

General Specifications

Electrical Capacity (Resistive Load)

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

Other Ratings

Contact Resistance:	10 milliohms maximum for silver; 20 milliohms maximum for gold
Insulation Resistance:	1,000 megohms minimum @ 500V DC
Dielectric Strength:	1,000V AC minimum between contacts for 1 minute minimum; 1,500V AC minimum between contacts and case for 1 minute minimum
Mechanical Life:	100,000 operations minimum
Electrical Life:	25,000 operations minimum for silver; 50,000 operations minimum for gold
Nominal Operating Force:	Single Pole: 1.75N for Momentary and 2.49N for Alternate Action Double Pole: 2.30N for Momentary and 3.05N for Alternate Action
Travel:	Momentary: Pretravel .047" (1.2mm); Overtravel .016" (0.4mm); Total Travel .063" (1.6mm) Alternate: Pretravel .071" (1.8mm); Overtravel .016" (0.4mm); Total Travel .087" (2.2mm)

Materials & Finishes

Plunger:	Brass with 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.

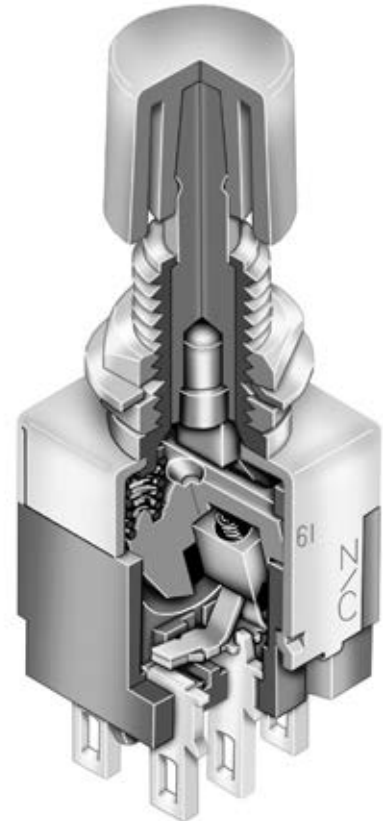
Stainless steel frame resists corrosion.

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

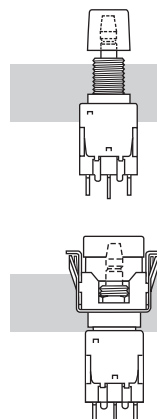
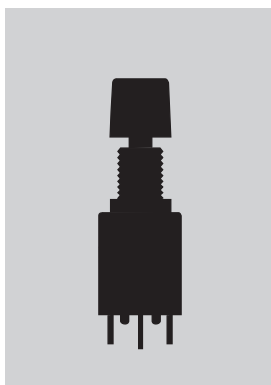
Higher insulating barriers protect against crossover in double pole devices.

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

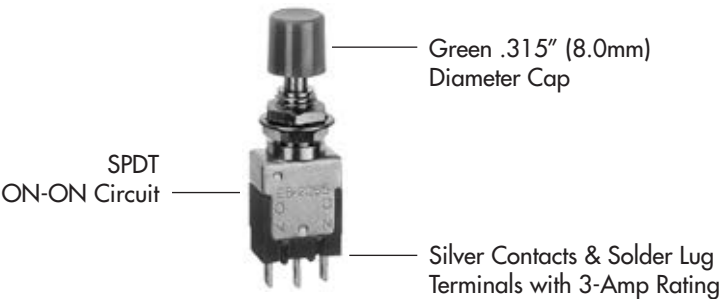
IMPORTANT:



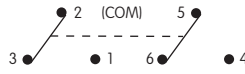
Switches are supplied without UL, cULus & CSA marking unless specified.
UL, cULus & CSA recognized only when ordered with marking on the switch.
Specific models, ratings, & ordering instructions are noted on the General Specifications page.

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

EB2065-BF



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

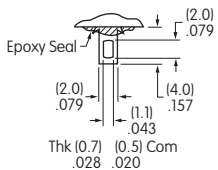


Solder Lug
Gold Contacts

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

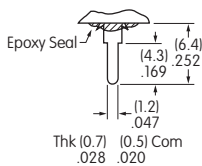


Straight PC
Gold Contacts

Logic Level

0.4VA max @ 28V AC/DC max

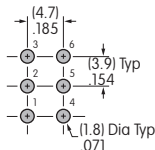
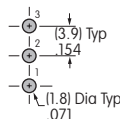
Complete explanation of operating range in Supplement section.



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	

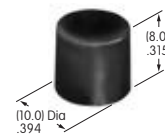


Cap Material: Polycarbonate Finish: Glossy

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

Cap Colors Available:

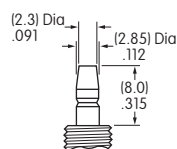
A Black	F Green
B White	G Blue
C Red	H Gray
E Yellow	



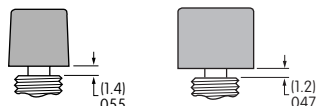
Cap Material: Polycarbonate Finish: Glossy

Plunger Extension

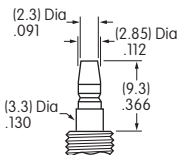
Due to a difference in plunger lengths on the momentary and alternate action models, cap distance from top of bushing varies.



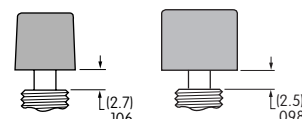
Momentary Plunger Length



Momentary Cap Location



Alternate Plunger Length



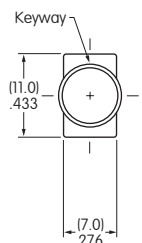
Alternate Cap Location

TYPICAL SWITCH DIMENSIONS

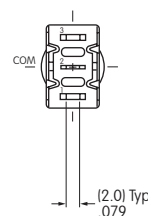
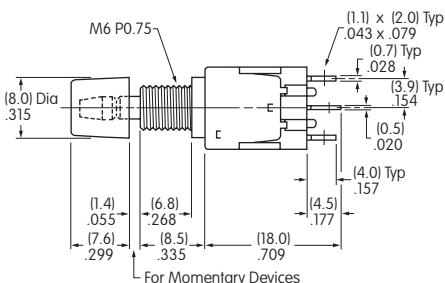
Solder Lug



EB2011-BA



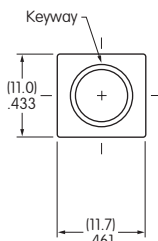
Single Pole



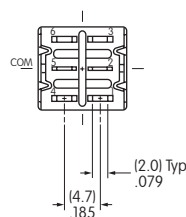
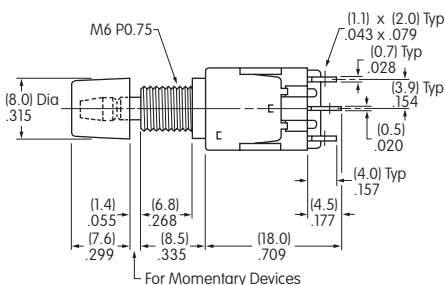
Solder Lug



EB2061-BA



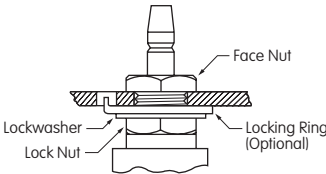
Double Pole



HARDWARE

Installation/Assembly

2 AT513M Metric Hexagon Nuts
1 AT509 Internal Tooth Lockwasher



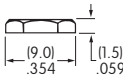
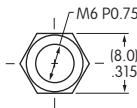
Optional Hardware:
AT507M Metric Locking Ring

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

Standard Hardware

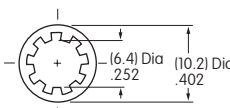
AT513M
Metric Hexagon Nut

Material:
Brass with
Nickel Plating



AT509
Lockwasher

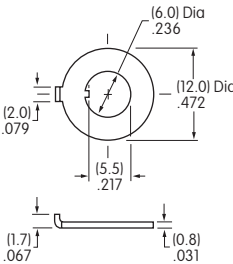
Material:
Steel with
Zinc/Chromate



Optional Hardware

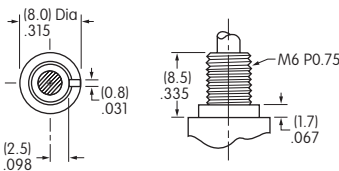
AT507M
Metric Locking Ring

Material:
Steel with
Zinc/Chromate

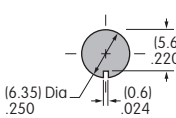


PANEL CUTOUTS & THICKNESSES

Metric Bushing

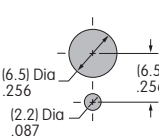


With
Standard Hardware



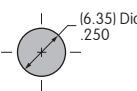
Maximum Effective
Panel Thickness:
.118" (3.0mm)

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.

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:

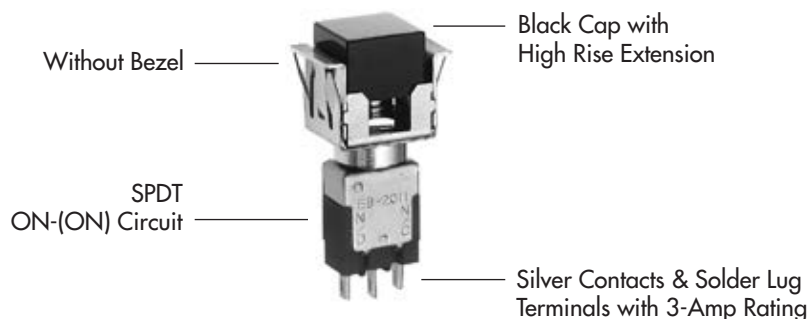
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Specific models, ratings, & ordering instructions are noted on the General Specifications page.

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

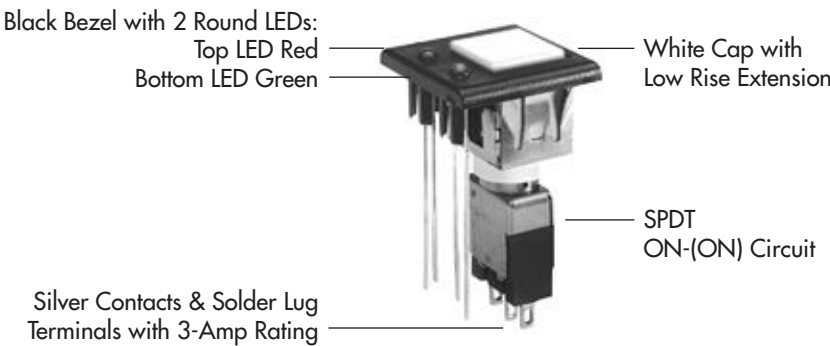
C	Red
F	Green

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



**Solder Lug
Silver Contacts**

Power Level

3A @ 125V AC

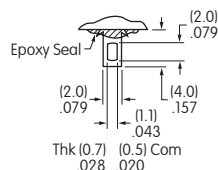


**Solder Lug
Gold Contacts**

Logic Level

0.4VA maximum @ 28V AC/DC maximum

Complete explanation of operating range in Supplement section.



**Straight PC
Silver Contacts**

Power Level

3A @ 125V AC



**Straight PC
Gold Contacts**

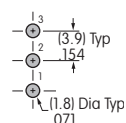
Logic Level

0.4VA maximum @ 28V AC/DC maximum

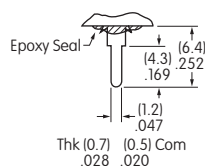
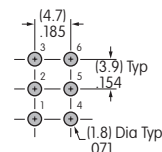
Complete explanation of operating range in Supplement section.

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.



Black



White



Red



Yellow



Green



Blue



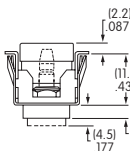
Gray

CAP EXTENSIONS & BEZEL TYPES

Cap Extension without Bezel

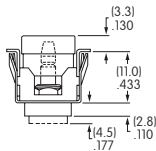
J20

Low Rise Momentary



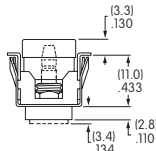
J30

Low Rise Alternate



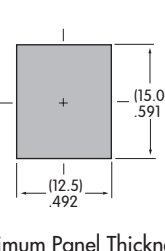
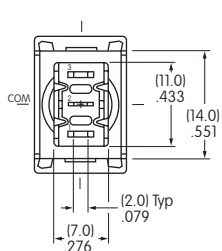
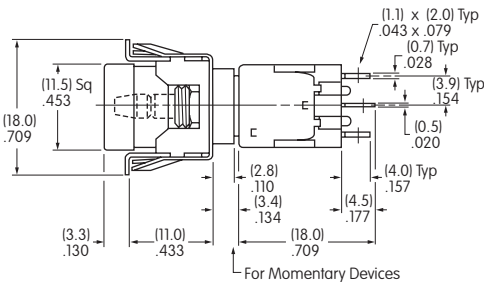
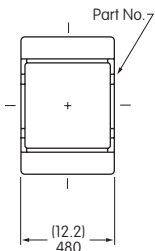
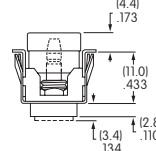
J40

High Rise Momentary



J50

High Rise Alternate



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



High Rise

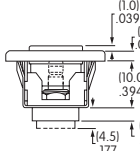
Single Pole

EB2011-A-J40

Cap Extension with Bezel

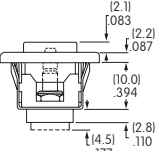
J21

Low Rise Momentary



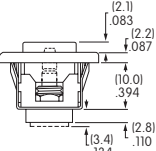
J31

Low Rise Alternate



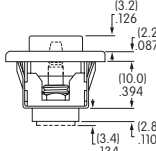
J41

High Rise Momentary



J51

High Rise Alternate



AT207 Bezel without LED

E

Yellow

A

Black

F

Green

B

White

G

Blue

C

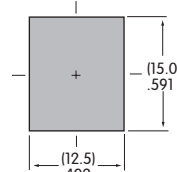
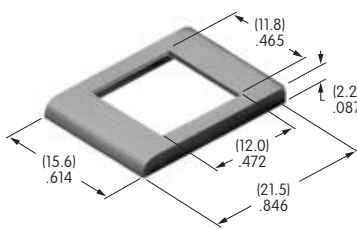
Red

H

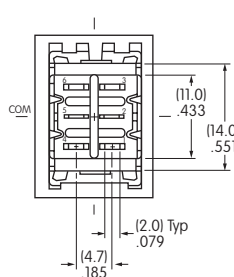
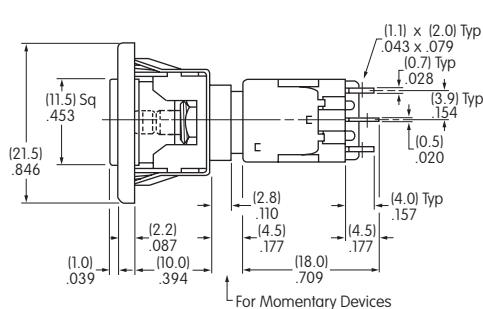
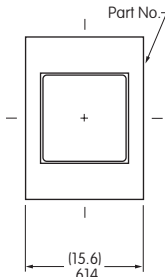
Gray

Material:
Polycarbonate

Finish:
Glossy



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



Low Rise

Double Pole

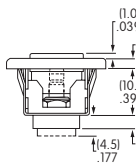
EB2061-B-J21A

CAP EXTENSIONS & BEZEL TYPES

Cap Extension with Bezel

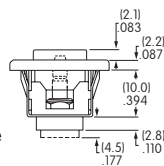
J22

Low Rise
Momentary



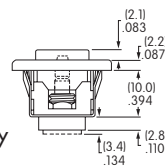
J32

Low Rise
Alternate



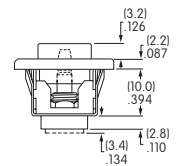
J42

High Rise
Momentary



J52

High Rise
Alternate

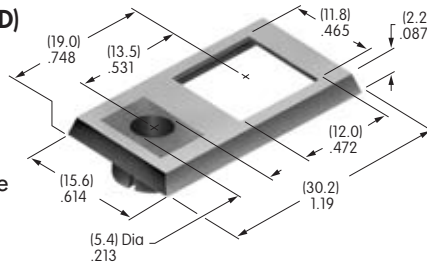


AT208 Bezel with 1 Round LED (AT070 LED)

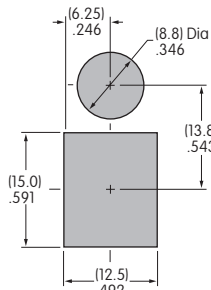
A

Black

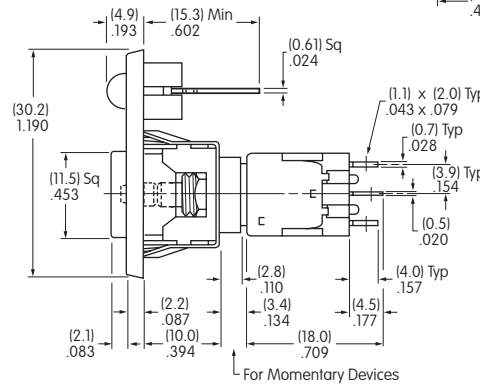
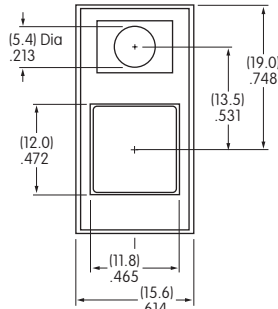
Material: Polycarbonate
Finish: Glossy



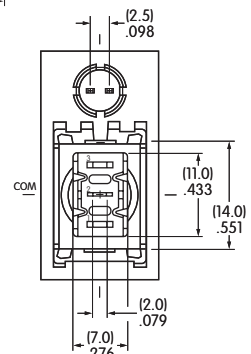
Maximum Panel Thickness
.039" ~ .126"
(1.0mm ~ 3.2mm)
Cutout applies to SP & DP



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



For Momentary Devices



EB2011-B-J42AC

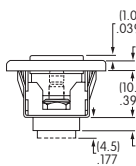
High Rise

Single Pole

Cap Extension with Bezel

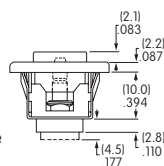
J23

Low Rise
Momentary



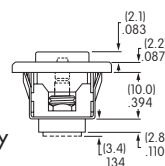
J33

Low Rise
Alternate



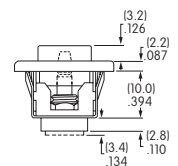
J43

High Rise
Momentary



J53

High Rise
Alternate

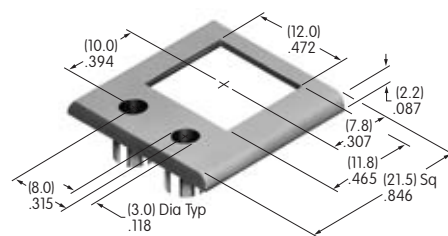


AT212 Bezel with 2 Round LEDs (AT617 LEDs)

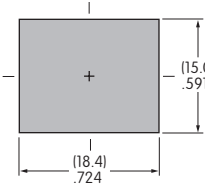
A

Black

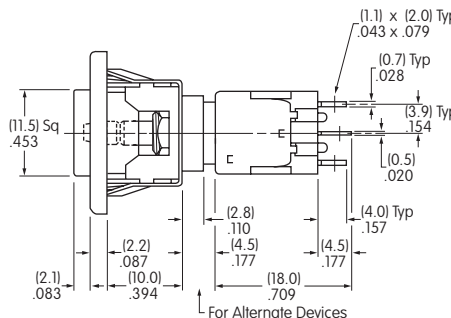
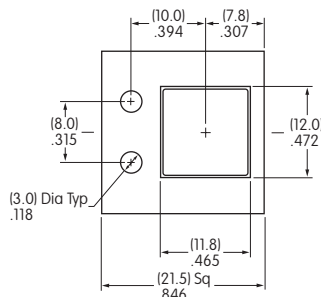
Material: Polycarbonate
Finish: Glossy



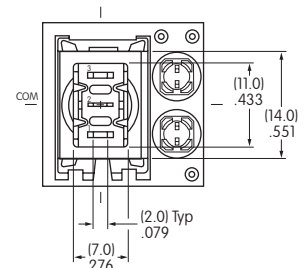
Maximum Panel Thickness
.039" ~ .126" (1.0mm ~ 3.2mm)
Cutout applies to SP & DP



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



For Alternate Devices



EB2065-B-J33ACF

Low Rise

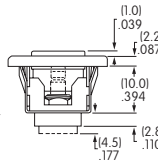
Single Pole

CAP EXTENSIONS & BEZEL TYPES

Cap Extension with Bezel

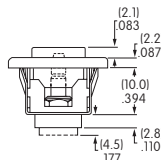
J24

Low Rise Momentary



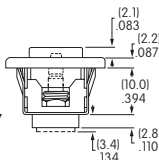
J34

Low Rise Alternate



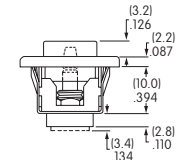
J44

High Rise Momentary



J54

High Rise Alternate

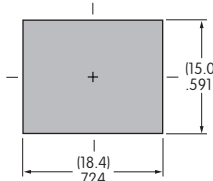
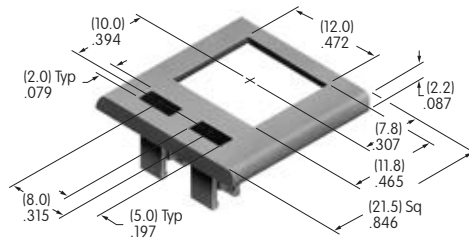


AT213 Bezel with 2 Rectangular LEDs (AT618 LEDs)

A

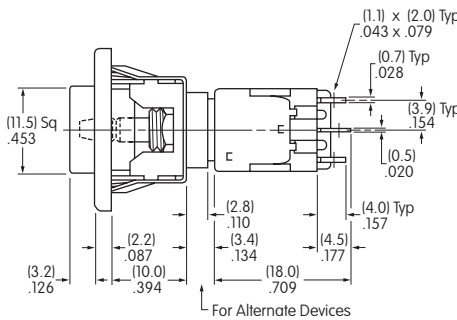
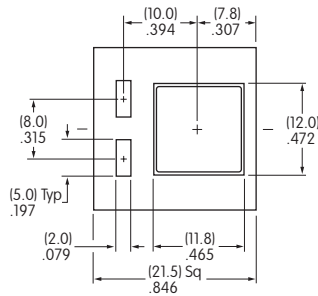
Black

Material: Polycarbonate
Finish: Glossy

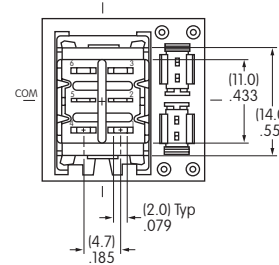


Maximum Panel Thickness
.039" ~ .126" (1.0mm ~ 3.2mm)
Cutout applies to SP & DP

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



High Rise



Double Pole

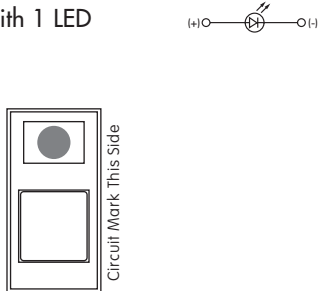


EB2085-B-J54ACF

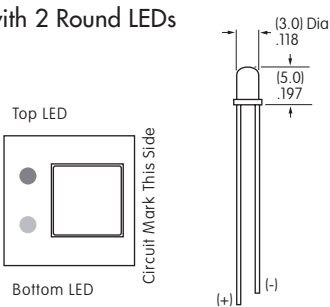
LED COLORS & SPECIFICATIONS

Bezel Orientation on Switch

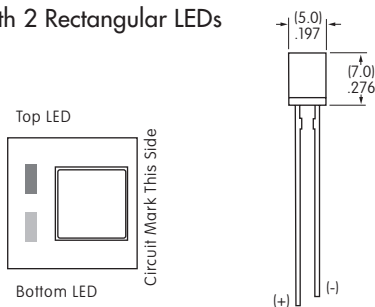
AT070 LED
For Bezel AT208
with 1 LED



AT617 LED
For Bezel AT212
with 2 Round LEDs



AT618 LED
For Bezel AT213
with 2 Rectangular LEDs



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

		AT070		AT617			AT618		
		C	F	C	E	F	C	E	F
	Color	Red	Green	Red	Yellow	Green	Red	Yellow	Green
Maximum Forward Current	I _{FM}	25mA	30mA	30mA	30mA	25mA	25mA	30mA	25mA
Typical Forward Current	I _F	20mA	20mA	20mA	20mA	20mA	20mA	20mA	20mA
Forward Voltage	V _F	2.8V	2.1V	2.0V	2.1V	2.25V	2.25V	2.1V	2.2V
Maximum Reverse Voltage	V _{RM}	4V	5V	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	0.40 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		

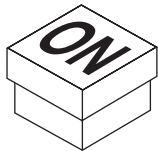
The electrical specifications shown are determined at a basic temperature of 25°C.
LED circuit is independent of switch operation. LED is colored in OFF state.

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.

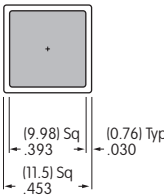
Suggested Printable Area for Cap



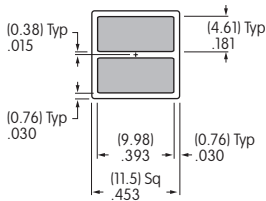
Recommended Print Method:

Screen Print or Pad Print

Epoxy based ink is recommended.



AT465



AT465

Shaded areas are printable areas.

Toggles

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement