Distinctive Characteristics

Industry's first LED illumination at tip of toggle and paddle switches.

Single color LEDs of red, yellow, and green, plus bicolor red/green, to meet varied design requirements.

LEDs can operate independently from or synchronously with switching operation.

Antijamming feature to protect contacts from damage due to excessive downward force on the toggle.

High torque bushing prevents the bushing from rotating or separating from the metal frame during installation.

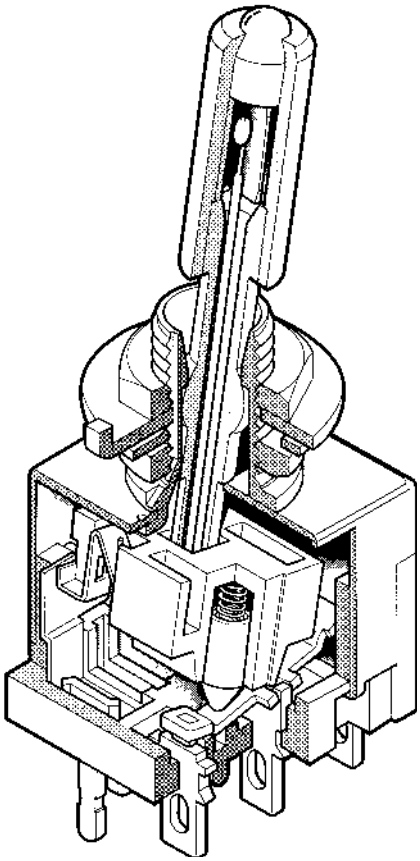
Stainless steel frame resists corrosion.

Silver contacts are of specially composed alloy for hardness.

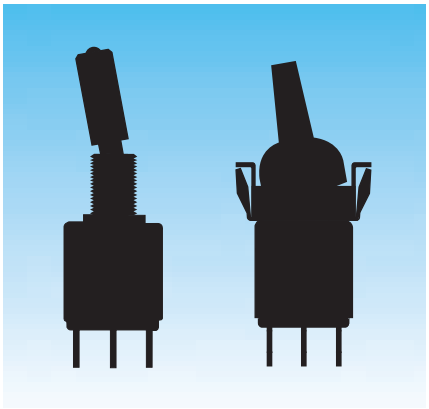
High insulating barriers protect against crossover in double pole devices.

Terminals are molded in and epoxy sealed to lock out flux, dust, and other contaminants.

1,500V dielectric strength between switch contacts and case is accomplished by clinching the frame away from the terminals.



Actual Sizes



General Specifications

Electrical Capacity (Resistive Load)

Power Level (code W): 6A @ 125V AC or 3A @ 250V AC or 3 A @ 30V DC
Logic Level (code G): 0.4VA maximum @ 28V AC/DC maximum
Note: See Supplement Index (page Z2) to find explanation of operating range.

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: Toggles & Paddles:
On to On position ~ 325 grams for single pole; 450 grams for double pole
Off to On position ~ 400 grams for single pole; 720 grams for double pole
Rockers:
On to On position ~ 650 grams for single pole; 1400 grams for double pole
Off to On position ~ 1000 grams for single pole; 1800 grams for double pole
Angle of Throw: 20°

Materials & Finishes

Bushing: Brass with nickel plating
Housing: Stainless steel
Mounting Bracket: Steel with tin plating
Movable Contacts: Silver alloy or silver alloy with gold plating
Stationary Contact: Silver with silver plating or copper or brass with gold plating
Lamp Contacts: Phosphor bronze
Base: Diallyl phthalate
Power 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 toggles & 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/sec²) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation

Mounting Torque: 1.47Nm (13 lb•in) for double nut; .67Nm (6 lb•in) for single nut
Soldering Time & Temperature: 3 seconds @ 350°C or 5 seconds @ 270°C
Process Seal: Not available

Standards & Certifications

Flammability Standards: UL94V-0 base
UL Recognized: Single pole toggles & rockers with synchronous circuits & solder lug or PC
recognized at 6A @ 125V AC; UL File No. WOYR2.E44145
Add "/U" to end of part number to order UL mark on switch.
CSA Certified: All single pole toggles & rockers with synchronous circuits
recognized at 6A @ 125/250V AC; CSA File No. 023535-0-000
Add "/C" to end of part number to order CSA mark on switch.

TYPICAL TOGGLE & ROCKER SWITCH ORDERING EXAMPLE

M21 [1] [2] [T] [C] [W] [01] — [ ]

POLES

1	SPDT
*2	DPDT

* Available only w/ Toggles & Rockers w/ 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 MATERIAL & RATING

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

LED CIRCUITS & ACTUATOR TYPES

Toggle	
L	Isolated
T	Synchronous
Rocker	
R	Isolated
N	Synchronous
Paddle	
P	Isolated
J	Synchronous

TERMINALS

01	Solder Lug with Threaded Bushing
02	Quick Connect with Threaded Bushing
03	Straight PC with Threaded Bushing
13	Straight PC with Bracket Mount (combines with toggle/paddle only)
*30	Right Angle PC with Smooth Bushing (combines with toggle only)

* Available with gold contacts only.

OPTIONAL BEZEL & COLORS

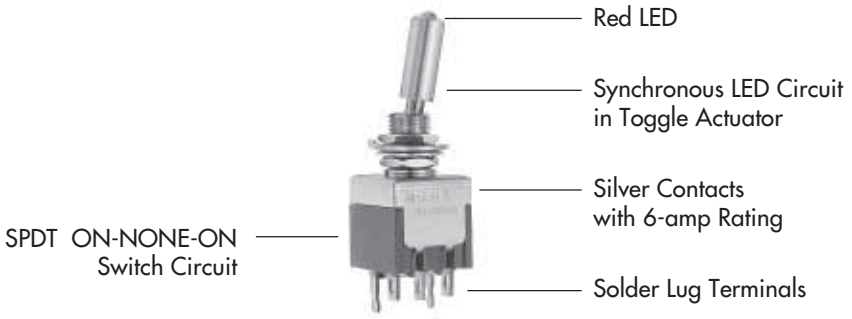
For Snap-in Frame with Paddle	
A	Black
B	White
C	Red
E	Yellow
F	Green
G	Blue
H	Gray

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

M2112TCW01

IMPORTANT:

Switches are supplied without UL & CSA marking unless specified. Specific models & ratings noted on General Specifications page.



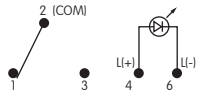
POLES & CIRCUITS & LED ILLUMINATION

Model	Pole & Throw	Actuator Position & Terminal Numbers: Down (Keyway)	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

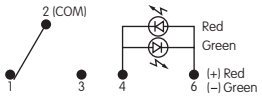
Schematics

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

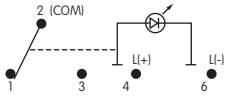
Isolated Single Color LED



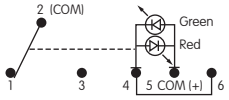
Isolated Bicolor LED



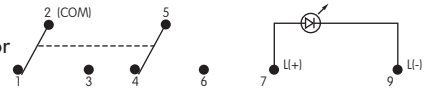
Synchronous Single Color LED



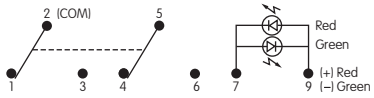
Synchronous Bicolor LED



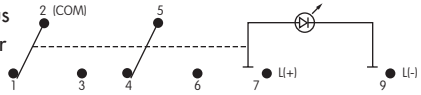
Isolated Single Color LED



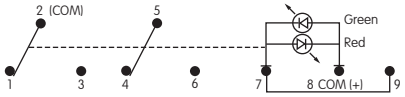
Isolated Bicolor LED



Synchronous Single Color LED



Synchronous Bicolor LED



LED COLORS & SPECIFICATIONS

Single Element LED		For Toggles & Rockers				For Paddles			
LED factory assembled **Not Available Separately** Bicolor is white in OFF state.		Single Color			Bicolor	Single Color			Bicolor
	Color	C Red	E Yellow	F Green	CF Red/Green	C Red	E Yellow	F Green	CF Red/Green
Forward Peak Current	I_{FM}	25mA	30mA	30mA	25mA	10mA	30mA	30mA	30/25mA
Continuous Forward Current	I_F	20mA	20mA	20mA	20mA	8mA	24mA	24mA	20/20mA
Forward Voltage	V_F	2.1V	2.1V	2.1V	2.1V	1.9V	2.0V	2.1V	2.0/2.2V
Reverse Peak Voltage	V_{RM}	4V	4V	4V	—	5V	5V	5V	—
Current Reduction Rate Above 25°C	ΔI_F	0.33mA/°C	0.40mA/°C	0.40mA/°C	0.33mA/°C	0.13mA/°C	0.40mA/°C	0.40mA/°C	0.43/0.38mA/°C
Ambient Temperature Range		-10°C ~ +55°C				-25°C ~ +70°C			-25°C ~ +70°C

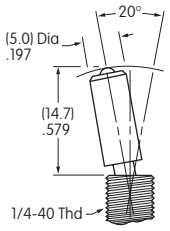
LED CIRCUIT, TOGGLE, & MOUNTING TYPE COMBINATIONS

L **Toggle with Isolated LED Circuit**

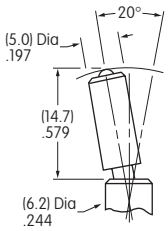
T **Toggle with Synchronous LED Circuit**

Finish: Brushed aluminum

Standard Hardware: 2 AT513H Hex Nuts, 1 AT507H Locking Ring, 1 AT509 Lockwasher
Standard & optional hardware details in Accessories & Hardware section.

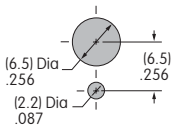


Threaded Bushing combines with terminal codes 01, 02, & 03.

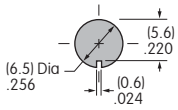


Smooth Bushing combines with terminal code 30.

Max. Panel Thickness With Standard Hardware 2.6mm (.102")



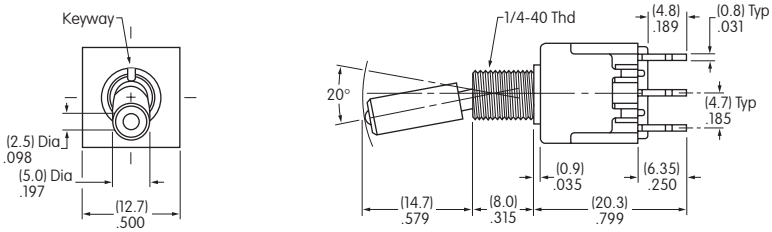
Max. Panel Thickness Without Locking Ring 3.4mm (.134")



TYPICAL TOGGLE SWITCH DIMENSIONS

Solder Lug

Single Pole

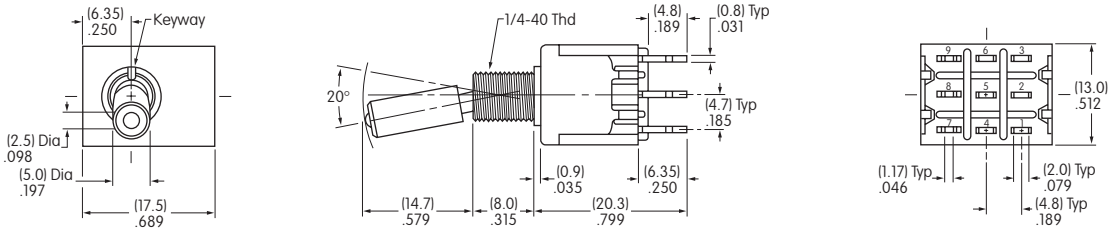


M2112TCFW01

Single color LED switch does not have terminal 5.

Solder Lug

Double Pole

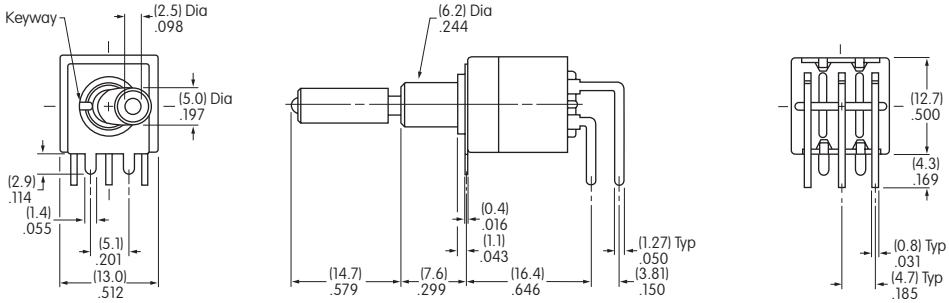


M2122TCFW01

Single color LED switch does not have terminal 8.

Right Angle PC

Single Pole Only



M2112TCFG30

Single color LED switch does not have terminal 5.

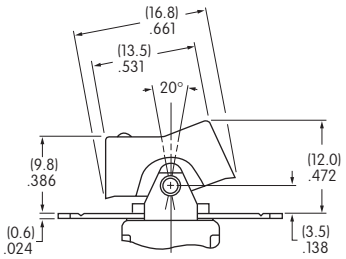
Gold contact material only.

LED CIRCUIT, ROCKER, & MOUNTING TYPE COMBINATIONS

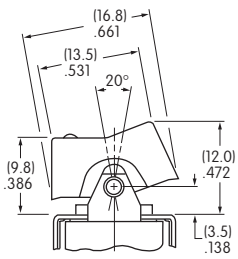
R **Rocker with Isolated LED Circuit**

N **Rocker with Synchronous LED Circuit**

Material: Polyamide
Finish: Matte
Color: Black

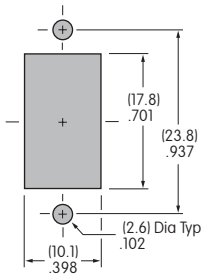


Flat Frame combines with Terminal codes 01, 02, & 03.



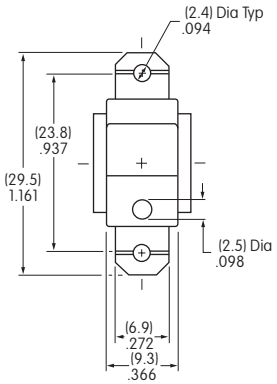
Bracket combines with Terminal code 13.

Max. Panel Thickness 3.2mm (.126")

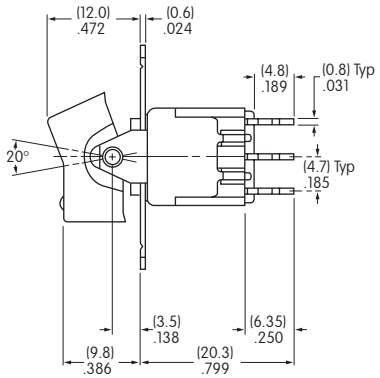


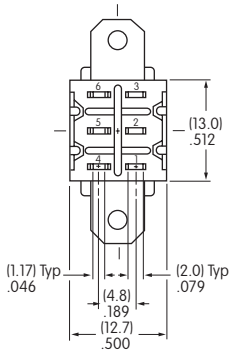
TYPICAL ROCKER SWITCH DIMENSIONS

Solder Lug



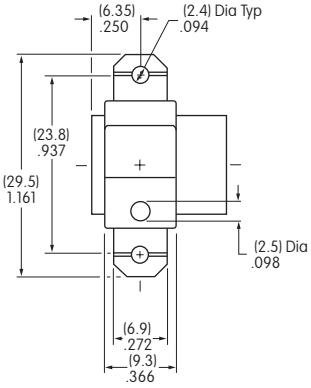
Single Pole



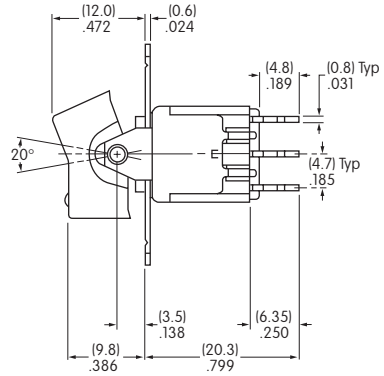


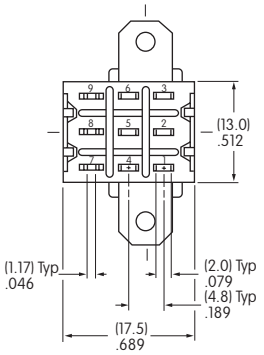
M2112NCFW01 Single color LED switch does not have terminal 5.

Solder Lug



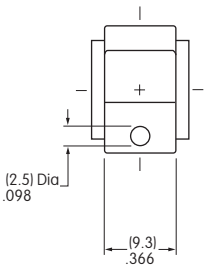
Double Pole



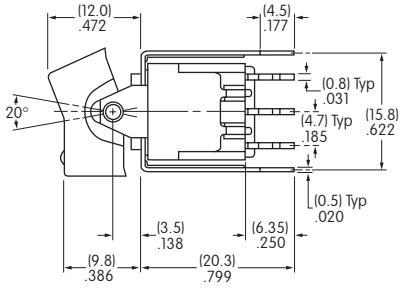


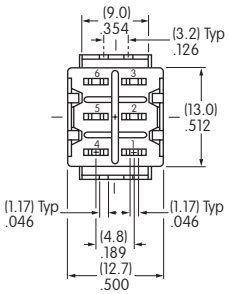
M2122NCFW01 Single color LED switch does not have terminal 8.

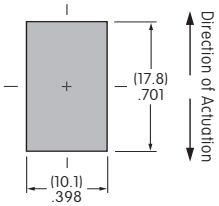
Straight PC • Bracket



Single Pole Only







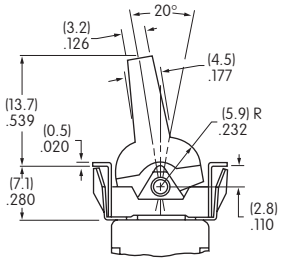
M2112NCFW13 Single color LED switch does not have terminal 5. Silver contact material is standard.

LED CIRCUIT, PADDLE, & MOUNTING TYPE COMBINATIONS

P **Paddle with Isolated LED Circuit**

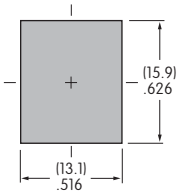
J **Paddle with Synchronous LED Circuit**

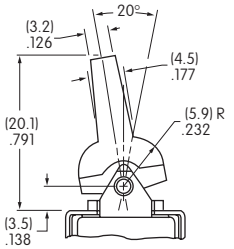
Material: Polyamide
Finish: Matte
Color: Black



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

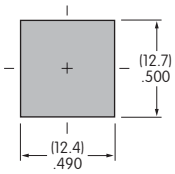
Max. Panel Thickness
1 ~ 3.2mm (.039" ~ .126") without Bezel
1 ~ 2.5mm (.039" ~ .098") with Bezel





Bracket combines with Terminal code 13.

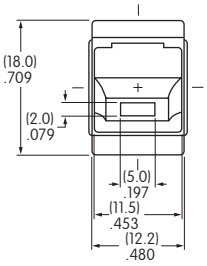
Max. Panel Thickness
3.2mm (.126")



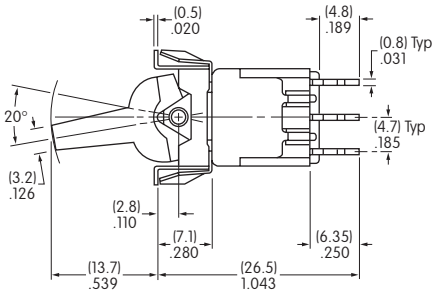
TYPICAL PADDLE SWITCH DIMENSIONS

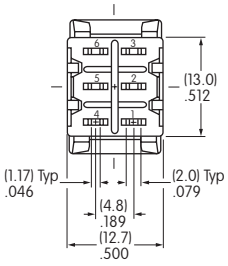
Solder Lug • Snap-in

M2112JCFW01



Single Pole Only

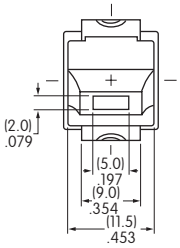




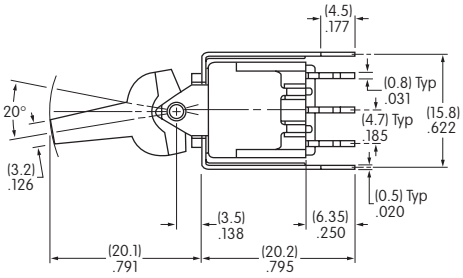
Single color LED switch does not have terminal 5.

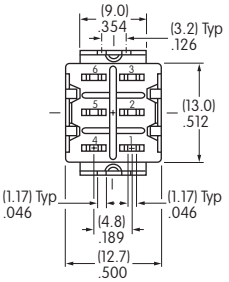
Straight PC • Bracket

M2112JCFW13



Single Pole Only





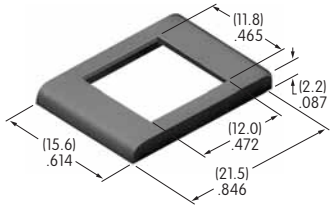
Silver contact material is standard.

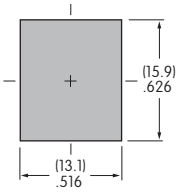
Single color LED switch does not have terminal 5.

OPTIONAL BEZEL & COLORS

AT2107 Bezel for Snap-in Panel Frame

Material: Polyamide
Finish: Matte





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

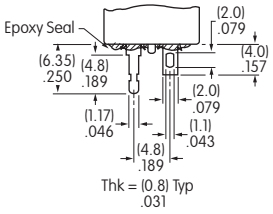
CONTACT MATERIALS & RATINGS

W	**Silver Contacts**	**Power Level**	**6A @ 125V AC & 3A@250V AC**
G	**Gold Contacts**	**Logic Level**	**0.4VA maximum @ 28V AC/DC**

See Supplement Index (page Z2) for complete explanation of operating range.

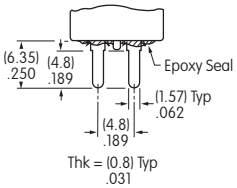
TERMINALS

01 Solder Lug with Turret LED Terminal

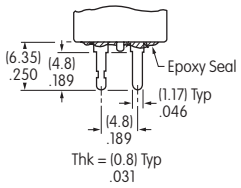


Wiring:
Solder lug terminals have a .043" x .079" oval hole which accommodates one solid 18-gauge wire or two solid or stranded 20-gauge wires.

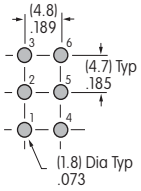
02 Quick Connect



03 Straight PC with Turret LED Terminal

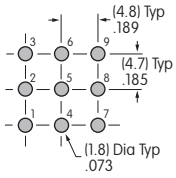


Single Pole



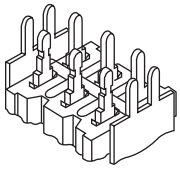
Single color LED switch does not have terminal 5.

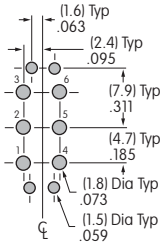
Double Pole



Single color LED switch does not have terminal 8.

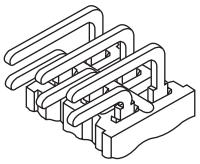
13 Straight PC with Bracket & Turret LED Terminal

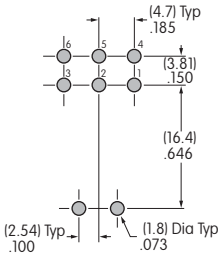




30 Right Angle PC

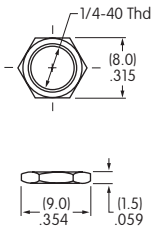
Single color LED switch does not have terminal 5.



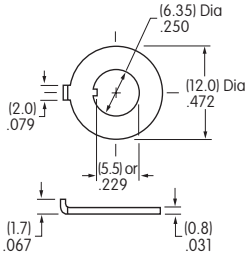


STANDARD MOUNTING HARDWARE

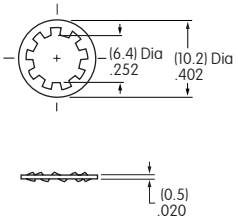
AT513H
Hexagon nuts (2 per switch)
Material: Brass with nickel plating



AT507H
Locking ring (1 per switch)
Material: Steel with chromate over zinc



AT509
Lockwasher (1 per switch)
Material: Steel with chromate over zinc



Optional Hardware: Knurled nuts, dress nuts, and ON-OFF plates are available; see details in Accessories & Hardware section.