General Specifications

Electrical Capacity (Resistive Load)

Power Level (silver): 6A @ 125V AC & 3A @ 250V AC
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)

Logic/Power Level (gold over silver): Combines silver & gold ratings
Note: Find additional explanation of dual rating & 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 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;
50,000 operations minimum for silver at 3A @ 125V AC

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); or silver alloy with gold plating (code A)

Stationary Contacts: Silver with silver plating (code W); copper or brass with gold plating (code G);
or silver with gold plating (code A)

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: **File No. E44145 - Recognized only when ordered with marking on switch.**
Add "/U" before first dash in part number to order UL recognized switch.
All models recognized at 6A @ 125V AC, 3A @ 250V AC or 0.4VA maximum @ 28V DC maximum.

CSA: **File No. 023535_0_000 - Certified only when ordered with marking on switch.**
Add "/C" before first dash in part number to order CSA certified switch.
All models certified at 6A @ 125V AC or 3A @ 250V AC or 0.4VA maximum @ 28V maximum.

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.

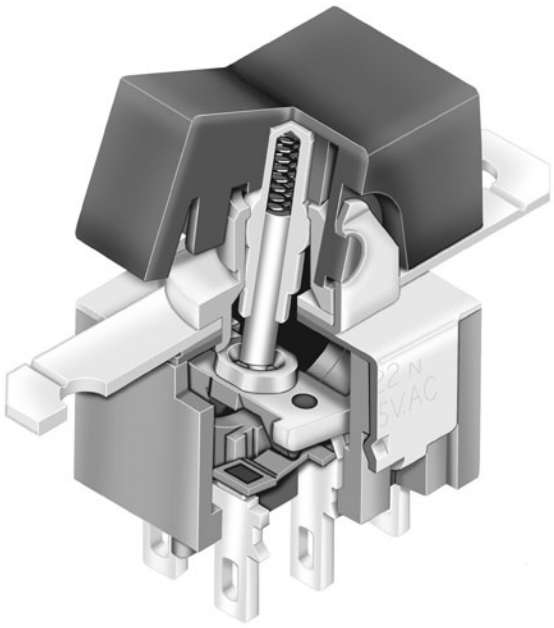
The molded diallyl phthalate case has a UL 94V-0 flammability rating.

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

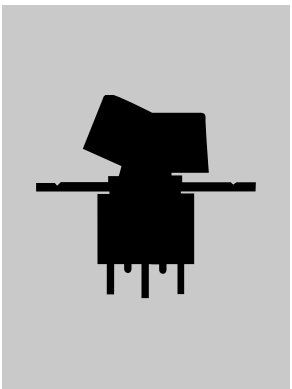
Prominent external insulating barriers increase insulation resistance and dielectric strength.

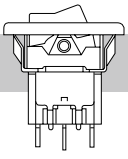
Bias guard prevents misalignment of contacts; interlocking of actuator block with rocker and internal guide does not allow transmission of diagonal force on rocker to reach contact mechanism.

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

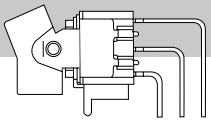


Actual Size

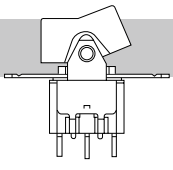




Snap-in Mount Page B64



Bracket PC Mount Page B72



Flat Frame Mount Page B83

TYPICAL SWITCH

M20 [1] [3] [TX] [G]

Poles

1	SPDT
2	DPDT SP3T
3	3PDT (used only with terminal codes 30 & 41 & frame code TX)
4	4PDT DP3T (used only with terminal code 41 & frame code TX)

Circuits

2	ON	NONE	ON
3	ON	OFF	ON
5	ON	NONE	(ON)
8	(ON)	OFF	(ON)
9	ON	OFF	(ON)
*4	ON	ON	ON
*6	(ON)	ON	(ON)
*7	ON	ON	(ON)

( ) = Momentary

* 3-ON circuits

Mounting Frames

TX	Narrow Frame for Small Actuator
TZ	Wide Frame for Large Actuator

Contact Materials & Ratings

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

ORDERING EXAMPLE

41 — D C

Terminals For TX & TZ Frames

Straight PC with Bracket (1-2 Pole only)

13	.250″ (6.35mm) Straight PC with .465″ (11.8mm) Bracket
15	.425″ (10.8mm) Straight PC with .630″ (16.0mm) Bracket
17	.964″ (24.5mm) Straight PC with 1.150″ (29.2mm) Bracket

Straight PC with Reinforced Bracket (1-2 Pole only)

23	.250″ (6.35mm) Straight PC with .465″ (11.8mm) Bracket
25	.425″ (10.8mm) Straight PC with .630″ (16.0mm) Bracket
26	.750″ (19.05mm) Straight PC with .953″ (24.2mm) Bracket

Terminals For TX Frame Only

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

30	.150″ (3.81mm) Right Angle PC

Vertical PC with Support (1-4 Pole)

41	.150″ (3.81mm) Vertical PC

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

Large Actuators (TZ Frame)

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

Rocker & Paddle Colors

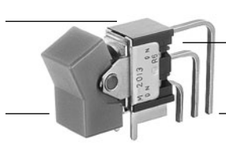
A	Black
B	White
C	Red
E	Yellow
F	Green
G	Blue
H	Gray

IMPORTANT:

Switches are supplied without UL & CSA marking unless specified.
UL & CSA recognized only when ordered with marking on the switch.
Specific models, ratings, & ordering instructions are noted on General Specifications page.

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

M2013TXG41-DC



SPDT
ON-OFF-ON Circuit

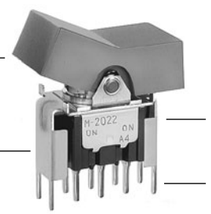
TX Frame with .365″ (9.27mm)
Wide Red Rocker

Gold Contacts with
0.4VA Rating

.150″ (3.81mm)
Vertical PC Terminals with Support

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

M2022TZG23-JC



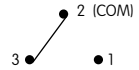
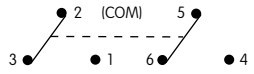
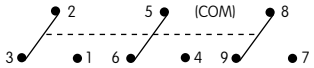
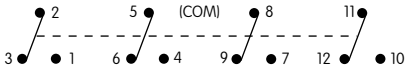
TZ Frame with .595″ (15.11mm)
Wide Red Rocker

DPDT
ON-NONE-ON Circuit

Gold Contacts with 0.4VA Rating

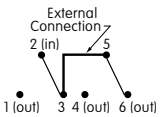
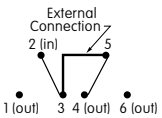
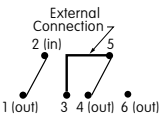
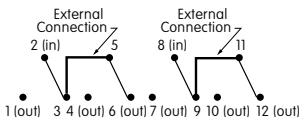
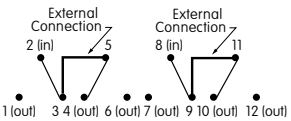
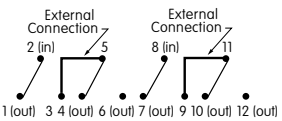
.250″ (6.35mm) Straight PC Terminals
with Reinforced Bracket

POLES & CIRCUITS

Pole	Model	Rocker Position ( ) = Momentary: Down	Center	Up	Connected Terminals: Down	Center	Up	Throw & Schematics
								Note: Terminal numbers are not actually on the switch. * Reverse circuits available for vertical mount SP & DP upon request.
SP	**M2012** **M2013** ***M2015** **M2018** ***M2019**	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (ON) (ON) (ON)	2-3	OPEN	2-1	SPDT 
DP	**M2022** **M2023** ***M2025** **M2028** ***M2029**	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (ON) (ON) (ON)	2-3 5-6	OPEN	2-1 5-4	DPDT 
3P	**M2022** **M2023** ***M2025** **M2028** ***M2029**	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (ON) (ON) (ON)	2-3 5-6 8-9	OPEN	2-1 5-4 8-7	3PDT 
4P	**M2042** **M2043** ***M2045** **M2048** ***M2049**	ON ON ON (ON) ON	NONE OFF NONE OFF OFF	ON ON (ON) (ON) (ON)	2-3 5-6 8-9 11-12	OPEN	2-1 5-4 8-7 11-10	4PDT 

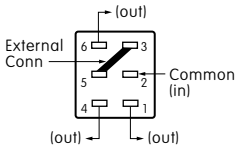
For 3 Throw (3-On)

Connected Terminals & Schematics

Pole	Model	Down	Center	Up	Down	Center	Up
SP	**M2024** **M2026** **M2027**	ON (ON) ON	ON ON ON	ON (ON) (ON)	 2-3 5-6	 2-3 5-4	 2-1 5-4
DP	**M2044** **M2046** **M2047**	ON (ON) ON	ON ON ON	ON (ON) (ON)	 2-3 5-6 8-9 11-12	 2-3 5-4 8-9 11-10	 2-1 5-4 8-7 11-10

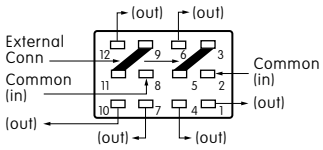
The SP3T model utilizes a double pole base.

External connection must be made during field installation.



The DP3T model utilizes a four pole base.

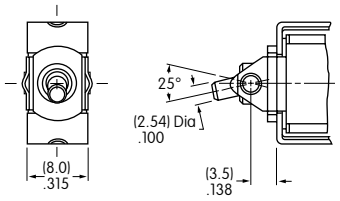
External connection must be made during field installation.



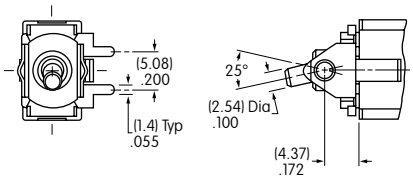
MOUNTING FRAMES

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)**

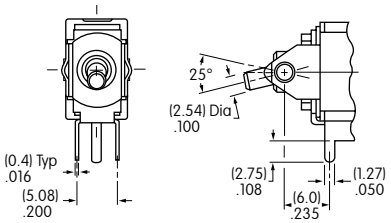
Straight PC Mounting



Right Angle PC Mounting

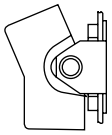


Vertical PC Mounting

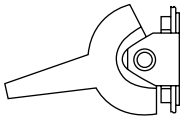


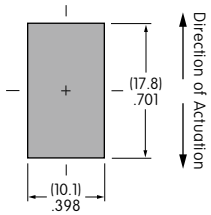
Small Actuators & Panel Cutouts for TX Frame (actuator details on the following pages)

AT4148

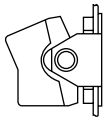


AT4149

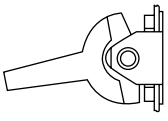


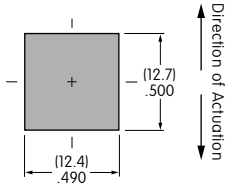


AT4150

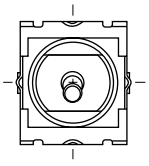


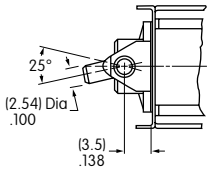
AT4151





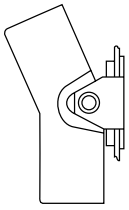
TZ **Wide Mounting Frame for Large Actuators with Straight PC Terminals (codes 13, 15, 17, 23, 25, & 26)**



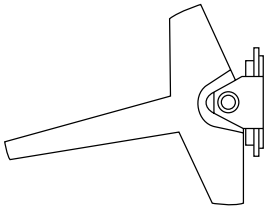


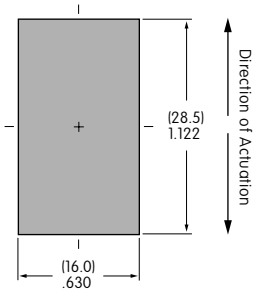
Large Actuators & Panel Cutouts for TZ Frame (actuator details on the following pages)

AT4156



AT4157





CONTACT MATERIALS & RATINGS

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

Note: See Supplement section to find complete explanation of operating range.

A	**Gold over Silver**	**Power Level or Logic Level**	**6A @ 125V AC or 0.4VA maximum @ 28V AC/DC maximum**

Note: 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

15 .425" (10.8mm) Terminal with .630" (16.0mm) Bracket

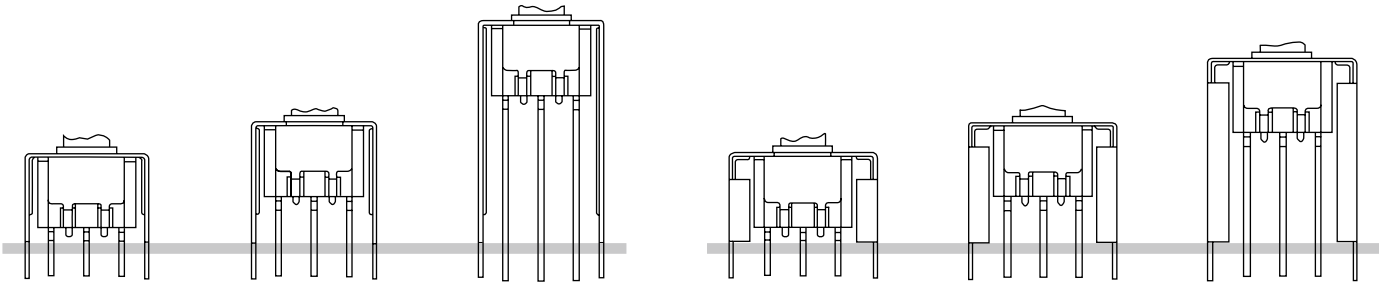
17 .964" (24.5mm) Terminal with 1.150" (29.2mm) Bracket

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

23 .250" (6.35mm) Terminal with .465" (11.8mm) Bracket

25 .425" (10.8mm) Terminal with .630" (16.0mm) Bracket

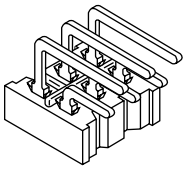
26 .750" (19.05mm) Terminal with .953" (24.2mm) Bracket



PCB footprints are on the following Typical Switch Dimension pages.

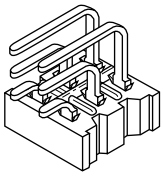
For TX 1-3 Pole Right Angle PC Mount

30 .150" (3.81mm) Right Angle PC



For TX 1-4 Pole Vertical PC Mount

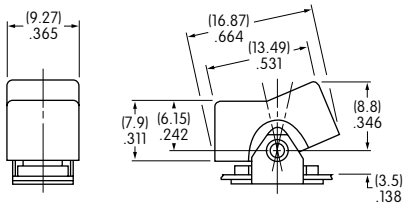
41 .150" (3.81mm) Vertical PC



ROCKERS & PADDLES FOR TX MOUNTING FRAMES

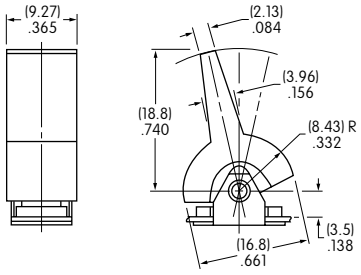
D AT4148 .365" (9.27mm) Wide Rocker

Material: Polyamide
Finish: Matte



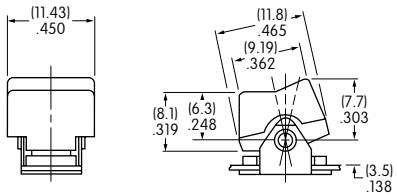
E AT4149 .365" (9.27mm) Wide Paddle

Material: Polyamide
Finish: Matte



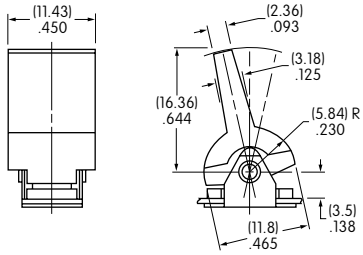
F AT4150 .450" (11.43mm) Wide Rocker

Material: Polyamide
Finish: Matte



G AT4151 .450" (11.43mm) Wide Paddle

Material: Polyamide
Finish: Matte



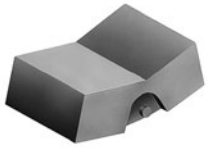
Cap Colors Available:

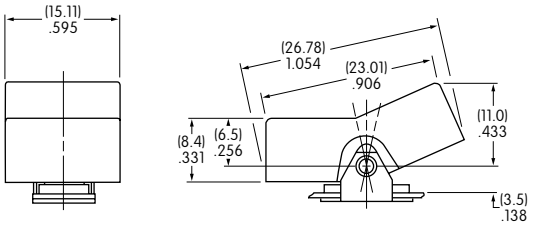
A Black **B** White **C** Red **E** Yellow **F** Green **G** Blue **H** Gray

ROCKERS & PADDLES FOR TZ MOUNTING FRAMES

J **AT4156 .595" (15.11mm) Wide Rocker**

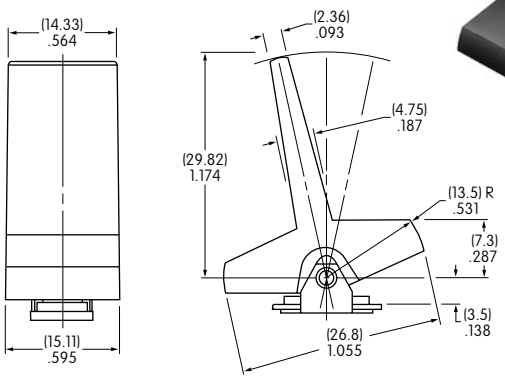
Material: Polyamide
Finish: Matte





H **AT4157 .595" (15.11mm) Wide Paddle**

Material: Polyamide
Finish: Matte



Cap Colors Available:

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

OPTIONAL SNAP-IN PANEL FRAMES

Used with AT4148 Rocker and AT4149 Paddle

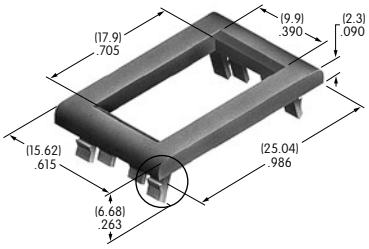
AT064-1
Accommodates .047" ~ .090"
(1.2 ~ 2.3mm) panel thickness

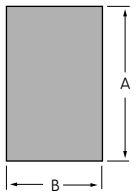
Material: Polyamide
Finish: Matte
Color: Black

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

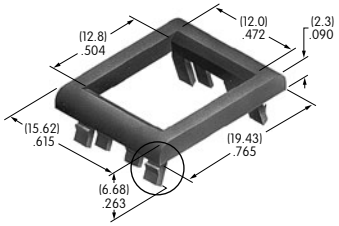
AT065-1
Accommodates .047" ~ .090"
(1.2 ~ 2.3mm) panel thickness

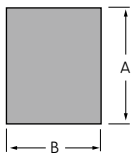
Material: Polyamide
Finish: Matte
Color: Black

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



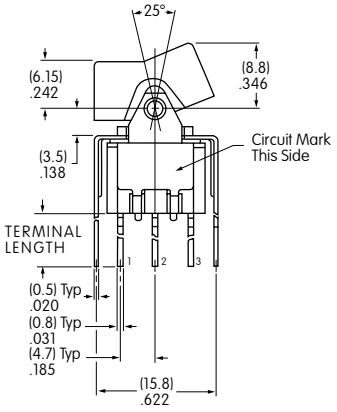


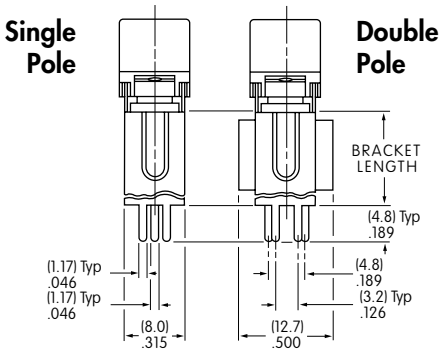
AT065–1 Enlarged Detail AT065–2 Enlarged Detail

TYPICAL SWITCH DIMENSIONS

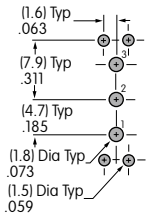
Straight PC • Bracket

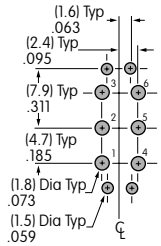
M2012TXG13-DC





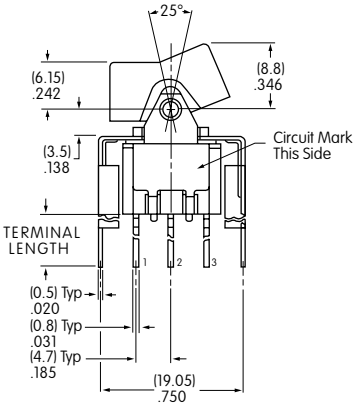
Terminal Code:	Terminal Length:	Bracket Length:
13	.250" (6.35mm)	.465" (11.8mm)
15	.425" (10.8mm)	.630" (16.0mm)
17	.964" (24.5mm)	1.150" (29.2mm)

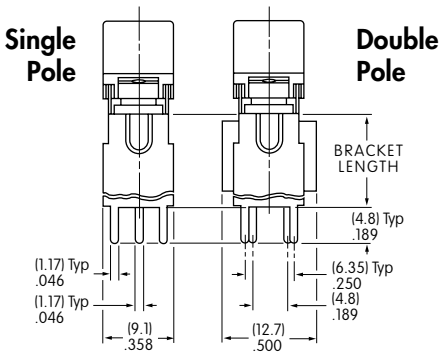




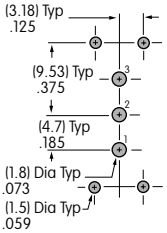
Straight PC • Reinforced Bracket

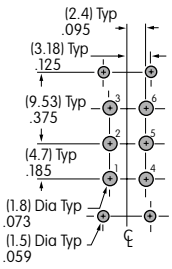
M2012TXG23-DC





Terminal Code:	Terminal Length:	Bracket Length:
23	.250" (6.35mm)	.465" (11.8mm)
25	.425" (10.8mm)	.630" (16.0mm)
26	.750" (19.05mm)	.953" (24.2mm)

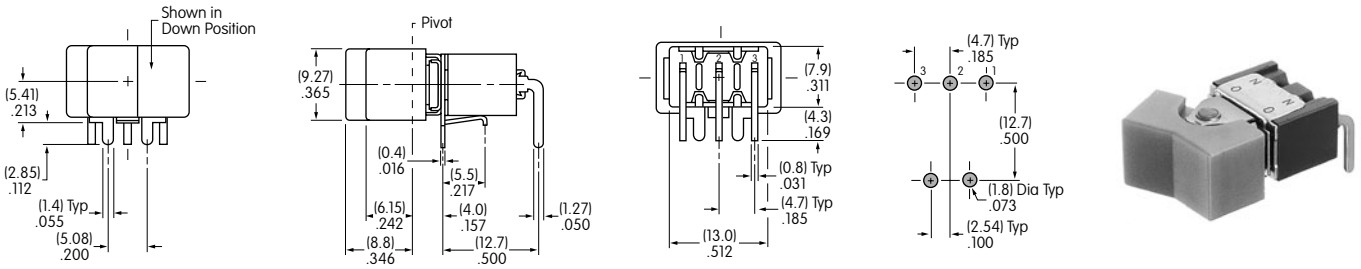




TYPICAL SWITCH DIMENSIONS

Single Pole

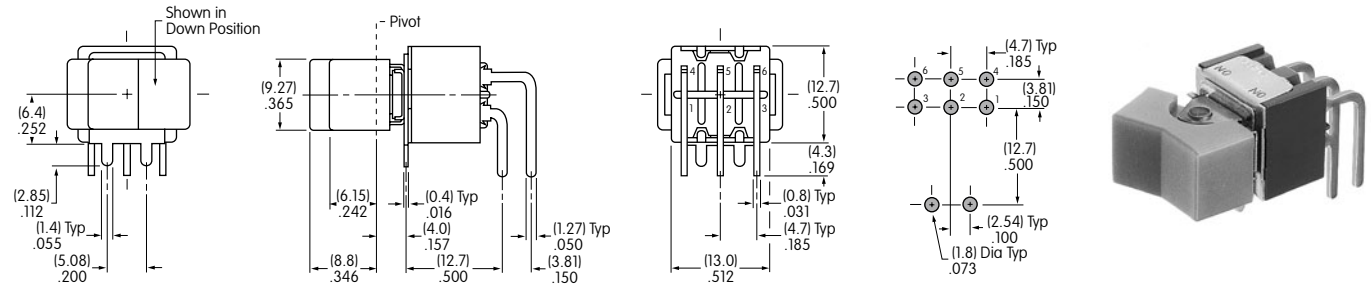
.150" (3.81mm) Right Angle PC



M2012TXG30-DC

Double Pole

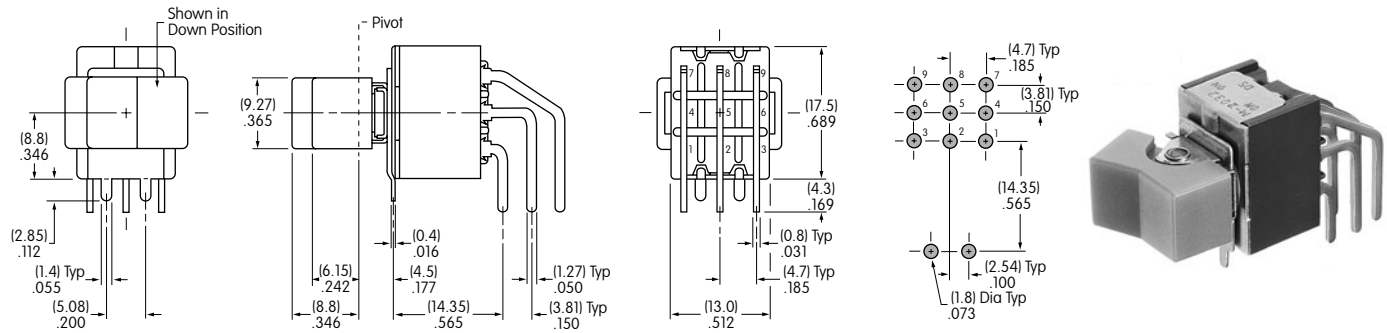
.150" (3.81mm) Right Angle PC



M2022TXG30-DC

Three Pole

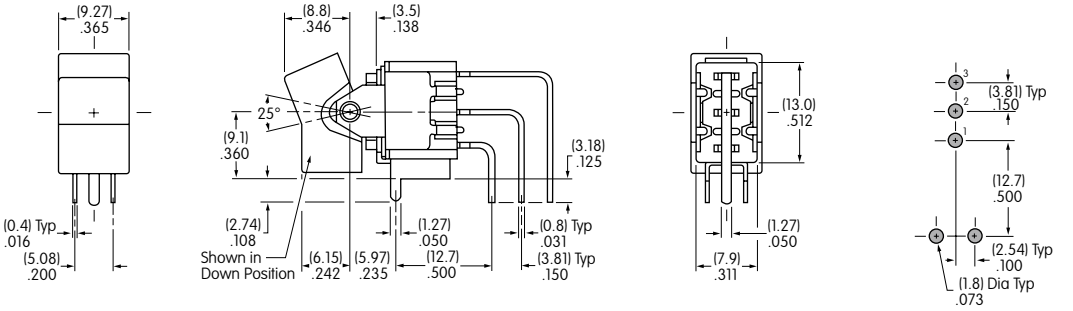
.150" (3.81mm) Right Angle PC



M2032TXG30-DC

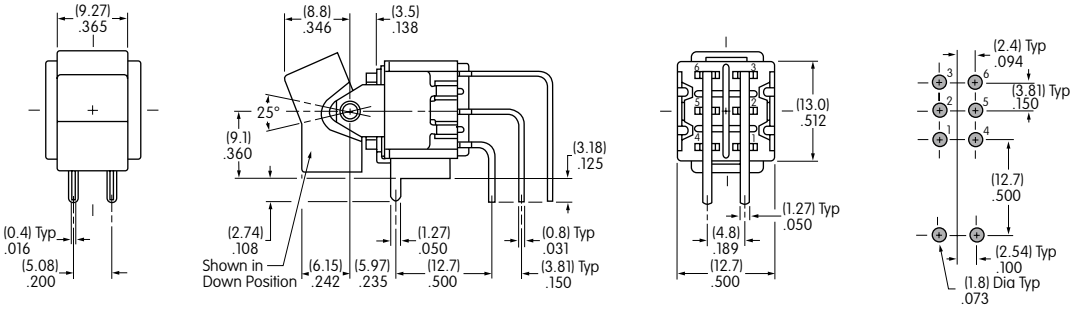
TYPICAL SWITCH DIMENSIONS

.150" (3.81mm) Vertical PC — Single Pole



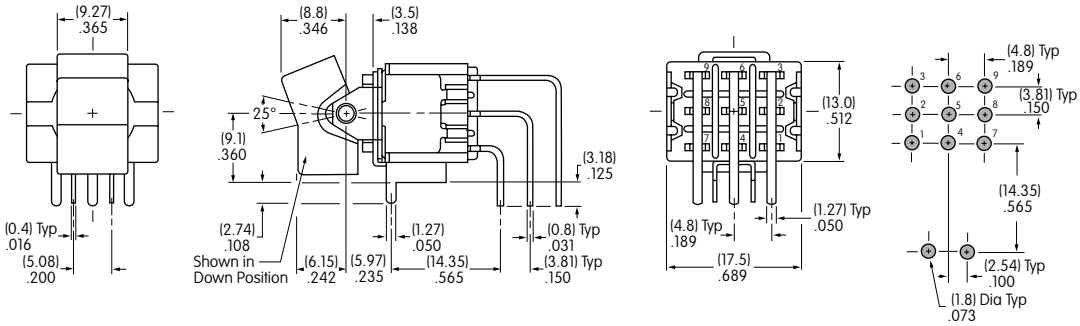
M2012TXG41-DC

.150" (3.81mm) Vertical PC — Double Pole



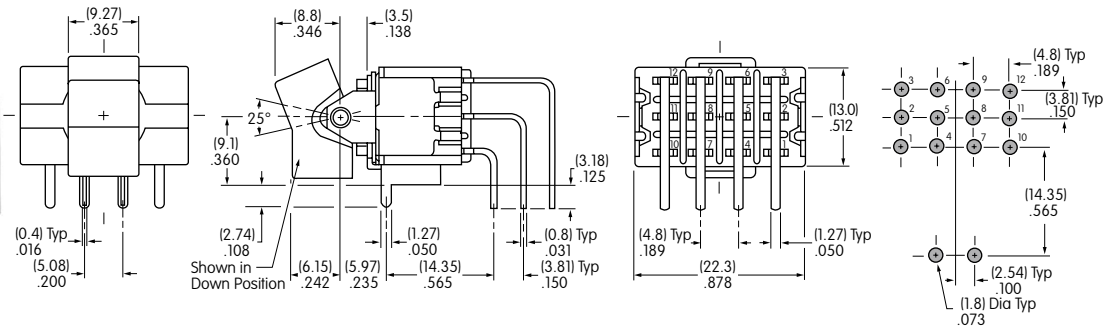
M2022TXG41-DC

.150" (3.81mm) Vertical PC — Three Pole



M2032TXG41-DC

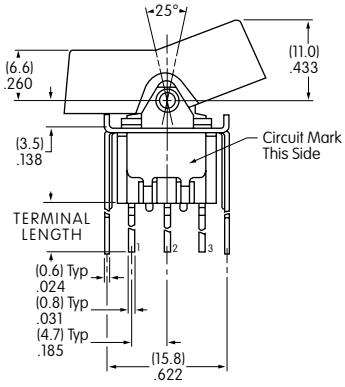
.150" (3.81mm) Vertical PC — Four Pole

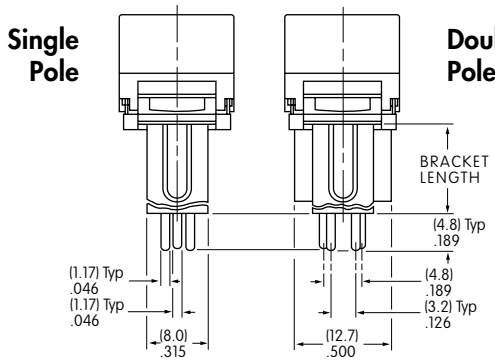


M2042TXG41-DC

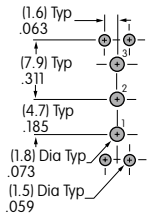
TYPICAL SWITCH DIMENSIONS

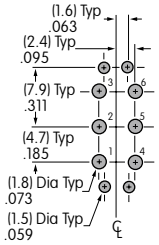
Straight PC • Bracket





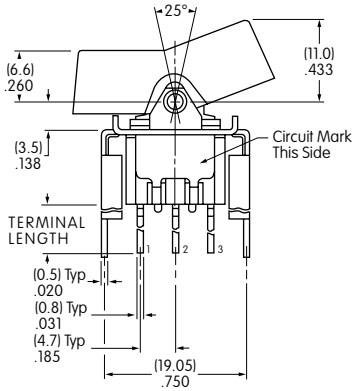
M2012TZG13-JC

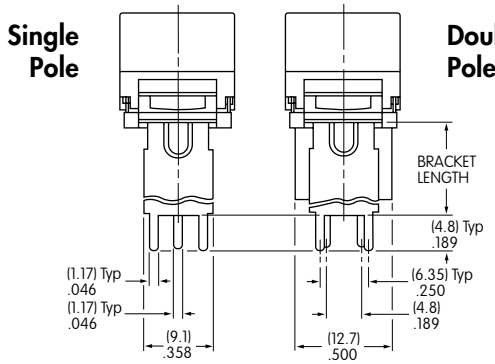




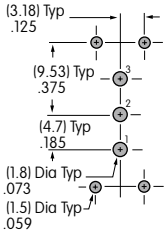
Terminal Code:	Terminal Length:	Bracket Length:
13	.250″ (6.35mm)	.465″ (11.8mm)
15	.425″ (10.8mm)	.630″ (16.0mm)
17	.964″ (24.5mm)	1.150″ (29.2mm)

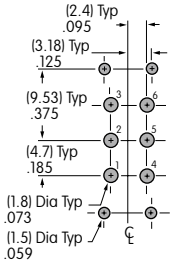
Straight PC • Reinforced Bracket





M2012TZG23-JC





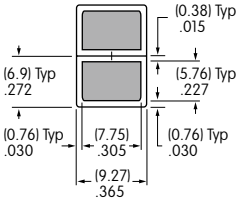
Terminal Code:	Terminal Length:	Bracket Length:
23	.250″ (6.35mm)	.465″ (11.8mm)
25	.425″ (10.8mm)	.630″ (16.0mm)
26	.750″ (19.05mm)	.953″ (24.2mm)

LEGENDS

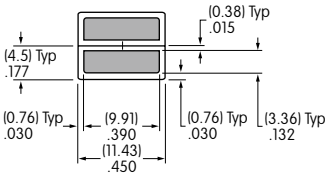
NKK Switches can provide custom legends for caps. Contact factory for more information.

Suggested Printable Area for Cap

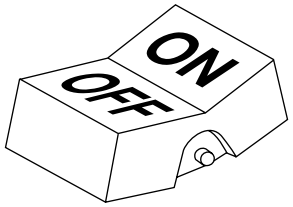
AT4148

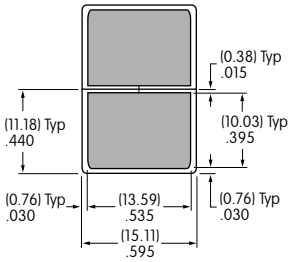


AT4150



AT4156





Shaded areas are printable areas.

Recommended Print Method:

Pad Print

Epoxy based ink is recommended.

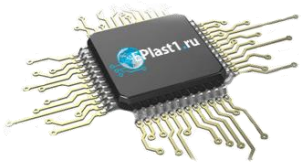
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.