Contents Illuminated Pushbuttons

FP01 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

NEW 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

NEW 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

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.

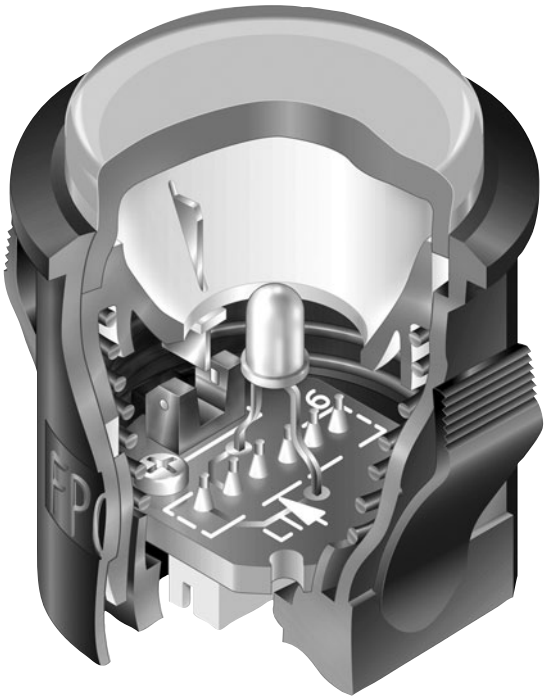
Photo interrupter, rather than contacts, ensures high reliability and long life of 3 million operations minimum.

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

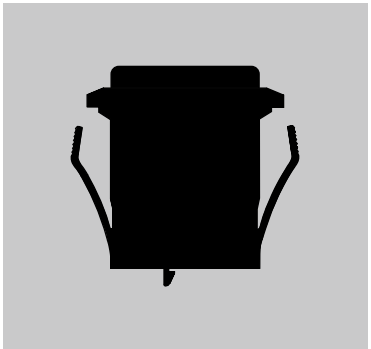
Snap-in mounting for easy installation.

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

FP01 [1] [5] [C] [A] [C1] [F] [F] — [ ]

Photo Transistor

1	Single

Shape

C	Round

Receptacle

C1	6-pin Socket

See Connector.

LEDs

C	Red
D	Amber
F	Green

Photo Interrupter

5	Unshaded	(Shaded)

(Momentary Operating Function)

Housing

A	Black

Actuator Colors

B	White
C	Red
D	Amber
F	Green

Connector

C2	Assembled Connector with Wire Leads
* C3	Unassembled Connector and Pins
No Code	No Connector

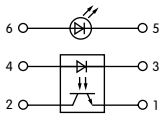
* Available in Americas only

Contact factory for custom options

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

FP0115CAC1FF

ACTUATOR & INTERRUPTER

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

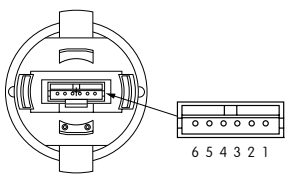
HOUSING SHAPE & COLOR

C — Round Shape

A — Black Housing

RECEPTACLE

C1 — 6-pin Socket



SWITCH SPECIFICATIONS

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

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
Input			
Forward Voltage V_F:	1.3V	1.6V	I_F = 50mA
Reverse Current I_R:		10µA	F_R = 5V
Transmission			
Collector-Emitter Saturation Voltage V_{CE} sat:		0.4V	I_F = 20mA & I_C = 0.1mA

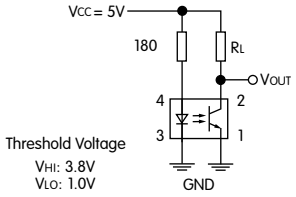
Absolute Maximum Ratings

Input LED		Output Photo Transistor	
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.

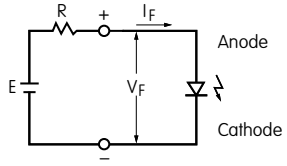
Recommended load resistance (RL) is 40k ~ 120kΩ for the illustrated circuit.



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.

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



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

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

Single Element LED Color		C Red	D Amber	F 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	ΔI_F	0.38mA /°C	0.28mA /°C	0.40mA /°C
Ambient Temperature Range		–25° ~ +50°C		

ACTUATOR COLORS

B White

C Red

D Amber

F Green

CONNECTOR OPTIONS

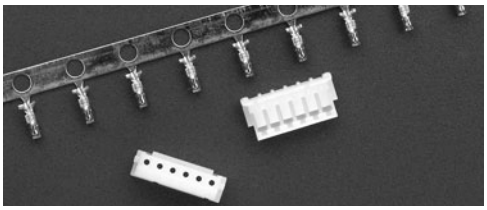
C2 **AT021**
Assembled Connector with Wire Leads

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

C3 **AT022**
Unassembled Connector and Pins

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

Matching wire leads: 28-26AWG



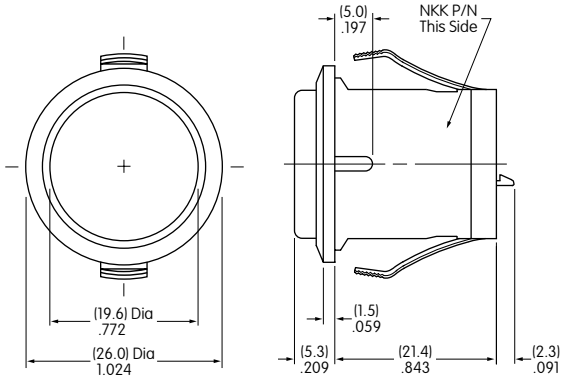
No Code

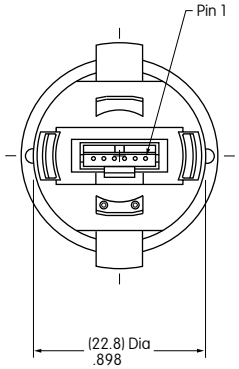
No Connector

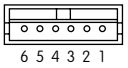
Recommended connector for assembly:
JST model number ZHR-6

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.

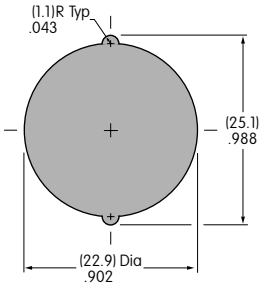
TYPICAL SWITCH DIMENSIONS







Terminal Connector Detail



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

FP0115CAC1FF

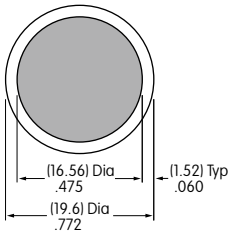
LEGENDS

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^2) 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.

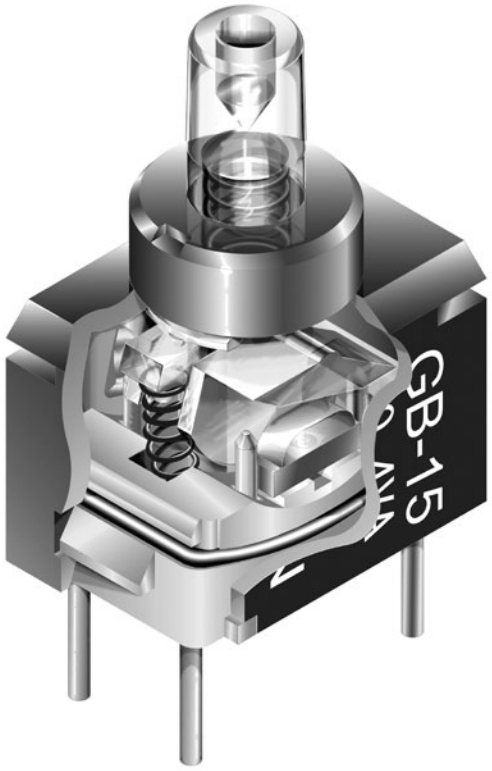
Ultra-miniature size allows high density mounting, and extremely light weight makes these switches ideal for handheld equipment.

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.

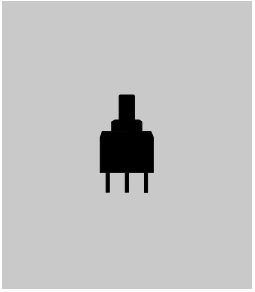
Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smooth, positive detent actuation, increased contact stability, and unparalleled logic-level reliability. (Additional STC details in Terms & Acronyms; see Supplement section.)

.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



TYPICAL SWITCH ORDERING EXAMPLE

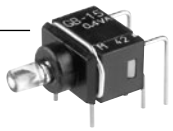
GB | 1 | 5 | J | H | F

Pole		Circuit			Actuator		PC Terminals		LEDs	
1	SPDT	5	ON	(ON)	J	Clear	P	Straight	C	Red
		( ) = Momentary					H	Right Angle	D	Amber
							V	Vertical	F	Green

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

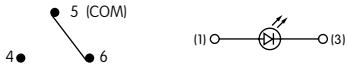
GB15JHF

SPDT
ON-(ON) Circuit
Clear Plunger, Green LED



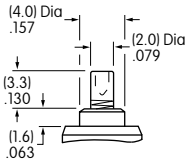
Right Angle PC Terminals

POLE & CIRCUIT

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

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.

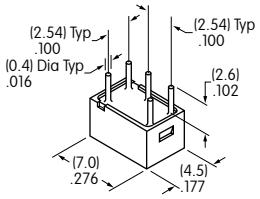
If the source voltage exceeds the rated voltage, a ballast resistor is required.

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

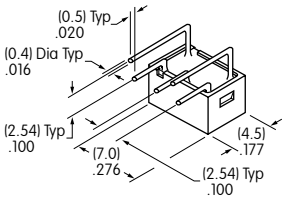
Colors		C Red	D Amber	F Green
Forward Peak Current	I_{FM}	30mA	30mA	25mA
Typical Forward Current	I_F	20mA	20mA	20mA
Forward Voltage	V_F	1.9V	1.9V	2.1V
Reverse Peak Voltage	V_{RM}	5V	5V	5V
Current Reduction Rate Above 25°C	ΔI_F	0.43mA/°C	0.43mA/°C	0.36mA/°C
Ambient Temperature Range		−25° ~ +55°C		

PC TERMINALS

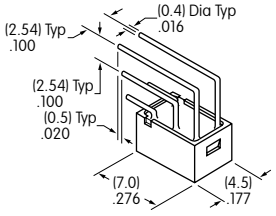
P Straight



H Right Angle

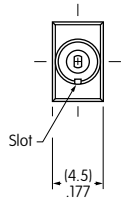


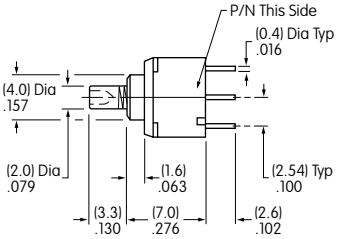
V Vertical

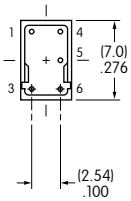


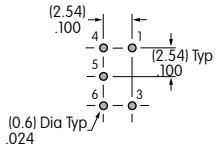
TYPICAL SWITCH DIMENSIONS

Straight PC





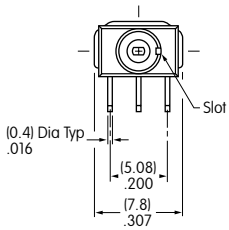


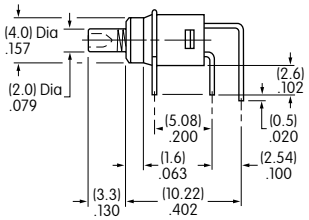


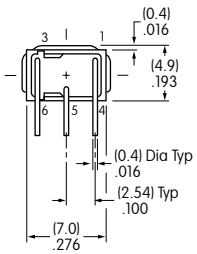
Terminals 1 & 3 are lamp terminals.

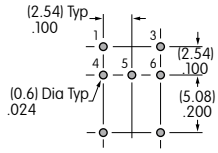
GB15JPD

Right Angle PC





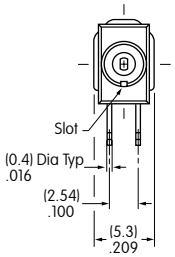


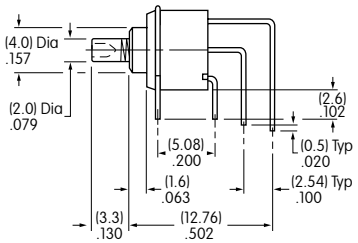


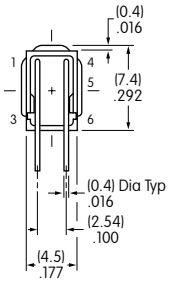
Terminals 1 & 3 are lamp terminals.

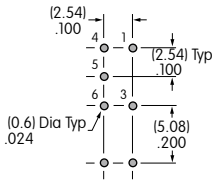
GB15JHF

Vertical PC









Terminals 1 & 3 are lamp terminals.

GB15JVC

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^2) 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.

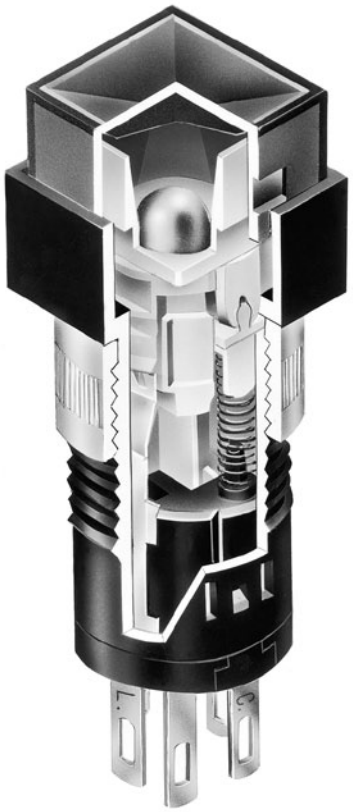
Dual, sliding contacts with self-cleaning action provide contact stability, high reliability, and increased operating life.

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

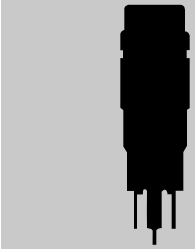
Longer normally closed terminal facilitates wiring and soldering.

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

Matching indicators available.



Actual Size



TYPICAL SWITCH ORDERING EXAMPLE

HB | 1 | 5 | S | K | W01 | — | 6G | — | JB

Pole

1	SPDT

Shapes

S	Square
C	Round

Contacts & Terminals

W01	Silver Contacts and Solder Lug Terminals* 0.1A @ 30V AC/DC

Circuits

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

Housing

K	Black only

LEDs

Bright

5C	Red
5D	Amber
5F	Green

Super Bright

6B	White
6F	Green
6G	Blue

Nonilluminated

No Code	Nonilluminated

Cap Types & Colors

LED Cap: Lens/Diffuser Color

AB	Black Cap/White Window for Spot Illuminated (Square only)
CB	Red/White
DB	Amber/White
FB	Green/White
JB	Clear/White

LED Cap: Lens/Diffuser Color

JB	Clear/White

Nonilluminated Cap Colors

A	Black (Square Only)
B	White
C	Red
E	Yellow
F	Green
G	Blue

* Wire harness & cable assemblies offered only in Americas

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

HB15SKW01-6G-JB

POLES & CIRCUITS

		Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch/Lamp Schematics
Pole	Model	Normal	Down	Normal	Down	
SP	**HB15** ***HB16**	ON ON	(ON) ON	1-3	1-2	SPDT

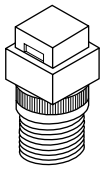
Notes: Switch is marked with NO, NC, C, L. LED circuit is isolated and requires external power source.

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

SHAPES & PANEL CUTOUT

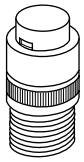
S **.354" (9.0mm) Square**

The bezel is an integral part of the switch body.



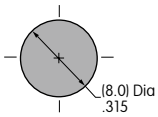
C **.354" (9.0mm) Round**

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.

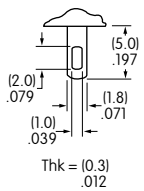
HOUSING

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).

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

Super Bright
AT624G
Blue
AT629B
White
AT630F
Green

T-1 Bi-pin

Note for Super Bright:

		Bright			Super Bright			
Color		5C Red	5D Amber	5F Green	6B White	6F Green	6G Blue	Unit
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	2.2	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	ΔI_F	0.40	0.42	0.38	0.50	0.50	0.50	mA/°C
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

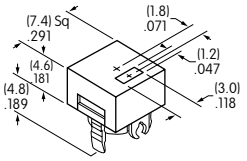
Cap Colors Available:

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

Colored Cap for Bright LEDs

Square only
Material: Polycarbonate
Finish: Matte

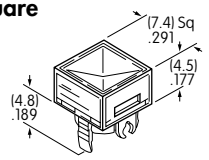
AT4052
Spot Illuminated



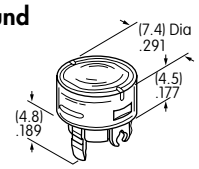
Lens/Diffuser Colors Available:

CB **Red/White**
DB **Amber/White**
FB **Green/White**

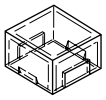
AT4166
Square



AT4167
Round



Material: Polycarbonate Finish: Glossy


Transparent Colored Lens


Translucent White Diffuser

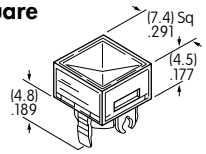

Colored LED AT633

White Cap for Bright & Super Bright LEDs

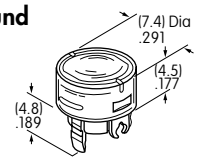
JB **Clear Lens/ White Diffuser**

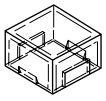
Material: Polycarbonate
Finish: Glossy

AT4031
Square



AT4032
Round




Transparent Clear Lens


Translucent White Diffuser


Colored LEDs AT624, AT629, AT630, or AT633

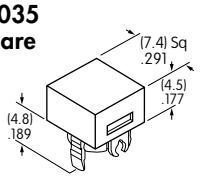
Nonilluminated Caps

Cap Colors Available:

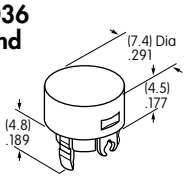
A **Black** (Square Only)
B **White**
C **Red**
E **Yellow**
F **Green**
G **Blue**

Material: Polycarbonate Finish: Glossy

AT4035
Square



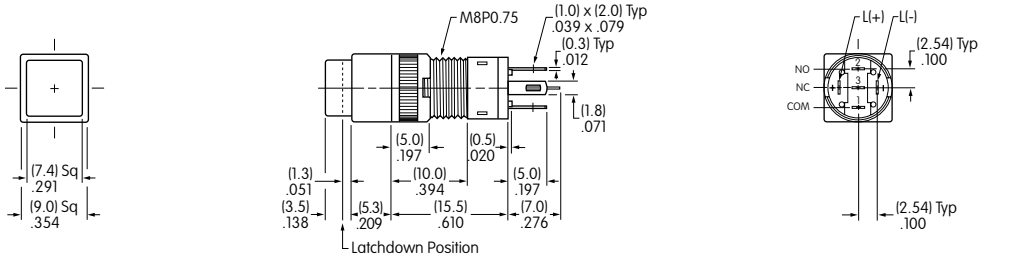
AT4036
Round



TYPICAL SWITCH DIMENSIONS

Single Pole

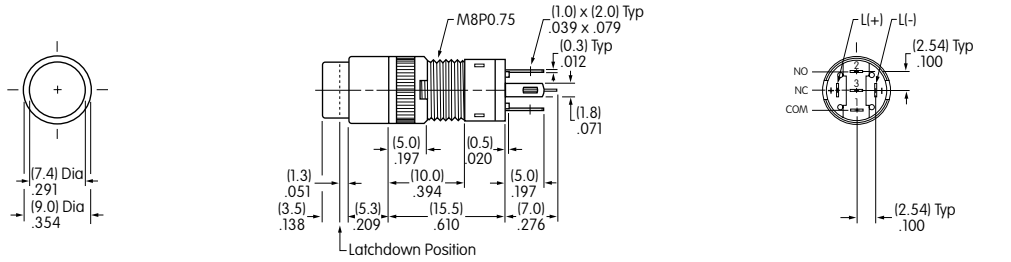
Square



HB15SKW01-5C-CB

Single Pole

Round

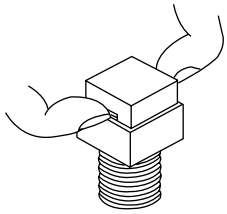


HB16CKW01-5C-CB

ASSEMBLY INSTRUCTIONS

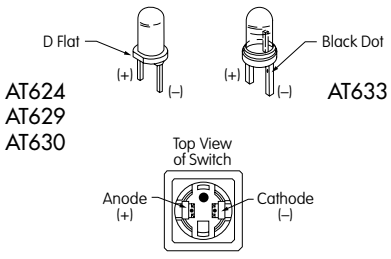
Cap Removal

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.

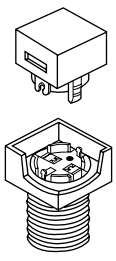


ATTENTION
ELECTROSTATIC
SENSITIVE DEVICES

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

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^2) 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.

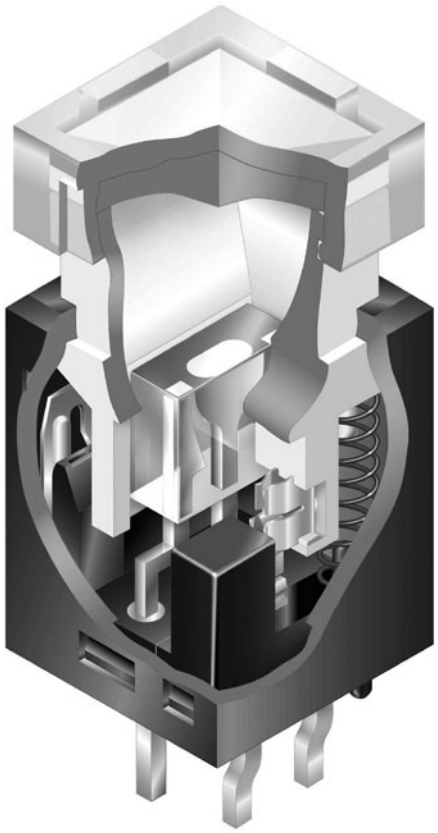
Option of legends on caps or film insert.

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

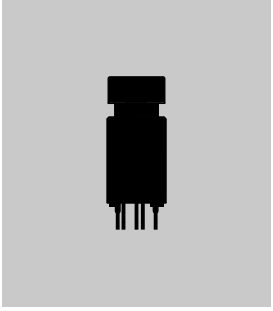
Sliding Twin Crossbar (STC) mechanism provides unequalled logic-level reliability, contact stability, smooth positive detent actuation, and long life.

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



Series HB2

Subminiature Audio/Video Pushbuttons

TYPICAL SWITCH ORDERING EXAMPLE

HB2 | 1 | 5 | S | K | G03 | CF | — | JB

Pole

1	SPST

Circuit

5	OFF	(ON)

( ) = Momentary

Shape

S	Square

Housing

K	Black

Contacts & Terminals

G03	Gold Contacts and PC Terminals, Rated 0.4VA @ 28V AC/DC

LEDs

CE	Red/Yellow
CF	Red/Green

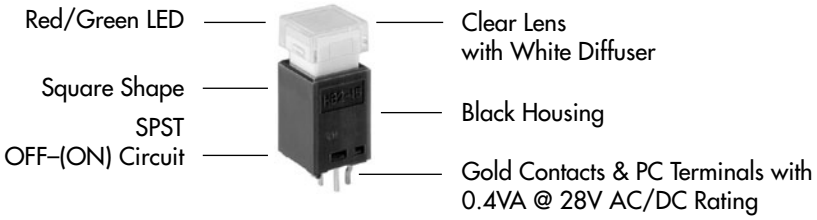
Amber can be achieved by simultaneous illumination of LEDs.

Cap Colors

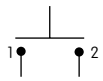
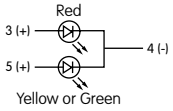
JB	Clear Lens/ White Diffuser

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

HB215SKG03CF-JB



POLE & CIRCUIT

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

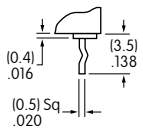
HOUSING SHAPE & COLOR

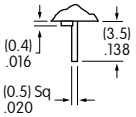
S **.307" (7.8mm) Square Body**

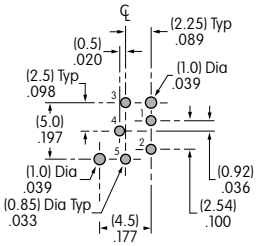
K **Black Housing**

CONTACT MATERIALS, RATINGS & TERMINALS

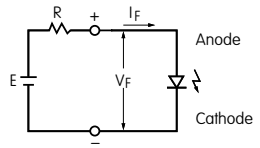
G03 **Gold Contacts** **Logic Level** **0.4VA maximum @ 28V AC/DC maximum**

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_F = Forward Voltage (V)
I_F = Forward Current (A)

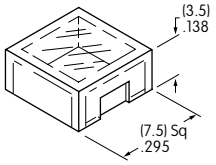
LED is an integral part of the switch.	Color	CE Red/Yellow	CF Red/Green	Unit
Forward Peak Current	I_{FM}	30/30	30/30	mA
Typical Forward Current	I_F	20/20	20/20	mA
Forward Voltage	V_F	2.0/2.1	2.0/2.1	V
Reverse Peak Voltage	V_{RM}	4/4	4/4	V
Current Reduction Rate Above 25°C	ΔI_F	0.33/0.33	0.33/0.33	mA/°C
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

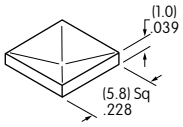
J **Clear Transparent Lens**

AT3081
Square Lens



B **White Translucent Diffuser**

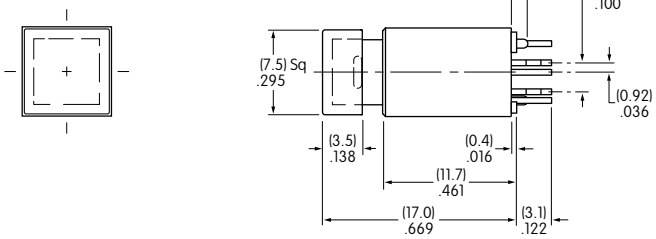
AT3082
Square Diffuser

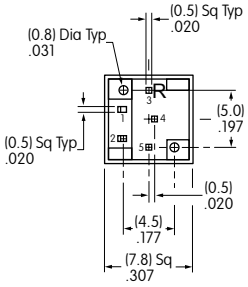


Lens & Diffuser Material: Polycarbonate Lens Finish: Glossy Diffuser Finish: Frosted

TYPICAL SWITCH DIMENSIONS

Single Pole





Square

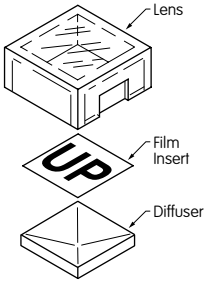
HB215SKG03CF-JB

LEGENDS

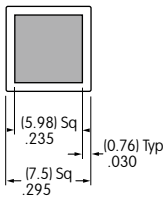
NKK Switches can provide custom legends for caps. Contact factory for more information.

Suggested Printable Area for HB2 Lens & Film Insert

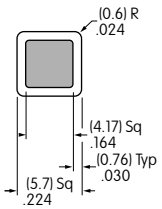
Recommended Methods: Screen Print or Pad Print on Lens; Laser Print on Film Insert.
Epoxy based ink is recommended.
Film Insert: Clear Polyester, 4 mil max. thickness



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 Contactor: 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^2) 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.

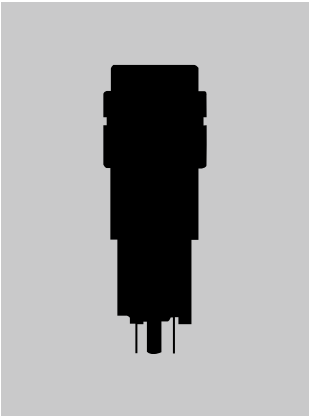
Molded-in terminals lock out flux, dust, and other contaminants.

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



TYPICAL SWITCH ORDERING EXAMPLE

KB | 1 | 5 | C | K | W01 | [ ] — 12 — FF

Poles

1	SPDT
2	DPDT

Circuits

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

Shapes

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

Housing

K	Black only

Contacts & Terminals

W01	Silver Contacts and Solder Lug Terminals* 1A @ 125/250V AC
G01	Gold Contacts and Solder Lug Terminals* 0.4VA @ 28V AC/DC

Barrier Type

No Code	No Barrier
B	With Barrier

Lamps

Incandescent Lamp Used with Solid Cap	
05	5-volt
12	12-volt
No Code	Nonilluminated

Incandescent or Neon Used with Insert Cap	
05	5-volt
12	12-volt
01	110-volt Neon
No Code	Nonilluminated

Bright LED Used with Cap for LED			
Colors		Resistor	
5C	Red	No Code	No Resistor
5D	Amber	05	5-volt
		12	12-volt
5F	Green	24	24-volt

Super Bright LED Used with Cap for LED	
6B	White
6F	Green
6G	Blue

Cap Types & Colors

Solid Cap: Lens/Filter Colors			
A	Black/None (Nonilluminated Only. Available in Square and Round Only.)		
BB	White/White	FB	Green/White
CB	Red/White	FF	Green/Green
CC	Red/Red	GB	Blue/White
EB	Yellow/White	GG	Blue/Blue

Insert Cap: Lens/Filter Colors	
JB	Clear/White
JC	Clear/Red
JE	Clear/Yellow
*JF	Clear/Green
*JG	Clear/Blue
* JF & JG not suitable with neon.	

LED Cap: Lens/Diffuser Colors	
AB	Square Spot Illuminated Black Cap/White Window
JB	Clear/White
JC	Clear/Red
JD	Clear/Amber
JF	Clear/Green

LED Cap: Lens/Diffuser Colors	
JB	Clear/White

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

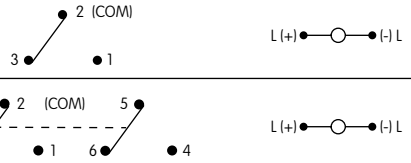
DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

KB15CKW01-12-FF

POLES & CIRCUITS

Pole	Model	Plunger Position ( ) = Momentary: Normal	Plunger Position ( ) = Momentary: Down	Connected Terminals: Normal	Connected Terminals: Down	Throw & Switch/Lamp Schematics
SP	**KB15** ***KB16**	ON ON	(ON) ON	2-3	2-1	SPDT
DP	**KB25** ***KB26**	ON ON	(ON) ON	2-3 5-6	2-1 5-4	DPDT

Notes: Switch is marked with "+" and "–". Lamp circuit is isolated and requires external power source.

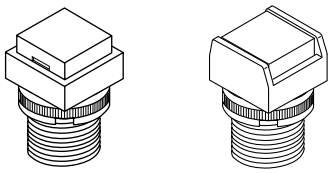


* When in latchdown position for the alternate circuit, cap position is .055" (1.4mm) above the built-in bezel.

MOUNTING TYPES & SHAPES

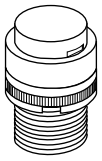
Bushing Mounting

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

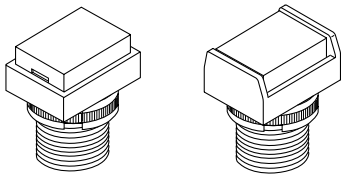


No barrier With barrier

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



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

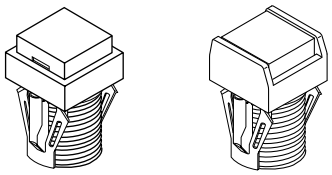


No barrier With barrier

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

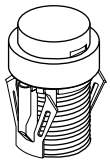
Snap-in Mounting

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

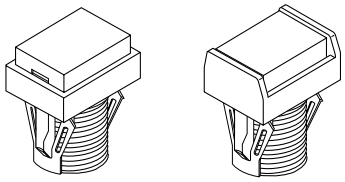


No barrier With barrier

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



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



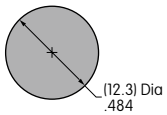
No barrier With barrier

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

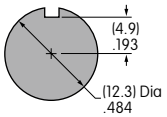
Panel Cutouts

Bushing Mounting

Without Keyway



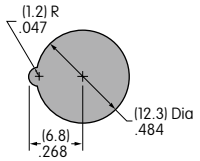
Panel Thickness:
.020" ~ .315"
(0.5 ~ 8.0mm)



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.

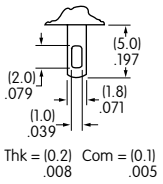
CONTACT MATERIALS, RATINGS & TERMINALS

W **Silver Contacts** — **Power Level** 1A @ 125V AC & 250V AC

G **Gold Contacts** — **Logic Level** 0.4VA maximum @ 28V AC/DC

Complete explanation of operating range in Supplement section.

01 **Solder Lug**

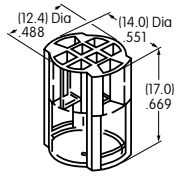


AT055 Crossover Guard

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

T-1 Bi-pin

		05	**12**	**01**
Voltage	V	5V AC	12V AC	110V AC
Current	I	115mA	60mA	1.5mA
Endurance	Hours	7,000 average		10,000

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

No Code **No Lamp**

Bright LED with Resistor

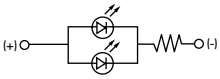
AT634

LEDs are colored in OFF state.

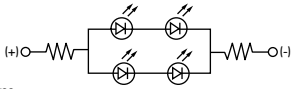
T-1¼ Bi-pin

Color Codes:	Red **5C**	Amber **5D**	Green **5F**	Resistor Codes **05**	**12**	**24**
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			ΔI_F	—	—	—

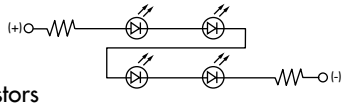
AT634
5-volt
2-element
with 1 Resistor



AT634
12-volt
4-element
with 2 Resistors



AT634
24-volt
4-element
with 2 Resistors



LAMP COLORS & SPECIFICATIONS

Bright LED without Resistor

AT635

LEDs are colored in OFF state.

T-1½ Bi-pin

Color Codes		Red 5C	Amber 5D	Green 5F	No Code: No Resistor
					Red / Amber / Green
Forward Peak Current	I_{FM}	30mA	30mA	30mA	
Typical Forward Current	I_F	20mA	20mA	20mA	
Forward Voltage	V_F	1.9V	2.0V	2.1V	
Reverse Peak Voltage	V_{RM}	5V	5V	5V	
Current Reduction Rate Above 25°C	ΔI_F	0.42mA/°C			
Ambient Temperature Range		−25° ~ +50°C			

Super Bright Single Element LED

AT625G Blue

AT631B White

AT632F Green

T-1 Bi-pin

ATTENTION ELECTROSTATIC SENSITIVE DEVICES

Color		6B White	6F Green	6G 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	ΔI_F	0.50mA/°C	0.50mA/°C	0.50mA/°C
Ambient Temperature Range		−25° ~ +50°C		

CAP TYPES & COLOR COMBINATIONS

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

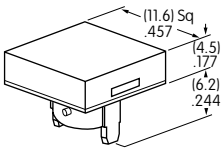
Solid Cap for Incandescent Lamp & Nonilluminated

Lens/Filter Colors Available:

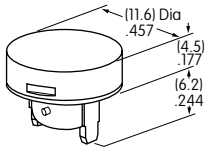
A Nonilluminated Only; Square & Round Only

BB **FB** **CB** **FF** **CC** **GB** **EB** **GG**

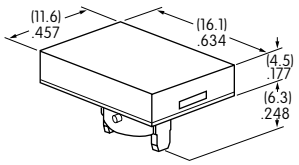
AT485 Square



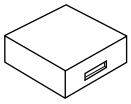
AT486 Round



AT4021 Rectangular



Material: Polycarbonate Finish: Glossy



Translucent Colored Lens

Translucent Colored Filter

Lamp AT611

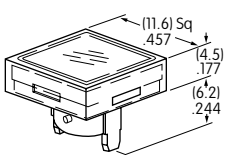
Insert Cap for Incandescent or Neon Lamp & Nonilluminated

Lens/Filter Colors Available:

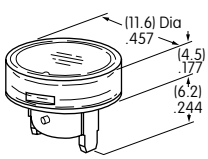
JB **JF** **JC** **JG** **JE**

JF and JG not suitable with neon lamp.

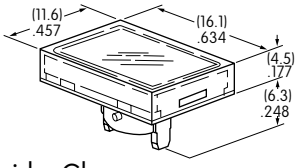
AT487 Square



AT488 Round



AT4022 Rectangular



Material: Polycarbonate Finish: Glossy

Transparent Clear Lens

Translucent Colored Filter

Lamp AT611 Lamp AT615

CAP TYPES & COLOR COMBINATIONS

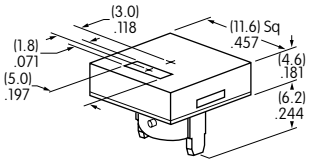
Color Codes: **A** Black **B** White **C** Red **D** Amber **E** Yellow **F** Green **G** Blue **J** Clear

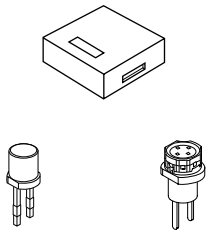
Spot Illuminated Cap for Bright LED without Resistor or with Resistor

Cap/Window Colors Available:

AB **Opaque Black Cap with Translucent White Window for Spot Illumination**

AT4051
Square





Material: Polycarbonate Finish: Matte

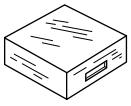
Bright LED AT635 Bright LED AT634

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**

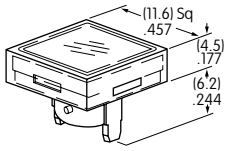


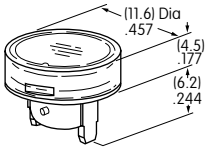
Transparent Clear Lens

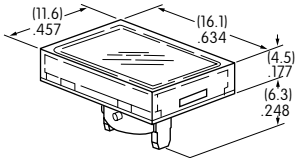
JC **AT4158** **AT4160** **AT4159**

JD

JF







Translucent Diffuser

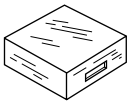
Material: Polycarbonate Finish: Glossy

Bright LED AT635 Bright LED AT634

Cap for Super Bright LED

Lens/Diffuser Colors Available:

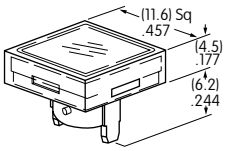
JB **AT4133** **Square** **AT4132** **Round** **AT4134** **Rectangular**

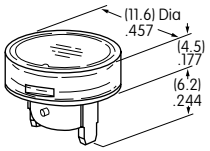


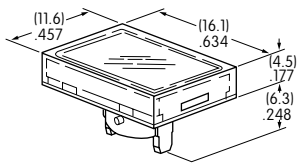
Translucent Clear Lens

Translucent White Diffuser

Super Bright LEDs AT625 AT631 AT632



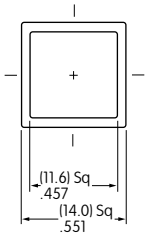


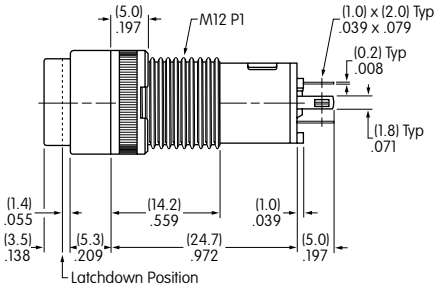


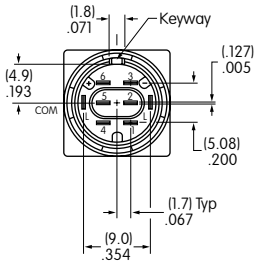
Material: Polycarbonate Finish: Glossy

TYPICAL SWITCH DIMENSIONS

Square • Bushing Mount — Single & Double Pole



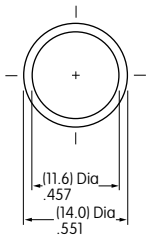


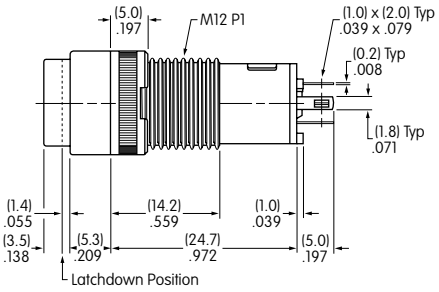


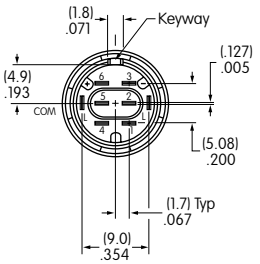
KB15SKW01-05-GG

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

Round • Bushing Mount — Single & Double Pole



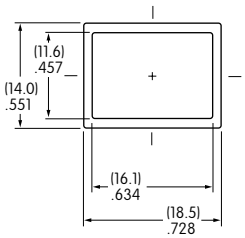


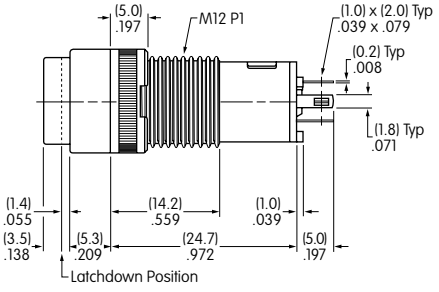


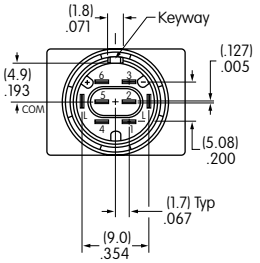
KB25CKW01-05-GG

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

Rectangular • Bushing Mount — Single & Double Pole





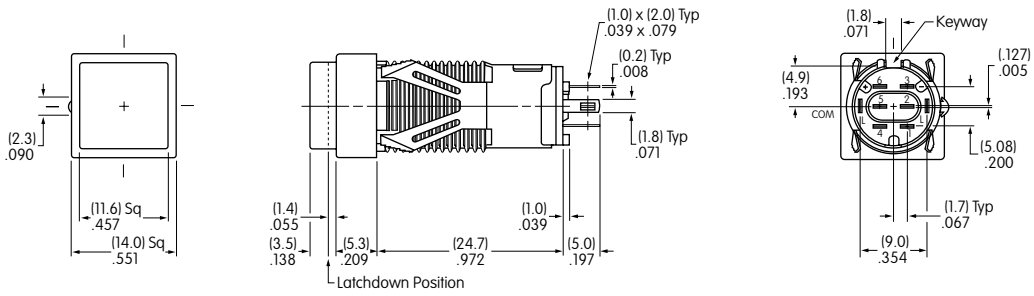


KB15RKW01-05-GG

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

TYPICAL SWITCH DIMENSIONS

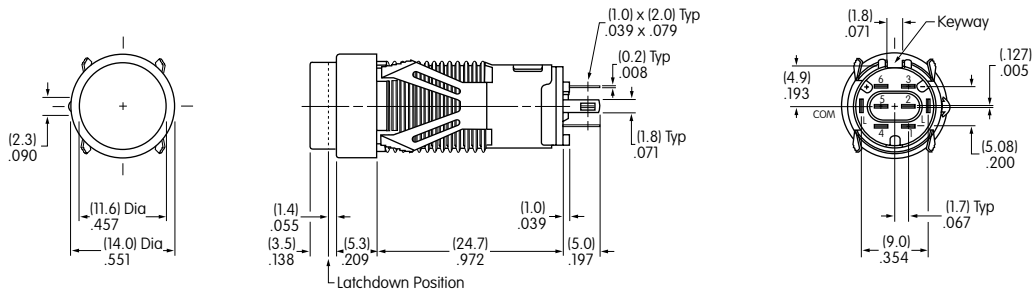
Single & Double Pole — Square • Snap-in Mount



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

KB16KKW01-05-CB

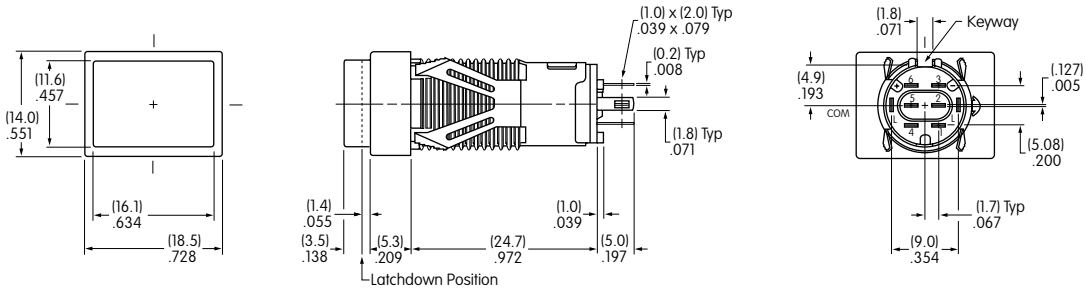
Single & Double Pole — Round • Snap-in Mount



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

KB26MKW01-05-CB

Single & Double Pole — Rectangular • Snap-in Mount

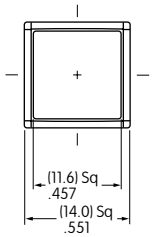


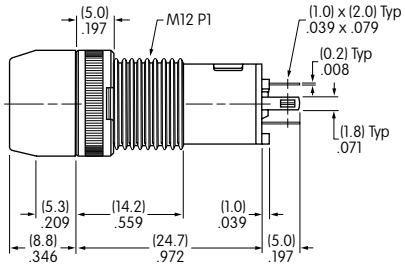
Single pole models do not have terminals 4, 5, & 6.

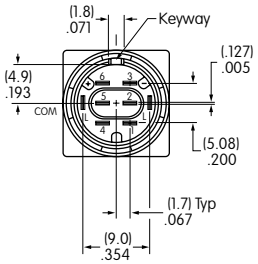
KB16NKW01-05-CB

TYPICAL SWITCH DIMENSIONS

Square • Barrier • Bushing Mount — Single & Double Pole



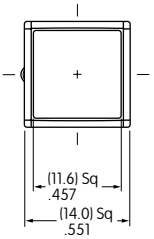


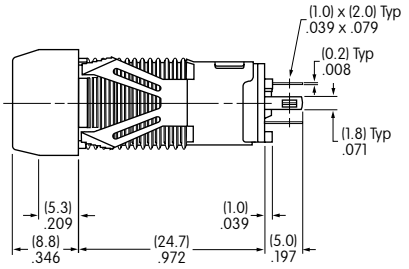


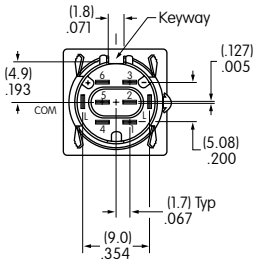
KB15SKW01B-6G-JB

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

Square • Barrier • Snap-in Mount — Single & Double Pole



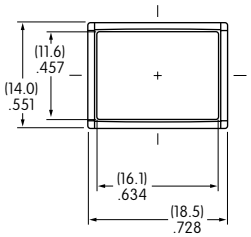


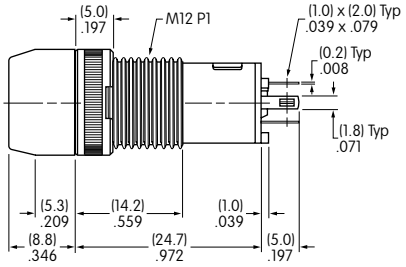


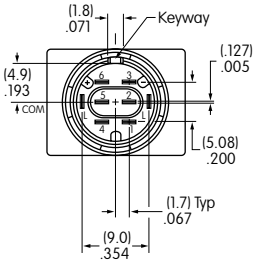
KB15KKW01B-5C-JC

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

Rectangular • Barrier • Bushing Mount — Single & Double Pole



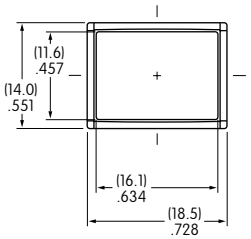


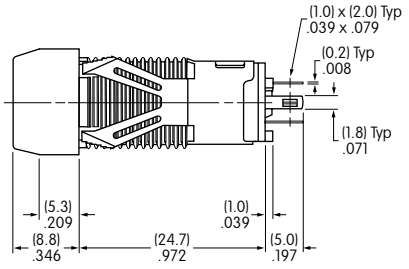


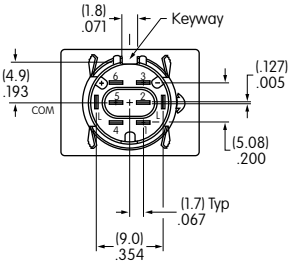
KB15RKW01B-5F-JF

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

Rectangular • Barrier • Snap-in Mount — Single & Double Pole







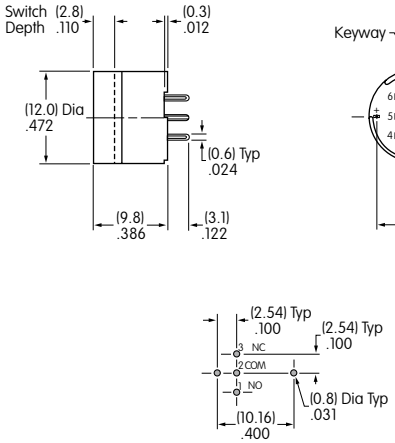
KB15NKW01B-5D-JD

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

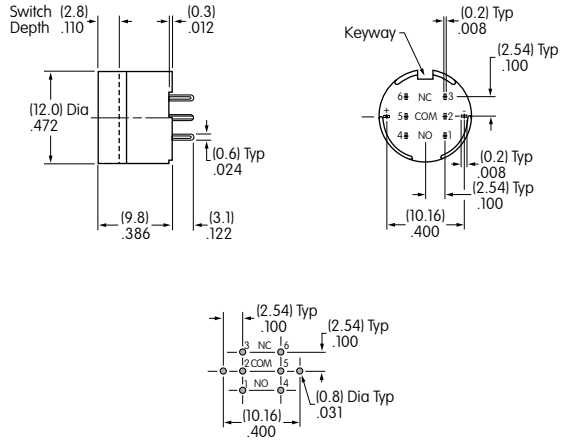
OPTIONAL ACCESSORIES

PCB Adaptors

AT701
Single Pole
Straight PC
Terminals



AT702
Double Pole
Straight PC
Terminals

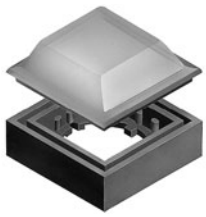


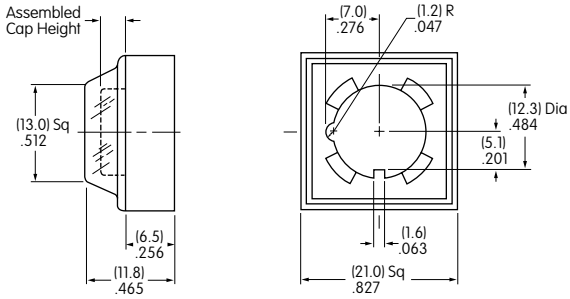
Material: Glass fiber reinforced polyamide Note: Order adaptors separately

Dust Covers

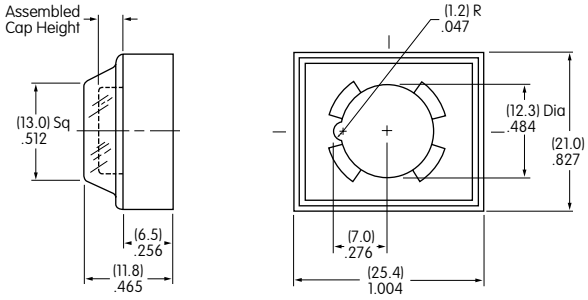
Panel Thickness Range: .020 ~ .268" (0.5 ~ 6.8mm) for Bushing Mounting; .020 ~ .079" (0.5 ~ 2.0mm) for Snap-in Mounting
Dust Covers reduce the depth of switch behind panel by .047" (1.2mm).

AT495
For Square & Round
(not for Barrier type)





AT4025
For Rectangular
(not for Barrier type)



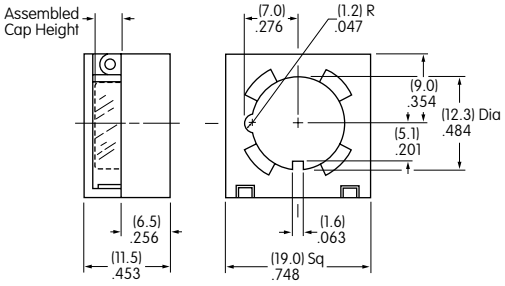
Material: Lid: PVC PVC loses pliability below 0°C (32°F). Base: Polyamide

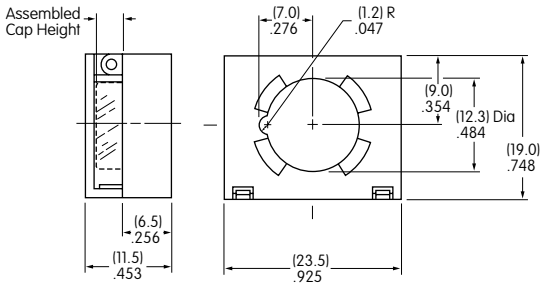
OPTIONAL ACCESSORIES

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

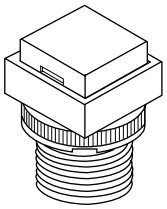
Protective Guards reduce the depth of switch behind panel by .047″ (1.2mm).

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

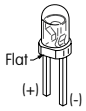
Super Bright LEDs AT625, AT631, & AT632 are electrostatic sensitive.

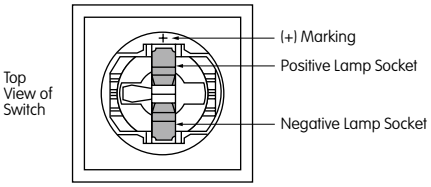
ATTENTION
ELECTROSTATIC SENSITIVE DEVICES

LED AT635

LED AT634

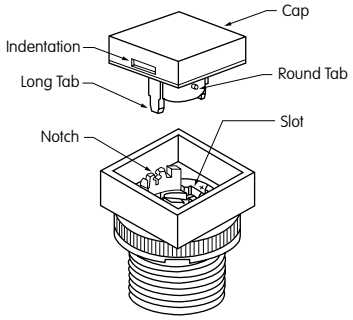
LEDs AT625 AT631 AT632





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.

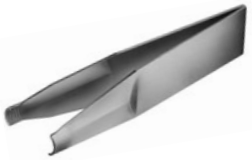


AT108 Socket Wrench for Bushing Mounting

Overtightening the mounting nut may damage the switch housing.

AT109 Cap Extractor

AT111 Lamping Tool

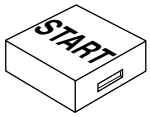


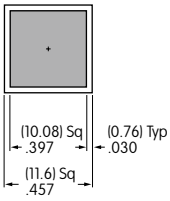
LEGENDS

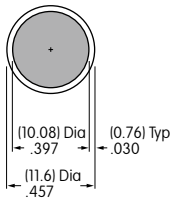
NKK Switches can provide custom legends for caps. Contact factory for more information.

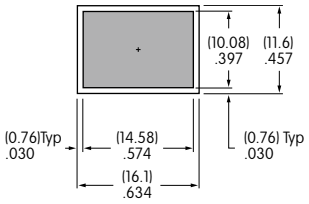
Suggested Printable Area for KB Lens

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



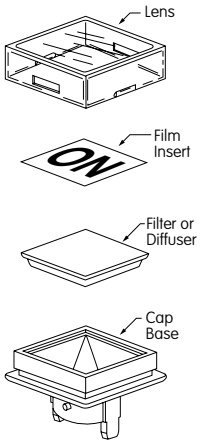






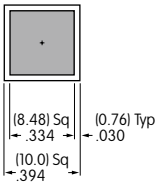
Shaded areas are printable areas.

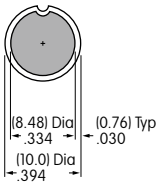
Suggested Printable Area for Film Insert

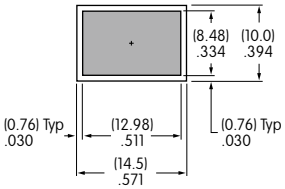


Recommended Print Method: Laser Print

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^2) 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.

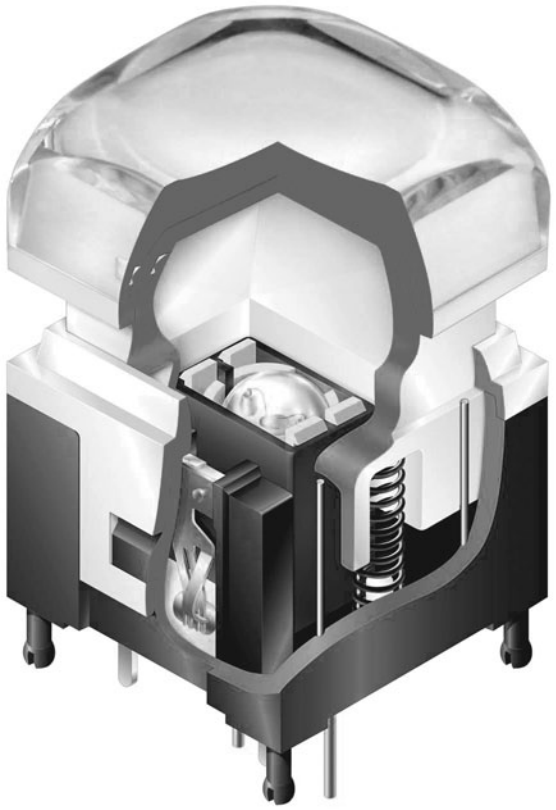
Unique actuation guide gives positive indication of circuit transfer as well as smooth and silent operation. (Patent pending).

Choices of tactile, nontactile or tactile/audible actuation.

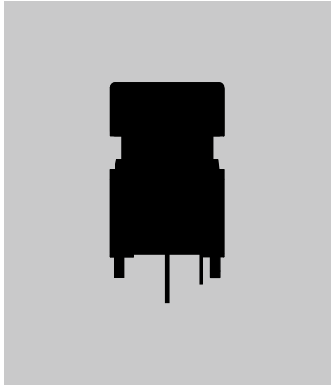
Compact design with height of .906" (23.0mm) from PC board to top of cap. (Same height as programmable SmartSwitch™.)

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



TYPICAL SWITCH ORDERING EXAMPLE

KP | 01 | 15A | N | B | K | G03 | 6CF | – | 2 | S | JB

Pole & Circuit

15A	SPST	OFF	(ON)

( ) = Momentary
Normally Open Contacts

Travel & Force

01	Stroke: 4.5mm (.177″) Actuation Force: 1.9N
02	Stroke: 3.5mm (.138″) Actuation Force: 1.6N

Actuation

01

C	Tactile
N	Nontactile

02

C	Tactile
N	Nontactile
S	Tactile/Audible

Housing

K	Black only

Plungers

A	9.2mm Plunger for 12.0mm Cap
B	11.6mm Plunger for 15.0mm & 17.4mm Caps

LEDs

6CF	Super Bright Red/Green Bicolor
RGB	Red/Green/Blue (Custom)

* See Note

Contacts & Terminals

G03	Gold Contacts and Straight PC Terminals; 100mA @ 12V DC

Cap Colors

JB	Clear Lens & White Diffuser

Cap Types

F	Flat
S	Sculptured
T	Home Key

Cap Sizes

1	12.0mm Square
2	15.0mm Square
3	17.4mm Square

** See Note

Notes

* Custom RGB LED Page D42

** Custom Rectangular Cap Page D43

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

KP0115ANBKG036CF-2SJB

11.6mm Plunger and
15.0mm Sculptured Cap
Clear Lens and White Diffuser

SPST
OFF-Momentary ON Circuit
Normally Open Contacts

Super Bright
Red/Green Bicolor LED

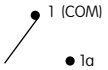
Nontactile Actuation

Black Housing

Gold Contacts with 100mA Rating

Straight PC Terminals

POLE & CIRCUIT

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

ACTUATION

C **Tactile**
KP01 or KP02

N **Nontactile**
KP01 or KP02

S **Tactile/Audible**
KP02 only

HOUSING

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.

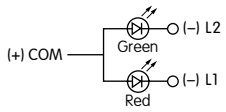
ATTENTION
ELECTROSTATIC SENSITIVE DEVICES

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.



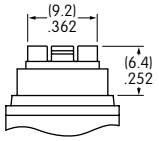
Colors		6CF Red	6CF Green	Unit
Minimum Luminous Intensity	I_V	450	820	mcd
Standard Luminous Intensity	I_V	700	1100	mcd
Forward Peak Current	I_{FM}	30 (25 for amber)	25 (22 for amber)	mA
Typical Forward Current	I_F	15	15	mA
Forward Voltage	V_F	2.1	3.2	V
Power Peak Dissipation	P_D	63	80	mW
Reverse Peak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

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

PLUNGERS

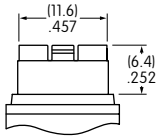
A **9.2mm Plunger for 12.0mm Cap**

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**

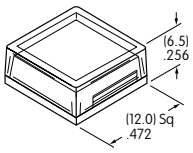
11.6mm Plunger is designed with a wider neck to hold both the 15.0mm and 17.4mm Caps.



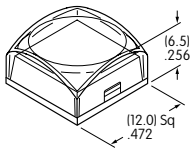
CAP TYPES & COLORS

1 **12.0mm Square** Used on A Plunger

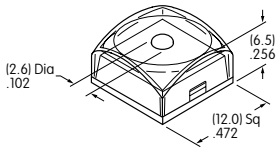
F **AT3083 Flat Cap**



S **AT3078 Sculptured Cap**

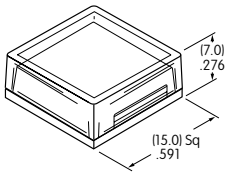


T **AT3086 Home Key Cap**

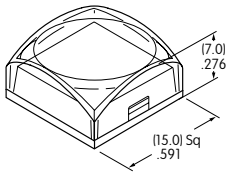


2 **15.0mm Square** Used on B Plunger

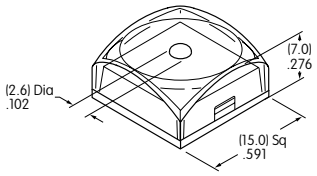
F **AT3084 Flat Cap**



S **AT3079 Sculptured Cap**

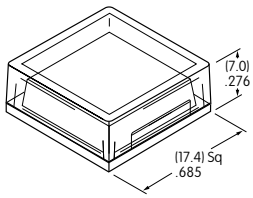


T **AT3087 Home Key Cap**

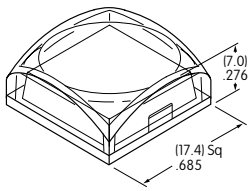


3 **17.4mm Square** Used on B Plunger

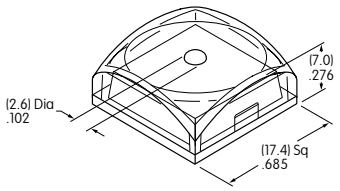
F **AT3085 Flat Cap**



S **AT3080 Sculptured Cap**

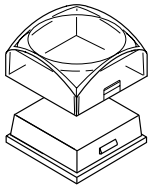


T **AT3088 Home Key Cap**



JB **Lens & Diffuser Colors Available:**

Clear/White



Clear Lens

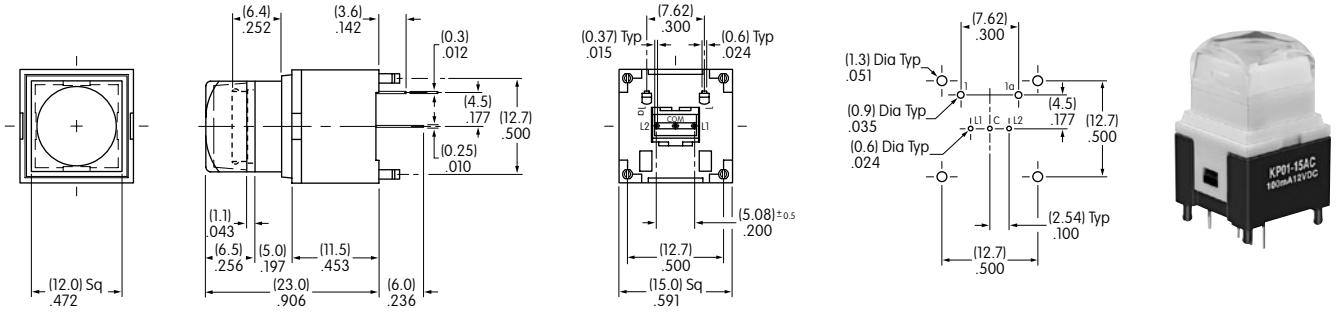
White Diffuser

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

Optional Protective Guard AT4170 available; contact factory.

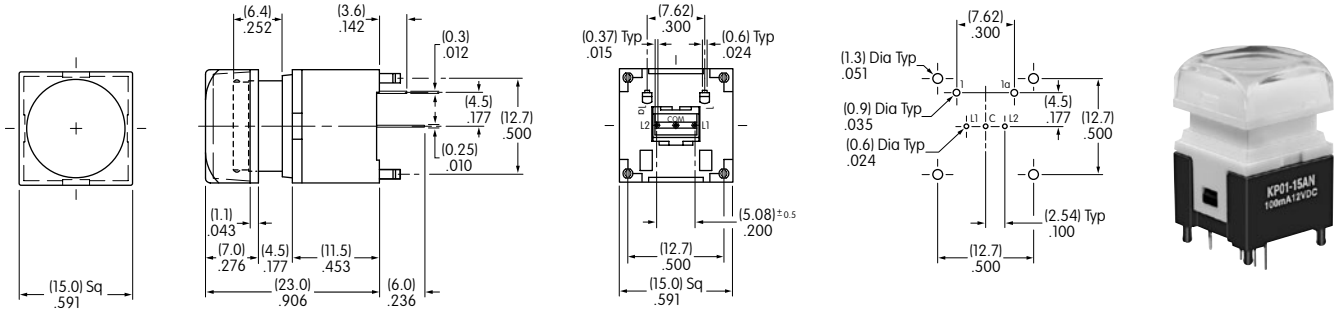
TYPICAL SWITCH DIMENSIONS

12.0mm Square Cap



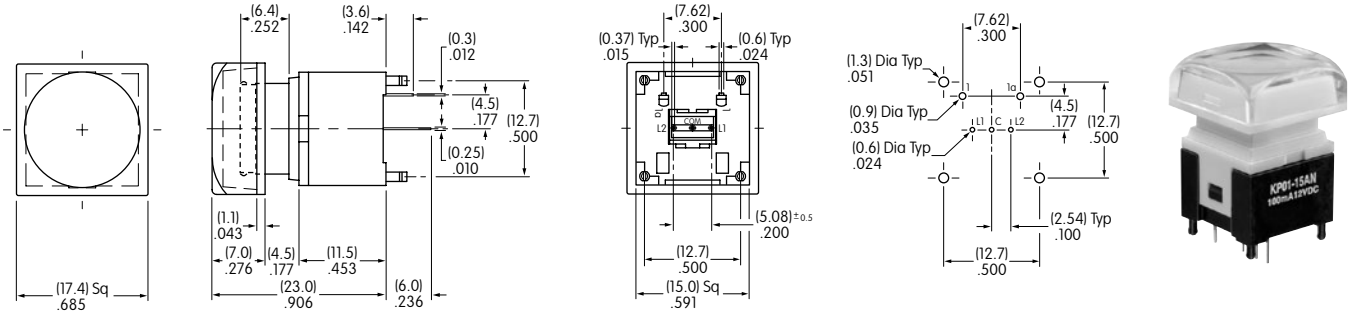
KP0115ACAKG036CF-1SJB

15.0mm Square Cap



KP0115ANBKG036CF-2SJB

17.4mm Square Cap



KP0115ANBKG036CF-3SJB

CUSTOM RGB

LED SPECIFICATIONS

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

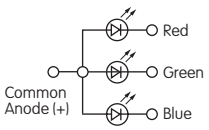
LEDs are an integral part of the switch and are not available separately.

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.

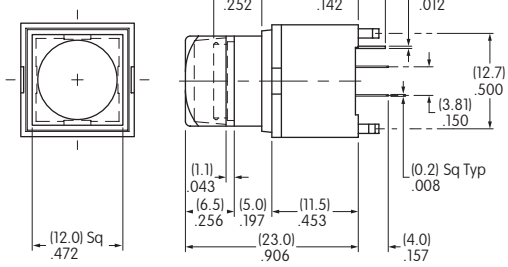


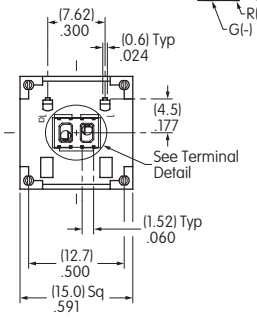
ATTENTION ELECTROSTATIC SENSITIVE DEVICES

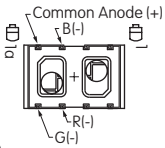
Color		RGB Red	RGB Green	RGB Blue	Unit
Forward Peak Current	I_{FM}	30	30	30	mA
Typical Forward Current	I_F	20	14	9	mA
Forward Voltage	V_F	2.0	2.9	2.9	V
Power Peak Dissipation	P_D	40	80	80	mW
Reverse Peak Voltage	V_{RM}	5	5	5	V
Dominant Wavelength	λ_d	621.5	522.5	472.5	nm
Current Reduction Rate Above 25°C	Δ_{IF}	0.50	0.50	0.50	mA/°C
Ambient Temperature Range		−25 ~ +50			°C

TYPICAL SWITCH DIMENSIONS

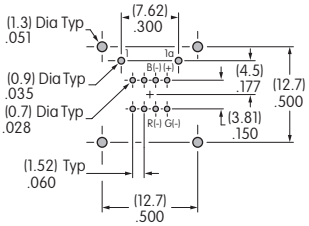
12.0mm Square Cap with RGB LED





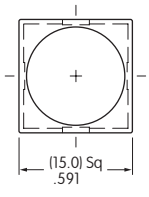


Terminal Detail

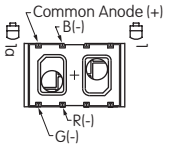


KP0115ACAKG03RGB-1SJB

15.0mm & 17.4mm Square Caps with RGB LED

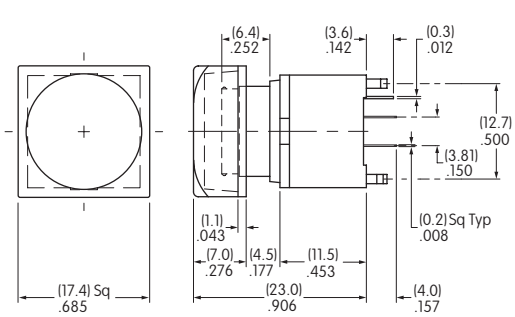


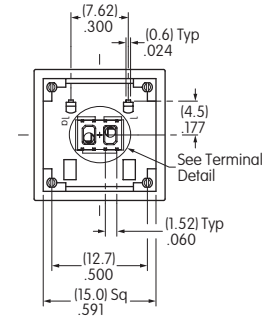
15.0mm Cap

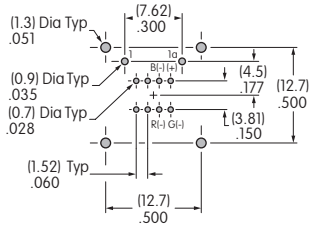


Terminal Detail

KP0115ANBKG03RGB-2SJB





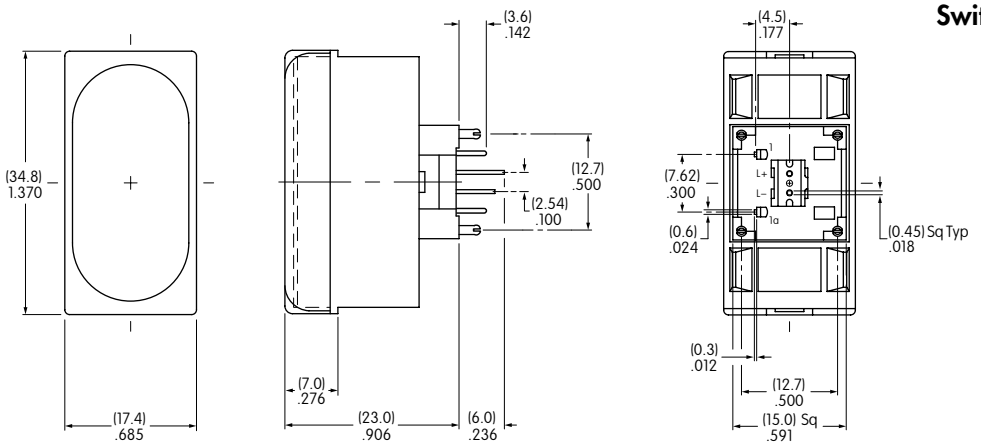


KP0115ANBKG03RGB-3SJB

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.

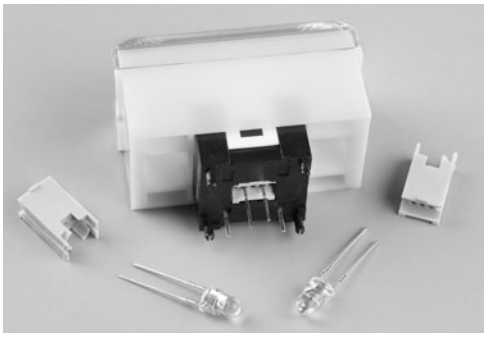
If the source voltage exceeds the rated voltage, a ballast resistor is required.

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

(+) (-)	Color	Red	Unit
Forward Peak Current	I_{FM}	30	mA
Typical Forward Current	I_F	20	mA
Forward Voltage	V_F	2.0	V
Reverse Peak Voltage	V_{RM}	4	V
Dominant Wavelength	λ_d	623	nm
Current Reduction Rate Above 25°C	ΔI_F	0.32	mA/°C
Ambient Temperature Range		–25 ~ +50	°C

Contact factory for other LED colors.

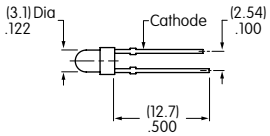
ASSEMBLY & INSTALLATION INSTRUCTIONS



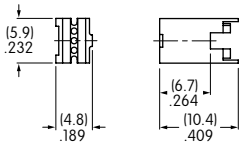
Switch/Rectangular Cap assembly has 3 LEDs to achieve bright and even illumination.

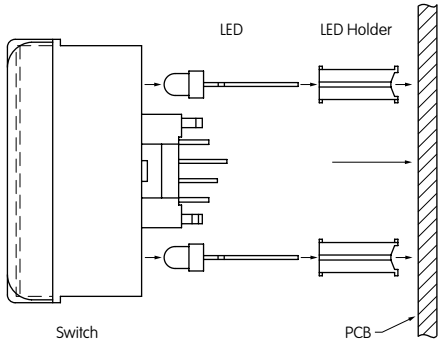
One LED (in center of switch bottom) is an integral part of the switch; the other 2 LEDs and 2 LED Holders are packaged separately.

LED

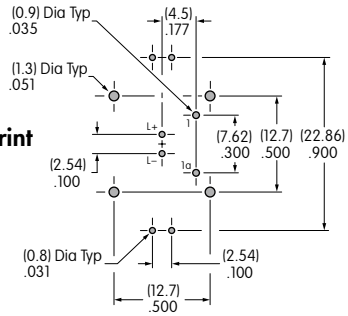


LED Holder





Footprint



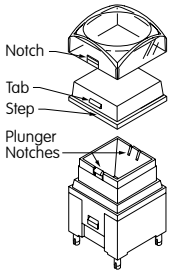
1. Install LED into LED Holder (quantity 2).
2. Solder LEDs and LED Holders into PCB.
3. Solder switch into PCB making sure that the two outer LEDs and LED Holders clear the bottom side opening of the cap.

ASSEMBLY INSTRUCTIONS FOR SQUARE CAPS

ATTENTION
ELECTROSTATIC SENSITIVE DEVICES

Cap Orientation

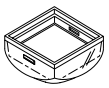
As shown in the accompanying illustration, the cap and plunger are designed with tabs and notches to assure proper orientation of the cap on the switch.



Removal of Cap Assembly & Separation of Lens & Diffuser

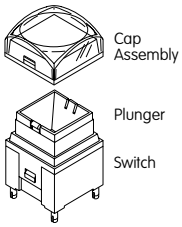
Holding the switch tightly, pull the cap off the switch. Once the cap assembly is released from the plunger, the lens and diffuser can be separated.

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.



LEGENDS

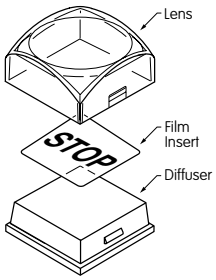
NKK Switches can provide custom legends for caps. Contact factory for more information.

Suggested Printable Areas for KP Lens

Recommended Methods:

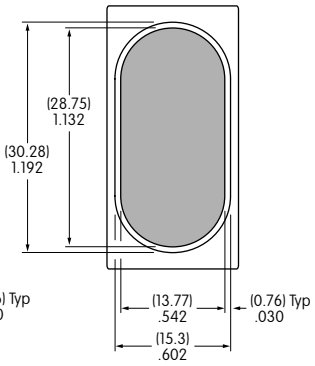
Laser Etch on clear lens, Screen Print, or Pad Print on lens.
Laser Print on film insert.
Epoxy based ink is recommended.

Printing on Diffuser is not advisable.

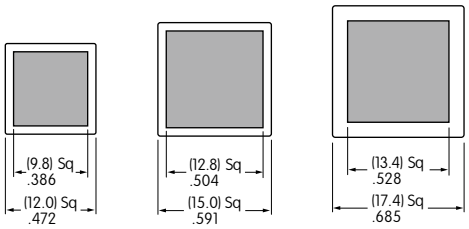


Shaded areas are suggested printable areas for Lens.

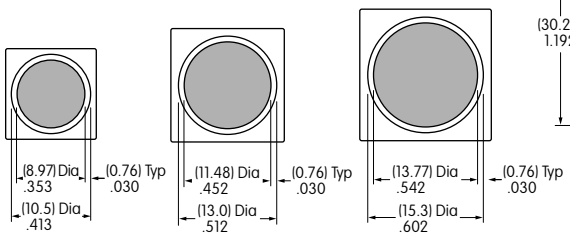
Custom Rectangular Cap Lens



Flat Cap Lens



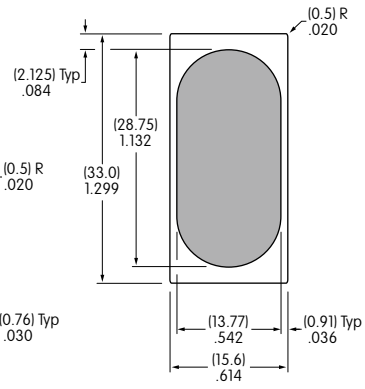
Sculptured Cap Lens



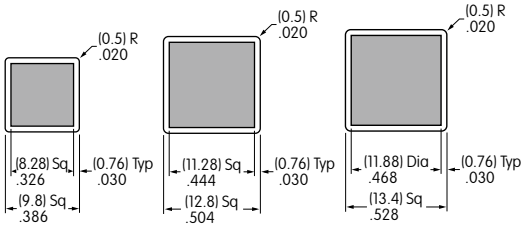
Suggested Printable Areas for KP Film Insert

Shaded areas are suggested printable areas for Film Insert.

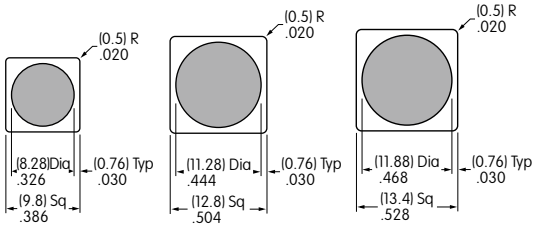
Custom Rectangular Film Insert



Flat Cap Film Inserts



Sculptured or Home Key Cap Film Inserts



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/s²) 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.

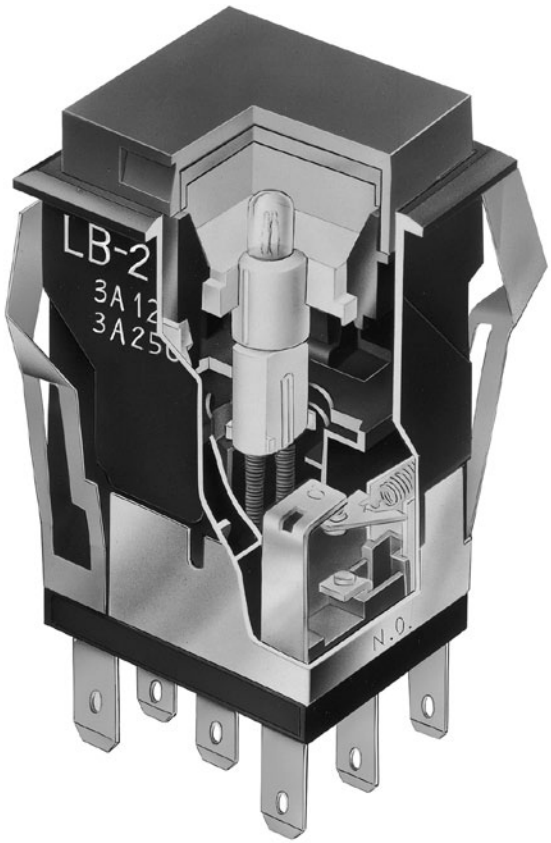
Snap-action contact mechanism gives long electrical life and sensitivity of actuation.

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

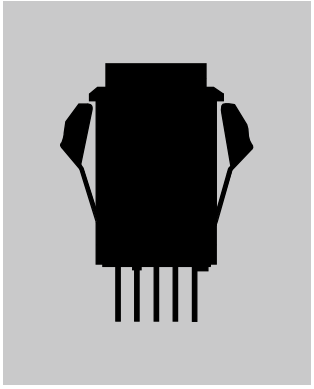
Panel sealed model meets IP65 of IEC60529 specifications (similar to NEMA 4 & 13).

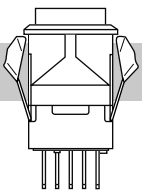
Compact switch design minimizes behind panel depth.

Matching indicators available.

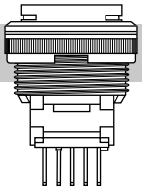


Actual Size





Snap-in Mount Page D46



Panel Seal Page D57

TYPICAL SWITCH ORDERING EXAMPLE

LB | 1 | 5 | S | K | W01

Poles

1	SPDT
2	DPDT

Circuits

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

Shapes

S	Square
C	Round
R	Rectangular

Housing

K	Black
G	Gray

Contacts & Terminals

W01	Silver Contacts Rated 3A @ 125/250V AC Solder Lug/Quick Connect Terminals*
G01	Gold Contacts Rated 0.4VA @ 28V AC/DC Solder Lug/Quick Connect Terminals*

* 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

LB15SKW01-5C12-JC

— 5C | 12 — JC

Lamps

Incandescent Lamp Used with Solid Cap

05	5-volt
12	12-volt
No Code	Nonilluminated

Incandescent or Neon Used with Insert Cap

01	110-volt Neon
05	5-volt Incandescent
12	12-volt Incandescent
No Code	Nonilluminated

Bright LED Used with LED Cap

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

Super Bright LED Used with LED Cap

6B	White
6F	Green
6G	Blue

LED in Spot Illuminated Cap

1C	Red Single Color
1D	Amber Single Color
1F	Green Single Color
CF	Red/Green Bicolor

Nonilluminated

No Code	Nonilluminated

Cap Types & Colors

Solid Cap: Lens/Filter Colors

BJ	White/Clear
CJ	Red/Clear
EJ	Yellow/Clear
FJ	Green/Clear
GJ	Blue/Clear

Insert Cap: Lens/Filter Colors

JB	Clear/White
JC	Clear/Red
JE	Clear/Yellow
*JF	Clear/Green
*JG	Clear/Blue

*JF & JG not suitable with neon.

LED Cap: Lens/Diffuser Colors

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

LED Cap: Lens/Diffuser Colors

JB	Clear/White

Spot Illuminated Cap Colors

A	Black	Available in Square and Round only.
B	White	
C	Red	
F	Green	

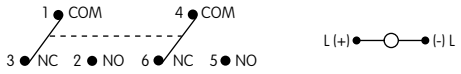
Nonilluminated Cap Colors

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

Series LB

Standard Size Snap-in Pushbuttons

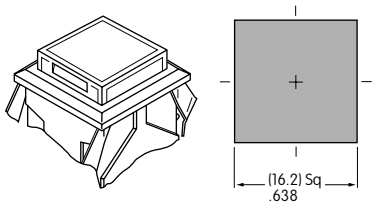
POLES & CIRCUITS

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

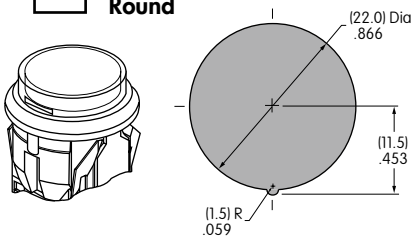
SHAPES & PANEL CUTOUTS

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

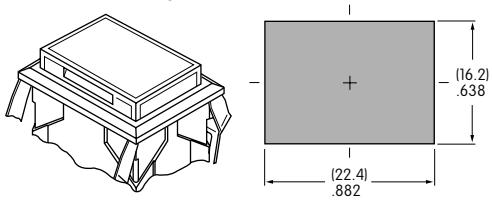


Cutout for 1 switch:
.638" x .638" (16.2mm x 16.2mm)
Cutout for 1 switch with barriers:
.638" x .815" (16.2mm x 20.7mm)

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



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



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

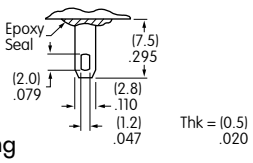
W01 **Silver Contacts** — **Power Level** **3A @ 125V AC & 250V AC**

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

Complete explanation of operating range in Supplement section.

Solder Lug/Quick Connect

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



INCANDESCENT & NEON LAMP CODES & SPECIFICATIONS

AT607 & AT607N

T-1 Bi-pin

AT607 Incandescent 5-volt or 12-volt; AT607N Neon 110-volt		**05**	**12**	**01** *
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

AT635

LEDs are colored in OFF state.

T-1½ Bi-pin

Color Codes	Red 5C	Amber 5D	Green 5F	No Code: No Resistor
				Red / Amber / Green
Forward Peak Current I_{FM}				30mA / 30mA / 30mA
Typical Forward Current I_F				20mA / 20mA / 20mA
Forward Voltage V_F				1.9V / 2.0V / 2.1V
Reverse Peak Voltage V_{RM}				5V / 5V / 5V
Current Reduction Rate Above 25°C ΔI_F				0.42mA/°C
Ambient Temperature Range				–25° ~ +50°C

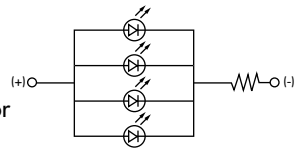
Bright LED with Resistor

AT627 with Resistor

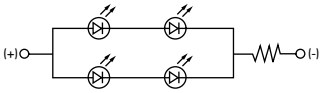
T-1 Bi-pin

Color Codes:	Red 5C	Amber 5D	Green 5F	Resistor Codes 05	12	24
Forward Peak Current I_{FM}				—	—	—
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 ΔI_F				0.50mA/°C		
Ambient Temperature Range				–25° ~ +50°C		

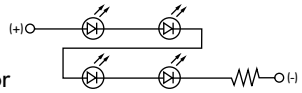
AT627 5-volt 4-element with Resistor



AT627 12-volt 4-element with Resistor



AT627 24-volt 4-element with Resistor



Super Bright Single Element LED

AT625G Blue
AT631B White
AT632F Green

T-1 Bi-pin

ATTENTION ELECTROSTATIC SENSITIVE DEVICES	Color	6B White	6F Green	6G 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	ΔI_F	0.50mA/°C		
Ambient Temperature Range		–25° ~ +50°C		

No Code **No Lamp**

CAP TYPES & COLOR COMBINATIONS

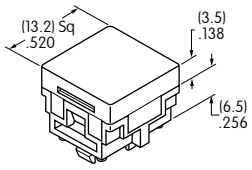
Color Codes: **B** White **C** Red **D** Amber **E** Yellow **F** Green **G** Blue **J** Clear

Solid Cap for Incandescent Lamp & Nonilluminated

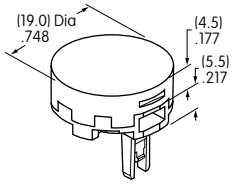
Lens/Filter Colors Available:

BJ FJ
CJ GJ
EJ

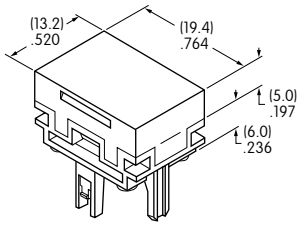
AT476 Square

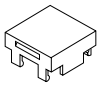


AT4012 Round



AT4026 Rectangular




Translucent Colored Lens


Transparent Clear Filter


Lamp AT607

Material: Polycarbonate Finish: Glossy

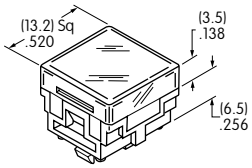
Insert Cap for Incandescent or Neon Lamp & Nonilluminated

Lens/Filter Colors Available:

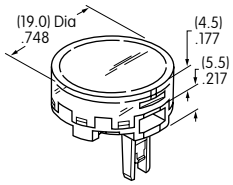
JB JF
JC JG
JE

JF and JG not suitable with neon lamp.

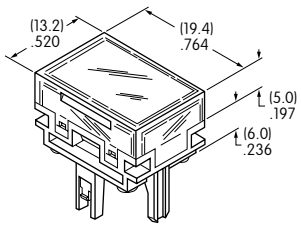
AT477 Square



AT4013 Round



AT4027 Rectangular




Transparent Clear Lens


Translucent Colored Filter


Lamp AT607 or 607N

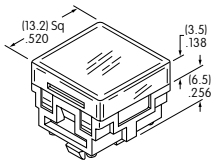
Material: Polycarbonate Finish: Glossy

Cap for Bright LED without Resistor

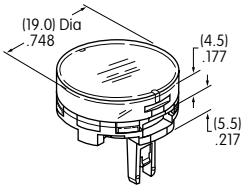
Lens/Diffuser Colors Available:

JB
JC
JD
JF

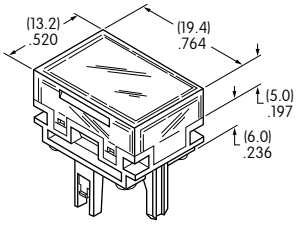
AT4176 Square

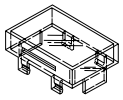


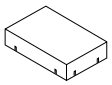
AT4178 Round



AT4177 Rectangular




Transparent Clear Lens


Translucent Colored Diffuser


Bright LED AT635

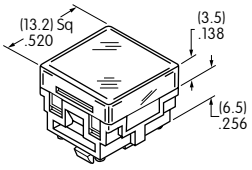
Material: Polycarbonate Finish: Glossy

Cap for Bright LED with Resistor

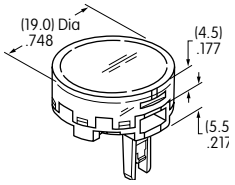
Lens/Diffuser Colors Available:

JB
JC
JD
JF

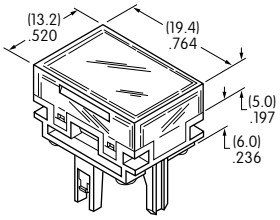
AT4162 Square

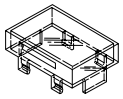


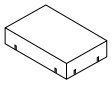
AT4164 Round



AT4163 Rectangular




Transparent Clear Lens


Translucent Colored Diffuser


Bright LED AT627

Material: Polycarbonate Finish: Glossy

CAP TYPES & COLOR COMBINATIONS

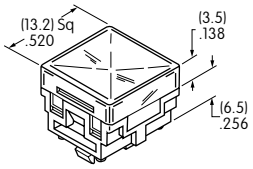
Color Codes: **A** Black **B** White **C** Red **D** Amber **E** Yellow **F** Green **G** Blue **H** Gray **J** Clear

Cap for Super Bright LEDs

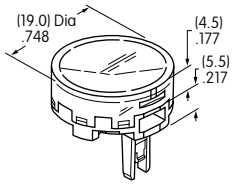
JB **Clear Lens White Diffuser**

Material: Polycarbonate
Finish: Glossy

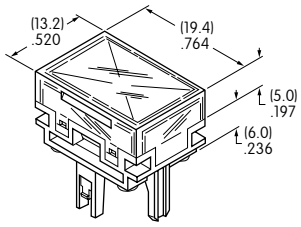
AT4129 Square

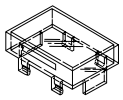


AT4128 Round

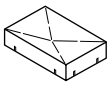


AT4130 Rectangular





Transparent Clear Lens



Translucent White Diffuser

LEDs AT625 AT631 AT632

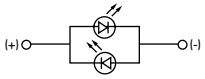
Spot Illuminated Cap with LED

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

Not Available Separately

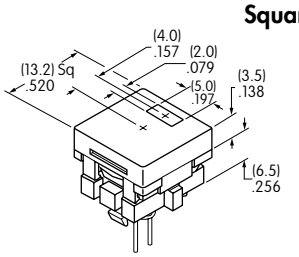
	Single Color LED with 1 Element	Bicolor LED with 2 Elements	Single Color			Bicolor
			**1C** Red	**1D** Amber	**1F** Green	**CF** Red/Green
Forward Peak Current		I_{FM}	10mA	30mA	30mA	30/25mA
Typical Forward Current		I_F	8mA	24mA	24mA	20mA
Forward Voltage		V_F	1.9V	2.0V	2.1V	2.0/2.2V
Reverse Peak Voltage		V_{RM}	5V	5V	5V	—
Current Reduction Rate Above 25°C		ΔI_F	0.13mA/°C	0.40mA/°C	0.40mA/°C	0.43/0.38mA/°C
Ambient Temperature Range			−25° ~ +50°C			

Cap Colors Available:

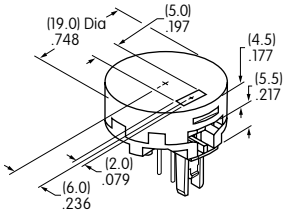
A **C**
B **F**

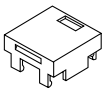
Material: Polycarbonate
Finish: Glossy

AT480 Square



AT4016 Round





Cap with Window

Factory Assembled LED; Not Available Separately

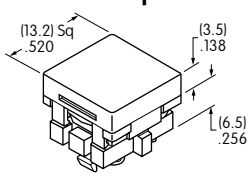
When ordering spot illuminated cap separately, LED color must be specified.
Examples: AT480CA (red LED, black cap); AT4016CFB (red/green bicolored LED, white cap)

Cap for Nonilluminated

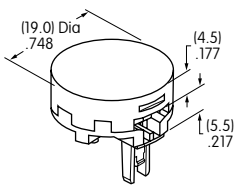
Cap Colors Available:

A **E** **H**
B **F**
C **G**

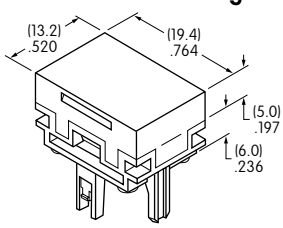
AT484 Square

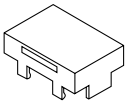


AT4017 Round



AT4030 Rectangular





Cap

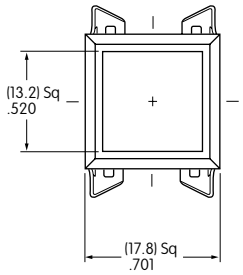
No Lamp

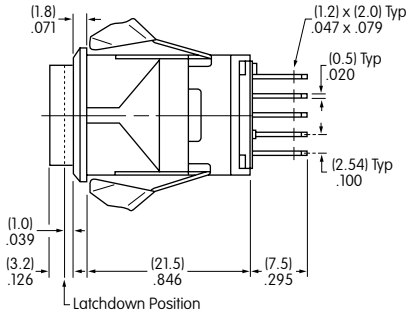
Material: Polycarbonate Finish: Glossy

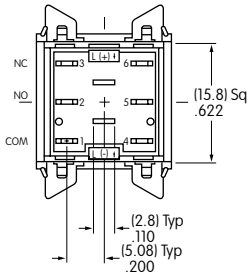
TYPICAL SWITCH DIMENSIONS

Square

Single & Double Pole





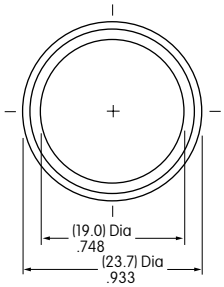


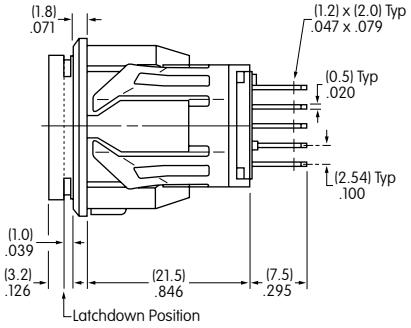
LB15SKW01-12-CJ

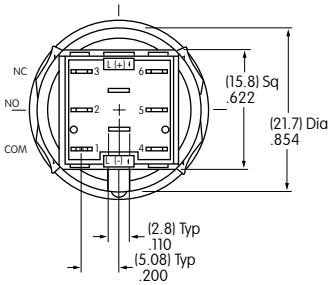
Single pole models do not have terminals 4, 5, & 6.

Round

Single & Double Pole





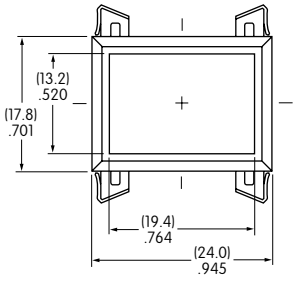


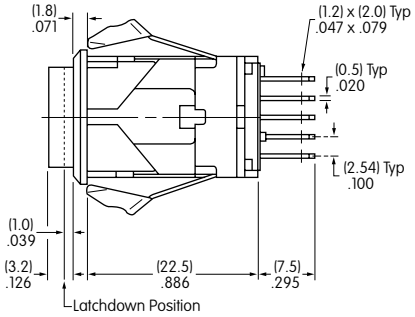
LB16CKW01-12-CJ

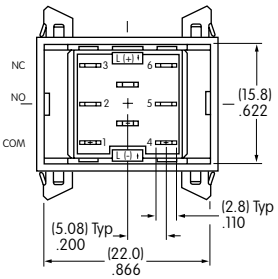
Single pole models do not have terminals 4, 5, & 6.

Rectangular

Single & Double Pole







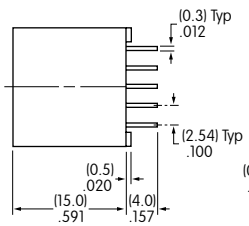
LB26RGW01-12-CJ

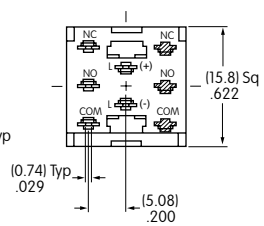
Single pole models do not have terminals 4, 5, & 6.

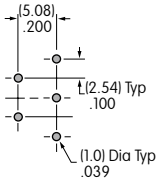
OPTIONAL ACCESSORIES

PCB Adaptors

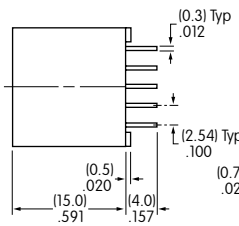
AT711 Single Pole • Straight PC Terminals

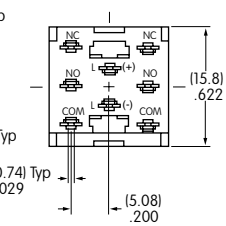


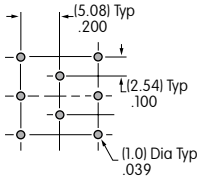




AT712 Double Pole • Straight PC Terminals







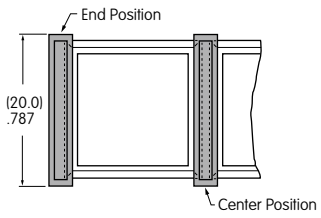
Note: Order adaptors separately.

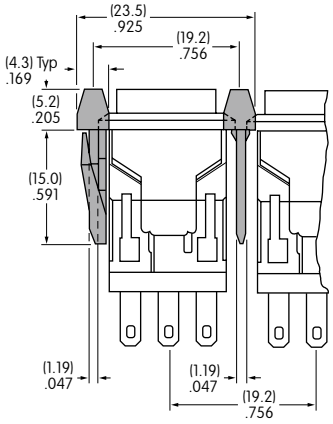
OPTIONAL ACCESSORIES

Barriers

AT497
End

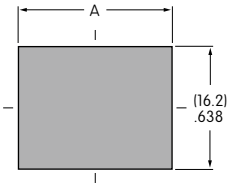
AT498
Center





Material: Polyamide

Cutouts for More Than 1 Switch

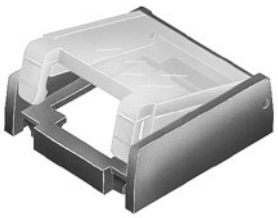


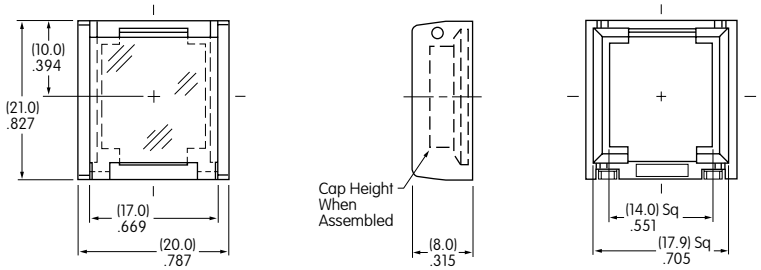
Square
A = .752" (19.1mm) x Number of Switches + .051" (1.3mm)
Rectangular
A = .996" (25.3mm) x Number of Switches + .051" (1.3mm)

Protective Guard

AT499
Square
Protective Guard

Opens 90°
Closes manually





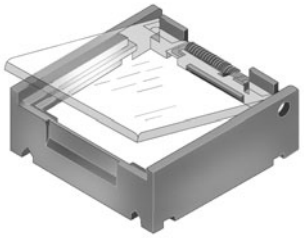
Material: Polyamide

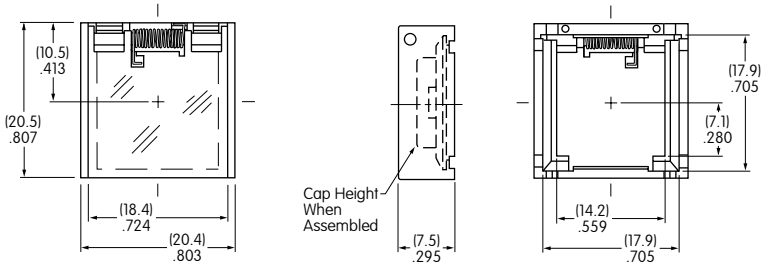
Protective Guards reduce depth of switch behind panel by .020" (0.5mm).

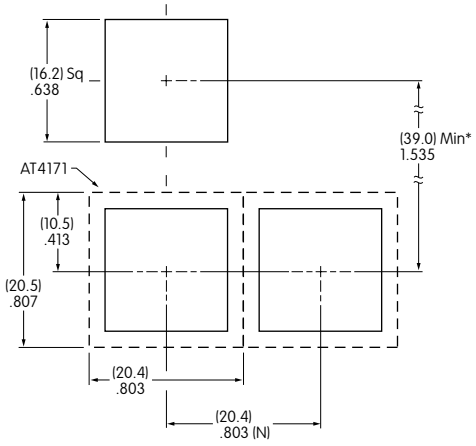
Spring Loaded Protective Guard

AT4171
Square
Protective Guard

Opens 180°
Closes automatically

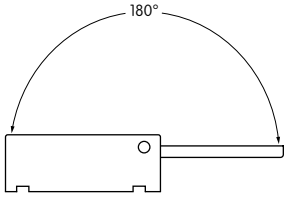






(N) = Number of switches * Minimum dimension allows opening of cover to 180°

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



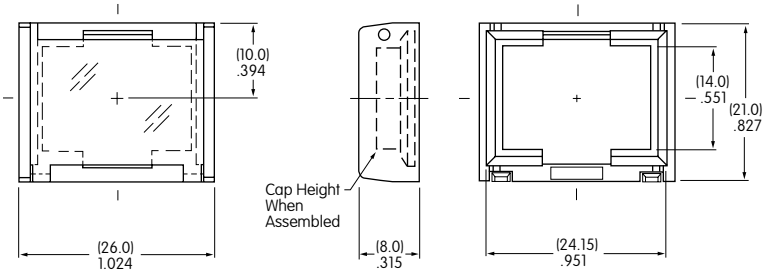
Recommended Panel Thickness:
.039" ~ .106" (1.0mm ~ 2.7mm)

OPTIONAL ACCESSORIES

Protective Guard

AT4057
Rectangular
Protective Guard

Opens 90°
Closes manually

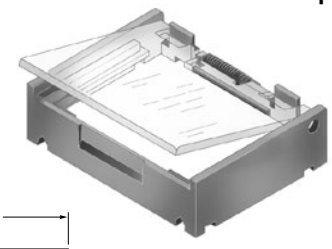


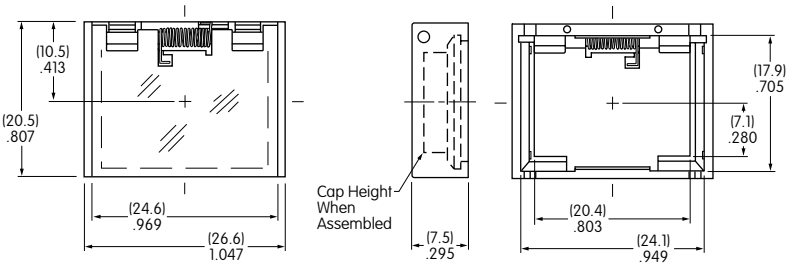
Material: Polyamide

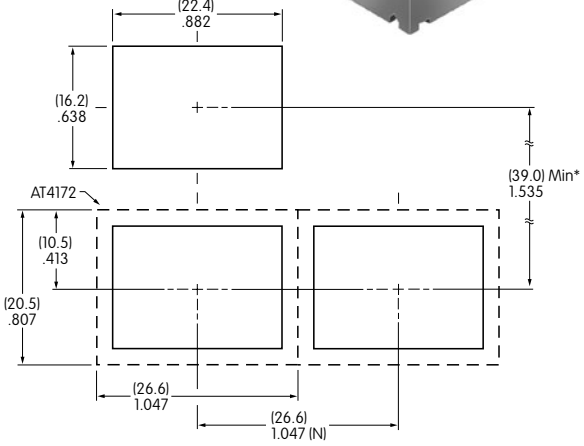
Protective Guards reduce depth of switch behind panel by .020" (0.5mm).

Spring Loaded Protective Guard

AT4172
Rectangular
Protective Guard





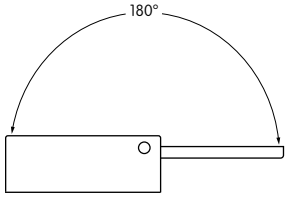


(N) = Number of switches * Minimum dimension allows opening of cover to 180°

Opens 180°
Closes automatically

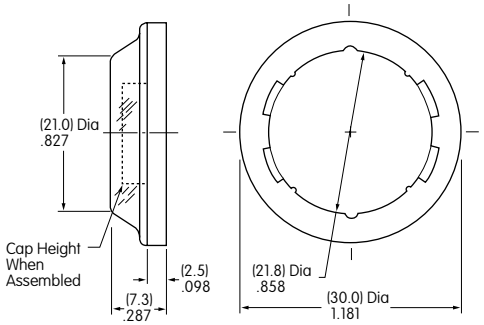
Materials:
Cover: Clear Polycarbonate
Base: Black GFR Polyamide
Coil Spring: Stainless Steel

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

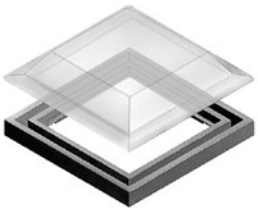


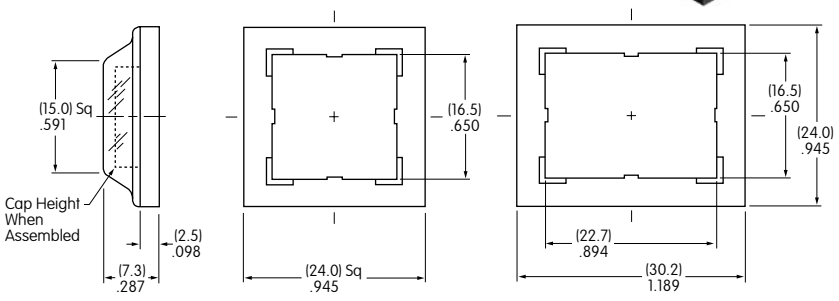
Dust Covers

AT4002
Round

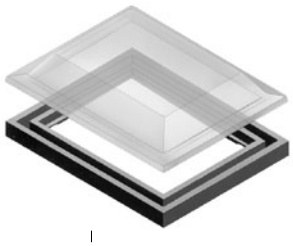


AT4001
Square





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^2) 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.

TYPICAL SWITCH ORDERING EXAMPLE

LB | 1 | 6 | W | K | W01 — 5C | 12 — JC

Poles

1	SPDT
2	DPDT

Circuits

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

Shape

W	Round

Housing

K	Black
G	Gray

Contacts & Terminals

W01	Silver Contacts Rated 3A @ 125/250V AC Solder Lug/Quick Connect Terminals*
G01	Gold Contacts Rated 0.4VA @ 28V AC/DC Solder Lug/Quick Connect Terminals*

* 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.

Lamps

Incandescent Lamp Used with Solid Cap	
05	5-volt
12	12-volt
No Code	Nonilluminated

Incandescent or Neon Used with Insert Cap	
01	110-volt Neon
05	5-volt Incandescent
12	12-volt Incandescent
No Code	Nonilluminated

Bright LED Used with LED Cap			
Colors		Resistor	
5C	Red	No Code	No Resistor
5D	Amber	05	5-volt
5F	Green	12	12-volt
		24	24-volt

Super Bright LED Used with LED Cap	
6B	White
6F	Green
6G	Blue

Cap Types & Colors

Solid Cap: Lens/Filter Colors	
BJ	White/Clear
CJ	Red/Clear
EJ	Yellow/Clear
FJ	Green/Clear
GJ	Blue/Clear

Insert Cap: Lens/Filter Colors	
JB	Clear/White
JC	Clear/Red
JE	Clear/Yellow
*JF	Clear/Green
*JG	Clear/Blue

*JF & JG not suitable with neon.

LED Cap: Lens/Diffuser Colors	
JB	Clear/White
JC	Clear/Red
JD	Clear/Amber
JF	Clear/Green

LED Cap: Lens/Diffuser Colors	
JB	Clear/White

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

LB16WKW01-5C12-JC

Red, 12-volt, Bright LED with Resistor

Round Shape

Black Housing

Clear Cap with Red Diffuser

SPDT ON-ON Circuit

Silver Contacts
Rated 3A @ 125/250V AC;
Solder Lug/Quick Connect Terminals

Series LB

Standard Size Panel Seal Pushbuttons

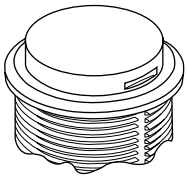
POLES & CIRCUITS

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

SHAPE & PANEL CUTOUT

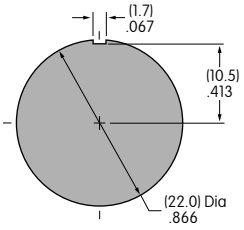
W **.866" (22.0mm) Round**



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

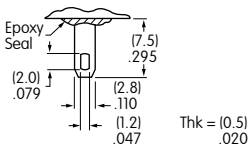
G01 **Gold Contacts**

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

Complete explanation of operating range in Supplement section.

Solder Lug/Quick Connect

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



INCANDESCENT & NEON LAMP CODES & SPECIFICATIONS

AT607 & AT607N

T-1 Bi-pin

AT607 Incandescent 5-volt or 12-volt; AT607N Neon 110-volt		**05**	**12**	**01** *
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

AT635

LEDs are colored in OFF state.

T-1½ Bi-pin

Color Codes	Red 5C	Amber 5D	Green 5F	No Code: No Resistor Red	Amber	Green
Forward Peak Current	I_{FM}			30mA	30mA	30mA
Typical Forward Current	I_F			20mA	20mA	20mA
Forward Voltage	V_F			1.9V	2.0V	2.1V
Reverse Peak Voltage	V_{RM}			5V	5V	5V
Current Reduction Rate Above 25°C	ΔI_F			0.42mA/°C		
Ambient Temperature Range				−25° ~ +50°C		

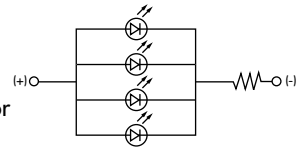
Bright LED with Resistor

AT627 with Resistor

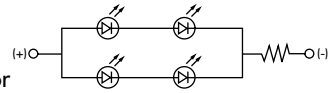
T-1 Bi-pin

Color Codes:	Red 5C	Amber 5D	Green 5F	Resistor Codes 05	12	24
Forward Peak Current	I_{FM}			—	—	—
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	ΔI_F			0.50mA/°C		
Ambient Temperature Range				−25° ~ +50°C		

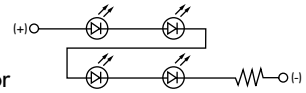
AT627 5-volt 4-element with Resistor



AT627 12-volt 4-element with Resistor



AT627 24-volt 4-element with Resistor



Super Bright Single Element LED

AT625G Blue
AT631B White
AT632F Green

T-1 Bi-pin

ATTENTION ELECTROSTATIC SENSITIVE DEVICES — Color		6B White	6F Green	6G 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	ΔI_F	0.50mA/°C		
Ambient Temperature Range		−25° ~ +50°C		

No Code **No Lamp**

CAP TYPES & COLOR COMBINATIONS

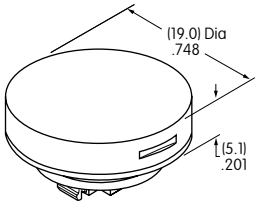
Color Codes: **B** White **C** Red **D** Amber **E** Yellow **F** Green **G** Blue **J** Clear

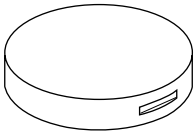
Solid Cap for Incandescent Lamp & Nonilluminated

Lens/Filter Colors Available:

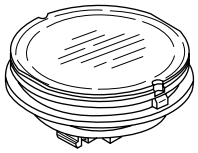
BJ FJ CJ GJ EJ

AT4054

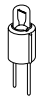




Translucent Colored Lens



Transparent Clear Filter



Lamp AT607

Material: Polycarbonate Finish: Glossy

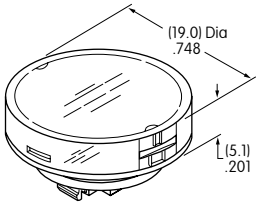
Insert Cap for Incandescent or Neon Lamp & Nonilluminated

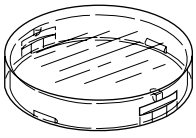
Lens/Filter Colors Available:

JB JF JC JG JE

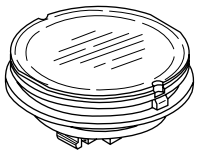
JF and JG not suitable with neon lamp.

AT4055

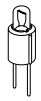




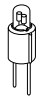
Transparent Clear Lens



Translucent Colored Filter



Lamp AT607



Lamp AT607N

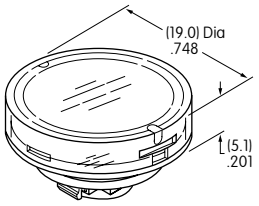
Material: Polycarbonate Finish: Glossy

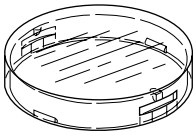
Cap for Bright LED without Resistor

Lens/Diffuser Colors Available:

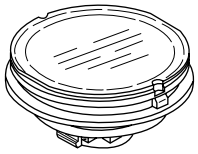
JB JC JD JF

AT4179





Transparent Clear Lens



Translucent Colored Diffuser

Bright LED AT635

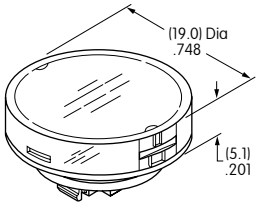
Material: Polycarbonate Finish: Glossy

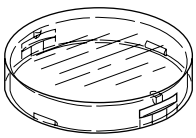
Cap for Bright LED with Resistor

Lens/Diffuser Colors Available:

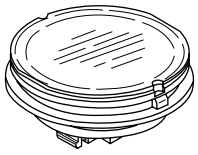
JB JC JD JF

AT4165

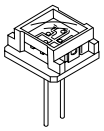




Transparent Clear Lens



Translucent Colored Diffuser



Bright LED AT627

Material: Polycarbonate Finish: Glossy

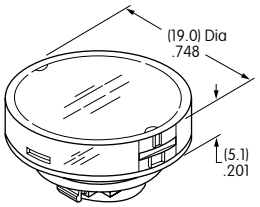
CAP TYPES & COLOR COMBINATIONS

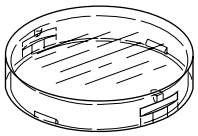
Cap for Super Bright LEDs

JB **Clear Lens**
White Diffuser

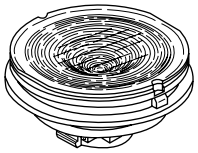
Material:
Polycarbonate
Finish: Glossy

AT4131





Transparent
Clear Lens

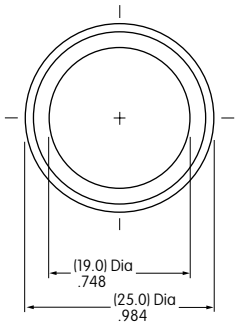


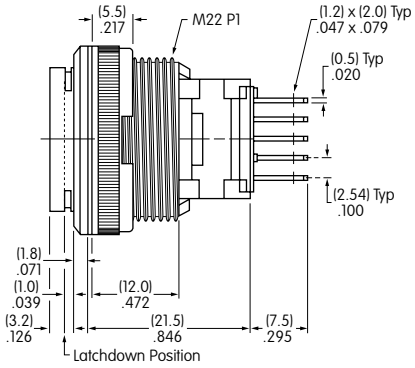
Translucent
Colored Diffuser

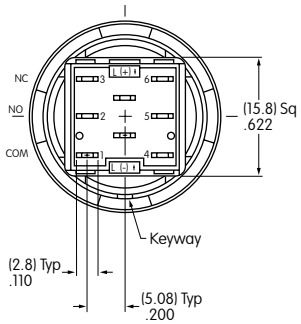
LEDs
AT625
AT631
AT632

TYPICAL SWITCH DIMENSIONS

Single & Double Pole







Panel Seal

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

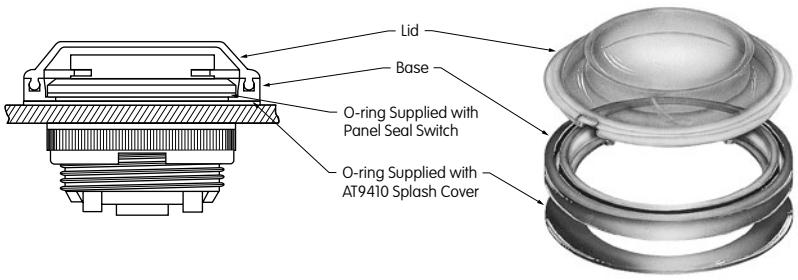
LB25WKW01-12-JC

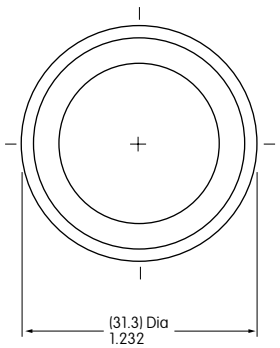
OPTIONAL ACCESSORIES

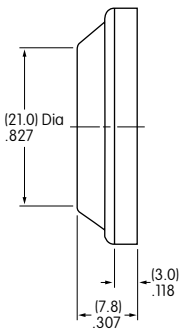
AT9410 Splash Cover for Panel Seal

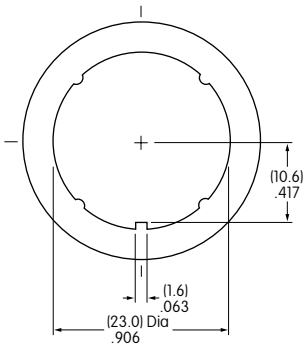
Materials:
Lid: PVC (loses pliability below 0°C/32°F)
Base: Polyethylene
O-ring: NBR

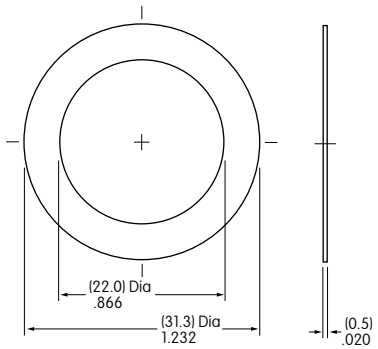
Recommended Panel Thickness:
.039" ~ .138" (1.0mm ~ 3.5mm)









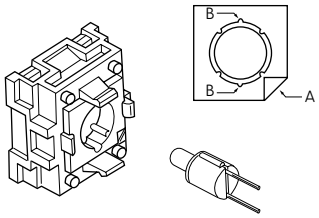


ASSEMBLY INSTRUCTIONS

Lamp Installation & LED Orientation

Incandescent & Neon Lamps AT607 & AT607N

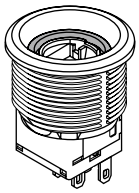
Align projections on lamp with grooves (B) in holder when inserting lamp. To correctly join the lamp holder and cap base, match the cut corners (A).



Bright LED AT627

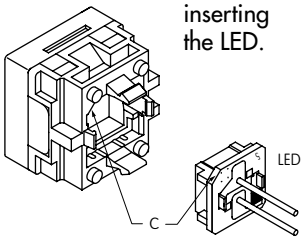
Panel Seal Models

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.



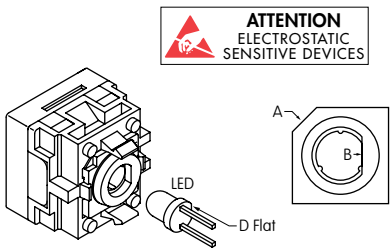
Snap-in Models

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

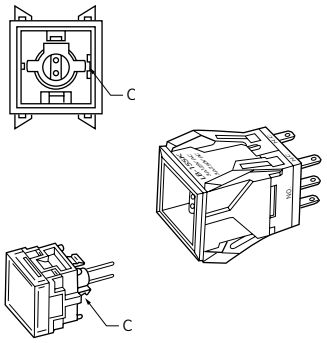
Align D-flat on LED with flat (B) in holder when inserting the LED.
To correctly join the lamp holder and cap base, match the cut corners (A).



Switch & Cap Assembly

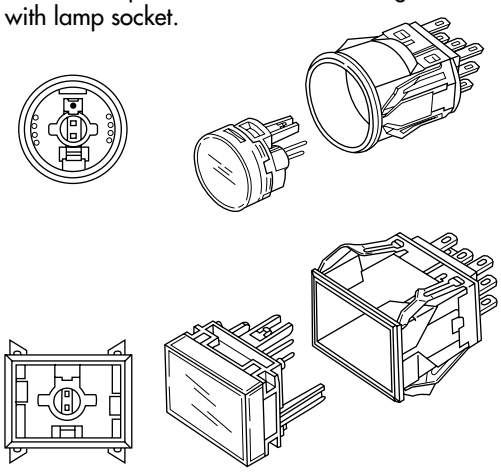
Square

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



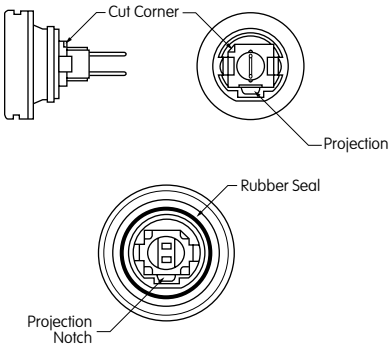
Round & Rectangular

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



Panel Seal

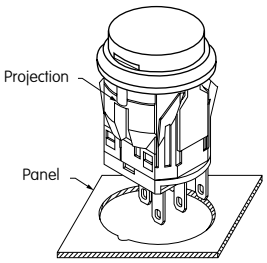
With Lamps AT607, AT607N, and LEDs AT614, AT625, AT631, AT632: Match projection on cap assembly with notch inside switch. Lamp terminals will then be aligned correctly with lamp socket.



Installation & Maintenance

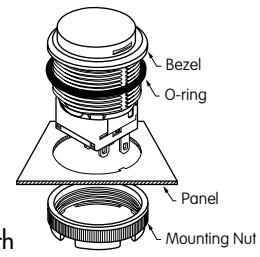
Snap-in Mount

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.



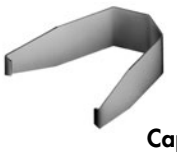
Panel Seal Bushing Mount

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

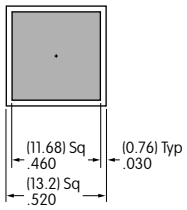
AT112
Socket Wrench

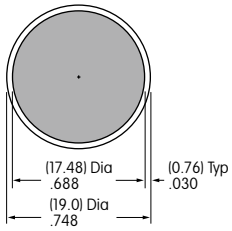
LEGENDS

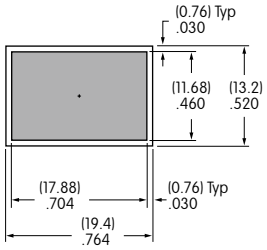
NKK Switches can provide custom legends for caps. Contact factory for more information.

Suggested Printable Area for Lens

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



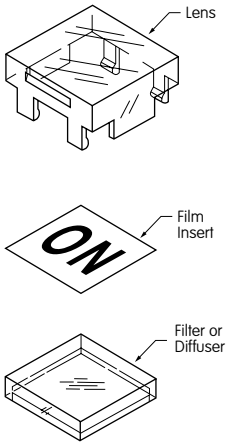




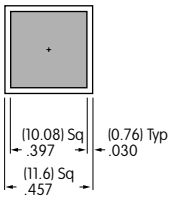
Shaded areas are printable areas.

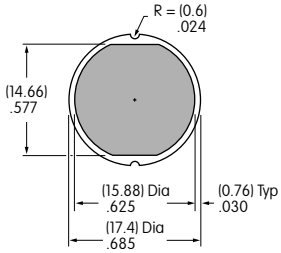
Suggested Printable Area for Film Insert

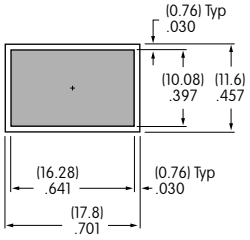
Recommended Print Method: Laser Print or Screen Print with Epoxy based ink



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: Phospher 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^2) 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.

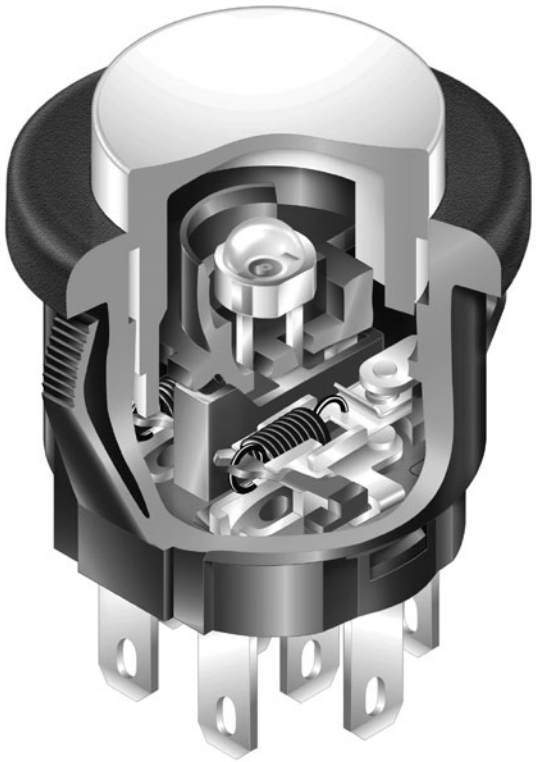
Smooth, slightly concave surface of cap designed to fit fingertip. Unique design and construction of cap prevents its removal and limits tampering.

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

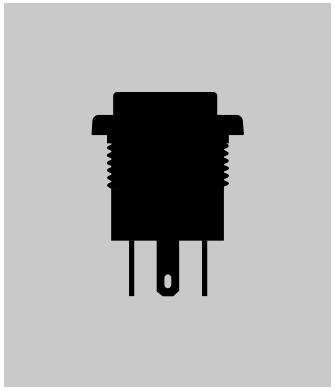
Short body of .551″ (14.0mm) conserves behind-panel space.

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

LP01 | 1 | 5 | C | C | K | W01 | 5C | B

Poles

1	SPDT
2	DPDT

Mounting Types

C	Bushing
M	Snap-in

Contacts & Terminals

W01	Silver Rated 3A @ 125V AC/250V AC Solder Lug/ Quick Connect Terminals*

Circuit

5	ON	(ON)

( ) = Momentary

Housing

K	Black

LEDs

5C	Red
5D	Amber
5F	Green

Cap Color

B	White

Nonilluminated

No Code	Nonilluminated

Nonilluminated Cap Colors

A	Black
C	Red
F	Green

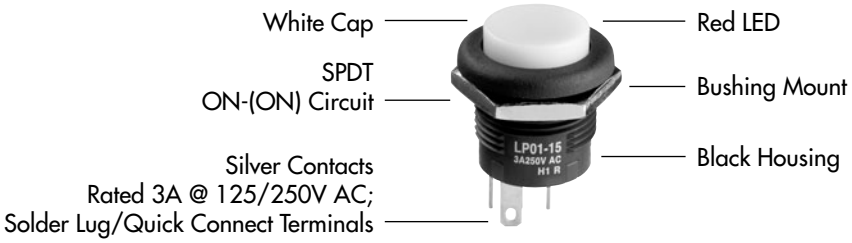
IMPORTANT:

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.

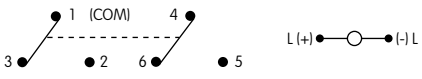
* Wire harness & cable assemblies offered only in Americas

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

LP0115CCKW015CB



POLES & CIRCUIT

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

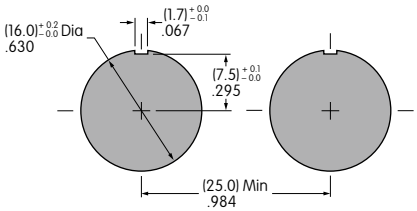
MOUNTING TYPES

C **Bushing**

.630" (16.0mm) Diameter

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

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

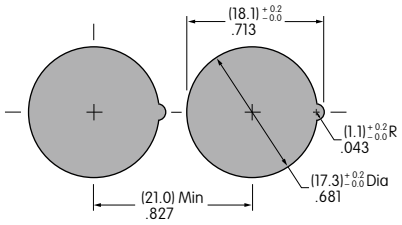


Allow .984" (25.0mm) distance from center-to-center between switches when mounted side-by-side.

M **Snap-in**

.669" (17.0mm) Diameter

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

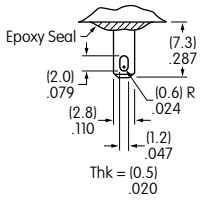
W01

Silver

Power Level

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

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



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 (+) (-)	Colors	5C Red	5D Amber	5F 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	ΔI_F	0.41mA/°C	0.29mA/°C	0.39mA/°C
Ambient Temperature Range		−10°C ~ +50°C		

No Code **No Lamp**

CAP COLORS

Illuminated Cap

Cap Color Available:

B **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:

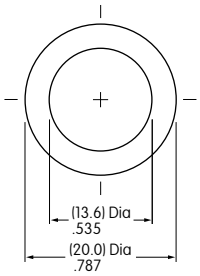
A **Black** **C** **Red** **F** **Green**

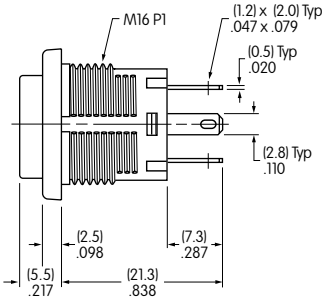
The cap is an integral part of the switch and is not available separately.

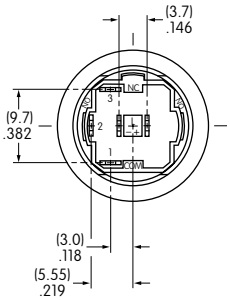
Material: Polycarbonate Finish: Matte

TYPICAL SWITCH DIMENSIONS

Bushing Mount • Single Pole

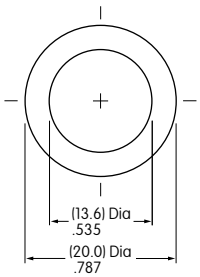


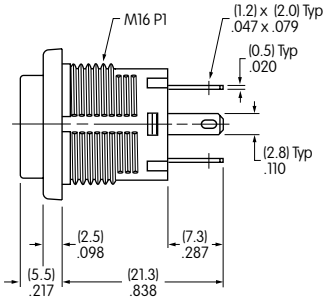


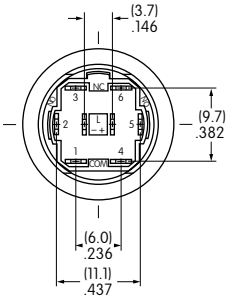


LP0115CCKW015CB

Bushing Mount • Double Pole



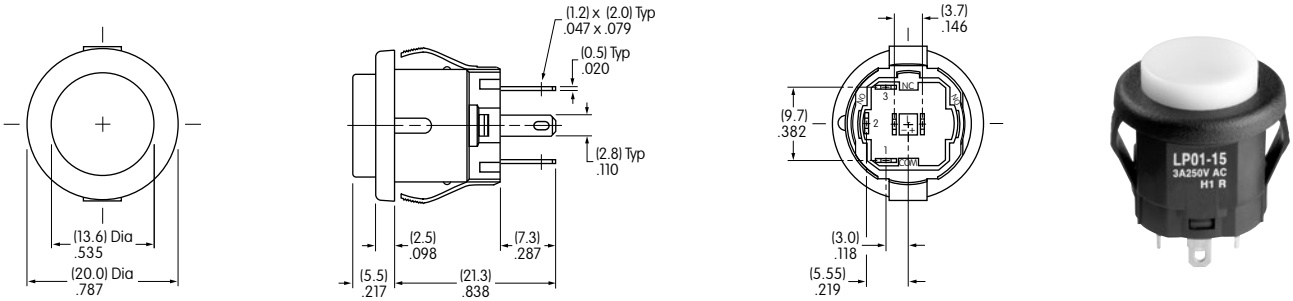




LP0125CCKW015CB

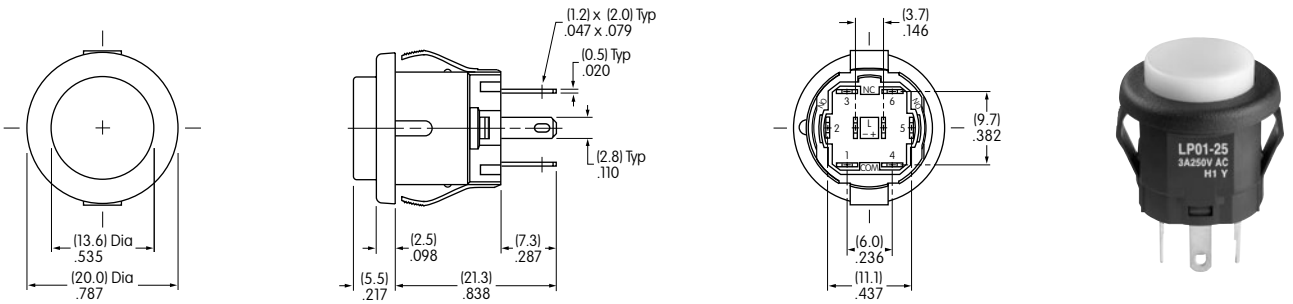
TYPICAL SWITCH DIMENSIONS

Snap-in • Single Pole



LP0115CMKW015CB

Snap-in • Double Pole



LP0125CMKW015DB

LEGENDS

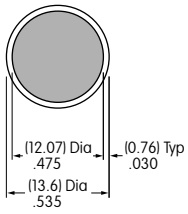
NKK Switches can provide custom legends for caps. Contact factory for more information.

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^2) 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.

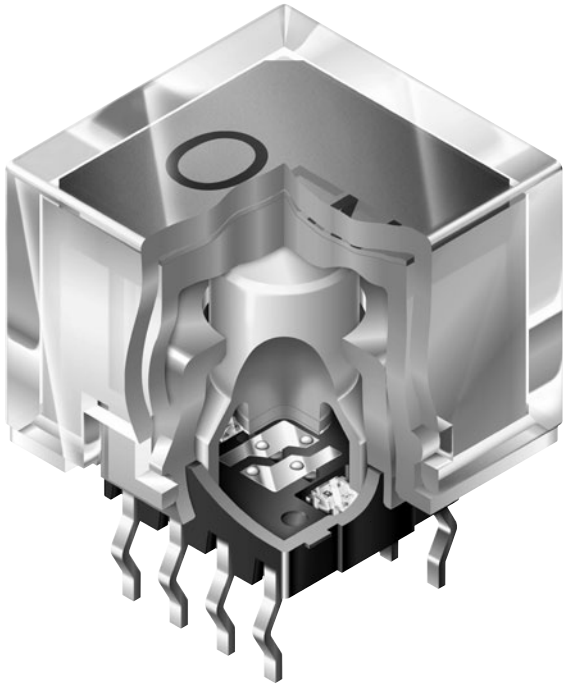
Alternating legend options (patent pending) with bicolor LED.

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

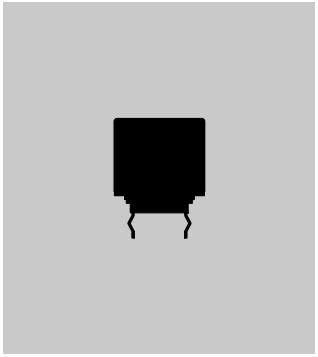
Gold plated contacts provide high reliability.

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

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



Actual Size



Series NP01

NEW → Subminiature Smooth Actuation Pushbuttons

TYPICAL SWITCH ORDERING EXAMPLE

NP01 | 15 | H | G03 | L | F | – | JF | – | ☐

Pole & Circuit

15	SPST	OFF	(ON)

( ) = Momentary
Normally Open Contacts

Contacts & Terminals

G03	Gold Contacts and PC Terminals, Rated 0.4VA @ 28V AC/DC

Illumination

L	Illuminated
N	Nonilluminated

Packaging

No Code	Partitioned Tray, Any Quantity (With or without caps installed)
S	Stick-Tube 50 Pieces/Stick (For switch body only; caps packaged separately)

Operating Force

A	Standard (1.5N) (Black Switch Body)
H	High (2.5N) (Gray Switch Body)

LEDs

Single or Bicolor LED

C	Red
D	Amber
F	Green
CF	Bicolor Red/Green

Bicolor LED

CF	Red/Green

Nonilluminated

N	No LED

Cap Types & Colors

Cap Lens/Diffuser Colors

JB	Clear/White (Combine with any LED)
JC	Clear/Red
JD	Clear/Amber
JF	Clear/Green

Cap with Alternating Legends

	Green	Red
J01	ON	OFF
J02	START	STOP
J04	OPEN	CLOSE

Solid Color Cap

A	Black
B	White
C	Red
H	Gray

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

NP0115HG03LF-JF

High (2.5N) Operating Force

SPST OFF-Momentary ON Circuit Normally Open Contacts

Clear Lens with Green Diffuser

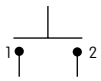
Green LED

Gold Contacts with 0.4VA Rating

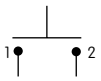
Straight PC Terminals

POLE & CIRCUIT

Illuminated Models

Pole	Model	Plunger Position ( ) = Momentary: Normal	Plunger Position ( ) = Momentary: Down	Connected Terminals		Throw & Switch Schematic
						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

Pole	Model	Plunger Position ( ) = Momentary: Normal	Plunger Position ( ) = Momentary: Down	Connected Terminals		Throw & Switch Schematic
						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**

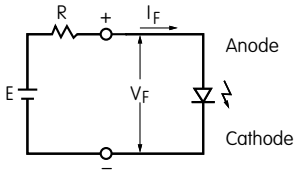
Series NP01

NEW → Subminiature Smooth Actuation Pushbuttons

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.



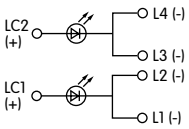
$$R = \frac{E - V_F}{I_F}$$

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

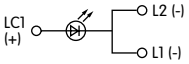
Single Color LED					Bicolor LED			
ATTENTION ELECTROSTATIC SENSITIVE DEVICES	Color	C Red	D Amber	F Green	ATTENTION ELECTROSTATIC SENSITIVE DEVICES	Color	CF Red	CF Green
Forward Peak Current	I_{FM}	50mA	50mA	30mA	Forward Peak Current	I_{FM}	50mA	30mA
Typical Forward Current	I_F	20mA	20mA	20mA	Typical Forward Current	I_F	20mA	20mA
Forward Voltage	V_F	2.0V	2.1V	3.5V	Forward Voltage	V_F	2.0V	3.5V
Reverse Peak Voltage	V_{RM}	5V	5V	5V	Reverse Peak Voltage	V_{RM}	5V	5V
Current Reduction Rate	ΔI_F	0.88mA/°C above 40°C	0.88mA/°C above 40°C	0.48mA/°C above 30°C	Current Reduction Rate	ΔI_F	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.

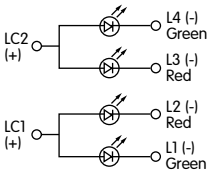
Amber LED



Red or Green LEDs



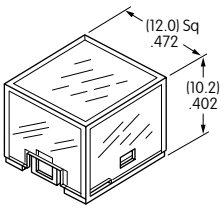
Red/Green Bicolor LED



CAP TYPES & COLORS

AT3022
12mm Square Cap

Material:
Polycarbonate Resin

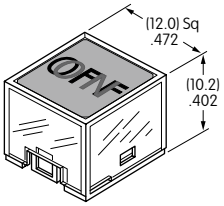


Cap for Single or Bicolor LED

- 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	OFF	J02	START	STOP	J04	OPEN	CLOSE
	Green	Red		Green	Red		Green	Red

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

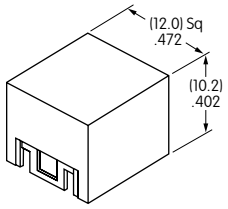
Legend illustrations are approximate representations of the actual characters on the filters.

CAP TYPES & COLORS (CONTINUED)

Solid Color Cap for Nonilluminated

AT3024
12mm Square Cap

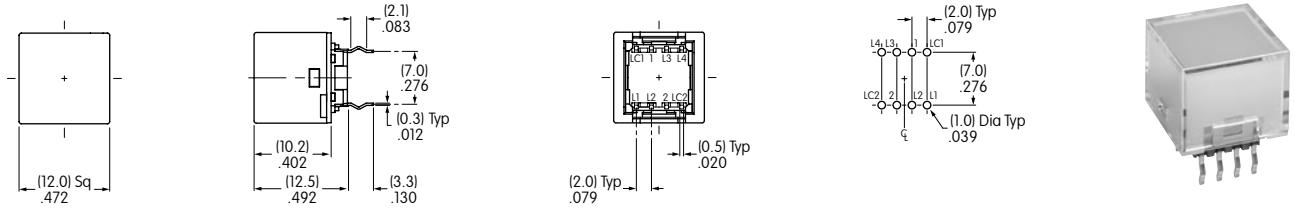
Material:
Polycarbonate Resin



A	Black	C	Red
B	White	H	Gray

TYPICAL SWITCH DIMENSIONS

Illuminated • Straight PC



NP0115HG03LF-JF

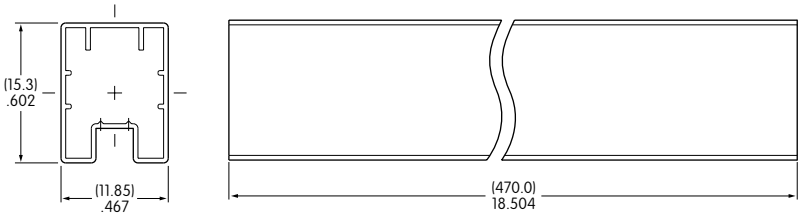
PACKAGING

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.

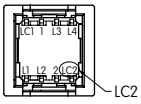


LEGEND ORIENTATION

Top View

OPEN

Bottom View



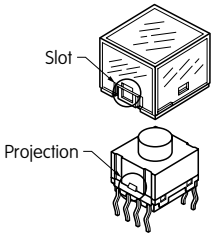
Orient cap with legend as shown here, and "LC2" at lower right of switch body.
Orders for switches with legends will be assembled as illustrated.

PRECAUTIONS FOR HANDLING & STORAGE

1. NP01 Pushbuttons are electrostatically sensitive. To prevent damage to LED, devices must be properly isolated from static electricity.
2. Once the cap is installed onto the switch body, it cannot be removed.
3. When assembling cap, align projection on switch body to slot on inside of cap. (Refer to illustration at right.)
4. * Legends may be printed on the lens with laser etch, screen print or pad print methods. Epoxy based ink is recommended.
5. 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.

ATTENTION
ELECTROSTATIC
SENSITIVE DEVICES



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;
100,000 operations minimum for silver with resistive load of 3A @ 125V AC
200,000 operations minimum for gold
Nominal Operating Force: Single Pole: 1.9N for Square & 1.9N for Rectangular
Double Pole: 2.55N for Square & 3.1N for Rectangular
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 silver 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
–20°C through +70°C (–4°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^2) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation

Cap Installation Force: 7.55N (1.70 lbf) maximum downward force on cap
Soldering Time & Temp: 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.
CSA: **File No. 023535_0_000 - Certified only when ordered with marking on switch.**
Add "/C" before dash in part number to order CSA certified switch.
All 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.

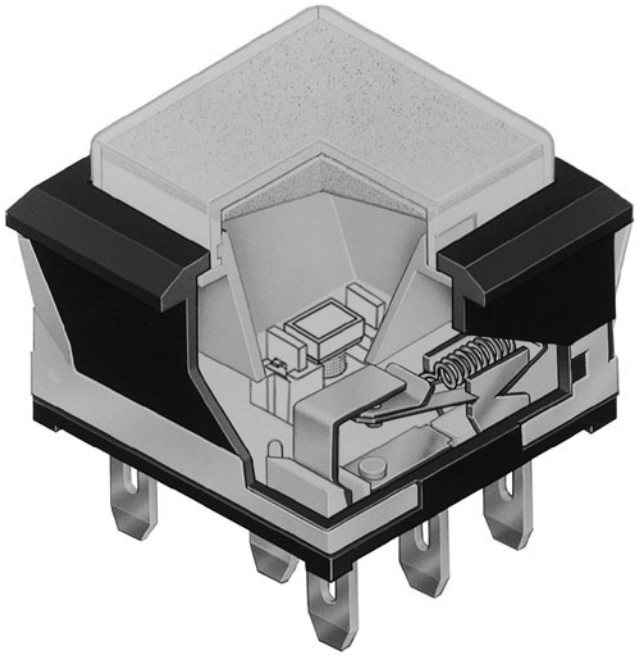
Snap-acting contact mechanism provides sensitive actuation with audible feedback; quick-make, quick-break characteristic limits arcing and prolongs electrical life.

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

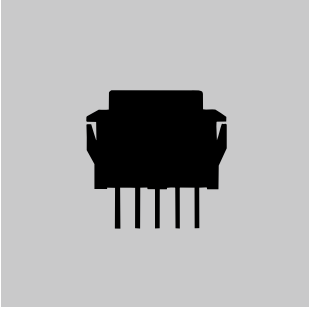
Terminals are epoxy sealed to lock out flux, solvents, and other contaminants.

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

Matching indicators available.



Actual Size



TYPICAL SWITCH ORDERING EXAMPLE

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

Poles

1	SPDT
2	DPDT

Circuits

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

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

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

* Wire harness & cable assemblies offered only in Americas

LEDs

Bright LED

5C	Red
5D	Amber
5F	Green

Super Bright LED

6B	White
6F	Green
6G	Blue
Available with Square only	

Nonilluminated

N	Nonilluminated

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

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 Cap Colors

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

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

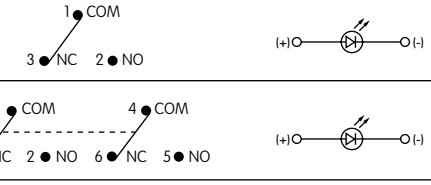
SPDT ON-(ON) Circuit

Straight PC Terminals

POLES & CIRCUITS

Pole	Model	Plunger Position ( ) = Momentary: Normal	Plunger Position ( ) = Momentary: Down	Connected Terminals: Normal	Connected Terminals: Down	Throw & Switch/Lamp Schematics
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

Notes: Switch is marked with NC, NO, COM, L+ & L–. Lamp circuit is isolated and requires an external power source.

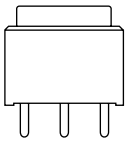


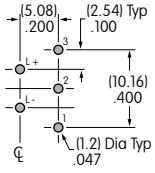
* When in latchdown position for the alternate circuit, cap position is .039" (1.0mm) above the housing.

MOUNTING TYPES & SHAPES

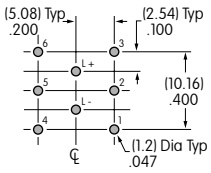
PCB Mounting

SK **Square**



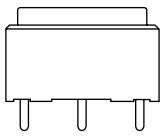


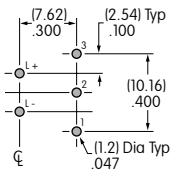
Single Pole



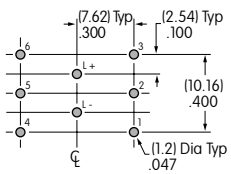
Double Pole

RK **Rectangular**





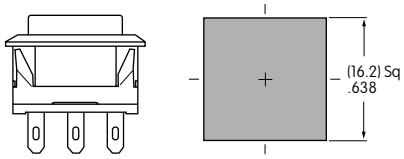
Single Pole



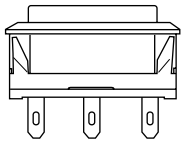
Double Pole

Snap-in Mounting (Solder Lug)

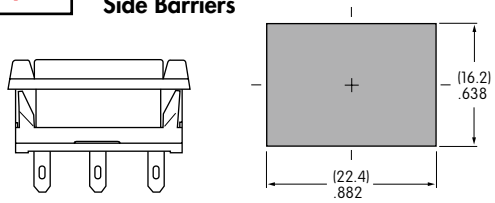
KK **Square with Built-in Bezel**



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)

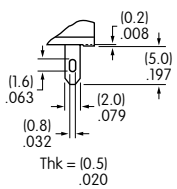
CONTACT MATERIALS & RATINGS

W	**Silver Contacts**	**Power Level**	**5A @ 125V AC & 250V AC**
G	**Gold Contacts**	**Logic Level**	**0.4VA maximum @ 28V AC/DC maximum**

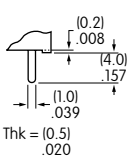
Complete explanation of operating range in Supplement section.

TERMINALS

01 **Solder Lug**



03 **Straight PC**



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.

Super Bright LEDs are Electrostatic Sensitive

ATTENTION ELECTROSTATIC SENSITIVE DEVICES

		Bright			Super Bright			
	Color	5C Red	5D Amber	5F Green	6B White	6F Green	6G Blue	Unit
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	ΔI_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**

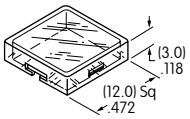
CAP TYPES & COLOR COMBINATIONS

Full Face Illuminated Cap for Bright LED

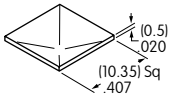
Lens/Diffuser Colors Available for Square Cap:

CB DD FJ JF
CC DJ JB JJ
CJ FB JC
DB FF JD

AT4074 Lens



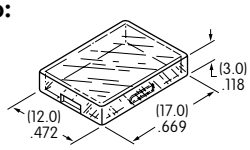
AT4075 Diffuser



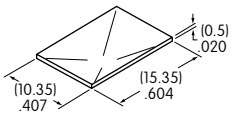
Lens/Diffuser Colors Available for Rectangular Cap:

CB FB JD
CC FF JF
DB JB
DD JC

AT4117 Lens



AT4118 Diffuser



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

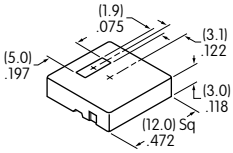
Spot Illuminated Caps for Bright & Super Bright LEDs

Cap/Window Colors Available:

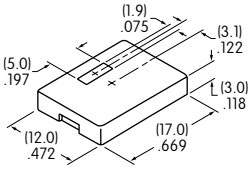
AB **Black Cap with Translucent White Window for LED Display**

Material: Polycarbonate Finish: Matte

AT4119 Square for Bright and Super Bright LED



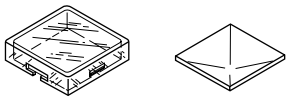
AT4120 Rectangular for Bright LED



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

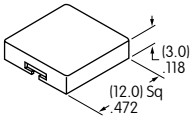
Opaque Caps for Nonilluminated

Cap Colors Available:

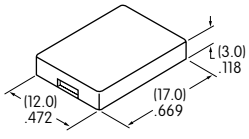
A C F
B E G

Material: Polycarbonate
Finish: Glossy

AT4073 Square



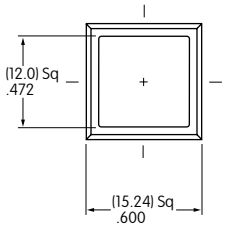
AT4116 Rectangular

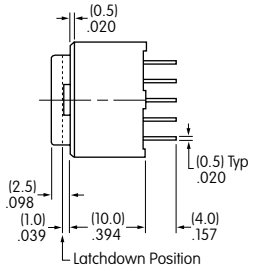


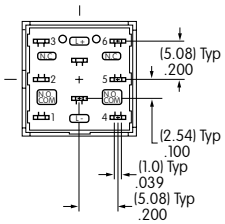
Color Codes: **A** Black **B** White **C** Red **D** Amber **E** Yellow **F** Green **G** Blue **J** Clear

TYPICAL SWITCH DIMENSIONS

Single & Double Pole — Square • PCB Mount



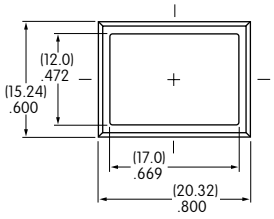


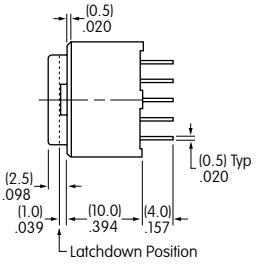


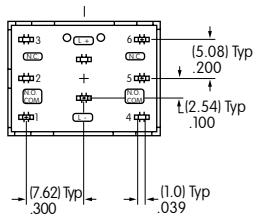
Single pole models do not have terminals 4, 5, & 6.

UB15SKG035C-CB

Single & Double Pole — Rectangular • PCB Mount



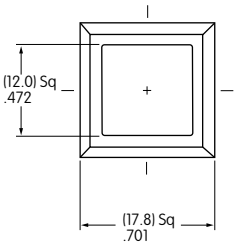


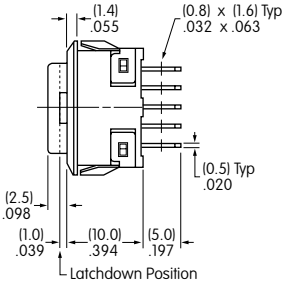


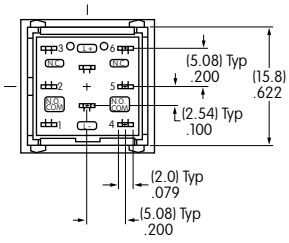
Single pole models do not have terminals 4, 5, & 6.

UB26RKG035D-DD

Single & Double Pole — Square • Snap-in Mount • Built-in Bezel



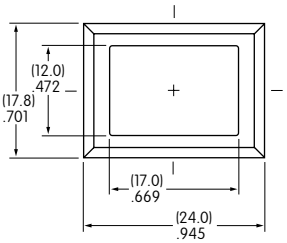


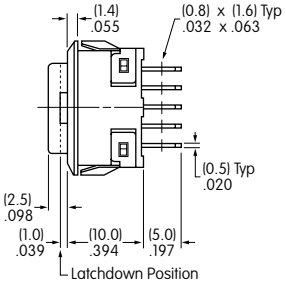


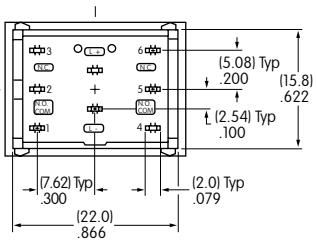
Single pole models do not have terminals 4, 5, & 6.

UB25KKW015C-CB

Single & Double Pole — Rectangular • Snap-in Mount • Built-in Bezel



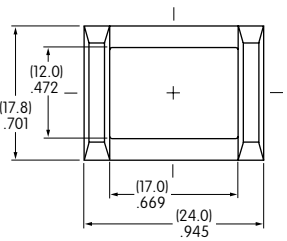


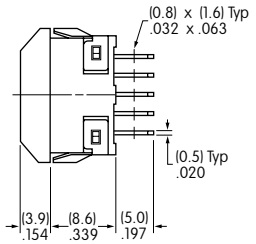


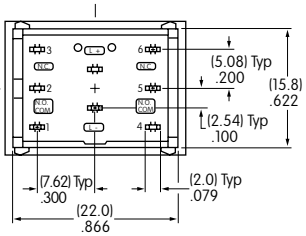
Single pole models do not have terminals 4, 5, & 6.

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

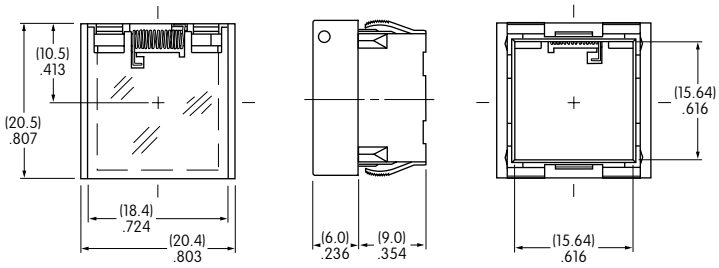
AT4173
Square Protective Guard/ Snap-in Frame

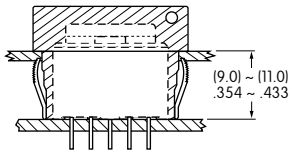
Opens 180°
Closes automatically

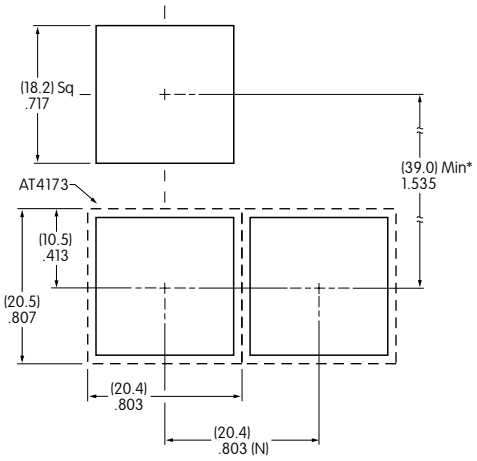
Materials:
Cover: Clear Polycarbonate
Base: Black Polyamide
Coil Spring: Stainless Steel

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

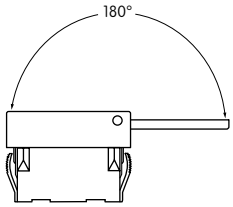
Recommended Panel-to-PCB Range:
.354" ~ .433"
(9.0mm ~ 11.0mm)





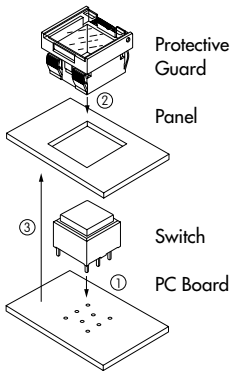


(N) = Number of switches
* Minimum dimension allows opening of cover to 180°



Installation

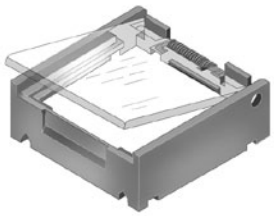
1. Install switch onto PC board.
2. Snap protective guard into panel.
3. Join the two assemblies.

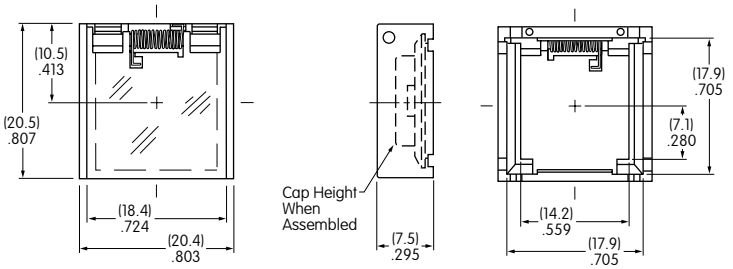


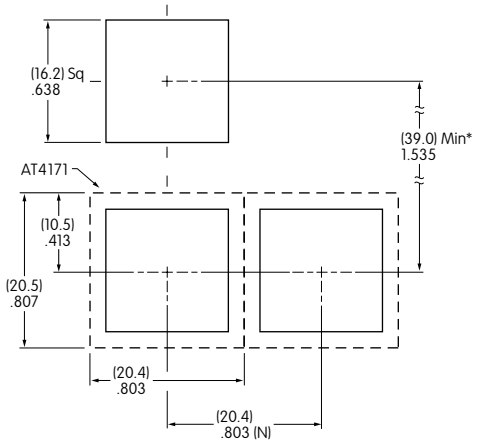
Spring Loaded Protective Guard for Square Snap-in Model

AT4171
Square Protective Guard

Opens 180°
Closes automatically



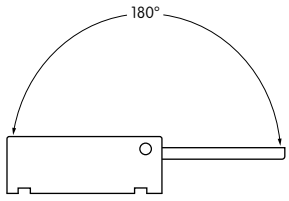




(N) = Number of switches * Minimum dimension allows opening of cover to 180°

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

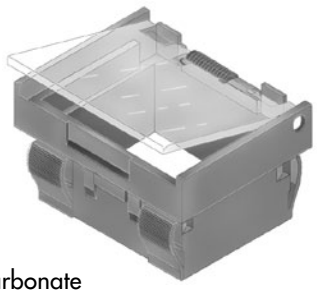
Recommended Panel Thickness:
.039" ~ .106" (1.0mm ~ 2.7mm)



OPTIONAL ACCESSORIES

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

AT4174
Rectangular
Protective Guard/
Snap-in Frame

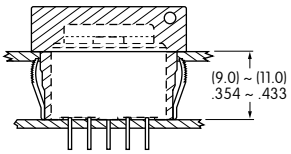


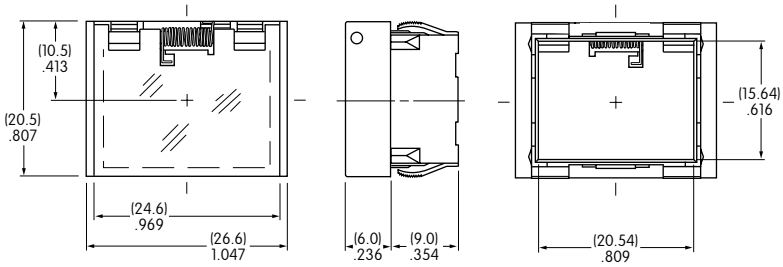
Opens 180°
Closes automatically

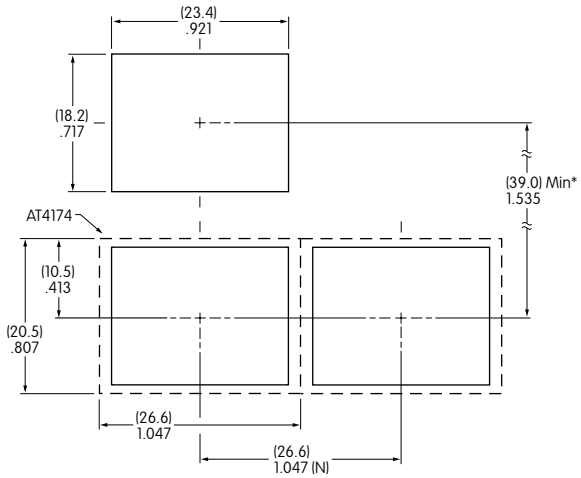
Materials:
Cover: Clear Polycarbonate
Base: Black Polyamide
Coil Spring: Stainless Steel

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

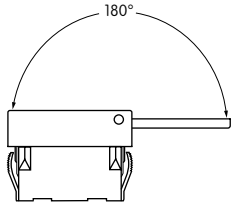
Recommended
Panel-to-PCB Range:
.354" ~ .433"
(9.0mm ~ 11.0mm)





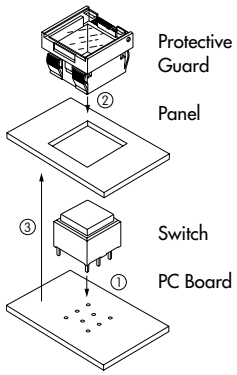


(N) = Number of switches * Minimum dimension allows opening of cover to 180°



Installation

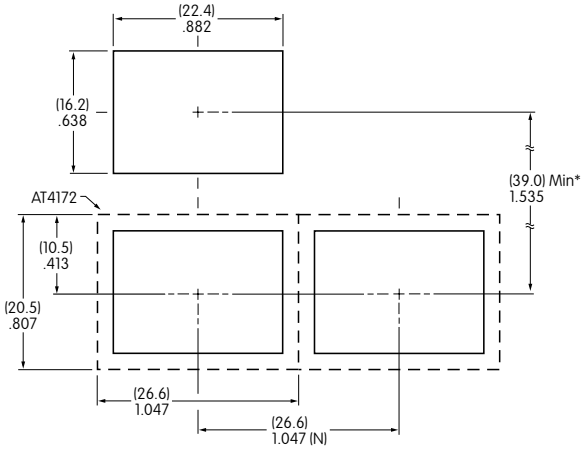
1. Install switch onto PC board.
2. Snap protective guard into panel.
3. Join the two assemblies.



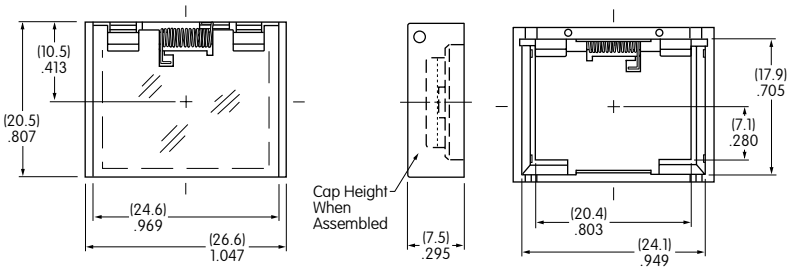
Spring Loaded Protective Guard for Rectangular Snap-in Model

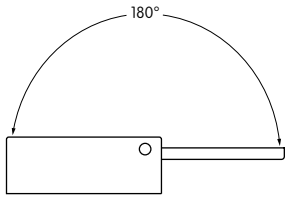
AT4172
Rectangular
Protective Guard

Opens 180°
Closes automatically



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



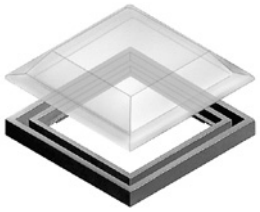


Materials:
Cover: Clear Polycarbonate
Base: Black GFR Polyamide
Coil Spring: Stainless Steel

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

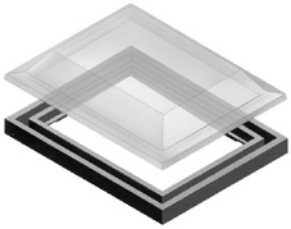
OPTIONAL ACCESSORIES

AT4001
Square



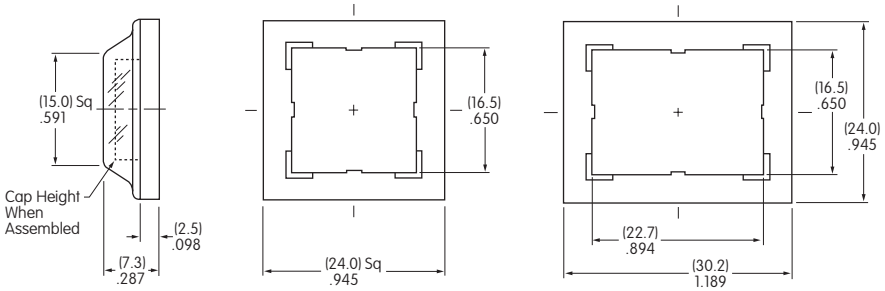
Only for use with KK mounting type

AT4011
Rectangular



Only for use with NK mounting type

Dust Covers



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

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

LEGENDS

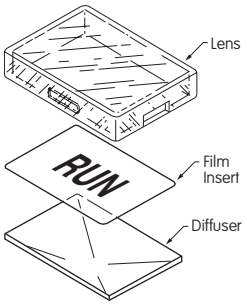
NKK Switches can provide custom legends for caps. Contact factory for more information.

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.

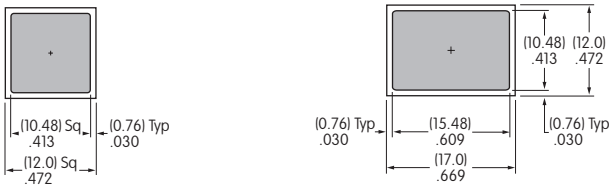
Square Cap

Rectangular Cap

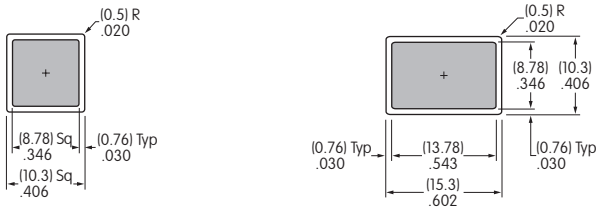


Shaded areas are printable areas.

Lens



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^2) 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.

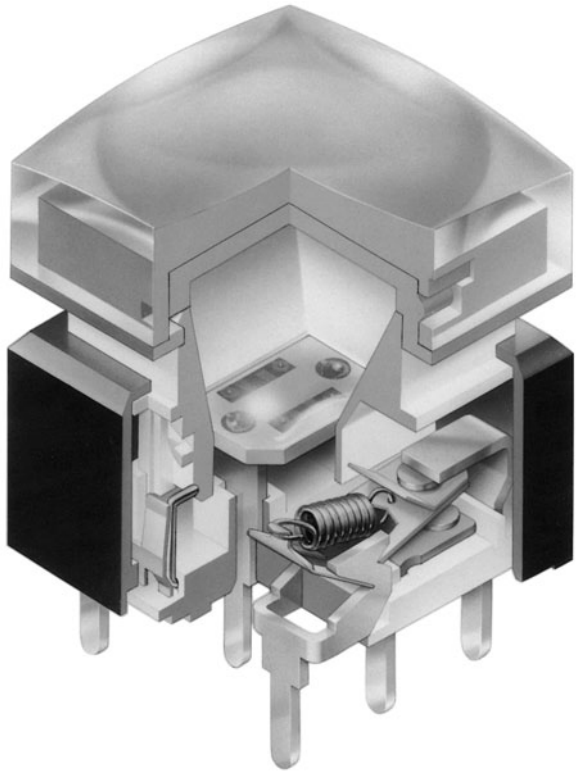
Snap-acting contact mechanism provides sensitive actuation with audible feedback; quick-make, quick-break characteristic limits arcing and prolongs electrical life.

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

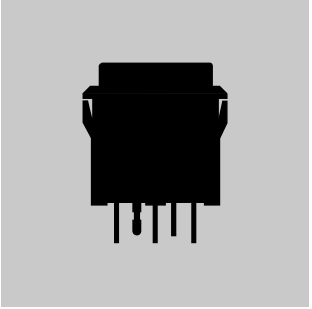
Terminals are epoxy sealed to lock out flux, solvents, and other contaminants.

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

Matching indicators available.



Actual Size



TYPICAL SWITCH ORDERING EXAMPLE

UB2 | 1 | 5 | SK | G | 03 | 5C — 1JC

Poles

1	SPDT
2	DPDT

Circuits

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

Mounting Types

PCB Mounting

SK	Square

*** Snap-in Mounting**

KK	Square

* Standard with Solder Lug terminals

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

* Wire harness & cable assemblies offered only in Americas

LEDS

Bright LED

5C	Red
5D	Amber
5F	Green

Super Bright LED

6B	White
6F	Green
6G	Blue

Super Bright Bicolor LED

6CF	Red/Green

Nonilluminated

N	Nonilluminated

Cap Types & Colors

Sculptured Cap Lens/Diffuser Colors

1JB	Clear/White
1JC	Clear/Red
1JD	Clear/Amber
1JF	Clear/Green

Beveled Cap & Colors

2B	White
2C	Red
2D	Amber
2F	Green

Flat Cap Lens/Diffuser Colors

3JB	Clear/White
3JC	Clear/Red
3JD	Clear/Amber
3JF	Clear/Green

Sculptured Cap Lens/Diffuser Color

1JB	Clear/White

Beveled Cap & Color

2B	White

Flat Cap Lens/Diffuser Color

3JB	Clear/White

Sculptured Cap Lens/Diffuser Color

1JB	Clear/White

Beveled Cap & Color

2B	White

Flat Cap Lens/Diffuser Color

3JB	Clear/White

Sculptured Cap with Alternating Legend

4J	Clear Lens

Flat Cap with Alternating Legend

5J	Clear Lens

Sculptured Cap Lens/Insert Colors

4JA	Clear/Black	4JD	Clear/Amber
4JB	Clear/White	4JF	Clear/Green
4JC	Clear/Red		

Beveled Cap & Colors

5A	Black	5D	Amber
5B	White	5F	Green
5C	Red		

Alternating Legends

01	ON/OFF
02	START/STOP
04	OPEN/CLOSE

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

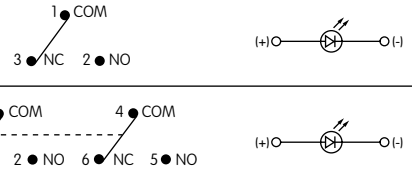
UB215SKG035C-1JC

- Gold Contacts with 0.4VA Rating
- Square with PCB Mounting
- Straight PC Terminals
- Red, Bright LED and Sculptured Cap with Clear Lens and Red Diffuser
- SPDT ON-(ON) Circuit

POLES & CIRCUITS

Pole	Model	Plunger Position ( ) = Momentary: Normal	Plunger Position ( ) = Momentary: Down	Connected Terminals: Normal	Connected Terminals: Down	Throw & Switch/Lamp Schematics
SP	**UB215** *UB216	ON ON	(ON) ON	1-3	1-2	SPDT
DP	**UB225** *UB226	ON ON	(ON) ON	1-3 4-6	1-2 4-5	DPDT

Notes: Switch is marked with NC, NO, COM, L+ & L–. Lamp circuit is isolated and requires an external power source.

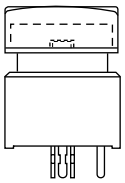


* When in latchdown position for the alternate circuit, cap positions above the housing are: .059" (1.5mm) for snap-in models & .276" (7.0mm) for PCB models.

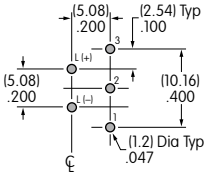
MOUNTING TYPES & SHAPES

PCB Mounting

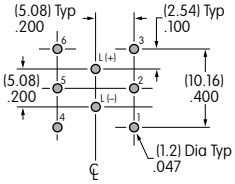
SK **Square**



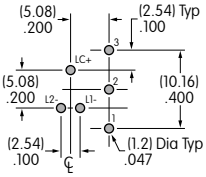
SP, Single Color LED



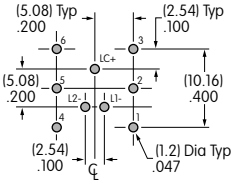
DP, Single Color LED



SP, Bicolor LED

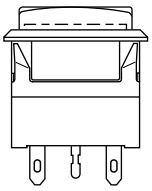


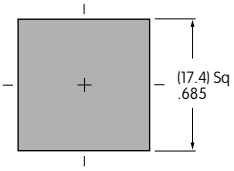
DP, Bicolor LED



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**

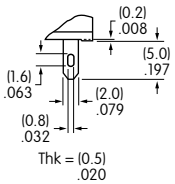
G **Gold Contacts** **Logic Level** **0.4VA maximum @ 28V AC/DC maximum**

Complete explanation of operating range in Supplement section.

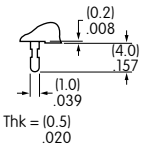
SWITCH & LAMP TERMINALS

01 **Solder Lug**

For Switch & Bright LED

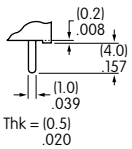


For Super Bright & Bicolor LED

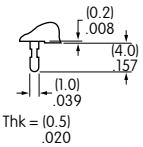


03 **Straight PC**

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.

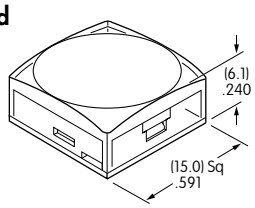
Electrical Specifications for Bright LED

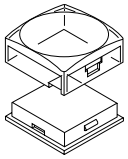
	Color	5C Red	5D Amber	5F Green	Unit
Forward Peak Current	I_{FM}	30	30	25	mA
Typical Forward Current	I_F	20	20	20	mA
Forward Voltage	V_F	1.85	2.0	2.1	V
Reverse Peak Voltage	V_{RM}	5	5	5	V
Current Reduction Rate Above 25°C	ΔI_F	0.40	0.42	0.46	mA/°C
Ambient Temperature Range		−25° ~ +50°			°C

Bright Single Color LED with 1 element 

Caps for Bright LED

1 AT3074 Sculptured

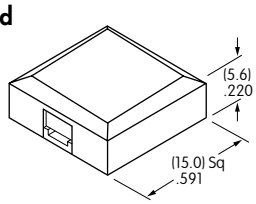


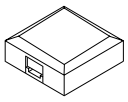


Clear Lens

Translucent Colored Diffuser

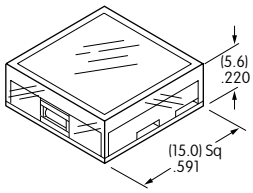
2 AT3075 Beveled

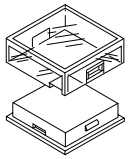




Translucent Colored Cap

3 AT3076 Flat





Clear Lens

Translucent Colored Diffuser

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.

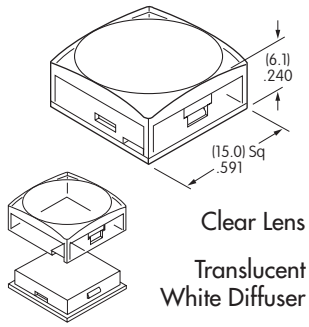
Electrical Specifications for Super Bright LEDS

Super Bright LEDs are Electrostatic Sensitive (ATTENTION ELECTROSTATIC SENSITIVE DEVICES)	Color	6B White	6F Green	6G Blue	Unit
Forward Peak 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
Reverse Peak Voltage	V_{RM}	5	5	5	V
Current Reduction Rate Above 25°C	ΔI_F	0.25	0.50	0.40	mA/°C
Ambient Temperature Range		−25° ~ +50°			°C

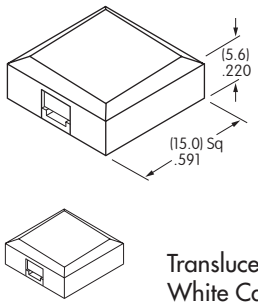
Super Bright Single Color LED with 1 element

Caps for Super Bright LED

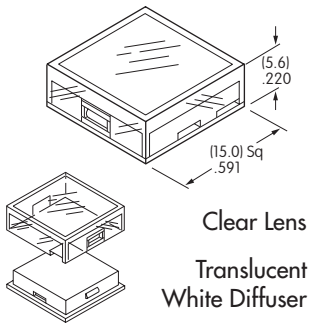
1JB **AT3074JB Sculptured Clear Lens/White Diffuser**



2B **AT3075B Beveled White Cap**



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



Material: Polycarbonate Finish: Glossy

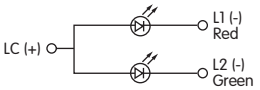
SUPER BRIGHT BICOLOR LED & CAPS

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)	Color	6CF Red/Green	Unit
Forward Peak 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
Reverse Peak Voltage	V_{RM}	4/4	V
Current Reduction Rate Above 25°C	ΔI_F	0.40/0.33	mA/°C
Ambient Temperature Range		−25° ~ +50°	°C

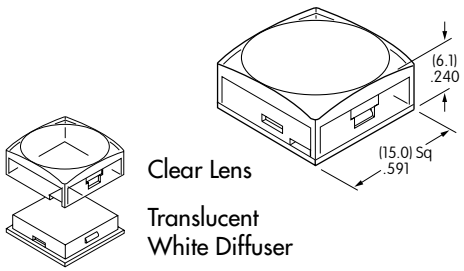
Super Bright Bicolor LED with 2 elements



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

Caps for Super Bright Bicolor LED

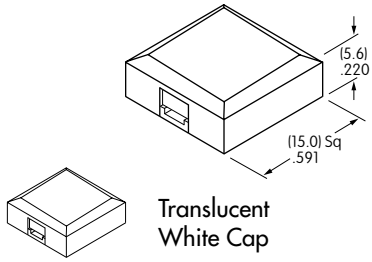
1JB **AT3074JB Sculptured Clear Lens/White Diffuser**



Clear Lens

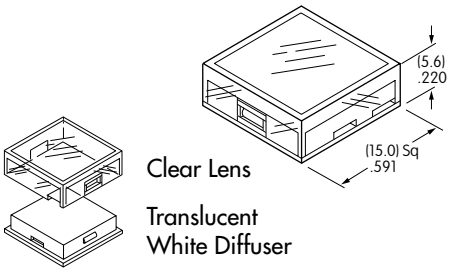
Translucent White Diffuser

2B **AT3075B Beveled White Cap**



Translucent White Cap

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



Clear Lens

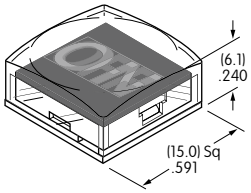
Translucent White Diffuser

Material: Polycarbonate Finish: Glossy

Alternating Legend Caps for Super Bright Bicolor LED

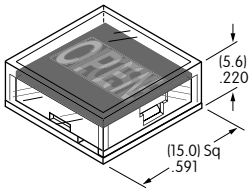
4J **AT3069J Sculptured Cap with Alternating Legend**

Clear Lens
Alternating Legend Filter



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

Clear Lens
Alternating Legend Filter



Material: Polycarbonate Finish: Glossy

Standard Alternating Legend Pairs

01	ON	OFF	02	START	STOP	04	OPEN	CLOSE
	Green	Red		Green	Red		Green	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.

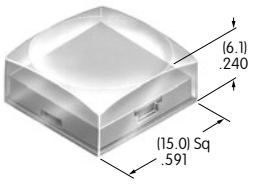
No Code **No Lamp**

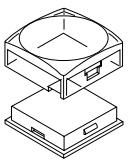
CAP TYPES & COLOR COMBINATIONS FOR NONILLUMINATED

4 **AT3073 Sculptured**

Lens/Insert Colors Available:

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





Clear Lens

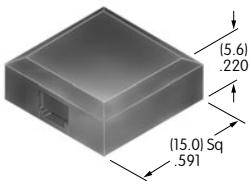
Opaque Colored Insert

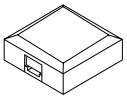
Material: Polycarbonate
Finish: Glossy

5 **AT3077 Beveled**

Cap Colors Available:

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



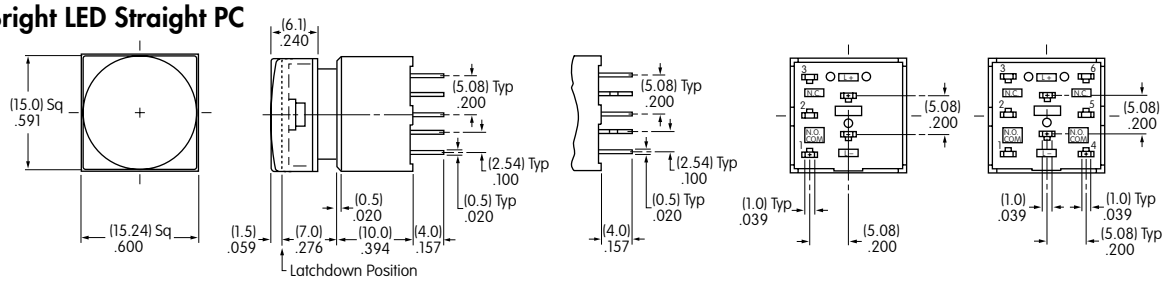


Opaque Colored Cap

Material: Polycarbonate
Finish: Glossy

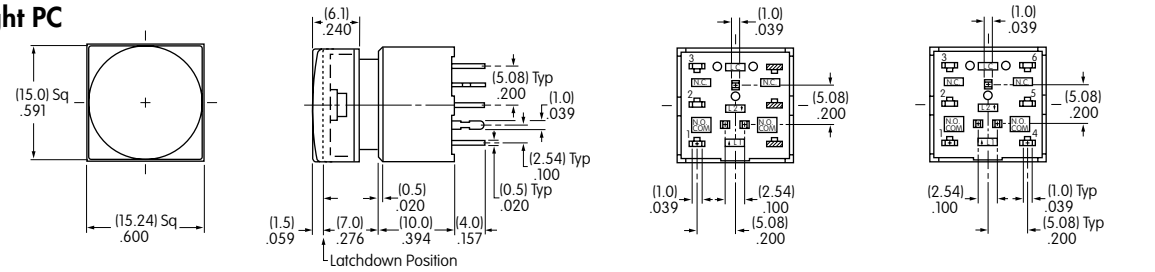
TYPICAL SWITCH DIMENSIONS

Bright & Super Bright LED Straight PC



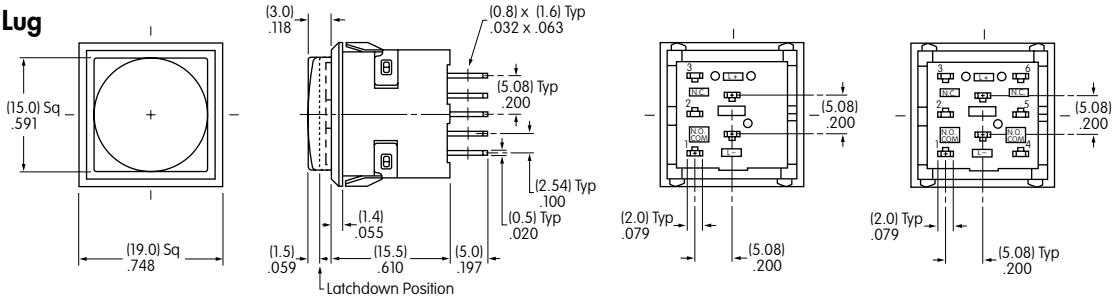
UB215SKG035C-1JC — Bright Single Color LED — Super Bright Single Color LED — Single Pole — Double Pole

Bicolor LED Straight PC



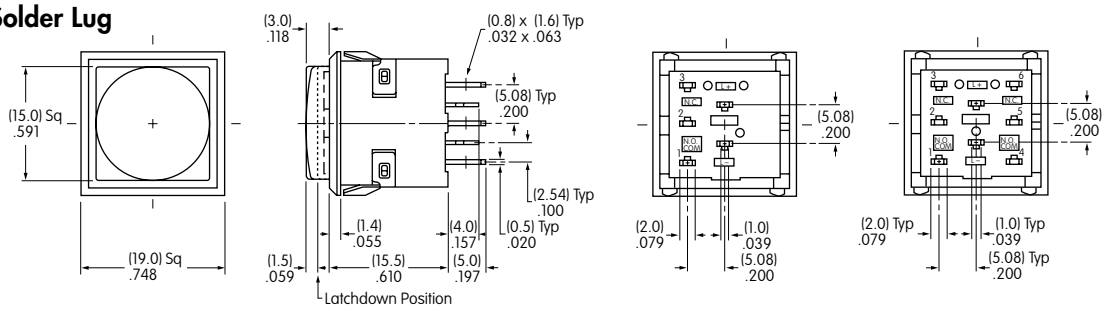
UB225SKG03CF-1JB — Bicolor LED Side View — Single Pole — Double Pole

Bright LED Solder Lug



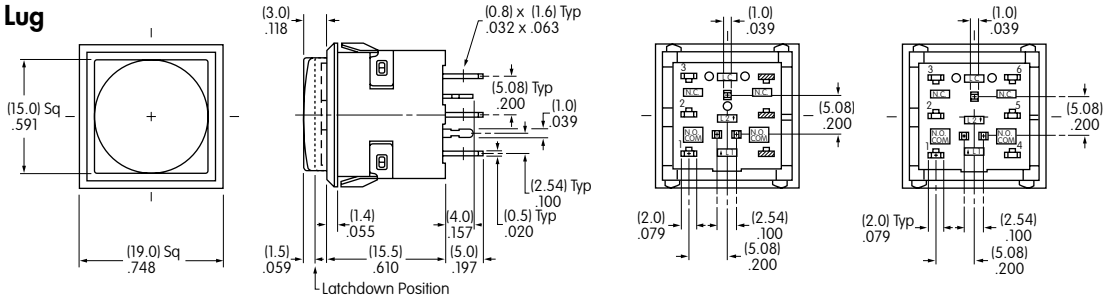
UB216KKW015F-1JF — Single Color LED Side View — Single Pole — Double Pole

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

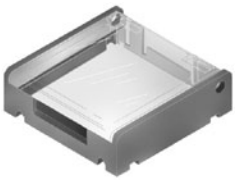
OPTIONAL ACCESSORIES

Protective Guard for Snap-in Model

AT4141

Opens 90°

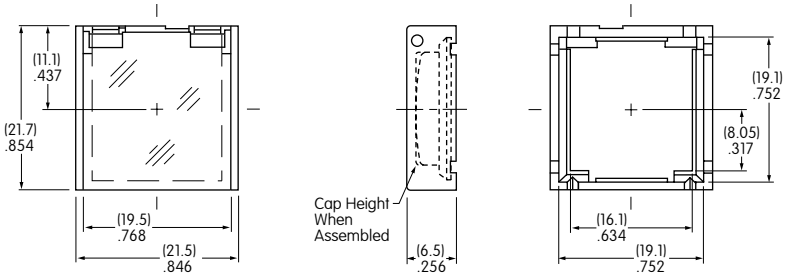
Closes manually



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°

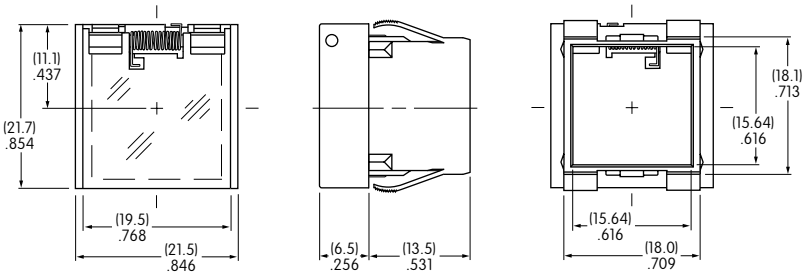
Closes automatically

Materials:

Cover: Clear Polycarbonate

Base: Black Polyamide

Coil Spring: Stainless Steel



Recommended Panel Thickness:

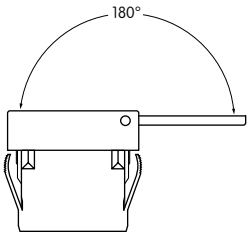
.039″ ~ .126″

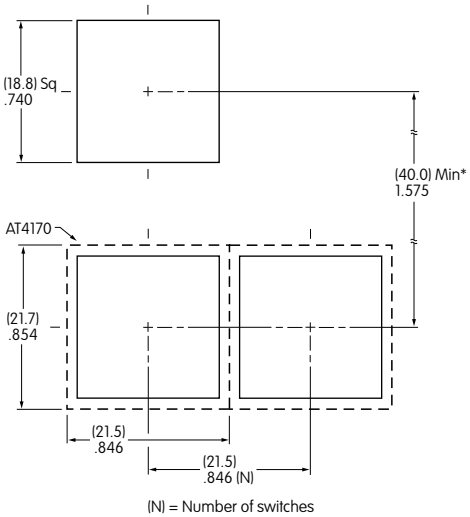
(1.0mm ~ 3.2mm)

Recommended Panel-to-PCB Range:

.531″ ~ .622″

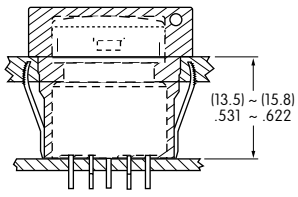
(13.5mm ~ 15.8mm)





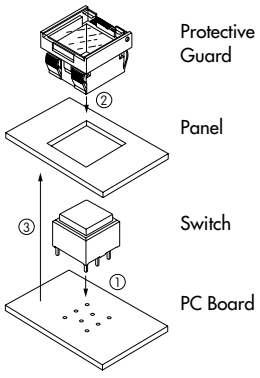
(N) = Number of switches

* 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.



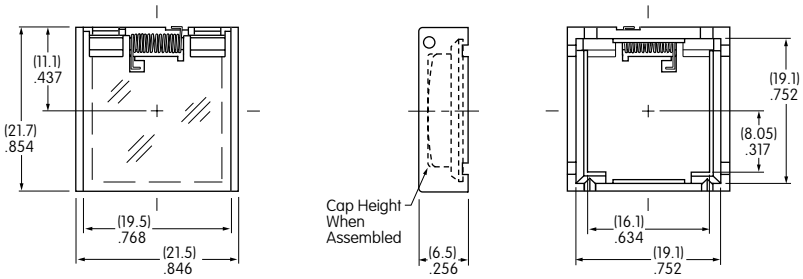
OPTIONAL ACCESSORIES

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:

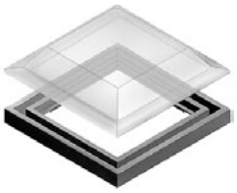
.039″ ~ .106″ (1.0mm ~ 2.7mm)

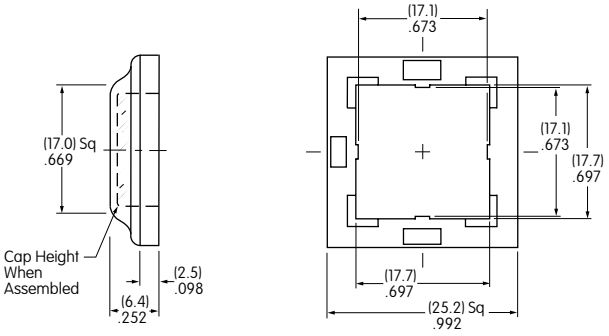
Dust Cover

AT4145 Not for use with barriers.

Materials:

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





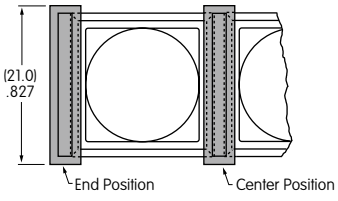
Recommended Panel Thickness

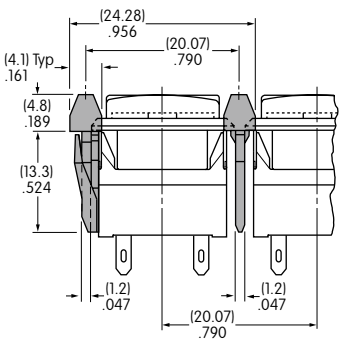
.039″ ~ .098″ (1.0mm ~ 2.5mm)

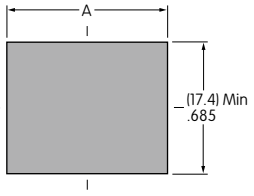
Barriers for Snap-in Mount

AT4143
End

AT4144
Center







Cutouts for more than 1 Switch:

A = .799″ (20.3mm) x Number of Switches + .051″ (1.3mm)

Material: Polyamide

LEGENDS

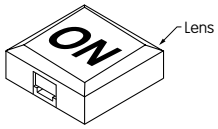
NKK Switches can provide custom legends for caps. Contact factory for more information.

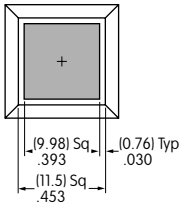
Suggested Printable Area for UB2 Lens, Film Insert or Diffuser

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

Shaded areas are printable areas.

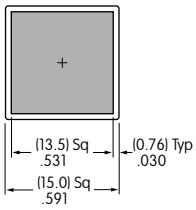
Beveled Cap



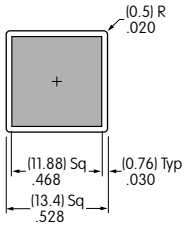


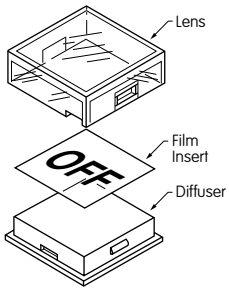
Flat Cap

Lens



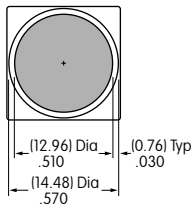
Film Insert or Diffuser



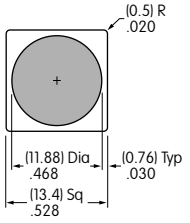


Sculptured Cap

Lens



Film Insert or Diffuser



Film Insert: Clear Polyester 4 mil 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: 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/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: 0.785Nm (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.

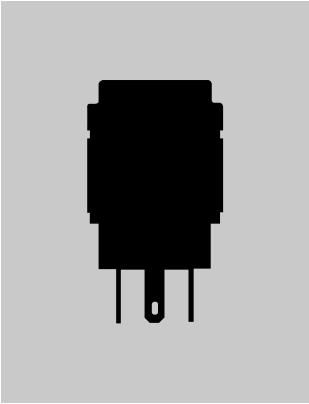
High density design to give behind panel depth of less than one inch.

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

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

Poles

1	SPDT
2	DPDT

Panel Seal

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

Housing

K	Black only

Terminals

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

Circuits

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

Shapes

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

Contact Materials & Ratings

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

Lamps

Incandescent Lamp	
05	5-volt
12	12-volt
No Code	Nonilluminated

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

IMPORTANT:

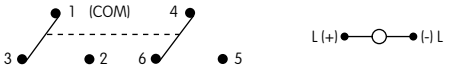
Switches are supplied without UL, cULus & CSA marking unless specified. **UL, cULus & CSA recognized only when ordered with marking on the switch.** Specific models, ratings, & ordering instructions are noted on General Specifications page.

* Wire harness & cable assemblies offered only in Americas

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

YB15CKW01-6F-JB

POLES & CIRCUITS

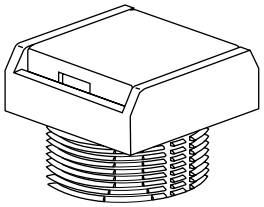
Pole	Model	Plunger Position ( ) = Momentary: Normal	Plunger Position ( ) = Momentary: Down	Connected Terminals: Normal	Connected Terminals: Down	Throw & Switch/Lamp Schematics
						Notes: Switch is marked with NC, NO, COM, L+, L–. Lamp circuit is isolated and requires external power source.
SP	**YB15**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

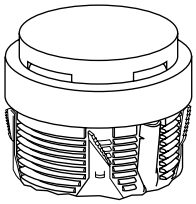
No Code **Without Panel Seal**

Bushing Mounting



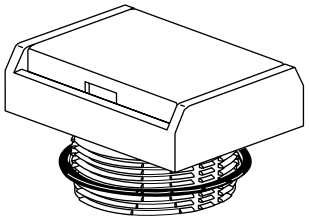
Supplied with mounting nut.

Snap-in Mounting



W **With Panel Seal**

Bushing Mounting only

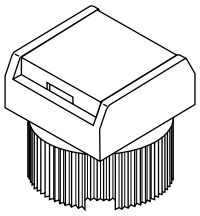


Supplied with mounting nut and o-ring AT089.

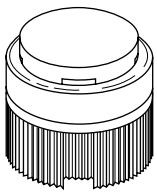
SHAPES & MOUNTING TYPES

Bushing Mounting

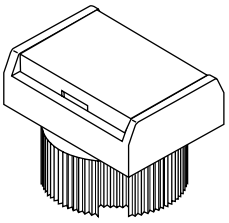
S **Square**



C **Round**

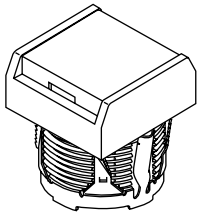


R **Rectangular**

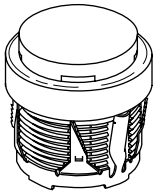


Snap-in Mounting

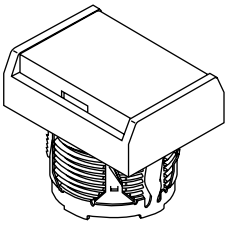
K **Square**



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**

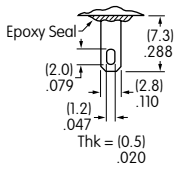
Power Level **3A @ 125/250V AC**

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

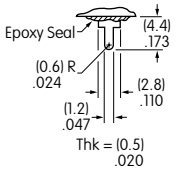
Complete explanation of operating range in Supplement section.

TERMINALS

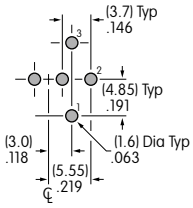
01 **Solder Lug/ .110" (2.8mm) Quick Connect**



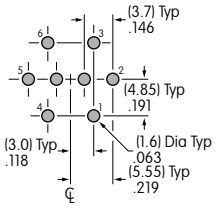
03 **Straight PC**



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	

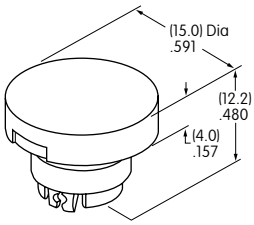
No Code **No Lamp**

Solid Cap for Incandescent Lamp & Nonilluminated

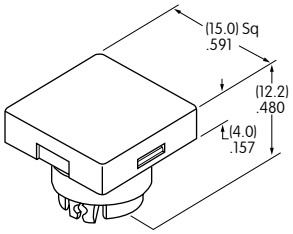
Lens/Insert Colors Available:

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

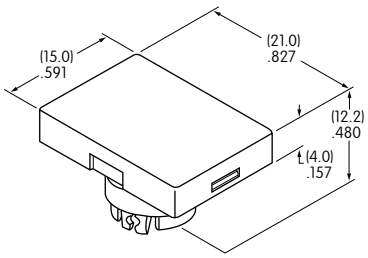
AT3002 Round

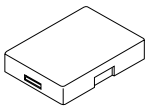


AT3001 Square

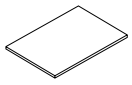


AT3003 Rectangular

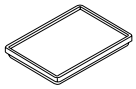




Translucent Colored Lens



Translucent White Insert



Translucent White Seal/Filter

Incandescent Lamp AT611

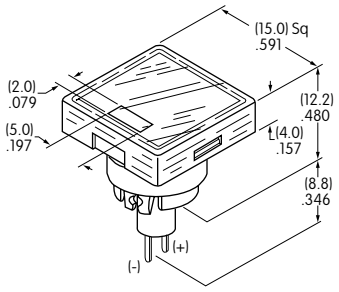
Materials:

Lens & Insert: Polycarbonate Seal/Filter: Thermoplastic Elastomer

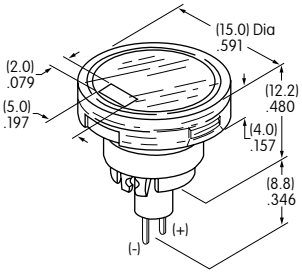
SPOT ILLUMINATED CAP WITH BUILT-IN LED

This spot-illuminated cap is factory assembled.

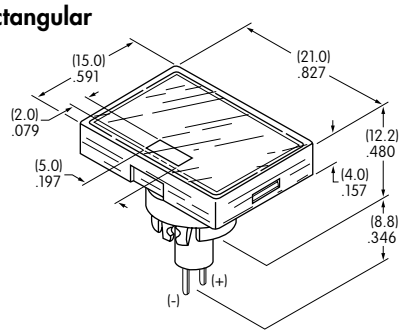
AT3010
Square



AT3011
Round

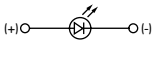


AT3012
Rectangular

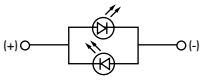


Colors Available: 1C Red	1D Amber	1F Green	1CF Red/Green	02 Without Resistor	05 With Resistor	12 With Resistor	24 With Resistor	Unit
Forward Peak Current			I_{FM}	20	15	15	12	mA
Typical Forward Current			I_F	15	12.5	12.5	10	mA
Forward Voltage			V_F	2.1	5	12	24	V
Reverse Peak Voltage (not applicable to bicolor)			V_{RM}	5	5	5	5	V
Current Reduction Rate Above 25°C			ΔI_F	0.27	——	——	——	mA/°C
Ambient Temperature Range				−25 ~ +50				°C

Without Resistor 2-volt

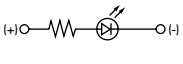


Single Color

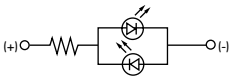


Bicolor

With Resistor 5, 12, 24-volt



Single Color



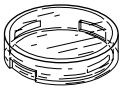
Bicolor

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.

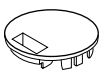
If the source voltage exceeds the rated voltage, a ballast resistor is required.
The resistor value can be calculated by using the formula in the Supplement section.

Lens/Insert Colors Available:

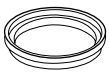
- JA **Clear/Black**
- JB **Clear/White**
- JC **Clear/Red**
- JE **Clear/Yellow**
- JF **Clear/Green**



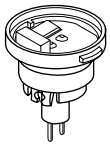
Clear Lens



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

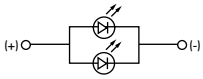
Materials:
Lens & Insert: Polycarbonate
Seal: Thermoplastic Elastomer

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

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
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	ΔI_F	0.50			mA/°C
Ambient Temperature Range		−25 ~ +50			°C

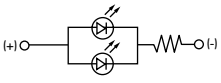
Electrical Specifications for Bright LED with Resistor

Bright AT634

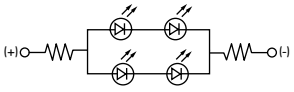
T-1¼ Bi-pin

Colors Available: 5C Red, 5D Amber, 5F Green		05	12	24	Unit
Forward Peak Current	I_{FM}	—	—	—	mA
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	ΔI_F	——	——	——	mA/°C
Ambient Temperature Range		−25 ~ +50			°C

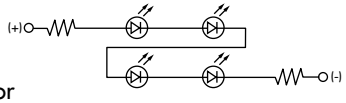
AT634 5-volt, 2-element with Resistor



AT634 12-volt, 4-element with Resistor



AT634 24-volt, 4-element with Resistor

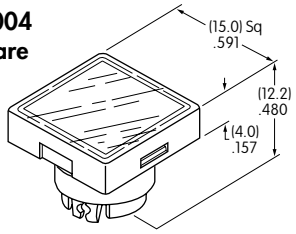


Cap for Bright LED

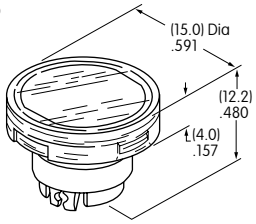
Lens/Insert Colors Available:

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

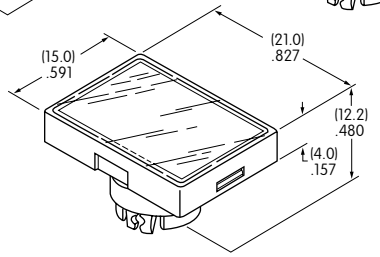
AT3004 Square

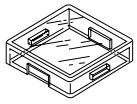


AT3005 Round

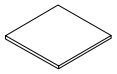


AT3006 Rectangular

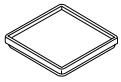




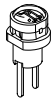
Transparent Clear Lens



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

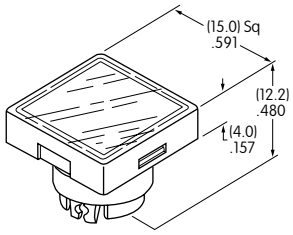
T-1 Bi-pin

ATTENTION ELECTROSTATIC SENSITIVE DEVICES

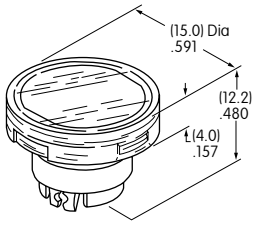
Colors:		6B White	6F Green	6G Blue	Unit
Forward Peak Current	I_{FM}	30	30	30	mA
Typical Forward Current	I_F	20	20	20	mA
Forward Voltage	V_F	3.6	3.5	3.6	V
Reverse Peak Voltage	V_{RM}	5	5	5	V
Current Reduction Rate Above 25°C	ΔI_F	0.50			mA/°C
Ambient Temperature Range		−25 ~ +50			°C

Cap for Super Bright LED

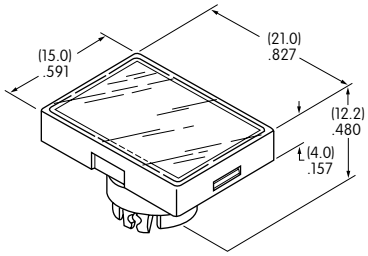
AT3014
Square



AT3015
Round

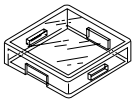


AT3016
Rectangular

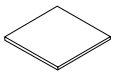


Lens/Insert Colors Available:

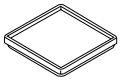
JB **Clear/White**



Transparent Clear Lens



Translucent White Insert



Translucent White Seal/Diffuser

Super Bright LEDs
AT625 AT631
AT632

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

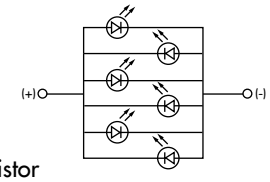
BICOLOR LED & LED CAPS

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.

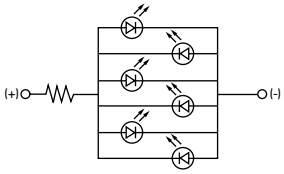
Electrical Specifications for Bicolor LED

Bicolor AT621	Bicolor LED is translucent white in OFF state.		02	05	12	24	Unit
2CF Red/Green	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	ΔI_F	0.80	——	——	——	mA/°C
T-1½ Bi-pin	Ambient Temperature Range		−25 ~ +50				°C

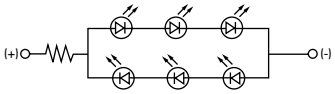
AT621
Bicolor LED
2-volt
6-element
without Resistor



AT621
Bicolor LED
5-volt
6-element
with Resistor



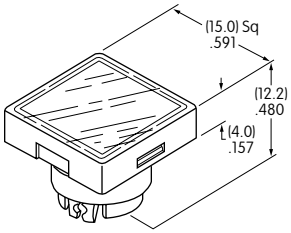
AT621
Bicolor LED
12 & 24-volt
6-element
with Resistor



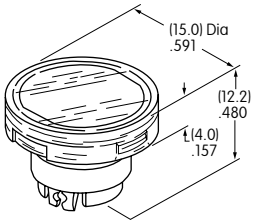
As shown for Red;
Reverse polarity for Green

LED Caps

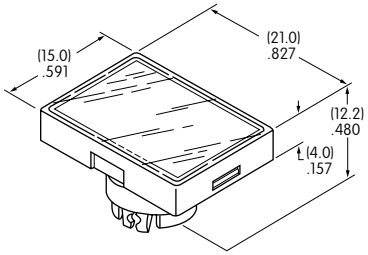
AT3004
Square

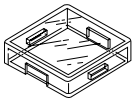


AT3005
Round

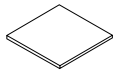


AT3006
Rectangular

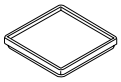




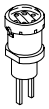
Transparent Clear Lens



Transparent White Insert



Translucent White Seal/Diffuser



Bicolor LED AT621

Lens/Insert Colors Available:

JB **Clear/White**

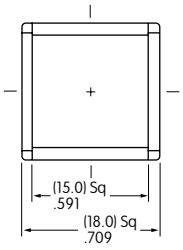
Materials:

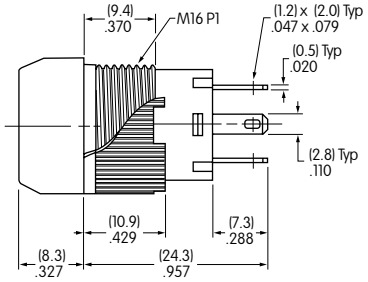
Lens & Insert: Polycarbonate Seal/Diffuser: Thermoplastic Elastomer

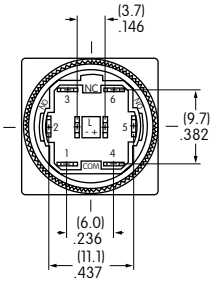
TYPICAL SWITCH DIMENSIONS

Square • Bushing Mounting

Single & Double Pole





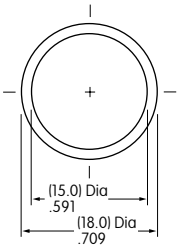


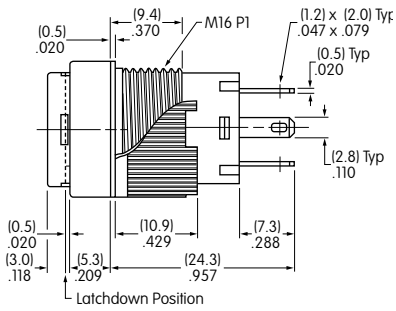
YB15SKW01-12-CB

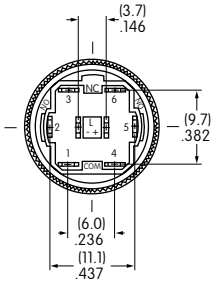
Single pole models do not have terminals 4, 5, & 6.

Round • Panel Seal

Single & Double Pole





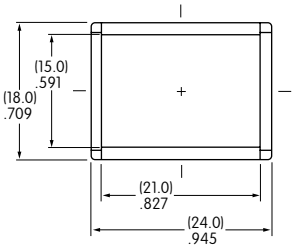


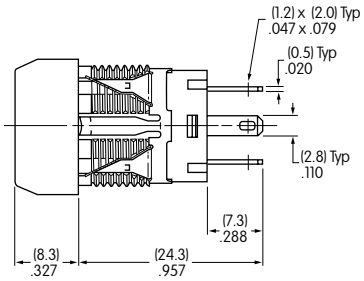
YB26WCKW01-12-EB

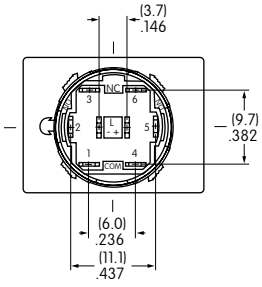
Single pole models do not have terminals 4, 5, & 6.

Rectangular • Snap-in Mounting

Single & Double Pole







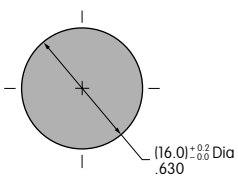
YB15NKW01-5C-JC

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

PANEL THICKNESS & CUTOUTS

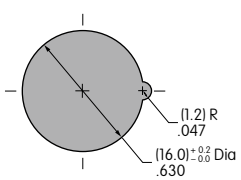
Bushing & Panel Seal Mount

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:

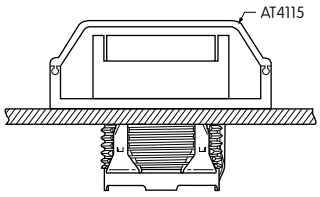
Bushing Mounting	Snap-in Mounting	Panel Seal
.020″ ~ .150″ (0.5mm ~ 3.8mm)	.020″ ~ .091″ (0.5mm ~ 2.3mm)	.020″ ~ .118″ (0.5mm ~ 3.0mm)

Dust/Splash Cover

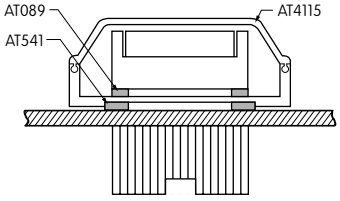
AT4115 Dust Cover for Snap-in or Bushing Mount

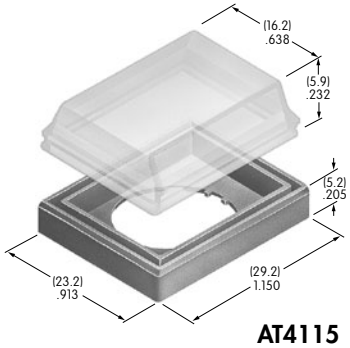
AT4115 Splash Cover and AT541 O-ring for Bushing Mount

Dust Cover



Splash Cover





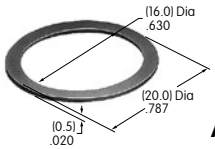
AT4115

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

Snap-in Mount

Panel Seal

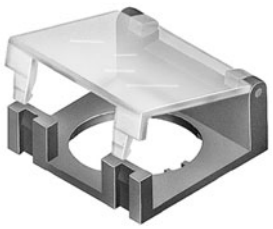
Note: AT089 o-ring supplied with panel seal model.



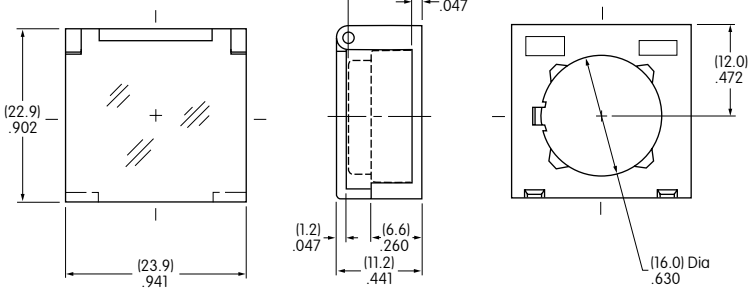
AT541

Protective Guard

AT4072 Protective Guard
Opens 90°
Closes manually

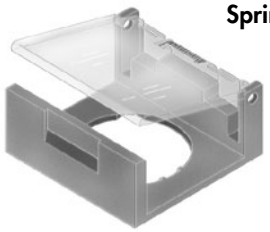


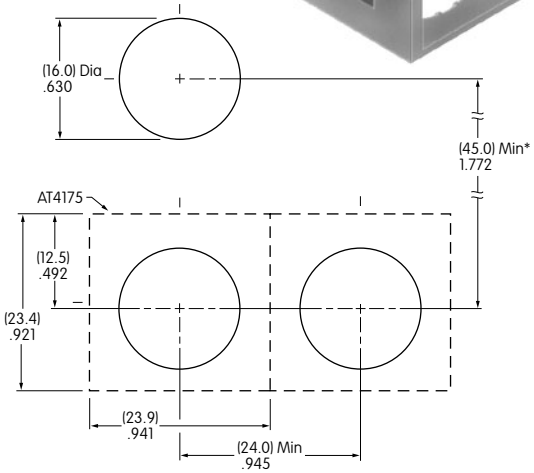
Materials:
Lid: Polycarbonate
Base: Glass Fiber Reinforced Polycarbonate

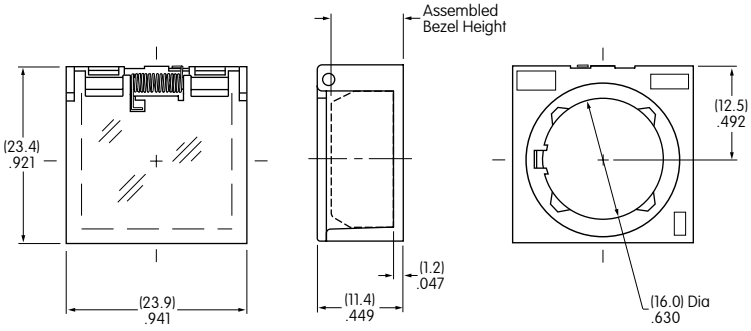


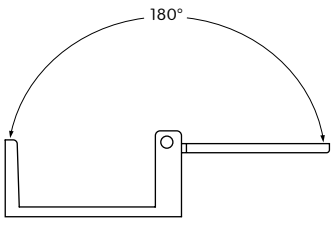
Spring Loaded Protective Guard

AT4175 Spring Loaded Protective Guard
Opens 180°
Closes automatically







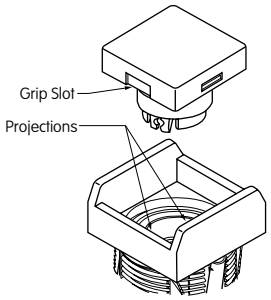


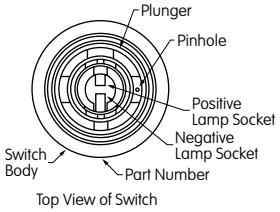
Materials:
Lid: Polycarbonate
Base: Glass Fiber Reinforced Polyamide
Coil Spring: Stainless Steel

* Minimum dimension allows opening of cover to 180°

ASSEMBLY INSTRUCTIONS

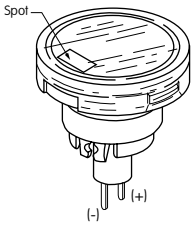
Cap Assembly





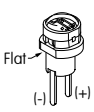
Top View of Switch

LED Polarity & Orientation in Lamp Socket

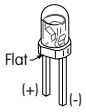


Spot Illuminated Cap with Built-in LED

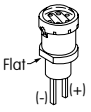
ATTENTION
ELECTROSTATIC SENSITIVE DEVICES



LED
AT628
AT634



LEDs
AT625G
AT631B AT632F



LED
AT621

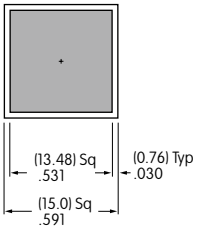
The following installation tools are available: AT106 Socket Wrench for bushing mounting (Overtightening the mounting nut AT092 may damage the switch housing.); AT109 Cap Extractor; AT111 Lamping Tool.
Further details and dimensions are shown in the Accessories and Hardware section.

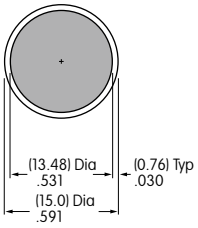
LEGENDS

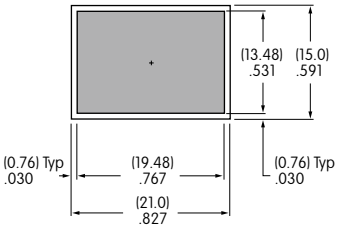
NKK Switches can provide custom legends for caps. Contact factory for more information.

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.

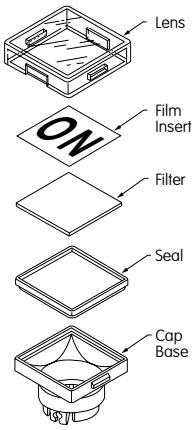




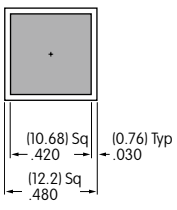


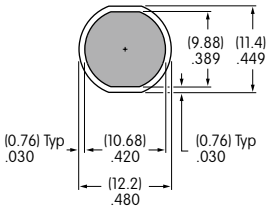
Shaded areas are printable areas.

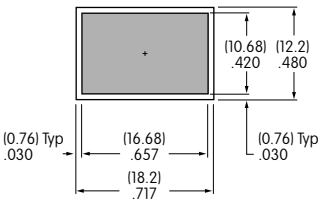
Suggested Printable Area for Film Insert



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







Shaded areas are printable areas.

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)

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^2) 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.

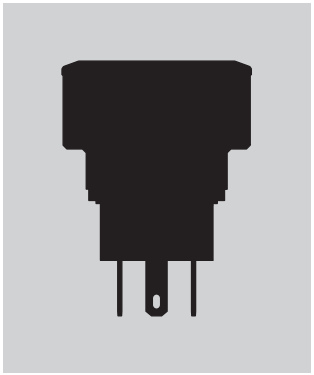
Available in momentary and alternate action with latchdown.

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)



Series YB2

Panel Seal Pushbuttons

TYPICAL SWITCH

YB2 | 1 | 5 | C | W | C | K | W | 01

Poles

1	SPDT
2	DPDT

Contact Point

C	Normally Open and Normally Closed

Shape

C	Round
S	Square

Terminals

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

Circuits

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

Panel Seal

W	With Panel Seal

Bezel

K	Black
P	Brushed Chrome

NEW

Contact Materials & Ratings

W	Silver Rated 3A @ 125V AC
G	Gold Rated 0.4VA maximum @ 28V AC/DC maximum

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 — JB

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

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
NEW → P	Brushed Chrome

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

YB216CWSPW01-N-P

POLES & CIRCUITS

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

CONTACT POINT

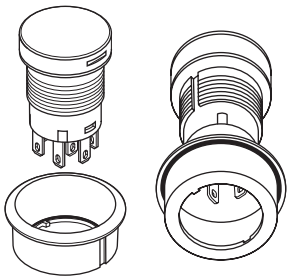
C **Normally Open and Normally Closed**

Contact points are both Normally Open and Normally Closed.

PANEL SEAL

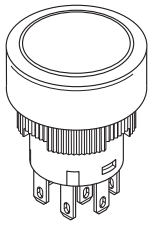
W **Panel Seal (Round and Square)**

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

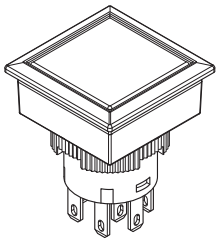


SHAPE

C **Round**



S **Square**

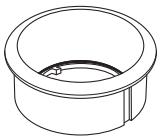


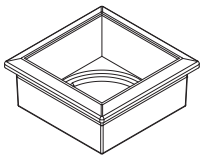
BEZEL

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

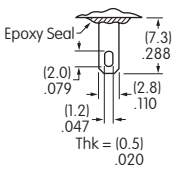
G **Gold Contacts**

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

Switch base is ivory

TERMINALS

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



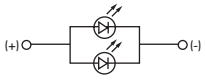
BRIGHT & SUPER BRIGHT LEDS

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

Bright AT628

T-1 Bi-pin



Colors Available: 5C Red, 5D Amber		No Code 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	ΔI_F	0.50		mA/°C
Ambient Temperature Range		−25 ~ +50		°C

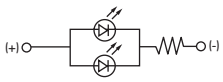
Electrical Specifications for Bright Red & Amber LED with Resistor

Bright AT634

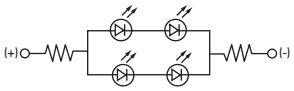
T-1¼ Bi-pin

Colors Available: 5C Red, 5D Amber		05	12	24	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	ΔI_F	—	—	—	mA/°C
Ambient Temperature Range		−25 ~ +50			°C

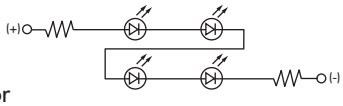
AT634 5-volt, 2-element with Resistor



AT634 12-volt, 4-element with Resistor



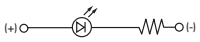
AT634 24-volt, 4-element with Resistor



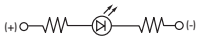
Electrical Specifications for Bright Green LED with Resistor

Bright AT636

T-1¼ Bi-pin



5V



12V & 24V

Colors Available: ATTENTION ELECTROSTATIC SENSITIVE DEVICES, 5F Green		05	12	24	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	ΔI_F	—	—	—	mA/°C
Ambient Temperature Range		−25 ~ +50			°C

Electrical Specifications for Super Bright LED

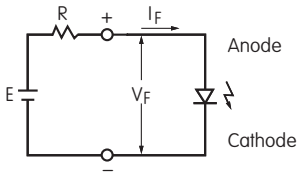
Super Bright AT625G Blue AT631B White AT632F Green

T-1 Bi-pin

ATTENTION ELECTROSTATIC SENSITIVE DEVICES  Colors:		6B White	6F Green	6G 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	ΔI_F	0.50	0.50	0.50	mA/°C
Ambient Temperature Range		−25 ~ +50			°C

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.



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

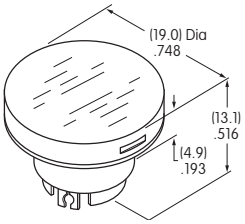
Where: R = Resistor Value (Ohms)
E = Source Voltage (V)
V_F = Forward Voltage (V)
I_F = Forward Current (A)

CAPS & CAP COLORS

AT3017 Cap for Bright LED

Lens/Diffuser Colors Available:

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

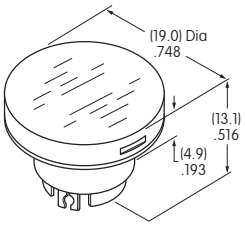


*Yellow cap pairs with amber LED to achieve amber illumination.

AT3018 Cap for Super Bright LED

Lens/Diffuser Colors Available:

- **JB** Clear/White



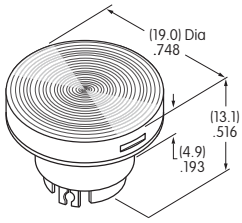
Material for Lens & Diffuser:
Polycarbonate

AT3019 Cap for Nonilluminated

Cap Color Available:

NEW → **P** Brushed Chrome

Note: AT3017 Cap can also be used without illumination.

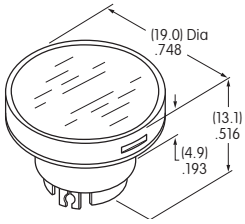


Material for Lens:
ABS Resin and Brushed Chrome Plating

AT3020 Cap with Illumination Ring for Bright or Super Bright LED

Cap Color Available:

- **JS** Metallic Silver with Clear Ring

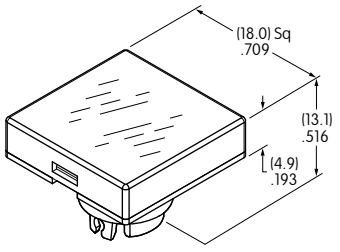


Materials
Lens: Polycarbonate
Insert: Polyester

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

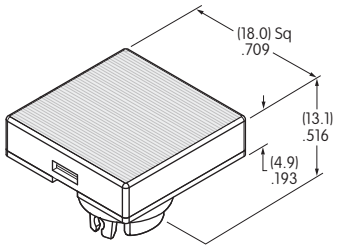
*Yellow cap pairs with amber LED to achieve amber illumination.

AT3027 Cap for Nonilluminated

Cap Color Available:

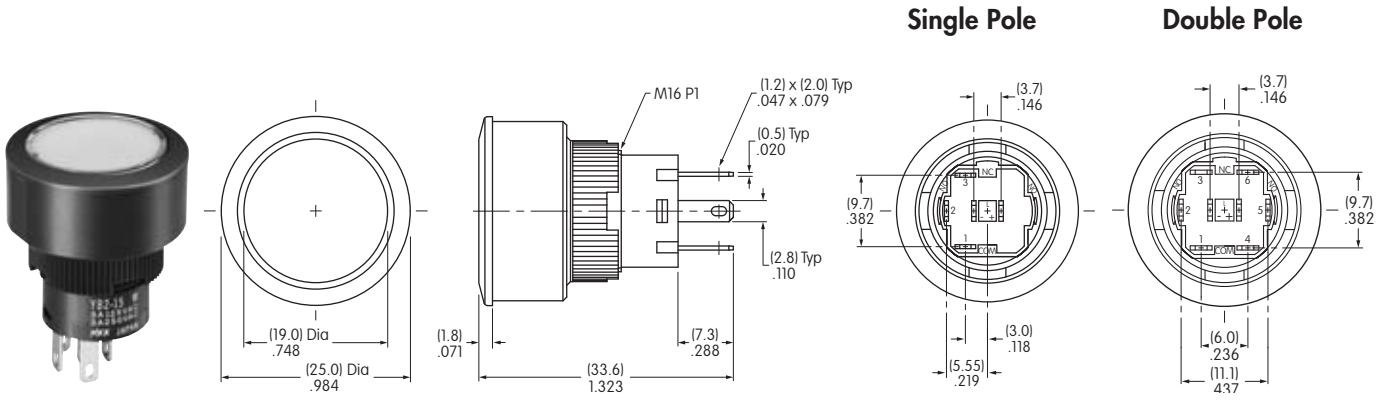
NEW → **P** Brushed Chrome

Note: AT3025 Cap can also be used without illumination.

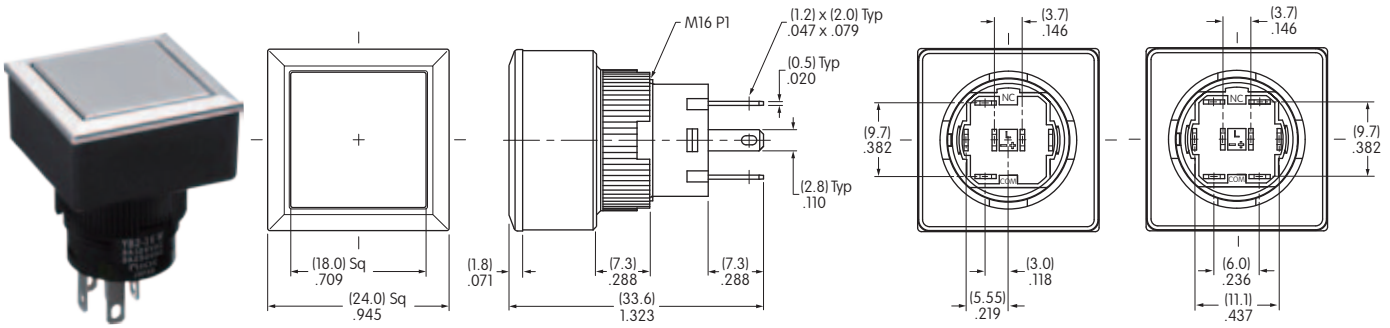


Material for Lens:
ABS Resin and Brushed Chrome Plating

TYPICAL SWITCH DIMENSIONS



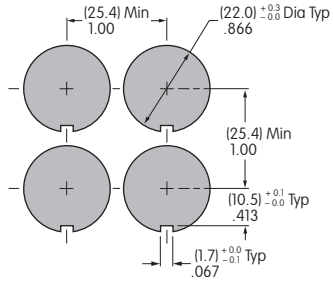
YB215CWCKW01-6B-JB



YB216CWSPW01-N-P

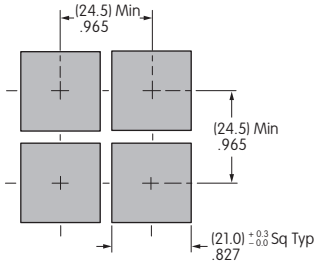
PANEL THICKNESS & CUTOUT

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



Side-by-side Mounting

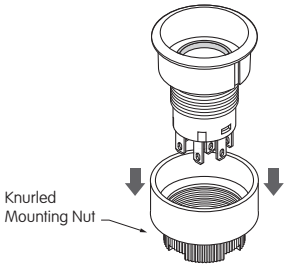
Recommended
Panel Thickness
.020" ~ .197"
(0.5mm ~ 5.0mm)



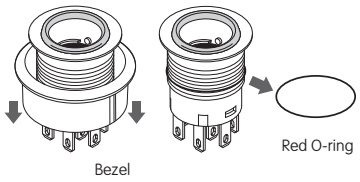
Side-by-side Mounting

ASSEMBLY INSTRUCTIONS FOR ROUND

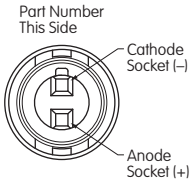
1. Remove knurled mounting nut.



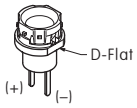
2. Remove bezel and red o-ring from housing. There are two o-rings in this assembly: one is red, one is orange.



3. Install LED.



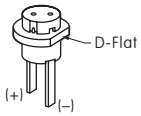
LEDs
AT634 & AT636



ATTENTION
ELECTROSTATIC
SENSITIVE DEVICES

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

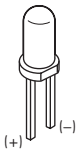
LED AT628



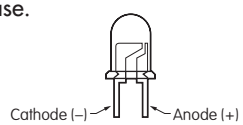
Align D-flat on LED with Part Number on switch for appropriate polarity and insert LED into base.

ATTENTION
ELECTROSTATIC
SENSITIVE DEVICES

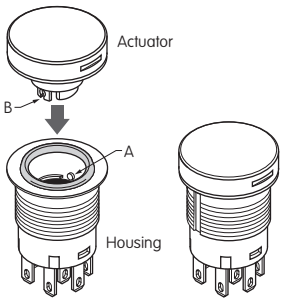
LEDs AT625G,
AT631B,
AT632F



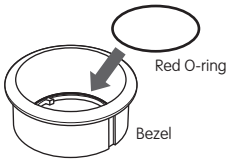
The larger metal part within the LED represents the cathode (–). Align LED for appropriate polarity and insert LED into base.



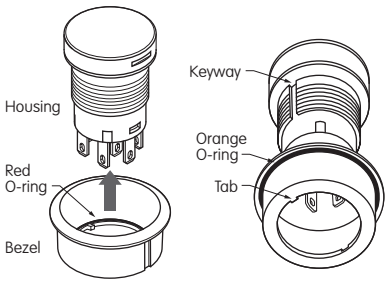
4. Align tabs (B) on both sides of actuator with the projections (A) inside of the housing and push actuator firmly down to snap in.



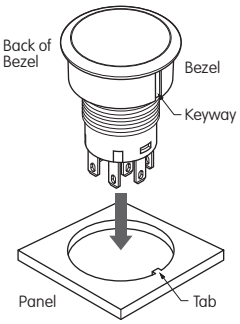
5. Install the red o-ring which was removed in step 2 at the inside bottom of the bezel.



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

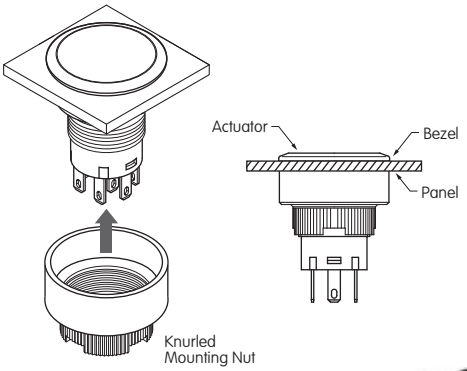


7. Before installing into panel, make sure that the orange o-ring is present at the back of the bezel. Align keyway on bezel with tab in panel and push switch all the way into the panel.



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.

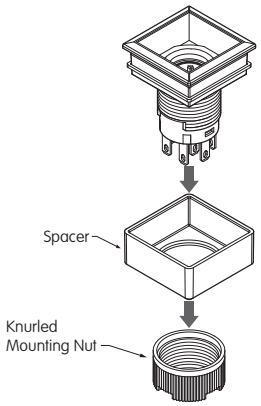
Mounting torque: 0.785Nm (6.95 lb•in) maximum. Optional socket wrench AT106 available.



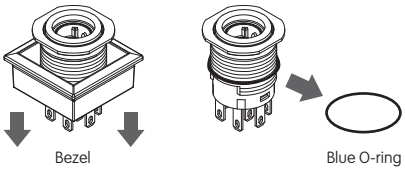
AT106 Socket Wrench

ASSEMBLY INSTRUCTIONS FOR SQUARE

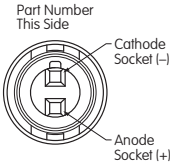
1. Remove knurled mounting nut.



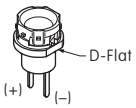
2. Remove bezel and blue o-ring from housing.



3. Install LED.



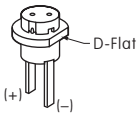
LEDs
AT634 & AT636



ATTENTION
ELECTROSTATIC
SENSITIVE DEVICES

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

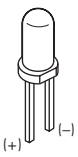
LED AT628



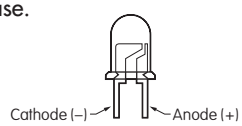
Align D-flat on LED with Part Number on switch for appropriate polarity and insert LED into base.

ATTENTION
ELECTROSTATIC
SENSITIVE DEVICES

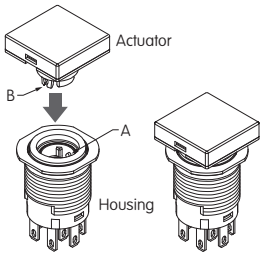
LEDs AT625G,
AT631B,
AT632F



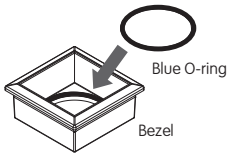
The larger metal part within the LED represents the cathode (–). Align LED for appropriate polarity and insert LED into base.



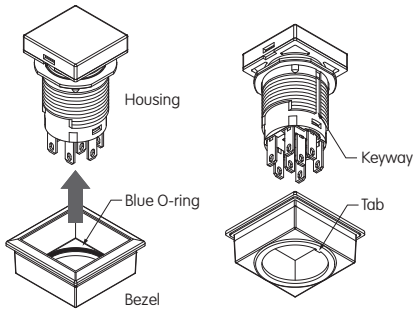
4. Align tabs (B) on both sides of actuator with the projections (A) inside of the housing and push actuator firmly down to snap in.



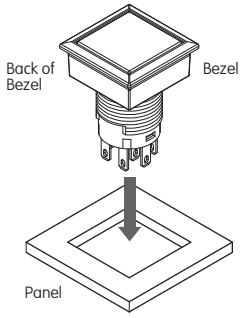
5. Install the blue o-ring which was removed in step 2 at the inside bottom of the bezel.



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

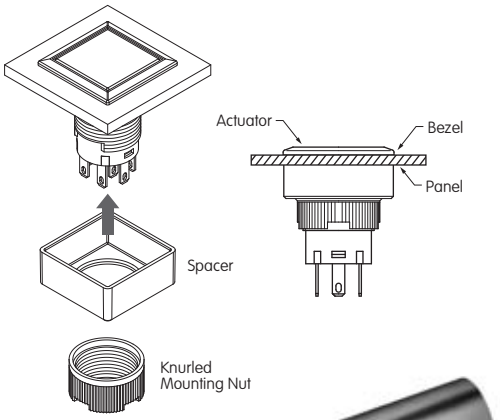


7. Before installing into panel, make sure that the square gasket is present at the back of the bezel. Align keyway on bezel with tab in panel and push switch all the way into the panel.



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

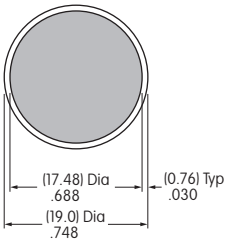
LEGENDS

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

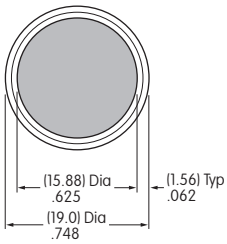
Suggested Printable Area for YB2 Caps

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

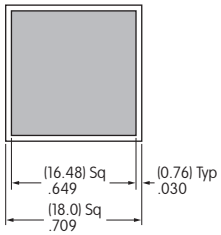
For Caps
AT3017, AT3018, and AT3019



For Cap
AT3020 (with clear ring for illumination)

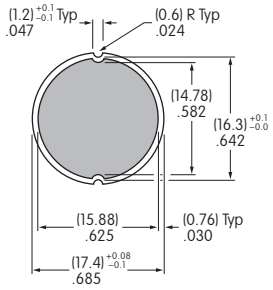


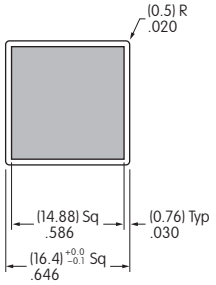
For Caps
AT3025 and AT3027



Shaded areas are printable areas.

Suggested Printable Area for Film Inserts





Recommended Method:
Screen Print; Epoxy based ink is recommended

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

Shaded areas are printable areas.

HANDLING & PRECAUTIONS

ATTENTION
ELECTROSTATIC
SENSITIVE DEVICES

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