8 Series
Toggle Switches

■Introduction

The **8** Series Toggles is Copal Electronics' high-reliability miniature switch product offering. This product line meets and exceeds all basic international switch standards.

With **8** toggle options, PC and solder lug terminals, power and logic level current ratings, 1-4 pole and many circuit offerings these switches can be used in many industries and various applications within these industries.

Four of the **8** Series lines are washable. Specifically designed for PC applications with automated solder and cleaning methods.

The 8 Series is available with **UL** Recognition and **CSA** Certification upon request from the customer.

■Applications

● Communication equipment
● Computer peripheral equipment
● Measuring instruments
● Medical equipment
● Automotive diagnosis

The switches can be used in a wide range of fields from industrial to consumer equipment.

■Features of 8 Series Toggles

1. **Terminal style :**
   Solder, Straight, Right angle and vertical mount PC terminals.
2. **Contacts :**
   Silver or gold.
3. **Epoxy resin case :**
   UL94V-0 self-extinguishing epoxy.
4. **Actuator styles :**
   Over 30 actuator variations.
5. **Insulation between terminal and ground :**
   4 mm minimum.
6. **Prevention of flux entry**
   The epoxy resin seal on bottom of the switch helps prevent the entry of solder and flux.
7. **Insulation barrier :**
   Insulation barrier design between poles helps prevent short-circuiting between poles ensuring high reliability.
8. **UL Recognized product   File No.E43275**
9. **CSA Certified product   File No.LR38341**
10. **For the UL Recognized and CSA Certified products please see page 412.**
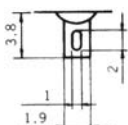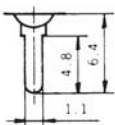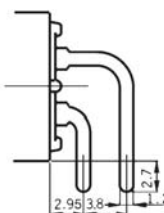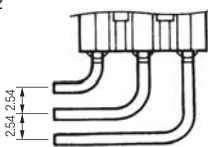
8 Series Toggles Selection Table

Part No.		Name	Actuator shape	Number of poles	Switching function	Terminals	Page
8A		Standard toggle		1·2·3·4		Solder Lug Straight PC	389 〜 391
8B		Mustang Toggle		1·2·3·4	ON — ON ON — OFF — ON (ON) — OFF — (ON) ON — OFF — (ON) ON — (ON) ※1/2 Poles	Solder Lug Straight PC	392 〜 393
8C		Flatted Toggle		1·2·3·4		Solder Lug Straight PC	394 〜 395
8D		Long Toggle		1·2·3·4	ON — ON ON — OFF — ON ※3/4 Poles	Solder Lug Straight PC	396 〜 397
8E		Lever Lock Toggle		1·2·3·4		Solder Lug Straight PC	398 〜 399
8F		Splash Proof Toggle		1·2·3·4	ON — ON — ON ON — ON — (ON) (ON) — ON — (ON) ※8A Type 2&4 Poles only	Solder Lug Straight PC	400 〜 401
8J		Short Toggle		1·2·3·4		Solder Lug Straight PC	402 〜 403
8S		Color Tip Toggle		1·2·3·4		Solder Lug Straight PC	404 〜 405
Washable	8G	Short Toggle Washable		1·2		Straight PC Right Angle Vertical	406 〜 407
	8GA	Standard Toggle Washable		1·2	ON — ON ON — OFF — ON (ON) — OFF — (ON) ON — OFF — (ON) ON — (ON)	Straight PC Right Angle Vertica	408
	8GD	LongToggle Washable		1·2		Straight PC Right Angle Vertica	409
	8GS	Color Tip Toggle Washable		1·2		Straight PC Right Angle Vertica	410

( ) indicates momentary actuation

■Terminals

Solder Terminal（Style:**1**）	PC Straight（Style:**2**）	Right Angle（Style:**4**）	Vertical Mount（Style:**6**）
t=0.8	t=0.8 PC	t=0.8 R/A	t=0.8 V/M w=1.2
3.8 2 1 1.9	4.8 6.4 1.1	2.7 2.95 3.8 1.2	2.54 2.54

■Part Numbering

8   A   1   01   1   C   –   Z

Series code | Actuator shape | Number of poles | Switching function | Terminals | Contact material and plating

Code	Type
A	Standard Toggle
B	Mustang Toggle
C	Flatted Toggle
D	Long Toggle
E	Lever—lock Toggle
F	Splash Proof Toggle
J	Short Toggle
S	Color Tip Toggle
G	Washable

Fig.	Number of poles
1	1 pole
2	2 poles
3	3 poles
4	4 poles

Code	Switching function
01	ON — ON
02	ON — OFF — ON
04	(ON) — OFF — (ON)
05	ON — OFF — (ON)
06	ON — (ON)
※10	ON — ON — ON
※11	ON — ON — (ON)
※12	(ON) — ON — (ON)

※8AType only.

Fig.	Terminals
1	Solder Terminal
2	PC Straight
4	Right Angle
6	Vertical Mounting

（※1）

Code	Contact material	Plating
None	Bs+Ag or Cu+Ag	Ag
C	Bs+Ag or Cu+Ag	Ni+Au

Bs=Brass
Cu=Copper
Ag=Silver
Ni=Nickel
Au=Gold

（※1）: Switches with gold-plated contacts ("C") are made-to order products. MOQ is 25 pcs.

Note : Some combinations may not be available. Please check the "Table of Part Numbers" for each series.

■8 Series Toggles Common Specifications

Contact specs.		Silver	Gold
Rating	Max.	AC125V 6A AC250V 3A DC30V 4A	AC125V 6A AC250V 3A DC20V 25mA
Initial contact resistance		10mΩ Max. （DC2〜4V 1A）	20mΩ Max. （AC200μV 1.5mA）
Initial dielectric strength		AC1500V 1 minute	
Initial insulation resistance		1000MΩMin.　　　　　　　　（DC500V）	
Electrical life	Alternate type	50,000cycles	
	Momentary type	25,000cycles	
Operating temperature range		−30〜+85℃	
Storage temperature range		−40〜+85℃	

（ON）：Momentary.

8F

Splash Proof Toggle Switch

■Features

The **8F** series is a panel seal toggle switch with an **O**-ring to provide drip-proof and dust proof effect (corresponding to IP67 rating). Since a locking ring cannot be used because the panel seal is required, "**D**-cutting" is provided to the sleeve to prevent the switch from rotating. Note that the switch itself is not waterproof.

●The **8F** series is intended for panel seal and is not designed for use in water.
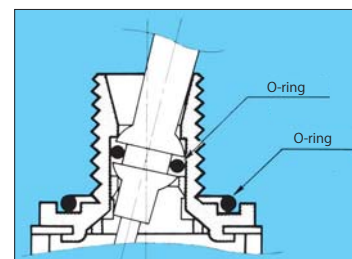
O-ring
O-ring

■Mounting Method

The **8F** series should be mounted so that the **O**-ring has direct contact with the panel.

"O" ring
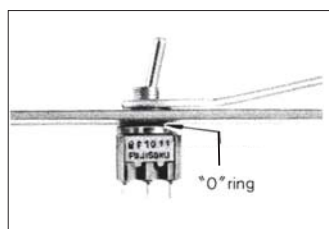
■Table of Part Numbers

Terminal Style	Switching Function / Number of poles	1 pole	2 poles	3 poles	4 poles
Solder Terminal	ON — ON	8F1011—Z ★ 8F1011C—Z	☆ 8F2011—Z ▲ 8F2011C—Z	★ 8F3011—Z	★ 8F4011—Z
	ON — OFF — ON	★ 8F1021—Z ▲ 8F1021C—Z	★ 8F2021—Z ▲ 8F2021C—Z	▲ 8F3021—Z	★ 8F4021—Z
	(ON) — OFF — (ON)	★ 8F1041—Z	★ 8F2041—Z		
	ON — OFF — ON	★ 8F1051—Z	★ 8F2051—Z		
	ON — (ON)	★ 8F1061—Z	★ 8F2061—Z		
PC Straight	ON — ON	★ 8F1012—Z ▲ 8F1012C—Z	★ 8F2012—Z ★ 8F2012C—Z	▲ 8F3012—Z	▲ 8F4012—Z
	ON — OFF — ON	▲ 8F1022—Z ▲ 8F1022C—Z	★ 8F2022—Z ▲ 8F2022C—Z	▲ 8F3022—Z	▲ 8F4022—Z
	(ON) — OFF — (ON)	▲ 8F1042—Z	▲ 8F2042—Z		
	ON — OFF — (ON)	▲ 8F1052—Z	▲ 8F2052—Z		
	ON — (ON)	★ 8F1062—Z	▲ 8F2062—Z		

☆ : Semi-standard products.　　▲ : Inquiry products.

（ON）: Momentary.　　★ : Made to order products.　　●For soldering and flux cleaning specifications, please refer to P.413.

SPDT
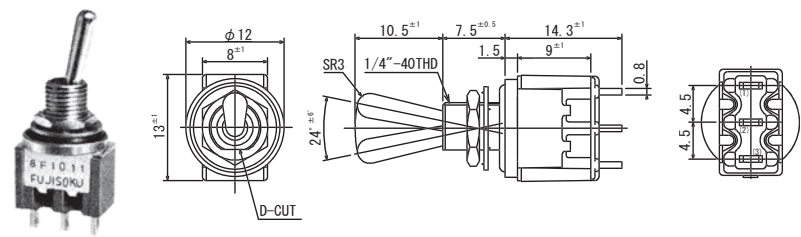
Terminal numbers are not shown on the switch.

Switching function / Part No.	D cut	D cut	D cut
8F101■−Z	ON	—	ON
8F102■−Z	ON	OFF	ON
8F104■−Z	(ON)	OFF	(ON)
8F105■−Z	ON	OFF	(ON)
8F106■−Z	ON	—	(ON)
Connecting terminals	2−3	—	2−1

■ : Please refer to "Table of Part Numbers" on P.400 for a list of full part numbers.

DPDT
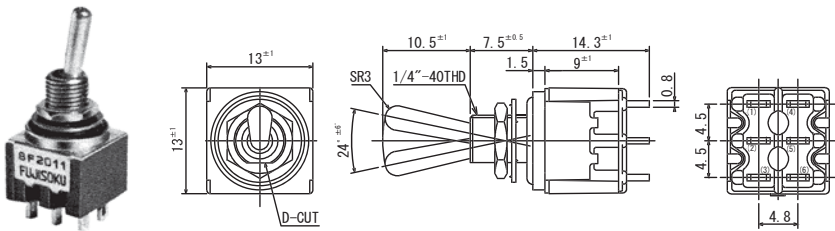
Terminal numbers are not shown on the switch.

Switching function / Part No.	D cut	D cut	D cut
8F201■−Z	ON	—	ON
8F202■−Z	ON	OFF	ON
8F204■−Z	(ON)	OFF	(ON)
8F205■−Z	ON	OFF	(ON)
8F206■−Z	ON	—	(ON)
Connecting terminals	2−3 5−6	—	2−1 5−4

■ : Please refer to "Table of Part Numbers" on P.400 for a list of full part numbers.

3PDT
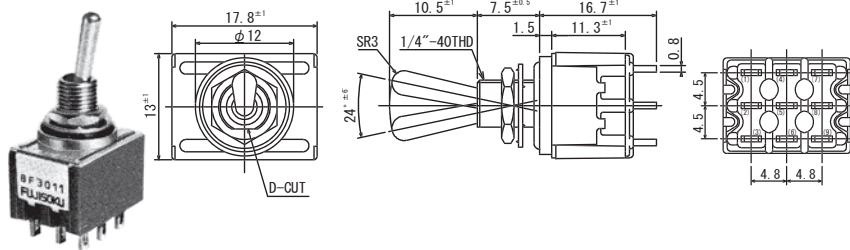
Terminal numbers are not shown on the switch.

Switching function / Part No.	D cut	D cut	D cut
8F301■−Z	ON	—	ON
8F302■−Z	ON	OFF	ON
Connecting terminals	2−3 5−6 8−9	—	2−1 5−4 8−7

■ : Please refer to "Table of Part Numbers" on P.400 for a list of full part numbers.

4PDT
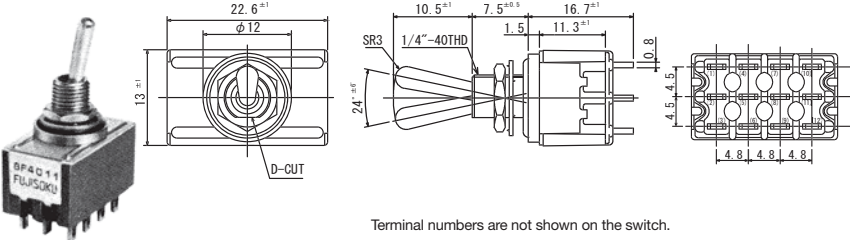
Terminal numbers are not shown on the switch.

Switching function / Part No.	D cut	D cut	D cut
8F401■−Z	ON	—	ON
8F402■−Z	ON	OFF	ON
Connecting terminals	2−3 5−6 8−9 11−12	—	2−1 5−4 8−7 11−10

■ : Please refer to "Table of Part Numbers" on P.400 for a list of full part numbers.

(ON)：Momentary.

1. Soldering Specifications

（1）Manual soldering

Device ： Solder iron

①420℃ Max. 3 sec. Max.

（2）Auto soldering

②275℃ Max. 6 sec. Max.

The above-stated soldering conditions shall apply only to switches with straight terminals. Auto soldering is not possible with right-angle terminals. Switches with right-angle terminals should be soldered manually according to the conditions specified in (1) above.

（3）When soldering two or more terminals to the common land, use the solder resist to isolate the terminals.

2.Flux Cleaning

（1）Solvent : Fluorine or Alcohol type.

（2）**8A/B/C/D/E/F/J/S** series are not washable. To wash the PC board, clean the soldering surface of the PC board with a brush so that the switch is not exposed to the cleaning solution.

（3）Cleaning after soldering should be done after the terminal temperature falls to 90℃ or below, or after leaving the switch for five minutes or longer at room temperature.

3. Mounting

●Do not bend the terminals before mounting the switch on the PC board.

●After mounting the switch, do not place the device in such a way that the device weight will be applied on to the actuator of the switch.

●For switches with straight terminals, solder the switch on the PC board after fixing the switch on the panel with a nut.
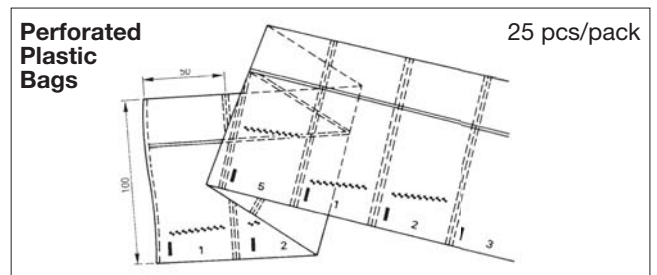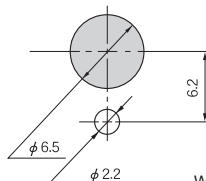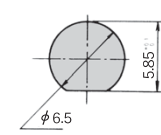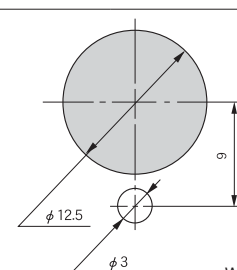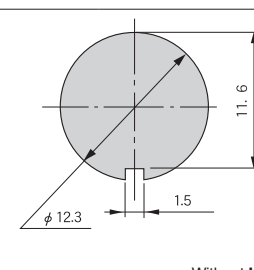
■Packaging Specification

Perforated Plastic Bags — 25 pcs/pack

（ON）：Momentary.

◆ 8 Series Toggles ◆

■ Panel Cut-Out Dimensions
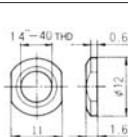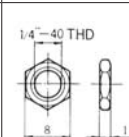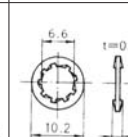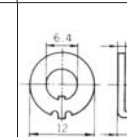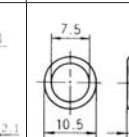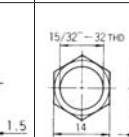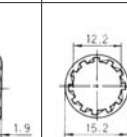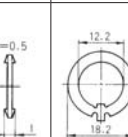
Series	8A·8D·8J·8S	8C	8E	8A·8D·8J·8S	8C	8E	8F
Panel thickness	2.5 mm Max.	2.4 mm Max.	1.5 mm Max.	3.5 mm Max.	3.4 mm Max.	2.5 mm Max.	5 mm Max.
Dimensions	φ6.5 6.2 φ2.2 With **Locking Ring**			5.9 0.7 φ6.4 Without **Locking Ring**			5.85 φ6.5

Series	8B	
Panel thickness	5.9 mm Max.	6.9 mm Max.
Dimensions	φ12.5 9 φ3 With **Locking Ring**	11.6 1.5 φ12.3 Without **Locking Ring**

■ PC Hole Layouts

Series	8A · 8B · 8C · 8D · 8E · 8F · 8J · 8S
Dimensions	4.8 / 4.5 / 4.5 / φ1.6 / 1-pole / 2-pole 4.8 4.8 4.8 / 4.5 4.5 / φ1.9 / 3-pole / 4-pole

■ Standard Accessories
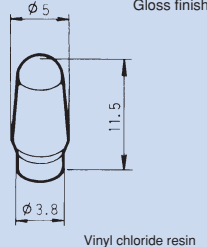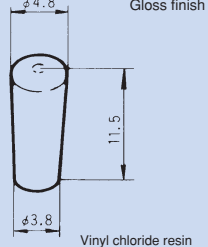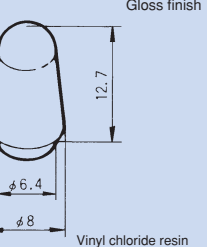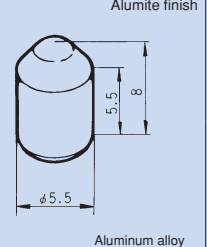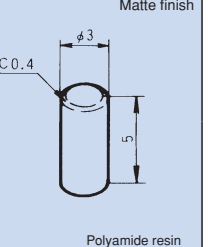
《Q'ty／switch》

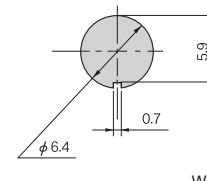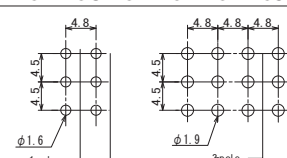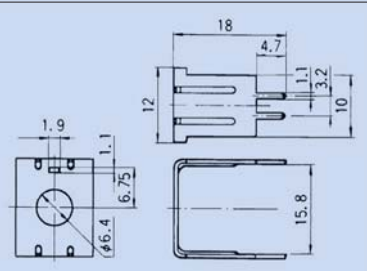| Part Name	Dress Nut	Hex Nut	Lockwasher	Locking Ring	O—Ring	Hex Nut	Lockwasher	Locking Ring
Part No.	140008010253	140008010241	140008030051	140008020062	140000610076	140008010243	140008030055	140008020065
Dimensions	1/4"-40 THD 0.6 φ12 11 1.6	1/4"-40 THD 8 1.5	6.6 t=0.5 10.2 1	6.4 1 2.1	7.5 10.5 1.5	15/32"-32 THD 14 1.9	12.2 t=0.5 15.2 1	12.2 1 18.2 2.3
Finish	Nickel plated		Zinc plated		Nitrile rubber（Black）	Nickel plated	Zinc plated	
8A		2	1	1				
8B						2	1	1
8C	1	1	1	1				
8D		2	1	1				
8E		2	1	1				
8F		1	1		1			
8J		2	1	1				
8S		2	1	1				

● Numbers in the above chart show the quantities of each accessories enclosed with the switch.
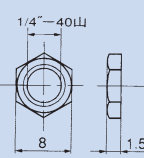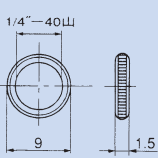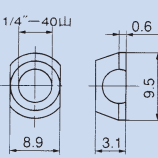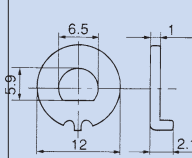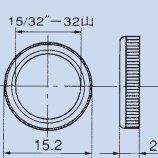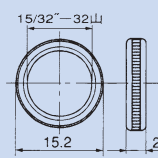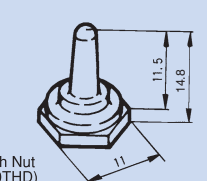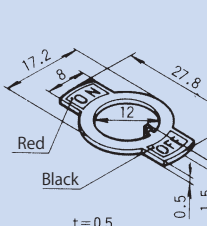
Type	8A・8F・8GA BT	8A・8F・8GA BT	8B	8E	8S・8GS
Part Name	Color Cap				Color Tip
Dimensions	Gloss finish Vinyl chloride resin	Gloss finish Vinyl chloride resin	Gloss finish Vinyl chloride resin	Alumite finish Aluminum alloy	Matte finish Polyamide resin
Silver	—	—	—	140000470058	—
White	140000470030	140000470038	140000470063	—	140000470118
Red	140000470098	140000470100	140000470108	140000470060	140000470119
Black	140000470031	140000470039	140000470064	140000470059	140000470112
Gray	140000470037	140000470077	140000470102	—	140000470120

Type	8A・8C・8D・8J・8S 1, 2 poles ※
Part Name	Bracket
Part No.	140000260715
Dimensions	t=0.5

※The Bracket cannot be used with switches with switching functions "10", "11", or "12" (ref. P.388). The size of the housings are different in switches with switching functions "10", "11", and "12" and the Bracket cannot be used.

Type	8A・8C・8D・8E・8J・8N・8S・8R			8F・8P	8B・8Y	
Part Name	Lock Nut	Round Nut	Pocketed Nut	Locking Ring	Round Nut	Round Nut
Part No.	140008010276	140008010258	140008010274	140008020066	140008010272	140008010273
Dimensions	1/4″—40Ш 8 / 1.5	1/4″—40Ш 9 / 1.5	1/4″—40Ш 0.6 8.9 / 3.1	6.5 5.9 12 / 2.1	15/32″—32Ш 15.2 / 2	15/32″—32Ш 15.2 / 2
Finish	Nickel	Chromium	Nickel	Zinc	Chromium	

Type	8A	8B	
Part Name	Boot	Plate	Plate
Part No.	140000470422	140008040021	140008040025
Dimensions	With Nut (1/4″—40THD)	Red Black t = 0.5	Red Black t = 1

:Optional Accessories.

Table of 8 Series Toggles UL and CSA Listed

■8 Series Toggles

Poles	Switching Function		Ⓤ (※1.) 8A	8B	8C	8D	8E	8F	8J	8S	Ⓢ (※2.) 8A	8B	8C	8D	8E	8F	8J	8S
1 pole	101□	ON — ON	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	102□	ON — OFF — ON	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	104□	(ON) — OFF — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	105□	ON — OFF — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	106□	ON — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
2 poles	201□	ON — ON	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	202□	ON — OFF — ON	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	204□	(ON) — OFF — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	205□	ON — OFF — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	206□	ON — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	210□	ON — ON — ON	○								○							
	211□	ON — ON — (ON)	○								○							
	212□	(ON) — ON — (ON)	○								○							
3 poles	301□	ON — ON	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	302□	ON — OFF — ON	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	304□	(ON) — OFF — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	305□	ON — OFF — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	306□	ON — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4 poles	401□	ON — ON	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	402□	ON — OFF — ON	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	404□	(ON) — OFF — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	405□	ON — OFF — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	406□	ON — (ON)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	410□	ON — ON — ON	○								○							
	411□	ON — ON — (ON)	○								○							
	412□	(ON) — ON — (ON)	○								○							

(1) Terminal types: ① Solder terminal; ② Straight terminal

(2) **UL**-recognized switches: Solder terminals and straight terminals available for Single/Double/Three/Four Pole

(3) **CSA**-certified switches: Solder terminals and straight terminals available for Single Pole. Straight terminals available for Double/Three/Four Pole.

(4) UL, CSA marked switches available with additional charge.

(5) (※1.) **UL File No.E43275**
　　(※2.) **CSA File No.JR38341**

(6) As shown in the above chart, not all products are **UL**-recognized or **CSA**-certified. Please check with your local sales representative if you have any questions.

(ON)：Momentary.