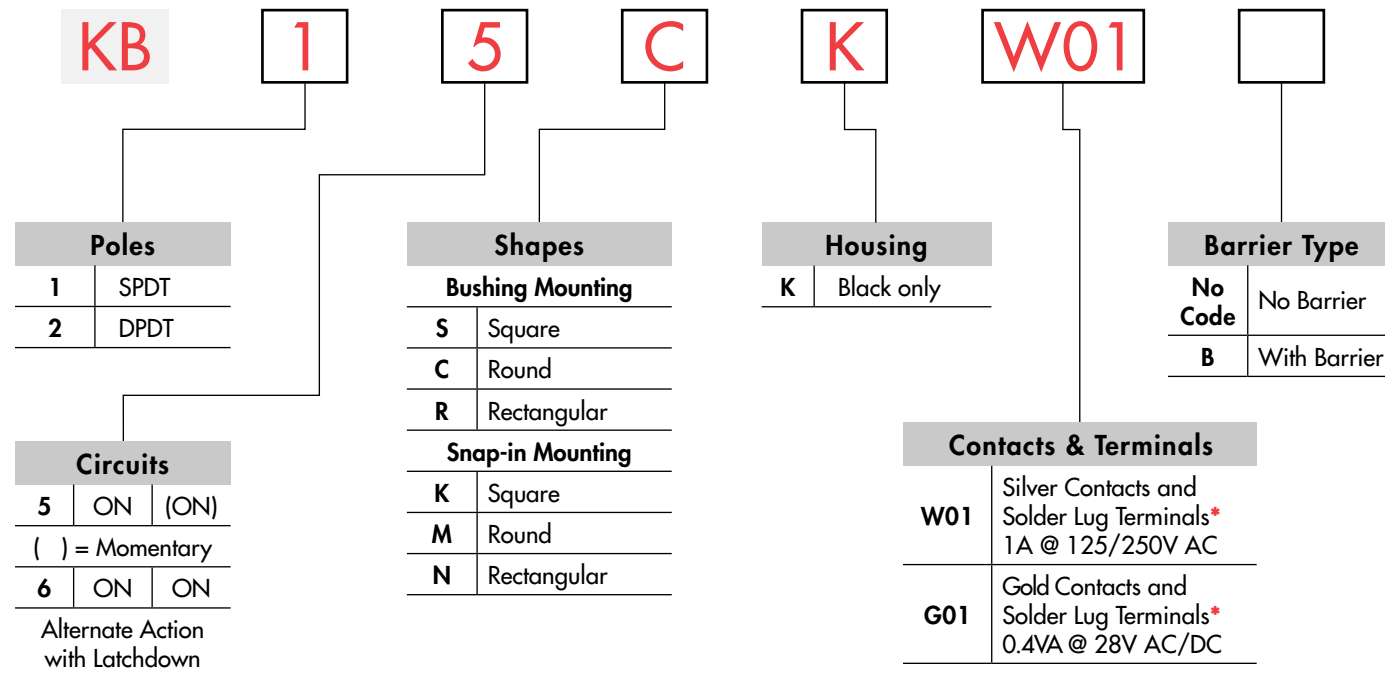


Actual Size



- Toggle
- Rockers
- Pushbuttons
- Illuminated PB**
- Programmable
- Keylocks
- Rotaries
- Slides
- Tactiles
- Tilt
- Touch
- Indicators
- Accessories
- Supplement

## TYPICAL SWITCH ORDERING EXAMPLE



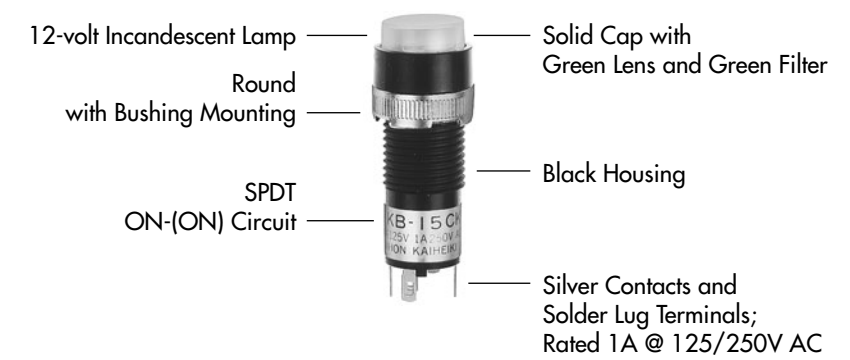
**IMPORTANT:**

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

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**KB15CKW01-12-FF**



Toggle

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt






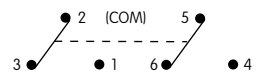
Touch

Indicators

Accessories

Supplement

## POLES & CIRCUITS

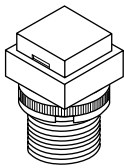
		Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
Pole	Model	Normal 	Down 	Normal 	Down 	Notes: Switch is marked with "+" and "-". Lamp circuit is isolated and requires external power source.
SP	KB15 *KB16	ON ON	(ON) ON	2-3	2-1	SPDT  L(+)-O(-)L
DP	KB25 *KB26	ON ON	(ON) ON	2-3 5-6	2-1 5-4	DPDT  L(+)-O(-)L

\* When in latchdown position for the alternate circuit, cap position is .055" (1.4mm) above the built-in bezel.

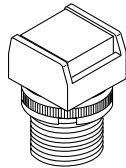
## MOUNTING TYPES & SHAPES

### Bushing Mounting

**S** .551" (14.0mm)  
Square

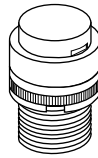


No barrier

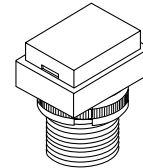


With barrier

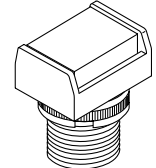
**C** .551" (14.0mm)  
Round



**R** .551" x .728" (14.0mm x 18.5mm)  
Rectangular



No barrier

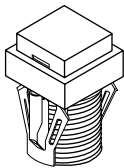


With barrier

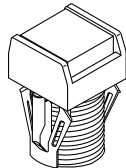
Bezel or barrier is an integral part of the switch body. One mounting nut AT057 supplied with each switch.

### Snap-in Mounting

**K** .551" (14.0mm)  
Square

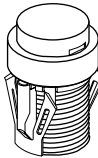


No barrier

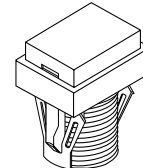


With barrier

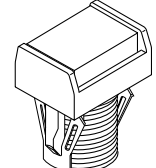
**M** .551" (14.0mm)  
Round



**N** .551" x .728" (14.0mm x 18.5mm)  
Rectangular



No barrier



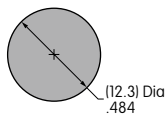
With barrier

Bezel or barrier is an integral part of the switch body.

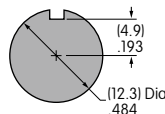
### Panel Cutouts

#### Bushing Mounting

Without Keyway



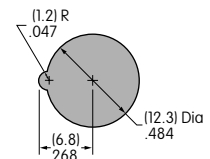
Panel Thickness:  
.020" ~ .315"  
(0.5 ~ 8.0mm)



With Keyway

#### Snap-in Mounting

Panel Thickness:  
.039" ~ .138"  
(1.0 ~ 3.5mm)



Panel thicknesses, when using optional accessories, are shown with the accessories at the end of this KB section.

## HOUSING

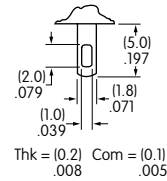
**K** Housing available in black only. Bezel or barrier is an integral part of the switch body.

## CONTACT MATERIALS, RATINGS & TERMINALS

**W** Silver Contacts

**Power Level**  
1A @ 125V AC & 250V AC

**01** Solder Lug



**G** Gold Contacts

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

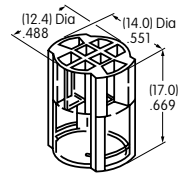
Complete explanation of operating range in Supplement section.

### AT055 Crossover Guard

A partitioned plastic guard is supplied with each switch to provide insulation between terminals.

Installation steps:

1. Identify wire-to-terminal connections.
2. Thread wires through the guard.
3. Solder the connections.
4. Push the guard fully onto the switch body.



## BARRIER TYPE



**No Code** No Barrier  
Built-in bezel

**B** With Barrier  
Built-in barrier only available for Square and Rectangular

## LAMP COLORS & SPECIFICATIONS


The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires external power source. Polarity marks are on the bottom of the switch. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in the Supplement section. Ambient Temperature Range for lamps below: -25°C ~ +50°C.

### Incandescent & Neon Lamps

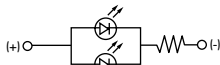
AT611 Incandescent	AT615 Neon		<b>05</b>	<b>12</b>	<b>01</b>	Recommended Resistors for Neon: 33K ohms for 110V AC; 100K ohms for 220V AC	
		Voltage	5V AC	12V AC	110V AC		
		Current	115mA	60mA	1.5mA		
		Endurance	7,000 average		10,000		

**No Code** No Lamp

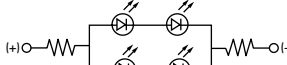
### Bright LED with Resistor

AT634 LEDs are colored in OFF state. 	Red	Amber	Green	Resistor Codes		
	Color Codes:	<b>5C</b>	<b>5D</b>	<b>5F</b>	<b>05</b>	<b>12</b>
Forward Peak Current			$I_{FM}$	—	—	—
Typical Forward Current			$I_F$	25mA	20mA	10mA
Forward Voltage			$V_F$	5V	12V	24V
Reverse Peak Voltage			$V_{RM}$	4V	8V	16V
Current Reduction Rate Above 25°C			$\Delta I_F$	—	—	—

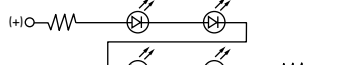
AT634  
5-volt  
2-element  
with 1 Resistor



AT634  
12-volt  
4-element  
with 2 Resistors





AT634  
24-volt  
4-element  
with 2 Resistors






## LAMP COLORS & SPECIFICATIONS

### Bright LED without Resistor

<b>AT635</b> LEDs are colored in OFF state.   T-1½ Bi-pin	Color Codes	Red <b>5C</b>	Amber <b>5D</b>	Green <b>5F</b>	<b>No Code</b> No Resistor
	Forward Peak Current	$I_{FM}$			30mA
	Typical Forward Current	$I_F$			20mA
	Forward Voltage	$V_F$			1.9V
	Reverse Peak Voltage	$V_{RM}$			5V
	Current Reduction Rate Above 25°C	$\Delta I_F$			0.42mA/°C
	Ambient Temperature Range	-25° ~ +50°C			

### Super Bright Single Element LED

<b>AT625G Blue</b> <b>AT631B White</b> <b>AT632F Green</b>   T-1 Bi-pin	 ATTENTION ELECTROSTATIC SENSITIVE DEVICES			Color	<b>6B</b>	<b>6F</b>	<b>6G</b>
	Forward Peak Current	$I_{FM}$			White	Green	Blue
	Typical Forward Current	$I_F$			30mA	30mA	30mA
	Forward Voltage	$V_F$			20mA	20mA	20mA
	Reverse Peak Voltage	$V_{RM}$			3.6V	3.5V	3.6V
	Current Reduction Rate Above 25°C	$\Delta I_F$			5V	5V	5V
	Ambient Temperature Range				0.50mA/°C	0.50mA/°C	0.50mA/°C
					-25° ~ +50°C		

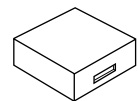
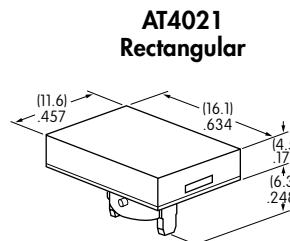
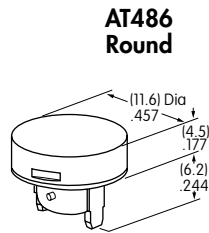
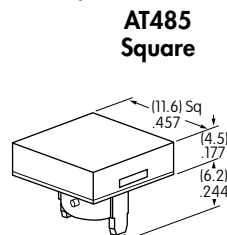
## CAP TYPES & COLOR COMBINATIONS

Color Codes:    **A** Black    **B** White    **C** Red    **E** Yellow    **F** Green    **G** Blue    **J** Clear

### Solid Cap for Incandescent Lamp & Nonilluminated

Lens/Filter Colors Available:

- A** Nonilluminated Only; Square & Round Only
- BB**    **FB**
- CB**    **FF**
- CC**    **GB**
- EB**    **GG**



Translucent Colored Lens



Translucent Colored Filter



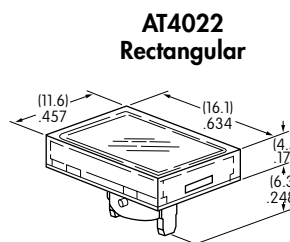
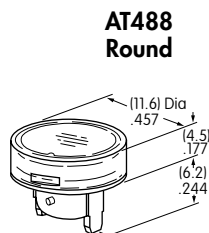
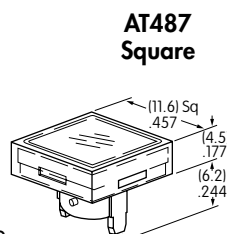
Lamp AT611

Material: Polycarbonate    Finish: Glossy

### Insert Cap for Incandescent or Neon Lamp & Nonilluminated

Lens/Filter Colors Available:

- JB**    **JF**
- JC**    **JG**
- JE**



Transparent Clear Lens



Translucent Colored Filter



Lamp AT611    Lamp AT615

JF and JG not suitable with neon lamp.

Material: Polycarbonate    Finish: Glossy

## CAP TYPES & COLOR COMBINATIONS

Color Codes: A Black B White C Red D Amber E Yellow F Green G Blue J Clear

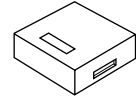
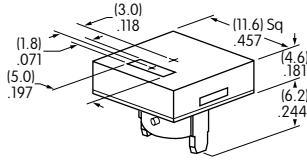
### Spot Illuminated Cap for Bright LED without Resistor or with Resistor

Cap/Window Colors Available:

**AB**

Opaque Black Cap with Translucent White Window for Spot Illumination

**AT4051**  
Square



Bright LED  
AT635

Bright LED  
AT634

Material: Polycarbonate Finish: Matte

### Cap for Bright LED without Resistor or LED with Resistor

Lens/Diffuser Colors Available: (AT4133, 4132, 4134 white diffusers; AT4158, 4160, 4159 colored diffusers)

**JB**

**AT4133**

**AT4132**

**AT4134**



Square

Round

Rectangular

Transparent Clear Lens

**JC**

**AT4158**

**AT4160**

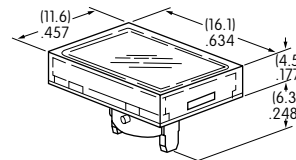
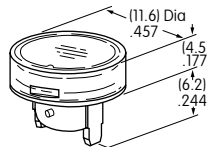
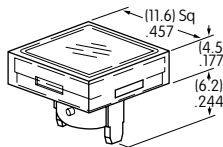
**AT4159**



Translucent Diffuser

**JD**

**JF**



Bright LED  
AT635

Bright LED  
AT634

Material: Polycarbonate Finish: Glossy

### Cap for Super Bright LED

Lens/Diffuser Colors Available:

**JB**

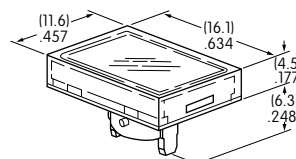
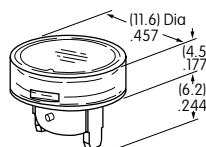
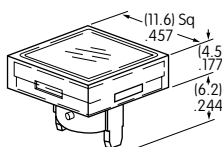
**AT4133**  
Square

**AT4132**  
Round

**AT4134**  
Rectangular



Translucent Clear Lens



Translucent White Diffuser



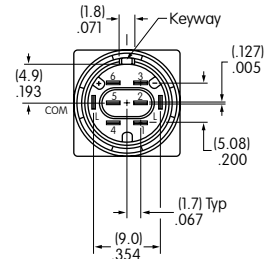
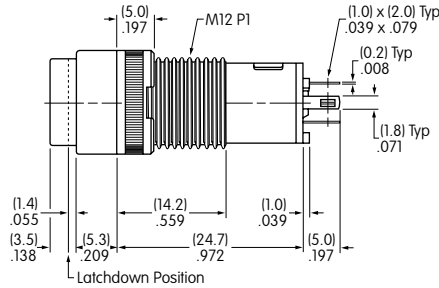
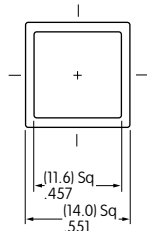
Super Bright LEDs  
AT625  
AT631 AT632

Material: Polycarbonate Finish: Glossy

## TYPICAL SWITCH DIMENSIONS

### Square • Bushing Mount

### Single & Double Pole

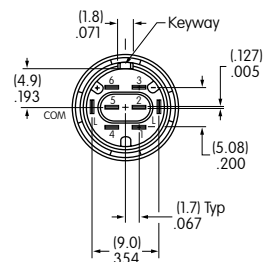
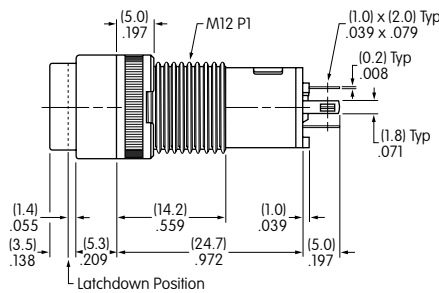
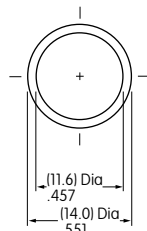


**KB15SKW01-05-GG**

Single pole models do not have terminals 4, 5, & 6.

### Round • Bushing Mount

### Single & Double Pole

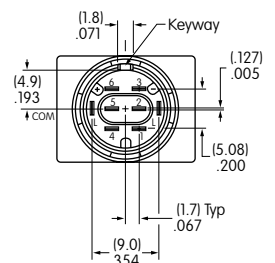
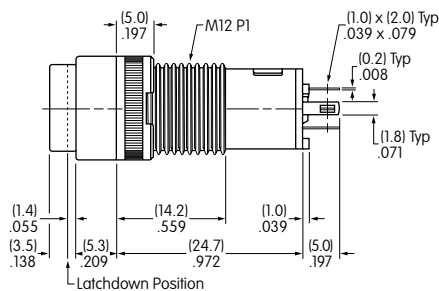
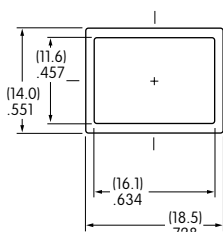


**KB25CKW01-05-GG**

Single pole models do not have terminals 4, 5, & 6.

### Rectangular • Bushing Mount

### Single & Double Pole



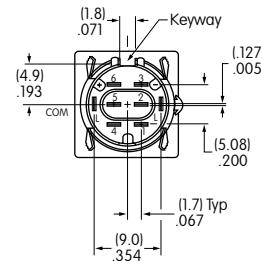
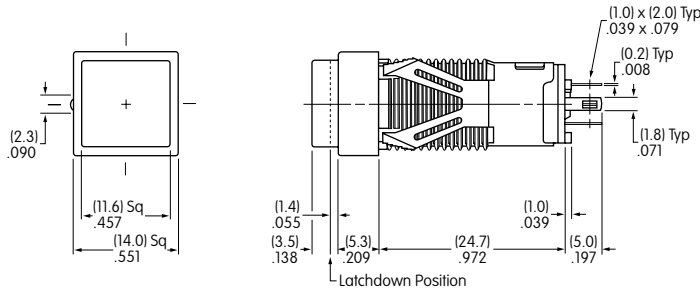
**KB15RKW01-05-GG**

Single pole models do not have terminals 4, 5, & 6.

TYPICAL SWITCH DIMENSIONS

Single & Double Pole

Square • Snap-in Mount

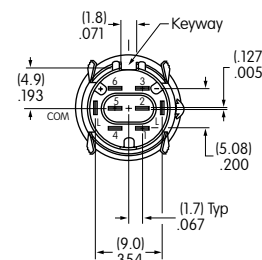
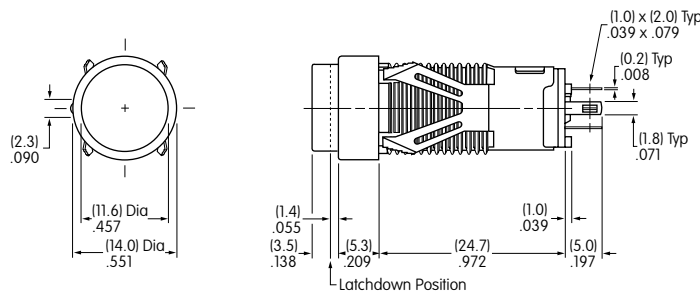


Single pole models do not have terminals 4, 5, & 6.

KB16KKW01-05-CB

Single & Double Pole

Round • Snap-in Mount

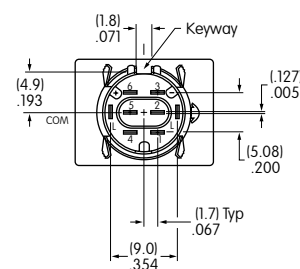
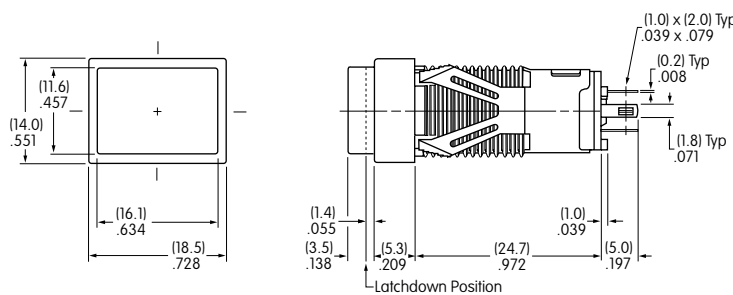


Single pole models do not have terminals 4, 5, & 6.

KB26MKW01-05-CB

Single & Double Pole

Rectangular • Snap-in Mount



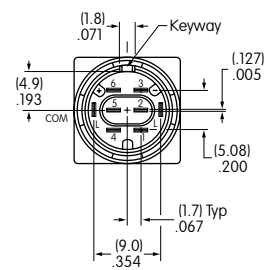
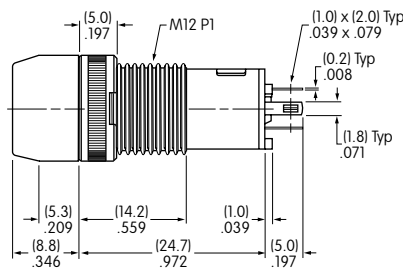
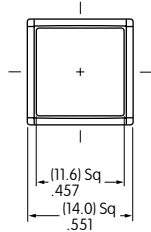
Single pole models do not have terminals 4, 5, & 6.

KB16NKW01-05-CB

## TYPICAL SWITCH DIMENSIONS

### Square • Barrier • Bushing Mount

### Single & Double Pole

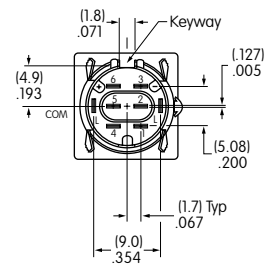
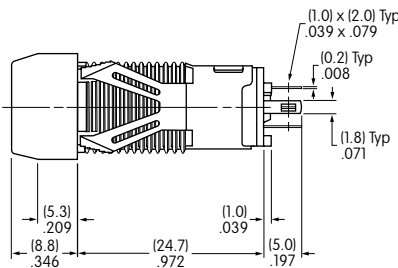
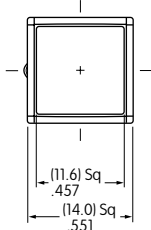


**KB15SKW01B-6G-JB**

Single pole models do not have terminals 4, 5, & 6.

### Square • Barrier • Snap-in Mount

### Single & Double Pole

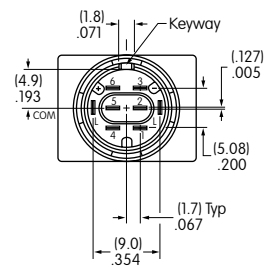
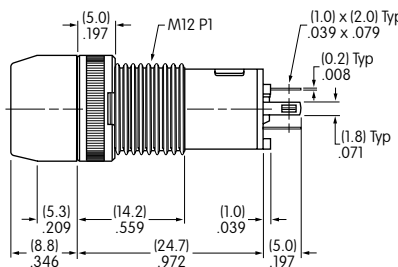
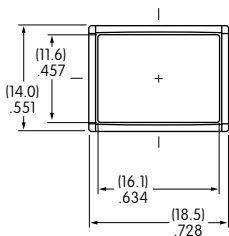


**KB15KKW01B-5C-JC**

Single pole models do not have terminals 4, 5, & 6.

### Rectangular • Barrier • Bushing Mount

### Single & Double Pole

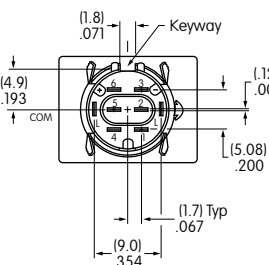
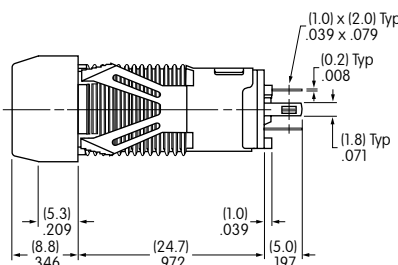
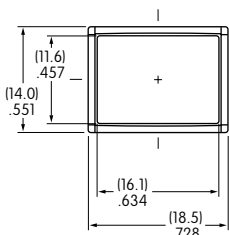


**KB15RKW01B-5F-JF**

Single pole models do not have terminals 4, 5, & 6.

### Rectangular • Barrier • Snap-in Mount

### Single & Double Pole



**KB15NKW01B-5D-JD**

Single pole models do not have terminals 4, 5, & 6.

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

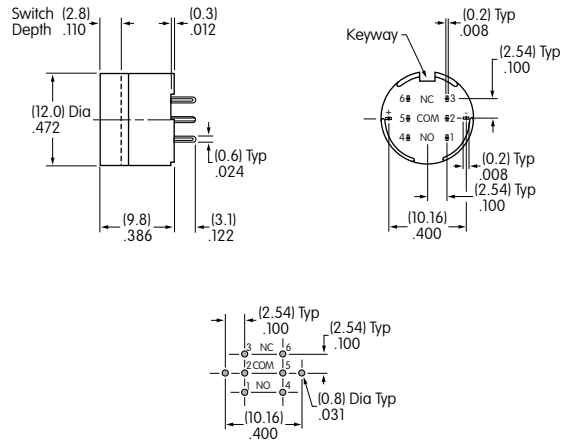
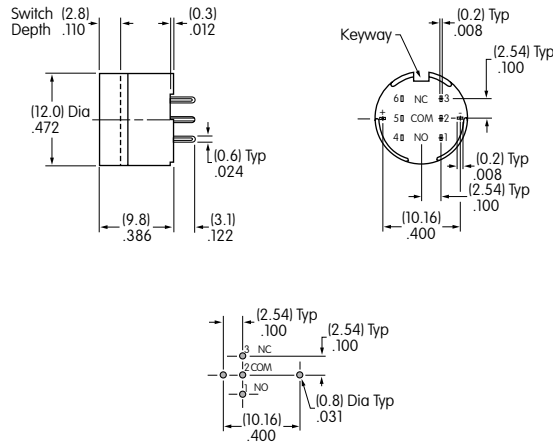
## OPTIONAL ACCESSORIES

### PCB Adaptors

**AT701**  
Single Pole  
Straight PC  
Terminals



**AT702**  
Double Pole  
Straight PC  
Terminals

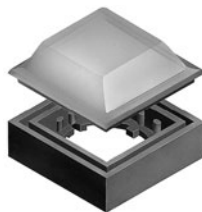


Material: Glass fiber reinforced polyamide Note: Order adaptors separately

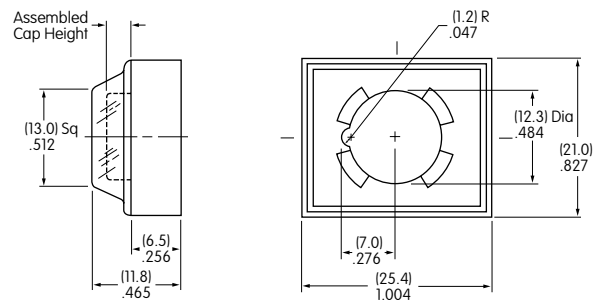
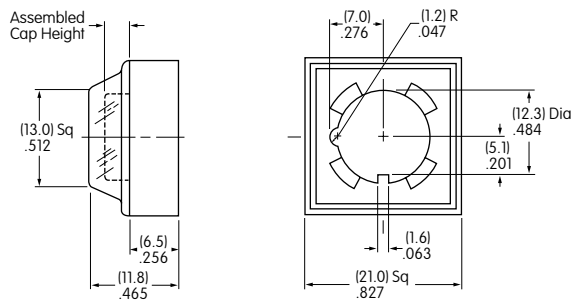
### Dust Covers

Panel Thickness Range: .020 ~ .268" (0.5 ~ 6.8mm) for Bushing Mounting; .020 ~ .079" (0.5 ~ 2.0mm) for Snap-in Mounting  
Dust Covers reduce the depth of switch behind panel by .047" (1.2mm).

**AT495**  
For Square & Round  
(not for Barrier type)



**AT4025**  
For Rectangular  
(not for Barrier type)



Material: Lid: PVC PVC loses pliability below 0°C (32°F). Base: Polyamide

Toggles  
Rockers  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

## OPTIONAL ACCESSORIES

### Protective Guards

**AT494**  
For Square & Round  
(not for Barrier type)



**AT4024**  
For Rectangular  
(not for Barrier type)

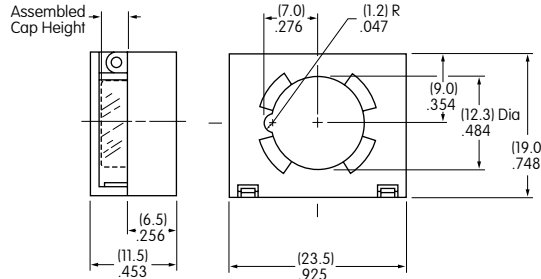
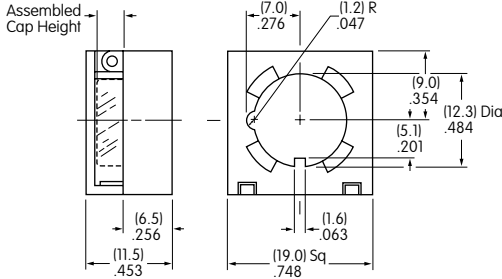


Panel Thickness  
Range:

.020" ~ .268"  
(0.5 ~ 6.8mm)  
for Bushing Mounting

.020" ~ .091"  
(0.5 ~ 2.3mm)  
for Snap-in Mounting

Protective Guards reduce  
the depth of switch  
behind panel by  
.047" (1.2mm).



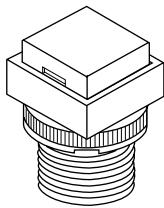
Material: Cover: Polycarbonate

Base: Polyamide

## ASSEMBLY INSTRUCTIONS

### Cap Removal & Installation

For alternate action models cap must be in UP position for cap removal. Indentations on opposite sides of the cap provide an easy way to lift the cap out of the holder, using either the finger nails, or cap extractor AT109.



### LED Polarity & Orientation in Lamp Socket

Super Bright LEDs AT625, AT631, & AT632 are electrostatic sensitive.



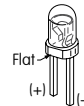
LED  
AT635



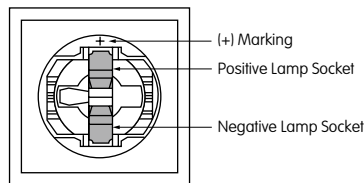
LED  
AT634



LEDs  
AT625  
AT631  
AT632

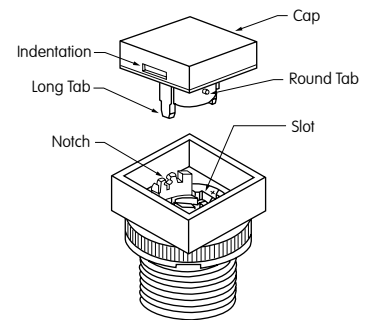


Top  
View of  
Switch



### Cap Replacement

Note that the cap has a pair of round tabs and a pair of long tabs which should be used for correctly replacing the cap in its holder. Using the long tabs as guides, slide the cap with the long tabs moving into the slots on opposite sides of the cap holder. Then, the round tabs will snap into notches on the other two sides of the holder.

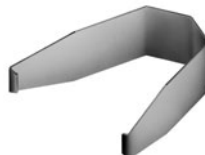


### AT108 Socket Wrench for Bushing Mounting

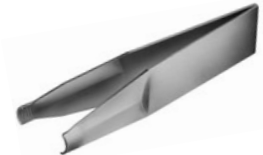
Overtightening the  
mounting nut  
may damage the  
switch housing.



### AT109 Cap Extractor



### AT111 Lamping Tool

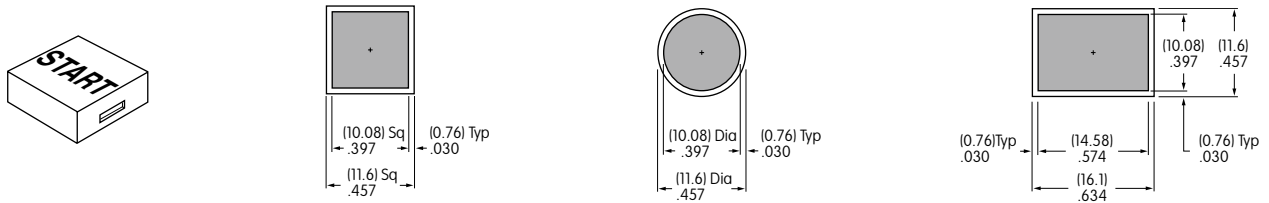


**LEGENDS**

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

**Suggested Printable Area for KB Lens**

**Recommended Methods:** Screen Print or Pad Print on Lens.  
Epoxy based ink is recommended.

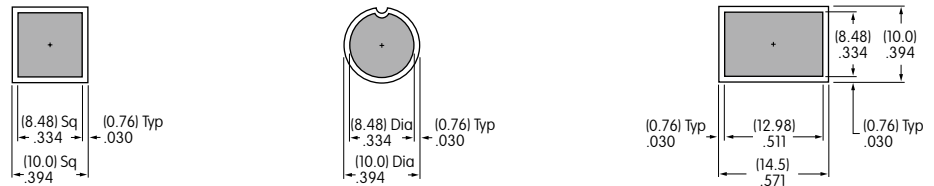
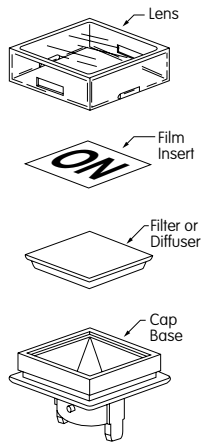


Shaded areas are printable areas.

**Suggested Printable Area for Film Insert**

**Recommended Print Method:** Laser Print

Film Insert: Clear Polyester, 4 mil max. thickness



Shaded areas are printable areas.

# General Specifications

## Electrical Capacity (Resistive Load)

**Low Level:** 100mA maximum @ 12V DC

## Other Ratings

**Contact Resistance:** 200 milliohms maximum

**Insulation Resistance:** 100 megohms minimum @ 250V 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:** 5,000,000 operations minimum;  
1,000,000 operations minimum for custom Rectangular Switch/Cap Assembly (at center of cap)

**Electrical Life:** 5,000,000 operations minimum

**Nominal Operating Force:** **KP01:** 1.9N maximum for Tactile & Nontactile models (at center of cap)

**KP02:** 1.6N maximum for Tactile, Nontactile & Tactile/Audible models (at center of cap)

**Travel:** **KP01:** Pretravel .122" (3.1mm); Overtravel .055" (1.4mm); Total Travel .177" (4.5mm)

**KP02:** Pretravel .091" (2.3mm); Overtravel .047" (1.2mm); Total Travel .138" (3.5mm)

## Materials & Finishes

**Plunger/Upper Housing:** Polyacetal

**Lower Housing:** Glass fiber reinforced PBT (UL94V-0)

**Movable Contact:** Stainless steel with gold plating

**Stationary Contacts:** Gold over copper alloy

**Switch Terminals:** Brass with tin plating

## Environmental Data

**Operating Temperature Range:** -25°C through +50°C (-13°F through +122°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:** 51G (500m/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Installation

**Cap Installation Force :** 50.0N maximum downward force on actuator

## PCB Processing

**Soldering:** Wave Soldering. 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 lower housing

The KP 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

KP series offers a complete switch solution for all broadcast panel needs, including home keys and the custom rectangular switch/cap assembly.

Distinct, long total travel of .177" (4.5mm) for KP01 or shorter stroke of .138" (3.5mm) for KP02.

Available with super bright red/green bicolor LED and RGB LEDs. The RGB LED full color spectrum in a switch package provides unlimited color combinations.

Specially designed snap-in standoff for simple and secure PC board mounting and alignment.

Unique actuation guide gives positive indication of circuit transfer as well as smooth and silent operation. (Patent pending).

Choices of tactile, nontactile or tactile/audible actuation.

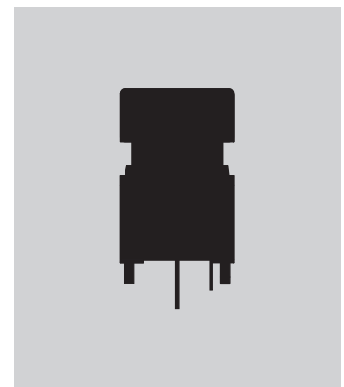
Compact design with height of .906" (23.0mm) from PC board to top of cap. (Same height as programmable SmartSwitch™.)

Flat, sculptured or home key square caps in three common sizes for design flexibility in audio/video applications.

Twin contacts with gold plating assure high reliability and long life of 5,000,000 operations minimum.

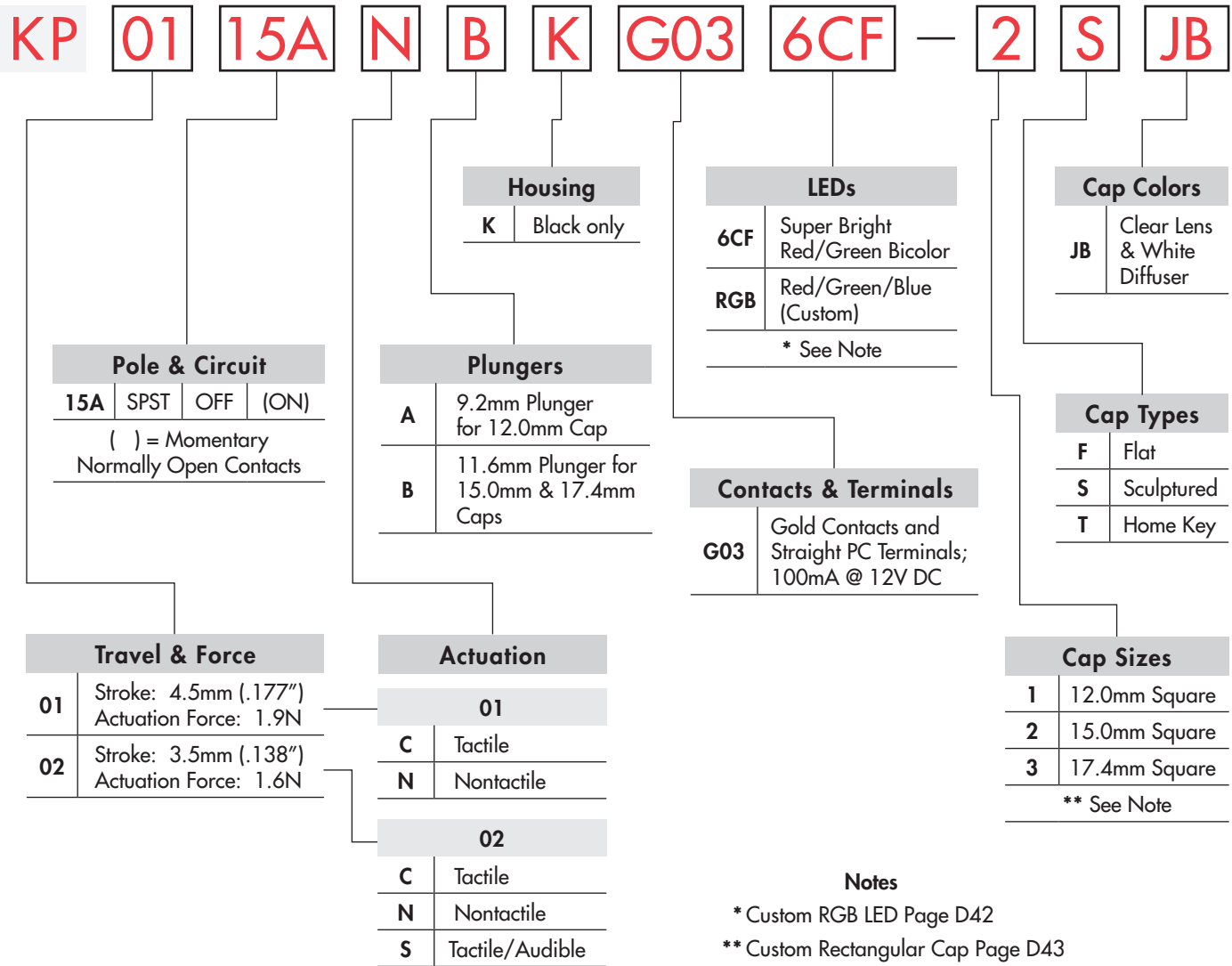


Actual Size



- Toggles
- Rockers
- Pushbuttons
- D Illuminated PB**
- Programmable
- Keylocks
- Rotaries
- Slides
- Tactiles
- Tilt
- Touch
- Indicators
- Accessories
- Supplement

### TYPICAL SWITCH ORDERING EXAMPLE



### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

#### KP0115ANBKG036CF-2SJB



POLE & CIRCUIT						
Pole	Model	Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch Schematic
		Normal	Down	Normal	Down	
						Note: Switch terminals "1" & "1a" are actually marked on the switch.
SP	KP0115A KP0215A	OFF	(ON)	Normally Open	1-1a	SPST

## ACTUATION HOUSING

**C**

**Tactile**  
KP01 or KP02

**N**

**Nontactile**  
KP01 or KP02

**S**

**Tactile/Audible**  
KP02 only

**K**

**Black only**

## CONTACTS, TERMINALS, & RATING

**G03**

**Gold Contacts**

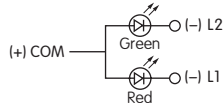
**Straight PC Terminals**

**100mA @ 12V DC**

## SUPER BRIGHT BICOLOR LED SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C.

	Colors	<b>6CF</b>		Unit
		Red	Green	
Minimum Luminous Intensity	$I_V$	450	820	mcd
Standard Luminous Intensity	$I_V$	700	1100	mcd
Maximum Forward Current	$I_{FM}$	30 (25 for Amber)	25 (22 for Amber)	mA
Typical Forward Current	$I_F$	15	15	mA
Forward Voltage	$V_F$	2.1	3.2	V
Power Peak Dissipation	$P_D$	63	80	mW
Maximum Reverse Voltage	$V_{RM}$	5	5	V
Wavelength at Peak Emission	$\lambda$	630 ~ 640	520 ~ 535	nm
Current Reduction Rate Above 25°C	$\Delta I_F$	0.40	0.36	mA/°C
Ambient Temperature Range		-25 ~ +50		°C



LEDs are an integral part of the switch and are not available separately.

LED circuit is isolated and requires an external power source.

If the source voltage exceeds the rated voltage, a ballast resistor is required.

The resistor value can be calculated by using the formula in the Supplement section.

Amber can be achieved by simultaneous illumination of Red & Green.

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

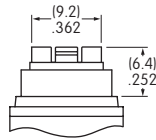
Accessories

Supplement

## PLUNGERS

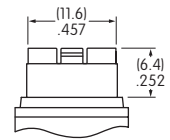
### A 9.2mm Plunger for 12.0mm Cap

9.2mm Plunger is designed with a narrower neck to hold the 12.0mm Cap.



### B 11.6mm Plunger for 15.0mm & 17.4mm Caps

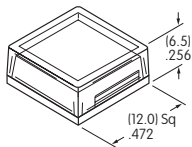
11.6mm Plunger is designed with a wider neck to hold both the 15.0mm and 17.4mm Caps.



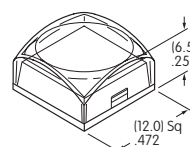
## CAP TYPES & COLORS

### 1 12.0mm Square Used on A Plunger

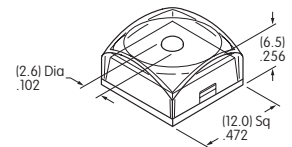
#### F AT3083 Flat Cap



#### S AT3078 Sculptured Cap

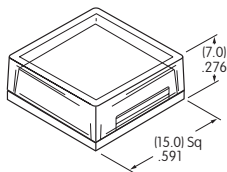


#### T AT3086 Home Key Cap

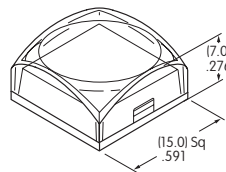


### 2 15.0mm Square Used on B Plunger

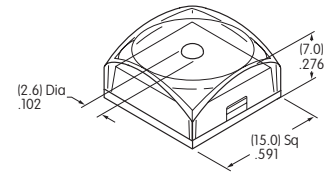
#### F AT3084 Flat Cap



#### S AT3079 Sculptured Cap

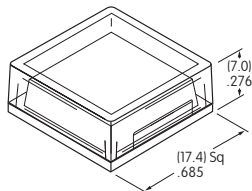


#### T AT3087 Home Key Cap

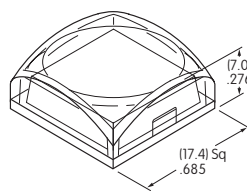


### 3 17.4mm Square Used on B Plunger

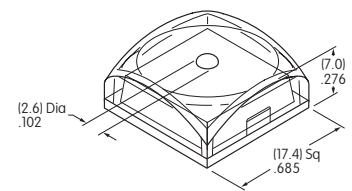
#### F AT3085 Flat Cap



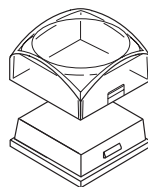
#### S AT3080 Sculptured Cap



#### T AT3088 Home Key Cap



### JB Lens & Diffuser Colors Available: Clear/White



Clear Lens

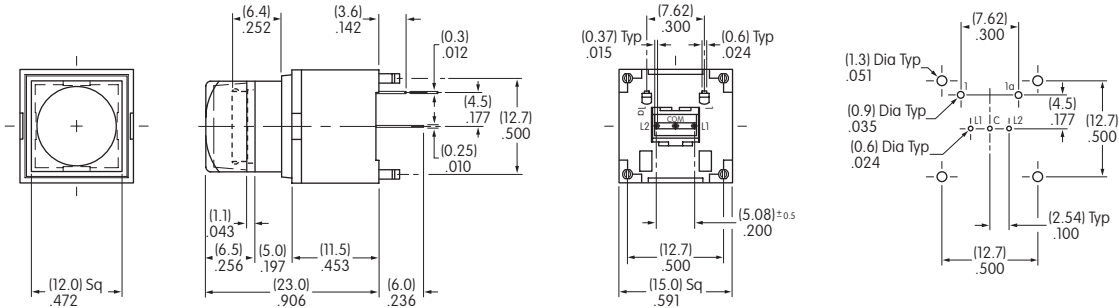
White Diffuser

Materials & Finishes: Lens - Polycarbonate with glossy finish; Diffuser - Polycarbonate with textured finish

Optional Protective Guard AT4170 available; contact factory.

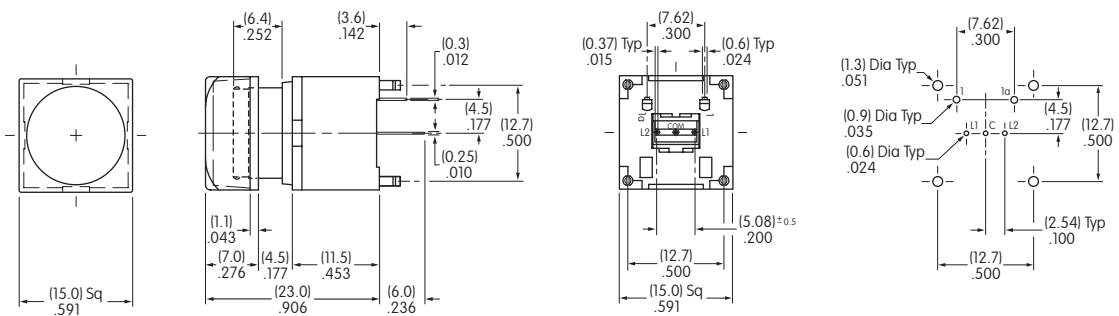
TYPICAL SWITCH DIMENSIONS

12.0mm Square Cap



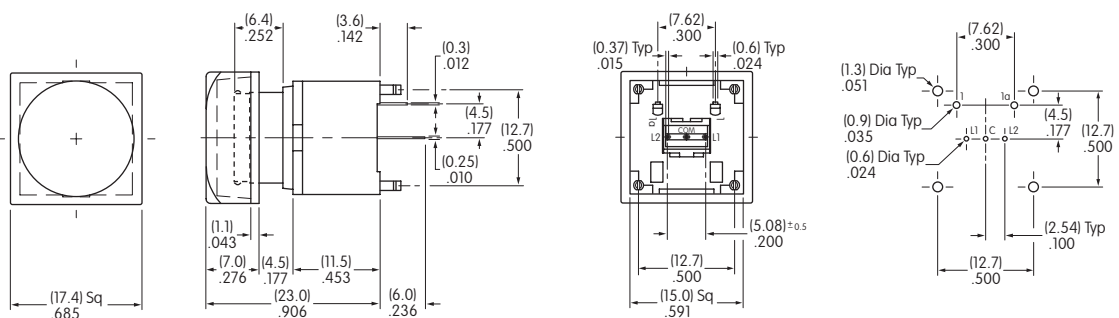
KP0115ACAKG036CF-1SJB

15.0mm Square Cap



KP0115ANBKG036CF-2SJB

17.4mm Square Cap



KP0115ANBKG036CF-3SJB

Toggles  
Rocker  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

Toggle

Rockers

Pushbuttons

Programmable Illuminated PB

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

## CUSTOM RGB

### LED SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C.

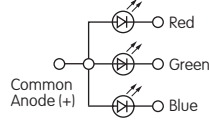
LEDs are an integral part of the switch and are not available separately.

LED circuit is isolated and requires an external power source.

If the source voltage exceeds the rated voltage, a ballast resistor is required.

The resistor value can be calculated by using the formula in the Supplement Section.

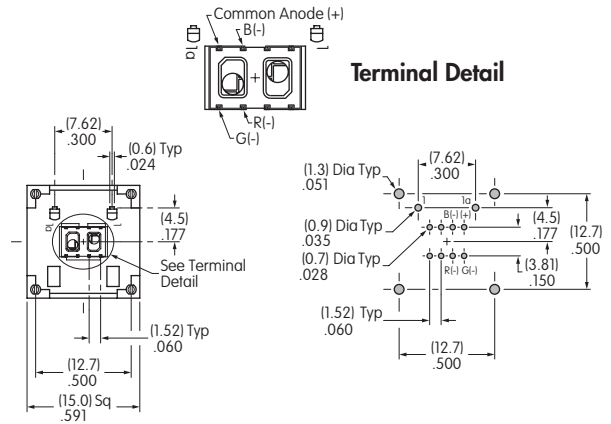
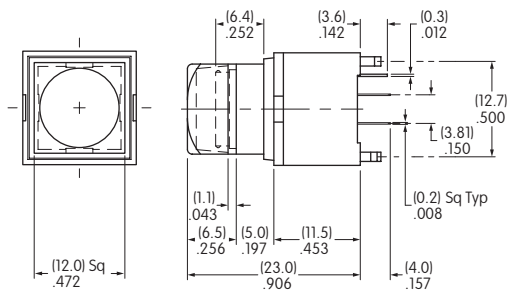
Note: For applications that require white illumination, contact factory.



	Color	Red	Green	Blue	Unit
Maximum Forward Current	$I_{FM}$	30	30	30	mA
Typical Forward Current	$I_F$	20	14	9	mA
Forward Voltage	$V_F$	2.0	2.9	2.9	V
Power Peak Dissipation	$P_D$	60	80	80	mW
Maximum Reverse Voltage	$V_{RM}$	5	5	5	V
Dominant Wavelength	$\lambda_d$	621.5	522.5	472.5	nm
Current Reduction Rate Above 25°C	$\Delta_{IF}$	0.50	0.50	0.50	mA/°C
Ambient Temperature Range		-25 ~ +50			°C

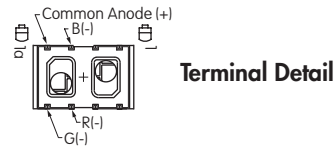
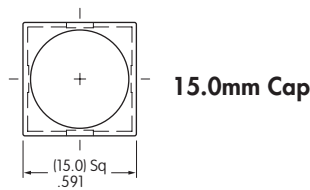
### TYPICAL SWITCH DIMENSIONS

#### 12.0mm Square Cap with RGB LED

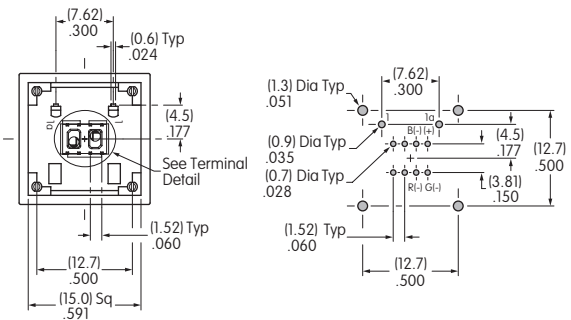
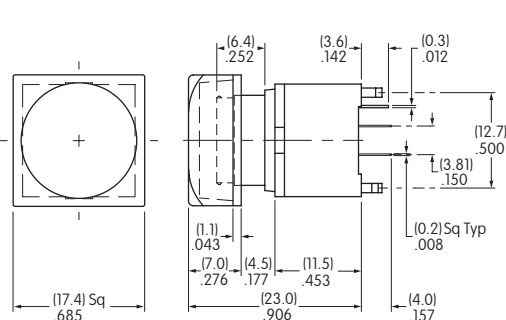


**KP0115ACAKG03RGB-1SJB**

#### 15.0mm & 17.4mm Square Caps with RGB LED



**KP0115ANBKG03RGB-2SJB**

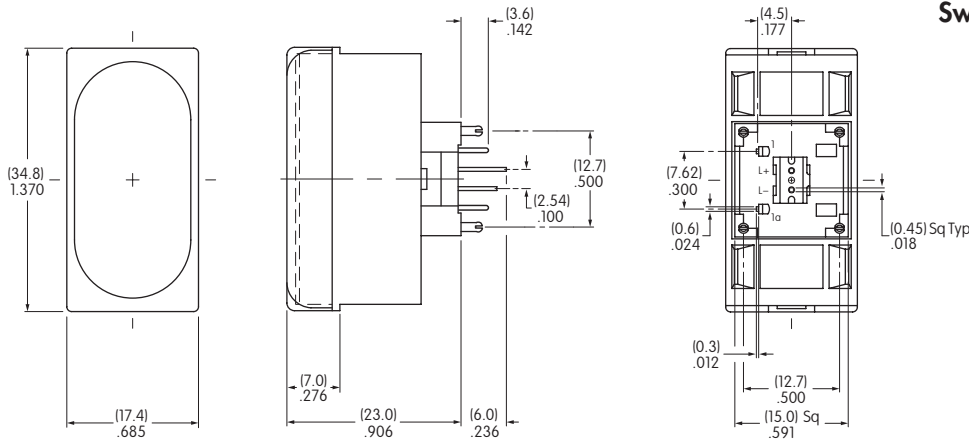


**KP0115ANBKG03RGB-3SJB**

#### 17.4mm Cap

CUSTOM RECTANGULAR CAP ASSEMBLY

CAP ASSEMBLY DIMENSIONS



Switch/Rectangular Cap Assembly



KP0115ACBKG03CJB for Tactile  
 KP0115ANBKG03CJB for Nontactile

See below for complete assembly of switch, LEDs and LED holders.

LED SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C. Center LED is an integral part of the switch. LEDs are not sold separately. LED circuits are isolated and require an external power source. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in the Supplement Section.

	Color	Red	Unit
Maximum Forward Current	$I_{FM}$	30	mA
Typical Forward Current	$I_F$	20	mA
Forward Voltage	$V_F$	2.0	V
Maximum Reverse Voltage	$V_{RM}$	4	V
Dominant Wavelength	$\lambda_d$	623	nm
Current Reduction Rate Above 25°C	$\Delta I_F$	0.32	mA/°C
Ambient Temperature Range		-25 ~ +50	°C

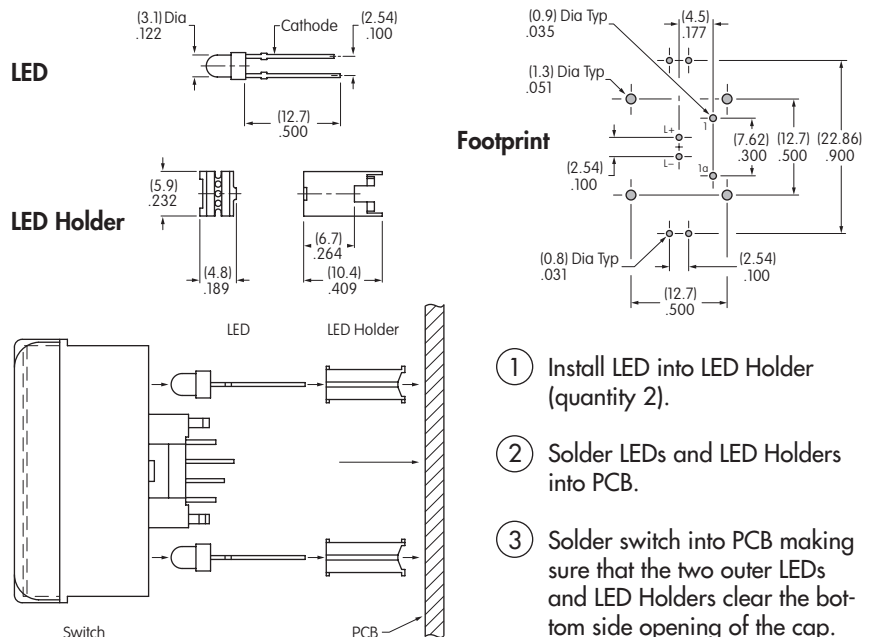
Contact factory for other LED colors.

ASSEMBLY & INSTALLATION INSTRUCTIONS



Switch/Rectangular Cap assembly has 3 LEDs to achieve bright and even illumination.

One LED (in center of switch bottom) is an integral part of the switch; the other 2 LEDs and 2 LED Holders are packaged separately.

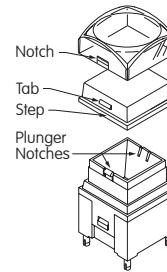


### ASSEMBLY INSTRUCTIONS FOR SQUARE CAPS



#### Cap Orientation

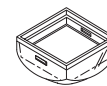
As shown in the accompanying illustration, the cap and plunger are designed with tabs and notches to assure proper orientation of the cap on the switch.



#### Removal of Cap Assembly & Separation of Lens & Diffuser

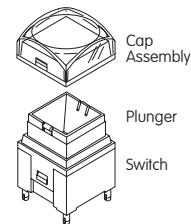
Holding the switch tightly, pull the cap off the switch. Once the cap assembly is released from the plunger, the lens and diffuser can be separated.

Pry up the lens with fingernail or flat tip screwdriver inserted at the step on the diffuser.



#### Installation or Replacement of Cap

After aligning notches with tabs, join the lens and diffuser. Hold the switch tightly without touching the terminals. Firmly press the cap onto the plunger by applying pressure from one side to the other until both are snapped together.



Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

## LEGENDS

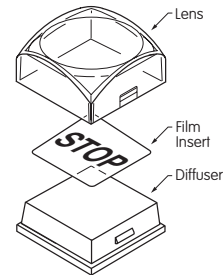
NKK Switches can provide custom legends for caps. Contact factory for more information.

### Suggested Printable Areas for KP Lens

#### Recommended Methods:

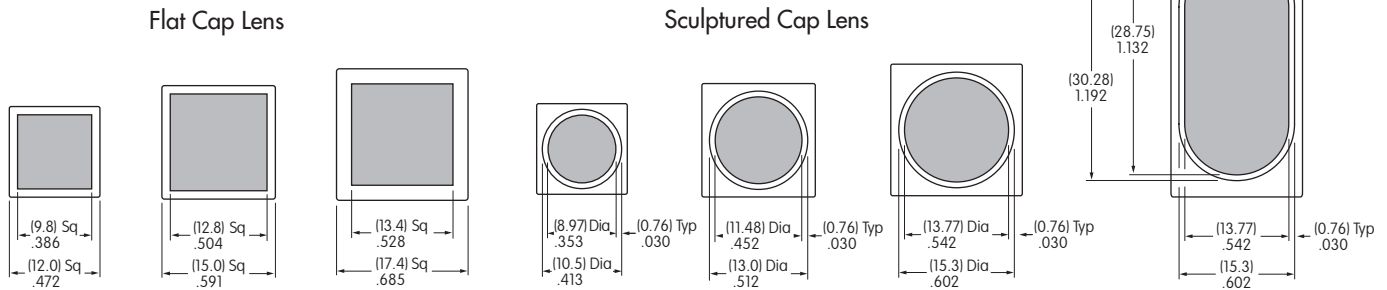
Laser Etch on clear lens, Screen Print, or Pad Print on lens.  
Laser Print on film insert.  
Epoxy based ink is recommended.

Printing on Diffuser is not advisable.



Shaded areas are suggested printable areas for Lens.

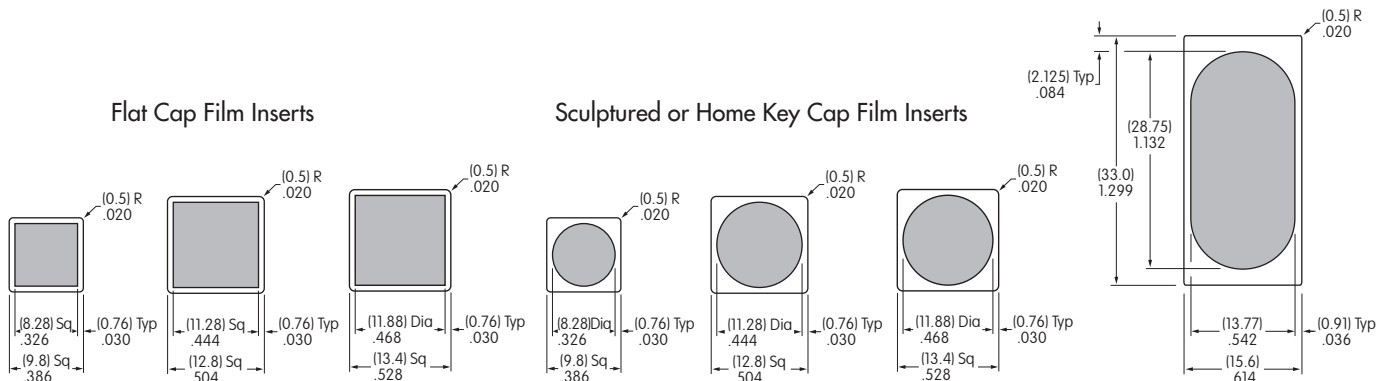
Custom Rectangular Cap Lens



### Suggested Printable Areas for KP Film Insert

Shaded areas are suggested printable areas for Film Insert.

Custom Rectangular Film Insert



Film Insert Material and Thickness: Clear Polyester; 4 mil (100μ) maximum thickness

# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 3A @ 125V AC or 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)  
 Note: Find additional explanation of operating range in Supplement section.

## Other Ratings

**Contact Resistance:** 50 milliohms maximum for silver; 100 milliohms maximum for gold  
**Insulation Resistance:** 200 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 for momentary circuit  
 200,000 operations minimum for maintained circuit  
**Electrical Life:** 100,000 operations minimum  
**Nominal Operating Force:** 4.41N  
**Contact Timing:** Nonshorting (break-before-make)  
**Travel:** Pretravel .059" (1.5mm); Overtravel .059" (1.5mm); Total Travel .118" (3.0mm)

## Materials & Finishes

**Housing:** Glass fiber reinforced polyamide (UL94V-0)  
**Snap-in Frame:** Stainless steel  
**Movable Contact:** Silver alloy or copper with gold plating  
**Stationary Contacts:** Silver alloy or copper with gold plating  
**Base:** Liquid crystal polymer (UL94V-0)  
**Switch Terminals:** Phosphor bronze with silver or gold plating  
**Lamp Terminals:** Brass with silver plating

## Environmental Data

**Operating Temperature Range:** -25°C through +50°C (-13°F through +122°F) for Illuminated  
 -25°C through +70°C (-13°F through +158°F) for Nonilluminated  
 Note: When used with a polyvinyl chloride splash cover, the lowest limit is 0°C (32°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/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)  
**Sealing:** Not available for snap-in; see next section for panel seal.

## Installation

**Cap Installation Force:** 3.92N maximum downward force on cap  
**Quick Connect Force:** 52.95N maximum downward force on connector  
**Soldering Time & Temperature:** Manual Soldering: See Profile A in Supplement section.

## Standards & Certifications

**Flammability Standards:** UL94V-0 housing & base  
**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 models recognized at 3A @ 125V or 250V AC or 0.4VA @ 28V AC/DC maximum.  
**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.  
 All models certified at 3A @ 125V or 250V AC or 0.4VA @ 28V AC/DC maximum.

# Distinctive Characteristics

Carefully designed light diffusion and filtering system produces bright, full surface illumination with front panel relamping.

Spot illumination available in single and bicolor LEDs.

Choice of super bright LEDs in white, green, and blue in addition to standard or bright red, amber, and green LEDs.

Stainless steel clips provide secure mounting with a wide range of panel thicknesses.

Latchdown feature gives indication of circuit status. Audible and tactile feedback with smooth and responsive operation.

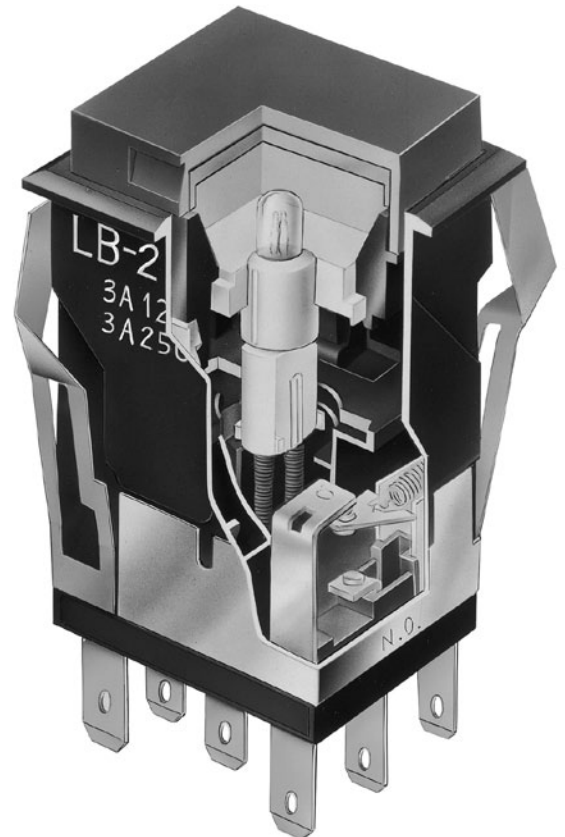
Snap-action contact mechanism gives long electrical life and sensitivity of actuation.

Combination solder lug and .110" quick connect terminals are epoxy sealed to prevent entry of flux, dust, and other contaminants.

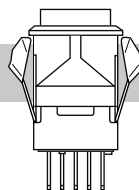
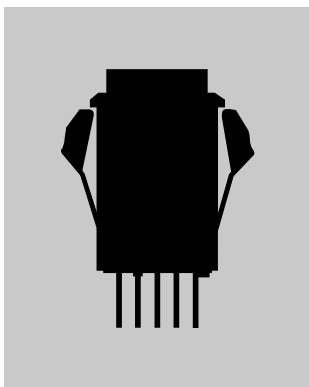
Panel sealed model meets IP65 of IEC60529 specifications (similar to NEMA 4 & 13).

Compact switch design minimizes behind panel depth.

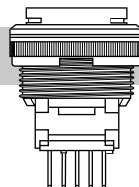
Matching indicators available.



Actual Size



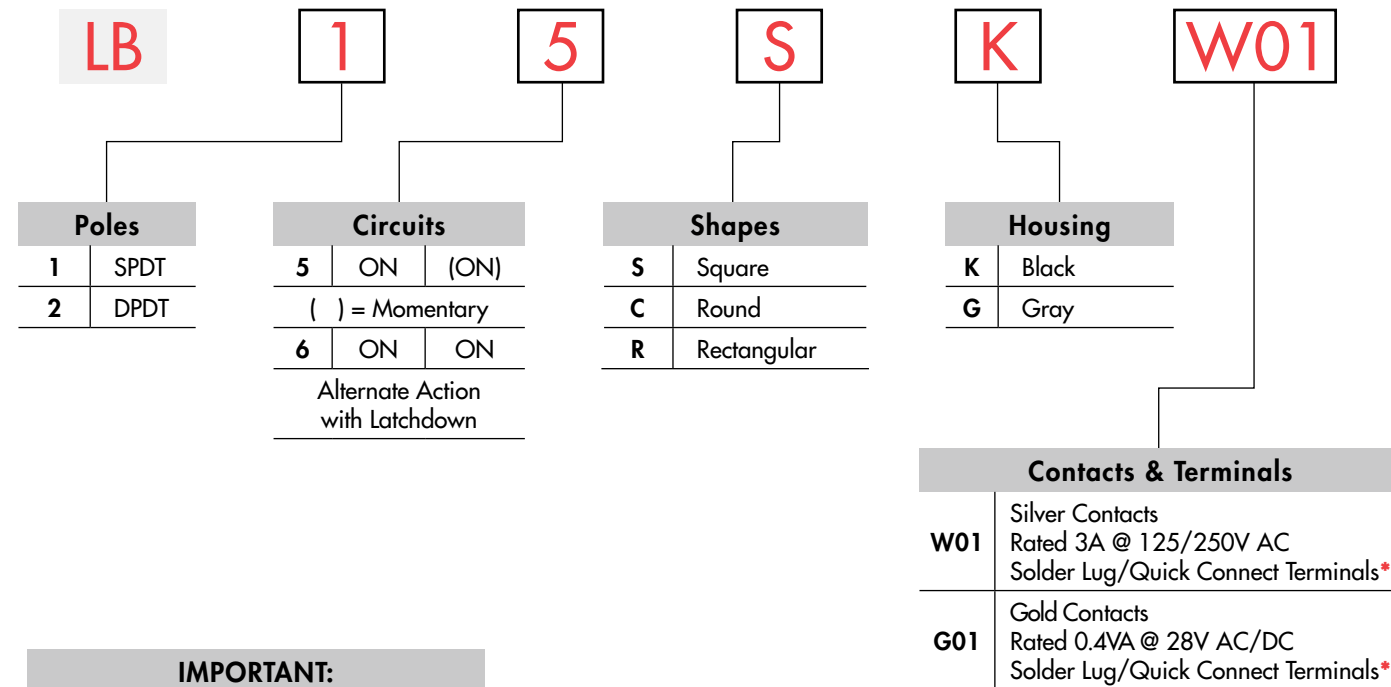
Snap-in Mount Page D46



Panel Seal Page D57

- Toggle
- Rockers
- Pushbuttons
- D Illuminated PB**
- Programmable
- Keylocks
- Rotaries
- Slides
- Tactiles
- Tilt
- Touch
- Indicators
- Accessories
- Supplement

## TYPICAL SWITCH ORDERING EXAMPLE



### IMPORTANT:

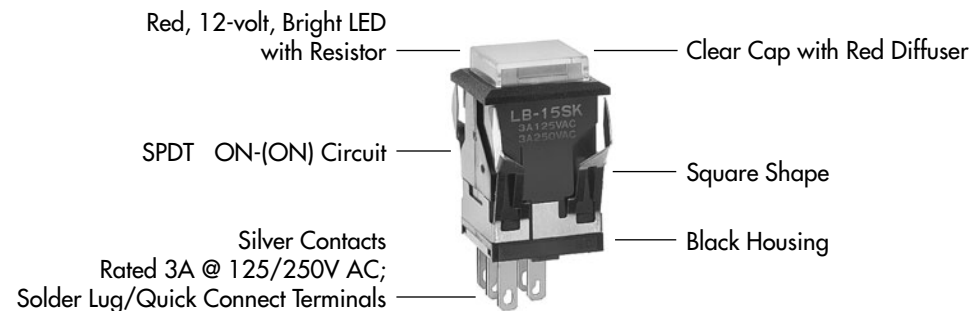


Switches are supplied without UL, cULus & CSA marking unless specified. **UL, cULus & CSA recognized only when ordered with marking on the switch.** Specific models, ratings, & ordering instructions are noted on General Specifications page.

\* Wire harness & cable assemblies offered only in Americas

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**LB15SKW01-5C12-JC**



Lamps				Cap Types & Colors			
<b>Incandescent Lamp Used with Solid Cap</b>				<b>Solid Cap: Lens/Filter Colors</b>			
05	5-volt	BJ	White/Clear				
12	12-volt	CJ	Red/Clear				
No Code	Nonilluminated	EJ	Yellow/Clear				
				<b>Insert Cap: Lens/Filter Colors</b>			
<b>Incandescent or Neon Used with Insert Cap</b>							
01	110-volt Neon	JB	Clear/White				
05	5-volt Incandescent	JC	Clear/Red				
12	12-volt Incandescent	JE	Clear/Yellow				
No Code	Nonilluminated	*JF	Clear/Green				
				*JF & JG not suitable with neon.			
				<b>LED Cap: Lens/Diffuser Colors</b>			
<b>Bright LED Used with LED Cap</b>							
<b>Colors</b>		<b>Resistor</b>					
5C	Red	No Code	No Resistor	JB	Clear/White		
5D	Amber	05	5-volt	JC	Clear/Red		
5F	Green	12	12-volt	JD	Clear/Amber		
		24	24-volt	JF	Clear/Green		
				<b>LED Cap: Lens/Diffuser Colors</b>			
<b>Super Bright LED Used with LED Cap</b>							
6B	White			JB	Clear/White		
6F	Green						
6G	Blue						
				<b>Spot Illuminated Cap Colors</b>			
<b>LED in Spot Illuminated Cap</b>							
1C	Red Single Color	A	Black	Available in Square and Round only.			
1D	Amber Single Color	B	White				
1F	Green Single Color	C	Red				
CF	Red/Green Bicolor	F	Green				
<b>Nonilluminated</b>				<b>Nonilluminated Cap Colors</b>			
No Code	Nonilluminated	A	Black	F	Green		
		B	White	G	Blue		
		C	Red	H	Gray		
		E	Yellow				

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

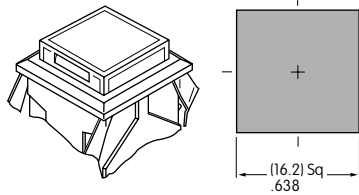
## POLES & CIRCUITS

		Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
Pole	Model	Normal	Down	Normal	Down	Notes: Switch is marked with NC, NO, COM, L+, L-. Lamp circuit is isolated and requires an external power source.
SP	<b>LB15</b> <b>*LB16</b>			1-3	1-2	SPDT 
DP	<b>LB25</b> <b>*LB26</b>			1-3 4-6	1-2 4-5	DPDT 

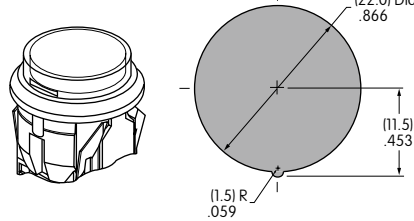
\* When in latchdown position for the alternate circuit, cap position is .039" (1.0mm) above the built-in bezel.

## SHAPES & PANEL CUTOUTS

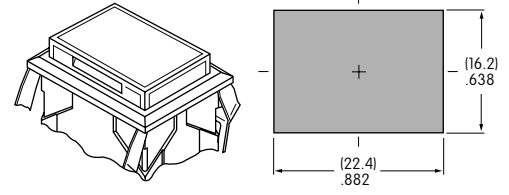
**S** .622" (15.8mm)  
Square



**C** .854" (21.7mm)  
Round



**R** .622" x .866" (15.8mm x 22.0mm)  
Rectangular



Cutout for 1 switch:  
.638" x .638" (16.2mm x 16.2mm)  
Cutout for 1 switch with barriers:  
.638" x .815" (16.2mm x 20.7mm)

Cutout for 1 switch:  
.638" x .882" (16.2mm x 22.4mm)  
Cutout for 1 switch with barriers:  
.638" x 1.059" (16.2mm x 26.9mm)

Panel Thickness for Switches & Barriers: .039" ~ .157" (1.0 ~ 4.0mm)  
Panel Thickness for Protective Guards & Splash Covers: .039" ~ .138" (1.0 ~ 3.5mm)

## HOUSING

Housing Colors Available:

**K** Black

**G** Gray

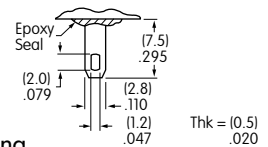
## CONTACT MATERIALS, RATINGS & TERMINALS

**W01** Silver Contacts

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

Solder Lug/Quick Connect

Optional PCB adaptors  
AT711 & AT712 available;  
illustrated in "Optional  
Accessories" immediately following  
"Typical Switch Dimensions."



**G01** Gold Contacts  
Logic Level  
0.4VA max. @ 28V AC/DC max.

Complete explanation of operating range in Supplement section.

## INCANDESCENT & NEON LAMP CODES & SPECIFICATIONS

**AT607 & AT607N**



T-1 Bi-pin

		<b>05</b>	<b>12</b>	<b>01</b> *
	AT607 Incandescent 5-volt or 12-volt; AT607N Neon 110-volt			
Voltage	V	5V AC	12V AC	110V AC
Current	I	115mA	60mA	1.5mA
Endurance	Avg. Hours	10,000		10,000
Ambient Temp. Range		-25°C ~ +50°C		


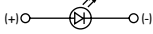
The electrical specifications shown are determined at a basic temperature of 25°C. Lamp circuit is isolated and requires external power source.

\* Recommended Resistors for Neon:  
33K ohms for 110V AC;  
100K ohms for 220V AC


## LED COLORS & SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C.  
 LED circuit is isolated and requires external power source. Polarity marks are on the switch.  
 If the source voltage exceeds the rated voltage, a ballast resistor is required.  
 The resistor value can be calculated by using the formula in the Supplement section.  
 Additional lamp detail is shown in the Accessories & Hardware section.

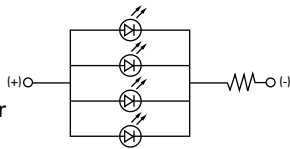
### Bright LED without Resistor

<b>AT635</b>  LEDs are colored in OFF state.      T-1 1/2 Bi-pin	Color Codes	Red <b>5C</b>	Amber <b>5D</b>	Green <b>5F</b>	<b>No Code</b> No Resistor		
	Forward Peak Current	$I_{FM}$			Red	Amber	Green
	Typical Forward Current	$I_F$			30mA	30mA	30mA
	Forward Voltage	$V_F$			1.9V	2.0V	2.1V
	Reverse Peak Voltage	$V_{RM}$			5V	5V	5V
	Current Reduction Rate Above 25°C	$\Delta I_F$			0.42mA/°C		
	Ambient Temperature Range				-25° ~ +50°C		

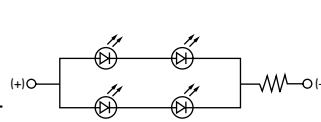
### Bright LED with Resistor

<b>AT627 with Resistor</b>    T-1 Bi-pin	Color Codes:	Red <b>5C</b>	Amber <b>5D</b>	Green <b>5F</b>	Resistor Codes		
	Forward Peak Current	$I_{FM}$			<b>05</b>	<b>12</b>	<b>24</b>
	Typical Forward Current	$I_F$			52mA	26mA	13mA
	Forward Voltage	$V_F$			5V	12V	24V
	Reverse Peak Voltage	$V_{RM}$			4V	8V	16V
	Current Reduction Rate Above 25°C	$\Delta I_F$			0.50mA/°C		
	Ambient Temperature Range				-25° ~ +50°C		

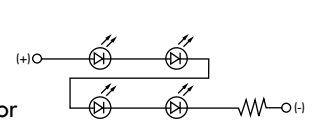
AT627  
5-volt  
4-element  
with Resistor




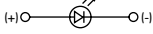

AT627  
12-volt  
4-element  
with Resistor



AT627  
24-volt  
4-element  
with Resistor



### Super Bright Single Element LED

<b>AT625G Blue</b> <b>AT631B White</b> <b>AT632F Green</b>      T-1 Bi-pin				<b>6B</b>	<b>6F</b>	<b>6G</b>	
	Color	White	Green	Blue			
	Forward Peak Current	$I_{FM}$			30mA	30mA	30mA
	Typical Forward Current	$I_F$			20mA	20mA	20mA
	Forward Voltage	$V_F$			3.6V	3.5V	3.6V
	Reverse Peak Voltage	$V_{RM}$			5V	5V	5V
	Current Reduction Rate Above 25°C	$\Delta I_F$			0.50mA/°C		
	Ambient Temperature Range				-25° ~ +50°C		

**No Code**

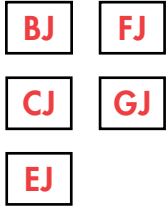
No Lamp

## CAP TYPES & COLOR COMBINATIONS

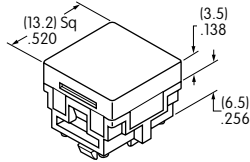
Color Codes: B White C Red D Amber E Yellow F Green G Blue J Clear

### Solid Cap for Incandescent Lamp & Nonilluminated

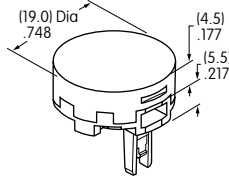
Lens/Filter  
Colors Available:



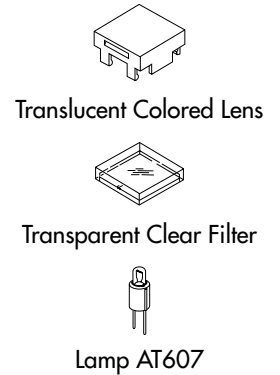
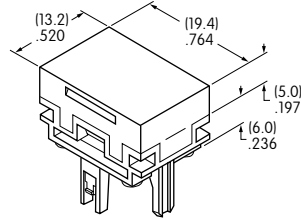
**AT476**  
Square



**AT4012**  
Round



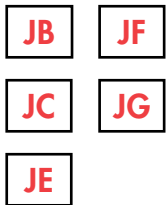
**AT4026**  
Rectangular



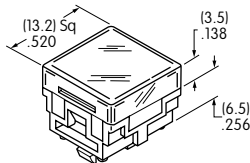
Material: Polycarbonate Finish: Glossy

### Insert Cap for Incandescent or Neon Lamp & Nonilluminated

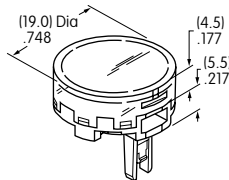
Lens/Filter  
Colors Available:



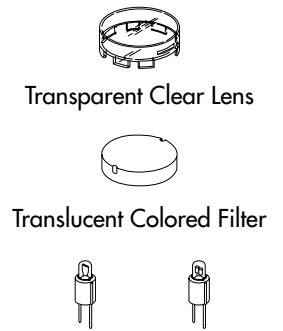
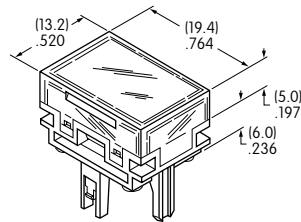
**AT477**  
Square



**AT4013**  
Round



**AT4027**  
Rectangular



JF and JG not suitable with neon lamp.

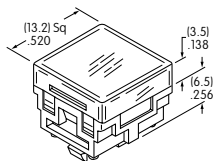
Material: Polycarbonate Finish: Glossy

### Cap for Bright LED without Resistor

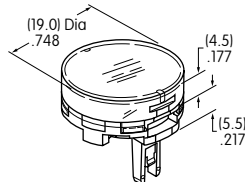
Lens/Diffuser  
Colors Available:



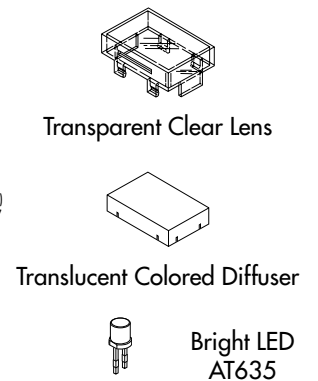
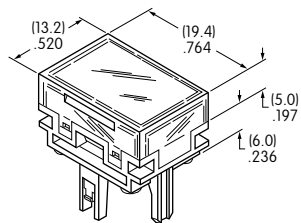
**AT4176**  
Square



**AT4178**  
Round



**AT4177**  
Rectangular



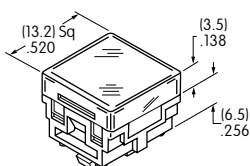
Material: Polycarbonate Finish: Glossy

### Cap for Bright LED with Resistor

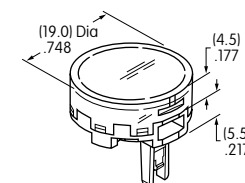
Lens/Diffuser  
Colors Available:



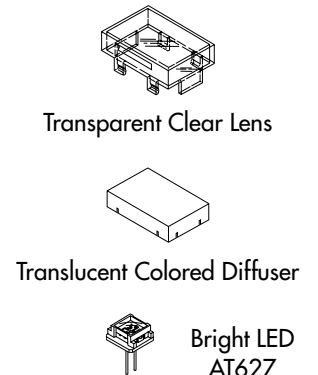
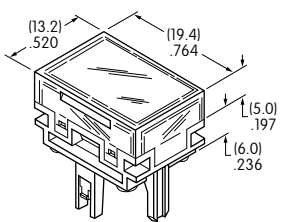
**AT4162**  
Square



**AT4164**  
Round



**AT4163**  
Rectangular



Material: Polycarbonate Finish: Glossy

Toggles  
Rockers  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

## CAP TYPES & COLOR COMBINATIONS

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

### Cap for Super Bright LEDs

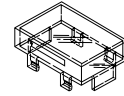
**JB**

Clear Lens  
White Diffuser

**AT4129**  
Square

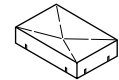
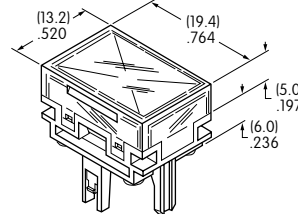
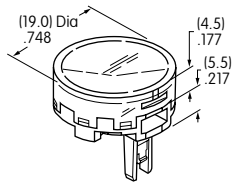
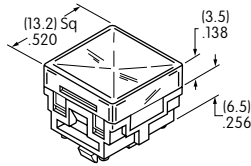
**AT4128**  
Round

**AT4130**  
Rectangular



Transparent  
Clear Lens

Material:  
Polycarbonate  
Finish: Glossy



Translucent  
White Diffuser



LEDs AT625  
AT631 AT632

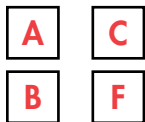
### Spot Illuminated Cap with LED

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. Single color LEDs are colored in OFF state; bicolor LEDs are translucent white in OFF state. Polarity marks are on the switch. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in the Supplement section. Additional lamp detail is shown in the Accessories & Hardware section.

### LED Specifications

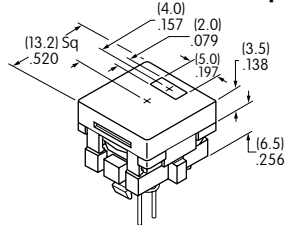
LED factory assembled in Spot Illuminated Caps	Single Color LED with 1 Element 	Bicolor LED with 2 Elements 	Single Color			Bicolor
			<b>1C</b> Red	<b>1D</b> Amber	<b>1F</b> Green	<b>CF</b> Red/Green
Not Available Separately	Forward Peak Current	$I_{FM}$	10mA	30mA	30mA	30/25mA
	Typical Forward Current	$I_F$	8mA	24mA	24mA	20mA
	Forward Voltage	$V_F$	1.9V	2.0V	2.1V	2.0/2.2V
	Reverse Peak Voltage	$V_{RM}$	5V	5V	5V	—
	Current Reduction Rate Above 25°C	$\Delta I_F$	0.13mA/°C	0.40mA/°C	0.40mA/°C	0.43/0.38mA/°C
	Ambient Temperature Range	-25° ~ +50°C				

Cap Colors Available:

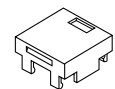
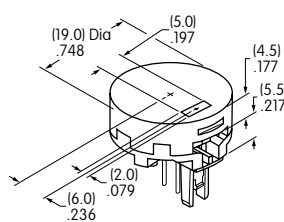


Material:  
Polycarbonate  
Finish: Glossy

**AT480**  
Square



**AT4016**  
Round



Cap with Window

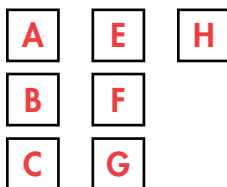


Factory Assembled LED;  
Not Available Separately

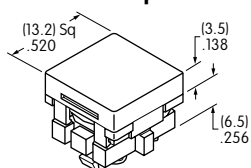
When ordering spot illuminated cap separately, LED color must be specified.  
Examples: AT480CA (red LED, black cap); AT4016CFB (red/green bicolored LED, white cap)

### Cap for Nonilluminated

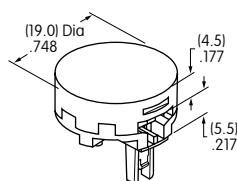
Cap Colors Available:



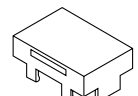
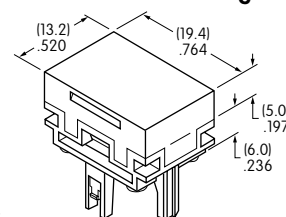
**AT484**  
Square



**AT4017**  
Round



**AT4030**  
Rectangular



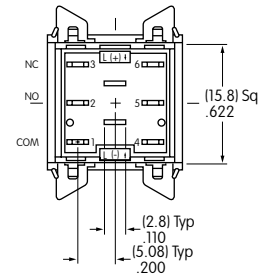
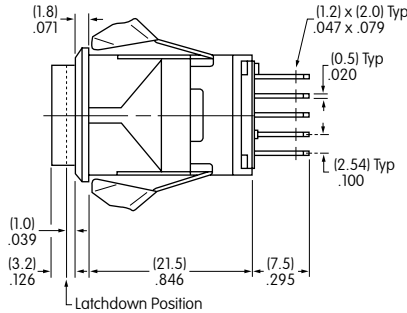
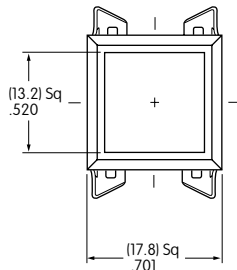
Cap  
No Lamp

Material: Polycarbonate Finish: Glossy

## TYPICAL SWITCH DIMENSIONS

### Square

### Single & Double Pole

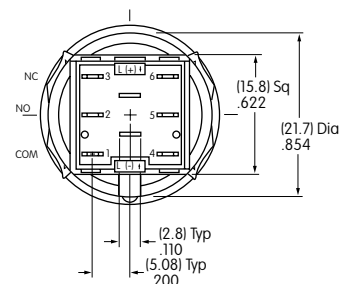
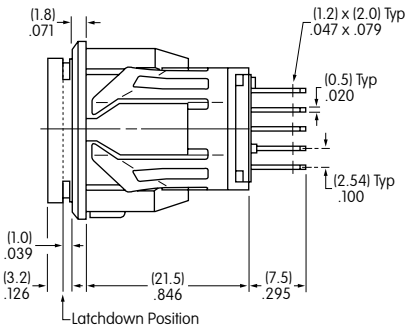
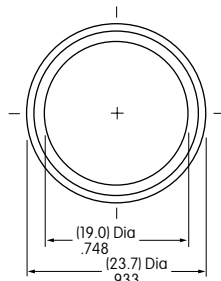


**LB15SKW01-12-CJ**

Single pole models do not have terminals 4, 5, & 6.

### Round

### Single & Double Pole

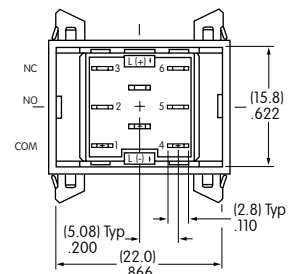
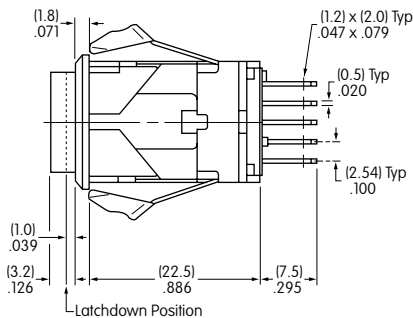
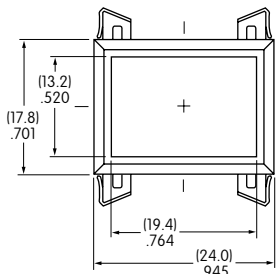


**LB16CKW01-12-CJ**

Single pole models do not have terminals 4, 5, & 6.

### Rectangular

### Single & Double Pole



**LB26RGW01-12-CJ**

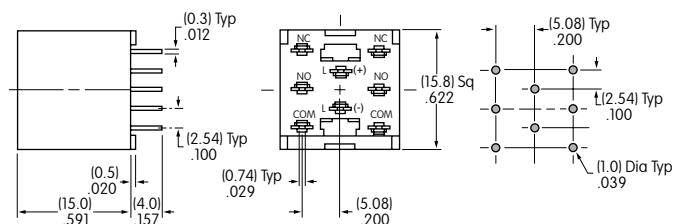
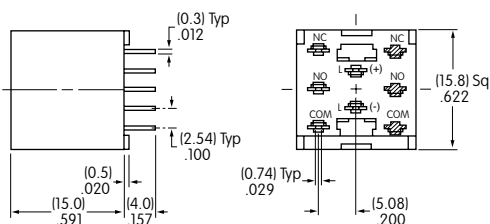
Single pole models do not have terminals 4, 5, & 6.

## OPTIONAL ACCESSORIES

### PCB Adaptors

#### AT711 Single Pole • Straight PC Terminals

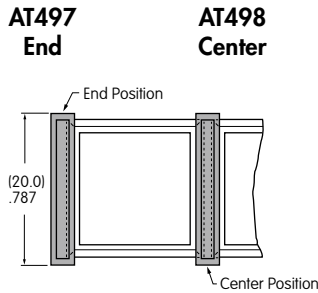
#### AT712 Double Pole • Straight PC Terminals



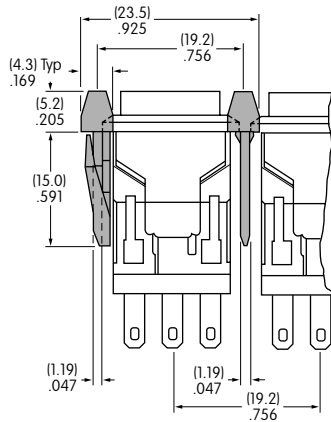
Note: Order adaptors separately.

## OPTIONAL ACCESSORIES

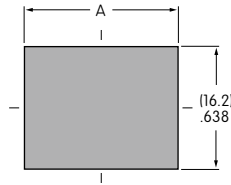
### Barriers



Material: Polyamide



### Cutouts for More Than 1 Switch



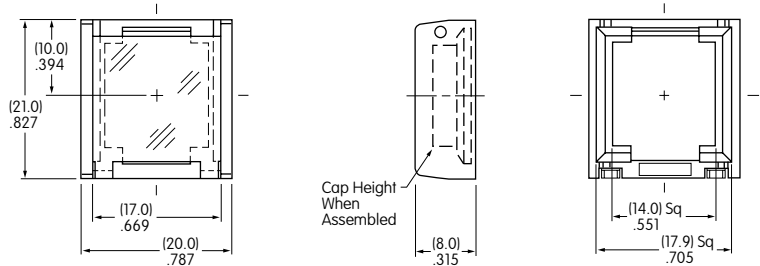
**Square**  
 $A = .752'' (19.1\text{mm}) \times \text{Number of Switches} + .051'' (1.3\text{mm})$

**Rectangular**  
 $A = .996'' (25.3\text{mm}) \times \text{Number of Switches} + .051'' (1.3\text{mm})$

### Protective Guard

#### AT499 Square Protective Guard

Opens 90°  
Closes manually



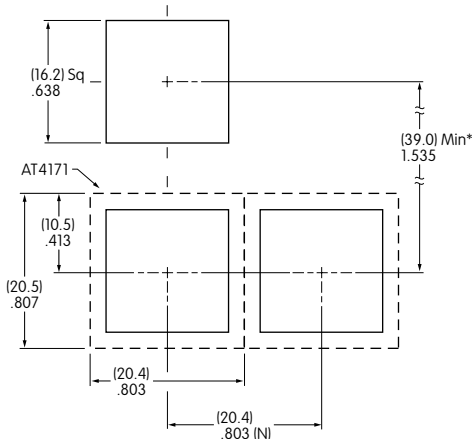
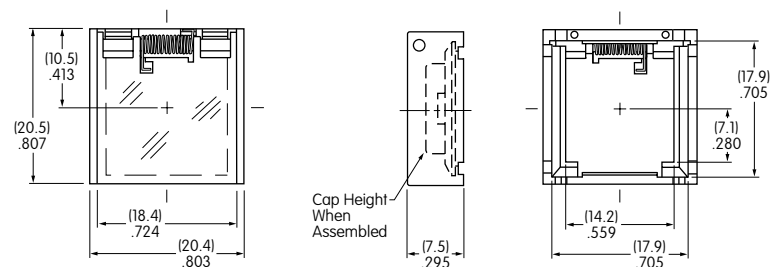
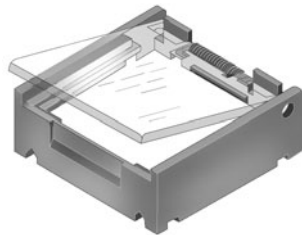
Material: Polyamide

Protective Guards reduce depth of switch behind panel by .020" (0.5mm).

### Spring Loaded Protective Guard

#### AT4171 Square Protective Guard

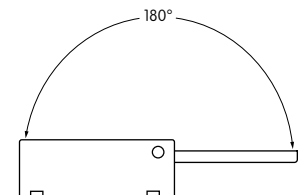
Opens 180°  
Closes automatically



(N) = Number of switches \* Minimum dimension allows opening of cover to 180°

#### Materials:

Cover: Clear Polycarbonate  
Base: Black GFR Polyamide  
Coil Spring: Stainless Steel



**Recommended Panel Thickness:**  
.039" ~ .106" (1.0mm ~ 2.7mm)

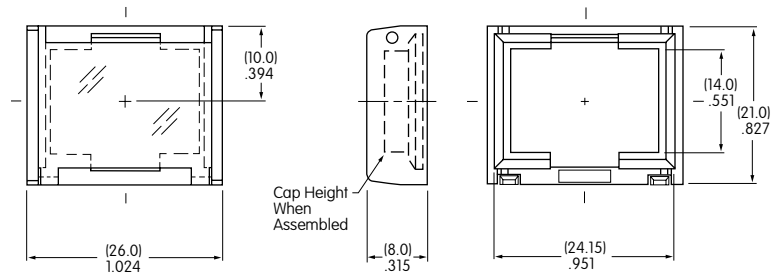
## OPTIONAL ACCESSORIES

### AT4057 Rectangular Protective Guard

Opens 90°  
Closes manually



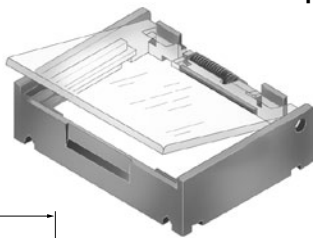
### Protective Guard



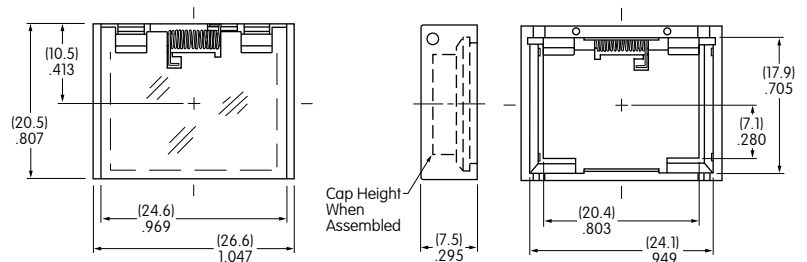
Material: Polyamide

Protective Guards reduce depth of switch behind panel by .020" (0.5mm).

### AT4172 Rectangular Protective Guard



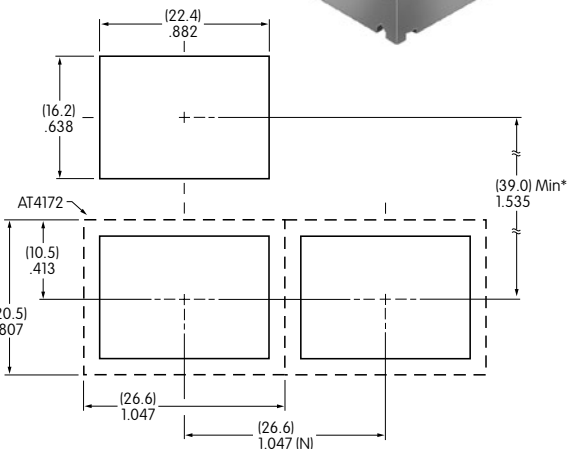
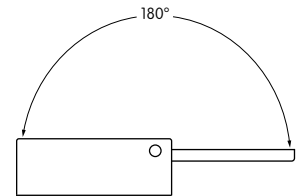
### Spring Loaded Protective Guard



Opens 180°  
Closes automatically

**Materials:**  
Cover: Clear Polycarbonate  
Base: Black GFR Polyamide  
Coil Spring: Stainless Steel

Recommended Panel Thickness:  
.039" ~ .106" (1.0mm ~ 2.7mm)



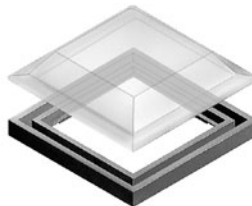
(N) = Number of switches \* Minimum dimension allows opening of cover to 180°

### Dust Covers

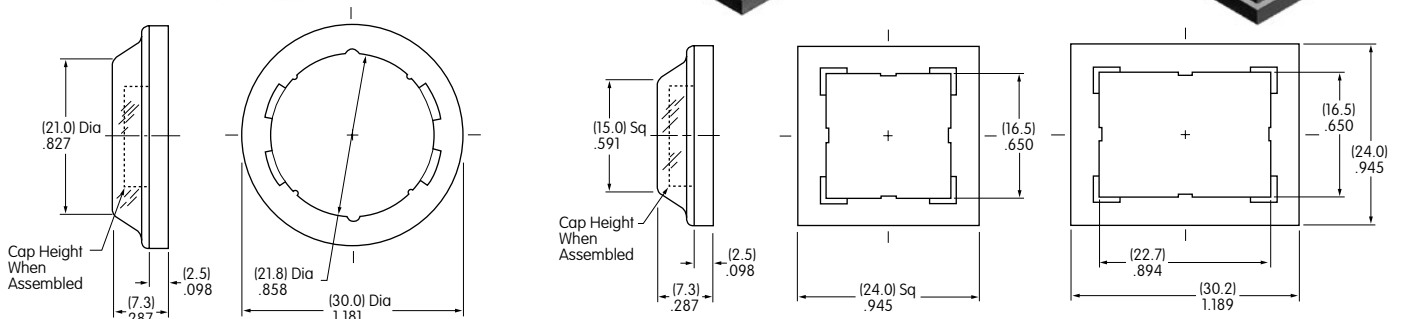
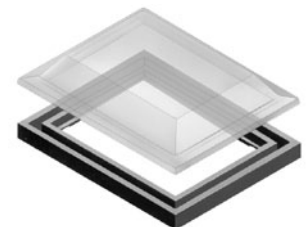
### AT4002 Round



### AT4001 Square



### AT4011 Rectangular



Materials: PVC with polyethylene gasket; PVC loses pliability below 0°C (32°F). Dust Covers reduce depth of switch behind panel by .020" (0.5mm).

# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 3A @ 125V AC or 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)

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

## Other Ratings

**Contact Resistance:** 50 milliohms maximum for silver; 100 milliohms maximum for gold  
**Insulation Resistance:** 200 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 for momentary circuit  
 200,000 operations minimum for maintained circuit  
**Electrical Life:** 100,000 operations minimum  
**Nominal Operating Force:** 5.39N  
**Contact Timing:** Nonshorting (break-before-make)  
**Travel:** Pretravel .059" (1.5mm); Overtravel .059" (1.5mm); Total Travel .118" (3.0mm)

## Materials & Finishes

**Housing:** Glass fiber reinforced polyamide (UL94V-0)  
**O-ring:** Nitrile butadiene rubber  
**Inner Seal:** Silicone rubber  
**Movable Contact:** Silver alloy or copper with gold plating  
**Stationary Contacts:** Silver alloy or copper with gold plating  
**Base:** Liquid crystal polymer (UL94V-0)  
**Switch Terminals:** Phosphor bronze with silver or gold plating  
**Lamp Terminals:** Brass with silver plating

## Environmental Data

**Operating Temperature Range:** -25°C through +50°C (-13°F through +122°F) for Illuminated  
 -25°C through +70°C (-13°F through +158°F) for Nonilluminated  
 Note: When used with a polyvinyl chloride splash cover, the lowest limit is 0°C (32°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/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)  
**Sealing:** IP65 of IEC60529 standard (similar to NEMA 4 & 13)

## Installation

**Mounting Torque:** 1.96Nm (17.35 lb•in) maximum  
**Cap Installation Force:** 3.92N maximum downward force on cap  
**Quick Connect Force:** 52.95N maximum downward force on connector  
**Soldering Time & Temperature:** Manual Soldering: See Profile A in Supplement section.

## Standards & Certifications

**Flammability Standards:** UL94V-0 housing & base  
**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 models recognized at 3A @ 125V or 250V AC or 0.4VA @ 28V AC/DC maximum.  
**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.  
 All models certified at 3A @ 125V or 250V AC or 0.4VA @ 28V AC/DC maximum.

Toggles

Rockers

Pushbuttons

**D** Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

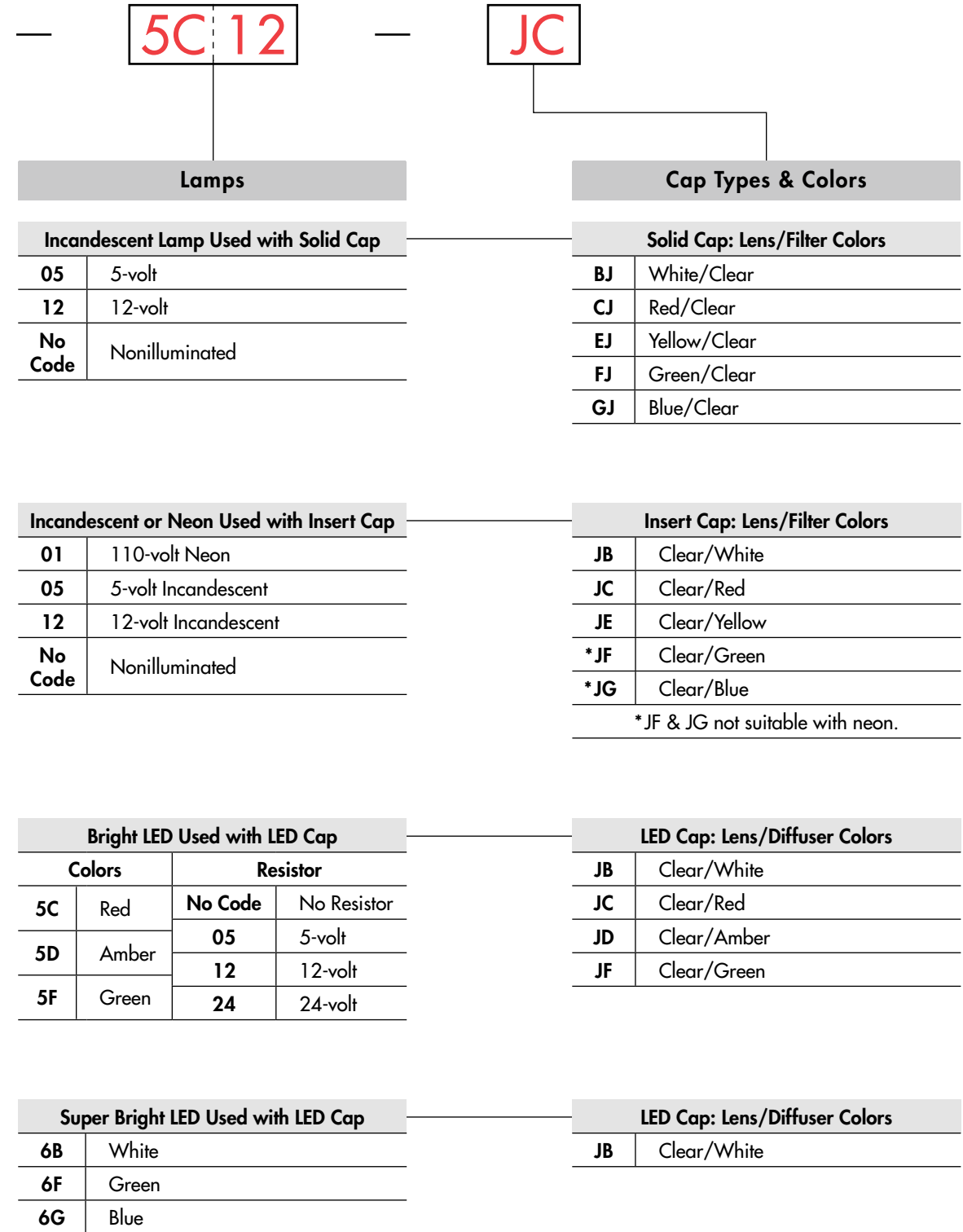
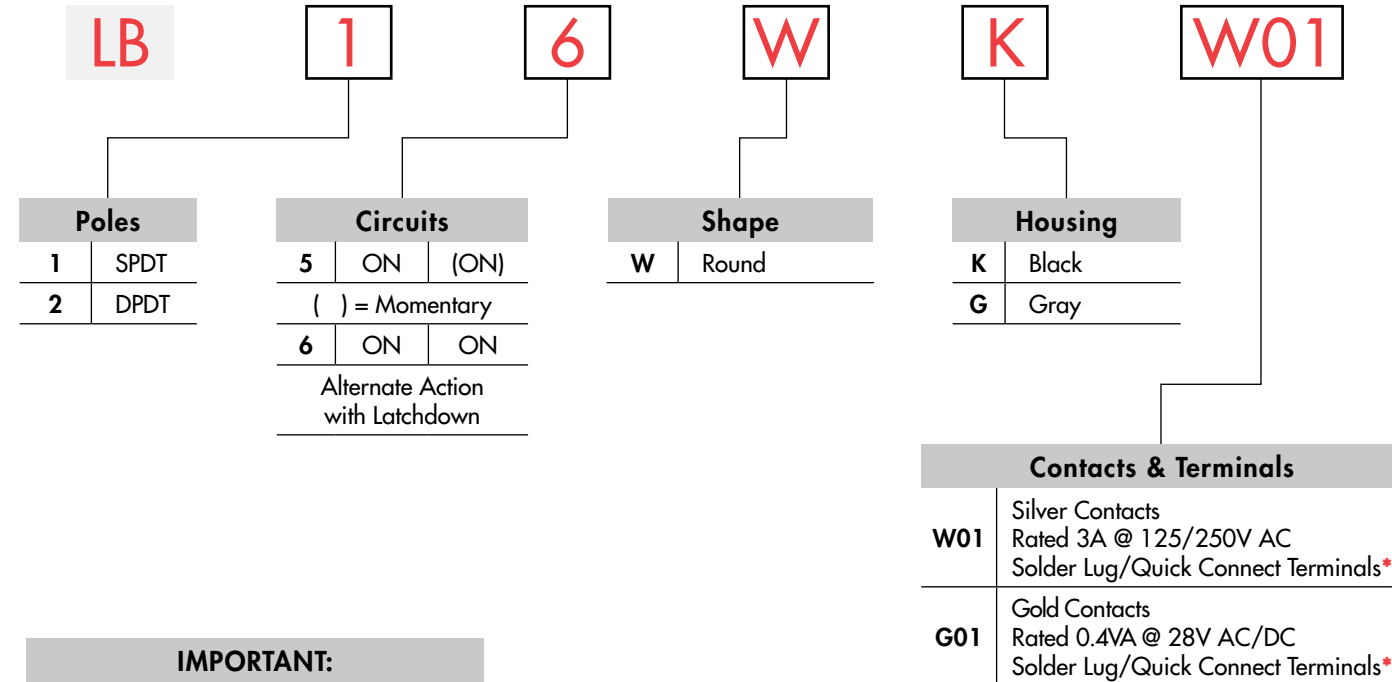
Touch

Indicators

Accessories

Supplement

## TYPICAL SWITCH ORDERING EXAMPLE



**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

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**LB16WKW01-5C12-JC**



Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

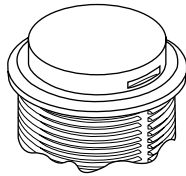
## POLES & CIRCUITS

Pole	Model	Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
		Normal	Down	Normal	Down	
SP	LB15 *LB16	ON ON	(ON) ON	1-3	1-2	Notes: Switch is marked with NC, NO, COM, L+, L-. Lamp circuit is isolated and requires external power source.  
DP	LB25 *LB26	ON ON	(ON) ON	1-3 4-6	1-2 4-5	

\* When in latchdown position for the alternate circuit, cap position is .039" (1.0mm) above the built-in bezel.

## SHAPE & PANEL CUTOUT

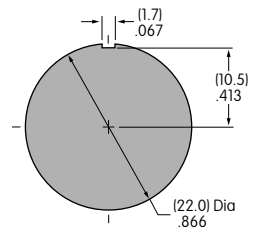
**W** .866" (22.0mm)  
Round



Recommended Panel Thickness:  
.039" ~ .157" (1.0mm ~ 4.0mm)

Recommended Panel Thickness with Splash Cover:  
.039" ~ .138" (1.0mm ~ 3.5mm)

Overtightening the mounting nut AT074  
may damage the switch housing.



## HOUSING

Housing Colors Available:

**K** Black

**G** Gray

## CONTACT MATERIALS, RATINGS & TERMINALS

**W01** Silver Contacts

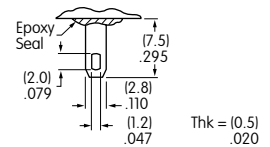
Power Level  
3A @ 125V AC & 250V AC

Solder Lug/Quick Connect

**G01** Gold Contacts

Logic Level  
0.4VA max. @ 28V AC/DC max.

Optional PCB adaptors AT711  
& AT712 available; illustrated  
in previous snap-in subsection.



Complete explanation of operating range in Supplement section.

## INCANDESCENT & NEON LAMP CODES & SPECIFICATIONS

AT607 & AT607N



T-1 Bi-pin

		<b>05</b>	<b>12</b>	<b>01</b> *
Voltage	V	5V AC	12V AC	110V AC
Current	I	115mA	60mA	1.5mA
Endurance	Avg. Hours	10,000		10,000
Ambient Temp. Range		-25°C ~ +50°C		


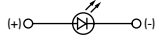
The electrical specifications shown are determined at a basic temperature of 25°C. Lamp circuit is isolated and requires external power source.

\* Recommended Resistors for Neon:  
33K ohms for 110V AC;  
100K ohms for 220V AC


## LED COLORS & SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C.  
 LED circuit is isolated and requires external power source. Polarity marks are on the switch.  
 If the source voltage exceeds the rated voltage, a ballast resistor is required.  
 The resistor value can be calculated by using the formula in the Supplement section.  
 Additional lamp detail is shown in the Accessories & Hardware section.

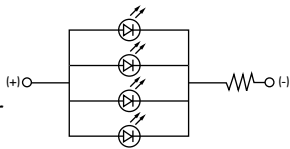
### Bright LED without Resistor

<b>AT635</b>  LEDs are colored in OFF state.      T-1 1/2 Bi-pin	Color Codes	Red <b>5C</b>	Amber <b>5D</b>	Green <b>5F</b>	<b>No Code</b> No Resistor		
	Forward Peak Current	$I_{FM}$			Red	Amber	Green
	Typical Forward Current	$I_F$			30mA	30mA	30mA
	Forward Voltage	$V_F$			1.9V	2.0V	2.1V
	Reverse Peak Voltage	$V_{RM}$			5V	5V	5V
	Current Reduction Rate Above 25°C	$\Delta I_F$			0.42mA/°C		
	Ambient Temperature Range				-25° ~ +50°C		

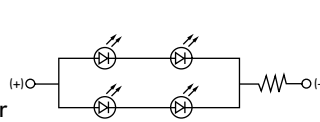
### Bright LED with Resistor

<b>AT627 with Resistor</b>    T-1 Bi-pin	Color Codes:	Red <b>5C</b>	Amber <b>5D</b>	Green <b>5F</b>	Resistor Codes		
	Forward Peak Current	$I_{FM}$			<b>05</b>	<b>12</b>	<b>24</b>
	Typical Forward Current	$I_F$			—	—	—
	Forward Voltage	$V_F$			5V	12V	24V
	Reverse Peak Voltage	$V_{RM}$			4V	8V	16V
	Current Reduction Rate Above 25°C	$\Delta I_F$			0.50mA/°C		
	Ambient Temperature Range				-25° ~ +50°C		

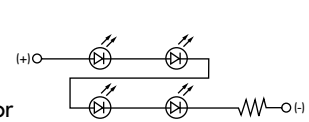
AT627  
5-volt  
4-element  
with Resistor




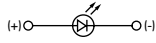

AT627  
12-volt  
4-element  
with Resistor



AT627  
24-volt  
4-element  
with Resistor



### Super Bright Single Element LED

<b>AT625G Blue</b> <b>AT631B White</b> <b>AT632F Green</b>      T-1 Bi-pin				<b>6B</b>	<b>6F</b>	<b>6G</b>	
	Color	White	Green	Blue			
	Forward Peak Current	$I_{FM}$			30mA	30mA	30mA
	Typical Forward Current	$I_F$			20mA	20mA	20mA
	Forward Voltage	$V_F$			3.6V	3.5V	3.6V
	Reverse Peak Voltage	$V_{RM}$			5V	5V	5V
	Current Reduction Rate Above 25°C	$\Delta I_F$			0.50mA/°C		
Ambient Temperature Range				-25° ~ +50°C			

**No Code** No Lamp

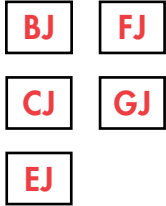
### CAP TYPES & COLOR COMBINATIONS

Color Codes: B White C Red D Amber E Yellow F Green G Blue J Clear

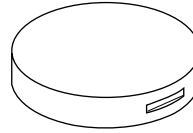
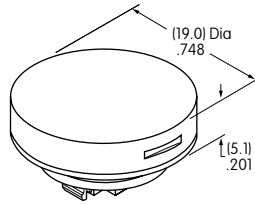
#### Solid Cap for Incandescent Lamp & Nonilluminated

Lens/Filter

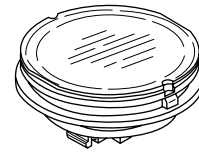
Colors Available:



AT4054



Translucent Colored Lens



Transparent Clear Filter



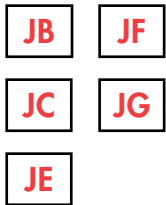
Lamp AT607

Material: Polycarbonate Finish: Glossy

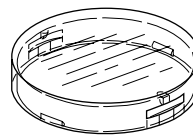
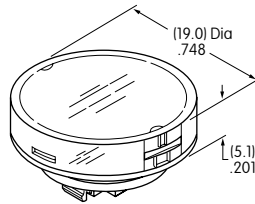
#### Insert Cap for Incandescent or Neon Lamp & Nonilluminated

Lens/Filter

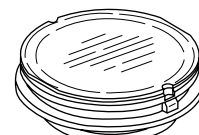
Colors Available:



AT4055



Transparent Clear Lens



Translucent Colored Filter



Lamp AT607



Lamp AT607N

JF and JG not suitable with neon lamp.

Material: Polycarbonate Finish: Glossy

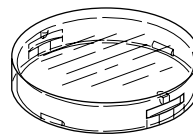
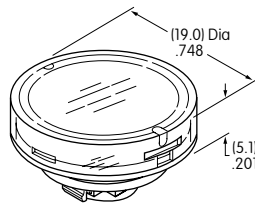
#### Cap for Bright LED without Resistor

Lens/Diffuser

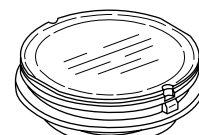
Colors Available:



AT4179



Transparent Clear Lens



Translucent Colored Diffuser



Bright LED AT635

Material: Polycarbonate Finish: Glossy

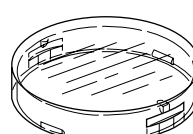
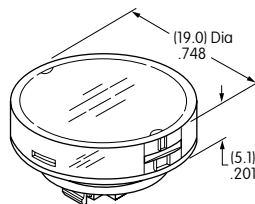
#### Cap for Bright LED with Resistor

Lens/Diffuser

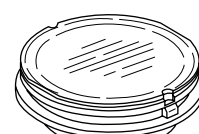
Colors Available:



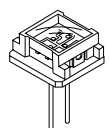
AT4165



Transparent Clear Lens



Translucent Colored Diffuser



Bright LED AT627

Material: Polycarbonate Finish: Glossy

## CAP TYPES & COLOR COMBINATIONS

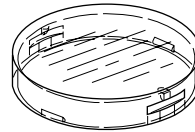
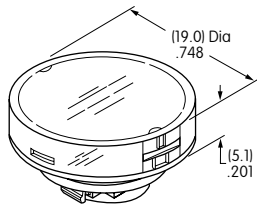
### Cap for Super Bright LEDs

**JB**

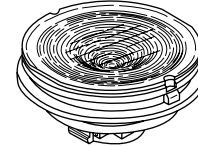
**Clear Lens  
White Diffuser**

Material:  
Polycarbonate  
Finish: Glossy

**AT4131**



Transparent  
Clear Lens



Translucent  
Colored Diffuser

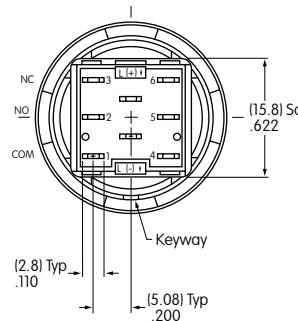
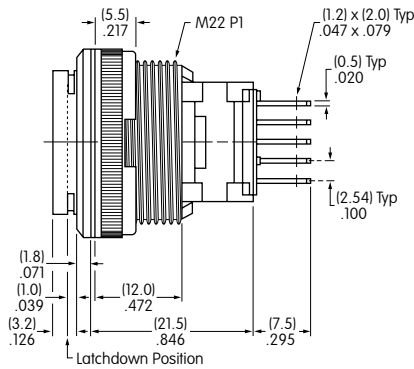
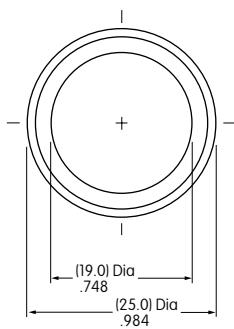


LEDs  
AT625  
AT631  
AT632

## TYPICAL SWITCH DIMENSIONS

### Single & Double Pole

### Panel Seal



Single pole models do not have terminals 4, 5, & 6.

**LB25WKW01-12-JC**

## OPTIONAL ACCESSORIES

### AT9410 Splash Cover for Panel Seal

Materials:

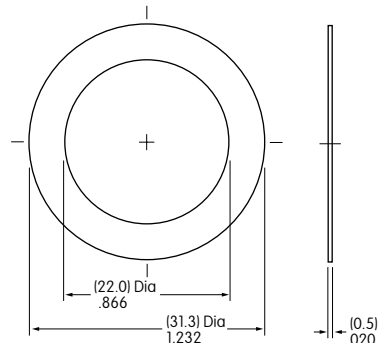
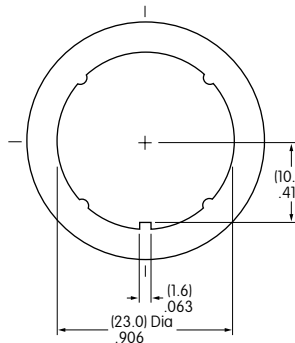
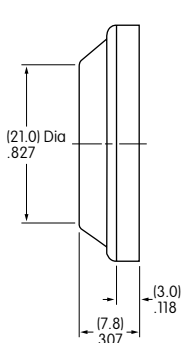
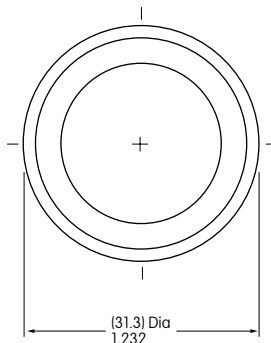
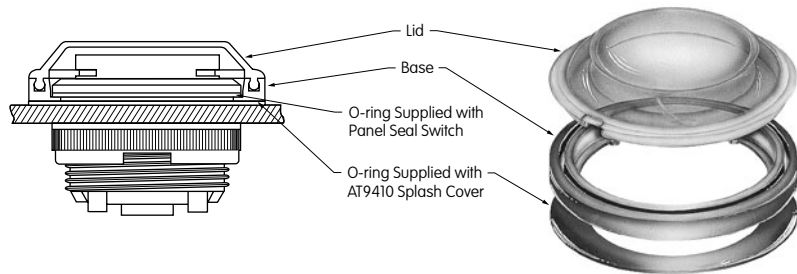
Lid: PVC (loses pliability below 0°C/32°F)

Base: Polyethylene

O-ring: NBR

Recommended Panel Thickness:

.039" ~ .138" (1.0mm ~ 3.5mm)



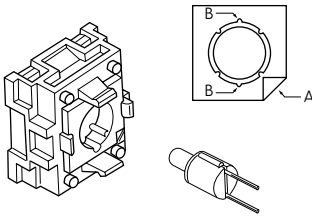
Toggles  
Rockers  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

## ASSEMBLY INSTRUCTIONS

### Lamp Installation & LED Orientation

#### Incandescent & Neon Lamps AT607 & AT607N

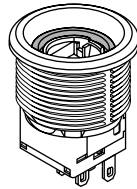
Align projections on lamp with grooves (B) in holder when inserting lamp. To correctly join the lamp holder and cap base, match the cut corners (A).



#### Bright LED AT627

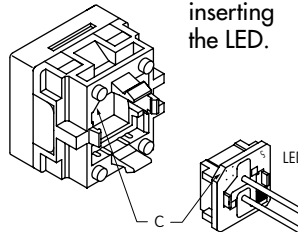
##### Panel Seal Models

For panel seal models, Bright LED must first be inserted into the lamp socket which is built into the switch. The cap can then be placed on the switch.



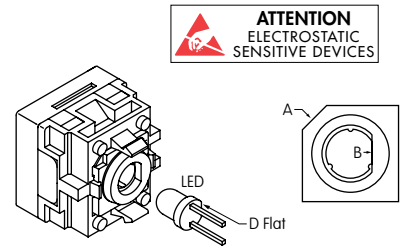
##### Snap-in Models

For snap-in models, Bright LED must be inserted into the cap first. Align cut corners (C) when inserting the LED.



#### Bright & Super Bright LEDs AT625, AT631, AT632, AT635

Align D-flat on LED with flat (B) in holder when inserting the LED. To correctly join the lamp holder and cap base, match the cut corners (A).

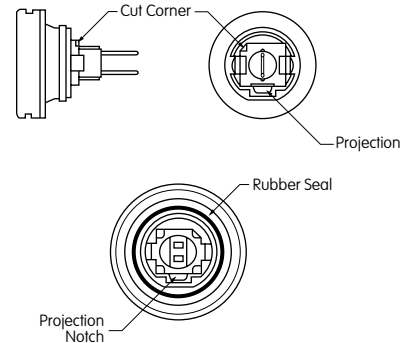
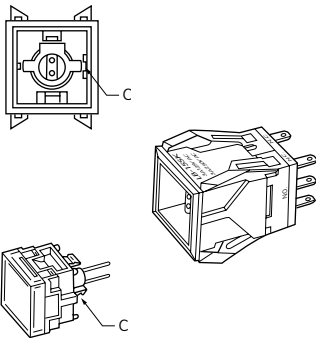


**ATTENTION**  
ELECTROSTATIC  
SENSITIVE DEVICES

### Switch & Cap Assembly

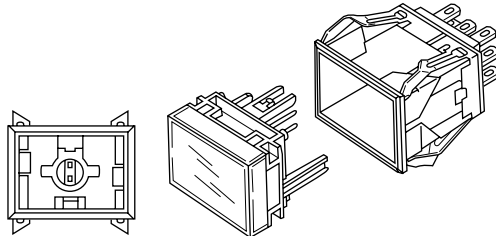
#### Round & Rectangular

Match clip on cap assembly with receptacle inside switch. Lamp terminals will then be aligned correctly with lamp socket.



#### Square

Match projection (C) on cap assembly with groove (C) inside switch. Lamp terminals will then be aligned correctly with lamp socket.



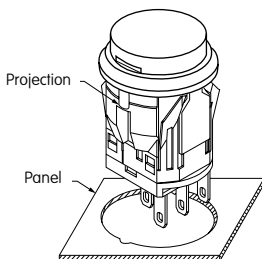
#### Panel Seal

With Lamps AT607, AT607N, and LEDs AT614, AT625, AT631, AT632: Match projection on cap assembly with notch inside switch. Lamp terminals will then be aligned correctly with lamp socket.

### Installation & Maintenance

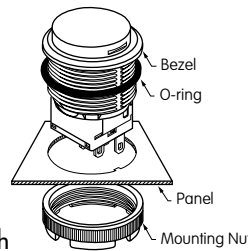
#### Snap-in Mount

Snap-in clip holds all switches firmly in place. To mount round switch, match the antirotation projection on switch with guide cut in panel. Snap into panel cutout.



#### Panel Seal Bushing Mount

Insert switch from the front of the panel with the o-ring between the built-in bezel and the panel. Install mounting nut AT075 (supplied with switch) from the rear of the panel. Overtightening mounting nut may damage the switch housing.



#### Lamp Replacement

Actuator must be in UP position. Pull off cap with cap extractor AT109. Replace lamp and reassemble as shown above.



AT109  
Cap Extractor



AT112  
Socket Wrench

Toggles  
Rockers  
Pushbuttons  
Illuminated PB  
D  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

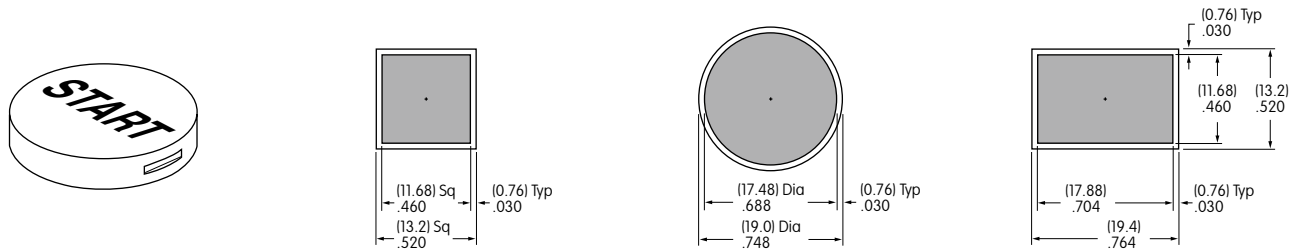
## LEGENDS

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

### Suggested Printable Area for Lens

**Recommended Methods:** Laser Etch on clear lens, Screen Print, or Pad Print on lens.

Epoxy based ink is recommended.

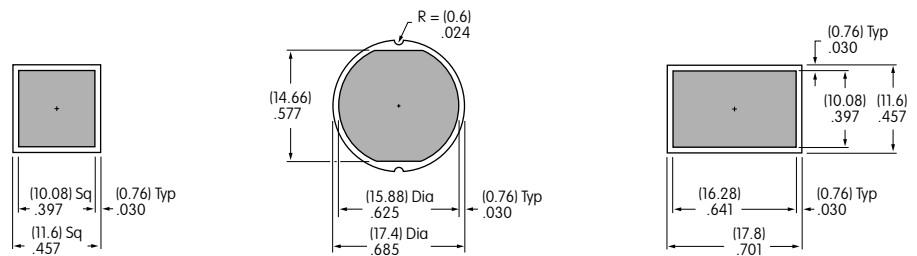
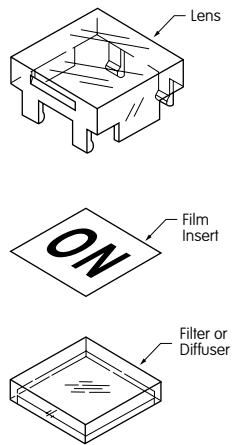


Shaded areas are printable areas.

### Suggested Printable Area for Film Insert

**Recommended Print Method:** Laser Print or Screen Print with Epoxy based ink

Film Insert: Clear Polyester, 4 mil max. thickness



Shaded areas are printable areas.

# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 3A @ 125V AC or 3A @ 250V AC or 3A @ 30V DC

## Other Ratings

**Contact Resistance:** 50 milliohms maximum  
**Insulation Resistance:** 200 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:** 500,000 operations minimum  
**Electrical Life:** 50,000 operations minimum for 3A @ 125V/250V AC & 3A @ 30V DC  
 100,000 operations minimum for 1A @ 125V/250V AC & 1A @ 30V DC  
**Nominal Operating Force:** 1.5N for Single Pole; 3.0N for Double Pole  
**Contact Timing:** Nonshorting (break-before-make)  
**Travel:** Total Travel .118" (3.0mm)

## Materials & Finishes

**Actuator:** Polycarbonate  
**Housing:** Bushing mount: Glass fiber reinforced polyamide (UL94V-0);  
 Snap in mount: Polyphenylene ether (UL94V-0)  
**Base:** Diallyl phthalate (UL94V-0)  
**Movable Contact:** Phosphor bronze & silver with silver plating  
**Stationary Contacts:** Common terminal: Phosphor bronze with silver plating;  
 Contact terminals: Phosphor bronze with tin & copper plating  
**Lamp Terminals:** Phosphor bronze with tin and copper plating

## Environmental Data

**Operating Temperature Range:** -10°C through +50°C (+14°F through +122°F) for Illuminated  
 -25°C through +70°C (+13°F through +158°F) for Nonilluminated  
**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/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Installation

**Mounting Torque:** 0.8Nm (7.08 lb•in)  
**Soldering Time & Temperature:** Manual Soldering: See Profile A in Supplement section.  
**Cleaning:** Hand clean locally with alcohol based solution

## Standards & Certifications

**Flammability Standards:** UL94V-0 housing & base  
**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.  
 All single & double pole models recognized at 3A @ 125V/250V AC or 3A @ 30V DC.

# Distinctive Characteristics

Environmentally friendly components and packaging materials meet RoHS Directive restricting use of hazardous materials. Suited for lead-free soldering because of heat resistant resin materials.

Smooth, slightly concave surface of cap designed to fit fingertip. Unique design and construction of cap prevents its removal and limits tampering.

Bright LED illumination in choice of red, green, or amber through translucent white cap.

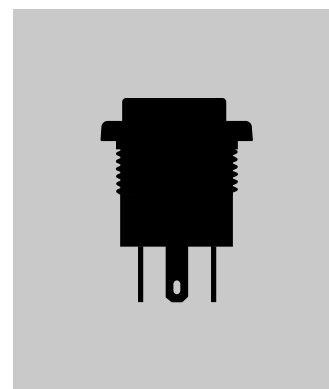
Short body of .551" (14.0mm) conserves behind-panel space.

Combination solder lug and .110" quick connect terminals.

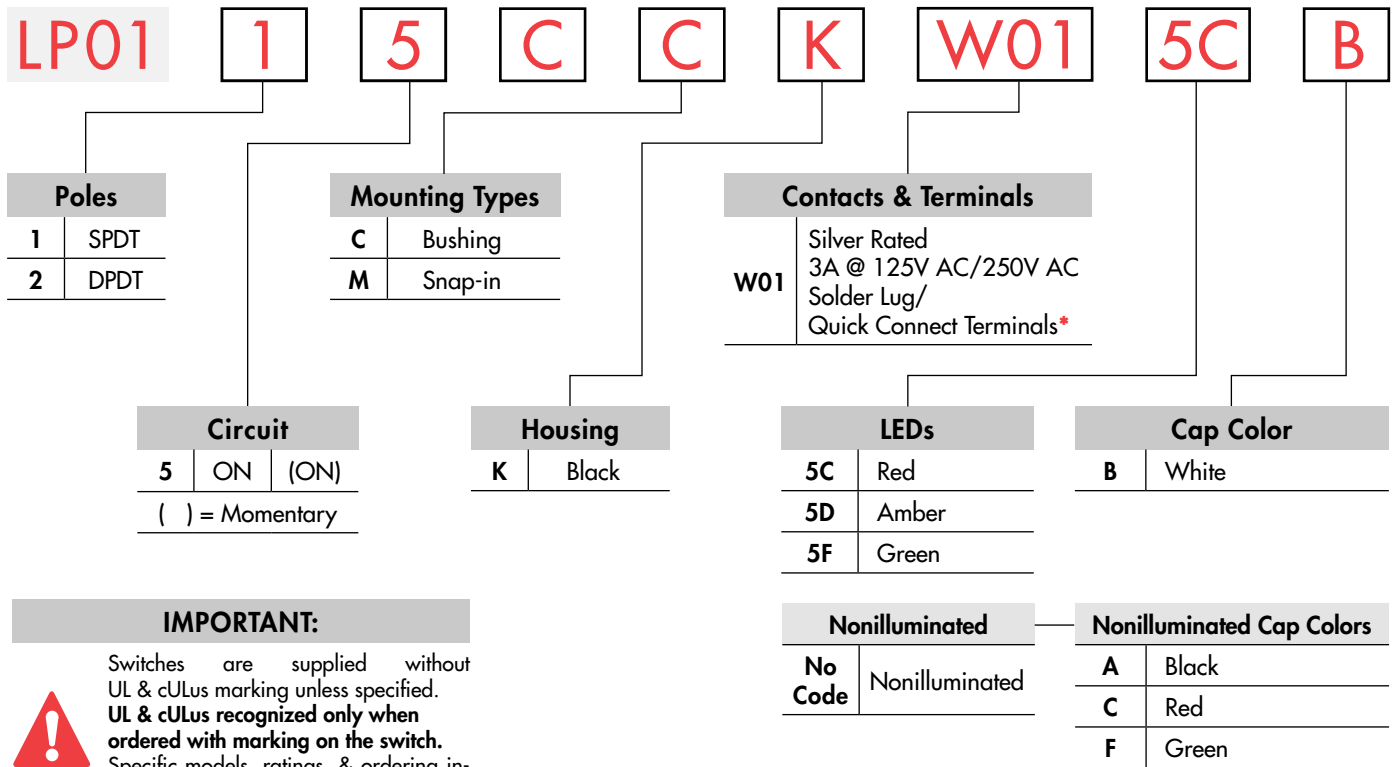
Crisp actuation and clear circuit status provided by snap-action contact mechanism. Arc barrier between movable contacts protects against crossover.



Actual Size



### TYPICAL SWITCH ORDERING EXAMPLE



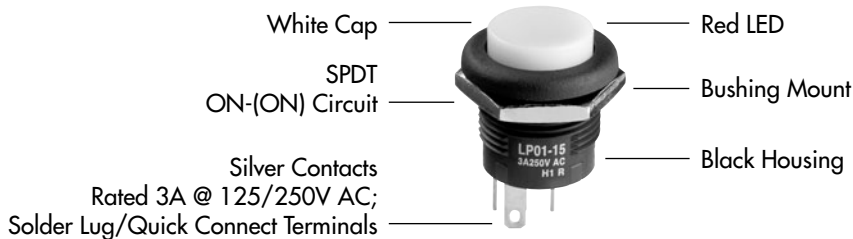
#### IMPORTANT:



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.

#### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**LP0115CCKW015CB**



\* Wire harness & cable assemblies offered only in Americas

### POLES & CIRCUIT

Pole	Model	Plunger Position ( ) = Momentary		Connected Terminals		Throw & Power/Lamp Schematics
		Normal	Down	Normal	Down	
SP	LP0115	ON	(ON)	1-3	1-2	Note: Terminal markings "COM, NO, NC, L, + and -" are actually on the switch; terminal numbers are not on the switch. 
DP	LP0125	ON	(ON)	1-3 4-6	1-2 4-5	

## MOUNTING TYPES

**C**

**Bushing**

.630" (16.0mm) Diameter

This mounting option is supplied with a brass hexagon nut with nickel plating.



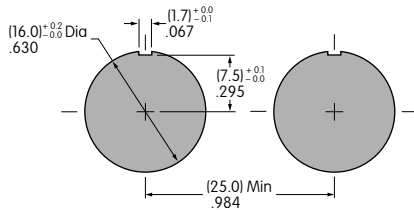
**M**

**Snap-in**

.669" (17.0mm) Diameter

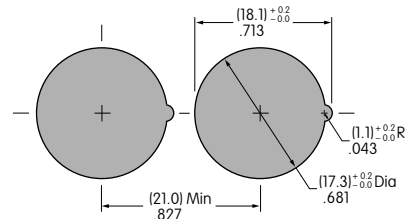


Recommended Panel Thickness:  
.079" ~ .256"  
(2.0mm ~ 6.5mm)



Allow .984" (25.0mm) distance from center-to-center between switches when mounted side-by-side.

Recommended Panel Thickness:  
.039" ~ .126"  
(1.0mm ~ 3.2mm)



Allow .827" (21.0mm) distance from center-to-center between switches when mounted side-by-side.

## HOUSING

**K**

**Black**

Housing available in black only. The one-piece body and bezel have a matte finish.

## CONTACT MATERIALS, RATINGS, & TERMINALS

**W01**

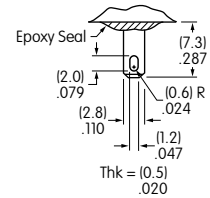
**Silver**

**Power Level**

**Solder Lug/  
.110" (2.8mm) Quick Connect**

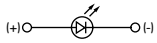
**3A @ 125V AC/250V AC; 3A @ 30V DC**

Note: If used at 1A @ 125V AC/250V AC or 1A @ 30V DC, electrical life will be 100,000 operations minimum.



## LED COLORS & SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires external power source. Polarity marks are on the switch. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in the Supplement section.

LEDs are an integral part of the switch and are not available separately.	Single Color LED with 1 Element		<b>5C</b>	<b>5D</b>	<b>5F</b>
		Colors	Red	Amber	Green
	Forward Peak Current	$I_{FM}$	30mA	30mA	30mA
	Typical Forward Current	$I_F$	20mA	20mA	20mA
	Forward Voltage	$V_F$	1.95V	2.0V	2.1V
	Reverse Peak Voltage	$V_{RM}$	5V	5V	5V
	Current Reduction Rate Above 25°C	$\Delta I_F$	0.41mA/°C	0.29mA/°C	0.39mA/°C
Ambient Temperature Range		-10°C ~ +50°C			

**No Code**

**No Lamp**

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

### CAP COLORS

#### Illuminated Cap

Cap Color Available:



White

The translucent cap is an integral part of the switch and is not available separately.

Material: Polycarbonate      Finish: Matte



#### Nonilluminated Caps

Cap Colors Available:



Black



Red



Green

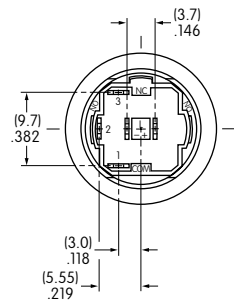
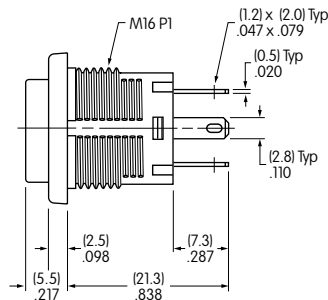
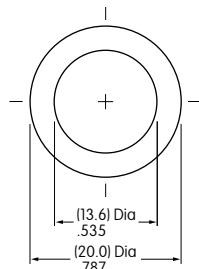
The cap is an integral part of the switch and is not available separately.

Material: Polycarbonate      Finish: Matte



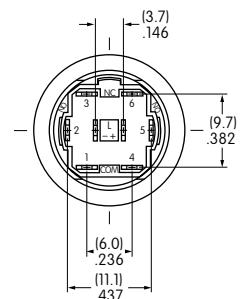
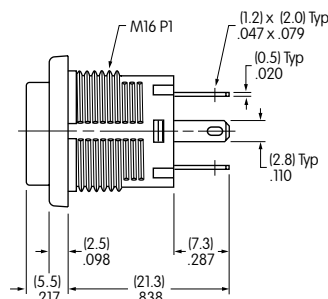
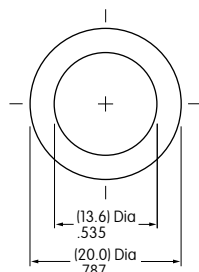
### TYPICAL SWITCH DIMENSIONS

#### Bushing Mount • Single Pole



**LP0115CCKW015CB**

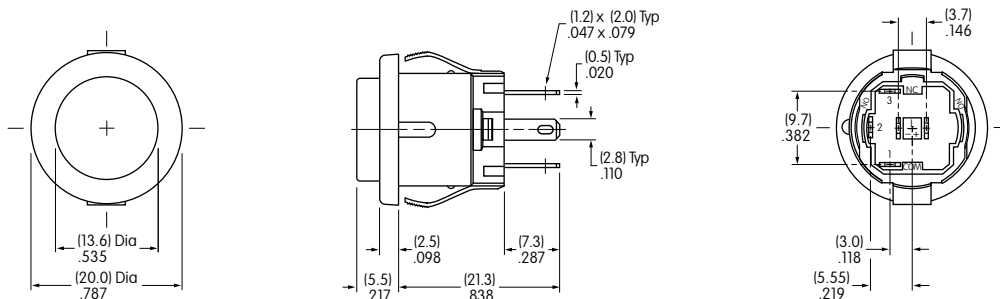
#### Bushing Mount • Double Pole



**LP0125CCKW015CB**

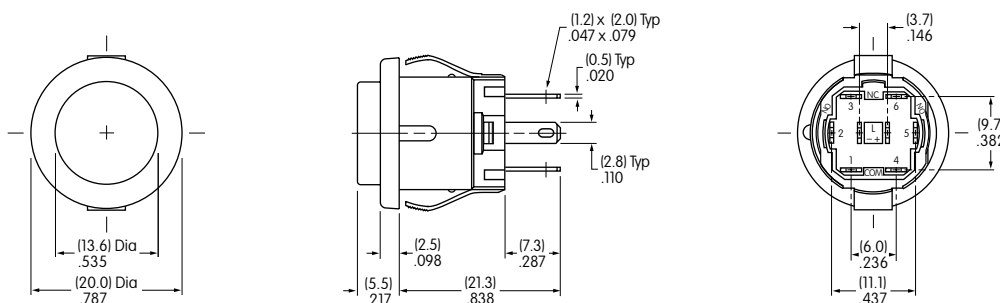
TYPICAL SWITCH DIMENSIONS

Snap-in • Single Pole



LP0115CMKW015CB

Snap-in • Double Pole



LP0125CMKW015DB

LEGENDS

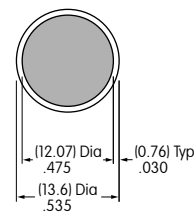
NKK Switches can provide custom legends for caps. Contact factory for more information.

Suggested Printable Area for LP01 Cap



Recommended Methods:

Pad Print or Laser Etch on cap.  
Epoxy based ink is recommended.



Shaded area is printable area

# General Specifications

## Electrical Capacity (Resistive Load)

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

## Other Ratings

**Contact Resistance:** 50 milliohms maximum  
**Insulation Resistance:** 500 megohms minimum @ 250V DC  
**Dielectric Strength:** 250V AC minimum between contacts for 1 minute minimum  
**Mechanical Life:** 500,000 operations minimum  
**Electrical Life:** 500,000 operations minimum  
**Nominal Operating Force:** **Standard:** 1.5 ±0.5 Newtons  
**High:** 2.5N ±0.8 Newtons  
**Stroke:** 1.5mm (.059")

## Materials & Finishes

**Actuator:** Silicon rubber  
**Case:** Polycarbonate resin  
**Base:** Glass fiber reinforced polyamide resin  
**Movable Contact:** Silver over nickel with gold plating  
**Stationary Contacts:** Brass with gold plating  
**Switch Terminals:** Brass with gold plating

## Environmental Data

**Operating Temperature Range:** -25°C through +50°C (-13°F through +122°F) for Illuminated  
-25°C through +70°C (-13°F through +158°F) for Nonilluminated  
**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/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Installation

**Cap Installation Force:** 5.0N maximum downward force on actuator

## PCB Processing

**Soldering:** Wave Soldering: 270°C maximum @ 6 seconds maximum  
Manual Soldering: 390°C maximum @ 4 seconds maximum  
**Cleaning:** These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

The NP01 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

Soft touch actuation achieved by mechanical silicon rubber structure.

Distinct, long stroke of 1.5mm (.059").

Entire cap is fully illuminated with single or bicolor LED.

Compact design with dimension of 12.5mm (.492") from PC board to top of cap.

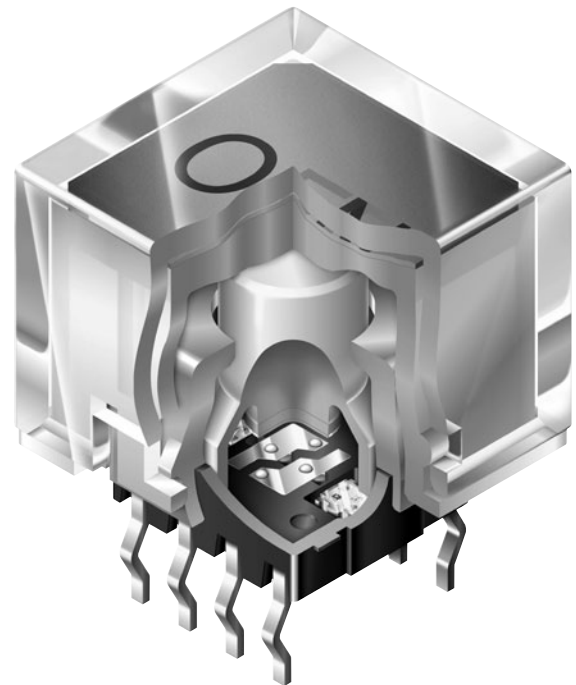
Alternating legend options (patent pending) with bicolor LED.

Available in both high (2.5N) or standard (1.5N) operating force.

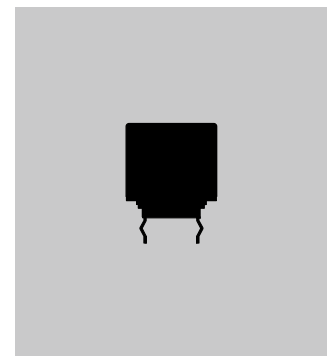
Gold plated contacts provide high reliability.

Crimped terminals ensure secure PC mounting and prevent dislodging during soldering.

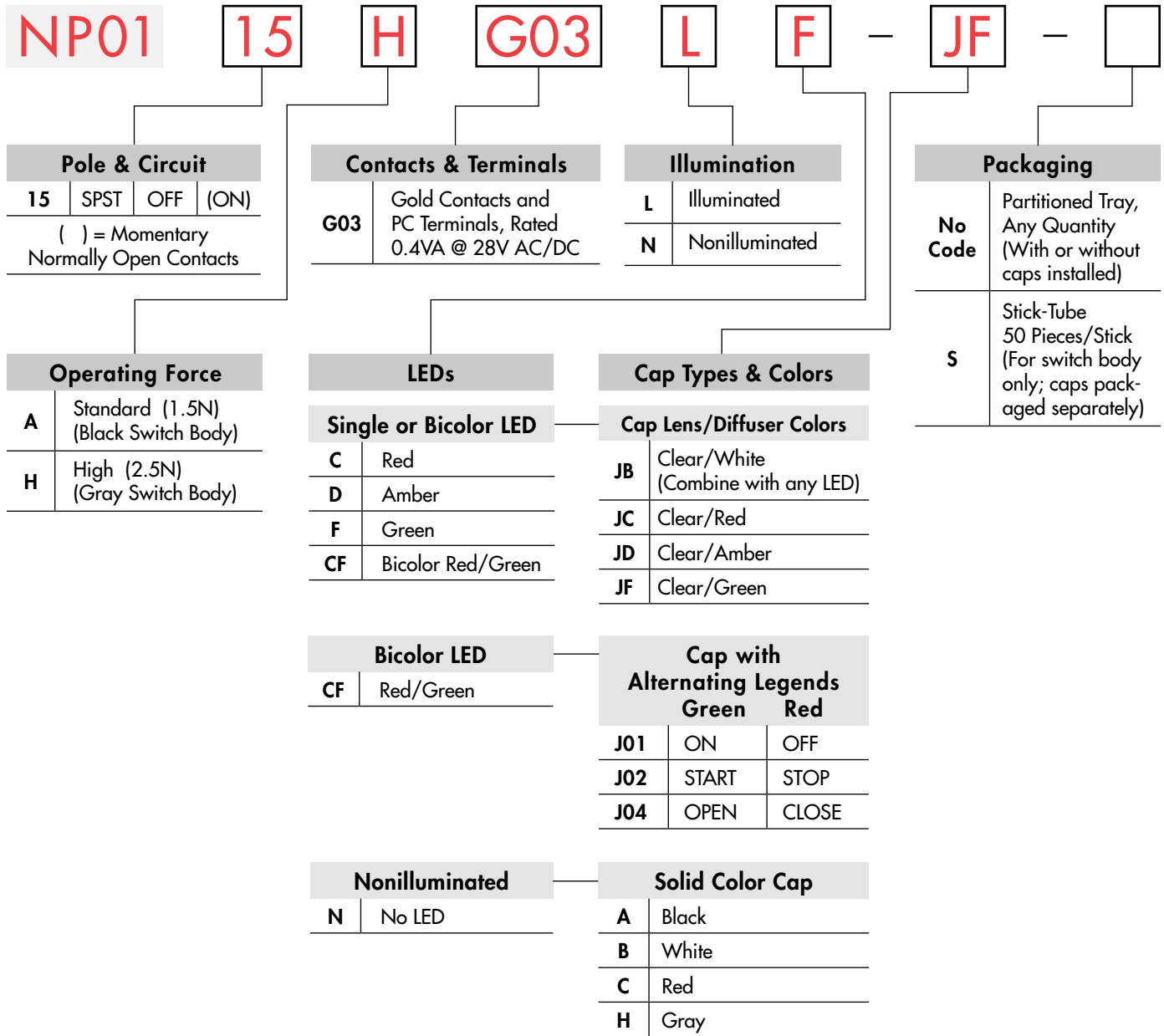
Molded-in terminals prevent entry of flux, solvents, and other contaminants.



Actual Size

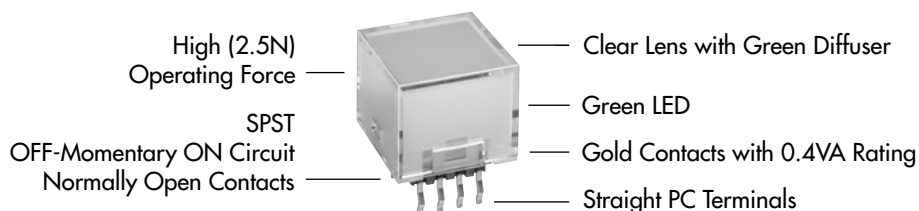


### TYPICAL SWITCH ORDERING EXAMPLE



### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

#### NP0115HG03LF-JF



**POLE & CIRCUIT**

**Illuminated Models**

		Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch Schematic
Pole	Model	Normal	Down			
						Notes: Switch is marked with LC1, 1, L3, L4, L1, L2, 2, LC2. Lamp circuit is isolated and requires an external power source.
SP	NP0115AG03L NP0115HG03L	OFF	(ON)	Normally Open	1-2	SPST

**Nonilluminated Models**

		Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch Schematic
Pole	Model	Normal	Down			
						Note: Switch is marked with LC1, 1, L3, L4, L1, L2, 2, LC2.
SP	NP0115AG03N NP0115HG03N	OFF	(ON)	Normally Open	1-2	SPST

**OPERATING FORCE**

**A** Standard Nominal Operating Force  
1.5 ±0.5N  
Switch base is Black

**H** High Nominal Operating Force  
2.5 ±0.8N  
Switch base is Gray

**CONTACTS, TERMINALS, & RATING**

**G03** Gold Contacts      Straight PC Terminals      0.4VA maximum @ 28V AC/DC maximum

**ILLUMINATION**

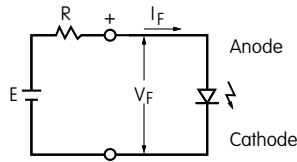
**L** Illuminated

**N** Nonilluminated

### LED COLORS & SPECIFICATIONS

LEDs are an integral part of the switch and not available separately. The electrical specifications shown are determined at a basic temperature of 25°C.

If the source voltage exceeds the forward voltage, a ballast resistor is required.

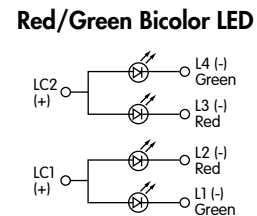
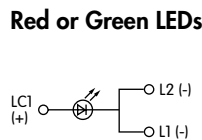
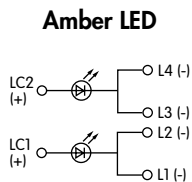


$$R = \frac{E - V_F}{I_F}$$

Where: R = Resistor Value (Ohms)  
E = Source Voltage (V)  
V<sub>F</sub> = Forward Voltage (V)  
I<sub>F</sub> = Forward Current (A)

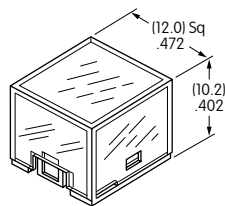
Single Color LED				Bicolor LED				
Color	Symbol	C	D	F	Color	Symbol	CF	
		Red	Amber	Green			Red	Green
Forward Peak Current	I <sub>FM</sub>	50mA	50mA	30mA	Forward Peak Current	I <sub>FM</sub>	50mA	30mA
Typical Forward Current	I <sub>F</sub>	20mA	20mA	20mA	Typical Forward Current	I <sub>F</sub>	20mA	20mA
Forward Voltage	V <sub>F</sub>	2.0V	2.1V	3.5V	Forward Voltage	V <sub>F</sub>	2.0V	3.5V
Reverse Peak Voltage	V <sub>RM</sub>	5V	5V	5V	Reverse Peak Voltage	V <sub>RM</sub>	5V	5V
Current Reduction Rate	ΔI <sub>F</sub>	0.88mA/°C above 40°C	0.88mA/°C above 40°C	0.48mA/°C above 30°C	Current Reduction Rate	ΔI <sub>F</sub>	0.88mA/°C above 40°C	0.48mA/°C above 30°C
Ambient Temperature Range		-25° ~ +50°C			Ambient Temperature Range		-25° ~ +50°C	

The electrical specifications shown are determined at a basic temperature of 25°C.



### CAP TYPES & COLORS

**AT3022**  
12mm Square Cap



Material:  
Polycarbonate Resin

Cap for Single or Bicolor LED

**JB**

Clear Lens/White Diffuser

**JC**

Clear Lens/Red Diffuser

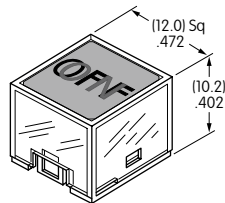
**JD**

Clear Lens/Amber Diffuser

**JF**

Clear Lens/Green Diffuser

**AT3023**  
12mm Square Cap



Material:  
Polycarbonate Resin

Alternating Legend Cap for Bicolor LED

Clear Lens  
Alternating Legend Filter

Standard Alternating Legend Pairs

**J01**

**ON**

Green

**OFF**

Red

**J02**

**START**

Green

**STOP**

Red

**J04**

**OPEN**

Green

**CLOSE**

Red

Cap illumination is alternating Green/Red; legend text is black.

Contact factory for other Alternating Legends.

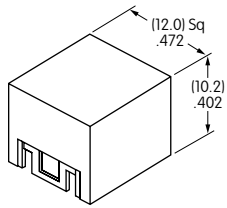
Legend illustrations are approximate representations of the actual characters on the filters.

**CAP TYPES & COLORS (CONTINUED)**

**Solid Color Cap for Nonilluminated**

**AT3024**  
**12mm Square Cap**

Material:  
Polycarbonate Resin



**A** Black  
**B** White

**C** Red  
**H** Gray

**TYPICAL SWITCH DIMENSIONS**



**Illuminated • Straight PC**



**NP0115HG03LF-JF**

**PACKAGING**

**No Code**

**Partitioned Tray**

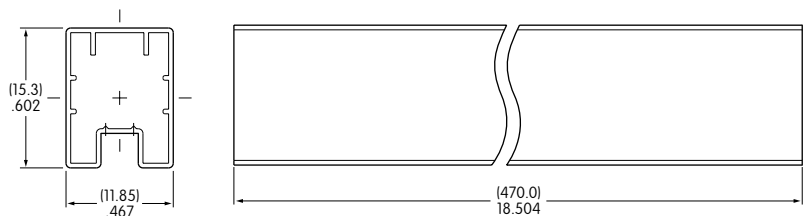
Any quantity. No code is required. Switches may be packaged with or without caps installed.

**S**

**Stick-Tube Packaging**

50 pieces per stick

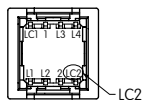
Switches must be ordered in 50-piece increments when stick-tube packaging is selected. This packaging is for the switch body only. Caps will be packaged separately.



**LEGEND ORIENTATION**

Top View

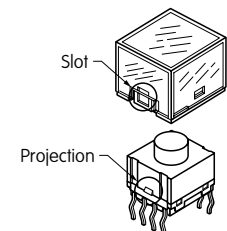
Bottom View



Orient cap with legend as shown here, and "LC2" at lower right of switch body. Orders for switches with legends will be assembled as illustrated.

**PRECAUTIONS FOR HANDLING & STORAGE**

- NP01 Pushbuttons are electrostatically sensitive. To prevent damage to LED, devices must be properly isolated from static electricity.
  - Once the cap is installed onto the switch body, it cannot be removed.
  - When assembling cap, align projection on switch body to slot on inside of cap. (Refer to illustration at right.)
  - \* Legends may be printed on the lens with laser etch, screen print or pad print methods. Epoxy based ink is recommended.
  - Do not use excessive force during installation on PC board or for cap installation.
- \* NKK Switches can provide custom legends for caps. Contact factory for more information.



# General Specifications

## Electrical Capacity (Resistive Load)

<b>Power Level (silver):</b>	5A @ 125/250V AC or 5A @ 30V DC
<b>Logic Level (gold):</b>	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

<b>Contact Resistance:</b>	50 milliohms maximum for silver; 100 milliohms maximum for gold
<b>Insulation Resistance:</b>	200 megohms minimum @ 500V DC
<b>Dielectric Strength:</b>	1,000V AC minimum between contacts for 1 minute minimum; 1,500V AC minimum between contacts & case for 1 minute minimum
<b>Mechanical Life:</b>	1,000,000 operations minimum for momentary; 200,000 operations minimum for alternate action
<b>Electrical Life:</b>	10,000 operations minimum for silver; 100,000 operations minimum for silver with resistive load of 3A @ 125V AC 200,000 operations minimum for gold
<b>Nominal Operating Force:</b>	Single Pole: 1.9N for Square & 1.9N for Rectangular Double Pole: 2.55N for Square & 3.1N for Rectangular
<b>Contact Timing:</b>	Break before make
<b>Travel:</b>	Pretravel .067" (1.7mm); Overtravel .024" (0.6mm); Total Travel .091" (2.3mm)

## Materials & Finishes

<b>Housing/Bezel:</b>	Glass fiber reinforced polyamide (UL94V-0)
<b>Snap-in Frame:</b>	Stainless steel
<b>Movable Contactor:</b>	Phosphor bronze
<b>Movable Contacts:</b>	Silver alloy or copper with gold plating
<b>Stationary Contacts:</b>	Silver alloy or copper with gold plating
<b>Switch Terminals:</b>	Phosphor bronze with silver or gold plating
<b>Lamp Terminals:</b>	Brass with silver plating
<b>Base:</b>	Glass fiber reinforced liquid crystal polymer (UL94V-0)

## Environmental Data

<b>Operating Temperature Range:</b>	-25°C through +50°C (-13°F through +122°F) for Illuminated -20°C through +70°C (-4°F through +158°F) for Nonilluminated
<b>Humidity:</b>	90 ~ 95% humidity for 96 hours @ 40°C (104°F)
<b>Vibration:</b>	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
<b>Shock:</b>	50G (490m/s <sup>2</sup> ) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Installation

<b>Cap Installation Force:</b>	7.55N (1.70 lbf) maximum downward force on cap
<b>Soldering Time &amp; Temp:</b>	Wave Soldering (PC version): See Profile A in Supplement section. Manual Soldering: See Profile A in Supplement section.
<b>Cleaning:</b>	These devices are not process sealed. Hand clean locally using alcohol based solution.

## Standards & Certifications

<b>Flammability Standards:</b>	UL94V-0 housing/bezel & base
<b>UL:</b>	<b>File No. E44145 - Recognized only when ordered with marking on switch.</b> Add "/U" or "/CUL" before dash in part number to order UL recognized switch. UL recognized only when ordered switch body with cap assembled. All single & double pole models recognized at 5A @ 125/250V AC or 0.014A @ 28V DC.
<b>CSA:</b>	<b>File No. 023535_0_000 - Certified only when ordered with marking on switch.</b> Add "/C" before dash in part number to order CSA certified switch. All single & double pole models certified at 5A @ 125/250V AC or 5A @ 30V DC or 0.4VA maximum @ 28V AC/DC maximum.

# Distinctive Characteristics

Bright or super bright LEDs (an integral part of the switch) of red, amber, green, blue, or white, in full face or spot illumination plus square or rectangular models.

Combination of PCB mountability and short body allows use in compact applications.

Small behind panel dimension for snap-in mounting in tight spaces.

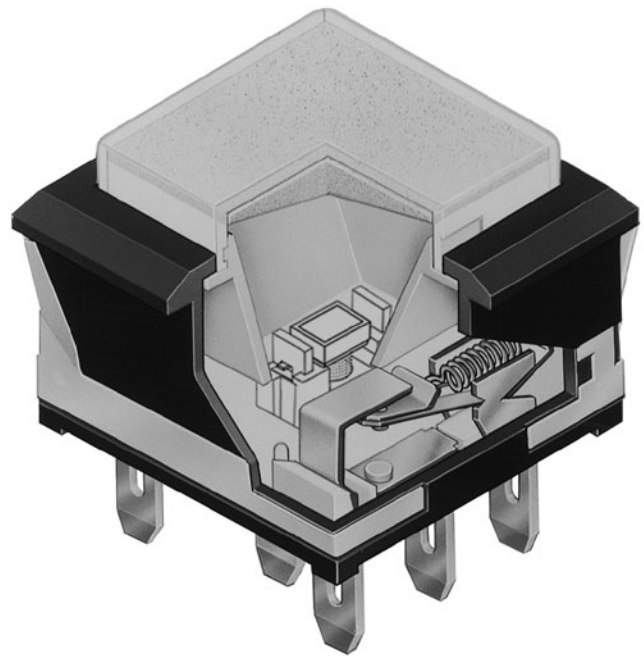
Snap-acting contact mechanism provides sensitive actuation with audible feedback; quick-make, quick-break characteristic limits arcing and prolongs electrical life.

Latchdown mechanism, independent of switching mechanism, gives visible and tactile indication of circuit status.

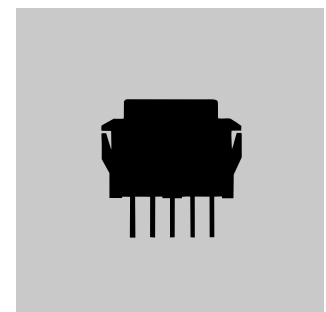
Terminals are epoxy sealed to lock out flux, solvents, and other contaminants.

Momentary and alternate action circuits available in the same space-saving body size.

Matching indicators available.



Actual Size



- Toggle
- Rockers
- Pushbuttons
- D Illuminated PB**
- Programmable
- Keylocks
- Rotaries
- Slides
- Tactiles
- Tilt
- Touch
- Indicators
- Accessories
- Supplement

### TYPICAL SWITCH ORDERING EXAMPLE

**UB** **1** **5** **SK** **G** **03** **5C** — **CC**

Poles	
1	SPDT
2	DPDT

Mounting Types	
PCB Mounting	
SK	Square
RK	Rectangular
* Snap-in Mounting	
KK	Square
NK	Rectangular
NBK	Rectangular with Side Barriers
* Standard with Solder Lug terminals	

Circuits		
5	ON	(ON)
( ) = Momentary		
6	ON	ON
Alternate Action with Latchdown		

Contacts & Ratings	
W	Silver Rated 5A @ 125/250V AC
G	Gold Rated 0.4VA max @ 28V AC/DC max

Terminals	
01	Solder Lug* (for Snap-in Mounting)
03	Straight PC

LEDs	
Bright LED	
5C	Red
5D	Amber
5F	Green

Cap Types & Colors			
Full Face Illuminated Cap for Bright LED			
Lens/Diffuser Colors			
CB	Red/White	FF	Green/Green
CC	Red/Red	*FJ	Green/Clear
*CJ	Red/Clear	JB	Clear/White
DB	Amber/White	JC	Clear/Red
DD	Amber/Amber	JD	Clear/Amber
*DJ	Amber/Clear	JF	Clear/Green
FB	Green/White	*JJ	Clear/Clear
AB	Square & Rectangular Spot Illuminated Black Cap with White Window		
* Not available with Rectangular cap			

Super Bright LED	
6B	White
6F	Green
6G	Blue
Available with Square only	

Full Face Illuminated Cap for Super Bright LED			
JB	Clear Lens/White Diffuser		
AB	Spot Illuminated Black Cap with White Window		
For Square only; see cap detail page			

Nonilluminated	
N	Nonilluminated

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

\* 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

**UB15SKG035C-CC**

Gold Contacts with 0.4VA Rating

Square with PCB Mounting

Red, Bright LED & Red Lens with Red Diffuser

SPDT ON-(ON) Circuit

Straight PC Terminals

POLES & CIRCUITS						
Pole	Model	Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
		Normal	Down	Normal	Down	
SP	UB15 *UB16	ON ON	(ON) ON	1-3	1-2	SPDT 
DP	UB25 *UB26	ON ON	(ON) ON	1-3 4-6	1-2 4-5	DPDT 

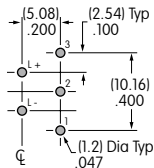
\* When in latched position for the alternate circuit, cap position is .039" (1.0mm) above the housing.

## MOUNTING TYPES & SHAPES

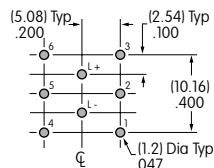
### PCB Mounting

**SK**

Square



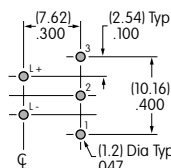
Single Pole



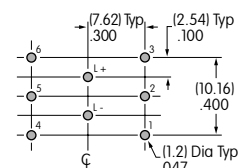
Double Pole

**RK**

Rectangular



Single Pole

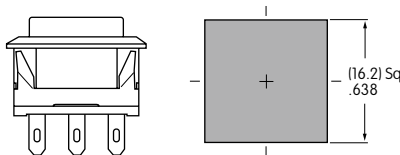


Double Pole

### Snap-in Mounting (Solder Lug)

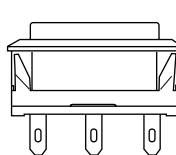
**KK**

Square with Built-in Bezel



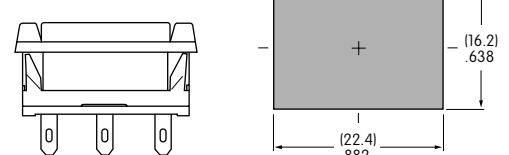
**NK**

Rectangular with Built-in Bezel



**NBK**

Rectangular with Built-in Side Barriers



Snap-in Mounting with Solder Lug terminals is the standard combination. Panel Thickness: .039 ~ .126" (1.0 ~ 3.2mm)

## CONTACT MATERIALS & RATINGS

**W**

Silver Contacts

Power Level

5A @ 125V AC & 250V AC

**G**

Gold Contacts

Logic Level

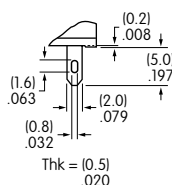
0.4VA maximum @ 28V AC/DC maximum

Complete explanation of operating range in Supplement section.

## TERMINALS

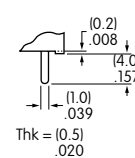
**01**

Solder Lug



**03**

Straight PC



Toggles  
Rockers  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

## LED COLORS & SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires external power source. Polarity marks are on bottom of switch. If the source voltage exceeds the rated voltage, a ballast resistor is required. Resistor value can be calculated by using the formula in the Supplement section. LED is an integral part of switch and not available separately.

	Color	Bright			Super Bright			Unit
		5C	5D	5F	6B	6F	6G	
Forward Peak Current	$I_{FM}$	30	30	25	30	30	30	mA
Typical Forward Current	$I_F$	20	20	20	20	20	20	mA
Forward Voltage	$V_F$	1.85	2.0	2.1	3.2	3.2	3.2	V
Reverse Peak Voltage	$V_{RM}$	5	5	5	5	5	5	V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.40	0.42	0.46	0.40	0.40	.040	mA/°C
Ambient Temperature Range		-25° ~ +50°C			-25° ~ +50°C			

**N**

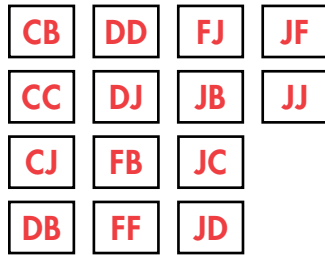
No Lamp

## CAP TYPES & COLOR COMBINATIONS

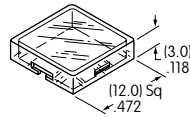
### Full Face Illuminated Cap for Bright LED

Lens/Diffuser

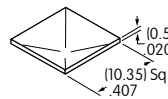
Colors Available for Square Cap:



AT4074 Lens

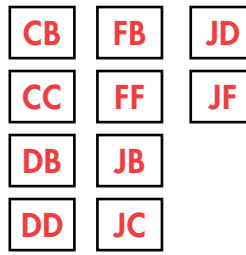


AT4075 Diffuser

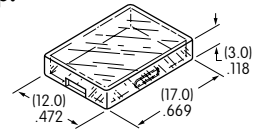


Lens/Diffuser

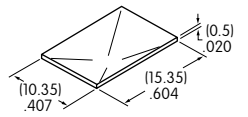
Colors Available for Rectangular Cap:



AT4117 Lens



AT4118 Diffuser



Lens & Diffuser Material: Polycarbonate

Lens Finish: Glossy

Diffuser Finish: Textured

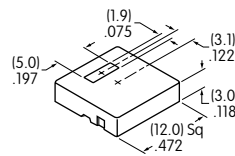
### Spot Illuminated Caps for Bright & Super Bright LEDs

Cap/Window Colors Available:

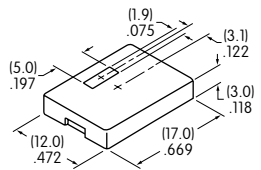
**AB**

Black Cap with Translucent White Window for LED Display

AT4119 Square for Bright and Super Bright LED



AT4120 Rectangular for Bright LED



Material: Polycarbonate Finish: Matte

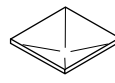
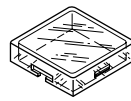
### Full Face Illuminated Cap for Super Bright LED

Lens/Diffuser

Colors Available for Square Cap:

**JB**

AT4074 Lens & AT4075 Diffuser (Dimensions above)



Rectangular lens & diffuser are not available for combining with super bright LED.

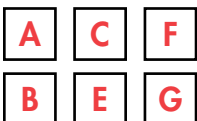
Lens & Diffuser Material: Polycarbonate

Lens Finish: Glossy

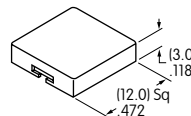
Diffuser Finish: Textured

### Opaque Caps for Nonilluminated

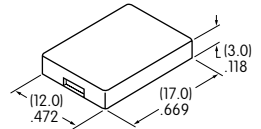
Cap Colors Available:



AT4073 Square



AT4116 Rectangular



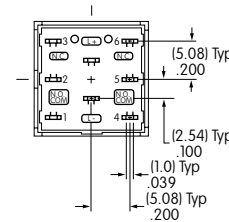
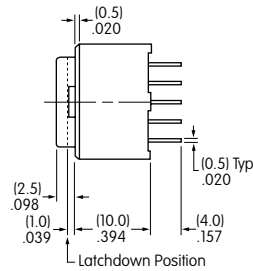
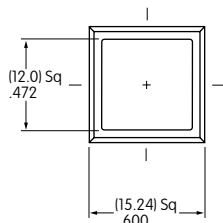
Material: Polycarbonate Finish: Glossy

Color Codes: A Black B White C Red D Amber E Yellow F Green G Blue J Clear

TYPICAL SWITCH DIMENSIONS

Single & Double Pole

Square • PCB Mount

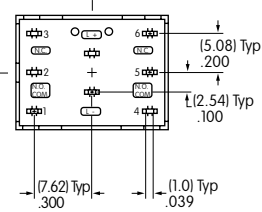
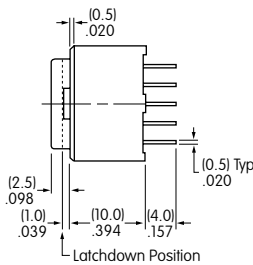
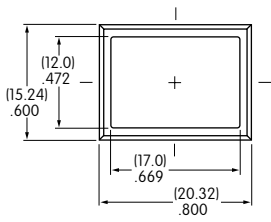


Single pole models do not have terminals 4, 5, & 6.

UB15SKG035C-CB

Single & Double Pole

Rectangular • PCB Mount

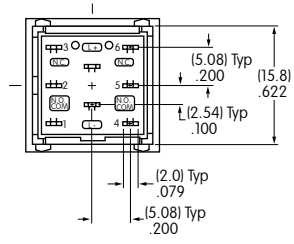
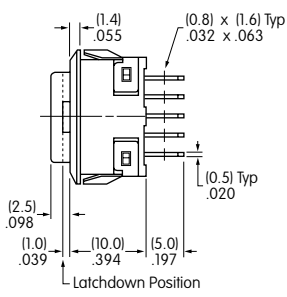
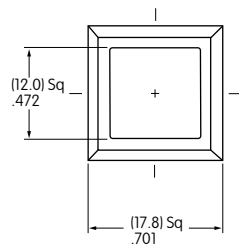


Single pole models do not have terminals 4, 5, & 6.

UB26RKG035D-DD

Single & Double Pole

Square • Snap-in Mount • Built-in Bezel

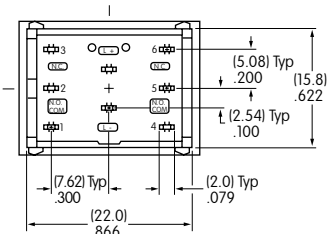
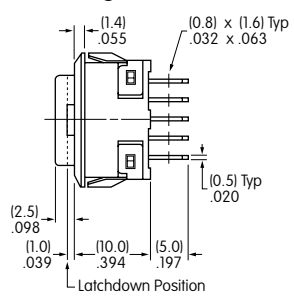
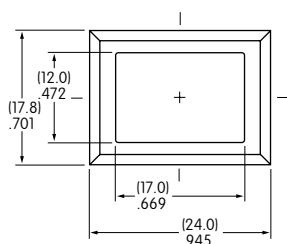


Single pole models do not have terminals 4, 5, & 6.

UB25KKW015C-CB

Single & Double Pole

Rectangular • Snap-in Mount • Built-in Bezel

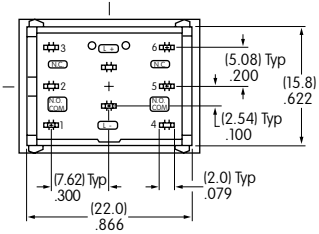
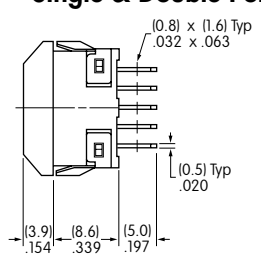
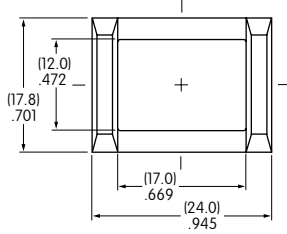


Single pole models do not have terminals 4, 5, & 6.

UB26NKW015F-FF

Single & Double Pole

Rectangular • Snap-in Mount • Built-in Side Barriers



Single pole models do not have terminals 4, 5, & 6.

UB25NBKW015F-FB

## OPTIONAL ACCESSORIES

### Spring Loaded Protective Guard for Snap-in Mounting of Square PCB Model

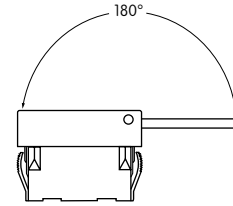
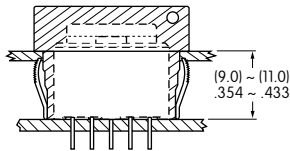
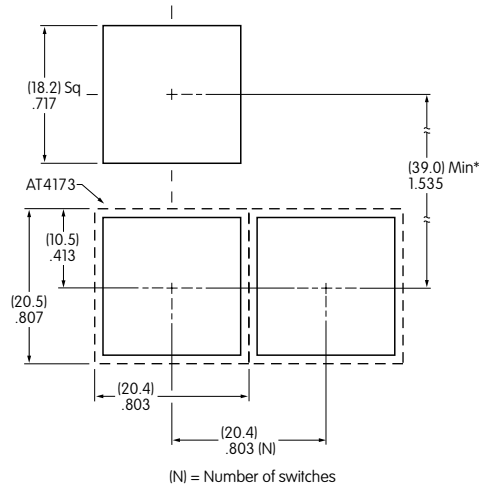
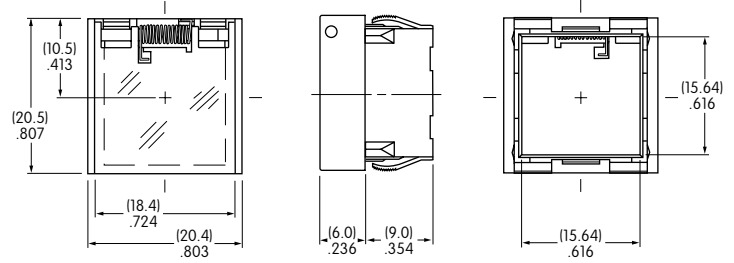
#### AT4173 Square Protective Guard/ Snap-in Frame

Opens 180°  
Closes automatically

**Materials:**  
Cover: Clear Polycarbonate  
Base: Black Polyamide  
Coil Spring: Stainless Steel

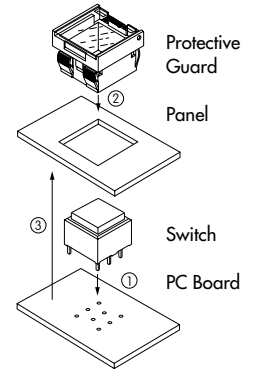
**Recommended  
Panel Thickness:**  
.039" ~ .126"  
(1.0mm ~ 3.2mm)

**Recommended  
Panel-to-PCB Range:**  
.354" ~ .433"  
(9.0mm ~ 11.0mm)



#### Installation

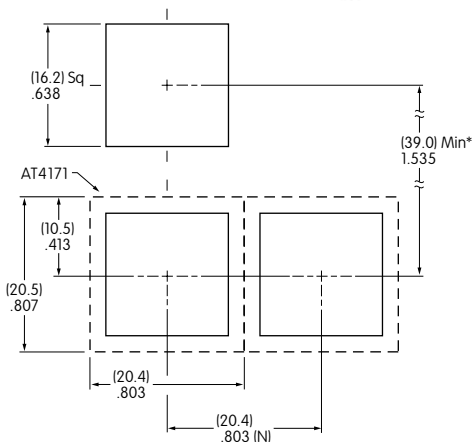
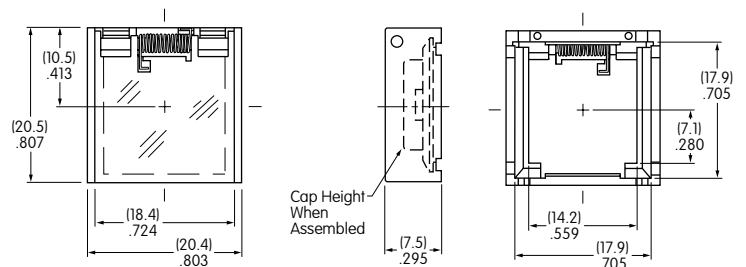
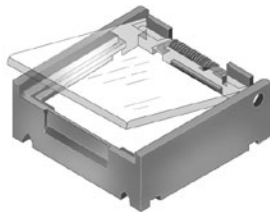
- 1 Install switch onto PC board.
- 2 Snap protective guard into panel.
- 3 Join the two assemblies.



### Spring Loaded Protective Guard for Square Snap-in Model

#### AT4171 Square Protective Guard

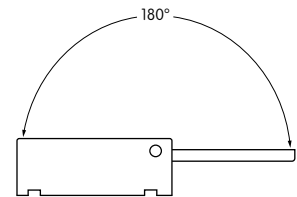
Opens 180°  
Closes automatically



#### Materials:

Cover: Clear Polycarbonate  
Base: Black GFR Polyamide  
Coil Spring: Stainless Steel

**Recommended Panel Thickness:**  
.039" ~ .106" (1.0mm ~ 2.7mm)



## OPTIONAL ACCESSORIES

### Spring Loaded Protective Guard for Snap-in Mounting of Rectangular PCB Model

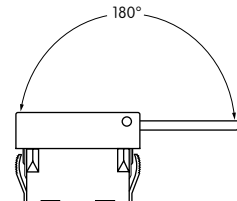
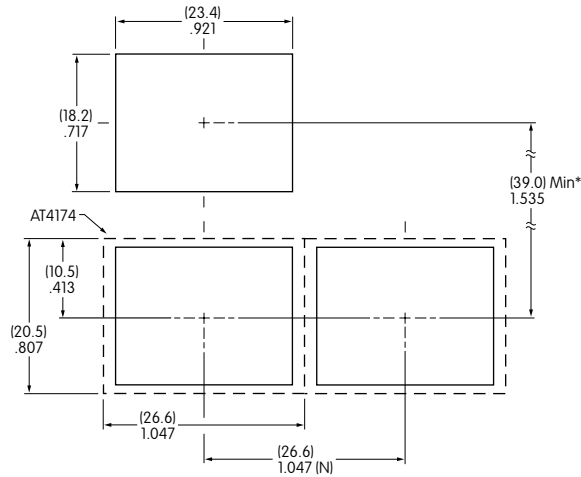
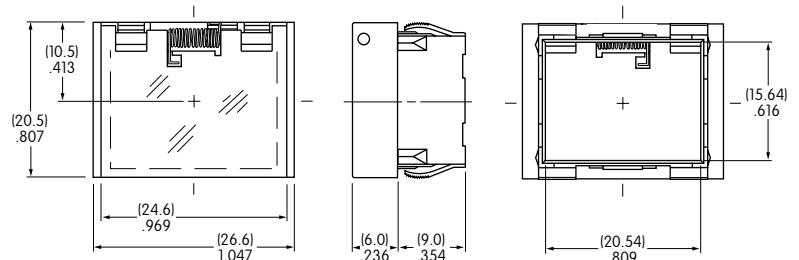
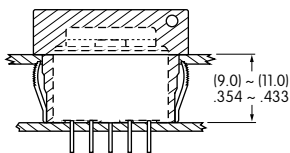
#### AT4174 Rectangular Protective Guard/ Snap-in Frame

Opens 180°  
Closes automatically

**Materials:**  
Cover: Clear Polycarbonate  
Base: Black Polyamide  
Coil Spring: Stainless Steel

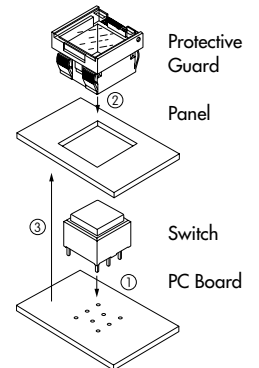
**Recommended  
Panel Thickness:**  
.039" ~ .126"  
(1.0mm ~ 3.2mm)

**Recommended  
Panel-to-PCB Range:**  
.354" ~ .433"  
(9.0mm ~ 11.0mm)



#### Installation

- ① Install switch onto PC board.
- ② Snap protective guard into panel.
- ③ Join the two assemblies.



(N) = Number of switches \* Minimum dimension allows opening of cover to 180°

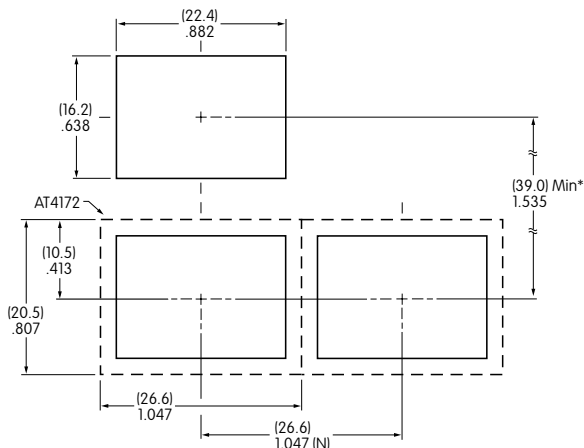
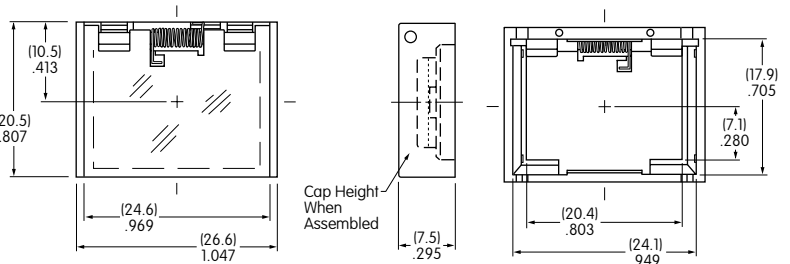
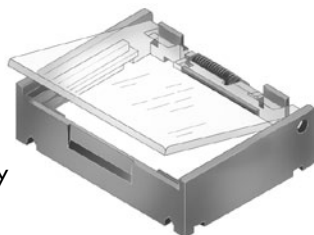
### Spring Loaded Protective Guard for Rectangular Snap-in Model

#### AT4172 Rectangular Protective Guard

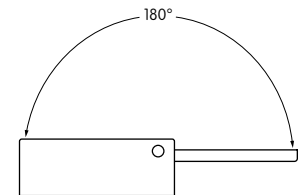
Opens 180°  
Closes automatically

**Materials:**  
Cover: Clear Polycarbonate  
Base: Black GFR Polyamide  
Coil Spring: Stainless Steel

**Recommended Panel Thickness:**  
.039" ~ .106" (1.0mm ~ 2.7mm)



(N) = Number of switches \* Minimum dimension allows opening of cover to 180°



Toggles

Rockers

Pushbuttons

Programmable  
Illuminated PB

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

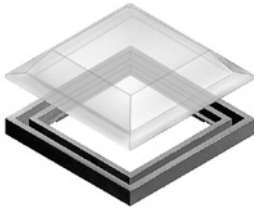
Accessories

Supplement

## OPTIONAL ACCESSORIES

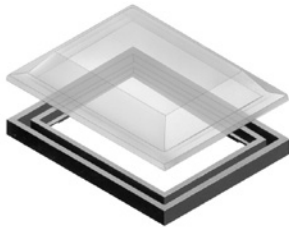
### Dust Covers

**AT4001  
Square**

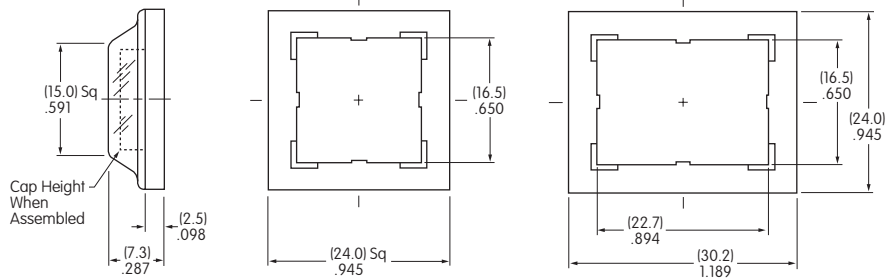


Only for use with KK mounting type

**AT4011  
Rectangular**



Only for use with NK mounting type



**Materials:**

PVC with polyethylene gasket  
(PVC loses pliability below 0°C (32°F).)

**Recommended Panel Thickness:** .039" ~ .098" (1.0mm ~ 2.5mm)

## LEGENDS

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

### Suggested Printable Area for UB Lens & Film Insert

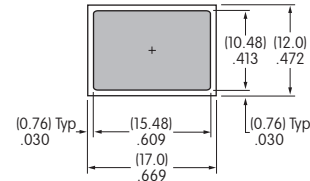
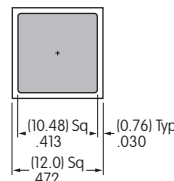
**Recommended Methods:** Laser Etch on clear lens, Screen Print or Pad Print on lens;  
Laser Print on film insert.

**Square Cap**

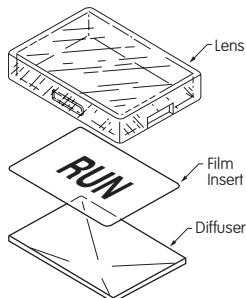


Shaded areas are printable areas.

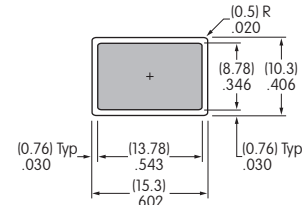
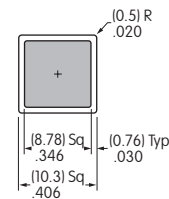
**Lens**



**Rectangular Cap**



**Film Insert**



Film Insert: Clear Polyester 4 mil max. thickness

# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 5A @ 125/250V AC or 5A @ 30V DC  
**Logic Level (gold):** 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 for silver; 100 milliohms maximum for gold  
**Insulation Resistance:** 200 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 for momentary;  
 200,000 operations minimum for alternate action

**Electrical Life:** 10,000 operations minimum for silver;  
 200,000 operations minimum for gold

**Nominal Operating Force:** Single Pole: 1.90N  
 Double Pole: 2.55N

**Contact Timing:** Break before make  
**Travel:** Pretravel .067" (1.7mm); Overtravel .024" (0.6mm); Total Travel .091" (2.3mm)

## Materials & Finishes

**Housing/Bezel:** Glass fiber reinforced polyamide (UL94V-0)  
**Snap-in Frame:** Stainless steel  
**Movable Contactor:** Phosphor bronze  
**Movable Contacts:** Silver alloy or copper with gold plating  
**Stationary Contacts:** Silver alloy or copper with gold plating  
**Switch Terminals:** Phosphor bronze with silver or gold plating  
**Lamp Terminals:** Brass with tin plating  
**Base:** Glass fiber reinforced liquid crystal polymer (UL94V-0)

## Environmental Data

**Operating Temperature Range:** -25°C through +50°C (-13°F through +122°F) for Illuminated  
 -25°C through +70°C (-13°F through +158°F) for Nonilluminated  
**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/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

## Installation

**Cap Installation Force:** 15.0N maximum downward force on cap

## Processing

**Soldering:** Wave Soldering (PC version): 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 housing/bezel & 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.  
 UL recognized only when ordered switch body with cap assembled.  
 All single & double pole models recognized at 5A @ 125/250V AC or 0.014A @ 28V DC.

# Distinctive Characteristics

Wide selection of illumination effects is achieved with single and bicolor, 1- or 6-element LEDs in flat, beveled, or sculptured caps.

Alternating legends (patent pending) in choice of sculptured or flat caps, combined with super bright bicolor LED.

Combination of PCB mountability and short body allows use in compact applications.

Small behind panel dimension for snap-in mounting in tight spaces.

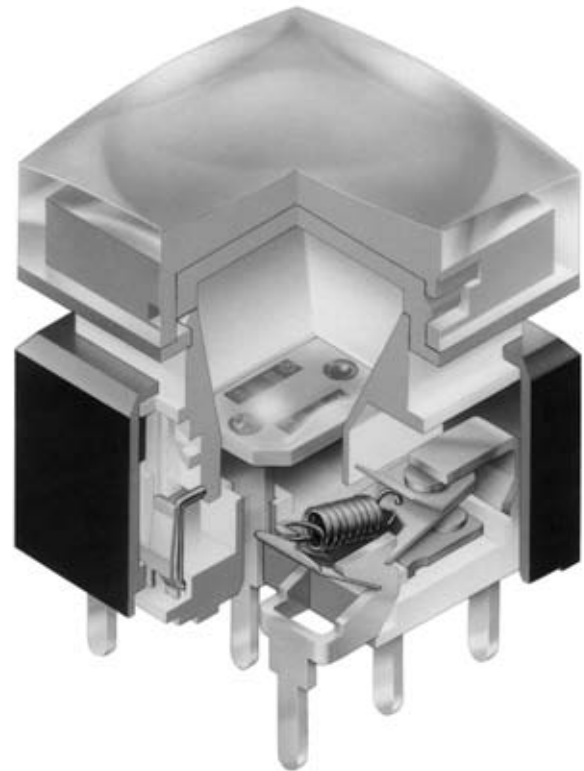
Snap-acting contact mechanism provides sensitive actuation with audible feedback; quick-make, quick-break characteristic limits arcing and prolongs electrical life.

Latchdown mechanism, independent of switching mechanism, gives outstanding stability and reliability plus visible and tactile indication of circuit status.

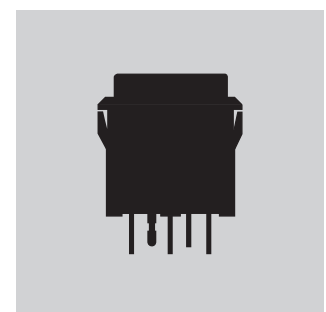
Terminals are epoxy sealed to lock out flux, solvents, and other contaminants.

Momentary and alternate action circuits available in the same space-saving body size.

Matching indicators available.



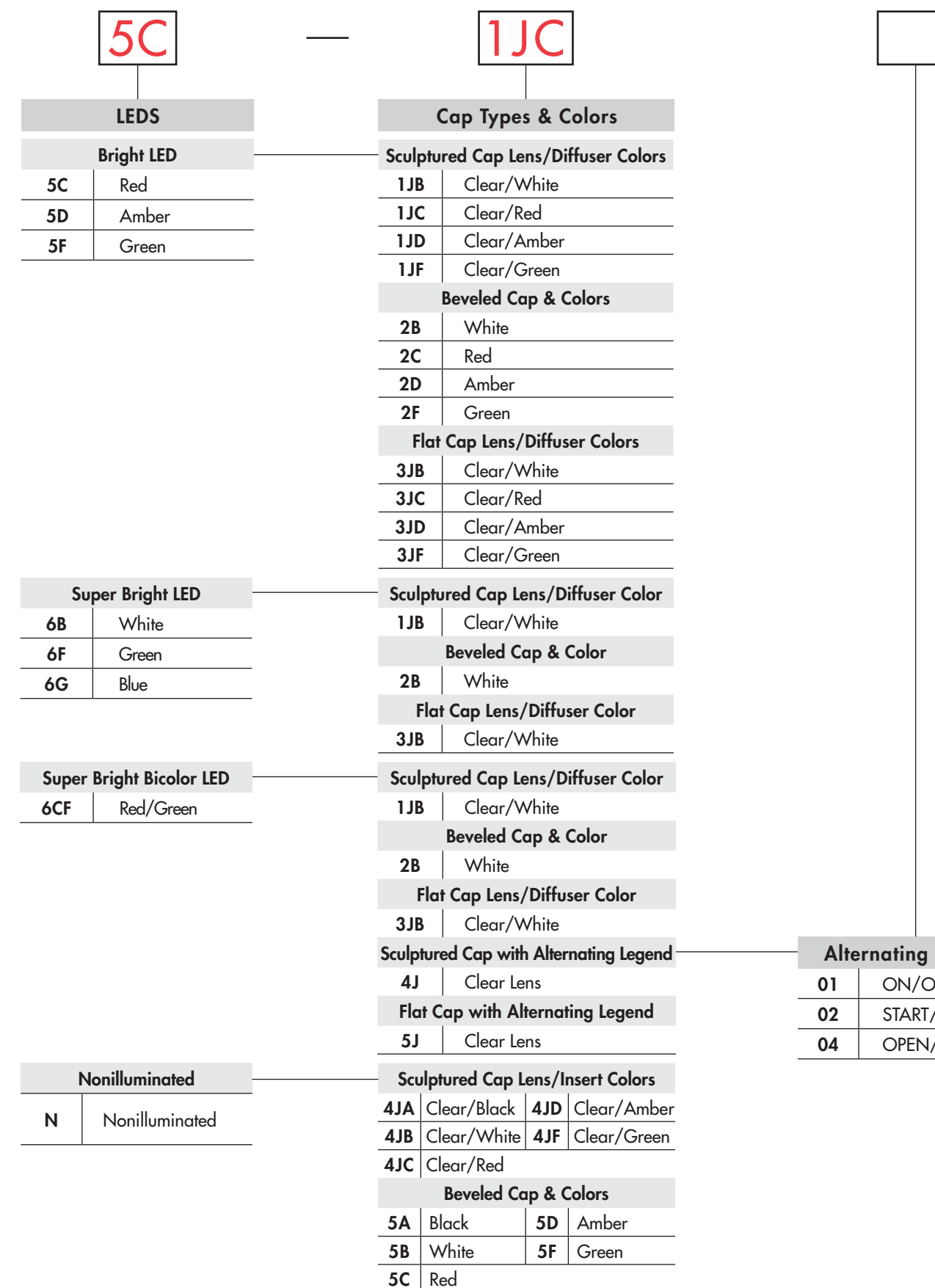
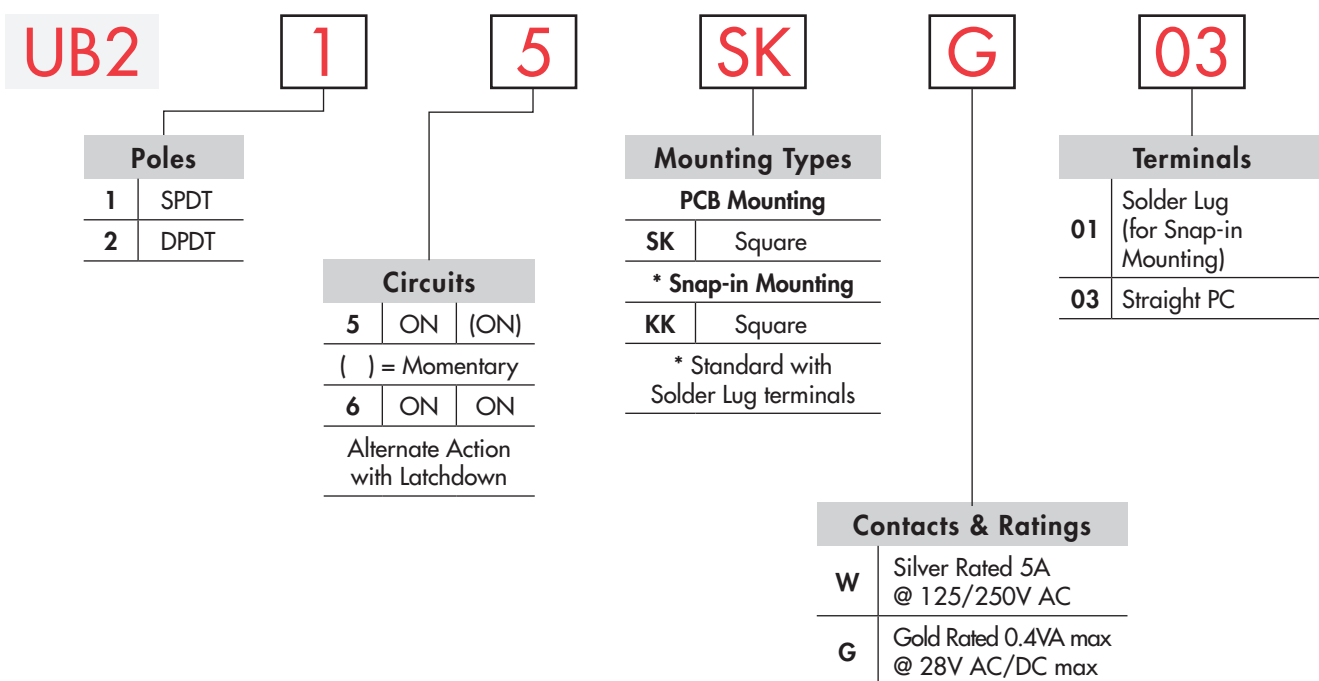
Actual Size



- Toggles
- Rockers
- Pushbuttons
- D Illuminated PB**
- Programmable
- Keylocks
- Rotaries
- Slides
- Tactiles
- Tilt
- Touch
- Indicators
- Accessories
- Supplement

### TYPICAL SWITCH

### ORDERING EXAMPLE



### IMPORTANT:





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

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**UB215SKG035C-1JC**



## POLES & CIRCUITS

Pole	Model	Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
		Normal	Down	Normal	Down	
SP	UB215 *UB216	ON ON	(ON) ON	1-3	1-2	Notes: Switch is marked with NC, NO, COM, L+ & L-. Lamp circuit is isolated and requires an external power source. 
DP	UB225 *UB226	ON ON	(ON) ON	1-3 4-6	1-2 4-5	

\* When in latchdown position for the alternate circuit, cap positions above the housing are:  
.059" (1.5mm) for snap-in models & .276" (7.0mm) for PCB models.

## MOUNTING TYPES & SHAPES

### PCB Mounting

**SK**

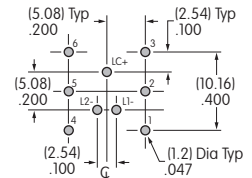
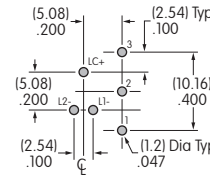
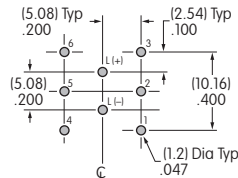
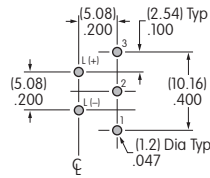
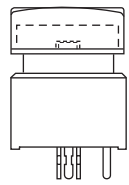
Square

SP, Single Color LED

DP, Single Color LED

SP, Bicolor LED

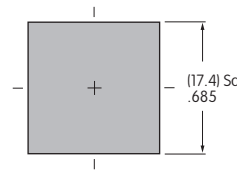
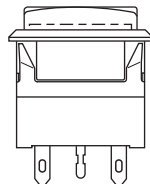
DP, Bicolor LED



### Snap-in Mounting (Solder Lug)

**KK**

Square with Built-in Bezel



Panel Thickness:  
.039 ~ .126"  
(1.0 ~ 3.2mm)

## CONTACT MATERIALS & RATINGS

**W**

Silver Contacts

Power Level

5A @ 125V AC & 250V AC

**G**

Gold Contacts

Logic Level

0.4VA maximum @ 28V AC/DC maximum

Complete explanation of operating range in Supplement section.

## SWITCH & LAMP TERMINALS

**01**

Solder Lug

For Switch & Bright LED

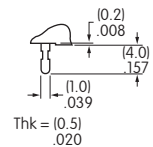
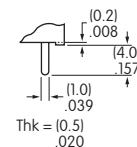
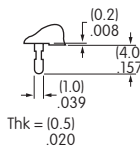
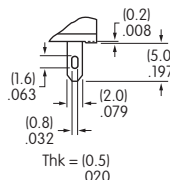
For Super Bright & Bicolor LED

**03**

Straight PC

For Switch & Bright LED

For Super Bright & Bicolor LED



## BRIGHT LED & CAPS

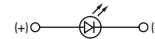
The electrical specifications shown are determined at a basic temperature of 25°C.  
 LED circuit is isolated and requires an external power source. Polarity marks are on the bottom of the switch.  
 If the source voltage exceeds the rated voltage, a ballast resistor is required.  
 The resistor value can be calculated by using the formula in the Supplement section.

The LED is an integral part of the switch and not available separately.

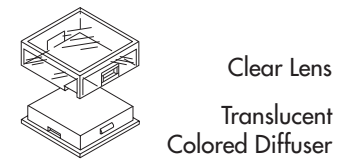
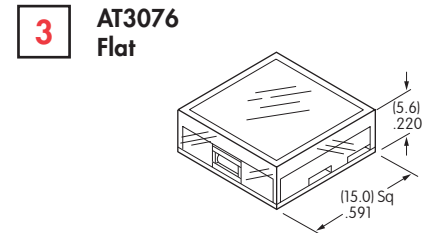
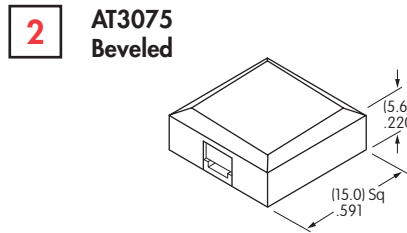
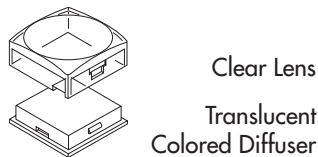
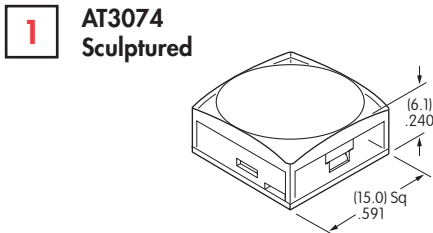
### Electrical Specifications for Bright LED

		<b>5C</b>	<b>5D</b>	<b>5F</b>	
	Color	Red	Amber	Green	Unit
Maximum Forward Current	$I_{FM}$	30	30	25	mA
Typical Forward Current	$I_F$	20	20	20	mA
Forward Voltage	$V_F$	1.85	2.0	2.1	V
Maximum Reverse Voltage	$V_{RM}$	5	5	5	V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.40	0.42	0.46	mA/°C
Ambient Temperature Range		-25° ~ +50°			°C

Bright Single Color LED with 1 element



### Caps for Bright LED



#### Lens/Diffuser Colors Available:

- JB** Clear/White
- JC** Clear/Red
- JD** Clear/Amber
- JF** Clear/Green

#### Cap Colors Available:

- B** White
- C** Red
- D** Amber
- F** Green

#### Lens/Diffuser Colors Available:

- JB** Clear/White
- JC** Clear/Red
- JD** Clear/Amber
- JF** Clear/Green

Material: Polycarbonate

Finish: Glossy

## SUPER BRIGHT LEDs & CAPS

The electrical specifications shown are determined at a basic temperature of 25°C.  
LED circuit is isolated and requires an external power source. Polarity marks are on the bottom of the switch.

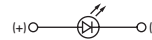
If the source voltage exceeds the rated voltage, a ballast resistor is required.  
The resistor value can be calculated by using the formula in the Supplement section.

The LED is an integral part of the switch and not available separately.

### Electrical Specifications for Super Bright LEDs

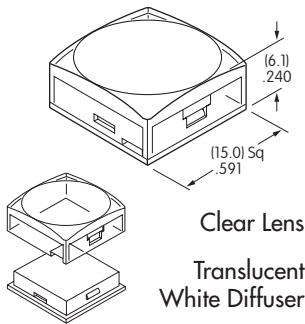
Super Bright LEDs are Electrostatic Sensitive	ATTENTION ELECTROSTATIC SENSITIVE DEVICES	Color	6B	6F	6G	Unit
			White	Green	Blue	
Maximum Forward Current		$I_{FM}$	20	30	25	mA
Typical Forward Current		$I_F$	15	20	20	mA
Forward Voltage		$V_F$	3.3	3.5	3.6	V
Maximum Reverse Voltage		$V_{RM}$	5	5	5	V
Current Reduction Rate Above 25°C		$\Delta I_F$	0.25	0.50	0.40	mA/°C
Ambient Temperature Range			-20° ~ +50°			°C

Super Bright Single Color LED with 1 element

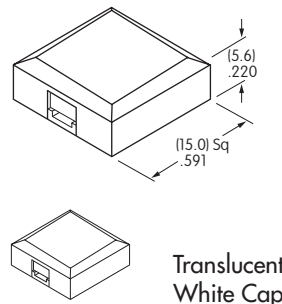


### Caps for Super Bright LED

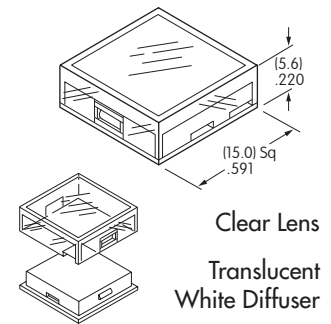
**1JB** AT3074JB Sculptured Clear Lens/White Diffuser



**2B** AT3075B Beveled White Cap



**3JB** AT3076JB Flat Clear Lens/White Diffuser



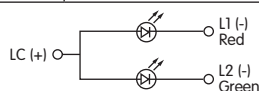
Material: Polycarbonate Finish: Glossy

## SUPER BRIGHT BICOLOR LED & CAPS

### Electrical Specifications for Super Bright Bicolor LED

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. Polarity marks are on bottom of switch. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in Supplement Section. The LED is an integral part of the switch and not available separately.	Super Bright LEDs are Electrostatic Sensitive	ATTENTION ELECTROSTATIC SENSITIVE DEVICES	6CF	Unit			
			Color		Red/Green		
			Maximum Forward Current		$I_{FM}$	30/25 (25/22 for Amber)	mA
			Typical Forward Current		$I_F$	20/20	mA
			Forward Voltage		$V_F$	2.1/3.5	V
			Maximum Reverse Voltage		$V_{RM}$	4/4	V
			Current Reduction Rate Above 25°C		$\Delta I_F$	0.40/0.33	mA/°C
Ambient Temperature Range		-25° ~ +50°	°C				

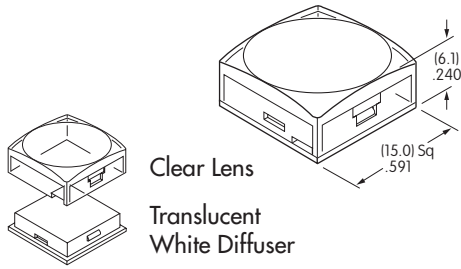
Super Bright Bicolor LED with 2 elements



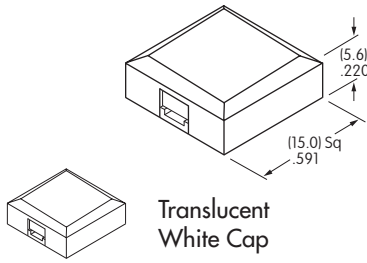
Amber color is achieved by lighting red and green simultaneously, but is not suitable for Alternating Legends.

## Caps for Super Bright Bicolor LED

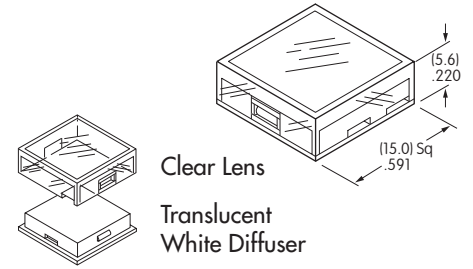
**1JB** AT3074JB Sculptured Clear Lens/White Diffuser



**2B** AT3075B Beveled White Cap



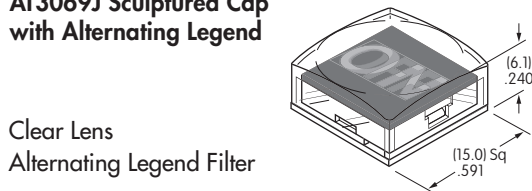
**3JB** AT3076JB Flat Clear Lens/White Diffuser



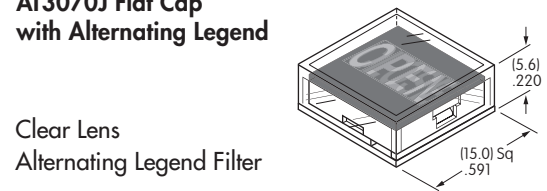
Material: Polycarbonate Finish: Glossy

## Alternating Legend Caps for Super Bright Bicolor LED

**4J** AT3069J Sculptured Cap with Alternating Legend



**5J** AT3070J Flat Cap with Alternating Legend



Material: Polycarbonate Finish: Glossy

## Standard Alternating Legend Pairs



Cap illumination is alternating green/red; legend text is black.  
Contact factory for other Alternating Legends.

Legend illustrations are approximate representations of the actual characters on the filters.

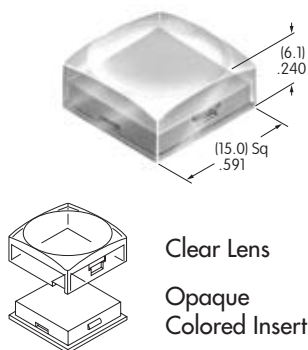
**No Code** No Lamp

## CAP TYPES & COLOR COMBINATIONS FOR NONILLUMINATED

**4** AT3073 Sculptured

Lens/Insert Colors Available:

- JA** Clear/Black
- JB** Clear/White
- JC** Clear/Red
- JD** Clear/Amber
- JF** Clear/Green

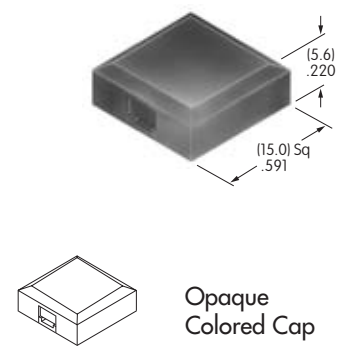


Material: Polycarbonate  
Finish: Glossy

**5** AT3077 Beveled

Cap Colors Available:

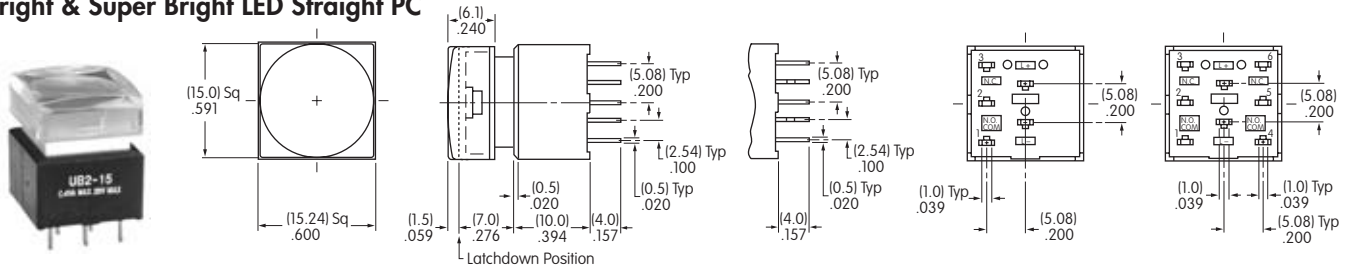
- A** Black
- B** White
- C** Red
- D** Amber
- F** Green



Material: Polycarbonate  
Finish: Glossy

## TYPICAL SWITCH DIMENSIONS

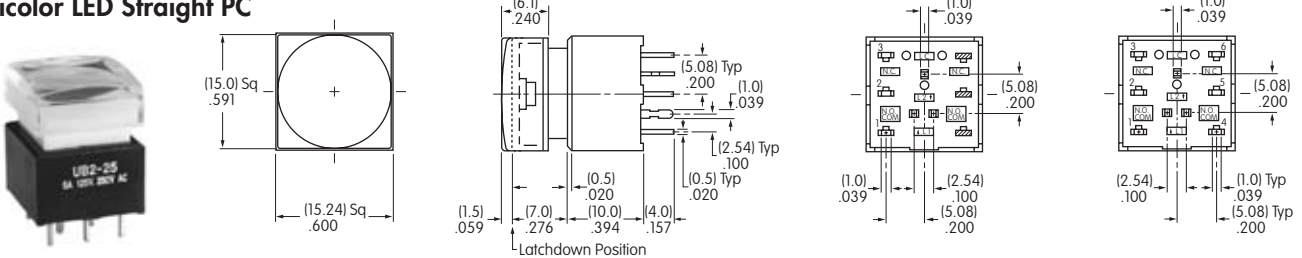
### Bright & Super Bright LED Straight PC



**UB215SKG035C-1JC**

Bright Single Color LED    Super Bright Single Color LED    Single Pole    Double Pole

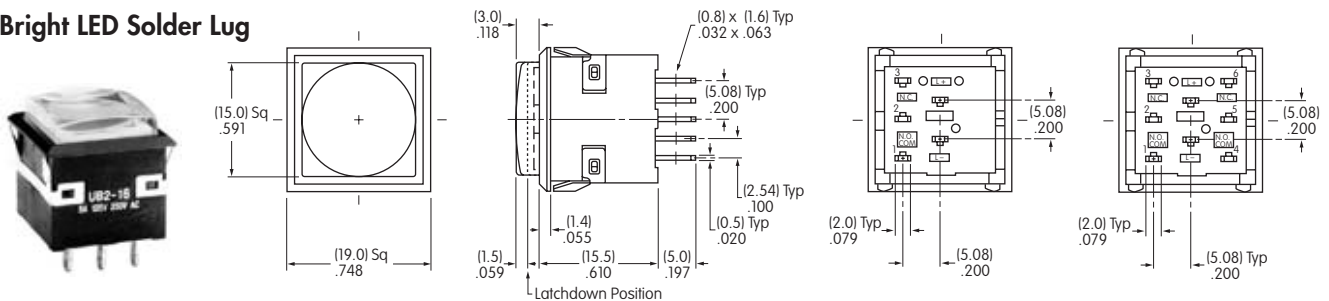
### Bicolor LED Straight PC



**UB225SKG03CF-1JB**

Bicolor LED Side View    Single Pole    Double Pole

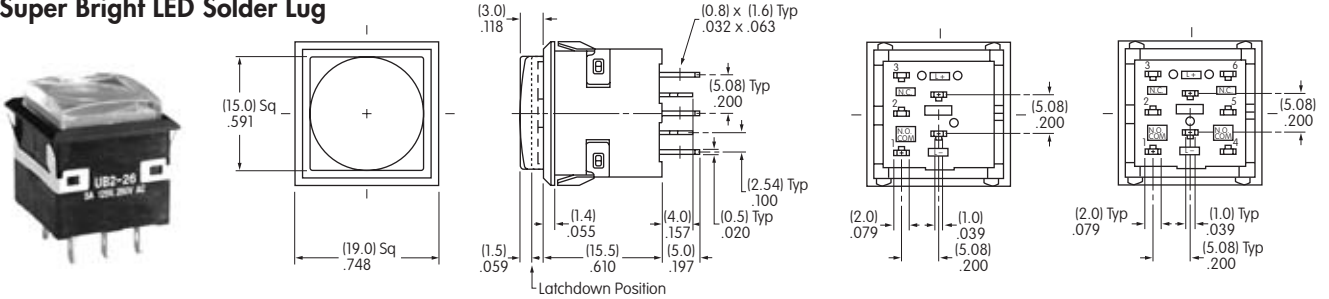
### Bright LED Solder Lug



**UB216KKW015F-1JF**

Single Color LED Side View    Single Pole    Double Pole

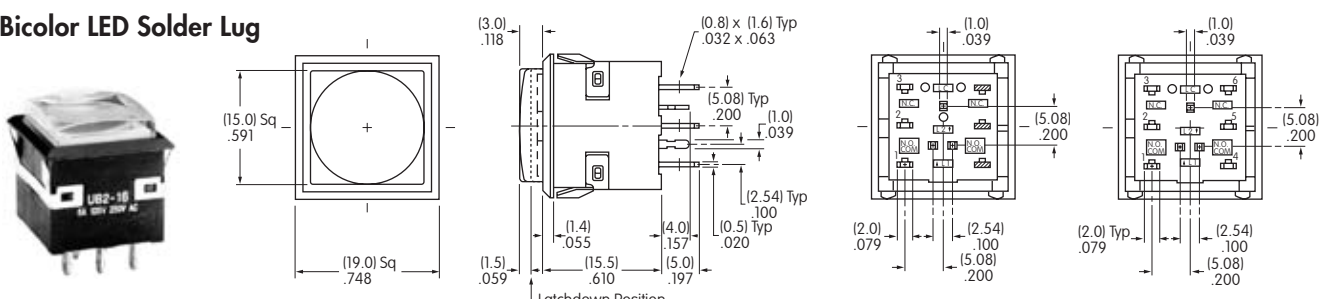
### Super Bright LED Solder Lug



**UB226KKW016F-1JF**

Single Color LED Side View    Single Pole    Double Pole

### Bicolor LED Solder Lug



**UB216KKW01CF-1JB**

Bicolor LED Side View    Single Pole    Double Pole

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

## OPTIONAL ACCESSORIES

### Protective Guard for Snap-in Model

#### AT4141

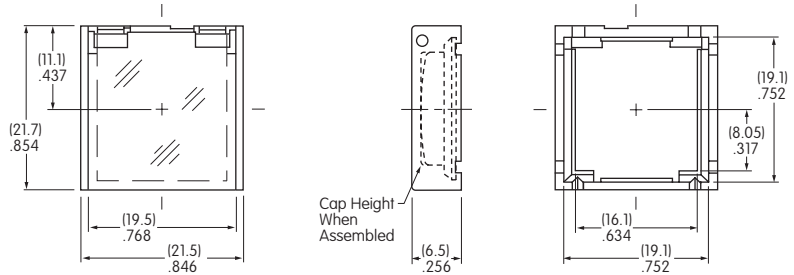
Opens 90°  
Closes manually



#### Materials:

Cover: Clear Polycarbonate  
Base: Black GFR Polyamide

**Recommended Panel Thickness:**  
.039" ~ .106" (1.0mm ~ 2.7mm)



### Spring Loaded Protective Guard for Snap-in Mounting of PCB Model

#### AT4170

Opens 180°  
Closes automatically

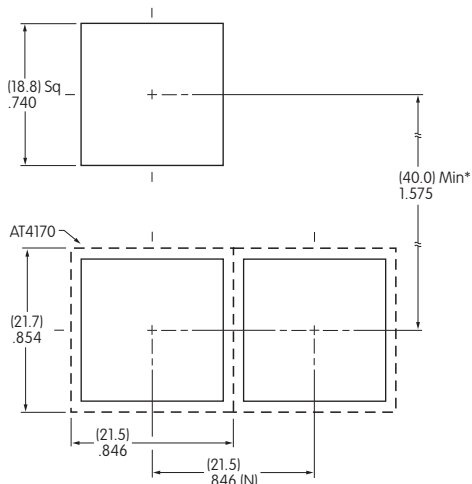
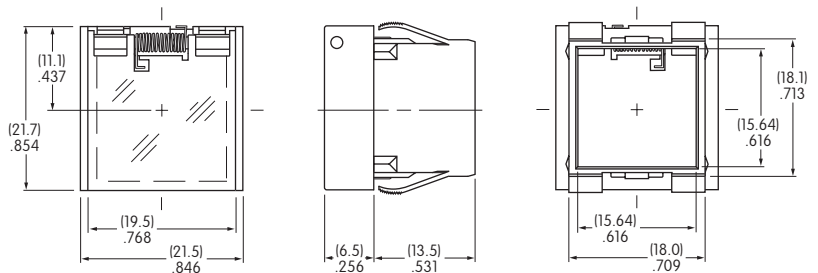


#### Materials:

Cover: Clear Polycarbonate  
Base: Black Polyamide  
Coil Spring: Stainless Steel

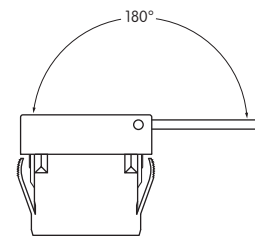
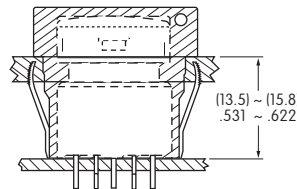
**Recommended Panel Thickness:**  
.039" ~ .126"  
(1.0mm ~ 3.2mm)

**Recommended Panel-to-PCB Range:**  
.531" ~ .622"  
(13.5mm ~ 15.8mm)



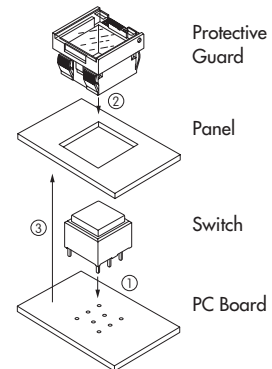
(N) = Number of switches

\* Minimum dimension allows opening of cover to 180°



#### Installation

- ① Install switch onto PC board.
- ② Snap protective guard into panel.
- ③ Join the two assemblies.



## OPTIONAL ACCESSORIES

### Spring Loaded Protective Guard for Snap-in Model

#### AT4142

Opens 180°  
Closes automatically

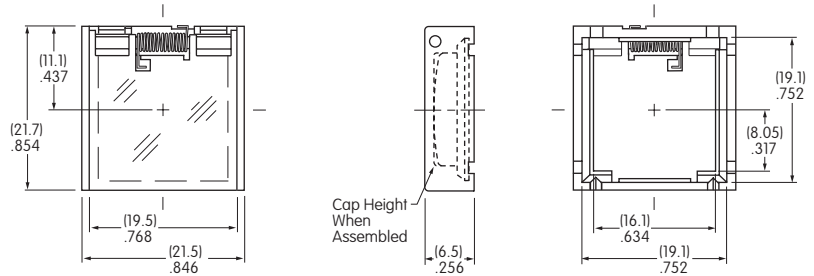


#### Materials:

Cover: Clear Polycarbonate  
Base: Black GFR Polyamide  
Coil Spring: Stainless Steel

#### Recommended Panel Thickness:

.039" ~ .106" (1.0mm ~ 2.7mm)

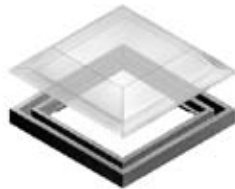


### Dust Cover

AT4145 Not for use with barriers.

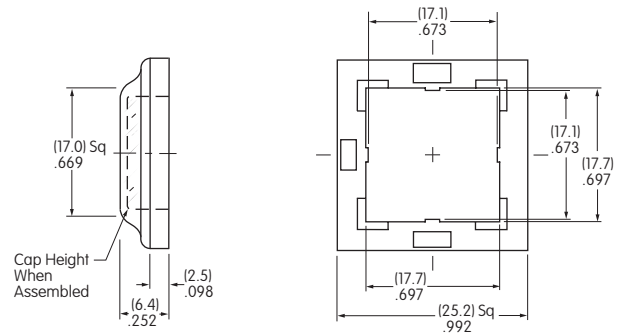
#### Materials:

Lid: Clear PVC  
Operating temperature range:  
0°C ~ +70°C (32°F ~ 158°C).  
Gasket: Polyethylene



#### Recommended Panel Thickness

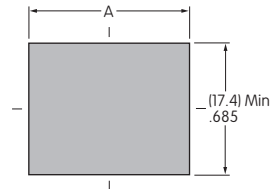
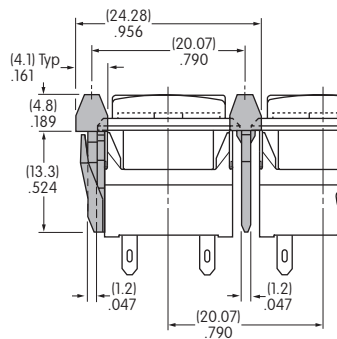
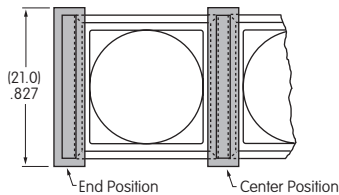
.039" ~ .098" (1.0mm ~ 2.5mm)



### Barriers for Snap-in Mount

#### AT4143 End

#### AT4144 Center



Cutouts for more than 1 Switch:

$$A = .799" (20.3\text{mm}) \times \text{Number of Switches} + .051" (1.3\text{mm})$$

Material: Polyamide

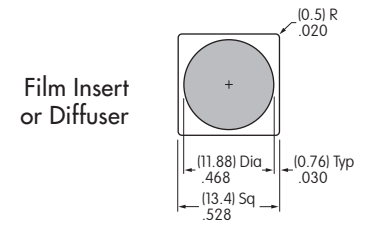
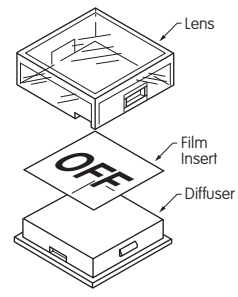
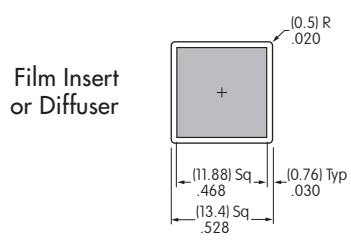
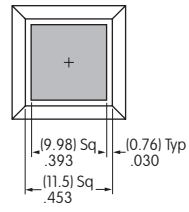
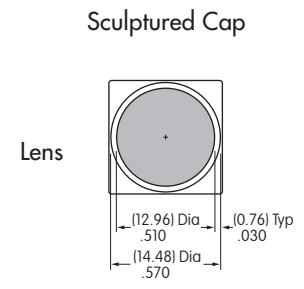
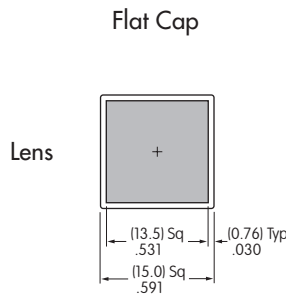
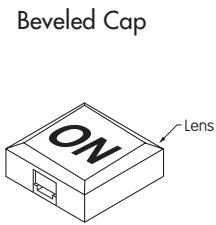
LEGENDS

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

Suggested Printable Area for UB2 Lens, Film Insert or Diffuser

Recommended Methods: Laser Etch on clear lens, Screen Print or Pad Print on lens;  
Laser Print on film insert.

Shaded areas are printable areas.



Film Insert: Clear Polyester 4 mil maximum thickness

Toggles  
Rocker  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

# General Specifications

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 3A @ 125V AC or 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)  
 Note: Find additional explanation of operating range in Supplement section.

## Other Ratings

**Contact Resistance:** 50 milliohms maximum for silver; 100 milliohms maximum for gold  
**Insulation Resistance:** 200 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 for momentary circuit  
 200,000 operations minimum for maintained circuit  
**Electrical Life:** 100,000 operations minimum  
**Nominal Operating Force:** Single pole: 1.47N for nonsealed; 1.67N for sealed  
 Double pole: 2.75N for nonsealed; 2.94N for sealed  
**Contact Timing:** Nonshorting (break-before-make)  
**Travel:** Pretravel .059" (1.5mm); Overtravel .059" (1.5mm); Total Travel .118" (3.0mm)

## Materials & Finishes

**Housing/Bezel:** Glass fiber reinforced polyamide (UL94V-0)  
**Snap-in Frame:** Stainless steel  
**Base:** Diallyl phthalate resin (UL94V-0)  
**Movable Contactor:** Phosphor bronze with silver or gold plating  
**Movable Contacts:** Silver alloy with silver plating or brass with gold plating  
**Stationary Contacts:** Silver alloy or copper with gold plating  
**Switch Terminals:** Phosphor bronze with tin plating  
**Lamp Terminals:** Phosphor bronze with tin plating

## Environmental Data

**Operating Temperature Range:** -25°C through +50°C (-13°F through +122°F) for Illuminated  
 -25°C through +70°C (-13°F through +158°F) for Nonilluminated  
**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/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)  
**Sealing:** IP65 of IEC60529 standard for panel seal models

## Installation

**Mounting Torque:** 0.785Nm (6.95 lb•in) maximum  
**Quick Connect Force:** 24.5N maximum downward force on connector  
**Soldering Time & Temperature:** Manual Soldering: See Profile A in Supplement section.

## Standards & Certifications

**Flammability Standards:** UL94V-0 housing & base  
**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 solder lug models recognized at 3A @ 125/250V AC or 0.4VA @ 28V AC/DC maximum.  
**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.  
 All solder lug models certified at 3A @ 125/250V AC or 0.4VA @ 28V AC/DC maximum.

# Distinctive Characteristics

Full face or spot illumination with incandescent lamps or multi-element LEDs, with or without resistors.

Choice of super bright LEDs in white, green, and blue as well as bright LEDs in red, amber, and green.

Combination bezel-barrier is an integral part of the switch and prevents accidental actuation.

Unique thermoplastic elastomer seal inside caps plus rolled sleeve of nitrile butadiene rubber at joining of housing and inner case, all for added protection to interior mechanism.

Dust and oil tight as well as splashproof panel seal models qualify to IP65 of IEC60529 Standards (similar to NEMA 4 and 13). Panel seal models provided with exterior o-ring.

Distinctive design of snap-action contacts for shock resistance, long life, and sensitive actuation.

High density design to give behind panel depth of less than one inch.

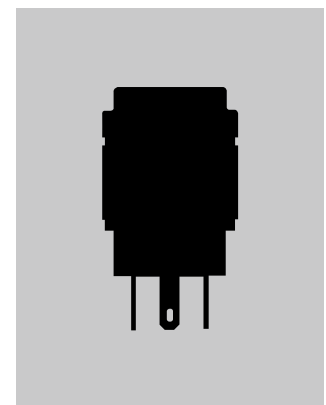
Terminals are epoxy sealed to lock out flux, dust, solvents, and other contaminants.

Latchdown for indication of circuit status, plus audible, tactile feedback with smooth, responsive operation.

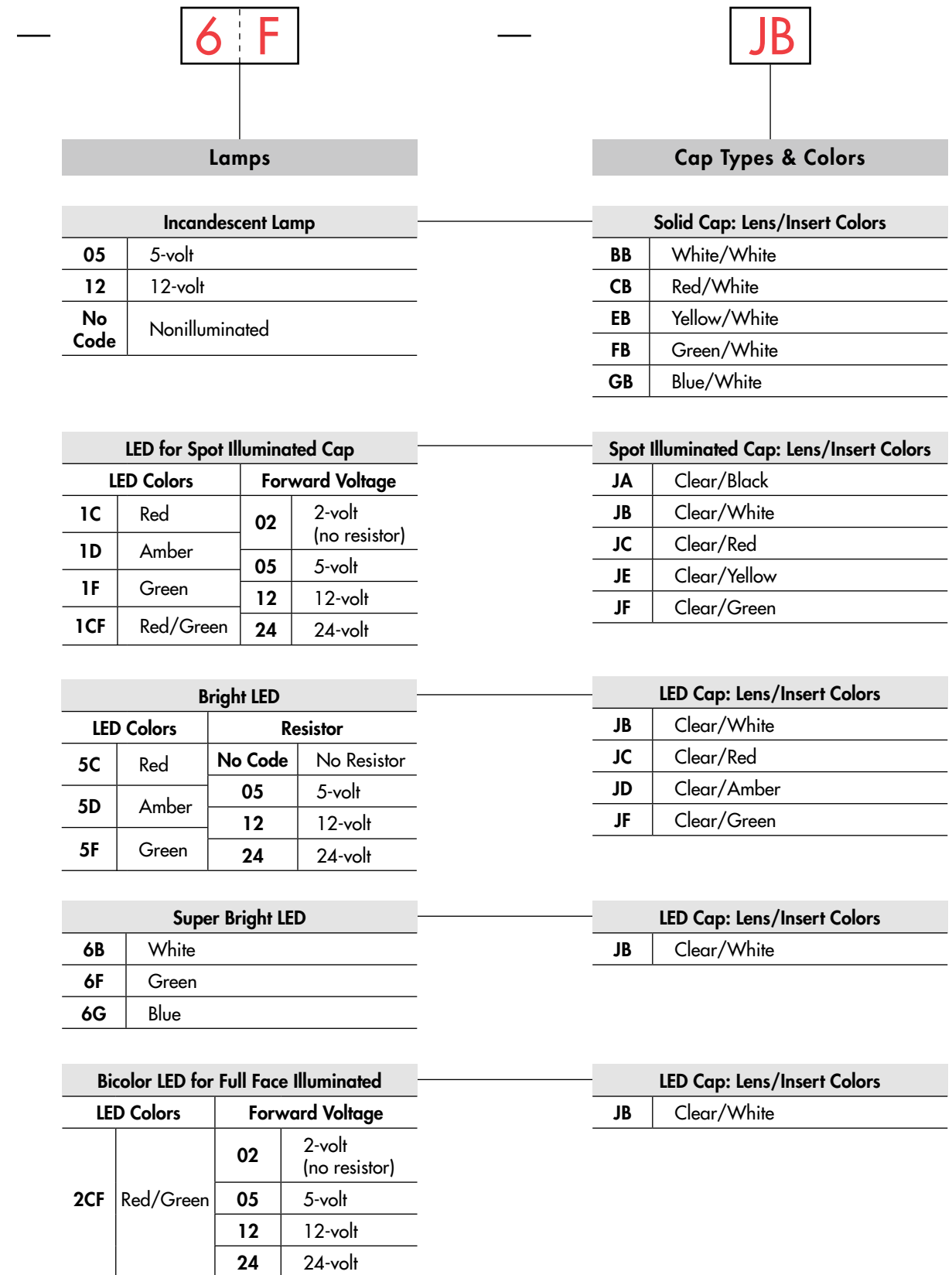
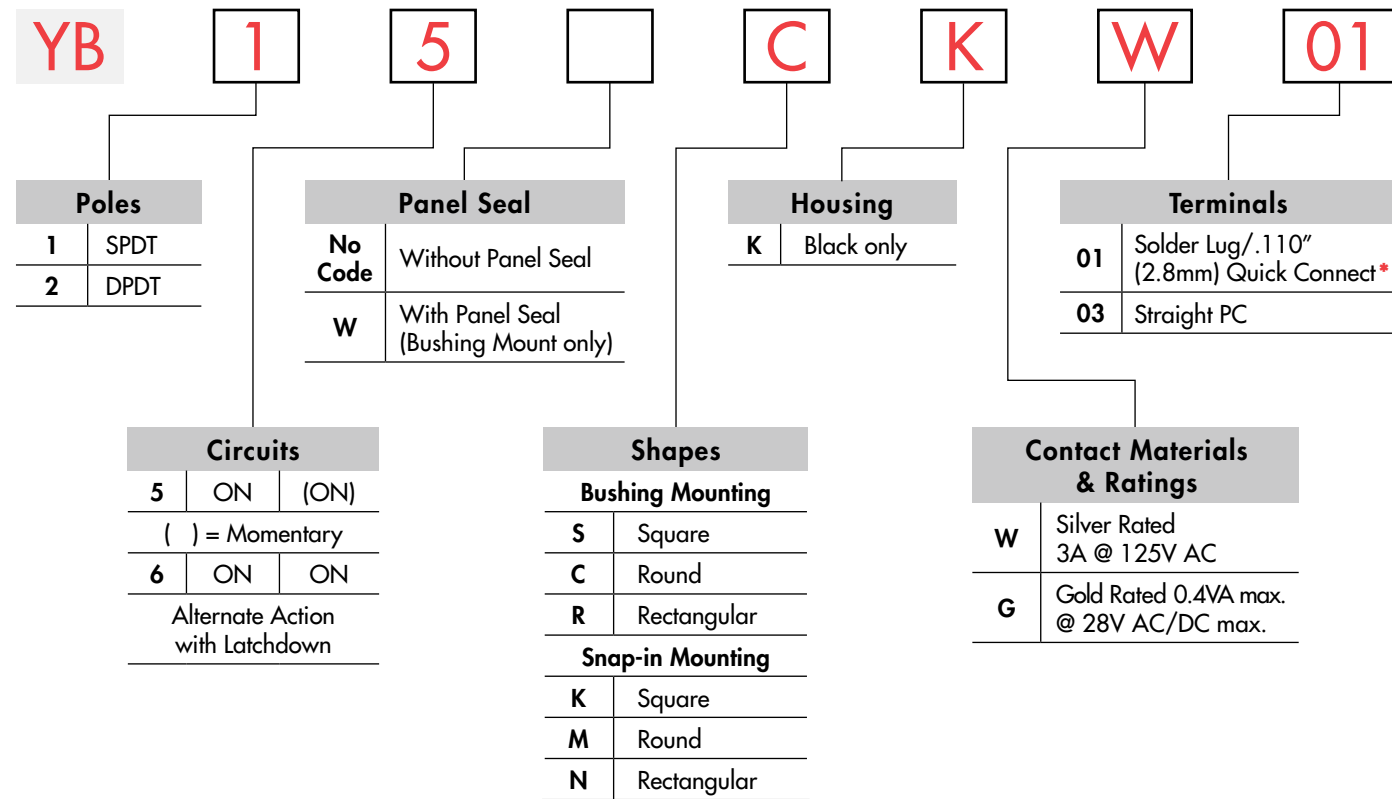
Matching indicators available.



Actual Size



## TYPICAL SWITCH ORDERING EXAMPLE



### 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

### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**YB15CCKW01-6F-JB**



Toggle

Rocker

Pushbutton

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt


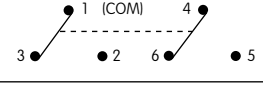
Touch

Indicators

Accessories

Supplement

## POLES & CIRCUITS

Pole	Model	Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
		Normal	Down	Normal	Down	
SP	YB15 *YB16	ON ON	(ON) ON	1-3	1-2	Notes: Switch is marked with NC, NO, COM, L+, L-. Lamp circuit is isolated and requires external power source. 
DP	YB25 *YB26	ON ON	(ON) ON	1-3 4-6	1-2 4-5	

\* When in latchdown position for the alternate circuit, cap position is .020" (0.5mm) above the built-in bezel.

## PANEL SEAL

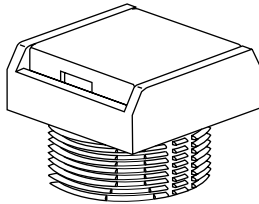
**No Code**

Without Panel Seal

**W**

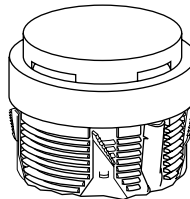
With Panel Seal

Bushing Mounting

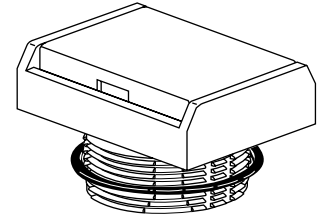


Supplied with mounting nut.

Snap-in Mounting



Bushing Mounting only



Supplied with mounting nut and o-ring AT089.

## SHAPES & MOUNTING TYPES

Bushing Mounting

Snap-in Mounting

**S**

Square

**C**

Round

**R**

Rectangular

**K**

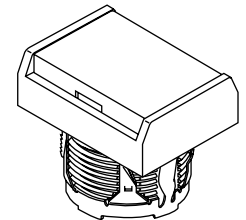
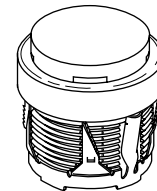
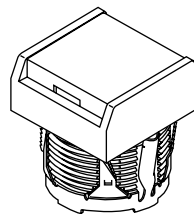
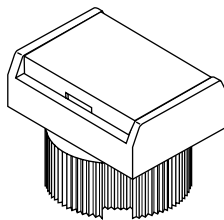
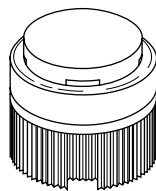
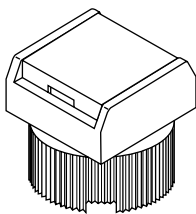
Square

**M**

Round

**N**

Rectangular



Bezel-barrier is an integral part of the switch body.

## HOUSING

**K**

Black

Housing available in black only. The 1-piece body and bezel-barrier have a matte finish.

## CONTACT MATERIALS & RATINGS

**W**

Silver Contacts

Power Level

3A @ 125/250V AC

**G**

Gold Contacts

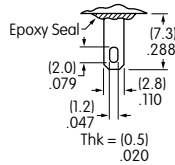
Logic Level

0.4VA max. @ 28V AC/DC max.

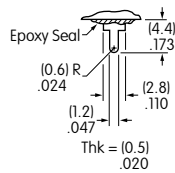
Complete explanation of operating range in Supplement section.

## TERMINALS

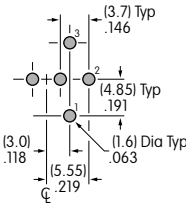
**01** Solder Lug/  
.110" (2.8mm) Quick Connect



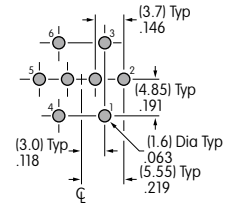
**03** Straight PC



Single Pole




Double Pole



## INCANDESCENT LAMP & SOLID CAP

Electrical specifications are determined at a basic temperature of 25°C. Lamp circuit is independent of switch operation. For dimension drawing of lamp see the Accessories & Hardware section.

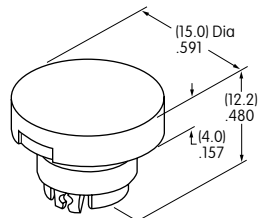
<b>AT611</b>   T-1 Bi-pin		<b>05</b>	<b>12</b>	
	Voltage	V	5V AC	12V AC
	Current	I	115mA	60mA
	MSCP		.150	.150
	Endurance	Hours	7,000 average	
	Ambient Temperature Range		-25°C ~ +50°C	

**No Code** No Lamp

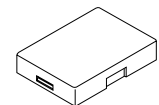
### Solid Cap for Incandescent Lamp & Nonilluminated

Lens/Insert  
Colors Available:

- BB** White/White
- CB** Red/White
- EB** Yellow/White
- FB** Green/White
- GB** Blue/White

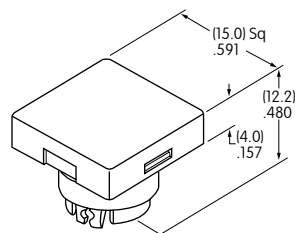


**AT3002**  
Round

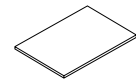
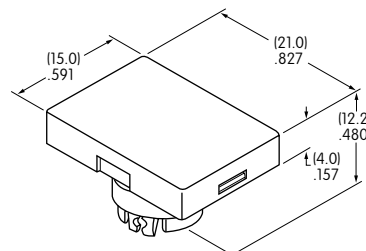


Translucent Colored Lens

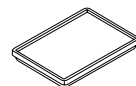
**AT3001**  
Square



**AT3003**  
Rectangular



Translucent White Insert



Translucent White Seal/Filter



Incandescent Lamp AT611

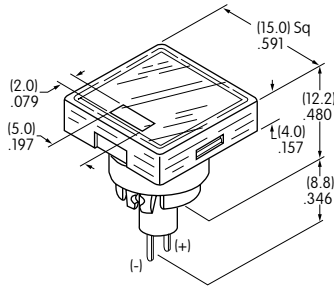
**Materials:**

Lens & Insert: Polycarbonate Seal/Filter: Thermoplastic Elastomer

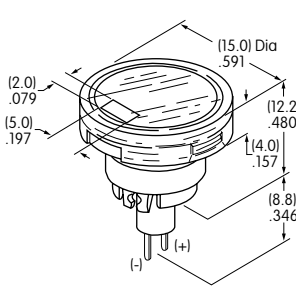
## SPOT ILLUMINATED CAP WITH BUILT-IN LED

This spot-illuminated cap is factory assembled.

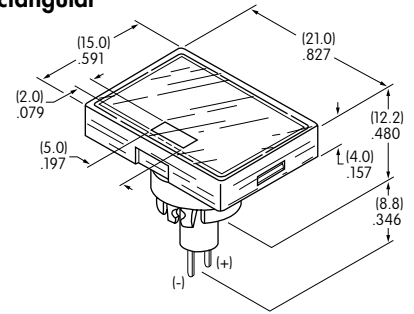
**AT3010**  
Square



**AT3011**  
Round



**AT3012**  
Rectangular



**Colors Available:**



Red



Amber



Green



Red/Green



Without Resistor



With Resistor



With Resistor

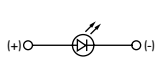


With Resistor

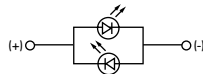
Unit

Forward Peak Current	$I_{FM}$	20	15	15	12	mA
Typical Forward Current	$I_F$	15	12.5	12.5	10	mA
Forward Voltage	$V_F$	2.1	5	12	24	V
Reverse Peak Voltage (not applicable to bicolor)	$V_{RM}$	5	5	5	5	V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.27	—	—	—	mA/°C
Ambient Temperature Range		-25 ~ +50				°C

Without Resistor 2-volt

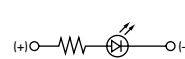


Single Color

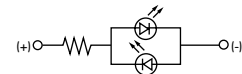


Bicolor

With Resistor 5, 12, 24-volt



Single Color



Bicolor

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires external power source. Single color LEDs are colored in OFF state. Bicolor LED is translucent white in OFF state.

If the source voltage exceeds the rated voltage, a ballast resistor is required.

The resistor value can be calculated by using the formula in the Supplement section.

**Lens/Insert**  
**Colors Available:**



Clear/Black



Clear/White



Clear/Red



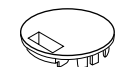
Clear/Yellow



Clear/Green



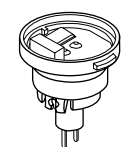
Clear Lens



Colored Insert



Seal



Built-in LED  
(integral part  
of the cap)

Example part number  
when cap is ordered separate  
from switch:

**AT3010F02JA**

for a

Square Spot Illuminated Cap  
with Green 2-volt LED  
without resistor  
Clear Lens and Black Insert

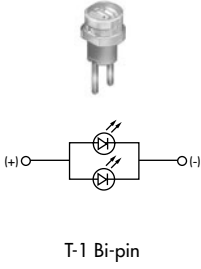
**Materials:**

Lens & Insert: Polycarbonate  
Seal: Thermoplastic Elastomer


## BRIGHT LED & LED CAPS

The electrical specifications shown are determined at a basic temperature of 25°C.  
 LED circuit is isolated and requires external power source.  
 If the source voltage exceeds the rated voltage, a ballast resistor is required.  
 The resistor value can be calculated by using the formula in the Supplement section.

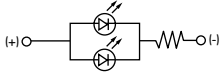
### Electrical Specifications for Bright LED without Resistor

<b>Bright AT628</b>   T-1 Bi-pin	<b>Colors Available:</b> <span style="border: 1px solid black; padding: 2px;">5C</span> Red <span style="border: 1px solid black; padding: 2px;">5D</span> Amber <span style="border: 1px solid black; padding: 2px;">5F</span> Green <span style="border: 1px solid black; padding: 2px; margin-left: 20px;">No Code</span> No Resistor	Unit				
	LED Colors	Red	Amber	Green		
	Forward Peak Current	$I_{FM}$	40	40	40	mA
	Typical Forward Current	$I_F$	26	26	26	mA
	Forward Voltage	$V_F$	1.9	2.0	2.0	V
	Reverse Peak Voltage	$V_{RM}$	4	4	4	V
	Current Reduction Rate Above 25°C	$\Delta I_F$	0.50			mA/°C
	Ambient Temperature Range	-25 ~ +50			°C	

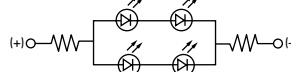
### Electrical Specifications for Bright LED with Resistor

<b>Bright AT634</b>   T-1 1/4 Bi-pin	<b>Colors Available:</b> <span style="border: 1px solid black; padding: 2px;">5C</span> Red <span style="border: 1px solid black; padding: 2px;">5D</span> Amber <span style="border: 1px solid black; padding: 2px;">5F</span> Green <span style="border: 1px solid black; padding: 2px; margin-left: 20px;">05</span> <span style="border: 1px solid black; padding: 2px; margin-left: 20px;">12</span> <span style="border: 1px solid black; padding: 2px; margin-left: 20px;">24</span>	Unit				
	Forward Peak Current	$I_{FM}$	—	—	—	mA
	Typical Forward Current	$I_F$	25	20	10	mA
	Forward Voltage	$V_F$	5	12	24	V
	Reverse Peak Voltage	$V_{RM}$	4	8	16	V
	Current Reduction Rate Above 25°C	$\Delta I_F$	—	—	—	mA/°C
	Ambient Temperature Range	-25 ~ +50			°C	

AT634  
5-volt,  
2-element  
with Resistor



AT634  
12-volt,  
4-element  
with Resistor



AT634  
24-volt,  
4-element  
with Resistor

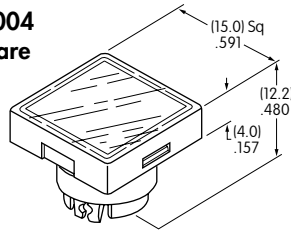


### Cap for Bright LED

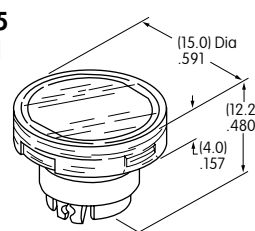
Lens/Insert  
Colors Available:

- JB Clear/White
- JC Clear/Red
- JD Clear/Amber
- JF Clear/Green

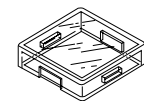
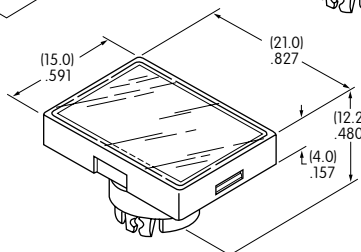
**AT3004**  
Square



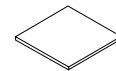
**AT3005**  
Round



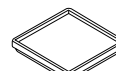
**AT3006**  
Rectangular



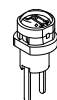
Transparent Clear Lens



Translucent Colored Insert



Translucent White Seal/Diffuser



Bright LEDs  
AT628 AT634


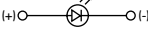

#### Materials:

Lens & Insert: Polycarbonate Seal/Diffuser: Thermoplastic Elastomer

## SUPER BRIGHT LED & LED CAPS

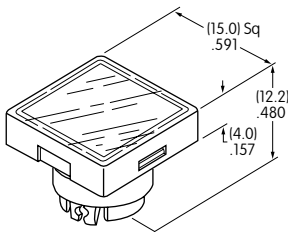
The electrical specifications shown are determined at a basic temperature of 25°C.  
 LED circuit is isolated and requires external power source.  
 If the source voltage exceeds the rated voltage, a ballast resistor is required.  
 The resistor value can be calculated by using the formula in the Supplement section.

### Electrical Specifications for Super Bright LED

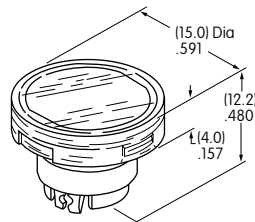
Super Bright AT625G Blue AT631B White AT632F Green	 	Colors:	6B	6F	6G	Unit
			White	Green	Blue	
 T-1 Bi-pin	Forward Peak Current	$I_{FM}$	30	30	30	mA
	Typical Forward Current	$I_F$	20	20	20	mA
	Forward Voltage	$V_F$	3.6	3.5	3.6	V
	Reverse Peak Voltage	$V_{RM}$	5	5	5	V
	Current Reduction Rate Above 25°C	$\Delta I_F$	0.50			mA/°C
	Ambient Temperature Range				-25 ~ +50	°C

### Cap for Super Bright LED

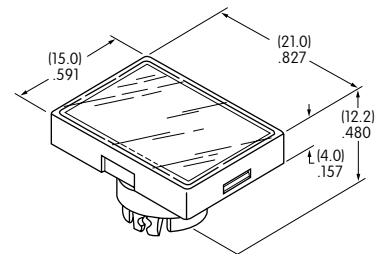
**AT3014**  
Square



**AT3015**  
Round



**AT3016**  
Rectangular



Lens/Insert  
 Colors Available:

**JB** Clear/White

Transparent Clear Lens

Translucent White Insert

Translucent White Seal/Diffuser


Super Bright LEDs  
 AT625 AT631  
 AT632

Materials:  
 Lens & Insert: Polycarbonate Seal/Diffuser: Thermoplastic Elastomer

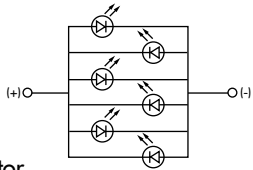
## BICOLOR LED & LED CAPS

The electrical specifications shown are determined at a basic temperature of 25°C.  
 LED circuit is isolated and requires external power source.  
 If the source voltage exceeds the rated voltage, a ballast resistor is required.  
 The resistor value can be calculated by using the formula in the Supplement section.

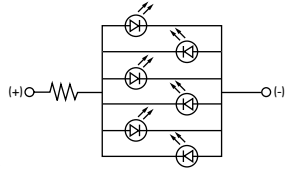
### Electrical Specifications for Bicolor LED

<b>Bicolor AT621</b> <b>2CF</b> Red/Green  T-1 1/2 Bi-pin	Bicolor LED is translucent white in OFF state.	<b>02</b>	<b>05</b>	<b>12</b>	<b>24</b>	Unit
	Forward Peak Current $I_{FM}$	60	60	20	12	mA
	Typical Forward Current $I_F$	45	45	15	10	mA
	Forward Voltage $V_F$	2.1	5	12	24	V
	Current Reduction Rate Above 25°C $\Delta I_F$	0.80	—	—	—	mA/°C
	Ambient Temperature Range	-25 ~ +50			°C	

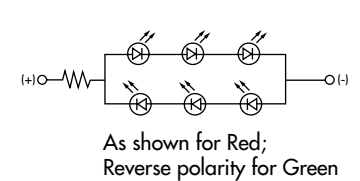
AT621  
 Bicolor LED  
 2-volt  
 6-element  
 without Resistor



AT621  
 Bicolor LED  
 5-volt  
 6-element  
 with Resistor

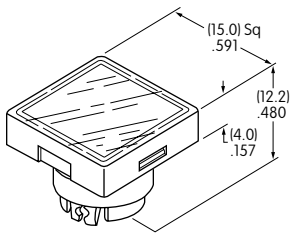


AT621  
 Bicolor LED  
 12 & 24-volt  
 6-element  
 with Resistor

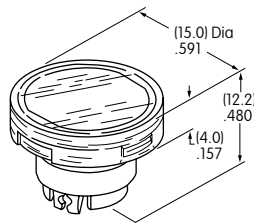


### LED Caps

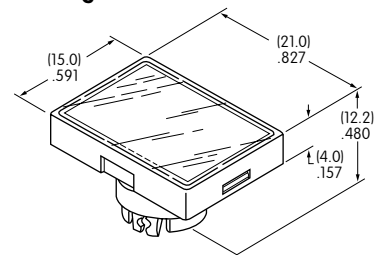
**AT3004**  
 Square



**AT3005**  
 Round



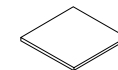
**AT3006**  
 Rectangular



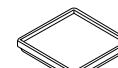
Lens/Insert  
 Colors Available:

**JB** Clear/White

Transparent Clear Lens



Transparent White Insert



Translucent White Seal/Diffuser



Bicolor LED AT621

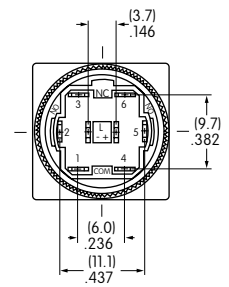
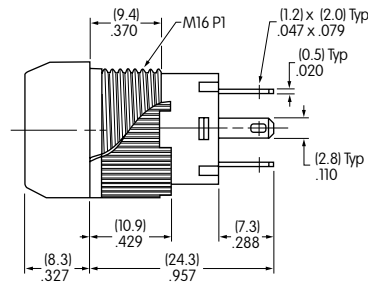
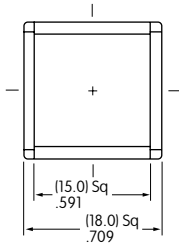
**Materials:**

Lens & Insert: Polycarbonate Seal/Diffuser: Thermoplastic Elastomer

## TYPICAL SWITCH DIMENSIONS

### Square • Bushing Mounting

### Single & Double Pole

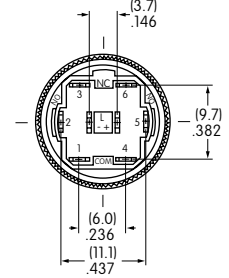
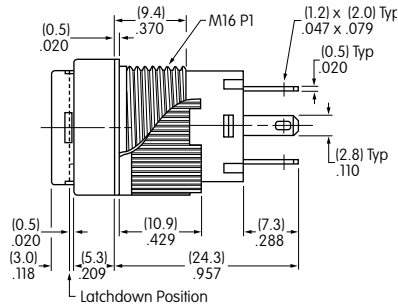
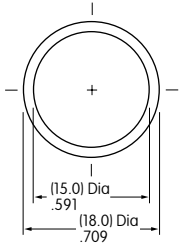


**YB15SKW01-12-CB**

Single pole models do not have terminals 4, 5, & 6.

### Round • Panel Seal

### Single & Double Pole

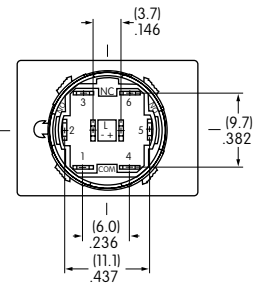
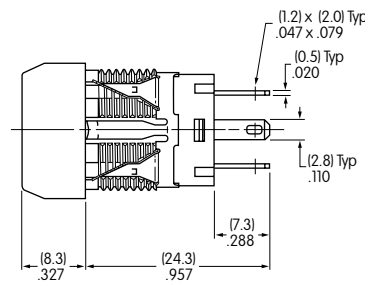
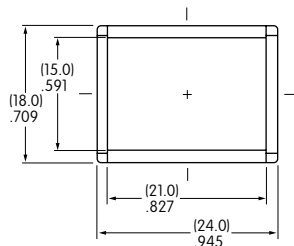


**YB26WCKW01-12-EB**

Single pole models do not have terminals 4, 5, & 6.

### Rectangular • Snap-in Mounting

### Single & Double Pole



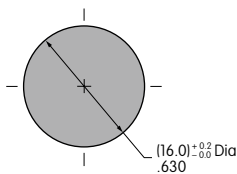
**YB15NKW01-5C-JC**

Single pole models do not have terminals 4, 5, & 6.

## PANEL THICKNESS & CUTOUTS

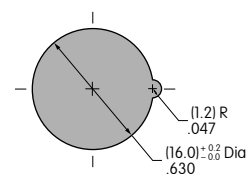
### Bushing & Panel Seal Mount

Panel Thickness  
.020" ~ .197"  
(0.5mm ~ 5.0mm)



### Snap-in Mount

Panel Thickness  
.039" ~ .138"  
(1.0mm ~ 3.5mm)



## OPTIONAL ACCESSORIES

Dust Covers and Protective Guards reduce depth of switch behind panel by .047" (1.2mm).

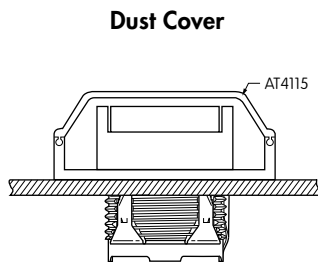
**Panel Thickness Range with Dust Cover or Protective Guards:**

Bushing Mounting  
.020" ~ .150" (0.5mm ~ 3.8mm)

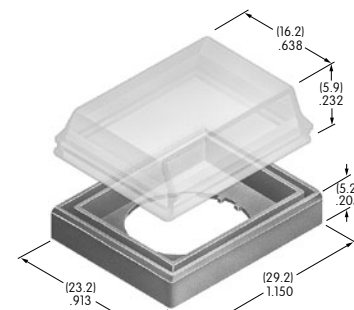
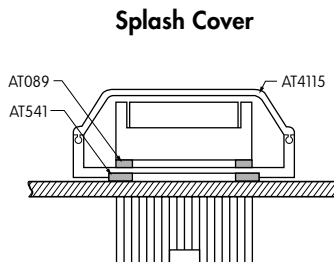
Snap-in Mounting  
.020" ~ .091" (0.5mm ~ 2.3mm)

Panel Seal  
.020" ~ .118" (0.5mm ~ 3.0mm)

### AT4115 Dust Cover for Snap-in or Bushing Mount

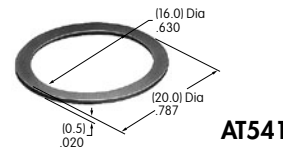


### Dust/Splash Cover



**AT4115**

### AT4115 Splash Cover and AT541 O-ring for Bushing Mount



**AT541**

**Materials:**  
Lid: Polyvinyl Chloride  
Base: Polyamide  
O-ring: Nitrile butadiene rubber

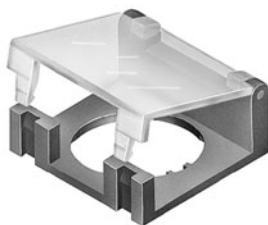
Snap-in Mount

Panel Seal

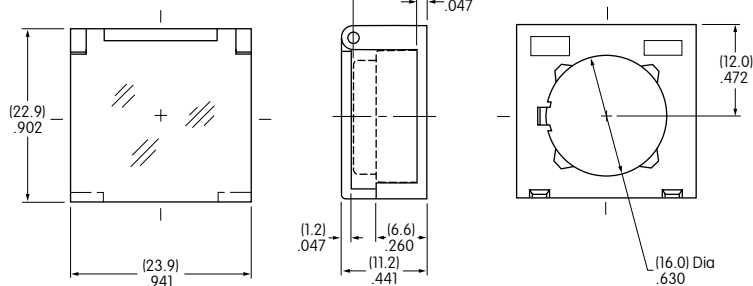
Note: AT089 o-ring supplied with panel seal model.

### AT4072 Protective Guard

Opens 90°  
Closes manually



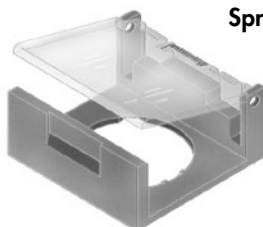
### Protective Guard



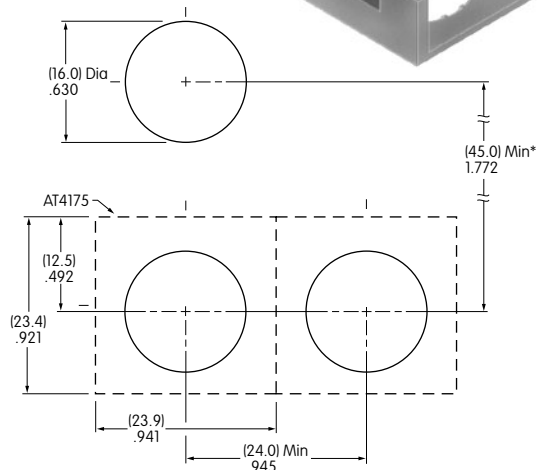
**Materials:**  
Lid: Polycarbonate  
Base: Glass Fiber Reinforced Polycarbonate

### AT4175 Spring Loaded Protective Guard

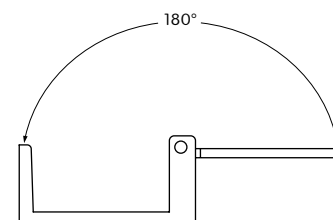
Opens 180°  
Closes automatically



### Spring Loaded Protective Guard



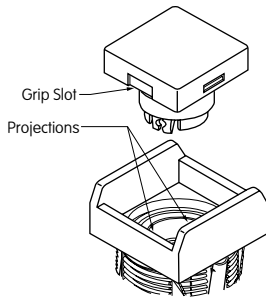
**Materials:**  
Lid: Polycarbonate  
Base: Glass Fiber Reinforced Polyamide  
Coil Spring: Stainless Steel



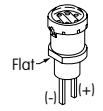
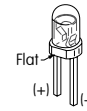
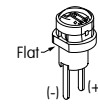
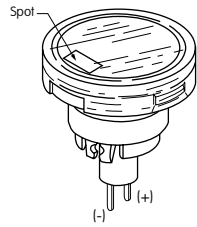
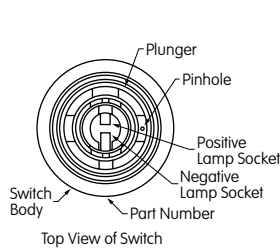
\* Minimum dimension allows opening of cover to 180°

## ASSEMBLY INSTRUCTIONS

### Cap Assembly



### LED Polarity & Orientation in Lamp Socket



Spot Illuminated Cap with Built-in LED

LED AT628 AT634

LEDs AT625G AT631B AT632F

LED AT621

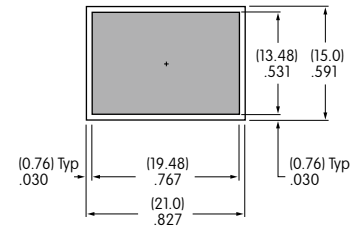
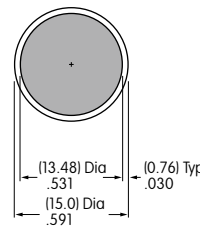
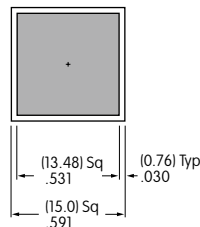
The following installation tools are available: AT106 Socket Wrench for bushing mounting (Overtightening the mounting nut AT092 may damage the switch housing.); AT109 Cap Extractor; AT111 Lamping Tool. Further details and dimensions are shown in the Accessories and Hardware section.

## LEGENDS

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

### Suggested Printable Area for YB Lens

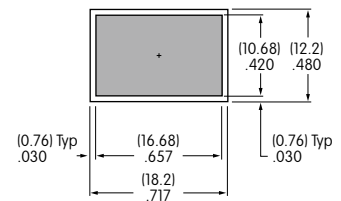
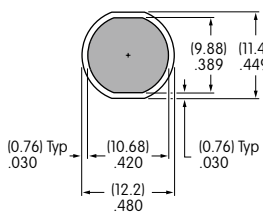
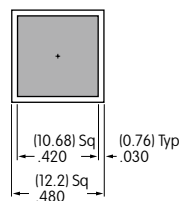
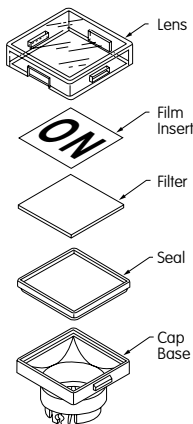
**Recommended Methods:** Laser Etch on clear lens, Screen Print or Pad Print on Lens. Epoxy based ink is recommended.



Shaded areas are printable areas.

### Suggested Printable Area for Film Insert

**Recommended Print Method:** Laser Print  
 Film Insert: Clear Polyester, 4 mil max. thickness



Shaded areas are printable areas.

Toggles  
 Rockers  
 Pushbuttons  
 Illuminated PB  
 Programmable  
 Keylocks  
 Rotaries  
 Slides  
 Tactiles  
 Tilt  
 Touch  
 Indicators  
 Accessories  
 Supplement

# General Specifications

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

## Electrical Capacity (Resistive Load)

**Power Level (silver):** 3A @ 125V AC or 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)

## Other Ratings

**Contact Resistance:** 50 milliohms maximum for silver; 100 milliohms maximum for gold  
**Insulation Resistance:** 200 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 for momentary circuit  
 200,000 operations minimum for maintained circuit  
**Electrical Life:** 100,000 operations minimum  
**Nominal Operating Force:** Single pole: 1.5N  
 Double pole: 3.0N  
**Contact Timing:** Nonshorting (break-before-make)  
**Travel:** Pretravel .059" (1.5mm); Overtravel .059" (1.5mm); Total Travel .118" (3.0mm)

## Materials & Finishes

**Bezel:** Black: Glass fiber reinforced polyamide (UL94V-0); Chrome plated: Chrome plating over ABS resin (UL94V-2)  
**Housing:** Glass fiber reinforced polyamide (UL94V-0)  
**Base:** Glass fiber reinforced polyamide (UL94V-0)  
**Movable Contactor:** Phosphor bronze with silver or gold plating  
**Movable Contacts:** Silver alloy or copper with gold plating  
**Stationary Contacts:** Silver alloy or copper with gold plating  
**Switch Terminals:** Phosphor bronze with tin plating  
**Lamp Terminals:** Phosphor bronze with tin plating

## Environmental Data

**Operating Temperature Range:** -25°C through +50°C (-13°F through +122°F) for Illuminated  
 -25°C through +70°C (-13°F through +158°F) for Nonilluminated  
**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/s<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)  
**Sealing:** IP65 of IEC60529 standard

## Installation

**Mounting Torque:** 0.785Nm (6.95 lb•in) maximum  
**Soldering Time & Temperature:** Manual Soldering: See Profile A in Supplement section.

## Standards & Certifications

**Flammability Standards:** UL94V-0 housing, base & black bezel  
**UL:** **File No. E44145 - Recognized only when ordered with marking on switch.**  
 Add "/CUL" before first dash in part number to order cULus marking on switch.  
 All solder lug models recognized at 3A @ 125/250V AC or 0.4VA @ 28V AC/DC maximum.

# Distinctive Characteristics

24mm square and 25mm diameter pushbuttons with the shortest above-panel dimension (1.8mm) in the industry for splashproof design.

Meets IP65 of IEC60529 standards (similar to NEMA 4 and 13), providing dust tight and splashproof panel seal protection.

Tamper resistant 18mm square and 19mm diameter actuators.

Short body of .965" (24.5mm) conserves behind-panel space.

Distinctive long stroke and light touch actuation for clear indication of circuit status.

Choice of cap colors includes clear, brushed chrome, red, green, or amber, for enhanced panel appearance. Metallic silver cap option has bright ring illumination (round only).

Brilliant illumination with multiple LED colors.

Bezel color options in black or brushed chrome.

Brushed chrome option is lighter weight than actual metal switches due to metal plating on resin.

Available in momentary and alternate action with latchdown.

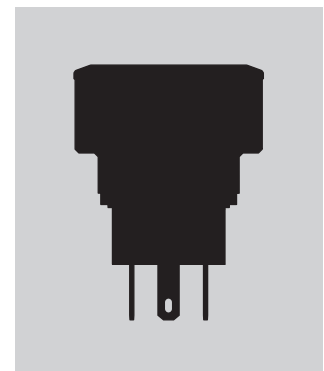
Crisp actuation and clear circuit status provided by snap-action contact mechanism. Arc barrier protects against crossover.

Combination solder lug and .110" quick connect terminals. Terminals are epoxy sealed to lock out flux, dust, solvents, and other contaminants, as well as to secure terminals and improve contact stability.

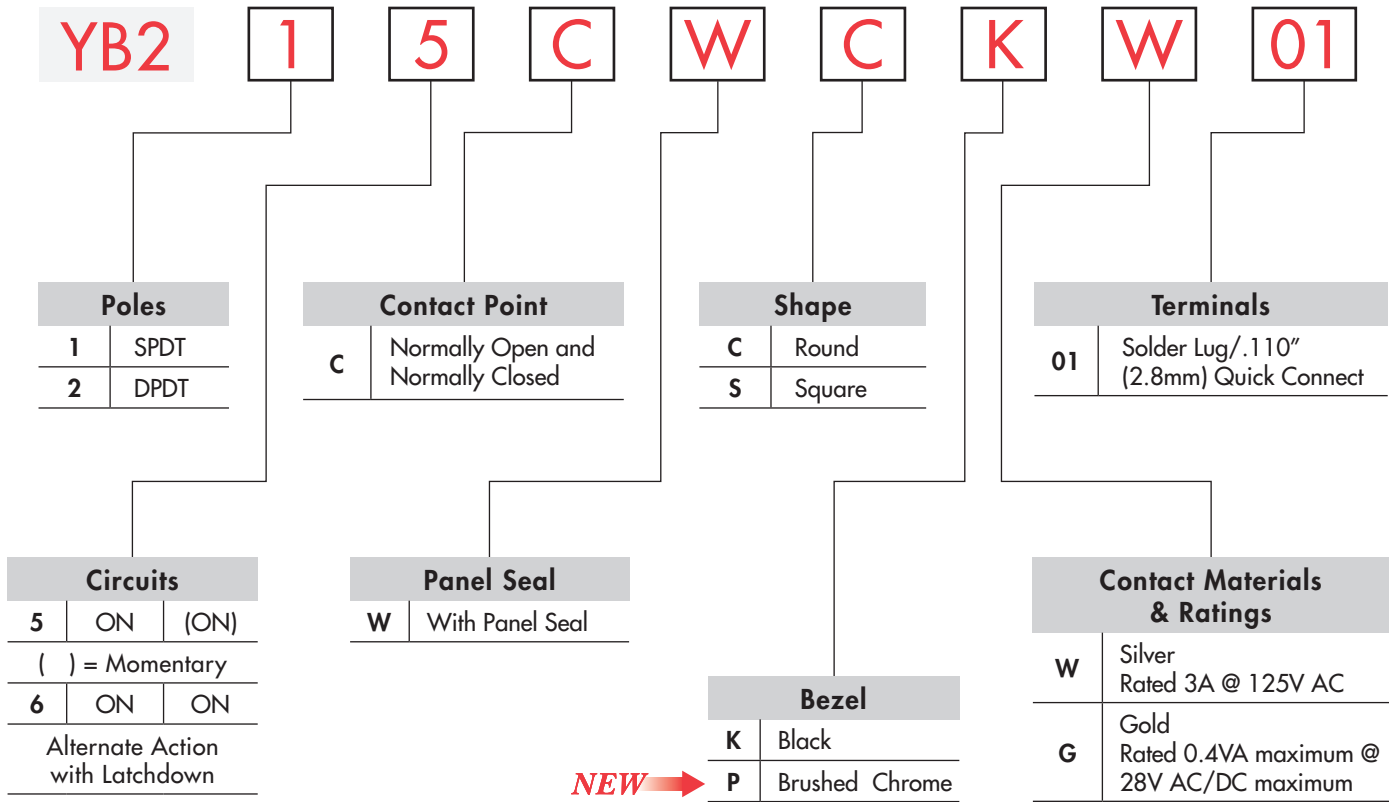
Custom legends on actuator available.



Actual Size (Round)



### TYPICAL SWITCH



**NEW** →

#### IMPORTANT:



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

#### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

**YB215CWCKW01-6B-JB**



ORDERING EXAMPLE

**6 B**

LEDS

Bright LED			
LED Colors		Resistor	
5C	Red	No Code	No Resistor (not for Green)
5D	Amber		05 5-volt
5F	Green	12	12-volt
		24	24-volt

Super Bright LED	
6B	White
6F	Green
6G	Blue

Nonilluminated	
N	No Lamp

**JB**

Cap Types & Colors

Lens/Diffuser Colors	
JB	Clear/White
JS	Metallic Silver Cap/Clear Ring (Round only)
CB	Red/White
EB	Yellow/White
FB	Green/White

LED and cap need to be the same color. Yellow cap pairs with amber LED to achieve amber illumination. Codes JB and JS (Round only) may be combined with all LED colors.

Lens/Diffuser Cap Colors	
JB	Clear/White
JS	Metallic Silver Cap/Clear Ring (Round only)

Cap Color	
JB	Clear/White
CB	Red/White
EB	Yellow/White
FB	Green/White
P	Brushed Chrome

NEW →

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

YB216CWSPW01-N-P



Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

## POLES & CIRCUITS

		Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
Pole	Model	Normal	Down	Normal	Down	
SP	YB215 YB216	ON ON	(ON) ON	1-3	1-2	Notes: Switch is marked with NC, NO, COM, L+, L-. Lamp circuit is isolated and requires an external power source.
DP	YB225 YB226	ON ON	(ON) ON	1-3 4-6	1-2 4-5	

## CONTACT POINT

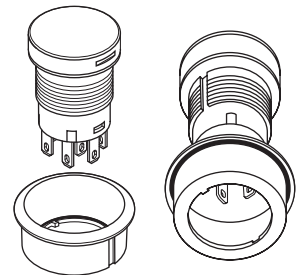
**C** Normally Open and Normally Closed

Contact points are both Normally Open and Normally Closed.

## PANEL SEAL

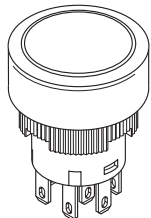
**W** Panel Seal (Round and Square)

Two o-rings provide panel seal protection meeting IP65 of IEC60529 standards.

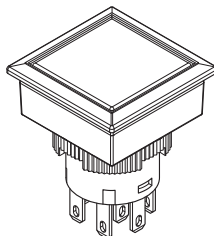


## SHAPE

**C** Round

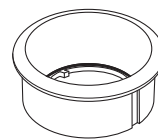


**S** Square



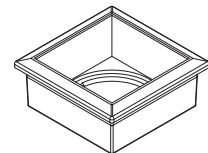
## BEZEL

**K** Black



**P** Brushed Chrome

For Round or Square



## CONTACT MATERIALS & RATINGS

**W** Silver Contacts

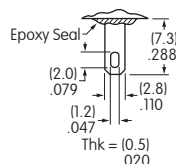
Power Level: 3A @ 125/250V AC  
Switch base is black

**G** Gold Contacts

Logic Level: 0.4VA max. @ 28V AC/DC max.  
Switch base is ivory

## TERMINALS


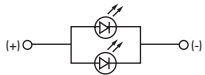
**01** Solder Lug/  
.110" (2.8mm) Quick Connect




**BRIGHT & SUPER BRIGHT LEDS**

The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. If the source voltage exceeds the rated voltage, a ballast resistor is required.  
 Base of AT634 and AT636 is Black for 5V, Light Blue for 12V and Gray for 24V.

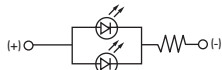
**Electrical Specifications for Bright LED without Resistor**

<b>Bright AT628</b>  T-1 Bi-pin 	<b>Colors Available:</b> <span style="border: 1px solid black; padding: 2px;">5C</span> Red <span style="border: 1px solid black; padding: 2px;">5D</span> Amber <span style="border: 1px solid black; padding: 2px;">No Code</span> No Resistor	Unit			
	LED Colors	Red	Amber		
	Forward Peak Current	$I_{FM}$	40	40	mA
	Typical Forward Current	$I_F$	26	26	mA
	Forward Voltage	$V_F$	1.9	2.0	V
	Reverse Peak Voltage	$V_{RM}$	4	4	V
	Current Reduction Rate Above 25°C	$\Delta I_F$	0.50		mA/°C
Ambient Temperature Range			-25 ~ +50	°C	

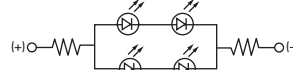
**Electrical Specifications for Bright Red & Amber LED with Resistor**

<b>Bright AT634</b>  T-1 1/4 Bi-pin	<b>Colors Available:</b> <span style="border: 1px solid black; padding: 2px;">5C</span> Red <span style="border: 1px solid black; padding: 2px;">5D</span> Amber <span style="border: 1px solid black; padding: 2px;">05</span> <span style="border: 1px solid black; padding: 2px;">12</span> <span style="border: 1px solid black; padding: 2px;">24</span>	Unit				
	Forward Peak Current	$I_{FM}$	—	—	—	mA
	Typical Forward Current	$I_F$	25	20	10	mA
	Forward Voltage	$V_F$	5	12	24	V
	Reverse Peak Voltage	$V_{RM}$	4	8	16	V
	Current Reduction Rate Above 25°C	$\Delta I_F$	—	—	—	mA/°C
	Ambient Temperature Range			-25 ~ +50	°C	

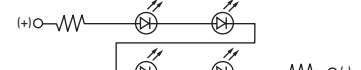
AT634  
5-volt,  
2-element  
with Resistor




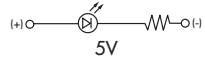
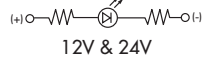

AT634  
12-volt,  
4-element  
with Resistor





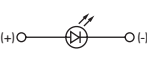
AT634  
24-volt,  
4-element  
with Resistor



**Electrical Specifications for Bright Green LED with Resistor**

<b>Bright AT636</b>  T-1 1/4 Bi-pin  5V  12V & 24V	<b>Colors Available:</b>  <b>ATTENTION</b> ELECTROSTATIC SENSITIVE DEVICES <span style="border: 1px solid black; padding: 2px;">5F</span> Green <span style="border: 1px solid black; padding: 2px;">05</span> <span style="border: 1px solid black; padding: 2px;">12</span> <span style="border: 1px solid black; padding: 2px;">24</span>	Unit				
	Forward Peak Current	$I_{FM}$	—	—	—	mA
	Typical Forward Current	$I_F$	11	9.5	8.7	mA
	Forward Voltage	$V_F$	5	12	24	V
	Reverse Peak Voltage	$V_{RM}$	5	5	5	V
	Current Reduction Rate Above 25°C	$\Delta I_F$	—	—	—	mA/°C
	Ambient Temperature Range			-25 ~ +50	°C	

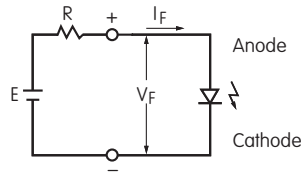
**Electrical Specifications for Super Bright LED**

<b>Super Bright AT625G Blue AT631B White AT632F Green</b>  T-1 Bi-pin	 <b>ATTENTION</b> ELECTROSTATIC SENSITIVE DEVICES 	Colors: <span style="border: 1px solid black; padding: 2px;">6B</span> White <span style="border: 1px solid black; padding: 2px;">6F</span> Green <span style="border: 1px solid black; padding: 2px;">6G</span> Blue	Unit			
	Forward Peak Current	$I_{FM}$	30	30	30	mA
	Typical Forward Current	$I_F$	20	20	20	mA
	Forward Voltage	$V_F$	3.6	3.5	3.6	V
	Reverse Peak Voltage	$V_{RM}$	5	5	5	V
	Current Reduction Rate Above 25°C	$\Delta I_F$	0.50	0.50	0.50	mA/°C
	Ambient Temperature Range			-25 ~ +50	°C	

Toggles  
 Rockers  
 Pushbuttons  
**D** Illuminated PB  
 Programmable  
 Keylocks  
 Rotaries  
 Slides  
 Tactiles  
 Tilt  
 Touch  
 Indicators  
 Accessories  
 Supplement

## BALLAST RESISTOR CALCULATION FOR LEDS

If the source voltage is greater than the rated voltage of a lamp or LED, a ballast resistor must be connected in series with the lamp. This circuit diagram and formula will assist in calculating the value of the required ballast resistor.



$$R = \frac{E - V_F}{I_F}$$

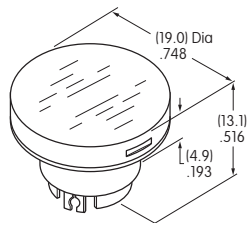
Where: R = Resistor Value (Ohms)  
 E = Source Voltage (V)  
 V<sub>F</sub> = Forward Voltage (V)  
 I<sub>F</sub> = Forward Current (A)

## CAPS & CAP COLORS

### AT3017 Cap for Bright LED

Lens/Diffuser Colors Available:

- JB** Clear/White
- CB** Red/White
- EB** \*Yellow/White
- FB** Green/White

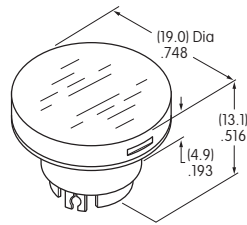


\*Yellow cap pairs with amber LED to achieve amber illumination.

### AT3018 Cap for Super Bright LED

Lens/Diffuser Colors Available:

- JB** Clear/White



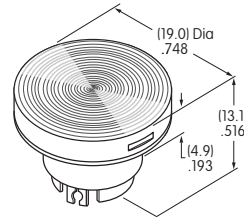
Material for Lens & Diffuser: Polycarbonate

### AT3019 Cap for Nonilluminated

Cap Color Available:

- P** Brushed Chrome

Note: AT3017 Cap can also be used without illumination.

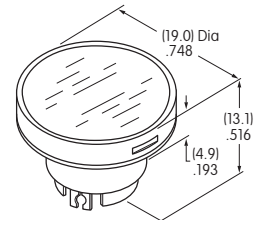


Material for Lens: ABS Resin and Brushed Chrome Plating

### AT3020 Cap with Illumination Ring for Bright or Super Bright LED

Cap Color Available:

- JS** Metallic Silver with Clear Ring

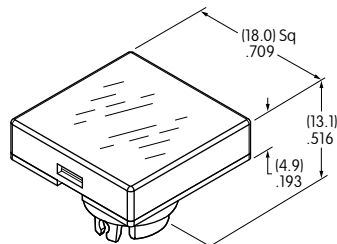


Materials  
 Lens: Polycarbonate  
 Insert: Polyester

### AT3025 Cap for Illuminated

Lens/Diffuser Colors Available:

- JB** Clear/White For Bright & Superbright LEDs
- CB** Red/White For Bright LED only
- EB** \*Yellow/White For Bright LED only
- FB** Green/White For Bright LED only



Material for Lens & Diffuser: Polycarbonate

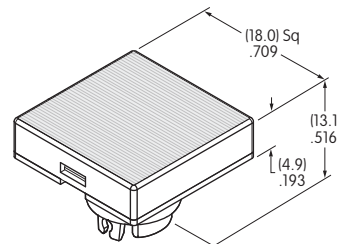
\*Yellow cap pairs with amber LED to achieve amber illumination.

### AT3027 Cap for Nonilluminated

Cap Color Available:

- P** Brushed Chrome

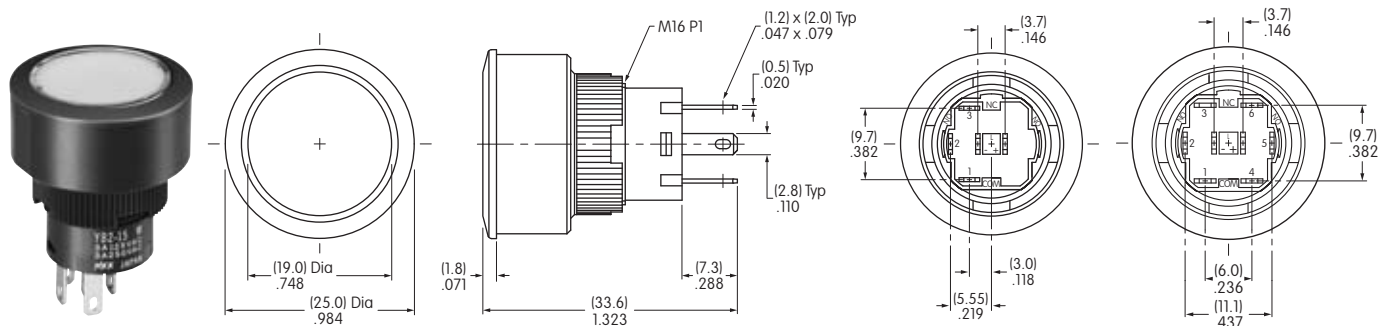
Note: AT3025 Cap can also be used without illumination.



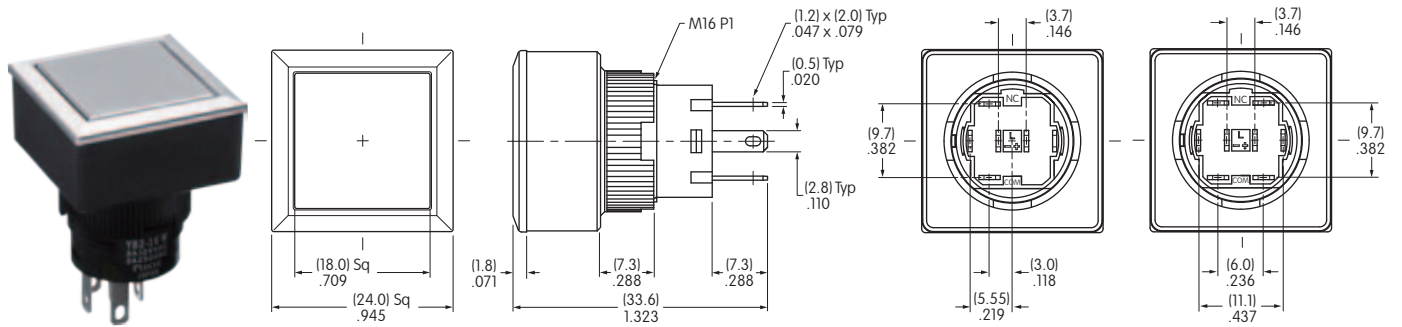
Material for Lens: ABS Resin and Brushed Chrome Plating

Toggles  
Rocker  
Pushbuttons  
Illuminated PB  
Programmable  
Keylocks  
Rotaries  
Slides  
Tactiles  
Tilt  
Touch  
Indicators  
Accessories  
Supplement

TYPICAL SWITCH DIMENSIONS



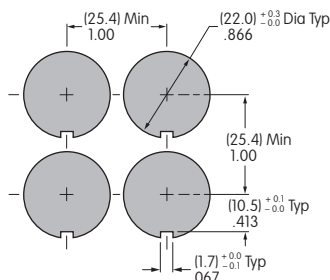
YB215CWCKW01-6B-JB



YB216CWSPW01-N-P

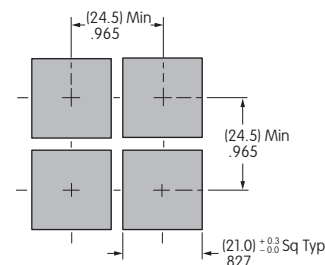
PANEL THICKNESS & CUTOUT

Recommended Panel Thickness  
.020" ~ .197"  
(0.5mm ~ 5.0mm)



Side-by-side Mounting

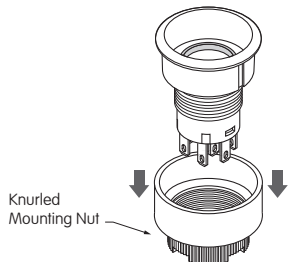
Recommended Panel Thickness  
.020" ~ .197"  
(0.5mm ~ 5.0mm)



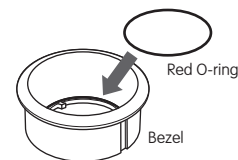
Side-by-side Mounting

## ASSEMBLY INSTRUCTIONS FOR ROUND

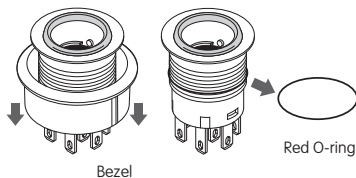
1. Remove knurled mounting nut.



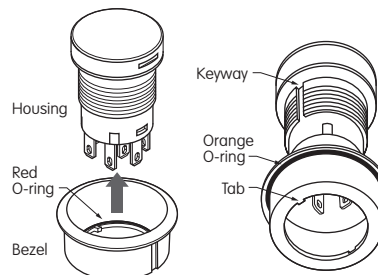
5. Install the red o-ring which was removed in step 2 at the inside bottom of the bezel.



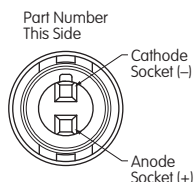
2. Remove bezel and red o-ring from housing. There are two o-rings in this assembly: one is red, one is orange.



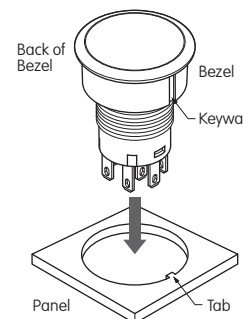
6. Align tab inside of the bezel with keyway on housing and bring bezel back into its original position.



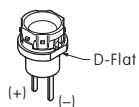
3. Install LED.



7. Before installing into panel, make sure that the orange o-ring is present at the back of the bezel. Align keyway on bezel with tab in panel and push switch all the way into the panel.



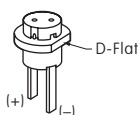
LEDs  
AT634 & AT636



Align D-flat on LED with Part Number on switch for appropriate polarity and insert LED into base.



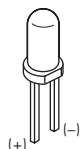
LED AT628



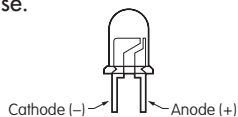
Align D-flat on LED with Part Number on switch for appropriate polarity and insert LED into base.



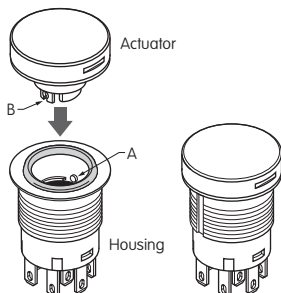
LEDs AT625G,  
AT631B,  
AT632F



The larger metal part within the LED represents the cathode (-). Align LED for appropriate polarity and insert LED into base.

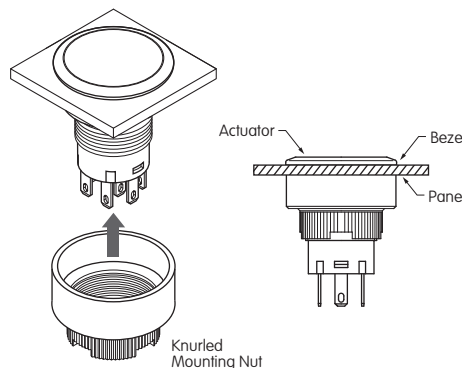


4. Align tabs (B) on both sides of actuator with the projections (A) inside of the housing and push actuator firmly down to snap in.



8. Attach mounting nut behind panel and tighten. Make sure that bezel and actuator fit properly and that there is no space between bezel and panel. Do not overtighten.

Mounting torque: 0.785Nm (6.95 lb•in) maximum.  
Optional socket wrench AT106 available.

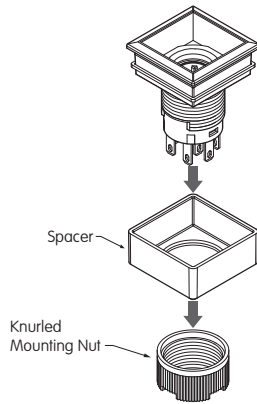


AT106 Socket Wrench

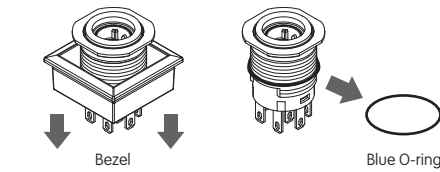


## ASSEMBLY INSTRUCTIONS FOR SQUARE

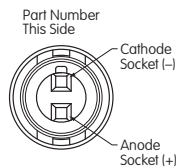
1. Remove knurled mounting nut.



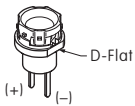
2. Remove bezel and blue o-ring from housing.



3. Install LED.

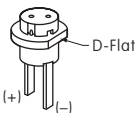


LEDs  
AT634 & AT636



Align D-flat on LED with Part Number on switch for appropriate polarity and insert LED into base.

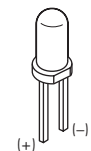
LED AT628



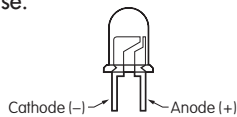
Align D-flat on LED with Part Number on switch for appropriate polarity and insert LED into base.



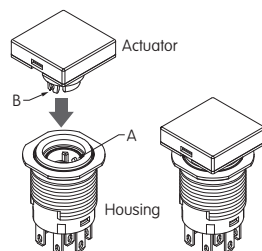
LEDs AT625G,  
AT631B,  
AT632F



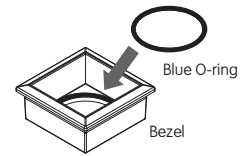
The larger metal part within the LED represents the cathode (-). Align LED for appropriate polarity and insert LED into base.



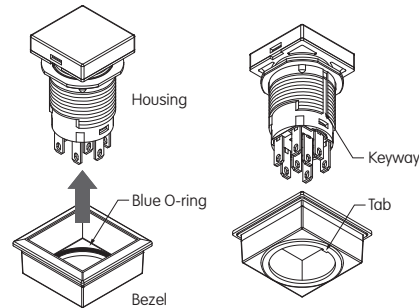
4. Align tabs (B) on both sides of actuator with the projections (A) inside of the housing and push actuator firmly down to snap in.



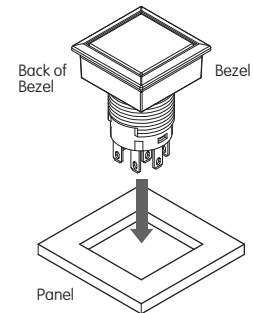
5. Install the blue o-ring which was removed in step 2 at the inside bottom of the bezel.



6. Align tab inside of the bezel with keyway on housing and bring bezel back into its original position.

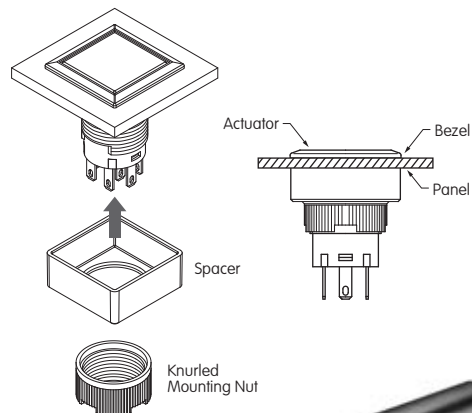


7. Before installing into panel, make sure that the square gasket is present at the back of the bezel. Align keyway on bezel with tab in panel and push switch all the way into the panel.



8. Attach mounting nut behind panel and tighten. Make sure that bezel and actuator fit properly and that there is no space between bezel and panel. Do not overtighten.

Mounting torque: 0.785Nm (6.95 lb•in) maximum.  
Optional socket wrench AT106 available.



AT106 Socket Wrench



Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

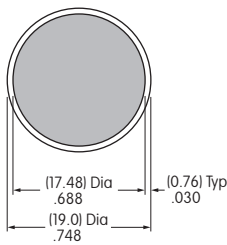
## LEGENDS

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

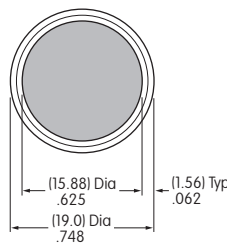
### Suggested Printable Area for YB2 Caps

**Recommended Methods:** Laser Etch on clear cap, Screen Print or Pad Print on cap.  
Epoxy based ink is recommended.

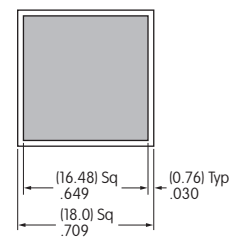
For Caps  
AT3017, AT3018, and AT3019



For Cap  
AT3020 (with clear ring for illumination)

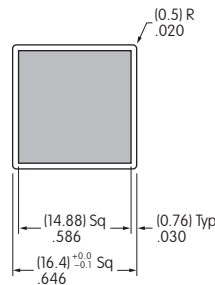
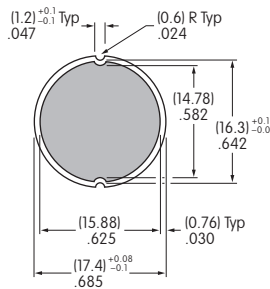


For Caps  
AT3025 and AT3027



Shaded areas are printable areas.

### Suggested Printable Area for Film Inserts



Shaded areas are printable areas.

#### Recommended Method:

Screen Print; Epoxy based ink is recommended

#### Film Material and Thickness:

Clear Polyester, 4 mil max.

## HANDLING & PRECAUTIONS



LEDs are electrostatic sensitive devices. When installing and handling LEDs, use an electrostatic protected work station to prevent LED damage.