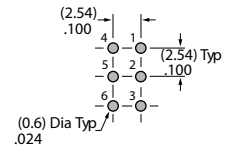
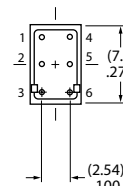
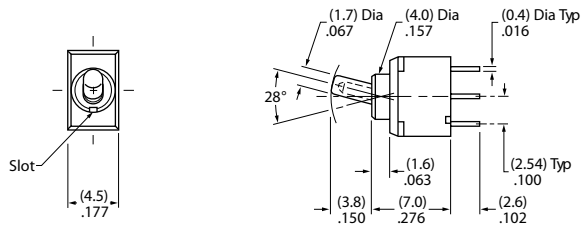


Illuminated Switches

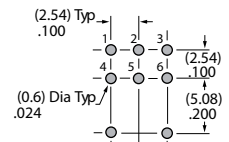
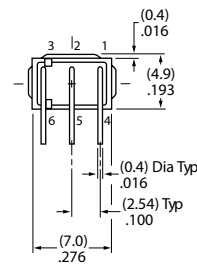
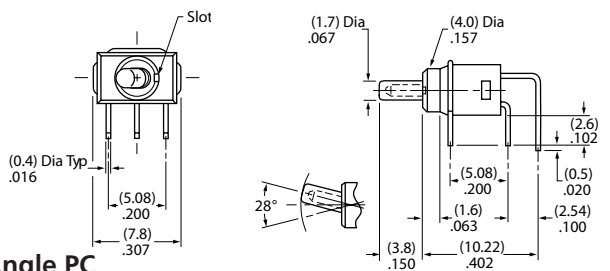
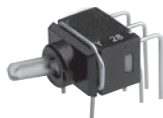
Ultra-Miniature Fully Illuminated Toggle Switches

G Series



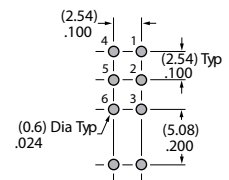
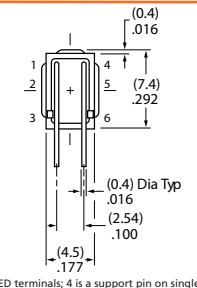
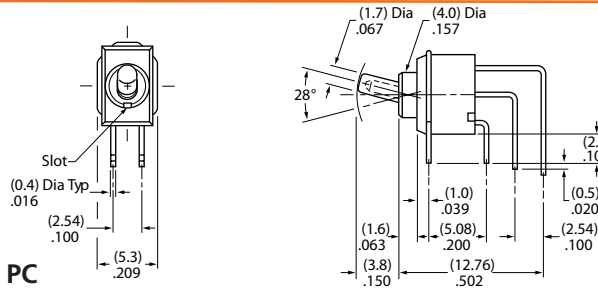
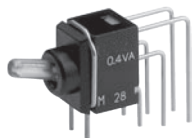
5 & 6 are LED terminals; 4 is a support pin on single color models & an LED terminal on bicolor models.

G12JPC Straight PC



5 & 6 are LED terminals; 4 is a support pin on single color models & an LED terminal on bicolor models.

G12JHD Right Angle PC



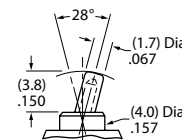
5 & 6 are LED terminals; 4 is a support pin on single color models & an LED terminal on bicolor models.

G12JPCF Vertical PC

POLE & CIRCUITS		Toggle Position			Connected Terminals			Throw & Schematics
Pole & Throw	Model	Up	Center	Down	Up	Center	Down	
SPDT	G12 G13	ON	NONE	ON	2-3	NONE	2-1	<p>Note: Terminal numbers are not actually on the switch. LED circuit is isolated and requires an external power source.</p>
		ON	OFF	ON	2-3	OPEN	2-1	

CLEAR TOGGLE

CUTAWAY



How to order:

G

- 1** POLES:
1 SPDT
- 2** CIRCUITS:
2 ON-NONE-ON (Combines with single color or bicolor LEDs)
- 3** ON-OFF-ON (Combines with bicolor LED only)
- B** ACTUATOR:
J Clear Actuator

- 4** PC TERMINALS:
P Straight
H Right Angle
V Vertical
- 5** LEDs:
C Red (Single Color, ON-NONE-ON only)
D Amber (Single Color, ON-NONE-ON only)
F Green (Single Color, ON-NONE-ON only)
CF Red/Green (Bicolor, ON-NONE-ON & ON-OFF-ON)

General Specifications:

ELECTRICAL CAPACITY (Resistive Load)
 » Logic Level: 0.4VA max. @28V AC/DC max.
 (Applicable Range 0.1mA~0.1A@20mV~28V)

OTHER RATINGS:
 » Contact Resistance: 80mΩ max.
 » Insulation Resistance: 500MΩ min. @500VDC
 » Mechanical Life: 100,000 operations min.
 » Electrical Life: 100,000 operations min.
 10,000 operations min. @ 0.1A @ 28V AC/DC
 » Norminal Operating Force: 1.30N
 » Angle of Throw: 28°

MATERIALS
 » Movable & Stationary Contacts:
 Phosphor bronze with gold plating
 » Power & Lamp Terminals:
 Phosphor bronze with gold plating

ENVIRONMENTAL DATA
 » Operating Temperature: -25°C through +55°C

PCB PROCESSING
 » Soldering: Wave soldering recommended.
 Manual Soldering 4 sec. max. @ 390°C max.

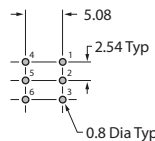
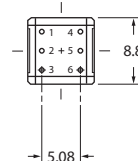
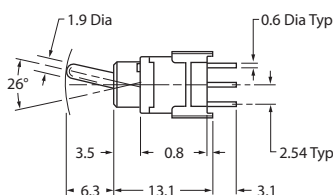
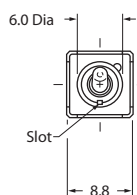
LED COLORS & SPECIFICATIONS

Colors		C	D	F	CF
		Red	Amber	Green	Red/Green
Forward Peak Current	I_{FM}	25mA	25mA	25mA	25mA/25mA
Continuous Forward Current	I_F	20mA	20mA	20mA	20mA/20mA
Forward Voltage	V_F	2.0V	2.1V	2.1V	2.0V/2.1V
Reverse Peak Voltage	V_{RM}	4V	4V	4V	4V/4V
Current Reduction Rate Above 25°C	ΔI_F	0.33mA/°C	0.33mA/°C	0.33mA/°C	0.33mA/°C / 0.33mA/°C
Ambient Temperature Range		-25°C ~ +55°C			

Illuminated Switches

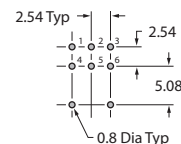
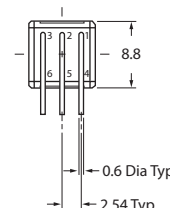
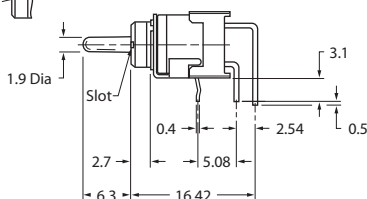
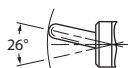
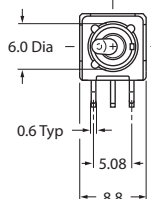
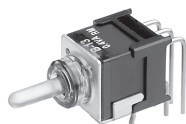
Subminiature Fully Illuminated Toggle Switches

B Series



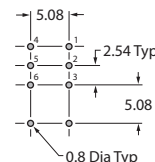
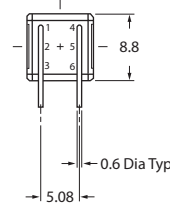
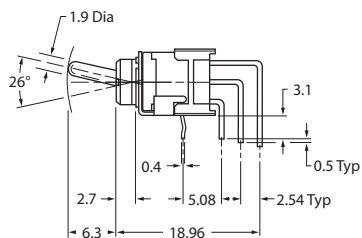
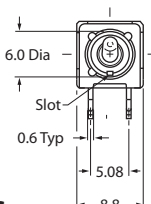
B12JJPC Straight PC

Terminal 4 is a support pin on single color models.



B13JJHCF Right Angle PC

Terminal 4 is a support pin on single color models.



B13JJVCF Vertical PC

Terminal 4 is a support pin on single color models.

POLE & CIRCUITS		Toggle Position			Connected Terminals			Throw & Schematics	
Pole & Throw	Model	Up	Center	Down	Up	Center	Down	Note: Terminal numbers are not actually on the switch. LED circuit is isolated and requires an external power source.	
SPDT	B12 B13	ON	NONE	ON	2-1	NONE	2-3	 	<p>CLEAR TOGGLE</p> <p>CLEAR BUSHING</p> <p>CUTAWAY</p>

How to order:

B

- 1** POLES:
1 SPDT
- 2** CIRCUITS:
2 ON-NONE-ON (Combines with single color or bicolor LEDs)
- 3** ON-OFF-ON (Combines with bicolor LED only)
- B** ACTUATOR & BUSHING:
JJ Clear Actuator & Clear Bushing

- 4** PC TERMINALS:
P Straight
H Right Angle
V Vertical
- 5** LEDs:
C Red (Single Color, ON-NONE-ON only)
D Amber (Single Color, ON-NONE-ON only)
F Green (Single Color, ON-NONE-ON only)
CF Red/Green (Bicolor, ON-NONE-ON & ON-OFF-ON)

General Specifications:

ELECTRICAL CAPACITY (Resistive Load)

» Logic Level: 0.4VA max. @28V AC/DC max.
(Applicable Range 0.1mA~0.1A@20mV~28V)

OTHER RATINGS:

- » Contact Resistance: 50mΩ max.
- » Insulation Resistance: 500MΩ min. @500VDC
- » Mechanical Life: 100,000 operations min.
- » Electrical Life: 50,000 operations min.
- » Normal Operating Force: 1.18N
- » Contact Timing: Nonshorting (break-before-make)
- » Angle of Throw: 26°

MATERIALS

- » Movable Contacts: Phosphor bronze with gold plating
- » Stationary Contacts: Brass with tin plating
- » Terminals: Brass with gold plating

ENVIRONMENTAL DATA

» Operating Temperature: -25°C through +55°C

PCB PROCESSING

- » Soldering: Wave soldering recommended.
- Manual Soldering 4 sec. max. @ 390°C max.

LED COLORS & SPECIFICATIONS

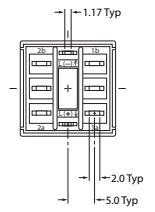
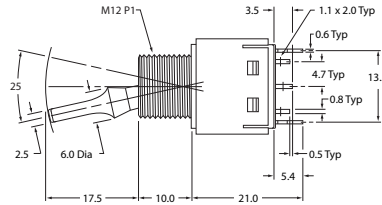
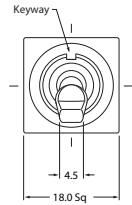
Colors	C	D	F	CF	
	Red	Amber	Green	Red/Green	
Forward Peak Current	I_{FM}	30mA	30mA	20mA	30mA/20mA
Continuous Forward Current	I_F	20mA	20mA	10mA	20mA/10mA
Forward Voltage	V_F	1.9V	1.9V	3.4V	1.9V/3.4V
Reverse Peak Voltage	V_{RM}	5V	5V	5V	5V/5V
Current Reduction Rate Above 25°C	ΔI_F	0.43mA/°C	0.43mA/°C	0.28mA/°C	0.43mA/°C / 0.28mA/°C
Ambient Temperature Range	-25°C ~ +55°C				



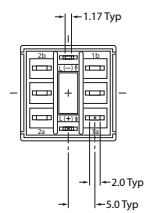
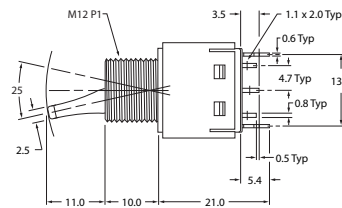
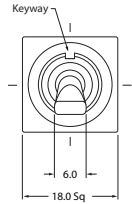
Illuminated Switches

Fully Illuminated Toggle Switches

TL Series



TL22DNKW016G 17.5mm Toggle



TL22SCKG015C 11.0mm Toggle

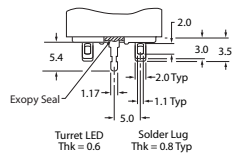
POLES & CIRCUITS

		Toggle Position			Connected Terminals			Throw & Schematics	
Pole	Model	Down Keyway	Center	Up	Down Keyway	Center	Up	Note: Terminal numbers are not actually on the switch. Lamp circuit is isolated and requires an external power source.	
DP	TL22	ON	NONE	ON	1-1b 2-2b	OPEN	1-1a 2-2a	DPDT	

TOGGLES

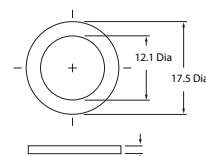
<p>D 17.5mm Combines with silver contacts only</p>	<p>S 11.0mm Combines with gold contacts only</p>
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TERMINALS



01 Solder Lug Terminals
The 1.1x2.0mm oblong hole accommodates one solid 18-gauge wire or 2 solid or stranded 20-gauge wires

OPTIONAL HARDWARE



AT401P O-ring
Use for Panel Seal Natural Rubber

CUTAWAY



How to order:

TL

1 POLE:	2 CIRCUIT:	3 TOGGLE LENGTH:	4 TOGGLE COLOR:	5 HOUSING:	6 TERMINAL/CONTACT/RATING:	7 LED COLOR:
DPDT	ON-NONE-ON	17.5mm (combines with silver contacts only) 11.0mm (combines with gold contacts only)		Black	Solder Lug Silver 6A@125 VAC (for 17.5mm Toggle only)	White Green Blue
N	C					For Super Bright: Red Amber Green
D	F					For Bright: Red Amber Green
K	W01					
						G01 Solder Lug Gold 0.4VA@28 AC/DC (for 11.0mm Toggle only)
						5C Red 5D Amber 5F Green

General Specifications:

ELECTRICAL CAPACITY (Resistive Load)

- » Power Level: 6A@125VAC or 3A@250VAC or 6A@12VDC for silver;
- » Logic Level: 0.4VA max.@28VAC/DC max. for gold

OTHER RATINGS:

- » Contact Resistance: 10mΩ max. for silver; 20mΩ max. for gold;
- » Insulation Resistance: 1,000MΩ min.@500VDC
- » Mechanical Life: 50,000 operations min.
- » Electrical Life: 25,000 operations min. for silver; 50,000 operations min. for gold
- » Nominal Operating Force: 1.9N for 17.5mm toggle; 2.5N for 11.0mm toggle
- » Angle of Throw: 25°

MATERIALS

- » Mov. Contacts: Silver alloy or copper w. gold plating
- » Stationary Contacts: Silver plus copper with silver plating or copper with gold plating
- » Lamp Contacts: Beryllium copper with silver plating
- » Power Terminals: Copper with silver or gold plating
- » Lamp Terminals: Brass with silver plating

ENVIRONMENTAL DATA

- » Operating Temperature: -10°C through +55°C

SOLDERING

- » 3 sec. max. @ 350°C max. for manual soldering



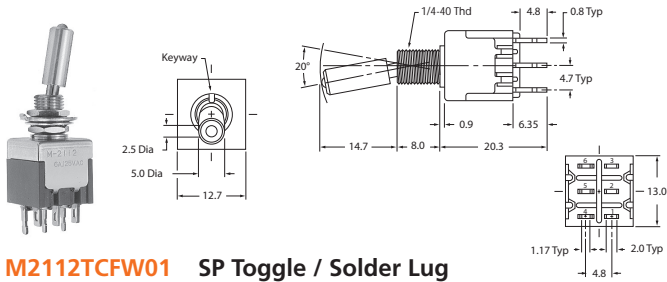
LED COLORS & SPECIFICATIONS

(LED not available separately)	Colored Toggle Bright LED			Clear Toggle Super Bright LED		
Colors	5C Red	5D Amber	5F Green	6B White	6F Green	6G Blue
Forward Peak Current	I_{FM}	30mA	30mA	50mA	30mA	30mA
Continuous Forward Current	I_F	20mA	20mA	20mA	20mA	20mA
Forward Voltage	V_F	2.0V	2.1V	2.27V	3.6V	3.3V
Reverse Peak Voltage	V_{RM}	4V	4V	4V	5V	5V
Current Reduction Rate Above 25°C	ΔI_F	0.32mA/°C	0.50mA/°C	0.50mA/°C	0.40mA/°C	0.40mA/°C
Ambient Temperature Range	-10°C ~ +55°C					

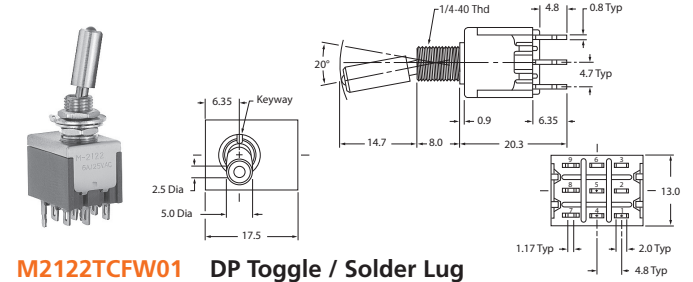
Illuminated Switches

Illuminated Switches with LED Tipped Actuator

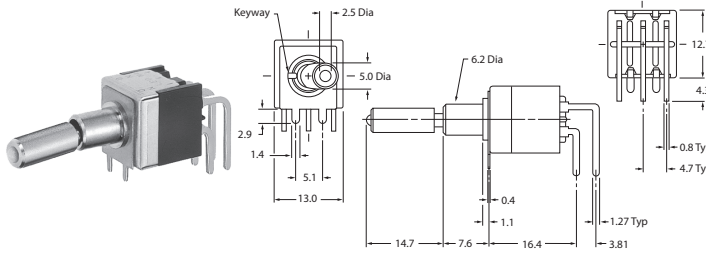
M21 Series



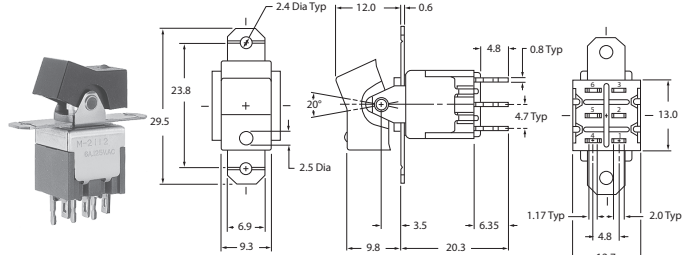
M2112TCFW01 SP Toggle / Solder Lug



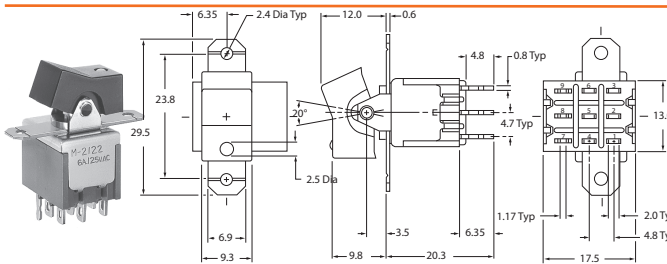
M2122TCFW01 DP Toggle / Solder Lug



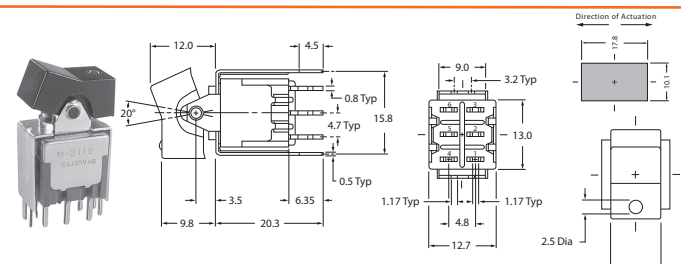
M2112TCFG30 SP Toggle / Right Angle PC



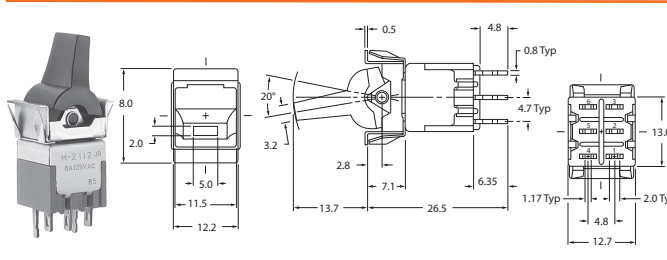
M2112NCFW01 SP Rocker / Solder Lug



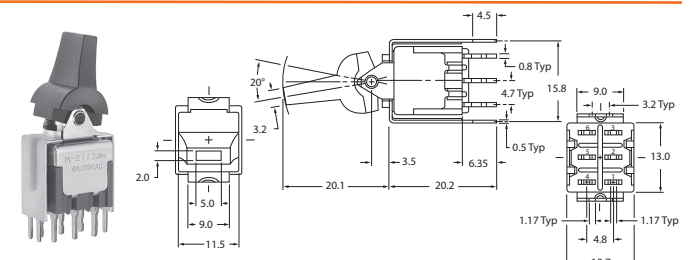
M2122NCFW01 DP Rocker / Solder Lug



M2112NCFW13 SP Rocker / Straight PC / Bracket



M2112JCFW01 SP Paddle / Solder Lug / Snap-in



M2112JCFW13 SP Paddle / Straight PC / Bracket

How to order:

M21 -

- 1 POLES:**
1 SPDT
2 DPDT (Available only w/ Toggles & Rockers w/ Terminals 01, 02 & 03)
- 2 CIRCUITS:**
2 ON-NONE-ON
3 ON-OFF-ON
- 3 LED CIRCUITS & ACTUATOR TYPES:**
Toggle:
L Isolated
T Synchronous
Rocker:
R Isolated
N Synchronous
Paddle:
P Isolated
J Synchronous
- 4 LED COLORS:**
Single Color:
C Red
E Yellow
F Green
Bicolor:
CF Red/Green

- 5 CONTACT MATERIALS & RATINGS:**
W Silver; Rated 6A@125VAC
G Gold; Rated 0.4VA max.@28VAC/DC max.
- 6 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)
- 7 OPTIONAL BEZEL & COLORS FOR SNAP-IN FRAME WITH PADDLE:**
A Black
B White
C Red
E Yellow
F Green
G Blue
H Gray

General Specifications:

ELECTRICAL CAPACITY (Resistive Load)
 » Power Level (Code W): 6A@125VAC or 3A@250VAC or 3A@30VDC
 » Logic Level (Code G): 0.4VA max.@28V AC/DC max.

OTHER RATINGS:
 » Contact Resistance: 10mΩ max. f. silver; 20mΩ max. f. gold;
 » Insulation Resistance: 1,000MΩ min.@500VDC
 » Mechanical Life: 50,000 operations min.
 » Electrical Life: 25,000 operations min.
 » Nominal Operating Force:
 On-to-On Position: 3.19N for Toggles & Paddles SP
 4.41N for Toggles & Paddles DP
 6.37N for Rockers SP
 13.73N for Rockers DP
 Off-to-On Position: 3.92N for Toggles & Paddles SP
 7.06N for Toggles & Paddles DP
 9.80N for Rockers SP
 17.65N for Rockers DP
 » Angle of Throw: 20°

MATERIALS
 » Movable Contacts: Silver alloy / silver alloy with gold plating
 » Stationary Contacts: Silver with silver plating / copper or brass with gold plating
 » Lamp Contacts: Phosphor bronze
 » Switch Terminals: Copper with silver or gold plating
 » Lamp Terminals: Brass with silver or gold plating

ENVIRONMENTAL DATA
 » Operating Temperature: -10°C through +55°C for toggles & rockers; -25°C through +70°C for paddles

PCB PROCESSING
 » Soldering: Manual Soldering 4 sec. max. @ 410°C max.;
 » For On-On Circuit: Soldering 5 sec. max. @ 270°C max.




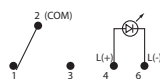
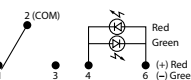
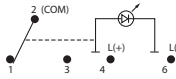
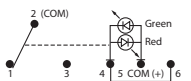
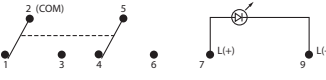
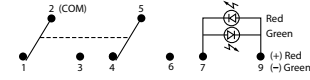
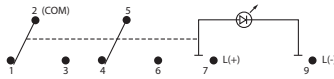
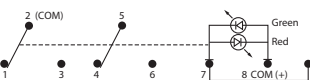


Illuminated Switches

Illuminated Switches with LED Tipped Actuator

M21 Series

POLES & CIRCUITS & LED ILLUMINATION

Model	Pole & Throw	Toggle Position & Terminal Numbers			Schematics
		Down Keyway 	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 
Connected Power Terminals		2-3	NONE	2-1	
LED Circuit	Isolated LEDs (see schematics) Connected LED Terminals	ON	NONE	ON	
	Synchronous Single Color LED Connected LED Terminals	ON	NONE	OFF	
	Synchronous Bicolor LED Connected LED Terminals	Red	NONE	Green	
M2113	SPDT	ON	OFF	ON	Synchronous Single Color LED  Synchronous Bicolor LED 
Connected Power Terminals		2-3	OPEN	2-1	
LED Circuit	Isolated LEDs (see schematics) Connected LED Terminals	ON	ON	ON	
	Synchronous Single Color LED Connected LED Terminals	ON	OFF	ON	
	Synchronous Bicolor LED Connected LED Terminals	Red	OFF	Green	
M2122	DPDT	ON	NONE	ON	Isolated Single Color LED  Isolated Bicolor LED 
Connected Power Terminals		2-3 5-6	NONE	2-1 5-4	
LED Circuit	Isolated LEDs (see schematics) Connected LED Terminals	ON	NONE	ON	
	Synchronous Single Color LED Connected LED Terminals	ON	NONE	OFF	
	Synchronous Bicolor LED Connected LED Terminals	Red	NONE	Green	
M2123	DPDT	ON	OFF	ON	Synchronous Single Color LED  Synchronous Bicolor LED 
Connected Power Terminals		2-3 5-6	OPEN	2-1 5-4	
LED Circuit	Isolated LEDs (see schematics) Connected LED Terminals	ON	ON	ON	
	Synchronous Single Color LED Connected LED Terminals	ON	OFF	ON	
	Synchronous Bicolor LED Connected LED Terminals	Red	OFF	Green	

Illuminated Switches

LED COLORS & SPECIFICATIONS

Single Element LED		For Toggles & Rockers				For Paddles				Units
LED factory assembled Not Available Separately Bicolor is white in OFF state	Color	Single Color			Bicolor	Single Color			Bicolor	
		C Red	E Yellow	F Green	CF Red/Green	C Red	E Yellow	F Green	CF Red/Green	
Forward Peak Current	I_{FM}	25	30	30	25	10	30	30	30/25	mA
Continuous Forward Current	I_F	20	20	20	20	8	24	24	20/20	mA
Forward Voltage	V_F	2.1	2.1	2.1	2.1	1.9	2.0	2.1	2.0/2.2	V
Reverse Peak Voltage	V_{RM}	4	4	4	-	5	5	5	-	V
Current Reduction Rate Above 25°C	I_F	0.33	0.40	0.40	0.27/0.33	0.13	0.40	0.40	0.43/0.38	mA/°C
Ambient Temperature Range		-10°C ~ +55°C				-25°C ~ +70°C				

Illuminated Switches

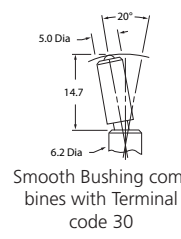
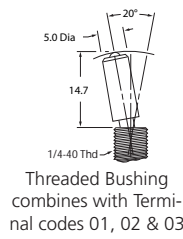
Illuminated Switches with LED Tipped Actuator

M21 Series

TOGGLES: LED CIRCUIT & MOUNTING TYPE COMBINATIONS

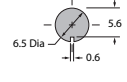
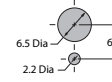
- L Toggle with isolated LED Circuit
- T Toggle with Synchronous LED Circuit

Finish: Brushed aluminum
 Standard Hardware: 2 AT513H Hex Nuts,
 1 AT507H Locking Ring, 1 AT509 Lock-washer



Max. Panel Thickness with Standard Hardware 2.6mm

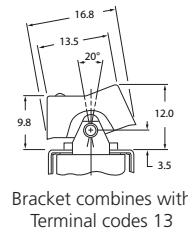
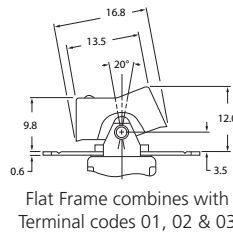
Max. Panel Thickness without Locking Ring 3.4mm



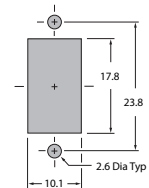
ROCKERS: LED CIRCUIT & MOUNTING TYPE COMBINATIONS

- R Rocker with isolated LED Circuit
- N Rocker with Synchronous LED Circuit

Material: Polyamide
 Finish: Matte
 Color: Black



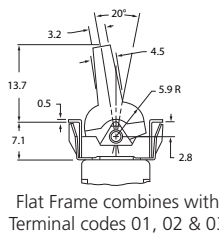
Max. Panel Thickness 3.2mm



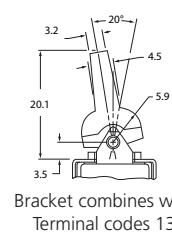
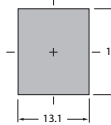
PADDLES: LED CIRCUIT & MOUNTING TYPE COMBINATIONS

- P Paddle with isolated LED Circuit
- J Paddle with Synchronous LED Circuit

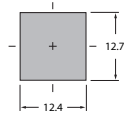
Material: Polyamide
 Finish: Matte
 Color: Black



Max. Panel Thickness without Bezel: 1 ~ 3.2mm;
 Max. Panel Thickness with Bezel: 1 ~ 2.5 mm

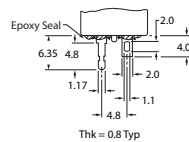


Max. Panel Thickness 3.2mm



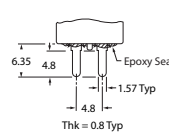
PADDLES: LED CIRCUIT & MOUNTING TYPE COMBINATIONS

- 01 Solder Lug with Turret LED Terminal

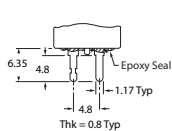


Wiring:
 Solder lug terminals have a 1.1x2.0mm oval hole which accommodates one solid 18-gauge wire or two solid or stranded 20-gauge wires.

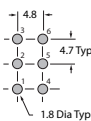
- 02 Quick Connect



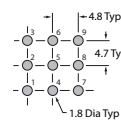
- 03 Straight PC with Turret LED Terminal



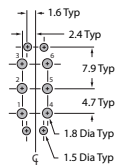
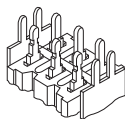
Single Pole:



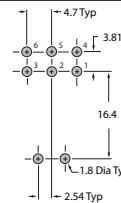
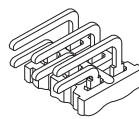
Double Pole:



- 13 Straight PC with Bracket & Turret LED Terminal



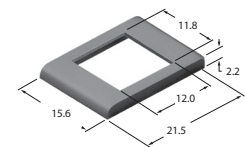
- 30 Right Angle PC



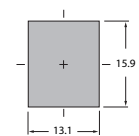
OPTIONAL BEZEL & COLORS

AT2107
 Bezel for snap-in Panel Frame

Material: Polyamide
 Finish: Matte

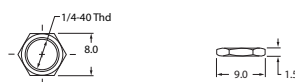


- A Black
- B White
- C Red
- E Yellow
- F Green
- G Blue
- H Gray

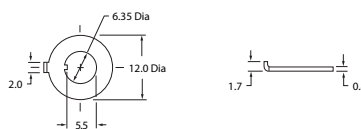


STANDARD MOUNTING HARDWARE

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

