General Specifications

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^2) 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

M21 [1] [2] [N] [CF] [W] [01] — [ ]

Poles

1	SPDT
* 2	DPDT

* Available only with Rockers with Terminals 01, 02, 03

Circuits

2	ON	NONE	ON
3	ON	OFF	ON

LED Colors

Single Color	
C	Red
E	Yellow
F	Green
Bicolor	
CF	Red/Green

Contact Materials & Ratings

W	Silver; Rated 6A @ 125V AC
G	Gold; Rated 0.4VA max @ 28V AC/DC max

LED Circuits & Actuator Types

Rocker	
R	Isolated
N	Synchronous

Paddle	
P	Isolated
J	Synchronous

Terminals & Mounting Types

01	Solder Lug with Flat Frame
02	Quick Connect with Flat Frame
03	Straight PC with Flat Frame
13	Straight PC with Bracket Mount

01	Solder Lug with Snap-in Frame
02	Quick Connect with Snap-in Frame
03	Straight PC with Snap-in Frame
13	Straight PC with Bracket Mount

Optional Bezel & Colors

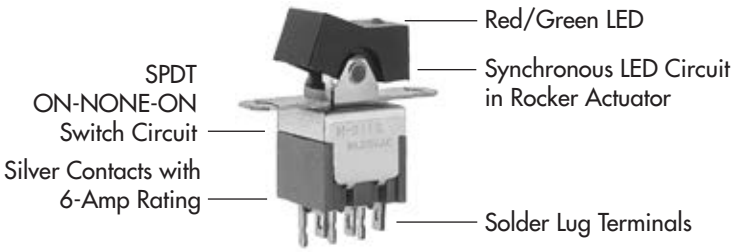
For Snap-in Frame	
A	Black
B	White
E	Yellow
F	Green
G	Blue
H	Gray

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



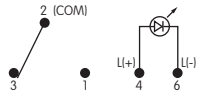
POLES & CIRCUITS & LED ILLUMINATION

Model		Pole & Throw	Toggle Position & Terminal Numbers: Down	Center	Up
M2112		**SPDT**	ON	NONE	ON
Connected Power Terminals			2-3	NONE	2-1
LED Circuit	**Isolated LEDs** (see schematics) Connected LED Terminals		ON 4-6	NONE NONE	ON 4-6
LED Circuit	**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
M2113		**SPDT**	ON	OFF	ON
Connected Power Terminals			2-3	OPEN	2-1
LED Circuit	**Isolated LEDs** (see schematics) Connected LED Terminals		ON 4-6	ON 4-6	ON 4-6
LED Circuit	**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
M2122		**DPDT**	ON	NONE	ON
Connected Power Terminals			2-3 5-6	NONE	2-1 5-4
LED Circuit	**Isolated LEDs** (see schematics) Connected LED Terminals		ON 7-9	NONE NONE	ON 7-9
LED Circuit	**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
M2123		**DPDT**	ON	OFF	ON
Connected Power Terminals			2-3 5-6	OPEN	2-1 5-4
LED Circuit	**Isolated LEDs** (see schematics) Connected LED Terminals		ON 7-9	ON 7-9	ON 7-9
LED Circuit	**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

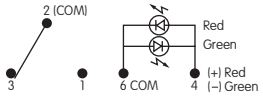
Schematics

Notes: Terminal numbers are not actually on the switch. LEDs require an external power source.

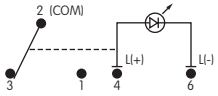
Isolated Single Color LED



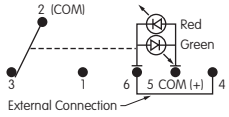
Isolated Bicolor LED



Synchronous Single Color LED



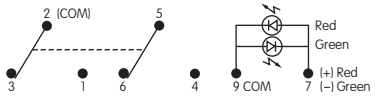
Synchronous Bicolor LED



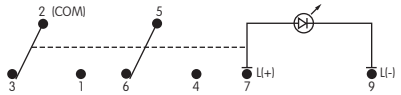
Isolated Single Color LED



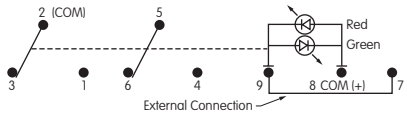
Isolated Bicolor LED



Synchronous Single Color LED



Synchronous Bicolor LED



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: Single Color C Red	Single Color E Yellow	Single Color F Green	Bicolor CF Red/Green	Paddles: Single Color C Red	Single Color E Yellow	Single Color F Green	Bicolor CF Red/Green	Units
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

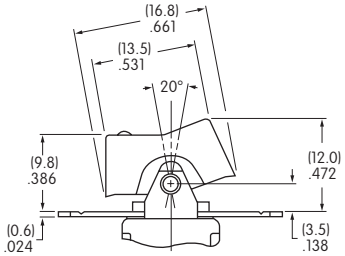
R **Rocker with Isolated LED Circuit**

N **Rocker with Synchronous LED Circuit**

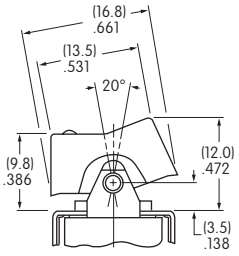
Material: Polyamide

Finish: Matte

Color: Black

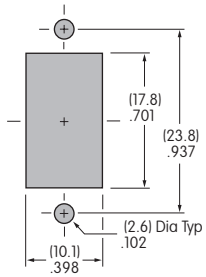


Flat Frame combines with Terminal codes 01, 02, & 03.



Bracket combines with Terminal code 13.

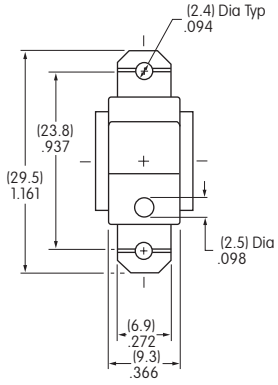
Maximum Panel Thickness .126" (3.2mm)

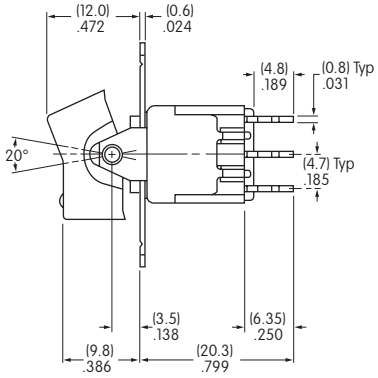


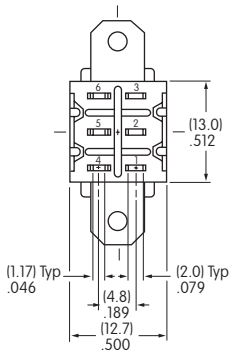
TYPICAL ROCKER SWITCH DIMENSIONS

Single Pole

Solder Lug







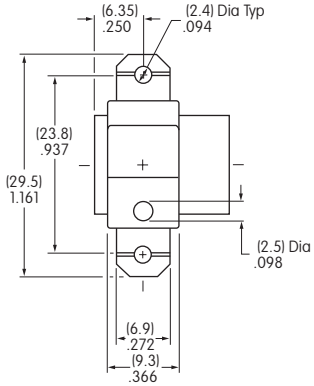


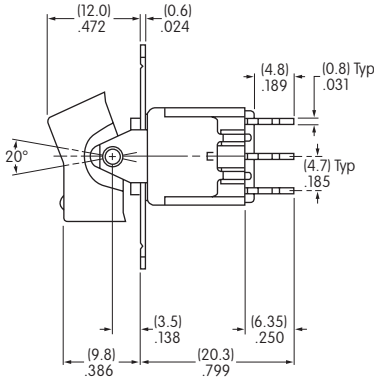
Single color LED switch does not have terminal 5.

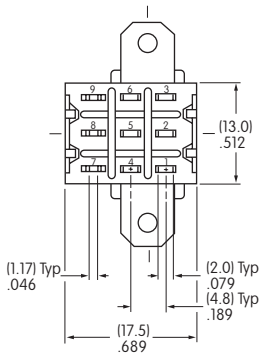
M2112NCFW01

Double Pole

Solder Lug







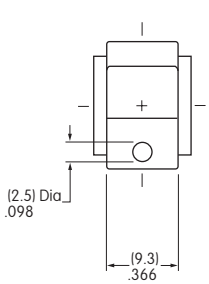


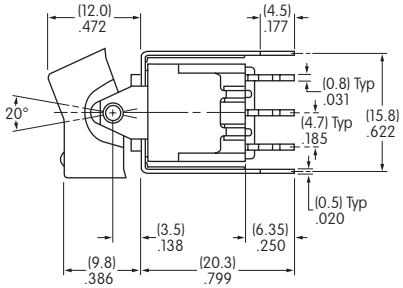
Single color LED switch does not have terminal 8.

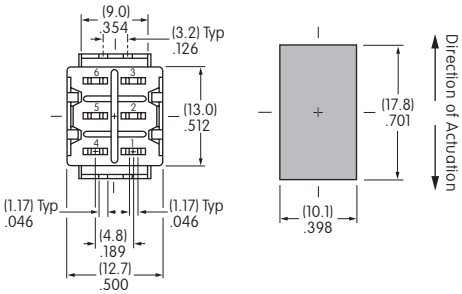
M2122NCFW01

Single Pole Only

Straight PC • Bracket









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

M2112NCFW13

LED CIRCUIT, PADDLE, & MOUNTING TYPE COMBINATIONS

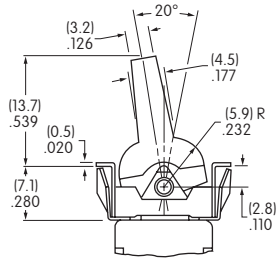
P **Paddle with Isolated LED Circuit**

J **Paddle with Synchronous LED Circuit**

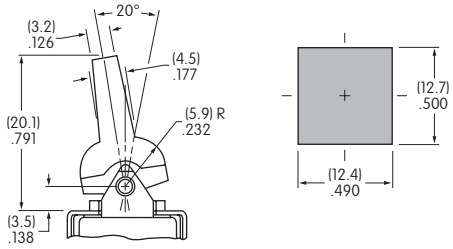
Maximum Panel Thickness
.039" ~ .126" (1.0 ~ 3.2mm)
without Bezel
.039" ~ .098" (1.0 ~ 2.5mm)
with Bezel

Maximum Panel Thickness .126" (3.2mm)

Material: Polyamide
Finish: Matte
Color: Black



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



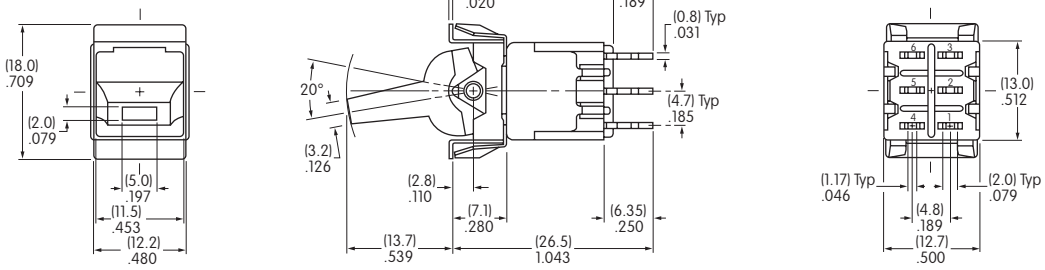
Bracket combines with Terminal code 13

TYPICAL PADDLE SWITCH DIMENSIONS

Solder Lug • Snap-in

Single Pole Only



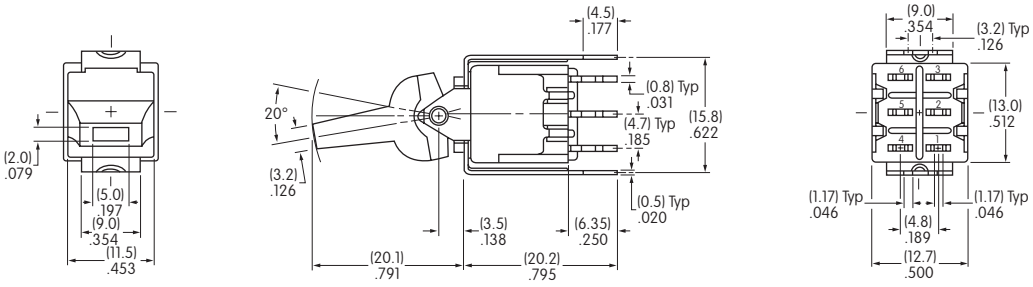


M2112JCFW01 Single color LED switch does not have terminal 5.

Straight PC • Bracket

Single Pole Only





M2112JCFW13 Silver contact material is standard. Single color LED switch does not have terminal 5.

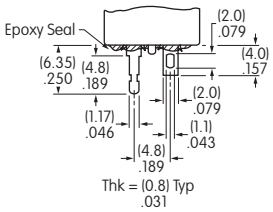
CONTACT MATERIALS & RATINGS

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

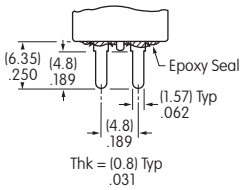
Complete explanation of operating range in Supplement section.

TERMINALS

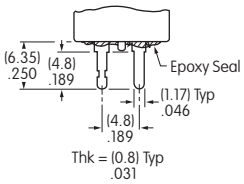
01 **Solder Lug with Turret LED Terminal**



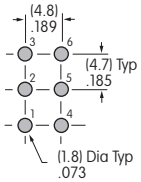
02 **Quick Connect**



03 **Straight PC with Turret LED Terminal**

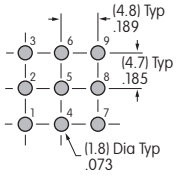


Single Pole



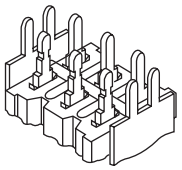
Single color LED & isolated bicolor LED switches do not have terminal 5.

Double Pole

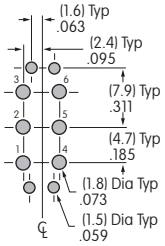


Single color LED & isolated bicolor LED switches do not have terminal 8.

13 **Straight PC with Bracket & Turret LED Terminal**



Single Pole



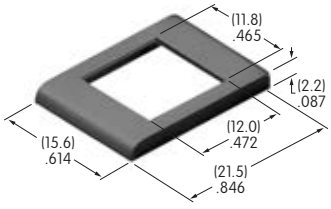
Single color LED & isolated bicolor LED switches do not have terminal 5.

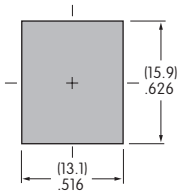
OPTIONAL BEZEL & COLORS

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