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
Single Pole	3.19N	3.92N
Double Pole	4.41N	7.06N

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 copper alloy with gold plating
Stationary Contacts: Silver alloy with silver plating or copper or brass with gold plating
Lamp Contacts: Phosphor bronze
Base: Diallyl phthalate resin (UL94V-0)
Switch Terminals: Brass or copper with silver or gold plating
Lamp Terminals: Brass or copper with silver or gold plating

Environmental Data

Operating Temp Range: –10°C through +55°C (+14°F through +131°F)
Humidity: 90 ~ 95% humidity for 240 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: 500 m/s^2 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 & 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: These devices are not process sealed. Hand clean locally using alcohol based solution.

Standards & Certifications

Flammability Standards: UL94V-0 base

Distinctive Characteristics

Industry's first LED illumination at tip of toggle 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.

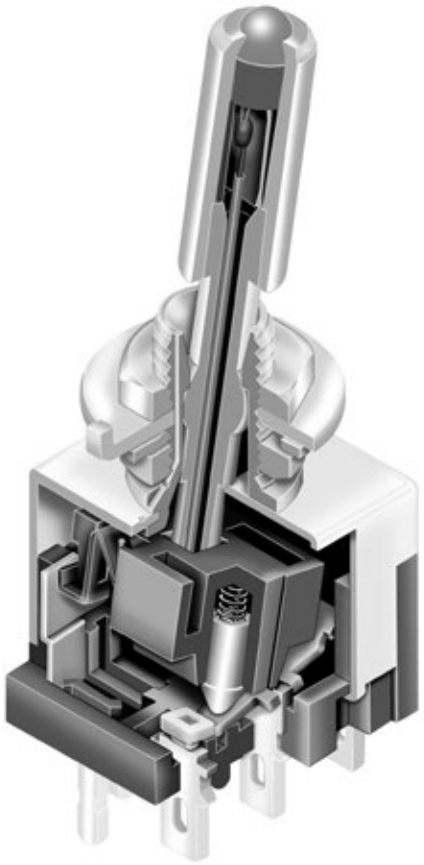
Stainless steel frame resists corrosion.

Silver contacts are of specially composed alloy for hardness.

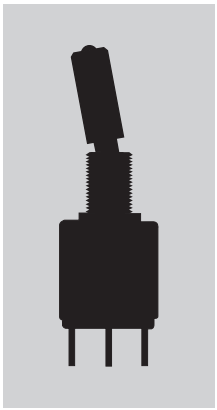
High insulating barriers protect against crossover in double pole devices.

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 Size



TYPICAL SWITCH ORDERING EXAMPLE

M	NL	1	2	T	C	W	01	

Poles

1	SPDT
2	DPDT

Circuits

2	ON	NONE	ON
3	ON	OFF	ON

NONE = No Position

LED Circuits & Actuator Types

L	Isolated
T	Synchronous

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

Terminals & Mounting Types

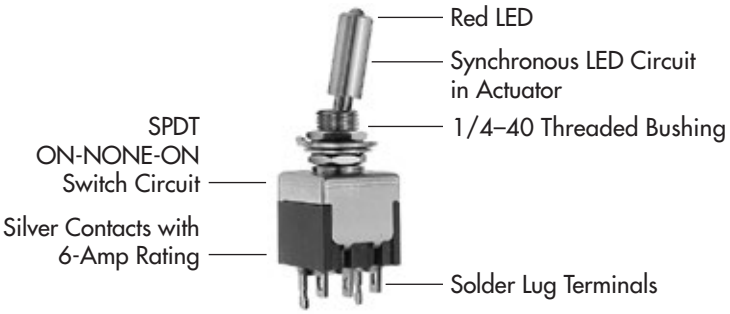
01	Solder Lug with Threaded Bushing

Threaded Bushings

No Code	1/4–40 Thread (Inch)
/M	6mm Thread (Metric)

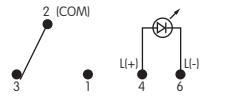
DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

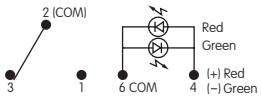
MNL12TCW01

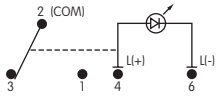


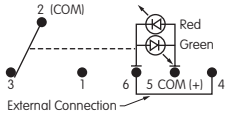
POLES & CIRCUITS & LED ILLUMINATION

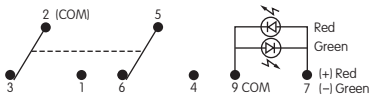
Model	Pole & Throw	Toggle Position & Terminal Numbers (NONE = No Position) Down (Keyway)	Center	Up	Schematics
MNL12	**SPDT** Connected Power Terminals	ON 2-3	NONE NONE	ON 2-1	Notes: Terminal numbers are not actually on the switch. LEDs require an external power source.
LED Circuit	**Isolated LEDs** (see schematics) Connected LED Terminals	ON 4-6	NONE NONE	ON 4-6	Isolated Single Color LED
LED Circuit	**Synchronous Single Color LED** Connected LED Terminals	ON 4-6	NONE NONE	OFF OPEN	Isolated Bicolor LED
LED Circuit	**Synchronous Bicolor LED** Connected LED Terminals	Red 5-6	NONE NONE	Green 5-4	
MNL13	**SPDT** Connected Power Terminals	ON 2-3	OFF OPEN	ON 2-1	Synchronous Single Color LED
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	Synchronous Bicolor LED
LED Circuit	**Synchronous Bicolor LED** Connected LED Terminals	Red 5-6	OFF OPEN	Green 5-4	
MNL22	**DPDT** Connected Power Terminals	ON 2-3 5-6	NONE NONE	ON 2-1 5-4	Isolated Single Color LED
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	Isolated Bicolor LED
LED Circuit	**Synchronous Bicolor LED** Connected LED Terminals	Red 8-9	NONE NONE	Green 8-7	
MNL23	**DPDT** Connected Power Terminals	ON 2-3 5-6	OFF OPEN	ON 2-1 5-4	Synchronous Single Color LED
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	Synchronous Bicolor LED
LED Circuit	**Synchronous Bicolor LED** Connected LED Terminals	Red 8-9	OFF OPEN	Green 8-7	

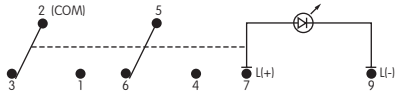


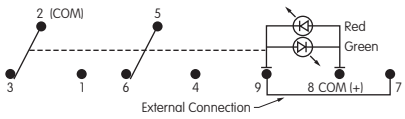












LED COLORS & SPECIFICATIONS

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

The LED is an integral part of the switch and not available separately. Bicolor LED is translucent white when unlit.	Color	Single Color			Bicolor	
		C	E	F	CF	
		Red	Yellow	Green	Red/Green	Units
Maximum Forward Current	I_{FM}	30	30	30	25	mA
Typical Forward Current	I_F	20	20	20	10	mA
Forward Voltage	V_F	2.2	2.1	2.2	1.7/2.0	V
Maximum Reverse Voltage	V_{RM}	4	4	4	—	V
Current Reduction Rate Above 25°C	ΔI_F	0.38	0.38	0.38	0.33/0.33	mA/°C
Ambient Temperature Range		–10° ~ +55°C				

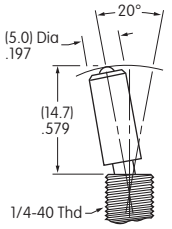
LED CIRCUIT, TOGGLE, & MOUNTING TYPE COMBINATIONS

L **Toggle with Isolated LED Circuit**

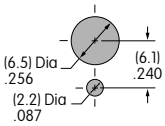
T **Toggle with Synchronous LED Circuit**

Finish: Brushed aluminum

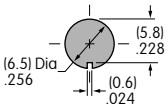
Standard Hardware: 2 AT513H Hex Nuts, 1 AT507H Locking Ring, 1 AT509 Lockwasher Standard & optional hardware details in Accessories & Hardware section.



Threaded Bushing combines with Terminal code 01.



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

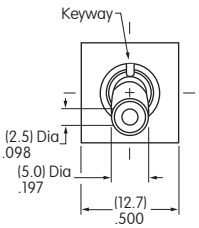


Max. Panel Thickness without Locking Ring .134" (3.4mm)

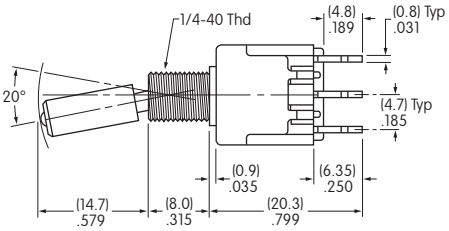
TYPICAL SWITCH DIMENSIONS

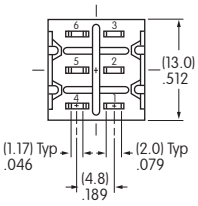
Solder Lug

MNL12TCFW01



Single Pole

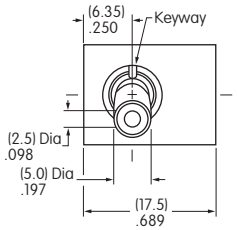


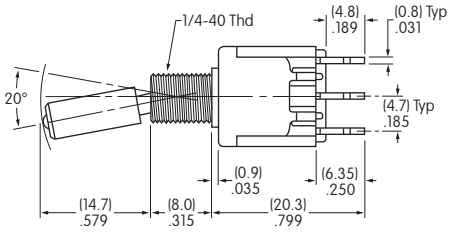


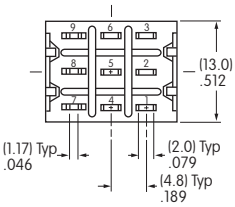
Single color LED switch does not have terminal 5.

TYPICAL SWITCH DIMENSIONS

Double Pole







Single color LED switch does not have terminal 8.

Solder Lug

MNL22TCFW01

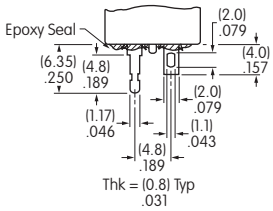
CONTACT MATERIALS & RATINGS

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

Complete explanation of operating range in Supplement section.

TERMINALS

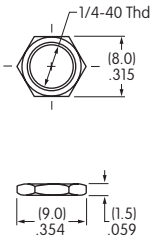
01 **Solder Lug with Turret LED Terminal**



STANDARD MOUNTING HARDWARE

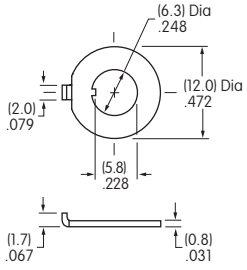
AT513H Hexagon Nut
(2 per switch)

Material:
Brass with nickel plating



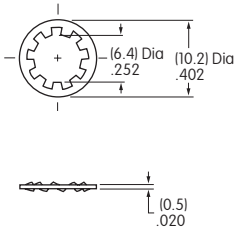
AT507H Locking Ring
(1 per switch)

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.