



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



12000X778 series

High performance toggle switches • threaded bushing Ø 11.9 mm



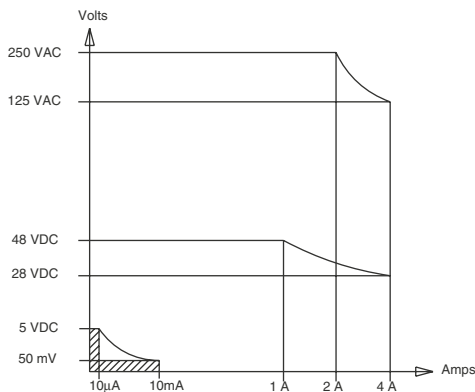
DISTINCTIVE FEATURES

- CECC approved - conforms to MIL specifications
- Highly reliable contacts
- Pinned lever
- Double shell case for high mechanical strength and high electrical insulation
- Compact size



ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load: 4 A 28 VDC
- Minimum load: 10 mA 50 mV, 10 µA 5 VDC
When used above 300 mA 28 VDC, the gold plating is removed on contact areas and is considered only as a protection against oxidation during storage.
- Initial contact resistance: 10 mΩ max.
- Insulation resistance: 1,000 MΩ min. at 500 VDC
- Dielectric strength:
1,000 Vrms 50 Hz min. between terminals
2,000 Vrms 50 Hz min. between poles
2,000 Vrms 50 Hz min. between terminals and frame
- Contact bounce: 2 ms max.
- Electrical life:
- At 4 A 28 VDC : 20,000 cycles (10,000 for functions 5, 4-1R, 4-2R)
- At low level (50 mV 10 mA):
150,000 cycles (switches with 2 maintained positions)
100,000 cycles (switches with 3 maintained positions)
50,000 cycles (momentary functions 7, 8, 4-1R, 4-2R, 5)



The company reserves the right to change specifications without notice.



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ENVIRONMENTAL SPECIFICATIONS

- Shock test: 50 g - 11 ms (IEC 68-2-27)
- Vibrations: 10-500 Hz - 10g (IEC68-2-6)
- Humidity test: 56 days, 93 % R.H., 40 °C (IEC 68-2-3)
- Salt spray test: 96 hours (IEC 68-2-11)
- Operating temperature: -40 °C to +85 °C (-40 °F to +185 °F)



GENERAL SPECIFICATIONS

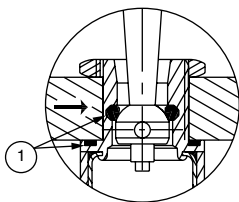
- Torque: 1.50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness: 8 mm (.314) max. - 3 mm (.118) min.



SEALING

- Front panel sealing by two O-rings
Flatted bush for precise orientation
- Panel seal withstands 1 bar pressure and remains sealed even when the switch is operated.
- Epoxy sealed terminals
- Splash-proof case

→ FLAT



① - O-rings

AGENCY APPROVALS



CECC 96201-005
CECC 96201-008

Designed to MIL specifications

Availability : consult factory for details of approved models.
Marking : to order switches marked CECC, complete appropriate box of ordering format.



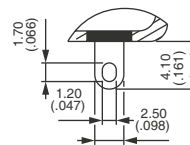
MATERIALS

- Case: diallyphthalate (DAP) with plastic external shell (epoxy sealed)
- Actuator: brass, black chrome plated
- Bushing: brass, black chrome plated
- Contacts: solid rivet - gold plated silver/nickel alloy

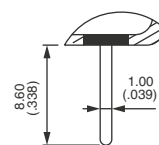
APEM products may be recycled at end-of-life for the re-claiming of valuable metal components.



TERMINALS



Solder lugs

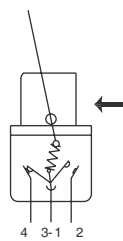


Straight PC

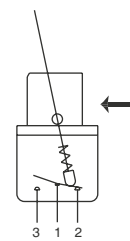


ELECTRICAL FUNCTIONS

→ FLAT



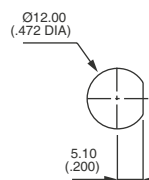
Function 6



Other functions



PANEL CUT-OUT



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BUILD YOUR PART NUMBER

BASIC PART NUMBER

SERIES	TERMINALS AND BUSHINGS	NUMBER OF POLES	ELECTRICAL FUNCTIONS	MOMENTARY FOR FUNCTION 4
12				
1 Solder lug terminals 2 Straight PC terminals All models with threaded bushing Ø 11.9 (15/32)		4 Double pole 5 Three pole 6 Four pole	6 ON - ON 9 ON OFF ON 7 MOM OFF MOM 8 ON OFF MOM 4 ON ON ON MOM Δ MOM ON MOM Δ 5 - ON MOM	1R ON ON MOM 2R MOM ON MOM For function 4 only. Leave blank for other functions.
			Function 4 For 2 and 4 poles only. Δ Must not have blank in «momentary» box.	

OPTIONS

FLUORESCENT TIP	LEVERS	X778	APPROVAL
Blank None -038 White fluorescent tip to lever	Blank Standard lever -12 Short lever : LOCKING LEVERS -1V 1 locked position -2V 2 locked positions -3V 3 locked positions Other : see following pages.	High performance fully sealed black switches.	CECC Availability: Consult factory for details of approved models.



ABOUT THIS SERIES

- ⚠ **Notice:** please note that not all combinations of above numbers are available. Refer to the following pages for further information.
- 💧 **Sealing boots** can be used to further protect the switches against dust and water. See "Sealing Boots" section of website.
- 🔩 **Mounting accessories:** standard hardware supplied with all models : 1 hex nut 14 mm (.551) across flats, part number U41.
- 🛡️ **Switch guards** are available to prevent inadvertent lever operation. See "Switch Guards" section of website.

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High performance toggle switches • threaded bushing Ø 11.9 mm

SOLDER LUG TERMINALS - DOUBLE POLE



BASIC P/N	Angle of throw (A)	I	II	III
12146 X778	26°	ON	-	ON
12149 X778	20°	ON	OFF	ON
12147 X778	20°	MOM	OFF	MOM
12148 X778	20°	ON	OFF	MOM
12144 X778	20°	ON	ON	ON
12144-1R X778	20°	MOM	ON	ON
12144-2R X778	20°	MOM	ON	MOM
12145 X778	12°	-	ON	MOM

SOLDER LUG TERMINALS - THREE POLE



BASIC P/N	Angle of throw (A)	I	II	III
12156 X778	26°	ON	-	ON
12159 X778	20°	ON	OFF	ON
12157 X778	20°	MOM	OFF	MOM
12158 X778	20°	ON	OFF	MOM

SOLDER LUG TERMINALS - FOUR POLE



BASIC P/N	Angle of throw (A)	I	II	III
12166 X778	26°	ON	-	ON
12169 X778	20°	ON	OFF	ON
12167 X778	20°	MOM	OFF	MOM
12168 X778	20°	ON	OFF	MOM
12164 X778	20°	ON	ON	ON
12164-1R X778	20°	ON	ON	MOM
12164-2R X778	20°	MOM	ON	MOM

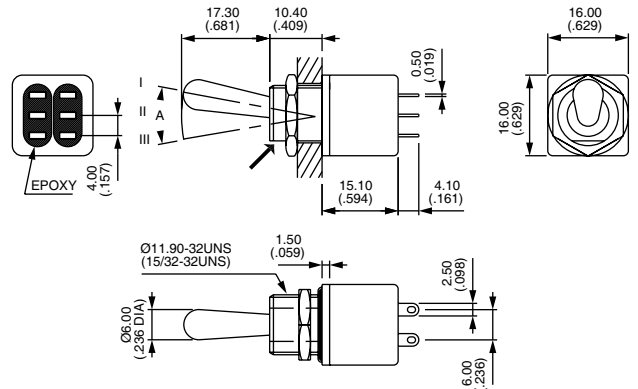
STRAIGHT PC TERMINALS - DOUBLE POLE ▲



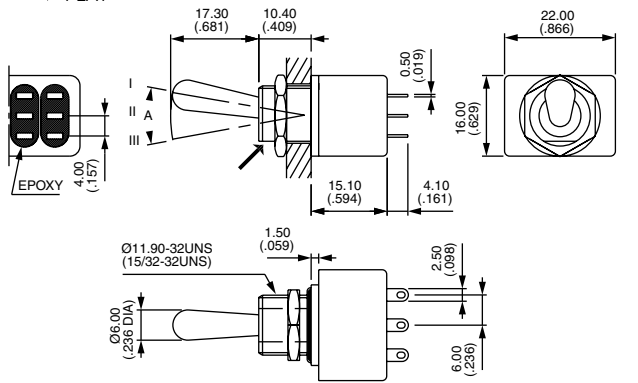
BASIC P/N	Angle of throw (A)	I	II	III
12246 X778	26°	ON	-	ON

→ FLAT

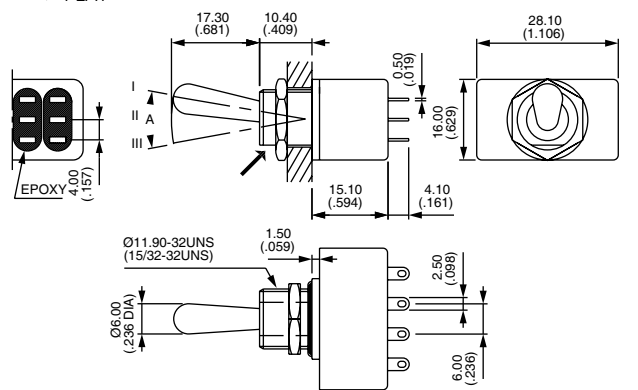
Shown with standard lever



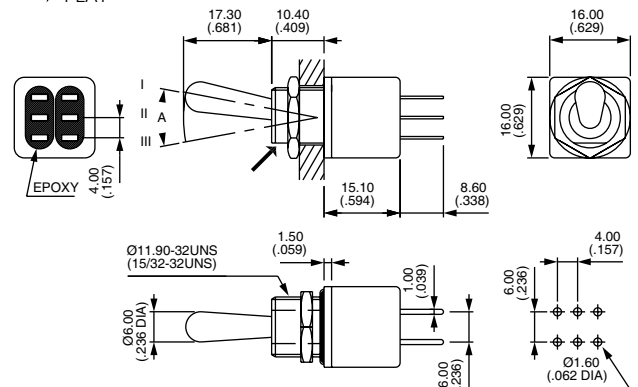
→ FLAT



→ FLAT



→ FLAT



12000X778 series

High performance toggle switches • threaded bushing Ø 11.9 mm

STRAIGHT PC TERMINALS - THREE POLE ▲



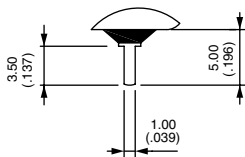
BASIC P/N	Angle of throw (A)	I	II	III
12256 X778	26°	ON	-	ON

STRAIGHT PC TERMINALS - FOUR POLE ▲

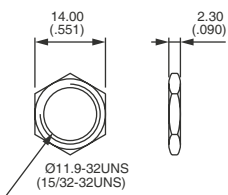


BASIC P/N	Angle of throw (A)	I	II	III
12266 X778	26°	ON	-	ON

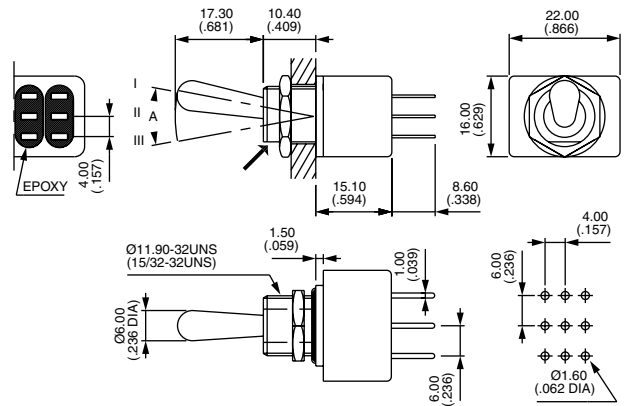
▲ 3.5 mm (.138) short terminals available on request for function 6. Standard for functions 9, 7, 8, 4 and 5.



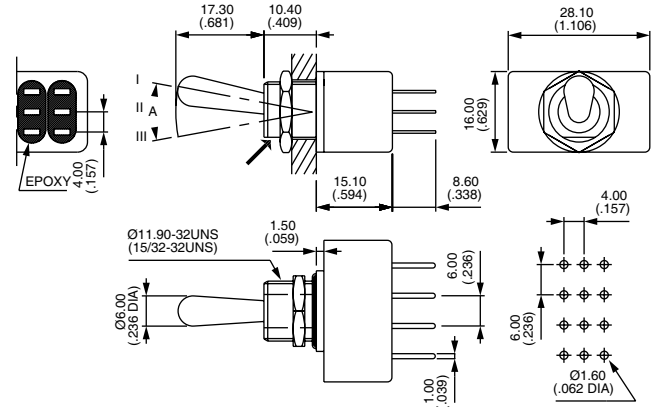
STANDARD HARDWARE - HEX NUT - U41 - BLACK



→ FLAT



→ FLAT



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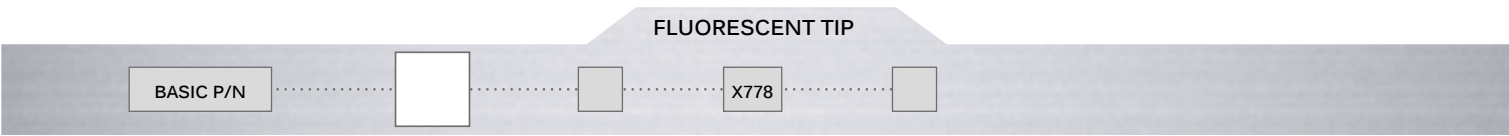


POSITIONS AND CONNECTIONS

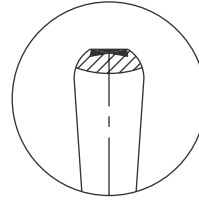
FUNCTION	LEVER POSITION AND CONNECTIONS			TERMINAL IDENTIFICATION	WIRING FOR 3-WAY SWITCHES (FUNCTION 4)
	I	II	III (FLAT)		
12146	ON (1-3)-4 (5-7)-8	-	ON (1-3)-2 (5-7)-6		<p>→EXTERNAL JUMPER (ADDED BY CUSTOMER)</p> <p>12144 </p> <p>12144-1R </p> <p>12144-2R </p>
12147 12148 12149 12148CT	MOM ON ON MOM	OFF OFF OFF OFF	MOM MOM ON ON	<p>→ FLAT</p>	
	1-2 4-5		1-3 4-6		
12145	-	ON	MOM		
		1-2 4-5	1-3 4-6		
12144 12144-1R 12144-2R	ON MOM MOM	ON ON ON	ON ON MOM		
	1-2 4-5	1-3 4-5	1-3 4-6		
12156	ON (1-3)-4 (5-7)-8 (9-11)-12	-	ON (1-3)-2 (5-7)-6 (9-11)-10		<p>12164 </p>
12166	ON 1A - 3A 1C - 3C 1E - 3E 1G - 3G	-	ON 1A - 2A 1C - 2C 1E - 2E 1G - 2G		
12164	ON 1A - 2A 1C - 2C 1E - 2E 1G - 2G	ON 1A - 2A 1C - 3C 1E - 2E 1G - 3G	ON 1A - 3A 1C - 3C 1E - 3E 1G - 3G		

12000X778 series

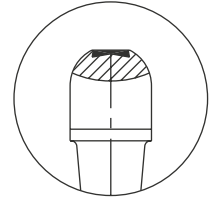
High performance toggle switches • threaded bushing Ø 11.9 mm



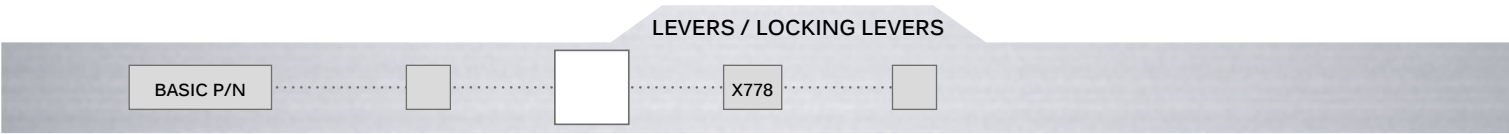
Blank None
038 White fluorescent tip. Becomes luminous when submitted to ultra-violet rays.



Standard lever

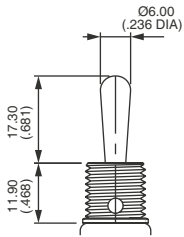


Locking lever

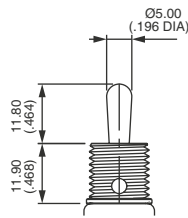


Dash compulsory before lever code.
 Switch guards and sealing boot: see "Switch Guards" and "Sealing boots" sections of website.

LEVERS

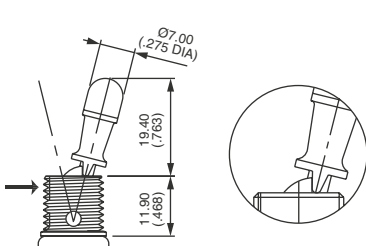


Blank Standard

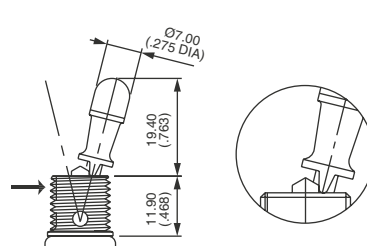


-12 Short lever

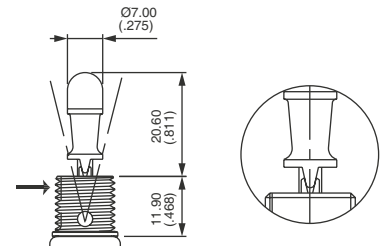
LOCKING LEVERS



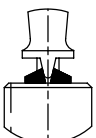
-1V
 1 locked position (function 6)
 Typical angle of throw : 26°



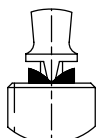
-2V
 2 locked positions (function 6)
 Typical angle of throw : 26°



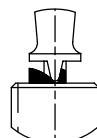
-3V
 3 locked positions (functions 9 and 4)
 Typical angle of throw : 20°



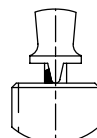
-4V
 Functions 9 & 4



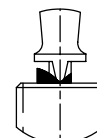
-5V
 Functions 7 & 442R



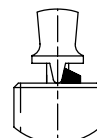
-7V
 Function 8



-8V
 Functions 9, 44 & 441R



-9V
 Function 8

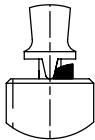
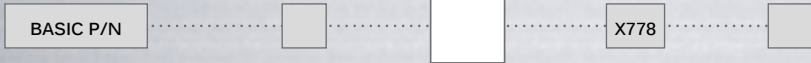


-11V
 Functions 8, 9 & 44

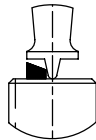
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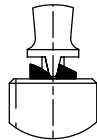
LOCKING LEVERS (CONTINUED)



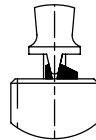
-12V
Functions 7, 8 & 441R



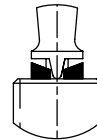
-13V
Funct 5, 7 & 442R



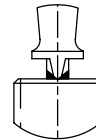
-15V
Function 8



-16V
Functions 4 & 9



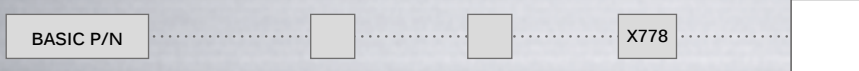
-17V
Functions 7 & 442R



-20V
Functions 9 & 44

Note: -5V and -12V are not true locking levers: no pulling is required before actuation.

AGENCY APPROVAL



- CECC** CECC 96201-005 and CECC 96201-008
Availability: consult factory for details of approved models.
Marking: to order switches marked CECC, complete above box with "CECC".
- Blank** No agency approval required.