

# 12000 series

Professional toggle switches •  
threaded bushing  $\varnothing$  11.9 mm



## DISTINCTIVE FEATURES

- CECC approved - conforms to MIL specifications
- Robust switches for high specification environments
- Toggle action on 2-position models for a smooth mechanical operation
- Several front panel sealing options
- Several locking lever options



## ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load:
  - silver contacts (A-AD2-X780): 4 A 30 VDC
  - gold contacts (D): 100 mA 30 VDC
- Minimum load: AD2-X780-D contacts: 10 mA 50 mV, 10  $\mu$ A 5 V min.
- Peak currents: refer to "Special options".
- Initial contact resistance: 10 m $\Omega$  max. (50 m $\Omega$  max. for function 4)
- Insulation resistance: 1,000 M $\Omega$  min. at 500 VDC
- Dielectric strength:
  - 1,000 Vrms 50 Hz min. between terminals
  - 2,000 Vrms 50 Hz min. between poles and between terminals and frame
- Contact bounce: 2 ms max.
- Electrical life at full load:

Contacts	Max. current/voltage rating	Number of cycles	
		2 positions	3 positions
A	4 A 30 VDC	50,000	50,000
AD2 X780	4 A 30 VDC (Gold plating: 100 mA 30 VDC max.)	20,000	20,000
D	100 mA 30 VDC	80,000	50,000
	Low level or mechanical life	150,000	100,000



## GENERAL SPECIFICATIONS

- Torque: 1.50 Nm (1.10 Ft.lb) max. applied between the 2 nuts
- Standard panel thickness: 4.5 mm (.177) max.
- Operating temperature: -40 °C to +85 °C (-40 °F to +185 °F)

The company reserves the right to change specifications without notice.



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## MATERIALS

- Case: diallyphthalate (DAP)
- Actuator: brass, chrome plated
- Bushing: brass, nickel plated
- Housing: brass, nickel plated
- Contacts
  - A: silver
  - AD2: gold plated silver (2 microns gold)
  - X780: solid rivet - gold plated - silver/nickel alloy
  - D: solid gold rivet
  - X910: silver/nickel alloy (for peak currents, see "Special options")
- Terminal seal: epoxy

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

Note: AD2 and X780 contacts can be used for high level applications. In this case, the gold layer is considered only as a protection against oxidation during storage.

## AGENCY APPROVALS



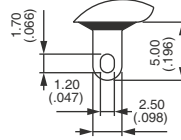
CECC 96201-005  
CECC 96201-008

Designed to MIL specifications

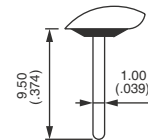
**Availability:** consult factory for details of approved models.

**Marking:** to order switches marked CECC, complete appropriate box of ordering format.

## TERMINALS



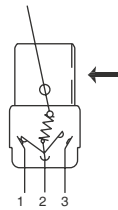
Solder lugs



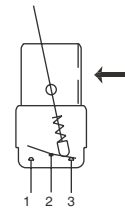
Straight PC

## ELECTRICAL FUNCTIONS

→ KEYWAY

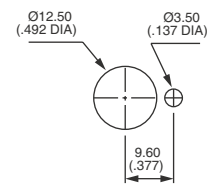


Function 6

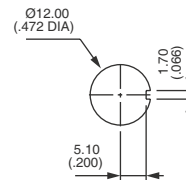


Other functions

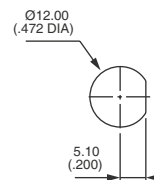
## PANEL CUT-OUT



Standard



With K sealing option



With X408 sealing option

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## BUILD YOUR PART NUMBER

**BASIC PART NUMBER**

12					
SERIES	TERMINALS AND BUSHINGS	NUMBER OF POLES	ELECTRICAL FUNCTIONS	MOMENTARY FOR FUNCTION 4	
<p><b>1</b> Solder lug terminals</p> <p><b>2</b> Straight PC terminals</p> <p>All models with threaded bushing Ø 11.9 (15/32). Bushing Ø 15 (.590), see X822 under "Special options".</p>	<p><b>4</b> Double pole</p> <p><b>5</b> Three pole</p> <p><b>6</b> Four pole</p>	<p><b>6</b> ON - ON</p> <p><b>9</b> ON OFF ON</p> <p><b>7</b> MOM OFF MOM</p> <p><b>8</b> ON OFF MOM</p> <p><b>5</b> - ON MOM</p> <p><b>4</b> ON ON ON ON ON MOM ▲ MOM ON MOM ▲</p> <p><b>Function 4</b> ▲ Must not have blank in "momentary" box.</p>	<p><b>1R</b> ON ON MOM</p> <p><b>2R</b> MOM ON MOM</p> <p>Leave blank for other functions.</p>		

**OPTIONS**

FINISH	FLUORESCENT TIP	SPECIAL OPTIONS	
<p><b>Blank</b> Bright chrome finish on actuator</p> <p><b>G</b> Black finish on bushing, actuator and hardware.</p> <p>Satin chrome finish, see "Special options".</p>	<p><b>Blank</b> None</p> <p><b>-038</b> White fluorescent tip to lever</p> <p>Available with black finish (G) only.</p>	<p><b>Blank</b> No special requirement</p> <p><b>X408</b> Front panel sealing by two O-rings</p> <p><b>X822</b> Bushing Ø 15 (.590)</p> <p>Other: see following pages..</p>	

CONTACT MATERIALS	SEALING	LEVERS	APPROVALS
<p><b>A</b> Silver</p> <p><b>AD2</b> Silver, gold plated (2 micron gold)</p> <p><b>D</b> Solid gold rivet</p> <p>See "Special options" for X780 (solid silver/nickel rivet) and X910 (for peak currents).</p>	<p><b>Blank</b> Epoxy sealed terminals standard</p> <p><b>K</b> Front panel sealing by one O-ring and sealing washer</p> <p>Sealing by two O-rings, see X408, "Special options" box.</p>	<p><b>Blank</b> Standard lever</p> <p><b>-12</b> Short lever</p> <p>⋮</p> <p><b>LOCKING LEVERS</b></p> <p><b>-1V</b> 1 locked position</p> <p><b>-2V</b> 2 locked positions</p> <p><b>-3V</b> 3 locked positions</p> <p>Other: see following pages.</p>	<p><b>CECC</b> Availability: Consult factory for details of approved models.</p>



## ABOUT THIS SERIES

On the following pages, you will find successively basic part numbers of switches and options in the same order as in above chart

- ⚠ **Notice:** please note that not all combinations of above numbers are available. Refer to the following pages for further information.
- 👉 **Sealing boots** are available to protect the switches against dust and water. See "Sealing Boots" section of website.
- 👉 **Switch guards** are available to prevent inadvertent lever operation. See "Switch Guards" section of website.
- 👉 **Mounting accessories:** standard hardware supplied with all models: 2 hex nuts 14 (.551) across flats and 1 locking ring. Standard and special hardware is presented in the "Hardware" section of website.

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## SOLDER LUG TERMINALS - DOUBLE POLE



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

\*Function 4: SP in DP case - connections, see "Technical information" on website

## TERMINALS - THREE POLE



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

## SOLDER LUG TERMINALS - FOUR POLE



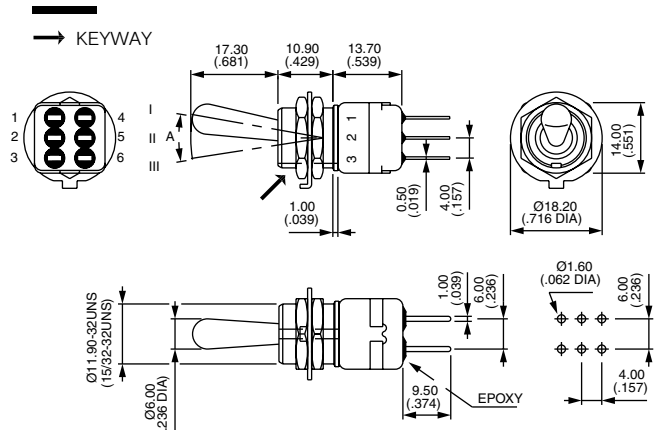
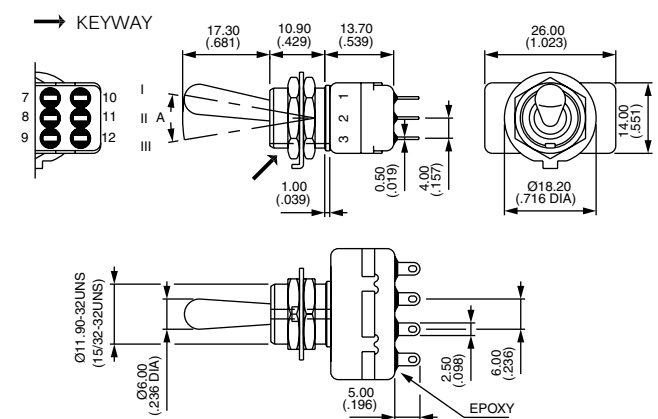
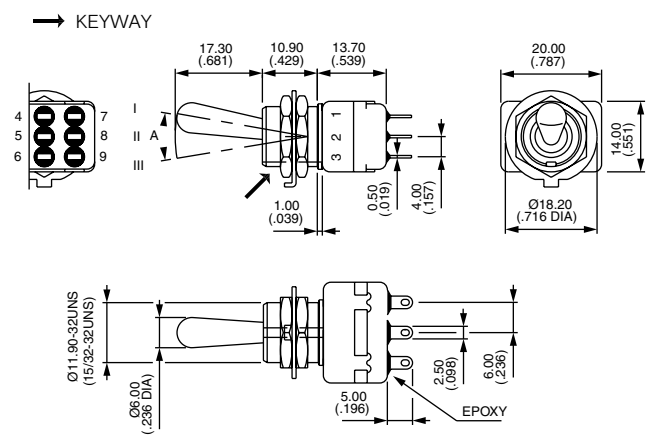
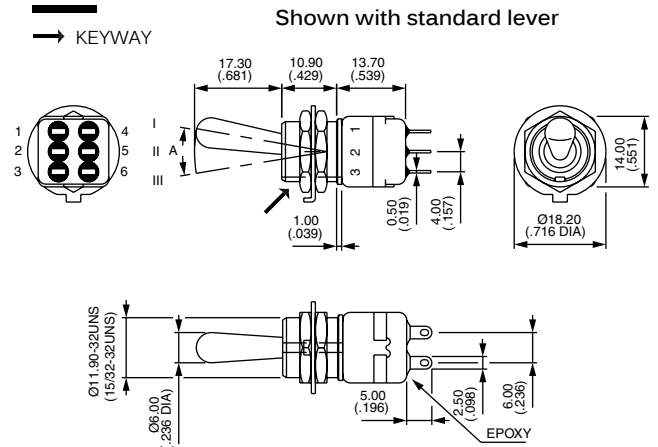
BASIC P/N	Angle of throw (A)	I	II	III
12166	26°	ON	-	ON
12169	20°	ON	OFF	ON
12167	20°	MOM	OFF	MOM
12168	20°	ON	OFF	MOM
12164*	20°	ON	ON	ON
12164 1R*	20°	ON	ON	MOM
12164 2R*	20°	MOM	ON	MOM

\*Function 4: DP in 4P case - connections, see "Technical information" on website

## STRAIGHT PC TERMINALS - DOUBLE POLE ▲



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



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## STRAIGHT PC TERMINALS - THREE POLE ▲



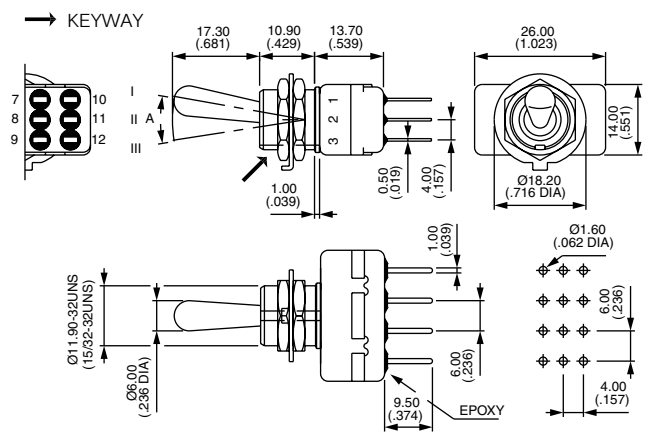
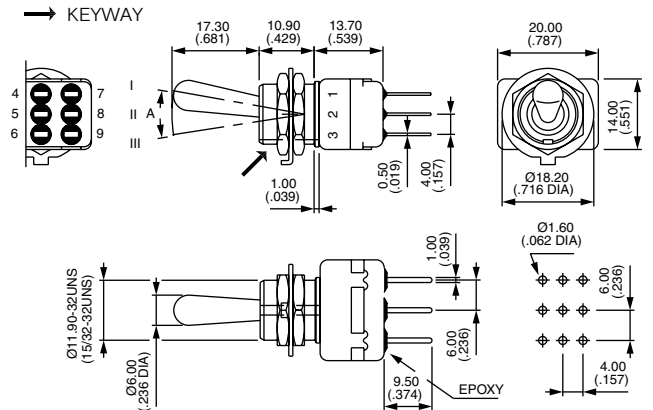
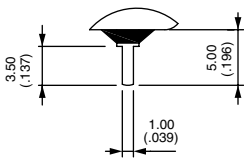
BASIC P/N	Angle of throw (A)	I	II	III
12256	26°	ON	-	ON

## STRAIGHT PC TERMINALS - FOUR POLE ▲



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

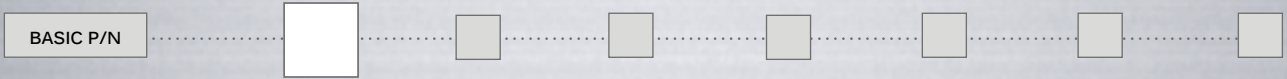
▲ 3.5 mm (.138) short terminals available on request for function 6. Standard for functions 9, 7, 8, 4 and 5.



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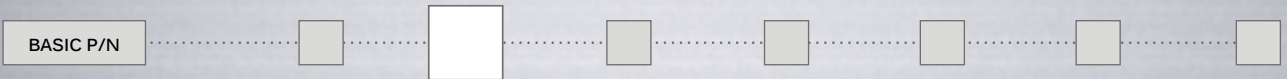
## CONTACT MATERIALS



- A Silver
- AD2 Silver, gold plated (2 micron gold)
- D Solid gold rivet (except functions 4 and 5)

See "Special options" for contacts X780 (solid silver/nickel rivet) and contacts X910 (for peak currents).

## FINISH



- Blank Bright chrome finish on actuator
  - G Black finish on bushing, lever and hardware
- For satin chrome finish, see "Special options".

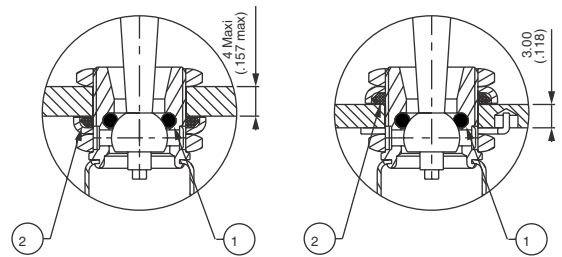
## SEALING



Epoxy sealed terminals are standard.

- Blank No sealing except standard
- K Front panel sealing by one O-ring and sealing washer. Protects the switch against water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.

Sealing by two O-rings, see X408 under "Special options". See "Sealing Boots" section of website.

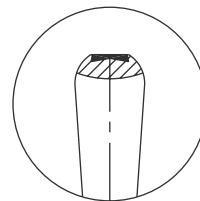


① O-ring    ② Sealing washer

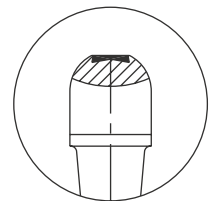
## FLUORESCENT TIP



- Blank None
- 038 White fluorescent tip. Becomes luminous when submitted to ultra-violet rays.
- ⓘ Available with black finish (option G) only



Standard lever



Locking lever

# 12000 series

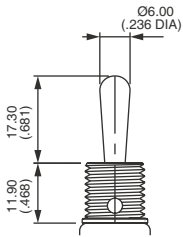
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## ACTUATORS

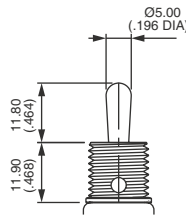
BASIC P/N

Dash compulsory before lever code.  
Switch guards : see "Switch Guards" section of website.

### LEVERS

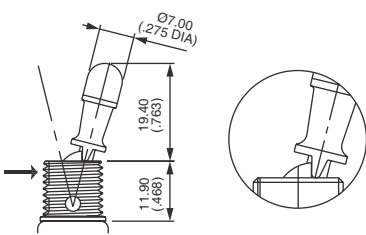


Blank Standard



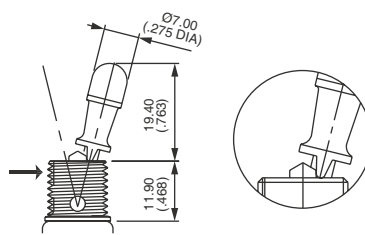
-12 Short lever

### LOCKING LEVERS



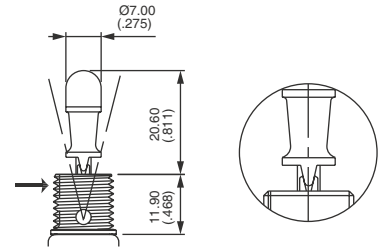
-1V

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



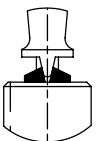
-2V

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



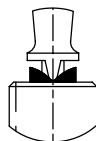
-3V

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



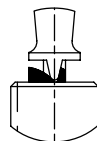
-4V

Functions 9 & 4



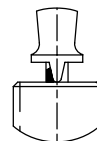
-5V

Functions 7 & 442R



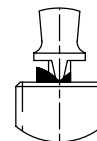
-7V

Functions 8 & 441R



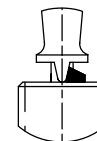
-8V

Functions 9 & 44



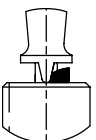
-9V

Functions 8 & 441R



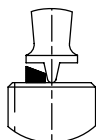
-11V

Functions 8, 9, 44 & 441R



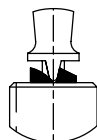
-12V

Functions 7 & 8



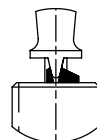
-13V

Funct. 5, 7 & 442R



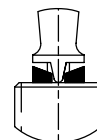
-15V

Functions 8 & 441R



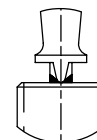
-16V

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.



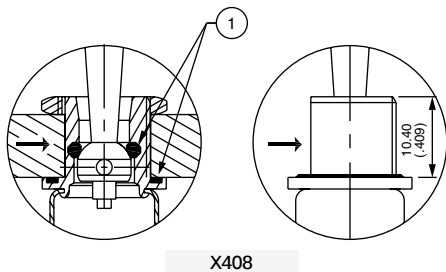
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## SPECIAL OPTIONS

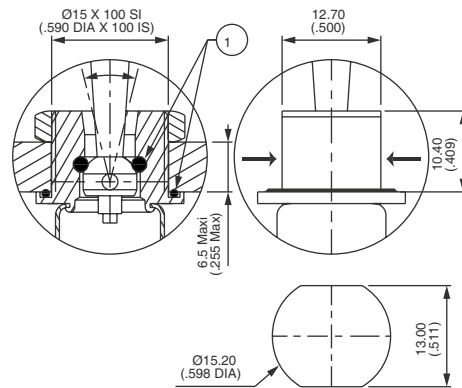


- Blank** No special requirement
- X408** Front panel sealing by two O-rings. Flatted bushing for precise orientation. Panel thickness: 8 mm (.314) max., 3 mm (.118) min. Protects the switch against water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.
- X545** Lever, bushing, housing, nuts and washers with **satín chrome finish**
- X822** Threaded bushing Ø 15 (.590), with double flat Not available with function 5 or locking levers. Includes front panel sealing and X780 contact material
- X780** Solid rivet - gold plated silver/nickel alloy contacts. Not available with function 5.
- X910** Switches for peak currents - double pole - on request.



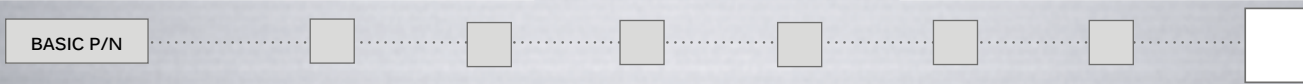
X408

① O-ring  
→ Flat



X822

## AGENCY APPROVAL



- CECC** CECC 96201-005 (high level - contacts X780) - CECC 96201-008 (low level - contacts AD2 or D)
- Blank** No agency approval required.

**Availability:** consult factory for details of approved models.  
**Marking:** to order switches marked CECC, complete above box with "CECC".