

## General Specifications

Toggle

Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

### B Electrical Capacity (Resistive Load)

**Power Level (silver):** 6A @ 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:** 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 & case for 1 minute minimum

**Mechanical Life:** 50,000 operations minimum  
**Electrical Life:** 25,000 operations minimum

Nominal Operating Force:		On-to-On Position		Off-to-On Position	
Paddles	Single Pole	3.19N		3.92N	
	Double Pole	4.41N		7.06N	
Rockers	Single Pole	6.37N		9.80N	
	Double Pole	13.73N		17.65N	

**Angle of Throw:** 20°

### Materials & Finishes

**Housing:** Stainless steel  
**Mounting Bracket:** Stainless steel  
**Movable Contacts:** Silver alloy or silver alloy with gold plating  
**Stationary Contacts:** Silver with silver plating or copper or brass with gold plating  
**Lamp Contacts:** Phosphor bronze  
**Base:** Diallyl phthalate (UL94V-0)  
**Switch Terminals:** Copper with silver or gold plating  
**Lamp Terminals:** Brass with silver or gold plating

### Environmental Data

**Operating Temp Range:** -10°C through +55°C (+14°F through +131°F) for rockers  
 -25°C through +70°C (-13°F through +158°F) for paddles  
**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<sup>2</sup>) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

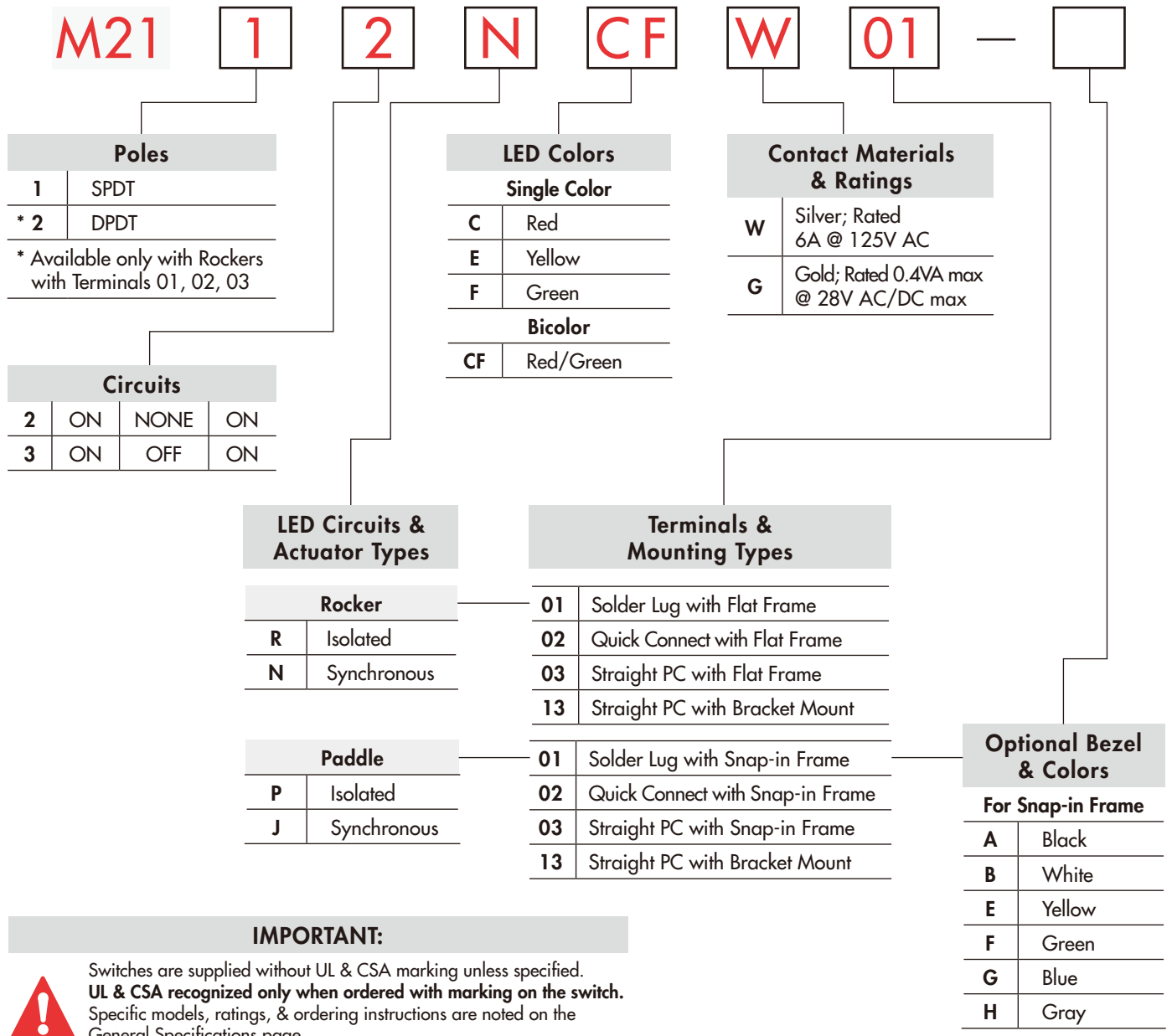
### Installation

**Soldering Time & Temp:** Wave Soldering (PC version): See Profile B in Supplement section.  
 Manual Soldering: See Profile B in Supplement section.  
 Note: Lever must be in center position while soldering.  
**Cleaning:** PC mountable device is not process sealed. Hand clean locally using alcohol based solution.

### Standards & Certifications

**Flammability Standards:** UL94V-0 base  
**UL:** **File No. E44145 - Recognized only when ordered with marking on switch.**  
 Add "/U" before dash in part number to order UL recognized switch.  
 Single pole rockers with synchronous circuits & single color LEDs & solder lug or PC recognized at 6A @ 125V AC.  
**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 pole rockers with synchronous circuits & single color LEDs certified at 6A @ 125V AC.

TYPICAL SWITCH ORDERING EXAMPLE



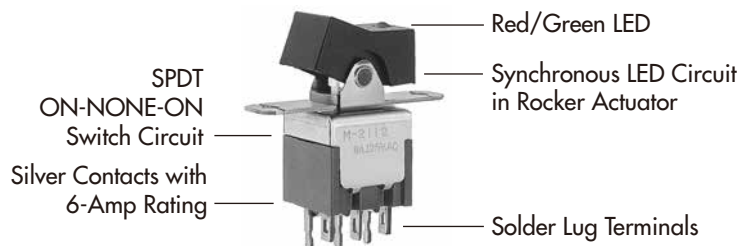
IMPORTANT:







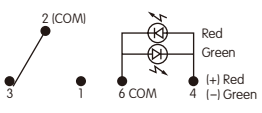
Switches are supplied without UL & CSA marking unless specified. **UL & CSA recognized only when ordered with marking on the switch.** Specific models, ratings, & ordering instructions are noted on the General Specifications page.

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

M2112NCFW01



## POLES & CIRCUITS & LED ILLUMINATION

Model	Pole & Throw	Toggle Position & Terminal Numbers			Schematics
		Down 	Center 	Up 	
Notes: Terminal numbers are not actually on the switch. LEDs require an external power source.					
<b>M2112</b>	<b>SPDT</b>	ON 2-3	NONE NONE	ON 2-1	Isolated Single Color LED  Isolated Bicolor LED 
LED Circuit	Isolated LEDs (see schematics) Connected LED Terminals	ON 4-6	NONE NONE	ON 4-6	
	Synchronous Single Color LED Connected LED Terminals	ON 4-6	NONE NONE	OFF OPEN	
LED Circuit	Synchronous Bicolor LED Connected LED Terminals	Red 5-6	NONE NONE	Green 5-4	
	<b>M2113</b>	<b>SPDT</b>	ON 2-3	OFF OPEN	ON 2-1
LED Circuit	Isolated LEDs (see schematics) Connected LED Terminals	ON 4-6	ON 4-6	ON 4-6	
	Synchronous Single Color LED Connected LED Terminals	ON 4-6	OFF OPEN	ON 4-6	
LED Circuit	Synchronous Bicolor LED Connected LED Terminals	Red 5-6	OFF OPEN	Green 5-4	
	<b>M2122</b>	<b>DPDT</b>	ON 2-3 5-6	NONE NONE	ON 2-1 5-4
LED Circuit	Isolated LEDs (see schematics) Connected LED Terminals	ON 7-9	NONE NONE	ON 7-9	
	Synchronous Single Color LED Connected LED Terminals	ON 7-9	NONE NONE	OFF OPEN	
LED Circuit	Synchronous Bicolor LED Connected LED Terminals	Red 8-9	NONE NONE	Green 8-7	
	<b>M2123</b>	<b>DPDT</b>	ON 2-3 5-6	OFF OPEN	ON 2-1 5-4
LED Circuit	Isolated LEDs (see schematics) Connected LED Terminals	ON 7-9	ON 7-9	ON 7-9	
	Synchronous Single Color LED Connected LED Terminals	ON 7-9	OFF OPEN	ON 7-9	
LED Circuit	Synchronous Bicolor LED Connected LED Terminals	Red 8-9	OFF OPEN	Green 8-7	

## LED COLORS & SPECIFICATIONS

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. 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. Bicolor LED is translucent white when unlit.

		Rockers				Paddles				Units
		Single Color		Bicolor	Single Color		Bicolor			
		C	E	F	CF	C	E	F	CF	
Maximum Forward Current	$I_{FM}$	30	30	30	25	25	30	25	30/25	mA
Typical Forward Current	$I_F$	20	20	20	20	20	20	20	20/20	mA
Forward Voltage	$V_F$	2.2	2.1	2.2	1.7/2.0	2.25	2.1	2.2	2.0/2.2	V
Maximum Reverse Voltage	$V_{RM}$	4	4	4	—	5	5	5	—	V
Current Reduction Rate Above 25°C	$\Delta I_F$	0.38	0.38	0.38	0.33/0.33	0.33	0.40	0.33	0.43/0.38	mA/°C
Ambient Temperature Range		-10° ~ +55°C				-25° ~ +50°C			-25° ~ +70°C	

Toggles  
 Rockers B  
 Pushbuttons  
 Illuminated PB  
 Programmable  
 Keylocks  
 Rotaries  
 Slides  
 Tactiles  
 Tilt  
 Touch  
 Indicators  
 Accessories  
 Supplement

## LED CIRCUIT, ROCKER, & MOUNTING TYPE COMBINATIONS

**R**

Rocker with Isolated LED Circuit

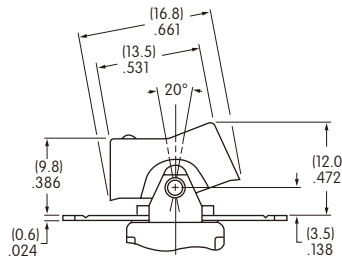
**N**

Rocker with Synchronous LED Circuit

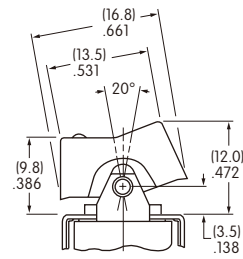
Material: Polyamide

Finish: Matte

Color: Black

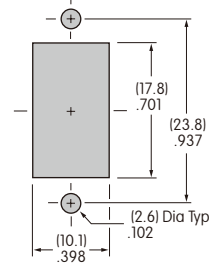


Flat Frame combines with Terminal codes 01, 02, & 03.



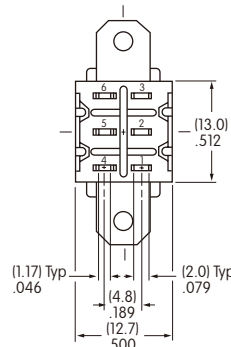
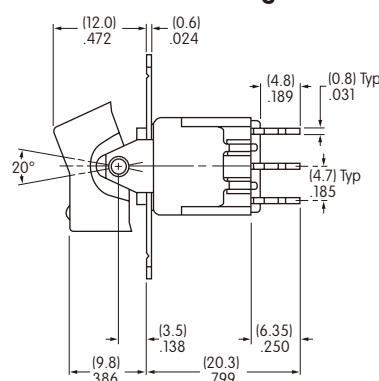
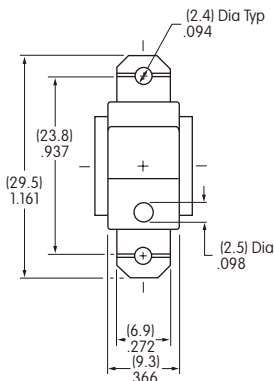
Bracket combines with Terminal code 13.

Maximum Panel Thickness  
.126" (3.2mm)



## TYPICAL ROCKER SWITCH DIMENSIONS

### Single Pole



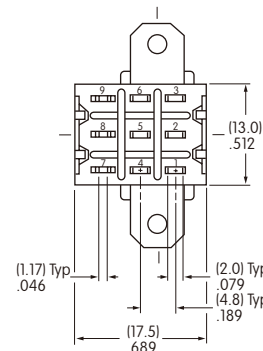
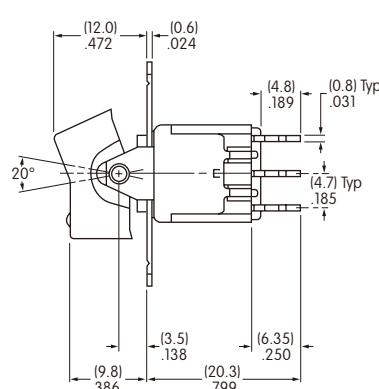
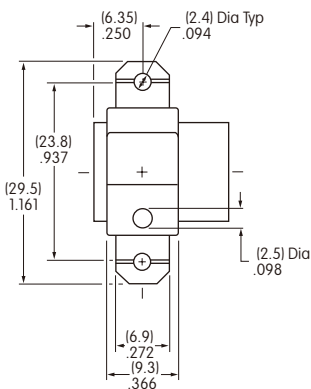
Single color LED switch does not have terminal 5.

### Solder Lug



**M2112NCFW01**

### Double Pole



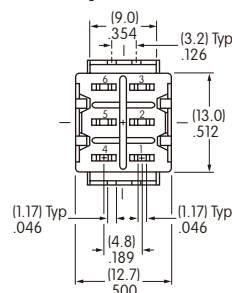
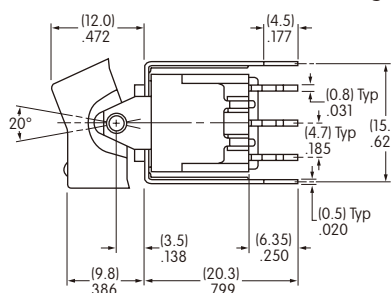
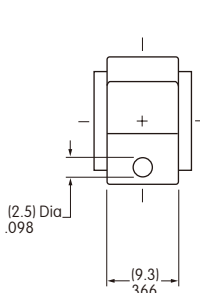
Single color LED switch does not have terminal 8.

### Solder Lug



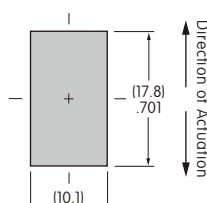
**M2122NCFW01**

### Single Pole Only



Single color LED switch does not have terminal 5. Silver contact material is standard.

### Straight PC • Bracket



**M2112NCFW13**

## LED CIRCUIT, PADDLE, & MOUNTING TYPE COMBINATIONS

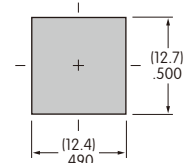
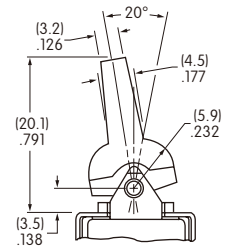
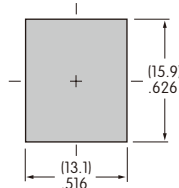
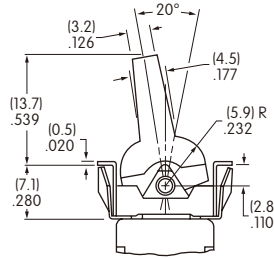
**P** Paddle with Isolated LED Circuit

**J** Paddle with Synchronous LED Circuit

Maximum Panel Thickness  
 .039" ~ .126" (1.0 ~ 3.2mm)  
 without Bezel

Maximum Panel Thickness  
 .126" (3.2mm)

Material: Polyamide  
 Finish: Matte  
 Color: Black



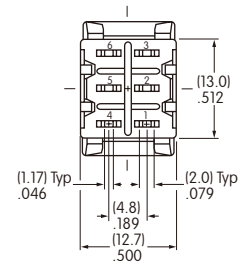
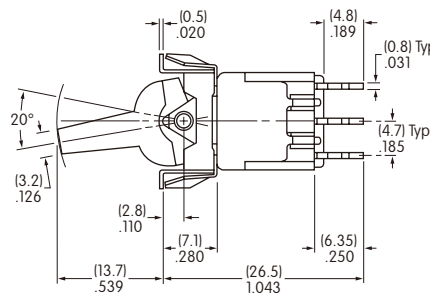
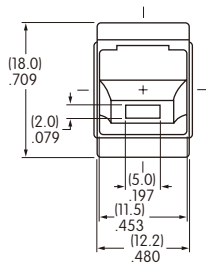
Snap-in combines with Terminal codes 01, 02, & 03

Bracket combines with Terminal code 13

## TYPICAL PADDLE SWITCH DIMENSIONS

Solder Lug • Snap-in

Single Pole Only

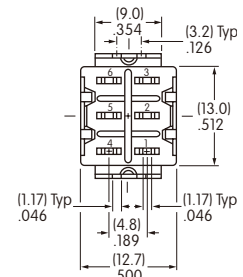
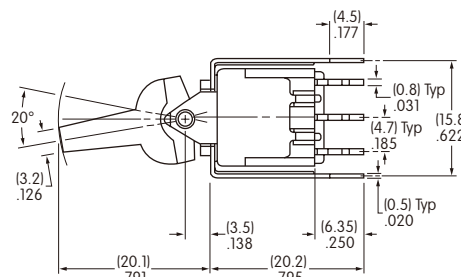
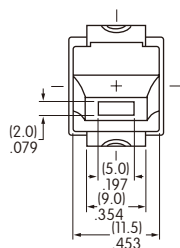


**M2112JCFW01**

Single color LED switch does not have terminal 5.

Straight PC • Bracket

Single Pole Only



**M2112JCFW13**

Silver contact material is standard. Single color LED switch does not have terminal 5.

Toggles  
 Rockers B  
 Pushbuttons  
 Illuminated PB  
 Programmable  
 Keylocks  
 Rotaries  
 Slides  
 Tactiles  
 Tilt  
 Touch  
 Indicators  
 Accessories  
 Supplement

## CONTACT MATERIALS & RATINGS

**W**

Silver over Silver

Power Level

6A @ 125V AC & 3A @ 250V AC

**G**

Gold over Brass or Copper

Logic Level

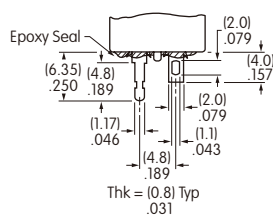
0.4VA maximum @ 28V AC/DC maximum

Complete explanation of operating range in Supplement section.

## TERMINALS

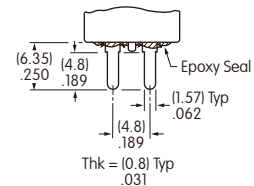
**01**

Solder Lug with Turret LED Terminal



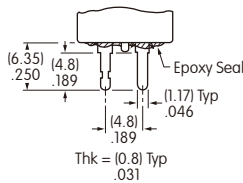
**02**

Quick Connect

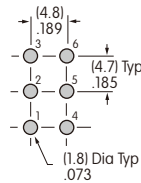


**03**

Straight PC with Turret LED Terminal

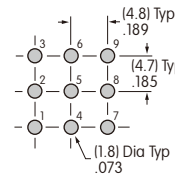


Single Pole



Single color LED & isolated bicolor LED switches do not have terminal 5.

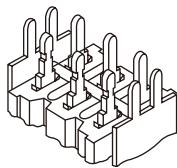
Double Pole



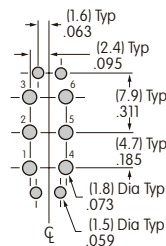
Single color LED & isolated bicolor LED switches do not have terminal 8.

**13**

Straight PC with Bracket & Turret LED Terminal



Single Pole



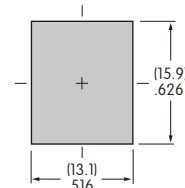
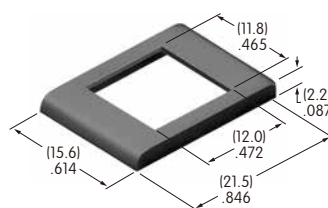
Single color LED & isolated bicolor LED switches do not have terminal 5.

## OPTIONAL BEZEL & COLORS

AT2107 Bezel for Snap-in Panel Frame

Material: Polyamide

Finish: Matte



Colors Available:

**A**

Black

**B**

White

**E**

Yellow

**F**

Green

**G**

Blue

**H**

Gray