

General Specifications

Electrical Capacity (Resistive Load)

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

Other Ratings

Contact Resistance:	10 milliohms maximum for silver; 20 milliohms maximum for gold
Insulation Resistance:	1,000 megohms minimum @ 500V DC
Dielectric Strength:	1,000V AC minimum between contacts for 1 minute minimum; 1,500V AC minimum between contacts and case for 1 minute minimum
Mechanical Life:	100,000 operations minimum
Electrical Life:	25,000 operations minimum for silver; 50,000 operations minimum for gold

Materials & Finishes

Plunger:	Brass with nickel plating
Bushing:	Brass with nickel plating
Frame:	Stainless steel
Case:	Melamine phenolic resin (UL94V-0)
Movable Contacts:	Copper with silver or gold plating
Stationary Contacts:	Silver & copper with silver or gold plating
Terminals:	Copper with silver or gold plating

Environmental Data

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

Installation

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

Standards & Certifications

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

Distinctive Characteristics

Power and logic level capabilities available to suit varying applications.

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

Light touch actuation.

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

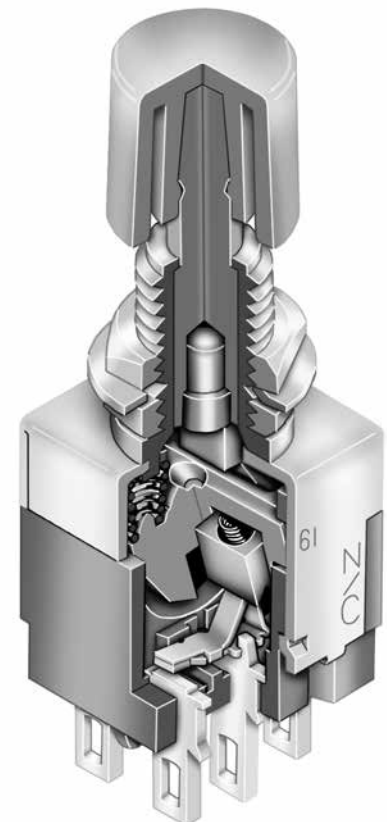
Stainless steel frame resists corrosion.

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

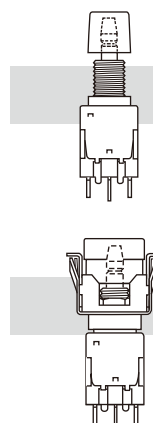
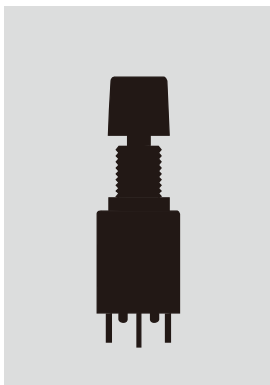
Higher insulating barriers protect against crossover in double pole devices.

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

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



Actual Size



Bushing Mount

Page C26

Snap-in Mount

Page C30

TYPICAL SWITCH ORDERING EXAMPLE

EB20

65

B

F

Poles & Circuits

11	SPDT	ON	(ON)
65	SPDT	ON	ON
61	DPDT	ON	(ON)
85	DPDT	ON	ON
() = Momentary			

Caps

B	.315" (8.0mm) Dia.
C	.394" (10.0mm) Dia.

Contacts, Ratings, & Terminals

No Code	Silver Contacts; Solder Lug Terminals 3A @ 125V AC
G	Gold Contacts; Solder Lug Terminals 0.4VA max @ 28V AC/DC max
P	Silver Contacts; Straight PC Terminals; 3A @ 125V AC
PG	Gold Contacts; Straight PC Terminals 0.4VA max @ 28V AC/DC max

Colors

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

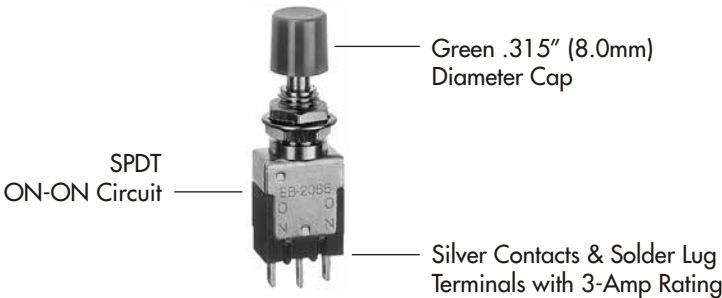
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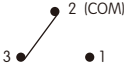
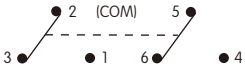


Switches are supplied without UL, cULus & CSA marking unless specified.
UL, cULus & CSA recognized only when ordered with marking on the switch.
Specific models, ratings, & ordering instructions are noted on the General Specifications page.

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

EB2065-BF



POLES & CIRCUITS						
		Plunger Position () = Momentary		Connected Terminals		Throw & Switch Schematics
Pole	Model	Normal  Keyway	Down 	Normal  Keyway	Down 	Note: Terminal numbers are not actually on the switch.
SP	EB2011 EB2065	ON ON	(ON) ON	2-3	2-1	SPDT 
DP	EB2061 EB2085	ON ON	(ON) ON	2-3 5-6	2-1 5-4	DPDT 

CONTACT MATERIALS, RATINGS, & TERMINALS



Solder Lug
Silver Contacts

Power Level

3A @ 125V AC

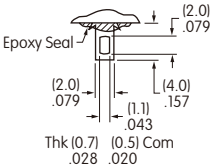


Solder Lug
Gold Contacts

Logic Level

0.4VA max @ 28V AC/DC max

Complete explanation of operating range in Supplement section.



Straight PC
Silver Contacts

Power Level

3A @ 125V AC

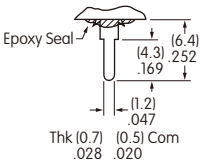


Straight PC
Gold Contacts

Logic Level

0.4VA max @ 28V AC/DC max

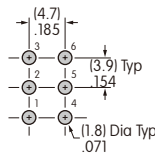
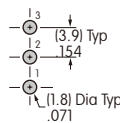
Complete explanation of operating range in Supplement section.



PCB Footprints

Single Pole

Double Pole

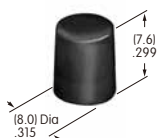


CAPS & COLORS

B AT443
.315" (8.0mm) Diameter Snap-on Cap

Cap Colors
Available:

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

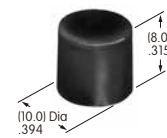


Cap Material: Polycarbonate Finish: Glossy

C AT442
.394" (10.0mm) Diameter Snap-on Cap

Cap Colors
Available:

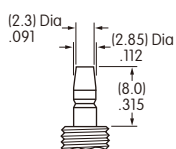
A Black	F Green
B White	G Blue
C Red	H Gray
E Yellow	



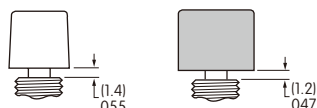
Cap Material: Polycarbonate Finish: Glossy

Plunger Extension

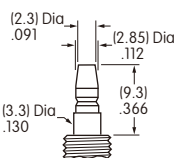
Due to a difference in plunger lengths on the momentary and alternate action models, cap distance from top of bushing varies.



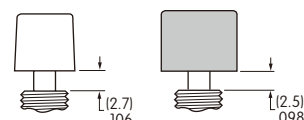
Momentary
Plunger Length



Momentary
Cap Location



Alternate
Plunger Length



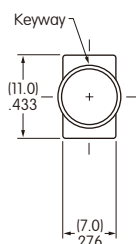
Alternate
Cap Location

TYPICAL SWITCH DIMENSIONS

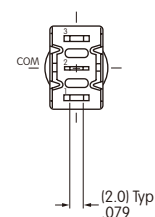
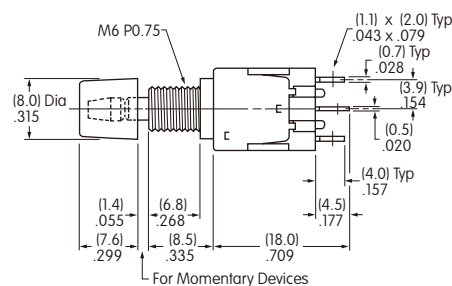
Solder Lug



EB2011-BA



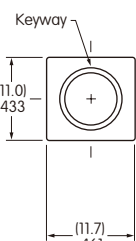
Single Pole



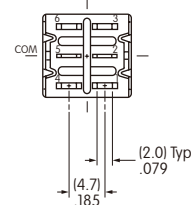
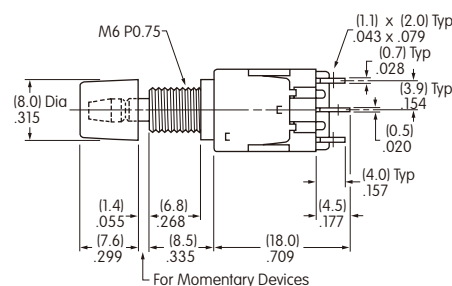
Solder Lug



EB2061-BA



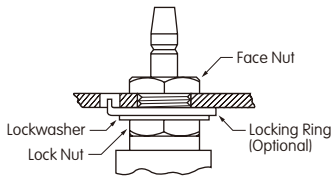
Double Pole



HARDWARE

Installation/Assembly

2 AT513M Metric Hexagon Nuts
1 AT509 Internal Tooth Lockwasher



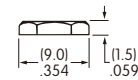
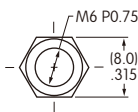
Optional Hardware:
AT507M Metric Locking Ring

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

Standard Hardware

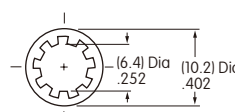
AT513M
Metric Hexagon Nut

Material:
Brass with
Nickel Plating



AT509
Lockwasher

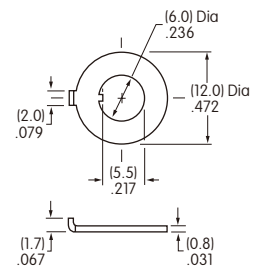
Material:
Steel with
Zinc/Chromate



Optional Hardware

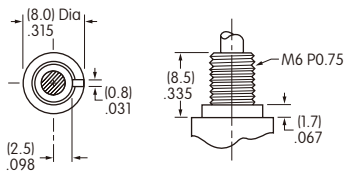
AT507M
Metric Locking Ring

Material:
Steel with
Zinc/Chromate

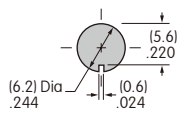


PANEL CUTOUTS & THICKNESSES

Metric Bushing

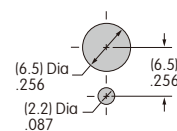


With Standard Hardware



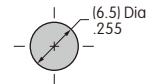
Maximum Effective
Panel Thickness:
.118" (3.0mm)

With Standard Hardware & Optional Locking Ring



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

Without Bottom Hex Nut



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

See Accessories & Hardware section for optional Conical Nuts:
AT512M used with cap AT443 and AT512CM used with cap AT442.

TYPICAL SWITCH

EB20

11

B

J23

Poles & Circuits			
11	SPDT	ON	(ON)
65	SPDT	ON	ON
61	DPDT	ON	(ON)
85	DPDT	ON	ON
() = Momentary			

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

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

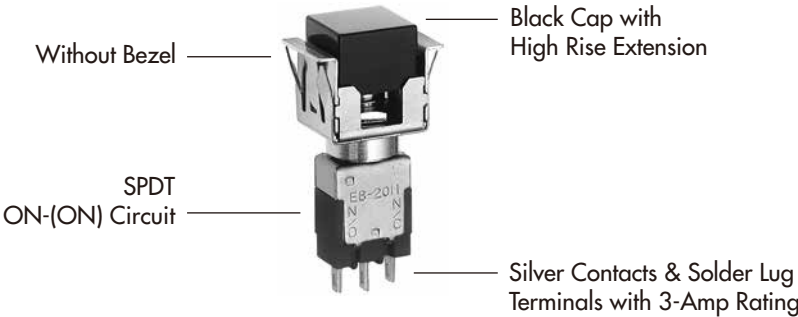
Cap Extensions & Bezel Types				
Low Rise		High Rise		Description
Momen- tary	Alter- nate	Momen- tary	Alter- nate	
J20	J30	J40	J50	Without Bezel
J21	J31	J41	J51	Bezel without LED
J22	J32	J42	J52	Bezel with 1 Round LED
J23	J33	J43	J53	Bezel with 2 Round LEDs
J24	J34	J44	J54	Bezel with 2 Rectangular LEDs

IMPORTANT:

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UL, cULus & CSA recognized only when ordered with marking on the switch.
Specific models, ratings, & ordering instructions are noted on the General Specifications page.

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE WITHOUT BEZEL

EB2011-A-J40



ORDERING EXAMPLES

A

Bezel Colors

Bezel without LEDs			
A	Black	F	Green
B	White	G	Blue
C	Red	H	Gray
E	Yellow		

Bezel with 1 Round LED	
A	Black

Bezel with 2 Round or Rectangular LEDs			
A	Black		

C F

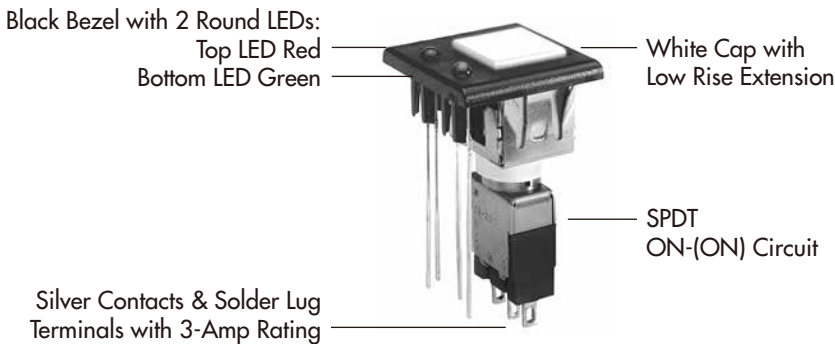
Led Colors

1 LED	
C	Red
F	Green

2 LEDs			
Top LED		Bottom LED	
C	Red	C	Red
E	Yellow	E	Yellow
F	Green	F	Green

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE WITH BEZEL

EB2011-B-J23ACF



POLES & CIRCUITS						
		Plunger Position () = Momentary		Connected Terminals		Throw & Switch Schematics
Pole	Model	Normal	Down	Normal	Down	
						Note: Terminal numbers are not actually on the switch.
SP	EB2011 EB2065	ON ON	(ON) ON	2-3	2-1	SPDT
DP	EB2061 EB2085	ON ON	(ON) ON	2-3 5-6	2-1 5-4	DPDT

CONTACT MATERIALS, RATINGS, & TERMINALS

No Code	Solder Lug Silver Contacts	Power Level	3A @ 125V AC
G	Solder Lug Gold Contacts	Logic Level	0.4VA maximum @ 28V AC/DC maximum
Complete explanation of operating range in Supplement section.			
P	Straight PC Silver Contacts	Power Level	3A @ 125V AC
PG	Straight PC Gold Contacts	Logic Level	0.4VA maximum @ 28V AC/DC maximum
Complete explanation of operating range in Supplement section.			

PCB Footprints			
		Single Pole	Double Pole

CAP COLORS

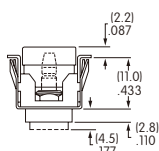
Factory Assembled on the Switch:
Square snap-on cap AT465, snap-in mounter
AT529, and optional bezels which follow.

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

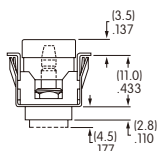
CAP EXTENSIONS & BEZEL TYPES

Cap Extension without Bezel

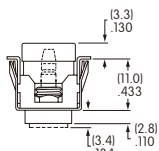
J20
Low Rise
Momentary



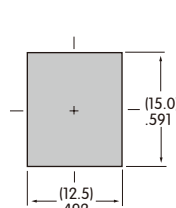
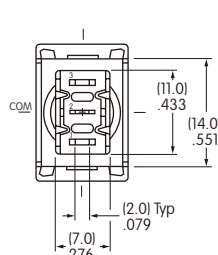
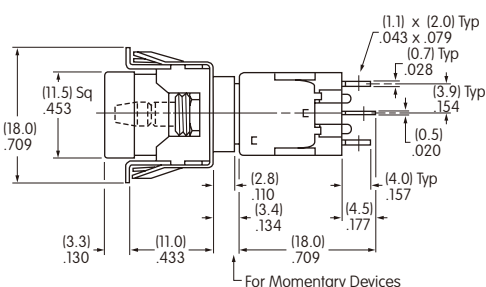
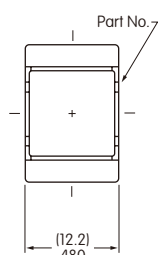
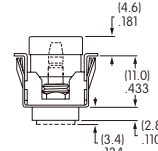
J30
Low Rise
Alternate



J40
High Rise
Momentary



J50
High Rise
Alternate



Maximum Panel Thickness
.039" ~ .157" (1.0mm ~ 4.0mm)
Cutout applies to SP & DP



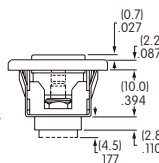
High Rise

Single Pole

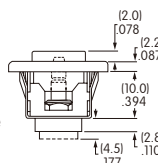
EB2011-A-J40

Cap Extension with Bezel

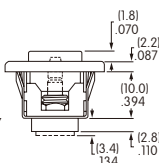
J21
Low Rise
Momentary



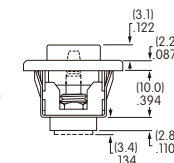
J31
Low Rise
Alternate



J41
High Rise
Momentary



J51
High Rise
Alternate

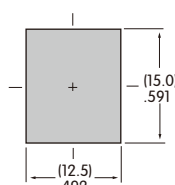
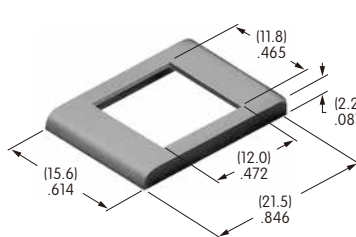


AT207 Bezel without LED

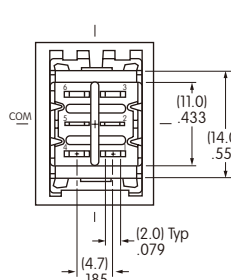
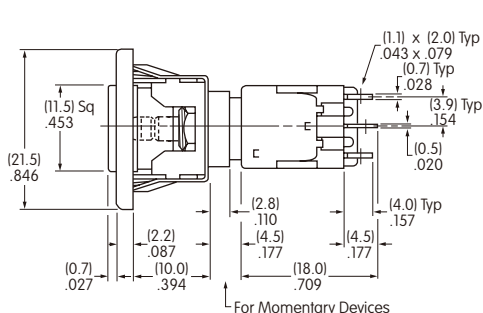
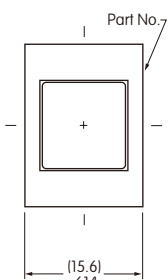
E	Yellow
A	Black
B	White
C	Red
F	Green
G	Blue
H	Gray

Material:
Polycarbonate

Finish:
Glossy



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



Low Rise

Double Pole

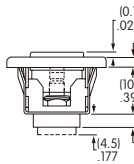
EB2061-B-J21A

CAP EXTENSIONS & BEZEL TYPES

Cap Extension with Bezel

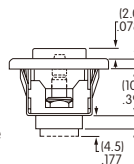
J22

Low Rise Momentary



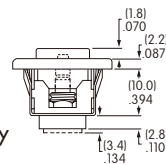
J32

Low Rise Alternate



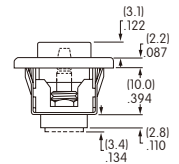
J42

High Rise Momentary



J52

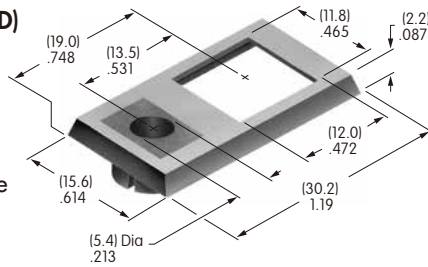
High Rise Alternate



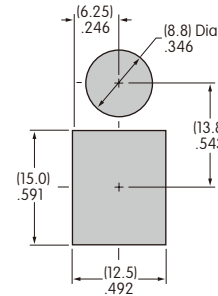
AT208 Bezel with 1 Round LED (AT070 LED)

A Black

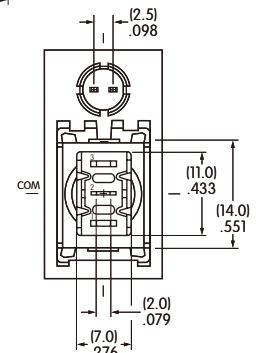
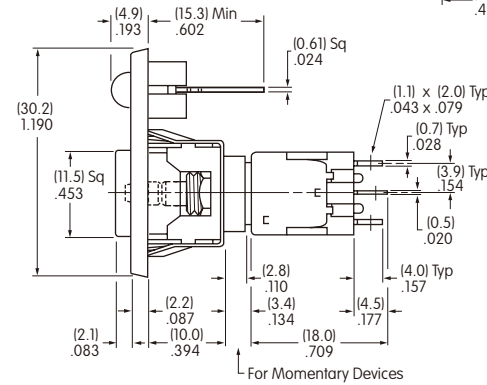
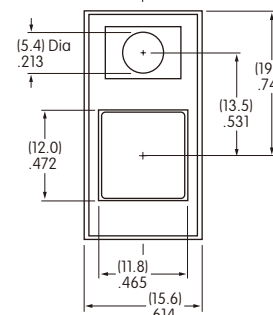
Material: Polycarbonate
Finish: Glossy



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



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



EB2011-B-J42AC

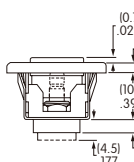
High Rise

Single Pole

Cap Extension with Bezel

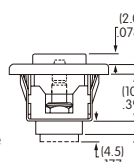
J23

Low Rise Momentary



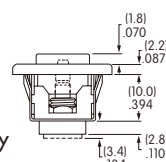
J33

Low Rise Alternate



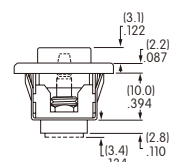
J43

High Rise Momentary



J53

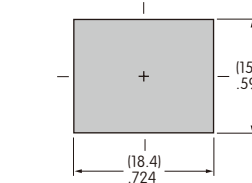
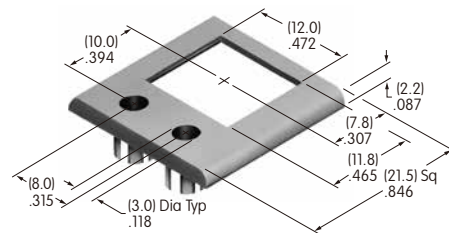
High Rise Alternate



AT212 Bezel with 2 Round LEDs (AT617 LEDs)

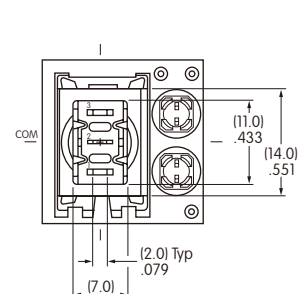
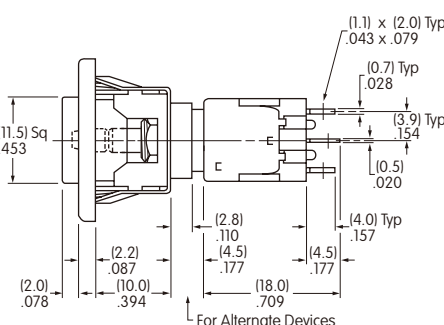
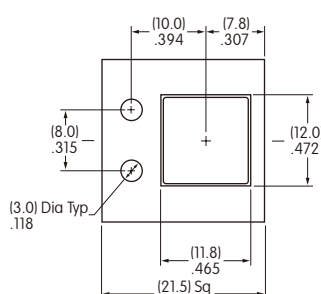
A Black

Material: Polycarbonate
Finish: Glossy



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

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



EB2065-B-J33ACF

Low Rise

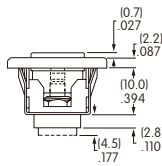
Single Pole

CAP EXTENSIONS & BEZEL TYPES

Cap Extension with Bezel

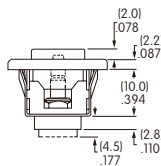
J24

Low Rise Momentary



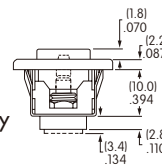
J34

Low Rise Alternate



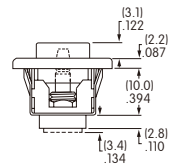
J44

High Rise Momentary



J54

High Rise Alternate

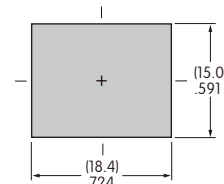
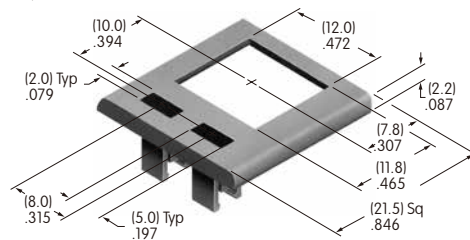


AT213 Bezel with 2 Rectangular LEDs (AT618 LEDs)

A

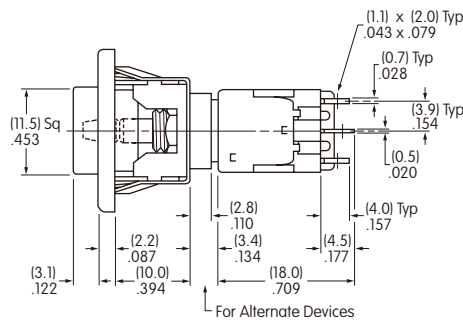
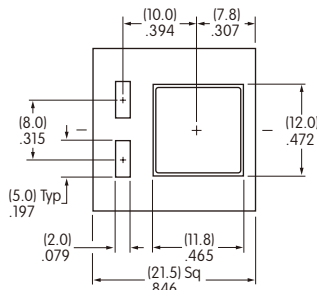
Black

Material: Polycarbonate
Finish: Glossy

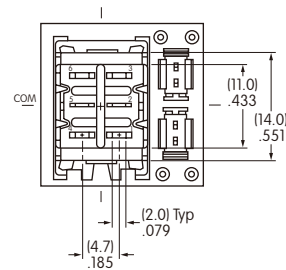


Maximum Panel Thickness
.039" ~ .126" (1.0mm ~ 3.2mm)
Cutout applies to SP & DP

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



High Rise



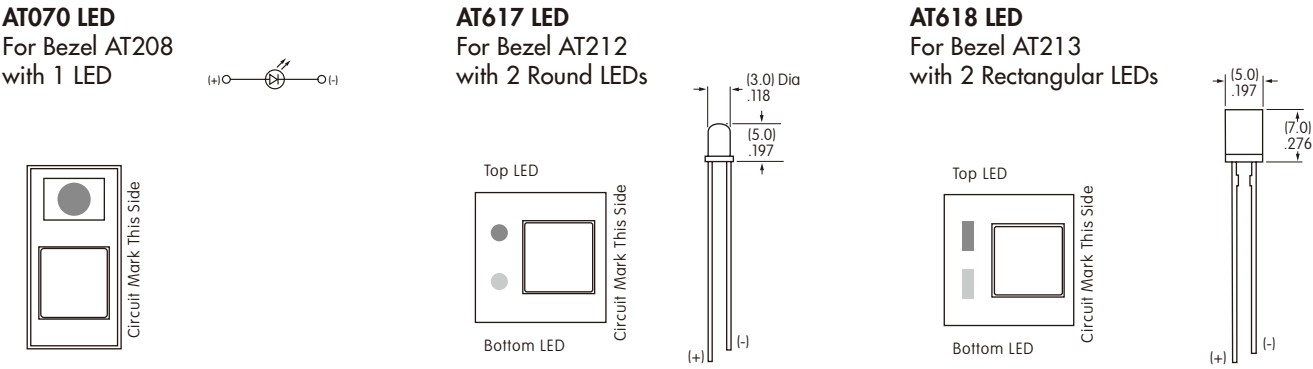
Double Pole



EB2085-B-J54ACF

LED COLORS & SPECIFICATIONS

Bezel Orientation on Switch



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

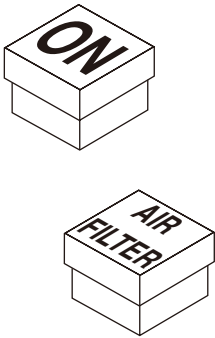
		AT070	AT617			AT618		
		C	C	E	F	C	E	F
Color		Red	Red	Yellow	Green	Red	Yellow	Green
Maximum Forward Current	I _{FM}	25mA	30mA	30mA	25mA	25mA	30mA	25mA
Typical Forward Current	I _F	20mA	20mA	20mA	20mA	20mA	20mA	20mA
Forward Voltage	V _F	2.8V	2.0V	2.1V	2.25V	2.25V	2.1V	2.2V
Maximum Reverse Voltage	V _{RM}	4V	5V	5V	5V	5V	5V	5V
Current Reduction Rate Above 25°C	ΔI _F	0.33 mA/°C	0.40 mA/°C	0.40 mA/°C	0.33 mA/°C	0.33 mA/°C	0.40 mA/°C	0.33 mA/°C
Ambient Temperature Range (when used with a bezel)		-10° ~ +70°C	-15° ~ +70°C			-25° ~ +50°C		

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

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

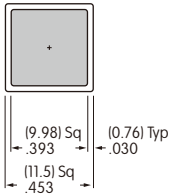
LEGENDS

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

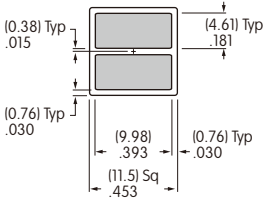


Recommended Print Method:
Screen Print or Pad Print
Epoxy based ink is recommended.

Suggested Printable Area for Cap



AT465



AT465

Shaded areas are printable areas.