

General Specifications

B Electrical Capacity (Resistive Load)

Power Level (silver):	Maximum rating varies by model number MN12, MN22: 6A @ 125V AC, 3A @ 250V AC, 4A @ 30V DC MN13, MN15, MN18, MN19, MN23, MN25: 6A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC MN28, MN29: 4A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC MN24, MN26, MN27: 3A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC MN32: 4A @ 125V AC, 2A @ 250V AC, 3A @ 30V DC MN33, MN35, MN38, MN39: 4A @ 125V, 2A @ 250V, 2A @ 30V Recommended minimum voltage/current: 0.1A @ 2V AC/DC 4A @ 30V DC for On-None-On; 3A @ 30V DC for all other circuits
Logic Level (gold):	0.4VA maximum @ 28V AC/DC maximum (Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)

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 and case for 1 minute minimum
Mechanical Life:	50,000 operations minimum
Electrical Life:	25,000 operations minimum for silver; 50,000 operations minimum for gold
Angle of Throw:	25°

Materials & Finishes

Actuator Clip & Mounting Frame:	Stainless steel
Body Frame:	Stainless steel
Case:	Diallyl phthalate resin (UL94V-0)
Movable Contactor:	Phosphor bronze with silver or gold plating
Movable Contacts:	Silver alloy (code W); copper with gold plating (code G)
Stationary Contacts:	Silver with silver plating (code W); copper or brass with gold plating (code G)
Terminals:	Copper or brass with silver plating; or copper or brass with gold plating

Environmental Data

Operating Temp Range:	-30°C through +85°C (-22°F through +185°F)
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)

Processing

Soldering:	Wave Soldering (PC version) for Gold: See Profile A in Supplement section. Manual Soldering for Gold: See Profile A in Supplement section. Wave Soldering (PC version) for Silver: See Profile B in Supplement section. Manual Soldering for Silver: See Profile B in Supplement section. Note: Actuator must be in OFF (center) position while soldering.
Cleaning:	These devices are not process sealed. Hand clean locally using alcohol based solution.

Standards & Certifications

Flammability Standards:	UL94V-0 for case
UL:	Contact NKK Switches for UL or CUL marking option requirements.

Distinctive Characteristics

Three methods of panel mounting: flat frame for flush with face or subpanel, snap-in, and PCB.

High insulating barriers increase isolation of circuits in multipole devices and provide added protection to contact points.

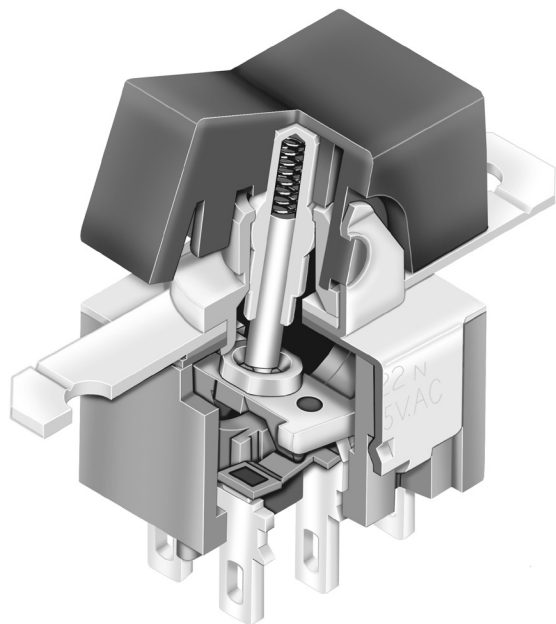
The molded diallyl phthalate case has a UL94V-0 flammability rating.

Epoxy sealed terminals prevent entry of solder flux and other contaminants.

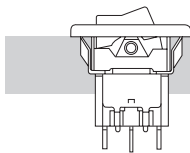
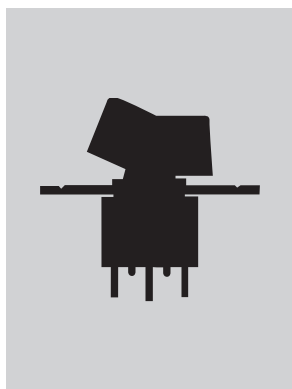
Prominent external insulating barriers increase insulation resistance and dielectric strength.

Bias guard prevents misalignment of contacts; interlocking of actuator block with rocker and internal guide does not allow transmission of diagonal force on rocker to reach contact mechanism.

Clinching of the frame to the case well above the base and terminals provides 1,500V dielectric strength.

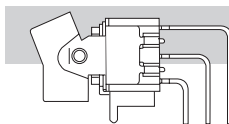


Actual Size



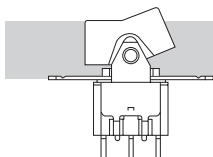
Snap-in Mount

Page B64



Bracket PC Mount

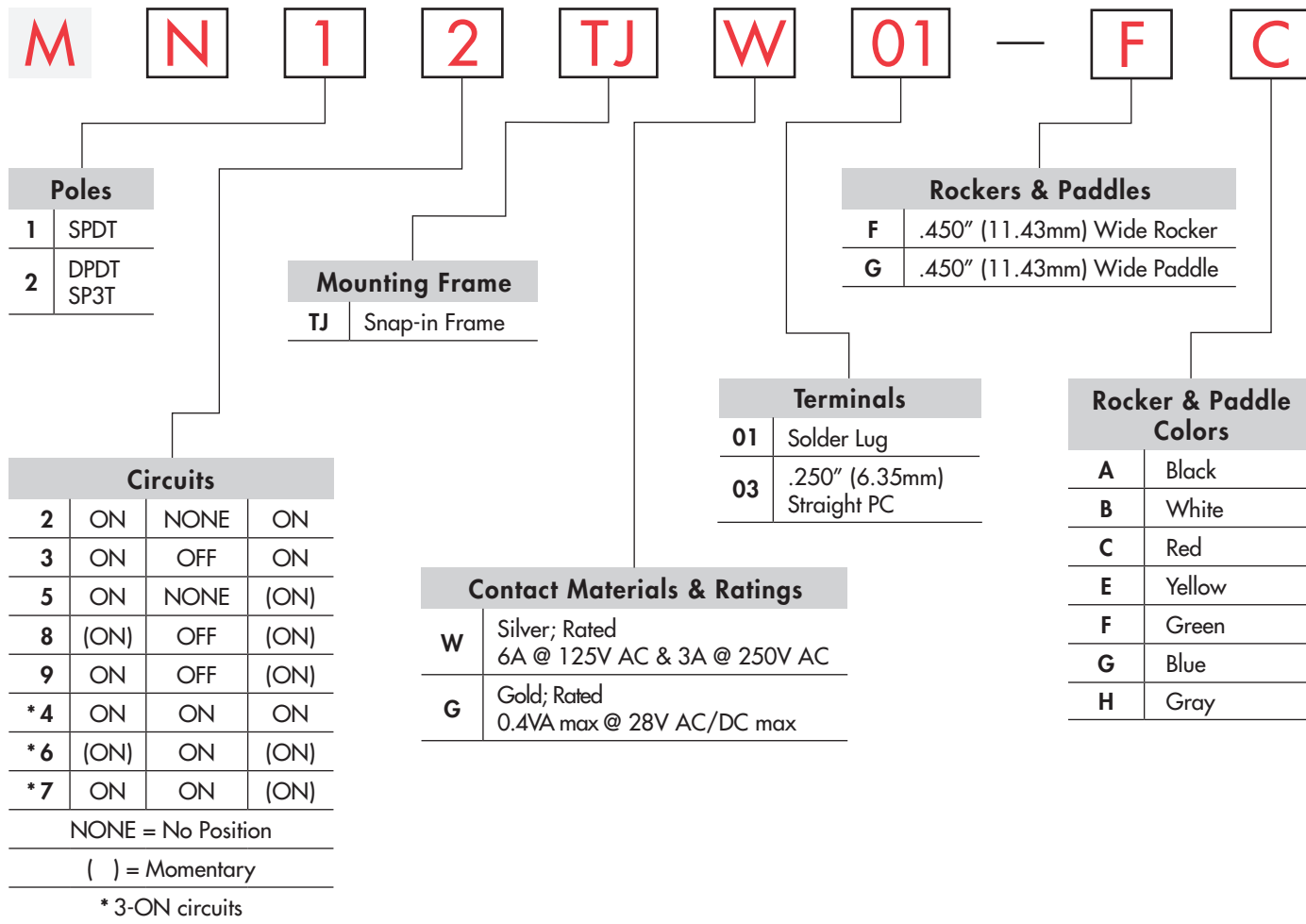
Page B72



Flat Frame Mount

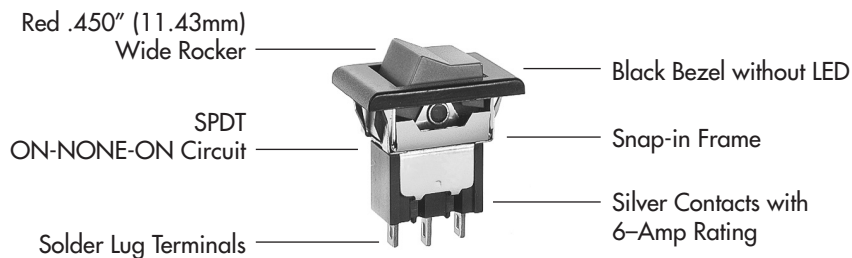
Page B83

TYPICAL SWITCH

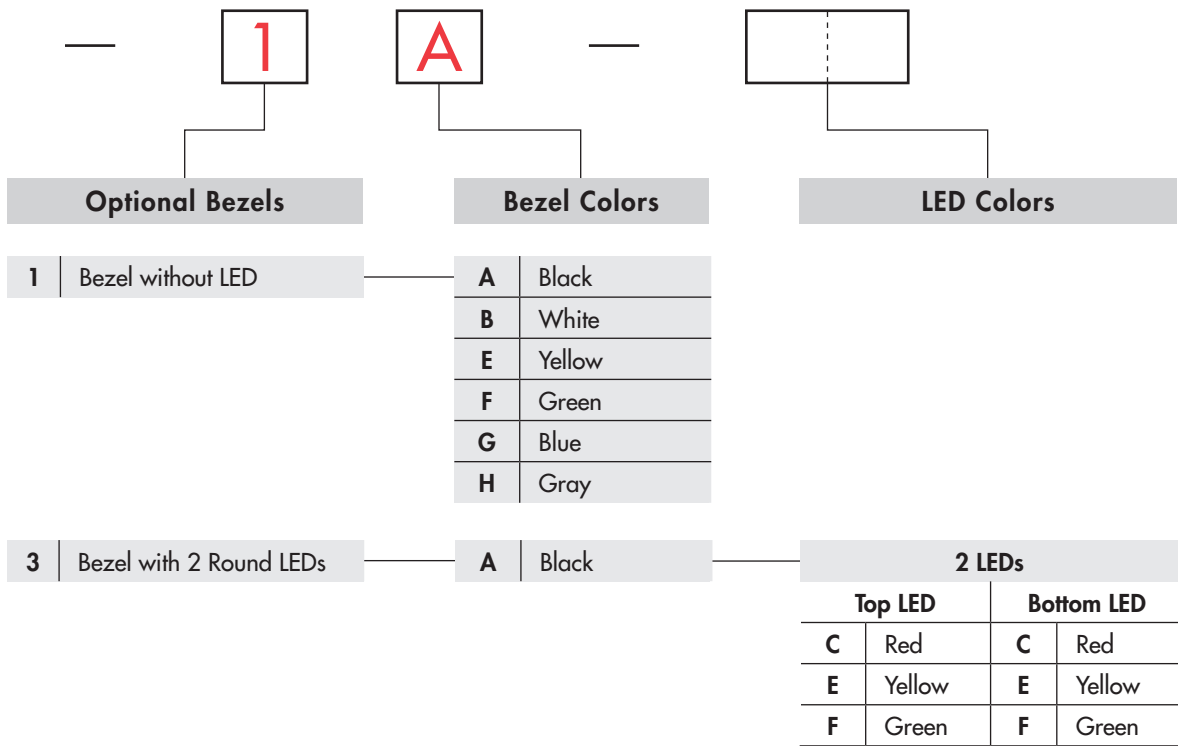


DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MN12TJW01-FC-1A

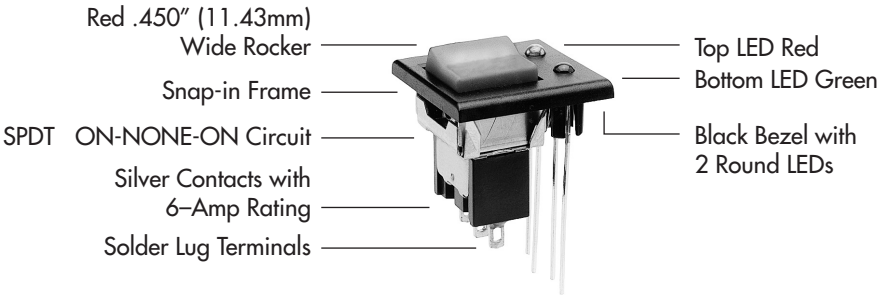


ORDERING EXAMPLE

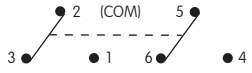


DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

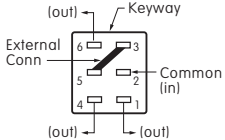
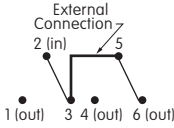
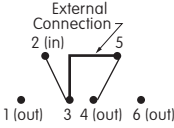
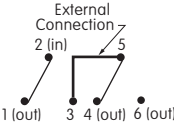
MN12TJW01-FC-3A-CF



POLES & CIRCUITS

		Rocker Position NONE = No Position () = Momentary			Connected Terminals			Throw & Schematics
Pole	Model	Down 	Center 	Up 	Down 	Center 	Up 	Note: Terminal numbers are not actually on the switch.
SP	MN12	ON	NONE	ON	2-3	OPEN	2-1	SPDT 
	MN13	ON	OFF	ON				
	MN15	ON	NONE	(ON)				
	MN18	(ON)	OFF	(ON)				
	MN19	ON	OFF	(ON)				
DP	MN22	ON	NONE	ON	2-3 5-6	OPEN	2-1 5-4	DPDT 
	MN23	ON	OFF	ON				
	MN25	ON	NONE	(ON)				
	MN28	(ON)	OFF	(ON)				
	MN29	ON	OFF	(ON)				

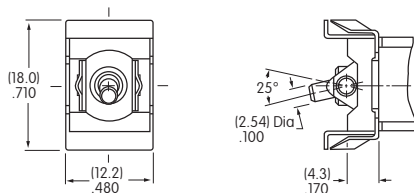
For 3 Throw (3-On)

		Connected Terminals & Schematic			External Connection
Pole	Model	Down	Center	Up	
SP	MN24	ON	ON	ON	The SP3T model utilizes a double pole base. External connection must be made during field installation. 
	MN26 MN27	(ON) ON	ON ON	(ON) (ON)	
		 2-3 5-6	 2-3 5-4	 2-1 5-4	

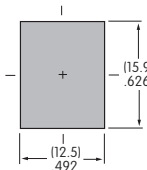
MOUNTING FRAME

TJ

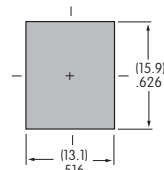
Snap-in Frame



Panel Cutout for Single Pole without Bezel



Panel Cutout for Double Pole without Bezel



Panel Thickness without Bezel: .039" ~ .126" (1.0mm ~ 3.2mm)

Panel Thickness with Bezel: .039" ~ .098" (1.0mm ~ 2.5mm)

CONTACT MATERIALS & RATINGS

W

Silver over Silver
Power Level

MN12, MN22: 6A @ 125V AC, 3A @ 250V AC, 4A @ 30V DC

MN13, MN15, MN18, MN19, MN23, MN25: 6A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC

MN28, MN29: 4A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC

MN24, MN26, MN27: 3A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC

G

Gold over Brass or Copper

Logic Level

0.4VA maximum @ 28V AC/DC maximum

Note: Complete explanation of operating range in Supplement section.

Gold over Silver

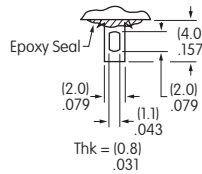
Power Level or Logic Level

See above for each rating

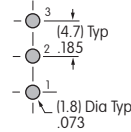
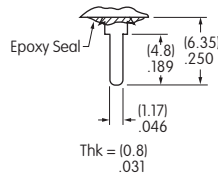
Note: Gold over silver is available as a custom option. This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section to find complete explanation of dual rating and operating range.

TERMINALS

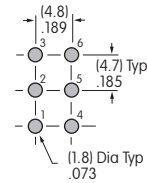
01 Solder Lug



03 .250" (6.35mm) Straight PC



Single Pole



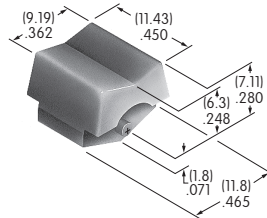
Double Pole

ROCKERS & PADDLES

F AT4150 .450" (11.43mm) Wide Rocker

Material: Polyamide
Finish: Matte

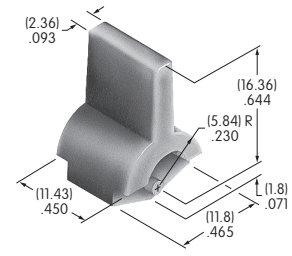
Colors Available:
A, B, C, E, F, G, H



G AT4151 .450" (11.43mm) Wide Paddle

Material: Polyamide
Finish: Matte

Colors Available:
A, B, C, E, F, G, H



Cap Colors
Available:



Black



White



Red



Yellow



Green



Blue



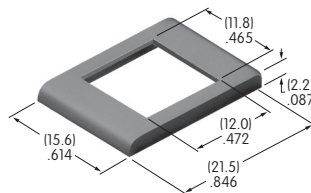
Gray

OPTIONAL SNAP-IN BEZELS & BEZEL COLORS

1 AT2107 Bezel

Material:
Polyamide

Finish:
Matte



Black



Green



White



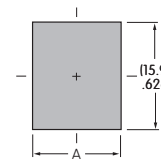
Blue



Yellow



Gray

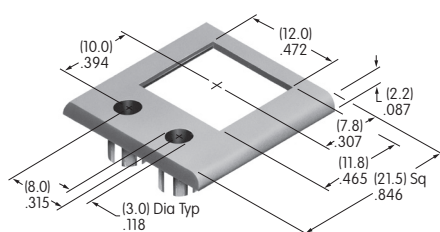


	Single Pole	Double Pole
A	(12.5)mm .492"	(13.1)mm .516"

3 AT212 Bezel for AT617 LED

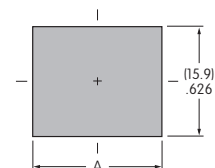
Material:
Polycarbonate

Finish:
Semi-glossy



Black

LED colors and
specifications
are on the
following page.



	Single Pole	Double Pole
A	(18.4)mm .724"	(18.7)mm .736"

Toggle

Rockers
B

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

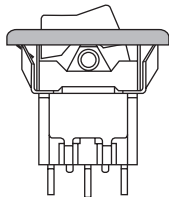
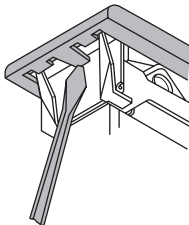
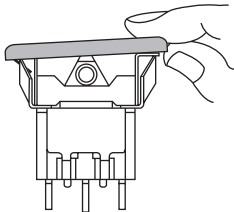
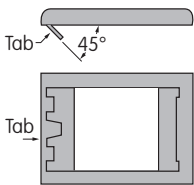
Indicators

Accessories

Supplement

Bezel Assembly

1. Pry out tab on bezel to a 45° angle.
2. Insert switch frame under tab and snap on bezel.
3. Push tab back into place.
4. Snap assembled bezel and switch into panel.

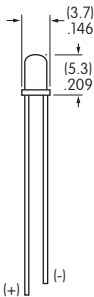
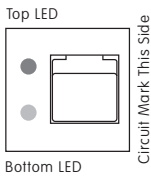


LED COLORS & SPECIFICATIONS

AT617 LED
For Bezel AT212
with 2 Round LEDs

Note: Lead lengths may differ from manufacturing lot to lot. The longer lead is the anode (+).

Bezel Orientation on Switch



AT617 LED				
	Color	C Red	E Yellow	F Green
Maximum Forward Current	I_{FM}	30mA	30mA	30mA
Typical Forward Current	I_F	20mA	20mA	20mA
Forward Voltage	V_F	2.1V	2.1V	2.2V
Maximum Reverse Voltage	V_{RM}	5V	5V	5V
Current Reduction Rate Above 25°C	ΔI_F	0.40mA/°C	0.40mA/°C	0.40mA/°C
Ambient Temperature Range (when used with a bezel)		-15° ~ +70°C		

The electrical specifications shown are determined at a basic temperature of 25°C.
The LED circuit is independent of switch operation. LED is colored in OFF state.

If the source voltage is greater than the rated voltage of the LED, a ballast resistor must be connected in series with the lamp. The ballast resistor calculation and more lamp detail are shown in the Supplement section.

LEGENDS

NKK Switches can provide custom legends for caps. Contact factory for more information.

Suggested Printable Area for Cap

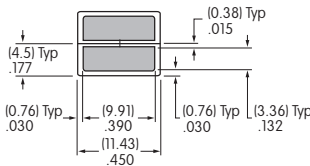
Recommended Print Method:

Pad Print

Epoxy based ink is recommended.



AT4150

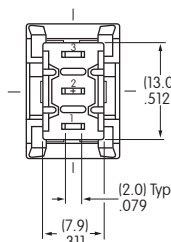
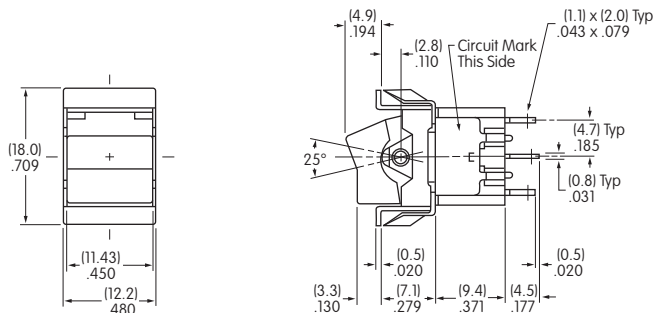


Shaded areas are printable areas.

TYPICAL SWITCH DIMENSIONS

Single Pole

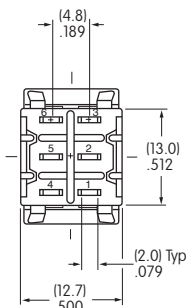
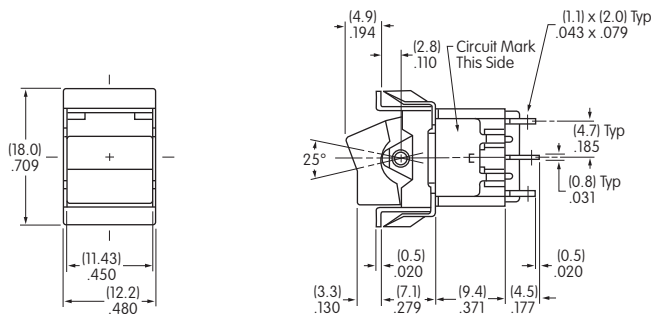
Snap-in Frame • Solder Lug



MN12TJW01-FC

Double Pole

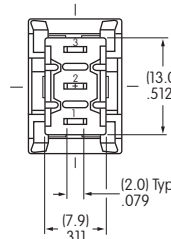
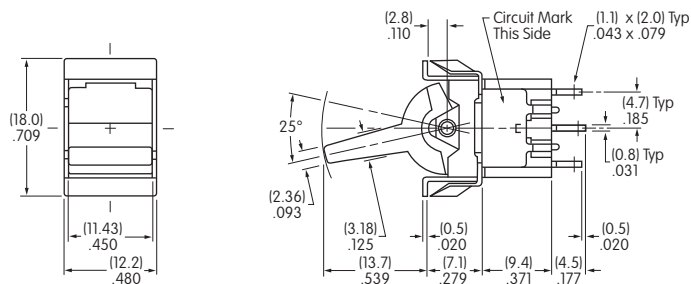
Snap-in Frame • Solder Lug



MN22TJW01-FC

Single Pole

Snap-in Frame • Solder Lug

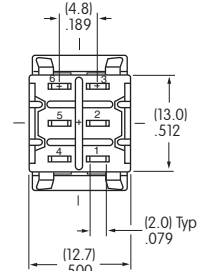
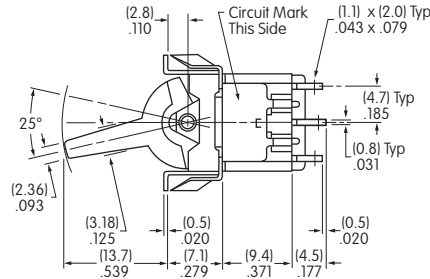
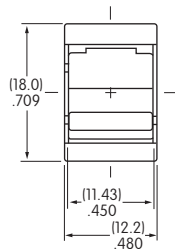


MN12TJW01-GC

TYPICAL SWITCH DIMENSIONS

Snap-in Frame • Solder Lug

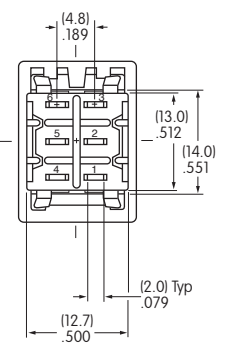
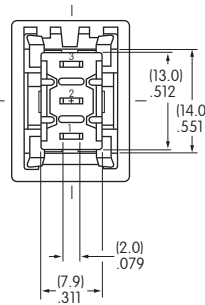
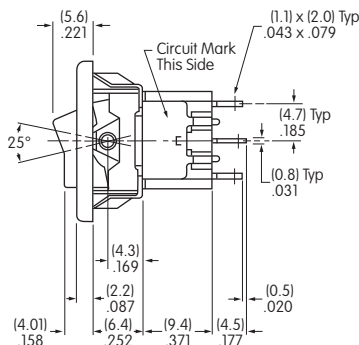
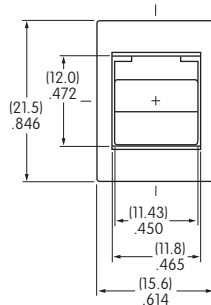
Double Pole



MN22TJW01-GC

Snap-in Frame • AT2107 Bezel • Solder Lug

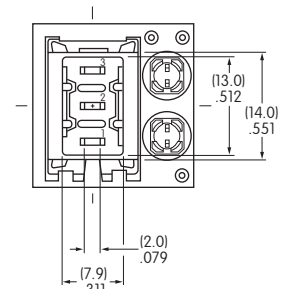
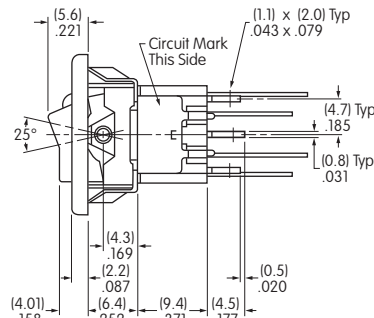
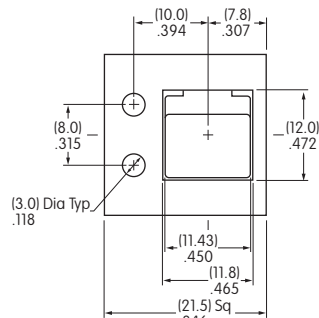
Single & Double Pole



MN12TJW01-FC-1A

Snap-in Frame • AT212 Bezel • Solder Lug

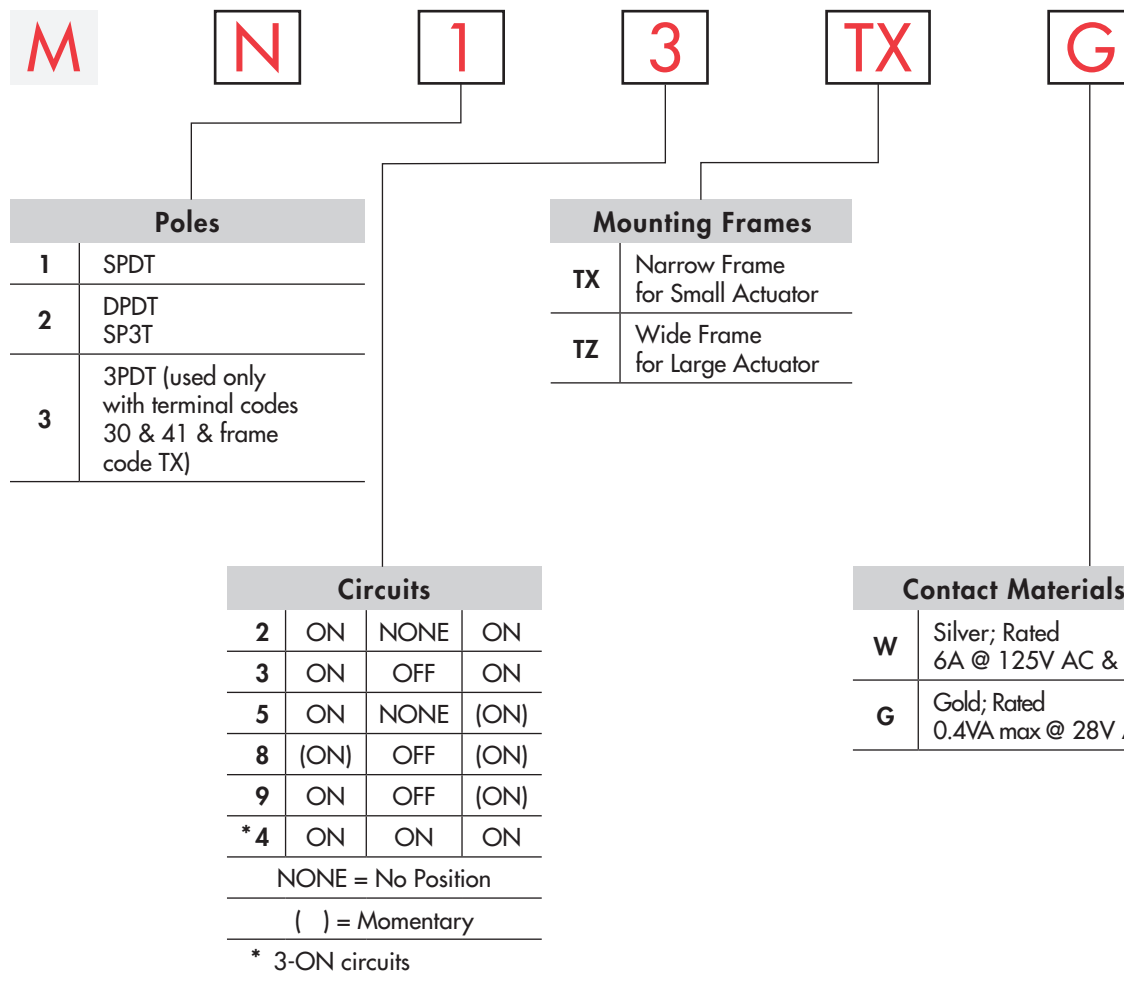
Single Pole



MN12TJW01-FC-3A-CF

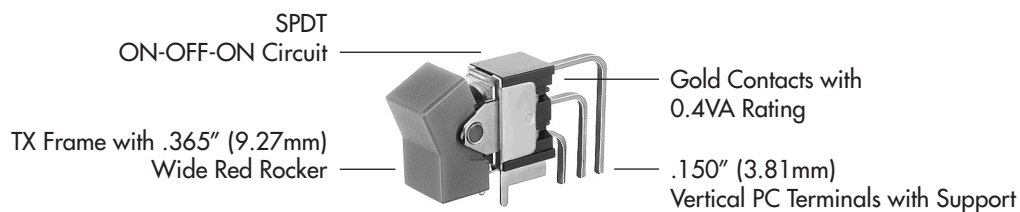
Supplement	Accessories	Indicators	Touch	Tilt	Tactiles	Slides	Rotaries	Keylocks	Programmable	Illuminated PB	Pushbuttons	B Rockers	Toggles
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TYPICAL SWITCH



DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MN13TXG41-DC



ORDERING EXAMPLE

41

Terminals For
TX & TZ Frames

Straight PC with Bracket
(1-2 Pole only)

13	.250" (6.35mm) Straight PC with .465" (11.8mm) Bracket
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Terminals For
TX Frame Only

Right Angle PC with Support
(1-3 Pole only)

30	.150" (3.81mm) Right Angle PC
41	.150" (3.81mm) Vertical PC

D

Rockers
& Paddles

Small Actuators
(TX Frame)

D	.365" (9.27mm) Wide Rocker
E	.365" (9.27mm) Wide Paddle
F	.450" (11.43mm) Wide Rocker
G	.450" (11.43mm) Wide Paddle
J	.595" (15.11mm) Wide Rocker
H	.595" (15.11mm) Wide Paddle

C

Rocker & Paddle
Colors

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

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

POLES & CIRCUITS

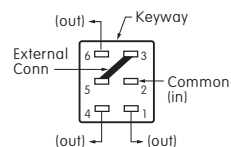
Pole	Model	Rocker Position NONE = No Position () =Momentary			Connected Terminals			Throw & Schematics
		Down	Center	Up	Down	Center	Up	
SP	MN12	ON	NONE	ON	2-3	OPEN	2-1	Note: Terminal numbers are not actually on the switch. * Reverse circuits available for vertical mount SP & DP upon request.
	MN13	ON	OFF	ON				
	*MN15	ON	NONE	(ON)				
	MN18	(ON)	OFF	(ON)				
	*MN19	ON	OFF	(ON)				
DP	MN22	ON	NONE	ON	2-3 5-6	OPEN	2-1 5-4	DPDT
	MN23	ON	OFF	ON				
	*MN25	ON	NONE	(ON)				
	MN28	(ON)	OFF	(ON)				
	*MN29	ON	OFF	(ON)				
3P	MN22	ON	NONE	ON	2-3 5-6 8-9	OPEN	2-1 5-4 8-7	3PDT
	MN23	ON	OFF	ON				
	*MN25	ON	NONE	(ON)				
	MN28	(ON)	OFF	(ON)				
	*MN29	ON	OFF	(ON)				

For 3 Throw (3-On)

Connected Terminals & Schematics							
Pole	Model	Down	Center	Up	Down	Center	Up
SP	MN24	ON	ON	ON			
	MN26	(ON)	ON	(ON)			
	MN27	ON	ON	(ON)			
					2-3 5-6	2-3 5-4	2-1 5-4

The SP3T model utilizes a double pole base.

External connection must be made during field installation.



MOUNTING FRAMES

Toggles

B Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

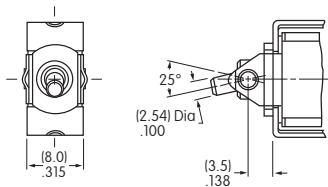
Accessories

Supplement

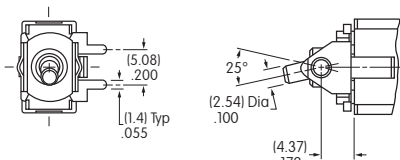
TX

Narrow Mounting Frame for Small Actuators
with Straight PC Terminals (codes 13, 15, 17, 23, 25, & 26)
or with Angle PC Terminals (codes 30 & 41)

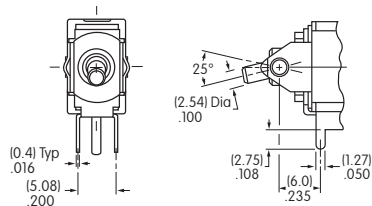
Straight PC Mounting



Right Angle PC Mounting

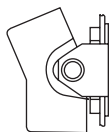


Vertical PC Mounting

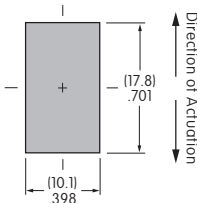
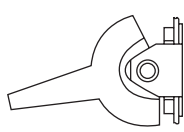


Small Actuators & Panel Cutouts for TX Frame (actuator details on the following pages)

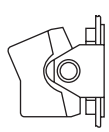
AT4148



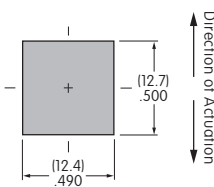
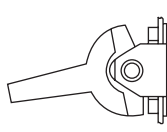
AT4149



AT4150



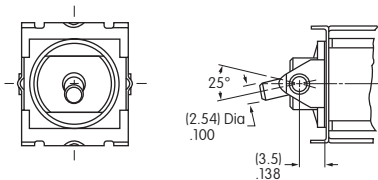
AT4151



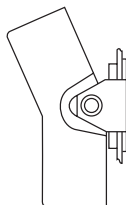
TZ

Wide Mounting Frame for Large Actuators
with Straight PC Terminals
(codes 13, 15, 17, 23, 25, & 26)

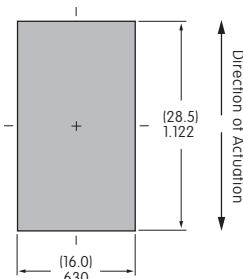
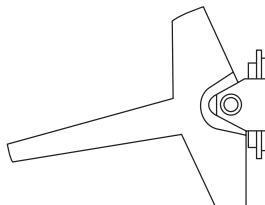
Large Actuators & Panel Cutouts for TZ Frame
(actuator details on the following pages)



AT4156



AT4157



CONTACT MATERIALS & RATINGS

W

Silver Power Levels

MN12, MN22: 6A @ 125V AC, 3A @ 250V AC, 4A @ 30V DC
MN13, MN15, MN18, MN19: 6A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC
MN23, MN25: 6A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC
MN28, MN29: 4A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC
MN24: 3A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC
MN32: 4A @ 125V AC, 2A @ 250V AC, 3A @ 30V DC
MN33, MN35, MN38, MN39: 4A @ 125V AC, 2A @ 250V AC, 2A @ 30V AC

G

Gold

Logic Level

0.4VA maximum @ 28V AC/DC maximum

Note: Complete explanation of operating range in Supplement section.

Gold over Silver

**Power Level
or Logic Level**

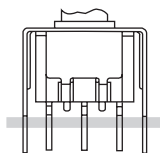
See above for ratings

Note: Gold over silver is available as a custom option. This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section to find complete explanation of dual rating and operating range.

TERMINALS

For TX and TZ 1-2 Pole Straight PC Mount with Bracket

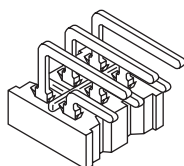
13 .250" (6.35mm) Terminal with
.465" (11.8mm) Bracket



PCB footprints are on the following Typical Switch Dimension pages.

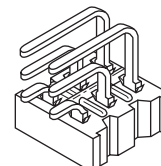
For TX 1-3 Pole Right Angle PC Mount

30 .150" (3.81mm)
Right Angle PC



For TX 1-4 Pole Vertical PC Mount

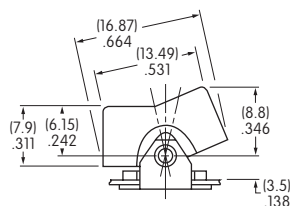
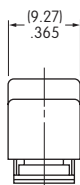
41 .150" (3.81mm)
Vertical PC



ROCKERS & PADDLES FOR TX MOUNTING FRAMES

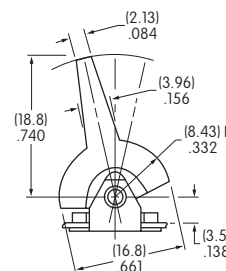
D AT4148 .365" (9.27mm)
Wide Rocker

Material: Polyamide
Finish: Matte



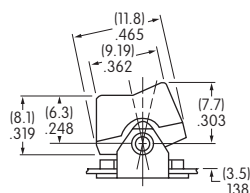
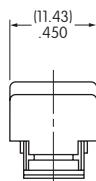
E AT4149 .365" (9.27mm)
Wide Paddle

Material: Polyamide
Finish: Matte



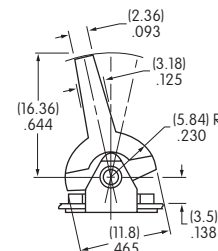
F AT4150 .450" (11.43mm)
Wide Rocker

Material: Polyamide
Finish: Matte



G AT4151 .450" (11.43mm)
Wide Paddle

Material: Polyamide
Finish: Matte



Cap Colors
Available:

A

Black

B

White

C

Red

E

Yellow

F

Green

G

Blue

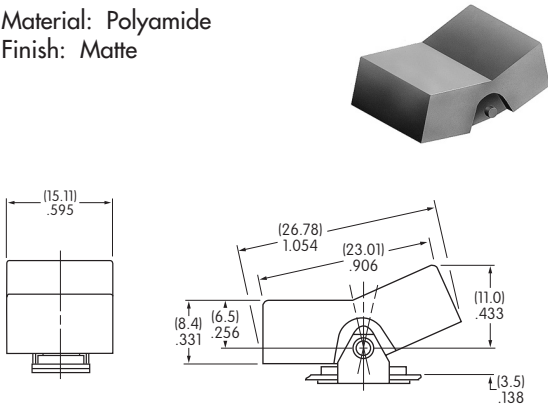
H

Gray

ROCKERS & PADDLES FOR TZ MOUNTING FRAMES

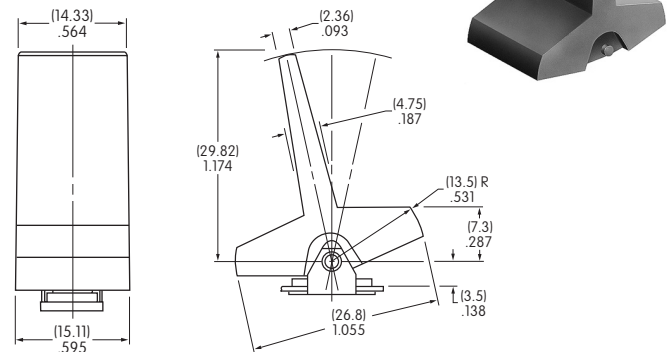
J AT4156 .595" (15.11mm) Wide Rocker

Material: Polyamide
Finish: Matte



H AT4157 .595" (15.11mm) Wide Paddle

Material: Polyamide
Finish: Matte



Cap Colors
Available:



Black



White



Red



Yellow



Green



Blue



Gray

OPTIONAL SNAP-IN PANEL FRAMES

Used with AT4148 Rocker and AT4149 Paddle

AT064-1

Accommodates .047" ~ .090"
(1.2 ~ 2.3mm) panel thickness

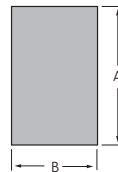
Material: Polyamide
Finish: Matte
Color: Black

Mounted separately from switches

Cutout Tolerances:

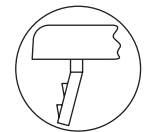
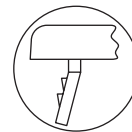
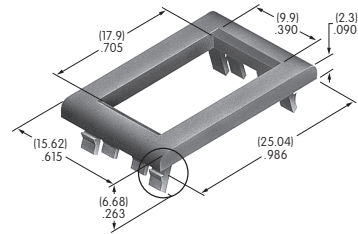
Dimension A:
.797" ~ .803" (20.24 ~ 20.4mm)

Dimension B:
.495" ~ .505" (12.57 ~ 12.83mm)



AT064-2

Accommodates .062" ~ .125"
(1.57 ~ 3.18mm) panel thickness



AT064-1 Enlarged Detail

Used with AT4150 Rocker and AT4151 Paddle

AT065-1

Accommodates .047" ~ .090"
(1.2 ~ 2.3mm) panel thickness

Material: Polyamide
Finish: Matte
Color: Black

Mounted separately from switches

Cutout Tolerances:

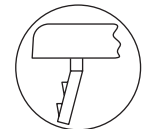
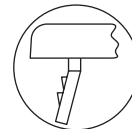
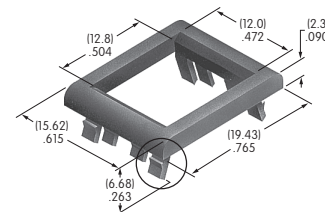
Dimension A:
.595" ~ .605" (15.11 ~ 15.37mm)

Dimension B:
.495" ~ .500" (12.57 ~ 12.7mm)



AT065-2

Accommodates .062" ~ .125"
(1.57 ~ 3.18mm) panel thickness

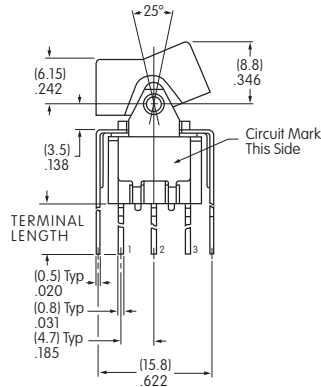
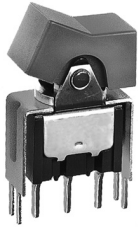


AT065-1 Enlarged Detail

AT065-2 Enlarged Detail

TYPICAL SWITCH DIMENSIONS

Straight PC • Bracket

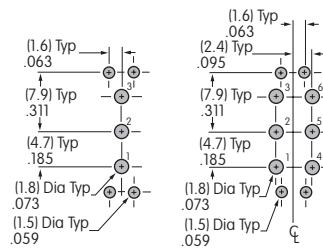
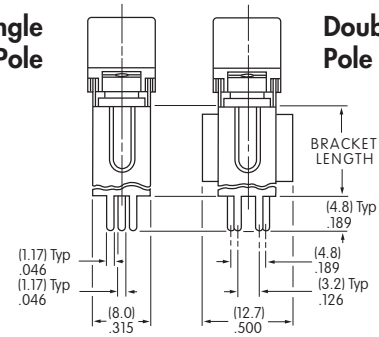


MN12TXG13-DC

Terminal Code:	Terminal Length:	Bracket Length:
13	.250" (6.35mm)	.465" (11.8mm)

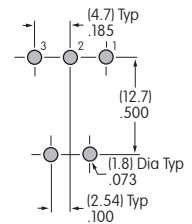
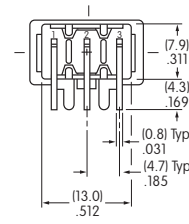
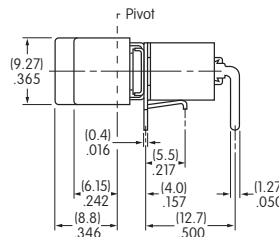
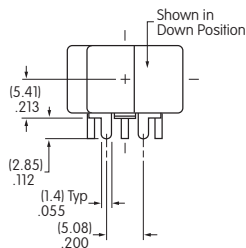
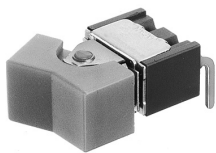
Single Pole

Double Pole



.150" (3.81mm) Right Angle PC

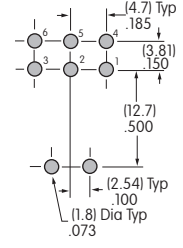
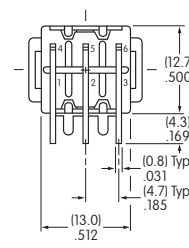
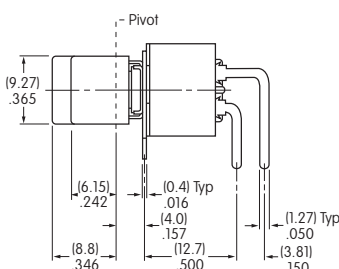
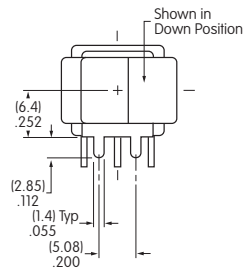
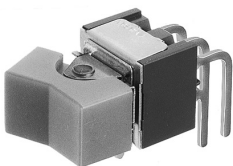
Single Pole



MN12TXG30-DC

.150" (3.81mm) Right Angle PC

Double Pole

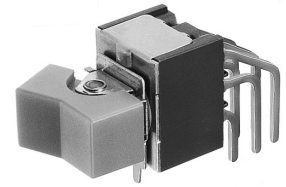
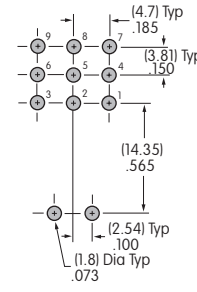
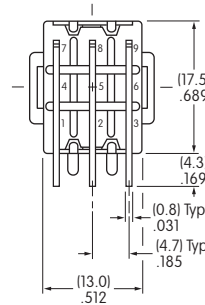
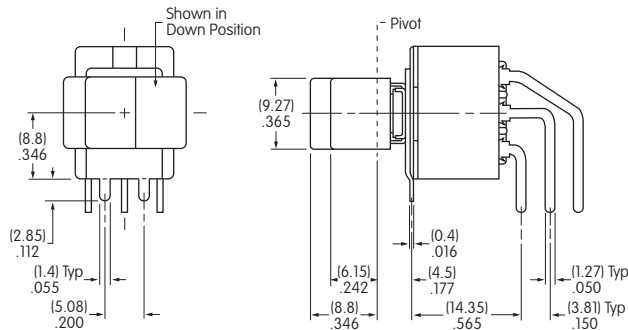


MN22TXG30-DC

TYPICAL SWITCH DIMENSIONS

Three Pole

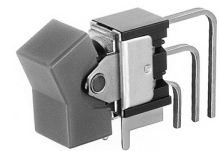
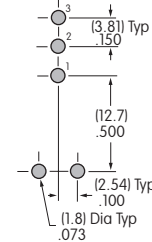
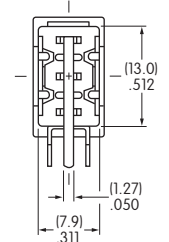
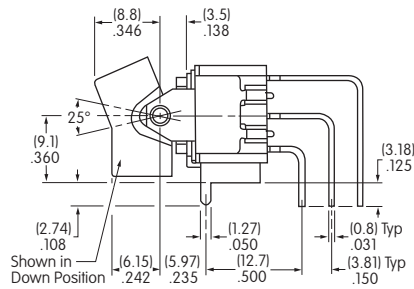
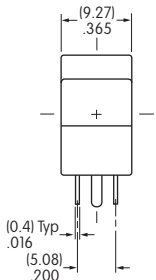
.150" (3.81mm) Right Angle PC



M2032TXG30-DC

Single Pole

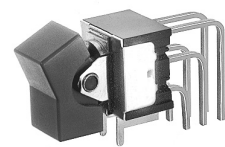
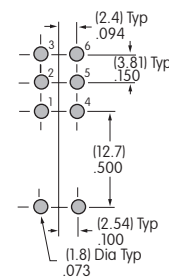
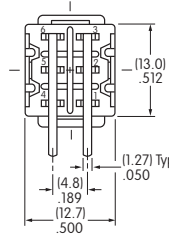
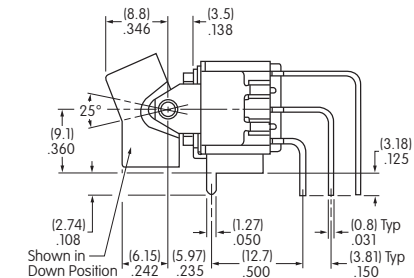
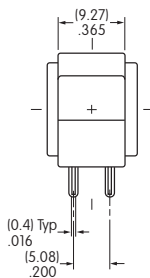
.150" (3.81mm) Vertical PC



MN12TXG41-DC

Double Pole

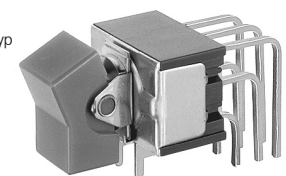
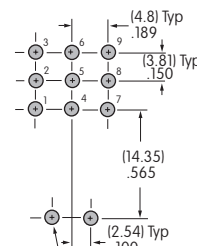
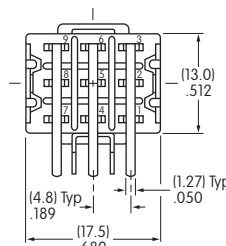
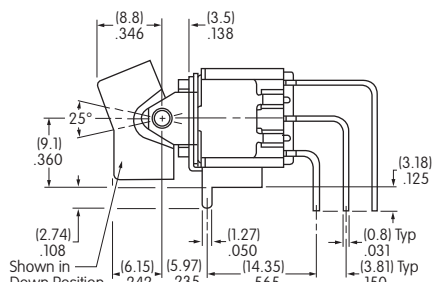
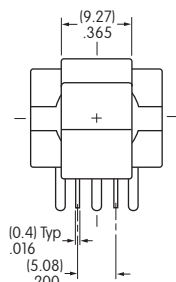
.150" (3.81mm) Vertical PC



MN22TXG41-DC

.150" (3.81mm) Vertical PC

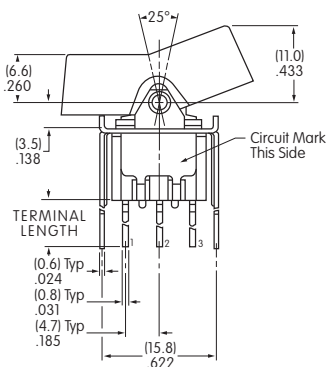
Three Pole



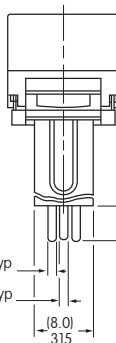
M2032TXG41-DC

TYPICAL SWITCH DIMENSIONS

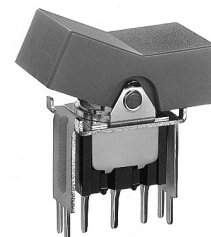
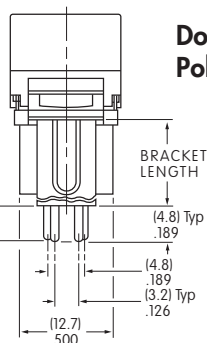
Straight PC • Bracket



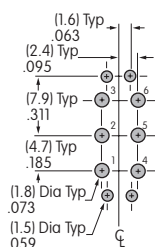
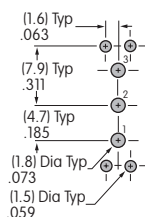
Single Pole



Double Pole



MN12TZG13-JC



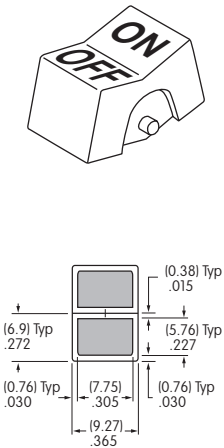
Terminal Code:	Terminal Length:	Bracket Length:
13	.250" (6.35mm)	.465" (11.8mm)

LEGENDS

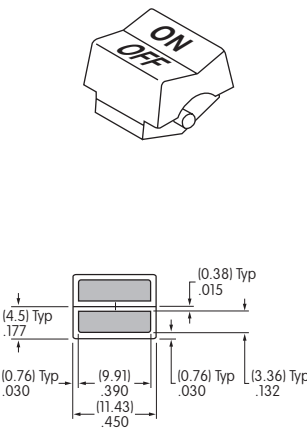
NKK Switches can provide custom legends for caps. Contact factory for more information.

Suggested Printable Area for Cap

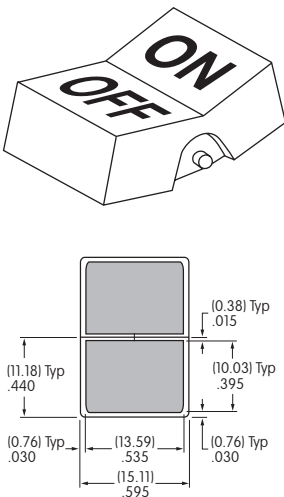
AT4148



AT4150



AT4156



Shaded areas are printable areas.

Recommended Print Method:

Pad Print

Epoxy based ink is recommended.

Toggles

B
Rockers

Pushbuttons

Illuminated PB

Programmable

Keylocks

Rotaries

Slides

Tactiles

Tilt

Touch

Indicators

Accessories

Supplement

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

TYPICAL SWITCH ORDERING EXAMPLE

M

N

1

2

TN

W

01

—

D

C

Poles

1	SPDT
2	DPDT SP3T
3	3PDT

Mounting Frame

TN	.272" (6.9mm) Wide Flat Frame
YT	.504" (12.8mm) Wide Flat Frame

Circuits

2	ON	NONE	ON
3	ON	OFF	ON
8	(ON)	OFF	(ON)
*4	ON	ON	ON

NONE = No Position
() = Momentary
*3-ON circuits

Contact Materials & Ratings

W	Silver; Rated 6A @ 125V AC & 3A @ 250V AC
G	Gold; Rated 0.4VA max @ 28V AC/DC max

Terminals

01	Solder Lug
03	.250" (6.35mm) Straight PC

Rockers & Paddles

Small Actuators (TN Frame)

D	.365" (9.27mm) Wide Rocker
E	.365" (9.27mm) Wide Paddle
F	.450" (11.43mm) Wide Rocker
G	.450" (11.43mm) Wide Paddle

Large Actuators (TY Frame)

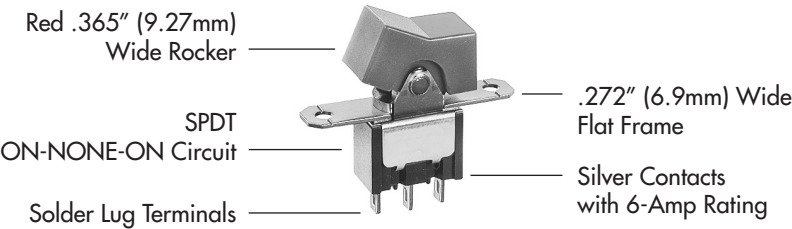
J	.595" (15.11mm) Wide Rocker
H	.595" (15.11mm) Wide Paddle

Rocker & Paddle Colors

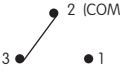
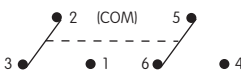
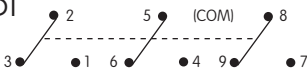
A	Black
B	White
C	Red
E	Yellow
F	Green
G	Blue
H	Gray

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MN12TNW01-DC

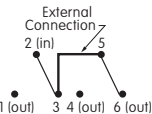
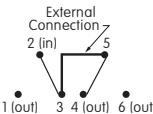
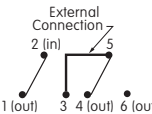


POLES & CIRCUITS

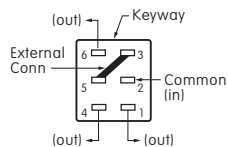
		Rocker Position NONE = No Position () = Momentary			Connected Terminals			Throw & Schematics
Pole	Model	Down 	Center 	Up 	Down 	Center 	Up 	Note: Terminal numbers are not actually on the switch.
SP	MN12 MN13 MN18	ON ON (ON)	NONE OFF OFF	ON ON (ON)	2-3	OPEN	2-1	SPDT 
DP	MN22 MN23 MN28	ON ON (ON)	NONE OFF OFF	ON ON (ON)	2-3 5-6	OPEN	2-1 5-4	DPDT 
3P	MN32 MN33 MN38	ON ON (ON)	NONE OFF OFF	ON ON (ON)	2-3 5-6 8-9	OPEN	2-1 5-4 8-7	3PDT 

For 3 Throw (3-On)

Connected Terminals & Schematics

Pole	Model	Down	Center	Up	Down	Center	Up
SP	MN24	ON	ON	ON	 2-3 5-6	 2-3 5-4	 2-1 5-4

The SP3T model utilizes a double pole base.



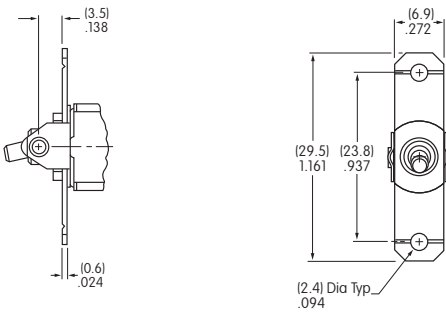
External connection must be made during field installation.

Flat Frame Mount Miniature Rockers

MOUNTING FRAMES

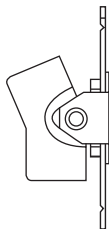
TN .272" (6.9mm)
Wide Flat Frame

Mounting hardware kit HK-1, as shown on the following page, must be ordered separately.

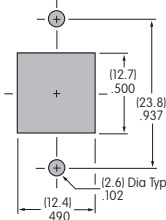
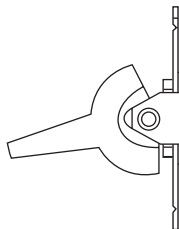


Small Actuators & Panel Cutouts for TN Frame (actuator details on the following pages)

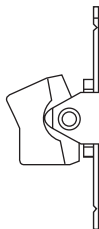
AT4148



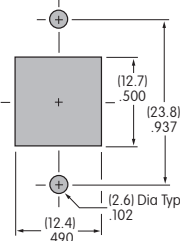
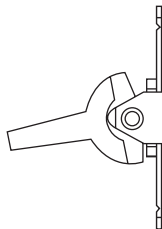
AT4149



AT4150



AT4151

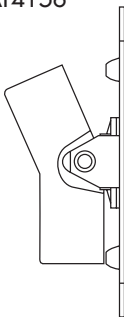


TY .504" (12.8mm)
Wide Flat Frame

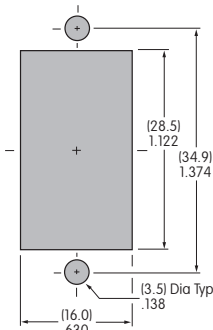
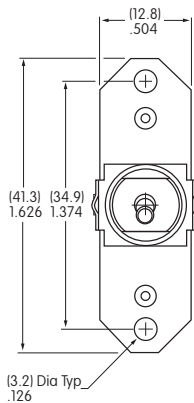
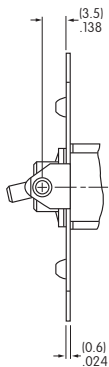
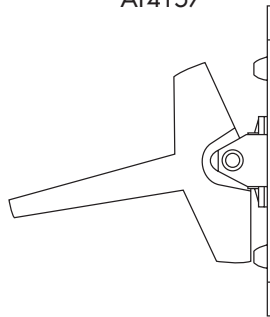
Large Actuators & Panel Cutout for TY Frame
(actuator details on the following pages)

Mounting hardware kit HK-2, as shown on the following page, must be ordered separately.

AT4156

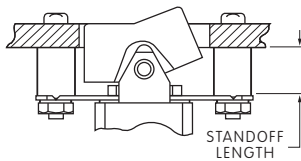


AT4157



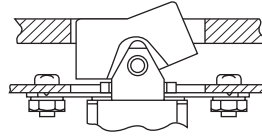
MOUNTING FRAMES (CONTINUED)

Face Panel Mounting



Flat frame devices may also be mounted to the face panel. Standoffs are used to recess the actuator and achieve an attractive front panel appearance.

Subpanel Mounting



These devices are especially designed for subpanel mounting. When installed on a mounting plate behind the panel, hardware is completely concealed and the front panel retains a clean, attractive appearance.

Optional Hardware Kits for Subpanel or Face Panel Mounting

Frame	Panel Thickness	Standoff Length	Hardware Kit Number
TN Frame	.125" (3.175mm)	.233" (5.918mm)	ATHK-1
TY Frame	.125" (3.175mm)	.312" (7.925mm)	ATHK-2

Hardware kits include:
2 stainless steel screws, 2 hex nuts, 2 lockwashers, & 2 standoffs

Optional Snap-in Panel Frames



AT064-1
AT064-2



AT065-1
AT065-2

Further details are shown in the previous bracketed PC mount subsection.

CONTACT MATERIALS & RATINGS

W

**Silver over Silver
Power Level**

MN12, MN22: 6A @ 125V AC, 3A @ 250V AC, 4A @ 30V DC
MN13, MN18, MN23: 6A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC
MN28: 4A @ 125V AC, 3A @ 250V AC, 3A @ 30V DC
MN32: 4A @ 125V AC, 2A @ 250V AC, 3A @ 30V DC
MN33, MN38: 4A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC
MN24: 3A @ 125V AC, 2A @ 250V AC, 2A @ 30V DC

G

Gold over Brass or Copper

Logic Level

0.4VA maximum @ 28V AC/DC maximum

Note: Complete explanation of operating range in Supplement section.

Gold over Silver

**Power Level
or Logic Level**

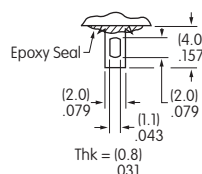
See above for each rating

Note: Gold over silver is available as a custom option. This dual rated option is suitable when two or more identical switches are used in logic and in power circuits within the same application. See Supplement section to find complete explanation of dual rating and operating range.

TERMINALS

01

Solder Lug



Toggles

B Rockers

Pushbuttons

Illuminated PB



Keylocks

Rotaries



Tactiles

Tilt

Touch

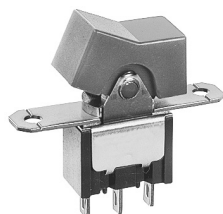


Accessories

Supplement

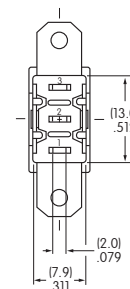
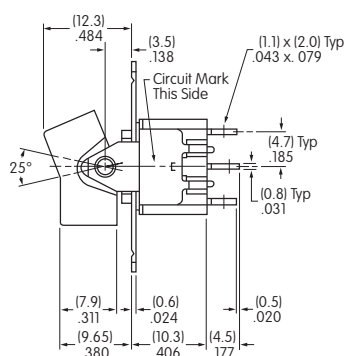
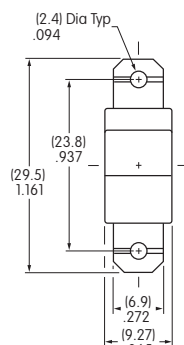
TYPICAL SWITCH DIMENSIONS

TN Frame • Solder Lug

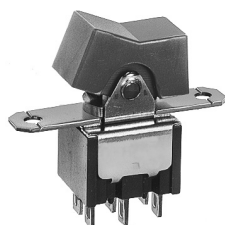


MN12TNW01-DC

Single Pole

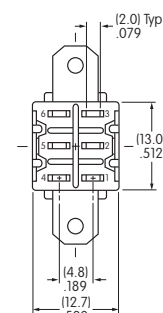
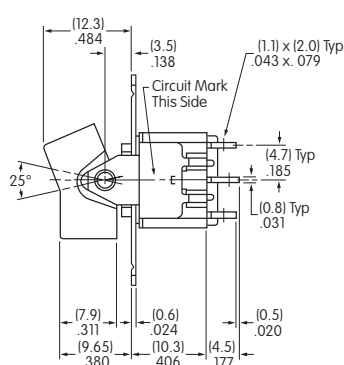
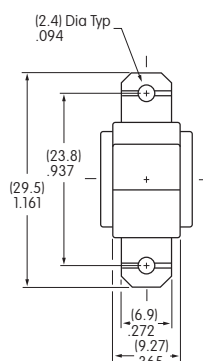


TN Frame • Solder Lug

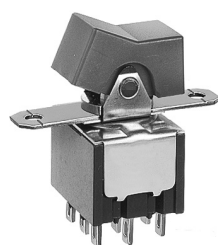


MN22TNW01-DC

Double Pole

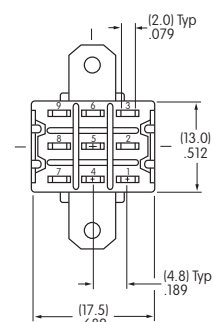
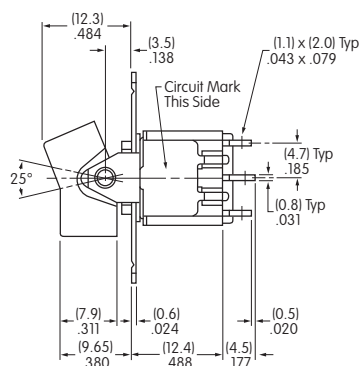
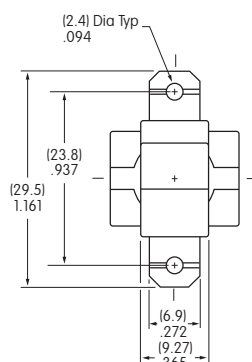


TN Frame • Solder Lug



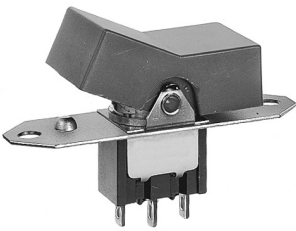
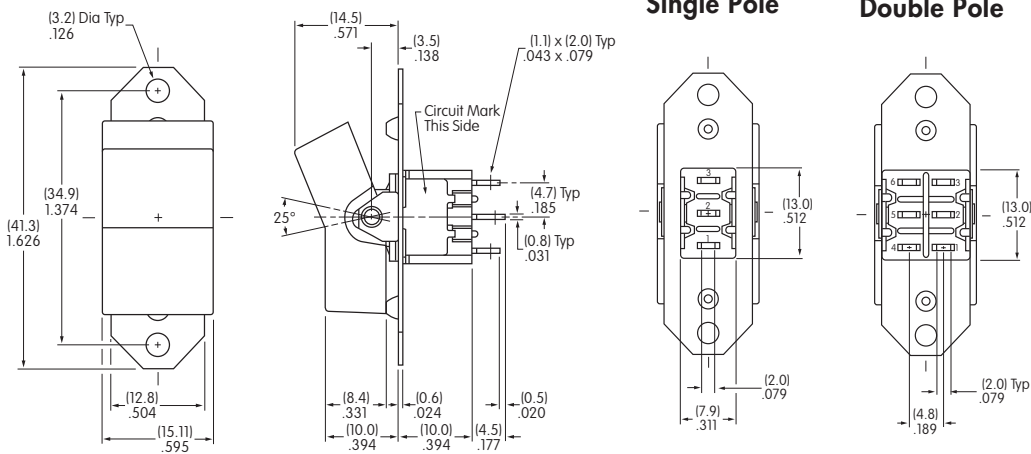
MN32TNW01-DC

Three Pole



TYPICAL SWITCH DIMENSIONS

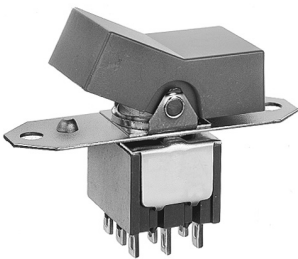
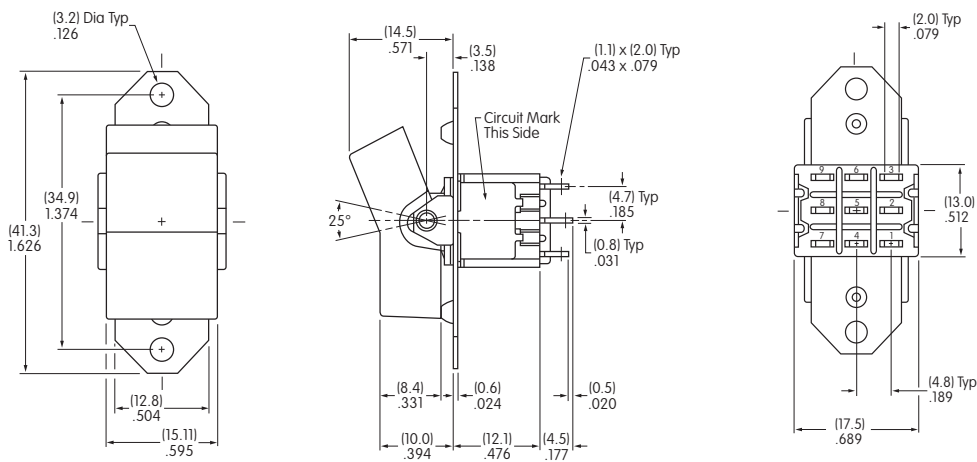
TY Frame • Solder Lug



MN12TYW01-JC

Three Pole

TY Frame • Solder Lug



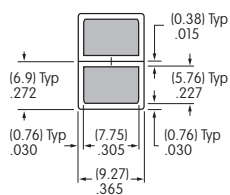
MN32TYW01-JC

LEGENDS

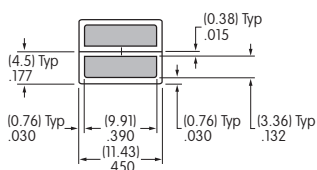
NKK Switches can provide custom legends for caps. Contact factory for more information.

Suggested Printable Area for Caps

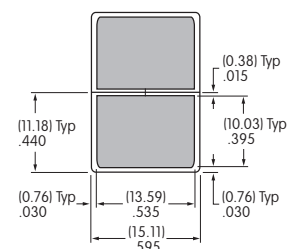
AT4148



AT4150



AT4156



Shaded areas are printable areas.

Recommended Print Method:

Pad Print

Epoxy based ink is recommended.

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	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 copper 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) for rockers
 -25°C through +70°C (-13°F through +158°F) for paddles
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: 500m/s² acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

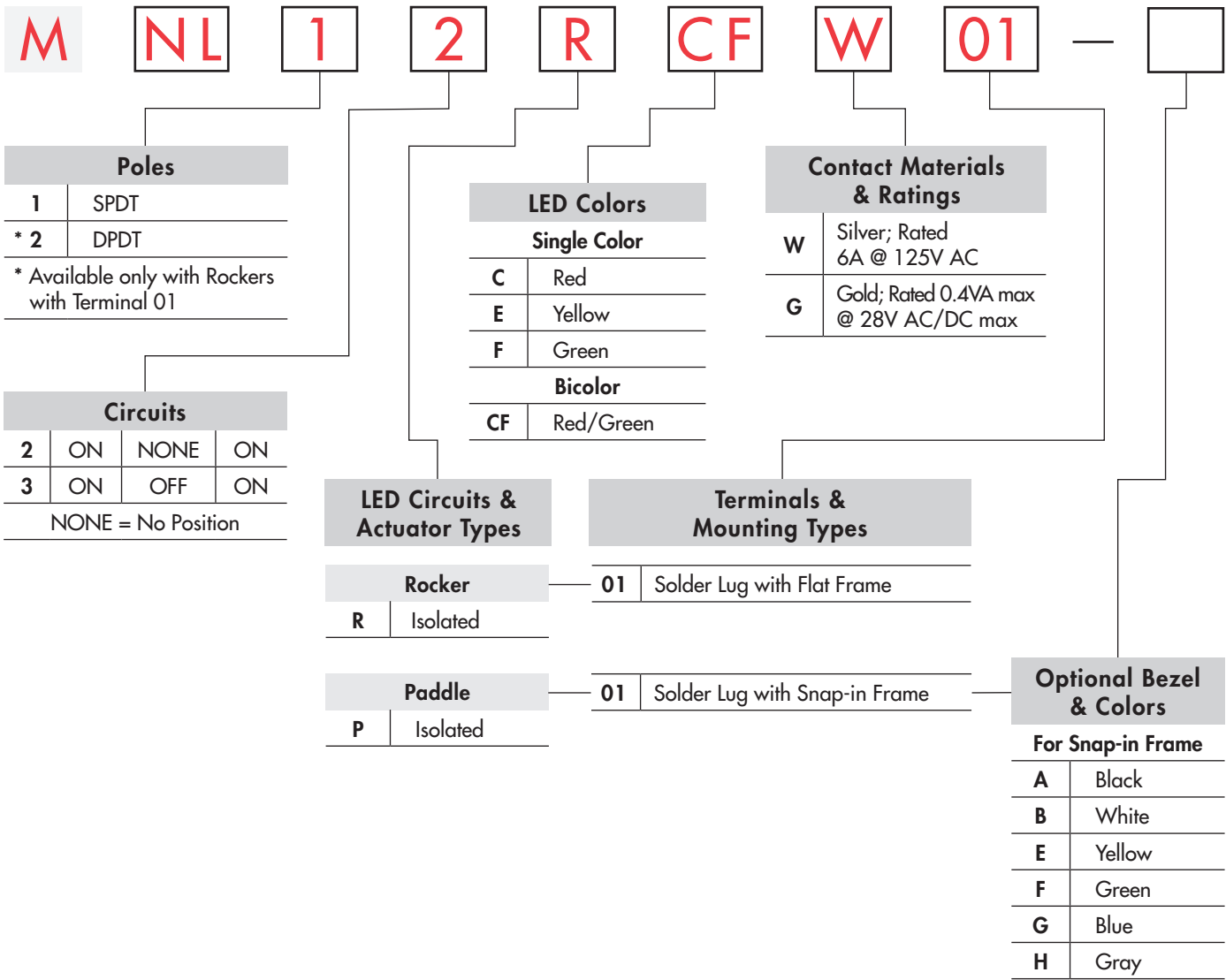
Installation

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: These devices are not process sealed. Hand clean locally using alcohol based solution.

Standards & Certifications

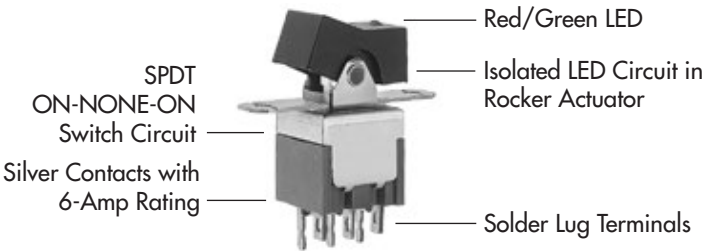
Flammability Standards: UL94V-0 base

TYPICAL SWITCH ORDERING EXAMPLE

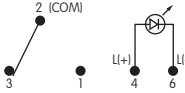
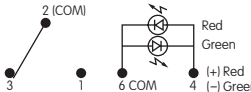


DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MNL12RCFW01



POLES & CIRCUITS & LED ILLUMINATION

Model	Pole & Throw	Rocker Position & Terminal Numbers NONE = No Position			Schematics
		Down 	Center 	Up 	
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. Isolated Single Color LED 
LED Circuit Isolated LEDs (see schematics) Connected LED Terminals		ON 4-6	NONE NONE	ON 4-6	
MNL13 SPDT Connected Power Terminals		ON 2-3	OFF OPEN	ON 2-1	Isolated Bicolor LED 
LED Circuit Isolated LEDs (see schematics) Connected LED Terminals		ON 4-6	ON 4-6	ON 4-6	
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	
MNL23 DPDT Connected Power Terminals		ON 2-3 5-6	OFF OPEN	ON 2-1 5-4	Isolated Bicolor LED 
LED Circuit Isolated LEDs (see schematics) Connected LED Terminals		ON 7-9	ON 7-9	ON 7-9	

LED COLORS & SPECIFICATIONS

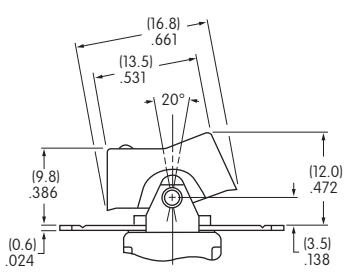
The electrical specifications shown are determined at a basic temperature of 25°C. LED circuit is isolated and requires an external power source. If the source voltage exceeds the rated voltage, a ballast resistor is required. The resistor value can be calculated by using the formula in Supplement Section. 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 Red	E Yellow	F Green	CF Red/Green	C Red	E Yellow	F Green	CF Red/Green	
Maximum Forward Current	I_{FM}	30	30	30	25	30	30	30	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	2.1	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	0.40	0.40	0.40	0.43/0.38	mA/°C
Ambient Temperature Range		-10° ~ +55°C				-25° ~ +70°C				

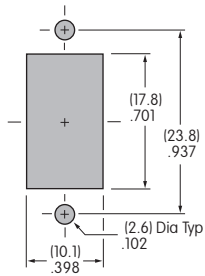
LED CIRCUIT, ROCKER, & MOUNTING TYPE COMBINATIONS

R Rocker with Isolated LED Circuit

Material: Polyamide
Finish: Matte
Color: Black



Flat Frame combines with Terminal code 01.

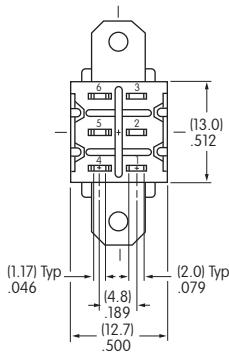
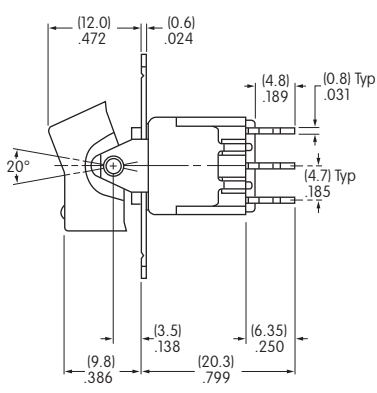
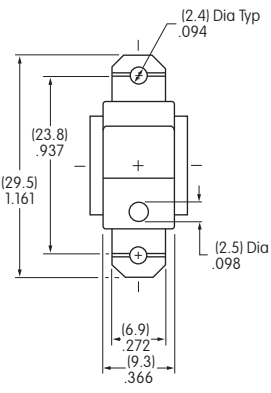


Maximum Panel Thickness .126" (3.2mm)

TYPICAL ROCKER SWITCH DIMENSIONS

Single Pole

Solder Lug

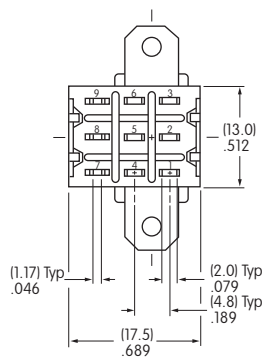
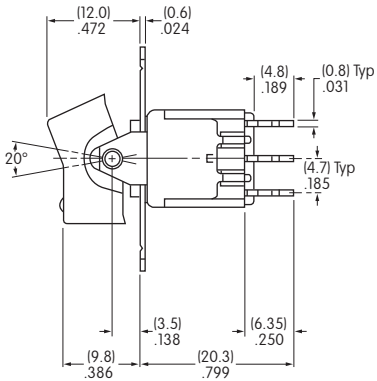
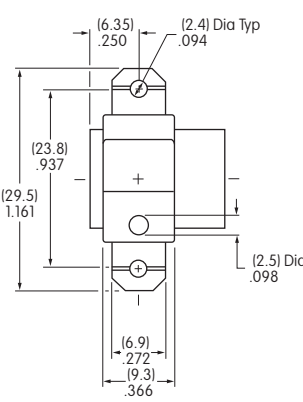


Single color LED switch does not have terminal 5.

MNL12RCFW01

Double Pole

Solder Lug



Single color LED switch does not have terminal 8.

MNL22RCFW01

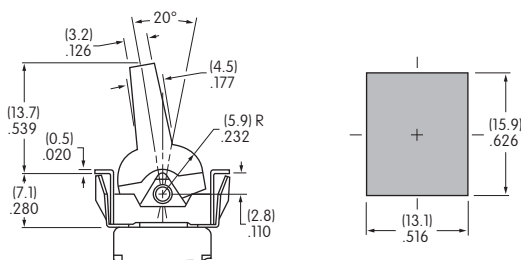
LED CIRCUIT, PADDLE, & MOUNTING TYPE COMBINATION

P

Paddle with Isolated LED Circuit

Material: Polyamide
Finish: Matte
Color: Black

Snap-in combines
with Terminal code 01



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

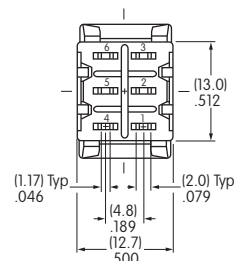
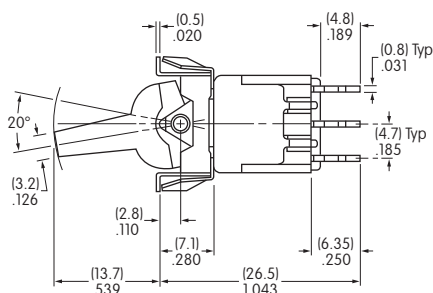
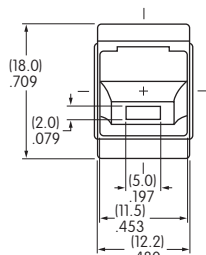
TYPICAL PADDLE SWITCH DIMENSIONS

Solder Lug • Snap-in

Single Pole Only



MNL12PCFW01



Single color LED switch does not have terminal 5.

CONTACT MATERIALS & RATINGS

W

Silver

Power Level

6A @ 125V AC & 3A @ 250V AC

G

Gold

Logic Level

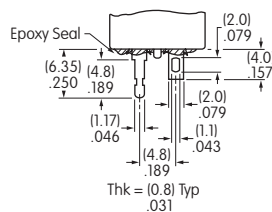
0.4VA maximum @ 28V AC/DC maximum

Complete explanation of operating range in Supplement section.

TERMINALS

01

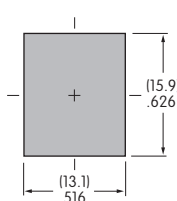
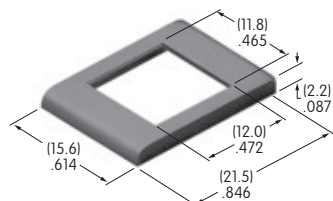
Solder Lug with Turret LED Terminal



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

