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: 50 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 On-None-On & On-Off-On
50,000 operations minimum for other circuits
50,000 operations minimum for locking lever models
Electrical Life: 50,000 operations minimum
Nominal Operating Force: Toggles A, A1, E & K with Long Paddle: 1.47N (momentary); 1.18N (maintained)
Toggles J & H & K with Short Paddle: 2.72N (momentary); 1.84N (maintained)
Toggle L: 0.59N
Contact Timing: Nonshorting (break-before-make)
Angle of Throw: 26°

Materials & Finishes

Toggle: Nickel plated brass
Bushing: Carbon blended polyamide; nickel plated zinc alloy for locking levers & threaded bushing
Gasket: Nitrile butadiene rubber
Case Housing: Glass fiber reinforced polyamide
Support Bracket: Tin plated phosphor bronze
Movable Contact: Phosphor bronze with gold plating
Stationary Contacts: Copper alloy with gold plating
Terminals: Copper alloy with gold plating

Environmental Data

Operating Temperature Range: –30°C through +85°C (–22°F through +185°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: .30 ~ .45Nm (2.65 ~ 3.98 lb•in) for A1 actuator with threaded bushing only

PCB Processing

Soldering: Wave Soldering Recommended: See Profile A in Supplement section.
Manual Soldering: See Profile A in Supplement section.
Cleaning: Automated cleaning. See Cleaning specifications in Supplement section.

Standards & Certifications

Flammability Standards: UL94V-0 available
The B Series toggles 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

Subminiature size saves space on PC boards.

Specifically developed for logic-level applications.

Antistatic superstructure, consisting of the carbon impregnated bushing and the support bracket, prevents static discharge to the contacts. Static electricity from an operator's touch travels from actuator through the bushing and bracket to the PC board.

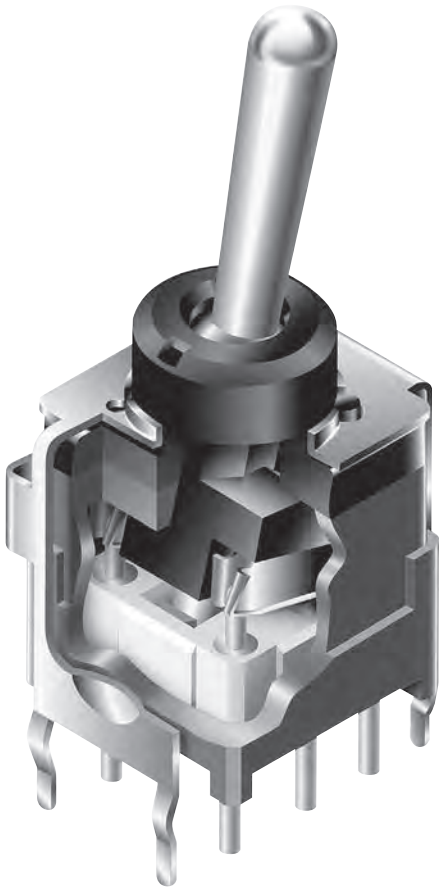
Locking lever mechanism offered as a toggle option.

Optional threaded, 6mm diameter bushing for panel seal mounting meets IP65 of IEC60529 specifications (similar to NEMA 4 and 13).

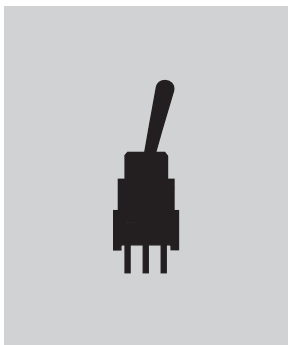
Totally sealed body construction prevents contact contamination and allows time- and money-saving soldering and cleaning. Epoxy sealed terminals lock out flux and other contaminants.

Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smoother, 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.



Actual Size



Series B

Process Sealed Subminiature Antistatic Toggles

TYPICAL SWITCH ORDERING EXAMPLE

B 1 2 A B — ☐ ☐

Poles

1	SPDT
2	DPDT

Toggles

A	.394" (10.0mm) Bat
A1	.315" (8.0mm) Bat with Panel Seal Threaded Bushing (Straight PC only)
J	.248" (6.3mm) Bat
E	.394" (10.0mm) Flatted
H	.248" (6.3mm) Flatted
L	Locking Lever (with Circuits 2 & 3 only)

Optional Caps

G	.394" (10.0mm) Bat Lever Cap
J	.248" (6.3mm) Bat Lever Cap

Circuits

2	ON	NONE	ON
3	ON	OFF	ON
5	ON	NONE	(ON)
*R	(ON)	NONE	ON
8	(ON)	OFF	(ON)
9	ON	OFF	(ON)
*S	(ON)	OFF	ON

( ) = Momentary

* Reverse circuits R & S available with right angle & vertical only

PC Terminals

P	Straight
*B	Straight with Bracket
*H	Right Angle with Bracket
*V	Vertical with Bracket

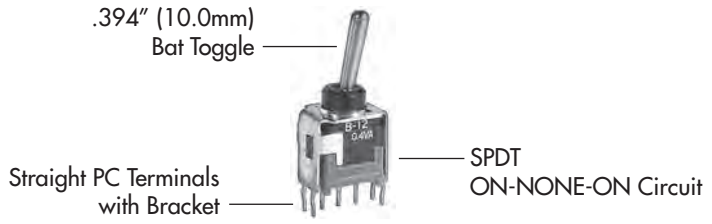
* Bracketed models are ESD protected

Cap Colors / Paddle Colors

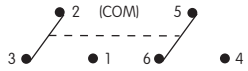
Cap Colors		Paddle Colors
A	Black	A
B	White	B
C	Red	C
---	Yellow	E
---	Green	F
---	Blue	G
---	Gray	H

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

B12AB



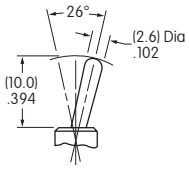
POLES & CIRCUITS

Pole	Model	Toggle Position ( ) = Momentary: Up	Center	Down	Connected Terminals: Up	Center	Down	Throw & Schematics
		Slot			Slot			Note: Terminal numbers are not actually on the switch.
SP	B12	ON	NONE	ON	2-3	OPEN	2-1	SPDT 
	B13	ON	OFF	ON				
	B15	ON	NONE	(ON)				
	B1R	(ON)	NONE	ON				
	B18	(ON)	OFF	(ON)				
	B19	ON	OFF	(ON)				
	B1S	(ON)	OFF	ON				
DP	B22	ON	NONE	ON	2-3 5-6	OPEN	2-1 5-4	DPDT 
	B23	ON	OFF	ON				
	B25	ON	NONE	(ON)				
	B2R	(ON)	NONE	ON				
	B28	(ON)	OFF	(ON)				
	B29	ON	OFF	(ON)				
	B2S	(ON)	OFF	ON				

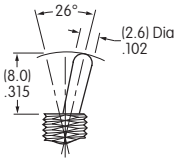
TOGGLES

Standard Material & Finish: Brass with Bright Nickel

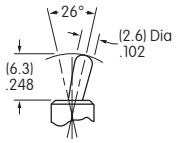
A **.394" (10.0mm) Bat**



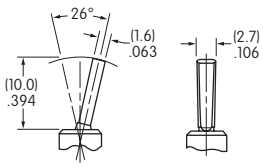
A1 **.315" (8.0mm) Bat with Panel Seal Threaded Bushing**



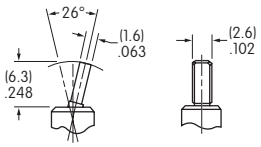
J **.248" (6.3mm) Bat**



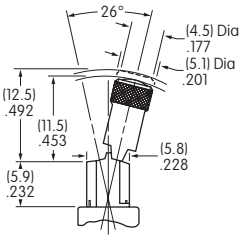
E **.394" (10.0mm) Flatted**



H **.248" (6.3mm) Flatted**



L **Locking Lever**



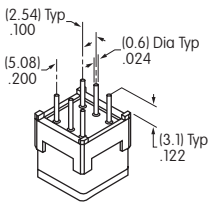
Series B

Process Sealed Subminiature Antistatic Toggles

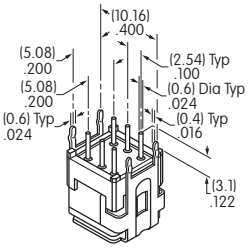
PC TERMINALS

Use of a support bracket is recommended to increase PCB mounting strength and stability.

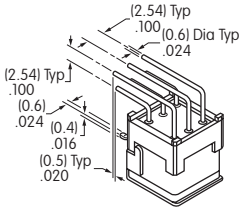
P **Straight**



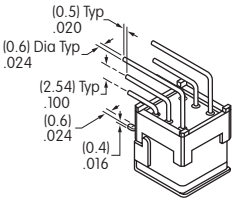
B **Straight with Bracket**



H **Right Angle with Bracket**



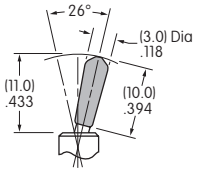
V **Vertical with Bracket**



OPTIONAL CAPS

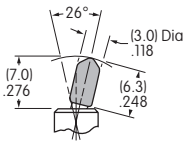
G **AT4003**
.394" (10.0mm) Bat Lever Cap

Material: PVC
Colors Available:
A, B, C



J **AT4064**
.248" (6.3mm) Bat Lever Cap

Material: PVC
Colors Available:
A, B, C

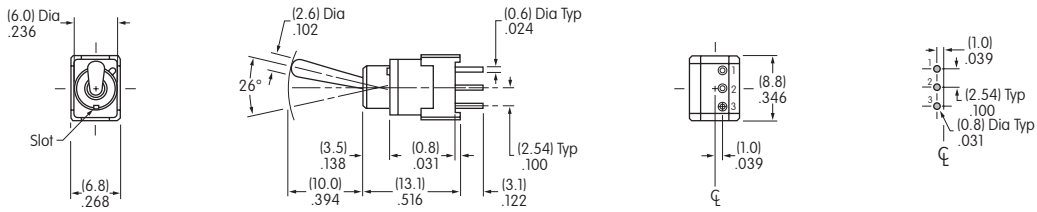


Color Codes:

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

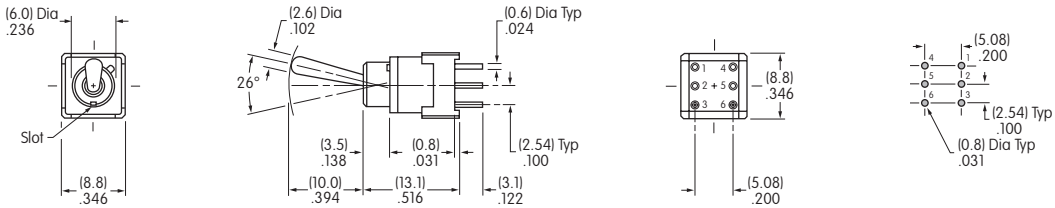
TYPICAL SWITCH DIMENSIONS

Single Pole — Straight PC



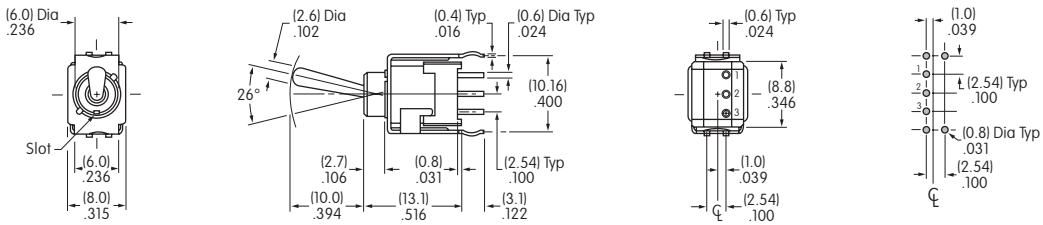
B12AP

Double Pole — Straight PC



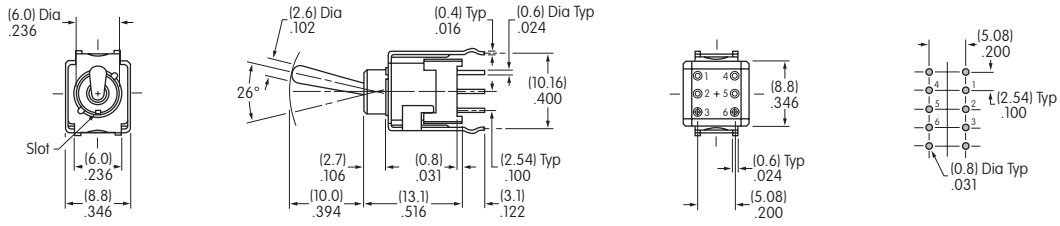
B22AP

Single Pole — Straight PC • Bracket



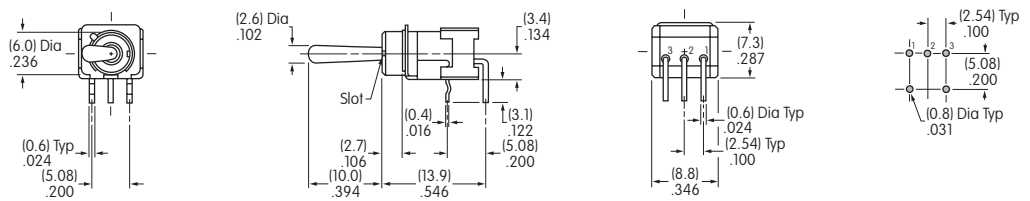
B12AB

Double Pole — Straight PC • Bracket



B22AB

Single Pole — Right Angle PC

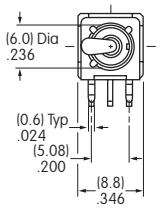


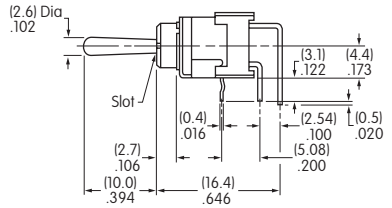
B12AH

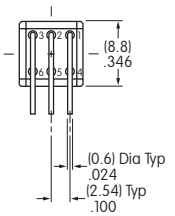
TYPICAL SWITCH DIMENSIONS

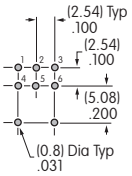
Right Angle PC — Double Pole

B22AH



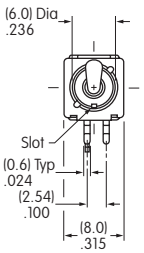


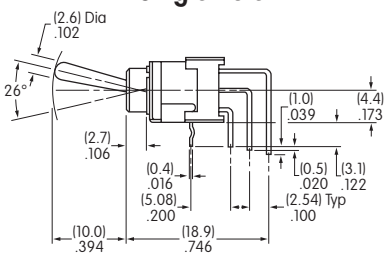


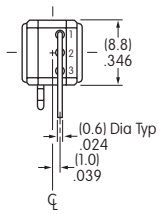


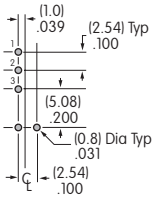
Vertical PC — Single Pole

B12AV



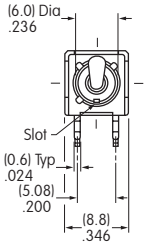


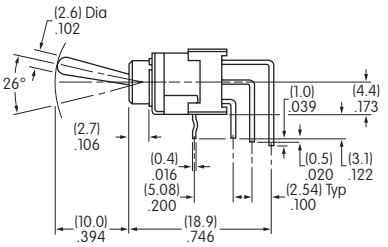


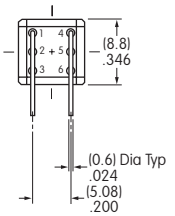


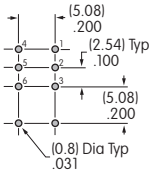
Vertical PC — Double Pole

B22AV



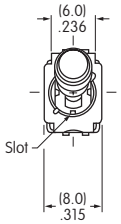


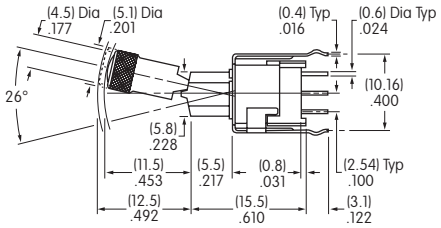


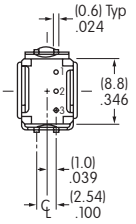


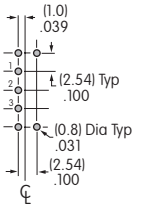
Locking Lever • Straight PC • Bracket — Single Pole

B12LB



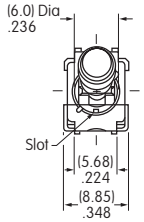


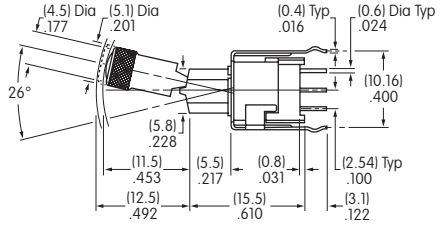


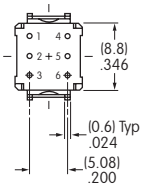


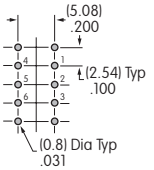
Locking Lever • Straight PC • Bracket — Double Pole

B22LB



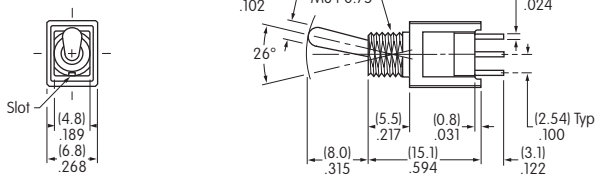




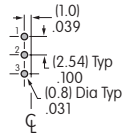


TYPICAL SWITCH DIMENSIONS

Panel Seal • Single Pole

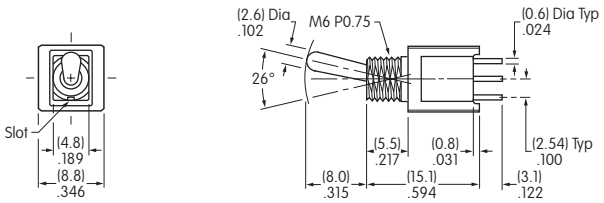


Threaded Bushing • Straight PC

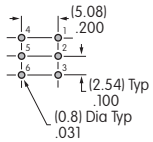


B12A1P

Panel Seal • Double Pole



Threaded Bushing • Straight PC

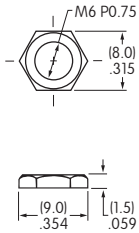


B22A1P

STANDARD HARDWARE & PANEL CUTOUT

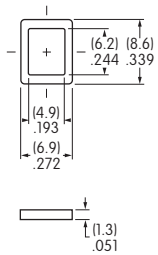
AT513M
Metric Hex Nut

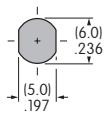
Material:
Brass,
Nickel plated



AT063
Gasket

Material:
Nitrile butadiene rubber





Maximum Panel Thickness with Standard Hardware: .087" (2.2mm)

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: 50 milliohms maximum
Insulation Resistance: 500 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: 1.18N
Contact Timing: Nonshorting (break-before-make)
Angle of Throw: 26°

Materials & Finishes

Actuator: Polyamide
Bushing Housing: Polyamide
Case Housing: Glass fiber reinforced polyamide
Support Bracket: Phosphor bronze with tin plating
Movable Contact: Phosphor bronze with gold plating
Stationary Contacts: Brass with tin plating
Terminals: Brass 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 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 5 minutes; 3 right angled directions for 2 hours
Shock: 50G (490m/s^2) acceleration (tested in 3 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 B Series illuminated toggles 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.

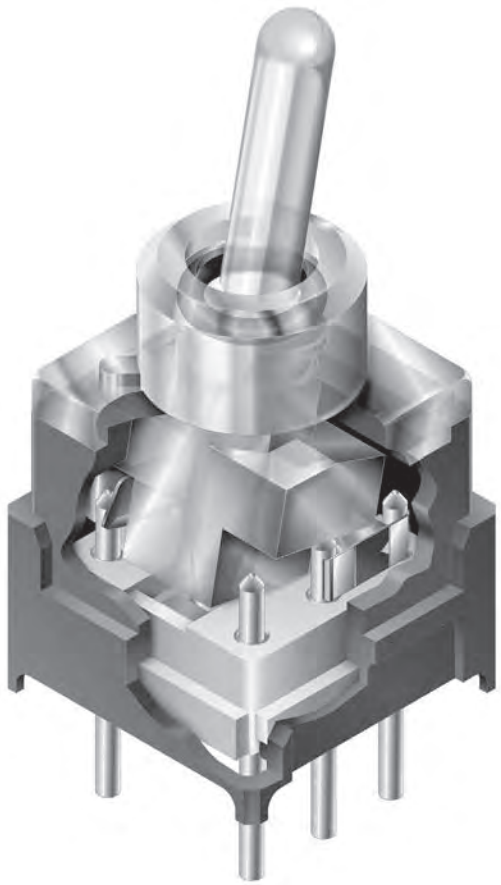
Distinctive Characteristics

LED provides maximum illumination to bushing and actuator, indicating actuator status in highly visible green, red, or amber for single color or red/green for bicolor.

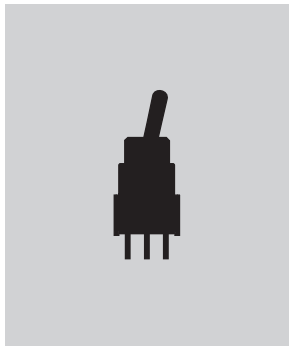
Totally sealed body construction prevents contact contamination and allows time- and money-saving automated soldering and cleaning. Molded-in, epoxy sealed terminals lock out flux and other contaminants.

Award-winning STC contact mechanism with benefits unavailable in conventional mechanisms: smoother, 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.



Actual Size



TYPICAL SWITCH ORDERING EXAMPLE

B	1	2	J	J	P	C

Poles

1	SPDT

Circuits

2	ON	NONE	ON

Combines with single color or bicolor LEDs

3	ON	OFF	ON

Combines with bicolor LED only

Actuator

J	Clear

Bushing

J	Clear

PC Terminals

P	Straight
H	Right Angle
V	Vertical

LEDs

Single Color

C	Red
D	Amber
F	Green

ON-NONE-ON only

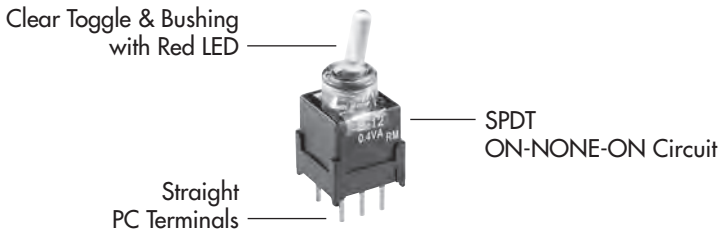
Bicolor

CF	Red/Green

ON-NONE-ON & ON-OFF-ON

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

B12JJPC

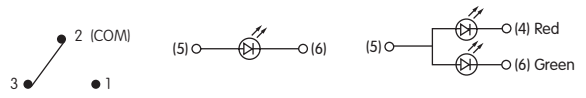


POLE & CIRCUITS

Pole Throw	Model	Toggle Position: Up	Center	Down	Connected Terminals: Up	Center	Down
SPDT	B12	ON	NONE	ON	2-3	NONE	2-1
	B13	ON	OFF	ON	2-3	OPEN	2-1

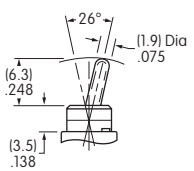
Note: Terminal numbers are not actually on the switch. LED circuit is isolated and requires an external power source.

Throw & Schematics



ACTUATOR & BUSHING

J Clear Toggle



J Clear Bushing

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.

		Single Color			Bicolor
	Colors	C Red	D Amber	F Green	CF Red/Green
Maximum Forward Current	I_{FM}	30mA	30mA	25mA	30mA/25mA
Typical Forward Current	I_F	20mA	20mA	20mA	20mA/20mA
Forward Voltage	V_F	1.95V	2.0V	3.3V	1.95V/3.3V
Maximum Reverse Voltage	V_{RM}	5V	5V	5V	5V/5V
Current Reduction Rate Above 25°C	ΔI_F	0.40mA/°C		0.33mA/°C	0.40mA/°C/0.33mA/°C
Ambient Temperature Range		–25°C ~ +55°C			

PC TERMINALS

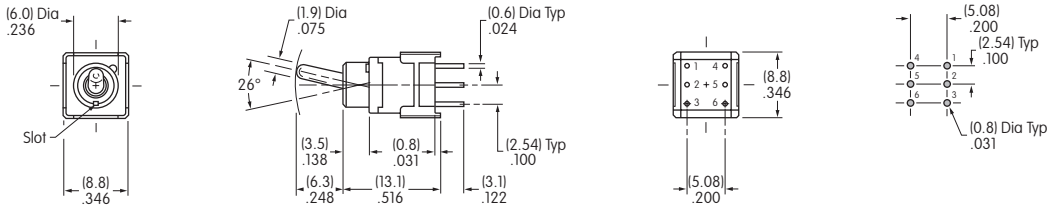
P Straight

H Right Angle with Bracket

V Vertical with Bracket

TYPICAL SWITCH DIMENSIONS

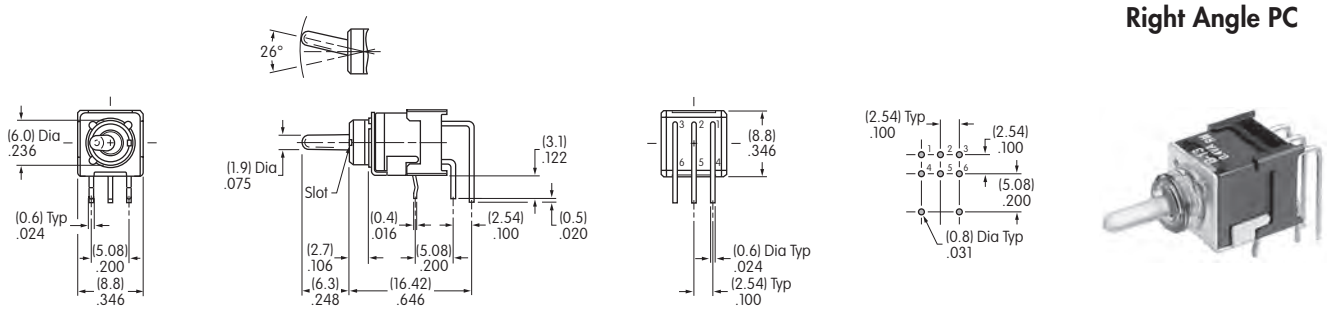
Straight PC



Terminal 4 is a support pin on single color models.

B12JJPC

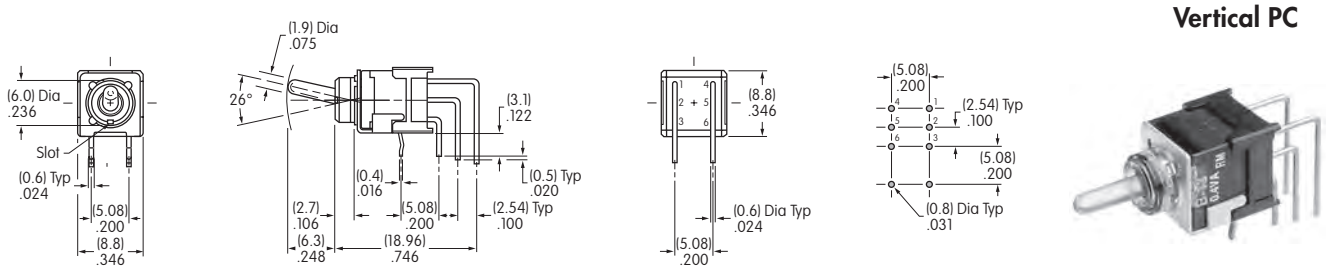
Right Angle PC



Terminal 4 is a support pin on single color models.

B13JJHCF

Vertical PC



Terminal 4 is a support pin on single color models.

B13JJVCF