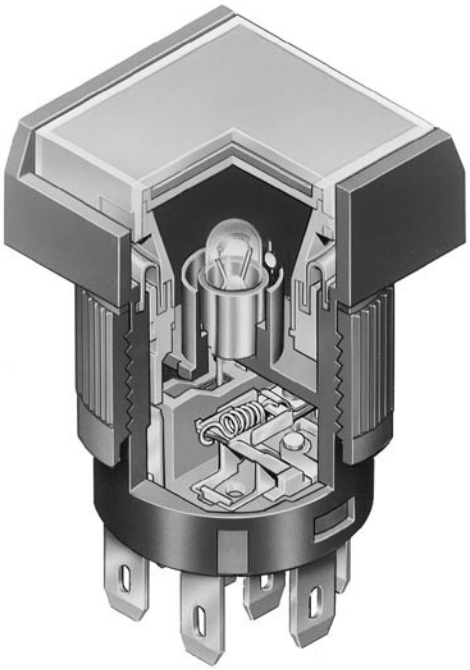
# Distinctive Characteristics

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.

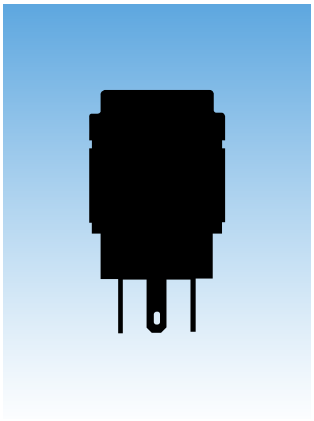
Terminals are epoxy sealed to lock out flux, dust, solvents, and other contaminants.

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

Nonilluminated models available and shown in the Pushbutton section.

Matching indicators available and shown at the end of Section M.

Actual Size



# 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 Temp Range:** –25°C through +50°C (–13°F through +122°F)
**Humidity:** 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
**Vibration:** 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
**Shock:** 50G (490m/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)
**Sealing:** IP65 of IEC60529 standard for panel seal models

## Installation

**Mounting Torque:** 0.80Nm (7.08 lb•in) maximum
**Soldering Time & Temperature:** Manual Soldering: See Profile A in Supplement section.

## Standards & Certifications

**Flammability Standards:** UL94V-0 housing & base
**UL & C-UL Recognized:** All solder lug models recognized at 3A @ 125/250V AC or 0.4VA @ 28V AC/DC maximum;
UL File No. WOYR2.E44145; add "/U" to end of part number to order UL mark on switch;
UL File No. WOYR8.E44145; add "/C-UL" to end of part number to order C-UL mark on switch.
**CSA Certified:** All solder lug models certified at 3A @ 125/250V AC or 0.4VA @ 28V AC/DC maximum;
CSA File Nos. 023535-0-000; add "/C" to end of part number to order CSA mark on switch.

## TYPICAL SWITCH ORDERING EXAMPLE

YB | 1 | 5 | □ | C | K | W | 01 — 6 | F — JB

### POLES

| | |
|---|---|
| 1 | SPDT |
| 2 | DPDT |

### CIRCUITS

| | | |
|---|---|---|
| 5 | ON | (ON) |
| ( ) = Momentary | | |
| 6 | ON | ON |
| Alternate Action with Latchdown | | |

### PANEL SEAL

| | |
|---|---|
| No Code | Without Panel Seal |
| W | With Panel Seal (Bushing Mount only) |

### SHAPES

| | |
|---|---|
| **Bushing Mounting** | |
| S | Square |
| C | Round |
| R | Rectangular |
| **Snap-in Mounting** | |
| K | Square |
| M | Round |
| N | Rectangular |

### HOUSING

| | |
|---|---|
| K | Black only |

### CONTACT MATERIALS & RATINGS

| | |
|---|---|
| W | Silver Rated 3A @ 125V AC |
| G | Gold Rated 0.4VA max. @ 28V AC/DC max. |

### TERMINALS

| | |
|---|---|
| 01 | Solder Lug/.110" (2.8mm) Quick Connect |
| 03 | Straight PC |

### IMPORTANT:

Switches are supplied without UL, C-UL, & CSA markings unless specified. Specific models & ratings noted on General Specifications page.

### LAMPS

**Incandescent Lamp**

| | |
|---|---|
| 05 | 5-volt |
| 12 | 12-volt |

**LED for Spot Illuminated Cap**

| LED Colors | | Forward Voltage | |
|---|---|---|---|
| 1C | Red | 02 | 2-volt (no resistor) |
| 1D | Amber | 05 | 5-volt |
| 1F | Green | 12 | 12-volt |
| 1CF | Red/Green | 24 | 24-volt |

**Bright LED**

| LED Colors | | Resistor | |
|---|---|---|---|
| 5C | Red | No Code | No Resistor |
| 5D | Amber | 05 | 5-volt |
| 5F | Green | 12 | 12-volt |
| | | 24 | 24-volt |

**Super Bright LED**

| | |
|---|---|
| 6B | White |
| 6F | Green |
| 6G | Blue |

**Bicolor LED for Full Face Illuminated**

| LED Colors | | Forward Voltage | |
|---|---|---|---|
| 2CF | Red/Green | 02 | 2-volt (no resistor) |
| | | 05 | 5-volt |
| | | 12 | 12-volt |
| | | 24 | 24-volt |

### CAP TYPES & COLORS

**Solid Cap: Lens/Insert Colors**

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

**Spot Illuminated Cap: Lens/Insert Colors**

| | |
|---|---|
| JA | Clear/Black |
| JB | Clear/White |
| JC | Clear/Red |
| JE | Clear/Yellow |
| JF | Clear/Green |

**LED Cap: Lens/Insert Colors**

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

**LED Cap: Lens/Insert Colors**

| | |
|---|---|
| JB | Clear/White |

**LED Cap: Lens/Insert Colors**

| | |
|---|---|
| JB | Clear/White |

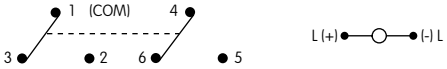
### DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

YB15CKW01-6F-JB




NKK Switches • email: sales@nkkswitches.com • Phone (480) 991-0942 • Fax (480) 998-1435 • www.nkkswitches.com

## POLES & CIRCUITS

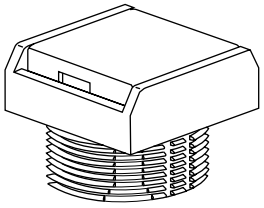
| | | Plunger Position ( ) = Momentary | | Connected Terminals | | Throw & Switch/Lamp Schematics |
|---|---|---|---|---|---|---|
| Pole | Model | Normal | Down | Normal | Down | Notes: Switch is marked with NC, NO, COM, L+, L–. Lamp circuit is isolated and requires external power source. |
| SP | YB15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

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

## PANEL SEAL

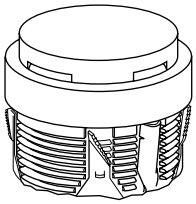
**No Code** **Without Panel Seal**

**Bushing Mounting**



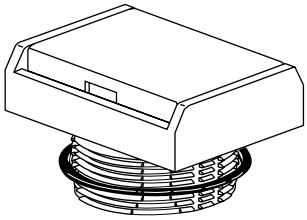
Supplied with mounting nut.

**Snap-in Mounting**



**W** **With Panel Seal**

**Bushing Mounting only**

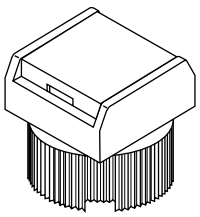


Supplied with mounting nut and o-ring AT089.

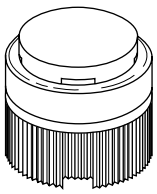
## SHAPES & MOUNTING TYPES

**Bushing Mounting**

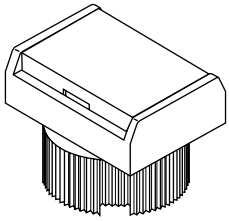
**S** **Square**



**C** **Round**

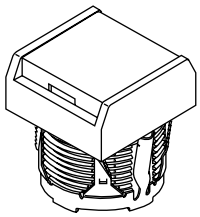


**R** **Rectangular**

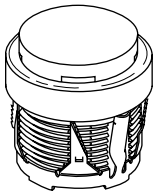


**Snap-in Mounting**

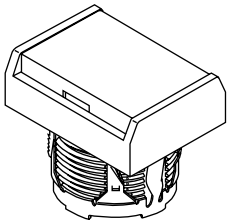
**K** **Square**



**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**

**G** **Gold Contacts**

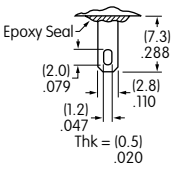
**Power Level** **3A @ 125/250V AC**

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

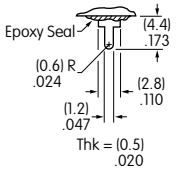
Complete explanation of operating range in Supplement section.

## TERMINALS

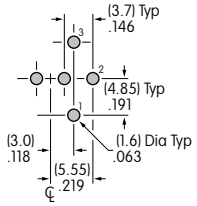
**01** **Solder Lug/ .110" (2.8mm) Quick Connect**



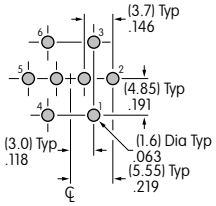

**03** **Straight PC**




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.

**AT611**

T-1 Bi-pin

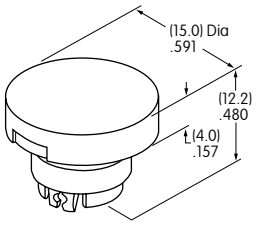
| | | 05 | 12 |
|---|---|---|---|
| Voltage | V | 5V AC | 12V AC |
| Current | I | 115mA | 60mA |
| MSCP | | .150 | .150 |
| Endurance | Hours | 7,000 average | |
| Ambient Temperature Range | | –25°C ~ +50°C | |

**Solid Cap for Incandescent Lamp**

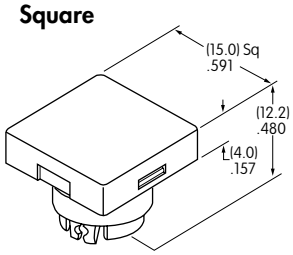
**Lens/Insert Colors Available:**

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

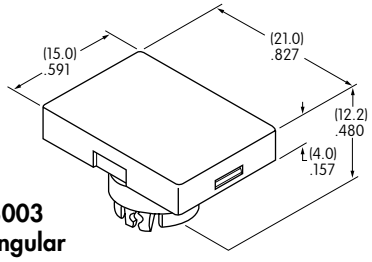
**AT3002 Round**

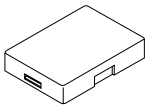



**AT3001 Square**

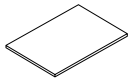



**AT3003 Rectangular**

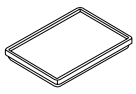


Translucent Colored Lens



Translucent White Insert



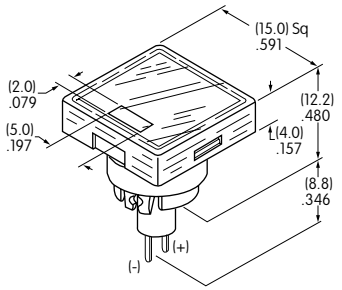
Translucent White Seal/Filter

Incandescent Lamp AT611

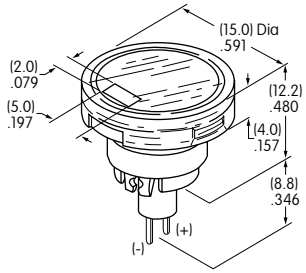
Materials: Polycarbonate (Lens & Insert)
Thermoplastic Elastomer (Seal/Filter)

## SPOT ILLUMINATED CAP WITH BUILT-IN LED

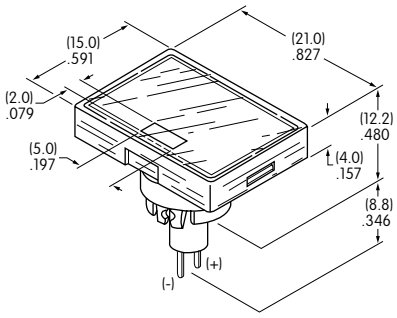
This spot-illuminated cap is factory assembled.




**AT3010**
**Square**



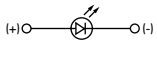

**AT3011**
**Round**



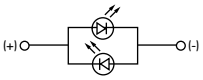

**AT3012**
**Rectangular**

| **Colors Available:** 1C Red, 1D Amber, 1F Green, 1CF Red/Green | | 02 w/o Resistor | 05 w/Resistor | 12 w/Resistor | 24 w/Resistor | Unit |
|---|---|---|---|---|---|---|
| Forward Peak Current | $I_{FM}$ | 20 | 15 | 15 | 12 | mA |
| Continuous 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

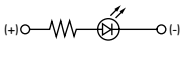



Single Color

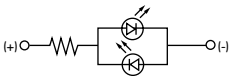



Bicolor

With Resistor 5, 12, 24-volt




Single Color

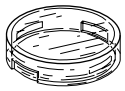



Bicolor

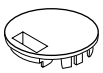
The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires external power source. Single color LEDs are colored in OFF state. Bicolor LED is translucent white in OFF state.
If the source voltage exceeds the rated voltage, a ballast resistor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

**Lens/Insert Colors Available:**

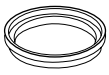
- JA **Clear/Black**
- JB **Clear/White**
- JC **Clear/Red**
- JE **Clear/Yellow**
- JF **Clear/Green**



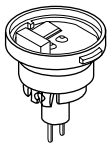
Clear Lens



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

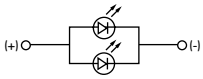
Materials: Polycarbonate (Lens & Insert) and Thermoplastic Elastomer (Seal)

## 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

**Bright AT628**




T-1 Bi-pin

| **Colors Available:** 5C Red, 5D Amber, 5F Green | | No Code No Resistor | | | Unit |
|---|---|---|---|---|---|
| LED Colors | | Red | Amber | Green | |
| Forward Peak Current | $I_{FM}$ | 40 | 40 | 40 | mA |
| Continuous Forward Current | $I_F$ | 26 | 26 | 26 | mA |
| Forward Voltage | $V_F$ | 1.9 | 2.0 | 2.2 | 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 |

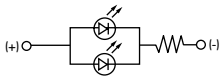
### Electrical Specifications for Bright LED with Resistor

**Bright AT634**

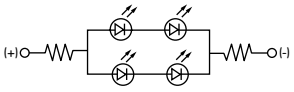
T-1¼ Bi-pin

| **Colors Available:** 5C Red, 5D Amber, 5F Green | | 05 | 12 | 24 | Unit |
|---|---|---|---|---|---|
| Forward Peak Current | $I_{FM}$ | — | — | — | mA |
| Continuous 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 |

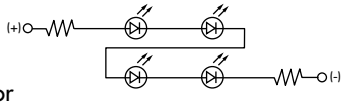
AT634 5-volt, 2-element with Resistor




AT634 12-volt, 4-element with Resistor




AT634 24-volt, 4-element with Resistor

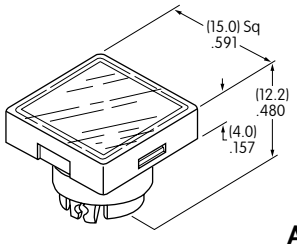



### Cap for Bright LED

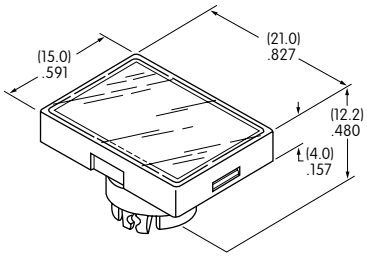
**Lens/Insert Colors Available:**

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

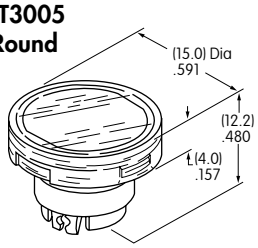
**AT3004 Square**

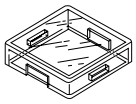



**AT3006 Rectangular**

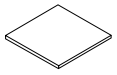



**AT3005 Round**

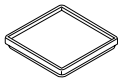


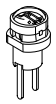
Transparent Clear Lens



Translucent Colored Insert



Translucent White Seal/Diffuser



Bright LEDs
AT628 AT634

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

## SUPER BRIGHT LED & LED CAPS

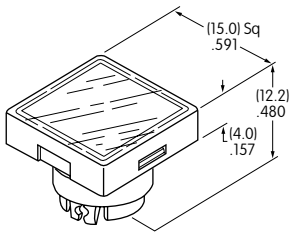
The electrical specifications shown are determined at a basic temperature of 25°C.
LED circuit is isolated and requires external power source.
If the source voltage exceeds the rated voltage, a ballast resistor is required.
The resistor value can be calculated by using the formula in the Supplement section.

**Electrical Specifications for Super Bright LED**

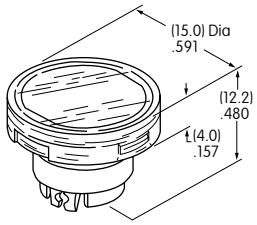
| **Super Bright**<br>**AT625G Blue**<br>**AT631B White**<br>**AT632F Green** | Attention Electrostatic Sensitive Devices (+)○ ○(-) Colors: | | **6B** White | **6F** Green | **6G** Blue | Unit |
|---|---|---|---|---|---|---|
|  | Forward Peak Current | $I_{FM}$ | 30 | 30 | 30 | mA |
| | Continuous Forward 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 |
| T-1 Bi-pin | Ambient Temperature Range | | −25 ~ +50 | | | °C |

**Cap for Super Bright LED**

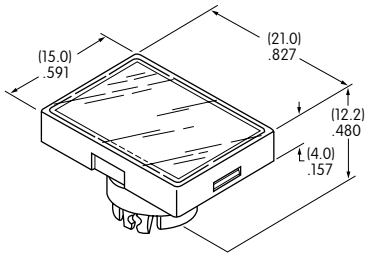
**AT3014**
**Square**




**AT3015**
**Round**

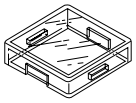



**AT3016**
**Rectangular**

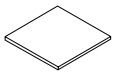



**Lens/Insert**
**Colors Available:**

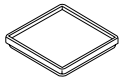
**JB** **Clear/White**



Transparent Clear Lens



Translucent White Insert



Translucent White Seal/Diffuser

Super Bright LEDs
AT625 AT631
AT632

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

## 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**

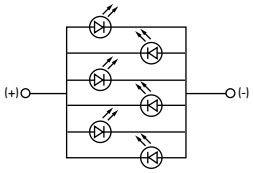
**Bicolor AT621**

**2CF** Red/Green

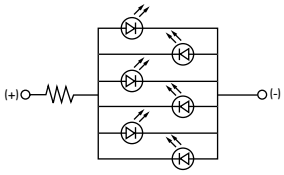
T-1½ Bi-pin

| Bicolor LED is translucent white in OFF state. | | 02 | 05 | 12 | 24 | Unit |
|---|---|---|---|---|---|---|
| Forward Peak Current | $I_{FM}$ | 60 | 60 | 20 | 12 | mA |
| Continuous 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 |

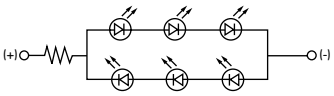
AT621
Bicolor LED
2-volt
6-element
w/o Resistor




AT621
Bicolor LED
5-volt
6-element
with Resistor



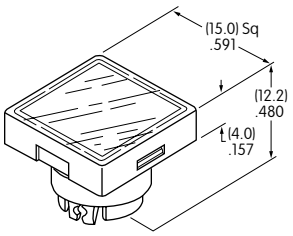

AT621
Bicolor LED
12 & 24-volt
6-element
with Resistor



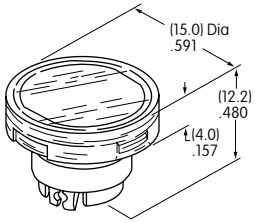

As shown for Red;
Reverse polarity for Green

### LED Caps

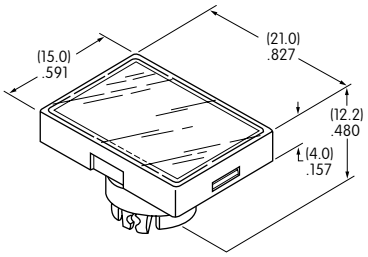
**AT3004**
**Square**




**AT3005**
**Round**

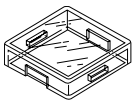



**AT3006**
**Rectangular**

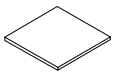



**Lens/Insert**
**Colors Available:**

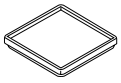
**JB** **Clear/White**



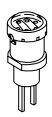
Transparent Clear Lens



Transparent White Insert



Translucent White Seal/Diffuser



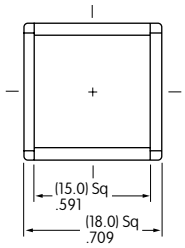
Bicolor LED AT621

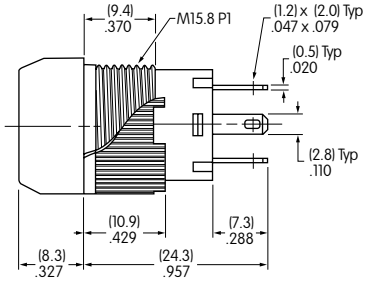
Materials: Polycarbonate (Lens & Insert)
Thermoplastic Elastomer (Seal/Diffuser)

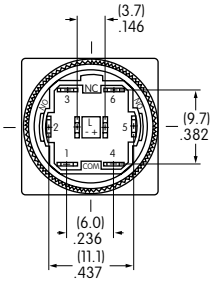
## TYPICAL SWITCH DIMENSIONS

### Square • Bushing Mounting

### Single & Double Pole

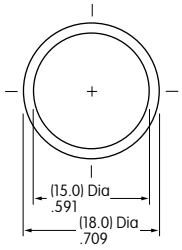



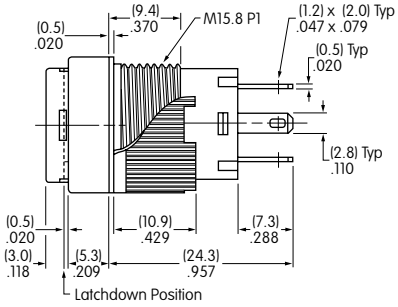

**YB15SKW01-12-CB**

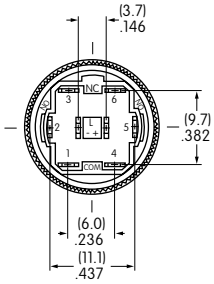
Single pole models do not have terminals 4, 5, & 6.

### Round • Panel Seal

### Single & Double Pole

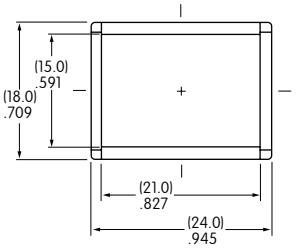



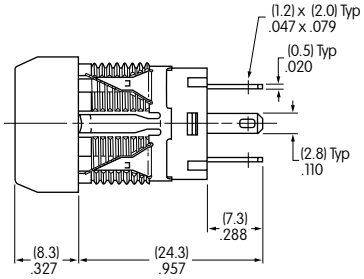

**YB26WCKW01-12-EB**

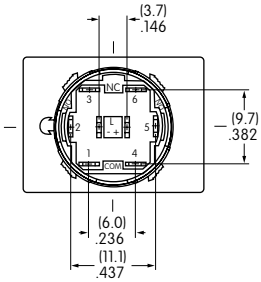
Single pole models do not have terminals 4, 5, & 6.

### Rectangular • Snap-in Mounting

### Single & Double Pole

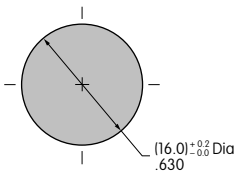

**YB15NKW01-5C-JC**

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

## PANEL THICKNESS & CUTOUTS

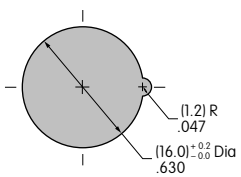
### Bushing & Panel Seal Mount

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:**

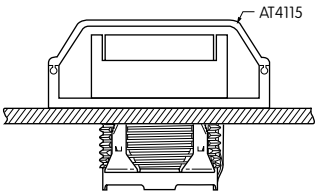
| Bushing Mounting | Snap-in Mounting | Panel Seal |
|---|---|---|
| .020″ ~ .150″ (0.5mm ~ 3.8mm) | .020″ ~ .091″ (0.5mm ~ 2.3mm) | .020″ ~ .118″ (0.5mm ~ 3.0mm) |

### Dust/Splash Cover

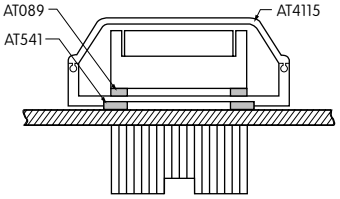
**AT4115 Dust Cover for Snap-in or Bushing Mount**

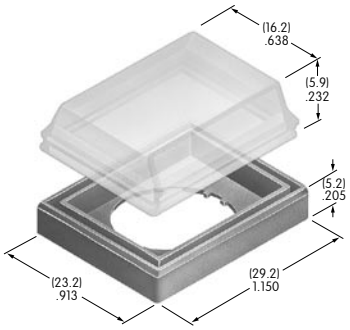
**AT4115 Splash Cover and AT541 O-ring for Bushing Mount**

**Dust Cover**




**Splash Cover**



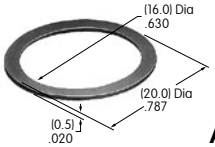




**AT4115**

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

Snap-in Mount

Panel Seal



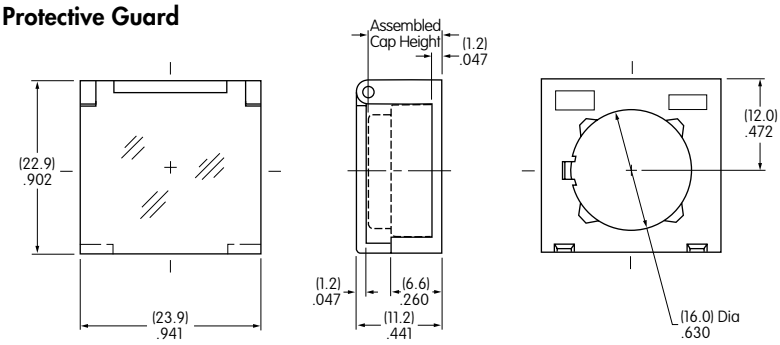

**AT541**

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

### Protective Guard

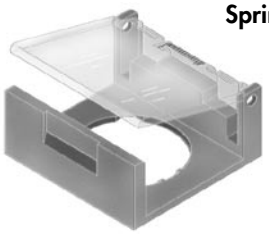
**AT4072 Protective Guard**
Opens 90°
Closes manually

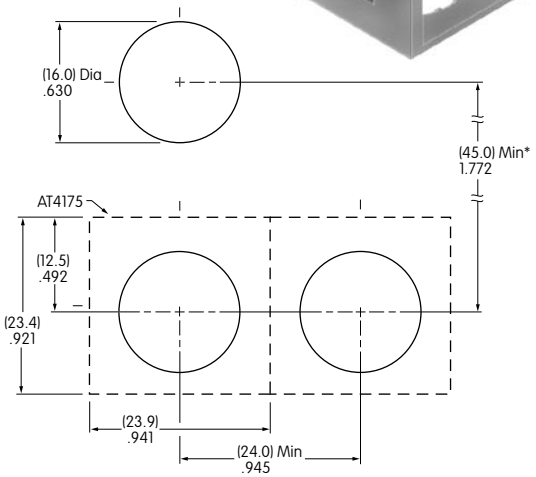
**Materials:**
Lid: Polycarbonate
Base: Glass Fiber Reinforced Polycarbonate

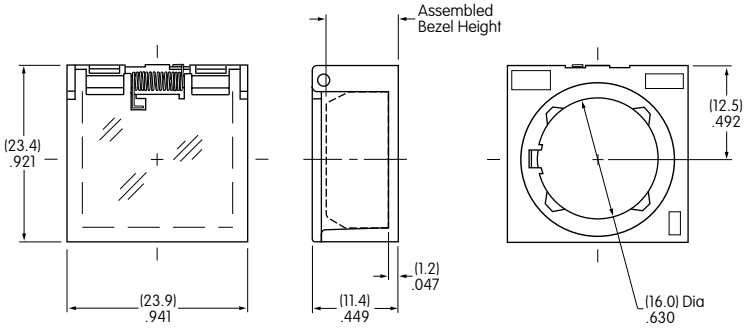


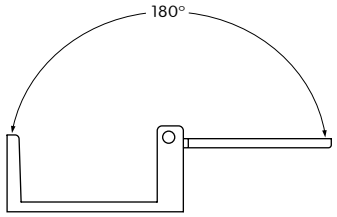

### Spring Loaded Protective Guard

**AT4175 Spring Loaded Protective Guard**
Opens 180°
Closes automatically





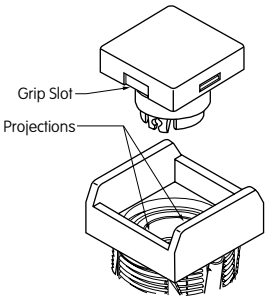



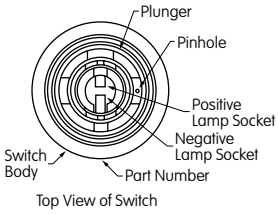

**Materials:**
Lid: Polycarbonate
Base: Glass Fiber Reinforced Polyamide
Coil Spring: Stainless Steel

* Minimum dimension allows opening of cover to 180°

## ASSEMBLY INSTRUCTIONS

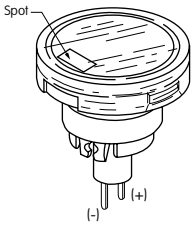
### Cap Assembly



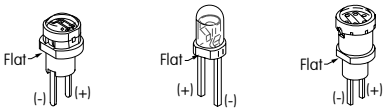

Top View of Switch

### LED Polarity & Orientation in Lamp Socket




Spot Illuminated Cap with Built-in LED

Attention Electrostatic Sensitive Devices



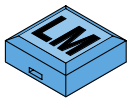

LED AT628 AT634

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

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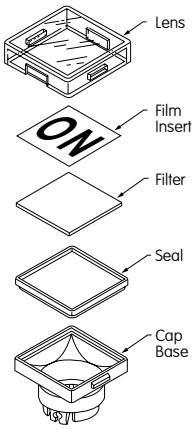
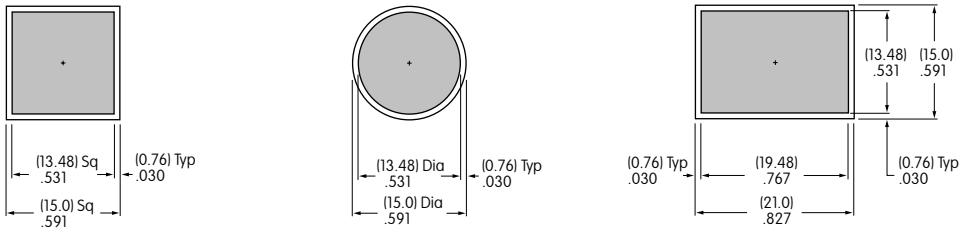
For other legend support options, customers may either contact the factory and request the YB Legend Packet, or utilize the general information and basic specifications presented below.

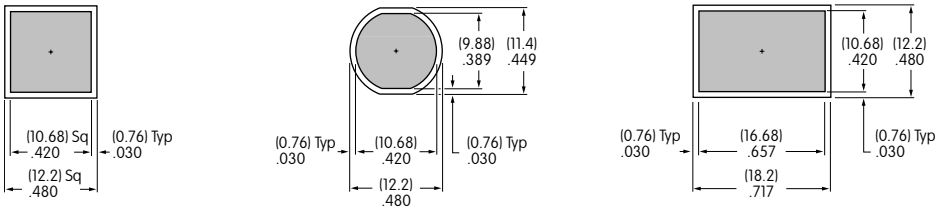
**Recommended Methods:** Laser Etch on clear lens, Screen Print or Pad Print on lens. Epoxy based ink is recommended.


### Shaded Areas Are Printable Areas for Lens




### Shaded Areas Are Printable Areas for Film Insert




**Film Material and Thickness:**
Clear Polyester, 4 mil max.

**Recommended Print Method:**
Screen Print; Epoxy based ink is recommended.

### Additional Methods

Additional methods for legends are engraving the lens and laser printing on film inserts. Maximum depth for engraving is .012" (0.3 mm) on the cap lens. Enamel paint is recommended to fill the engraved area.