

General Specifications

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	
		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/s²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

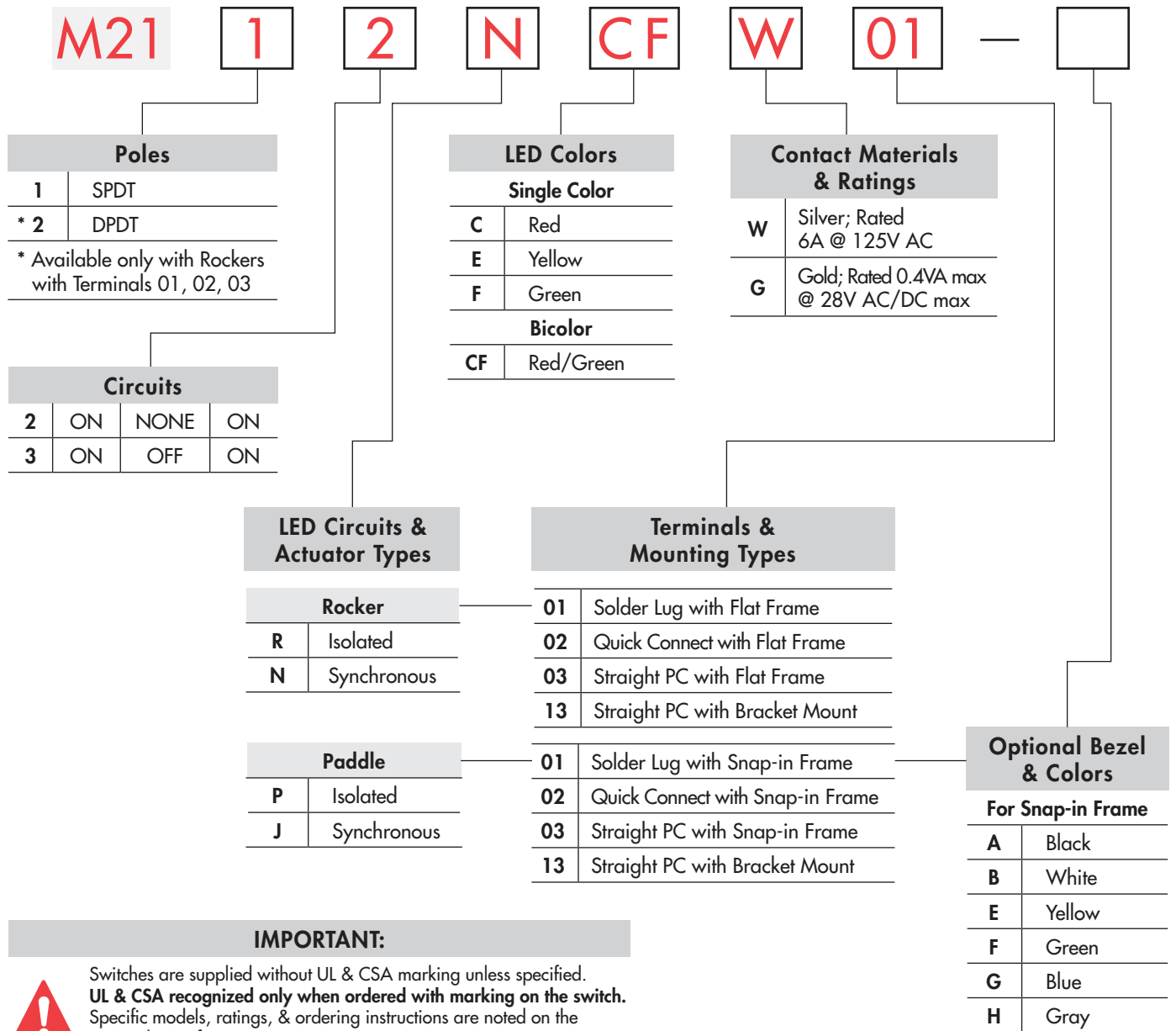
Installation

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



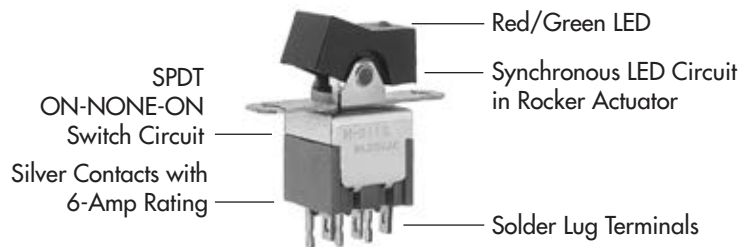
IMPORTANT:



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.




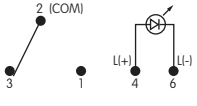
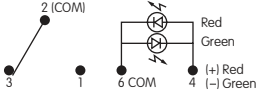
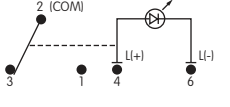
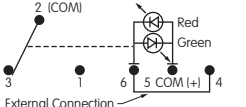
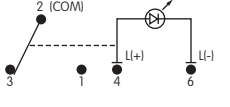
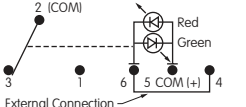
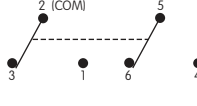
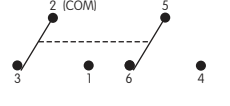
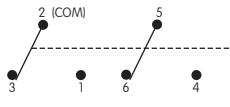
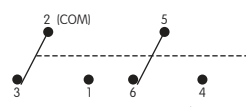
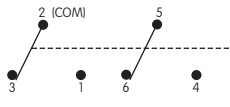
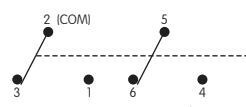
DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

M21 12NCFW01



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

POLES & CIRCUITS & LED ILLUMINATION

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

LED COLORS & SPECIFICATIONS

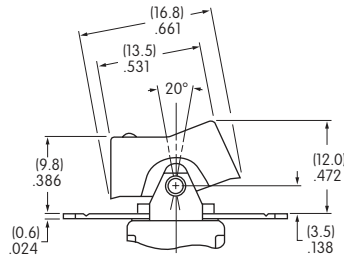
The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in Supplement Section. 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	
		Red	Yellow	Green	Red/Green	Red	Yellow	Green	Red/Green	
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	ΔI_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	

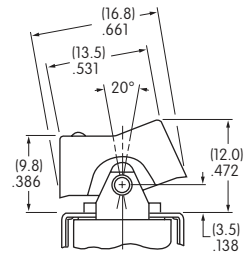
LED CIRCUIT, ROCKER, & MOUNTING TYPE COMBINATIONS

- R** Rocker with Isolated LED Circuit
- N** Rocker with Synchronous LED Circuit

Material: Polyamide
 Finish: Matte
 Color: Black

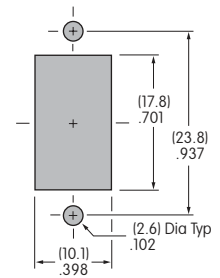


Flat Frame combines with Terminal codes 01, 02, & 03.



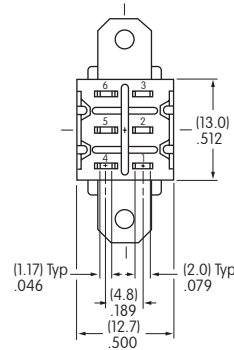
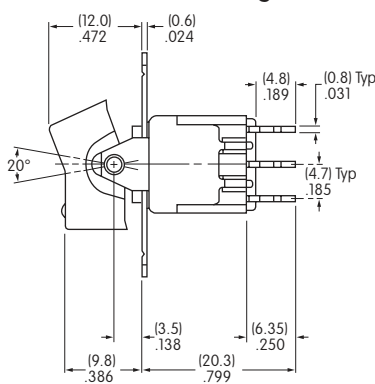
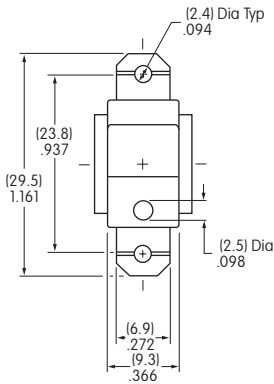
Bracket combines with Terminal code 13.

Maximum Panel Thickness
 .126" (3.2mm)



TYPICAL ROCKER SWITCH DIMENSIONS

Single Pole



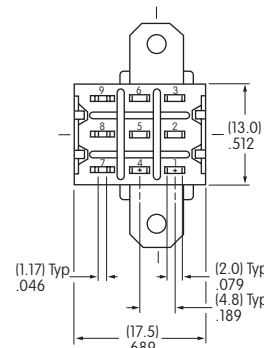
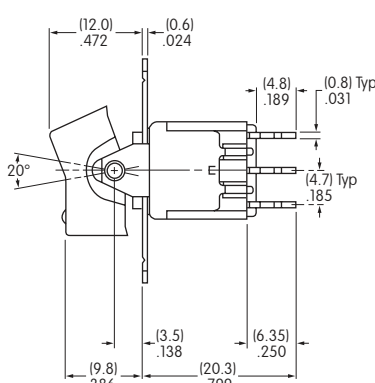
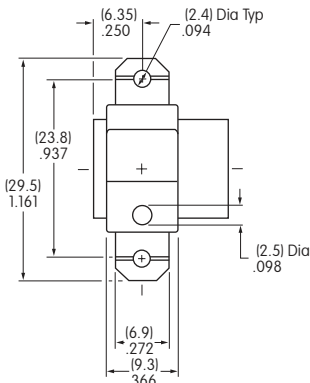
Single color LED switch does not have terminal 5.

Solder Lug



M2112NCFW01

Double Pole



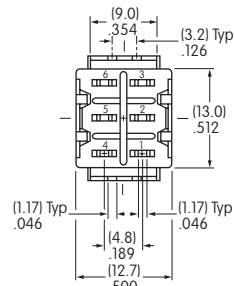
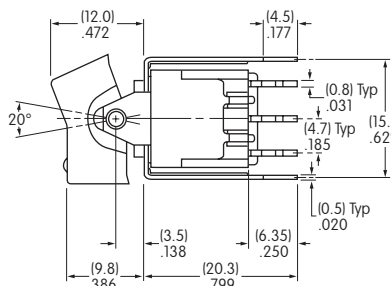
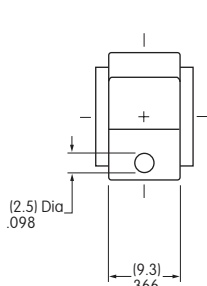
Single color LED switch does not have terminal 8.

Solder Lug



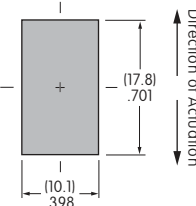
M2122NCFW01

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

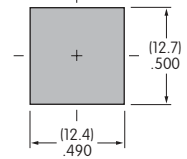
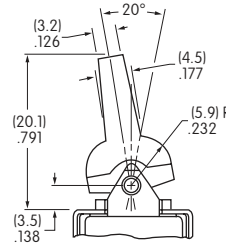
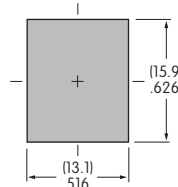
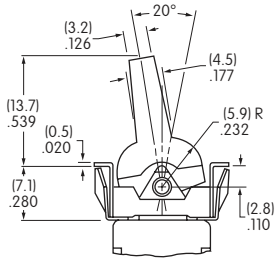
P Paddle with Isolated LED Circuit

J Paddle with Synchronous LED Circuit

Maximum Panel Thickness
 .039" ~ .126" (1.0 ~ 3.2mm)
 without Bezel
 .039" ~ .098" (1.0 ~ 2.5mm)
 with Bezel

Maximum Panel Thickness
 .126" (3.2mm)

Material: Polyamide
 Finish: Matte
 Color: Black



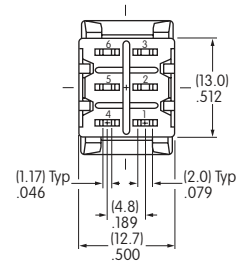
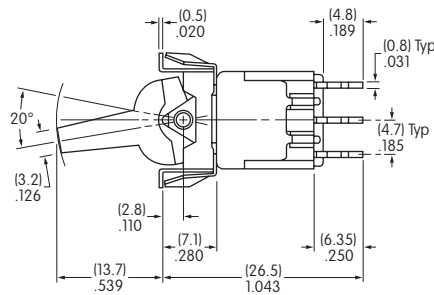
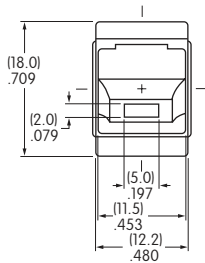
Snap-in combines with Terminal codes 01, 02, & 03

Bracket combines with Terminal code 13

TYPICAL PADDLE SWITCH DIMENSIONS

Solder Lug • Snap-in

Single Pole Only

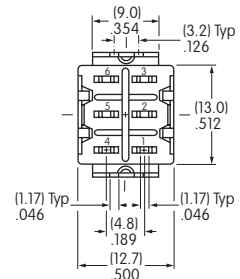
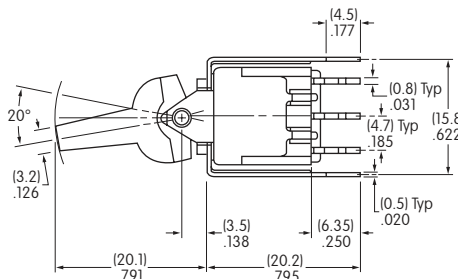
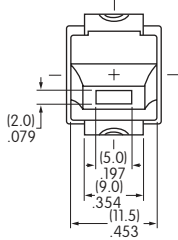


M2112JCFW01

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.

CONTACT MATERIALS & RATINGS

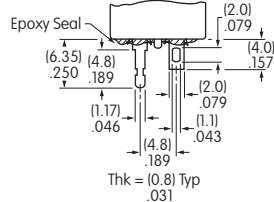
W Silver over Silver Power Level 6A @ 125V AC & 3A @ 250V AC

G Gold over Brass or Copper Logic Level 0.4VA maximum @ 28V AC/DC maximum

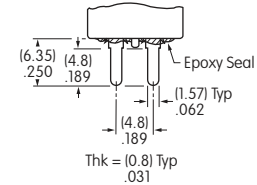
Complete explanation of operating range in Supplement section.

TERMINALS

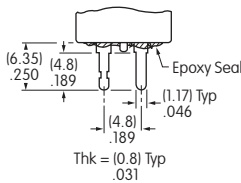
01 Solder Lug with Turret LED Terminal



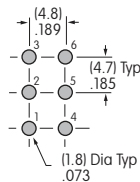
02 Quick Connect



03 Straight PC with Turret LED Terminal

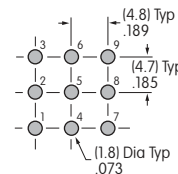


Single Pole



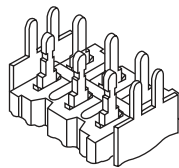
Single color LED & isolated bicolor LED switches do not have terminal 5.

Double Pole

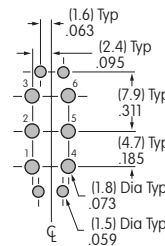


Single color LED & isolated bicolor LED switches do not have terminal 8.

13 Straight PC with Bracket & Turret LED Terminal



Single Pole



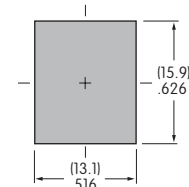
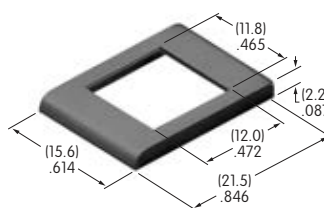
Single color LED & isolated bicolor LED switches do not have terminal 5.

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

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