

# 12000 series

Professional toggle switches • threaded bushing Ø 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 µA 5 V min.
- Peak currents: refer to "Special options".
- Initial contact resistance: 10 mΩ max. (50 mΩ max. for function 4)
- 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 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

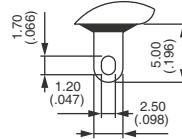
Designed to MIL specifications

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

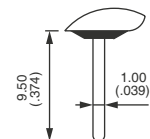
**Marking:** to order switches marked CECC, complete appropriate box of ordering format.



## TERMINALS



Solder lugs

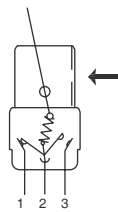


Straight PC

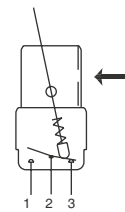


## ELECTRICAL FUNCTIONS

→ KEYWAY



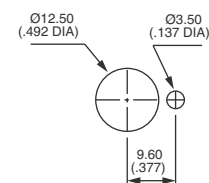
Function 6



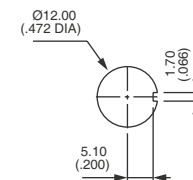
Other functions



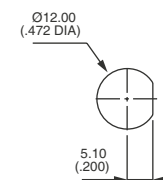
## PANEL CUT-OUT



Standard



With K sealing option



With X408 sealing option

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## BUILD YOUR PART NUMBER

**BASIC PART NUMBER**

12																																																							
<b>SERIES</b>	<b>TERMINALS AND BUSHINGS</b>	<b>NUMBER OF POLES</b>	<b>ELECTRICAL FUNCTIONS</b>	<b>MOMENTARY FOR FUNCTION 4</b>																																																			
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>1</b></td> <td>Solder lug terminals</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>2</b></td> <td>Straight PC terminals</td> </tr> </table> <p>All models with threaded bushing Ø 11.9 (15/32). Bushing Ø 15 (.590), see X822 under "Special options".</p>	<b>1</b>	Solder lug terminals	<b>2</b>	Straight PC terminals	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>4</b></td> <td>Double pole</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>5</b></td> <td>Three pole</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>6</b></td> <td>Four pole</td> </tr> </table>	<b>4</b>	Double pole	<b>5</b>	Three pole	<b>6</b>	Four pole	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>6</b></td> <td>ON</td> <td>-</td> <td>ON</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>9</b></td> <td>ON</td> <td>OFF</td> <td>ON</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>7</b></td> <td>MOM</td> <td>OFF</td> <td>MOM</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>8</b></td> <td>ON</td> <td>OFF</td> <td>MOM</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>5</b></td> <td>-</td> <td>ON</td> <td>MOM</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>4</b></td> <td>ON</td> <td>ON</td> <td>ON</td> </tr> <tr> <td></td> <td>ON</td> <td>ON</td> <td>MOM ▲</td> </tr> <tr> <td></td> <td>MOM</td> <td>ON</td> <td>MOM ▲</td> </tr> </table> <p><b>Function 4</b> ▲ Must not have blank in "momentary" box.</p>	<b>6</b>	ON	-	ON	<b>9</b>	ON	OFF	ON	<b>7</b>	MOM	OFF	MOM	<b>8</b>	ON	OFF	MOM	<b>5</b>	-	ON	MOM	<b>4</b>	ON	ON	ON		ON	ON	MOM ▲		MOM	ON	MOM ▲	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>1R</b></td> <td>ON</td> <td>ON</td> <td>MOM</td> </tr> <tr> <td style="border: 1px solid gray; padding: 2px;"><b>2R</b></td> <td>MOM</td> <td>ON</td> <td>MOM</td> </tr> </table> <p>Leave blank for other functions.</p>		<b>1R</b>	ON	ON	MOM	<b>2R</b>	MOM	ON	MOM
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**OPTIONS**

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## 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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Professional toggle switches • threaded bushing Ø 11.9 mm

## 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



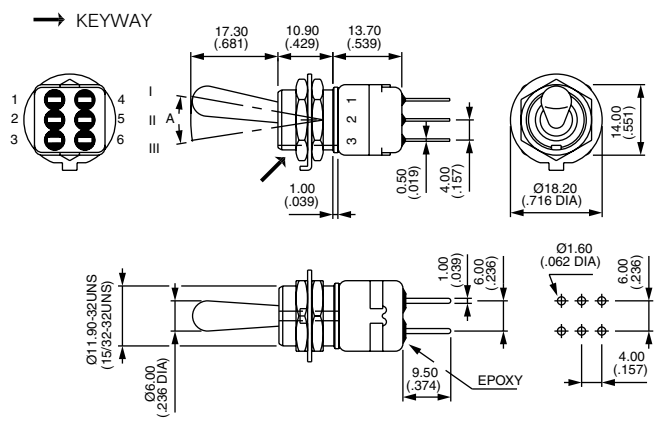
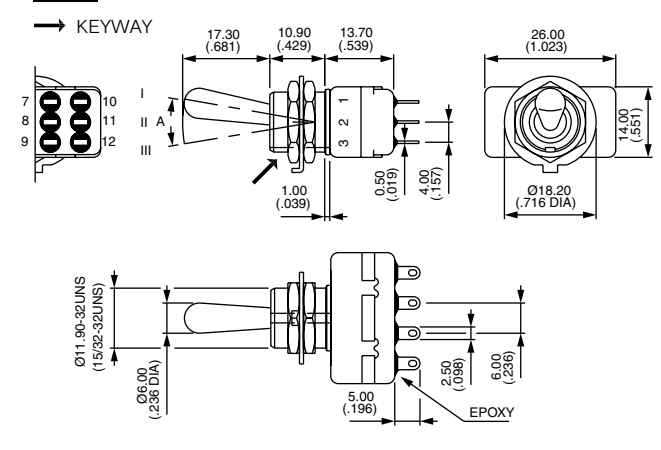
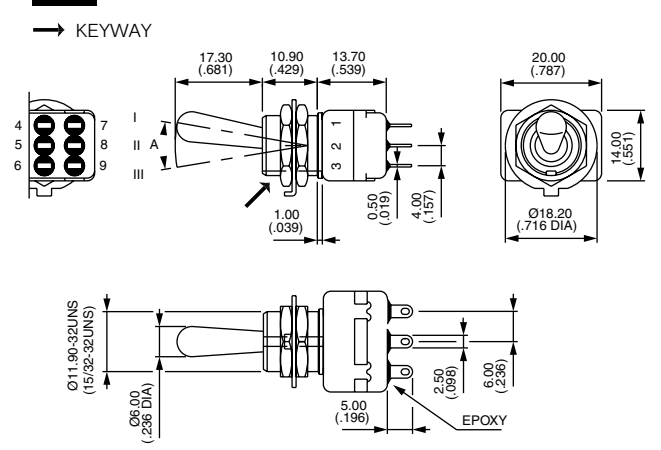
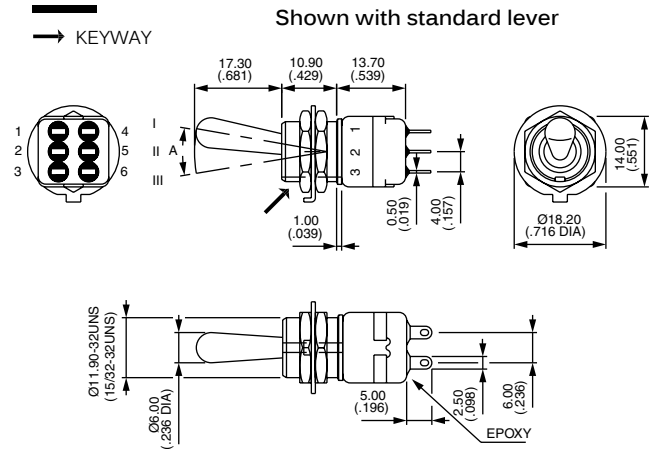
BASIC P/N	Angle of throw (A)	I	II	III
12166	26°	ON	-	ON
12169	20°	ON	OFF	ON
12167	20°	MOM	OFF	MOM
12168	20°	ON	OFF	MOM
12164*	20°	ON	ON	ON
12164 1R*	20°	ON	ON	MOM
12164 2R*	20°	MOM	ON	MOM

\*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 ▲



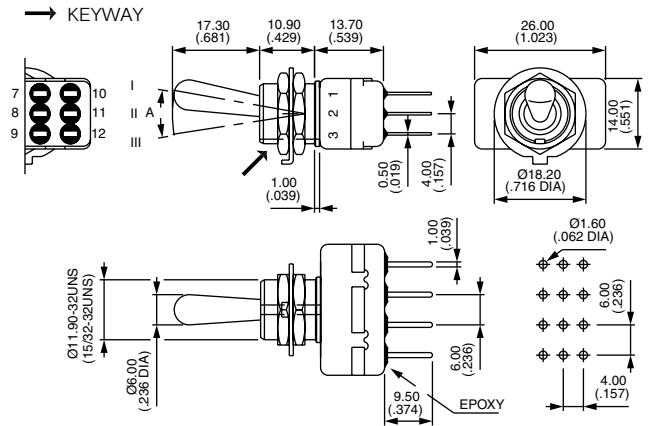
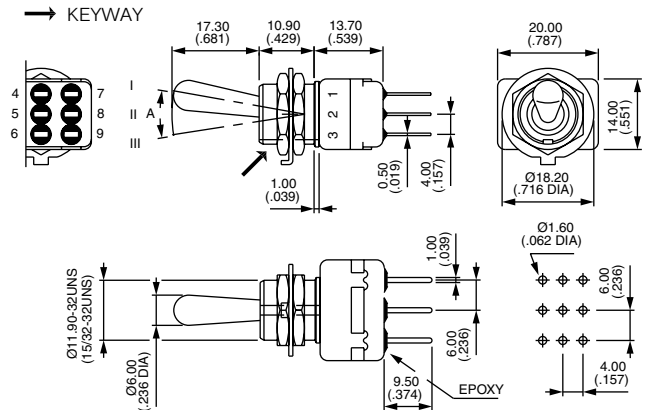
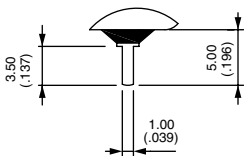
BASIC P/N	Angle of throw (A)	I	II	III
12256	26°	ON	-	ON

## 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.



Available :

- 12144-1RX778 ; 12144-2RX778
- 12144-3VX778 ; 12144AD2GK
- 12144AD2K ; 12144X778
- 12145X778 ; 12146-2VX778-40
- 12146-2VX987 ; 12146AD2G-18VX408
- 12146AD2GK ; 12146AD2GK12
- 12146AD2GK-2V ; 12146AGK
- 12146DGK ; 12146DK
- 12146GX910 ; 12146X778
- 12146X778-40 ; 12147AD2GK
- 12147DGK ; 12147X778
- 12147X987 ; 12149AD2GK-3V
- 12149DGK ; 12149X778

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## CONTACT MATERIALS

BASIC P/N

- 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

BASIC P/N

- Blank Bright chrome finish on actuator
- G Black finish on bushing, lever and hardware

For satin chrome finish, see "Special options".

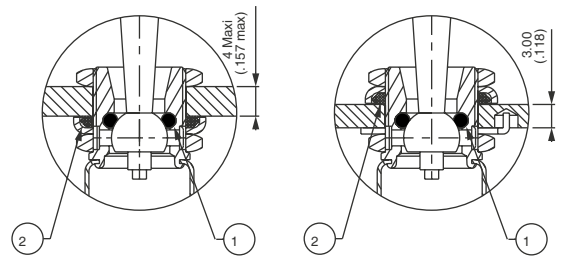
## SEALING

BASIC P/N

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.

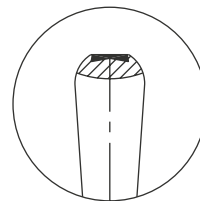


① O-ring    ② Sealing washer

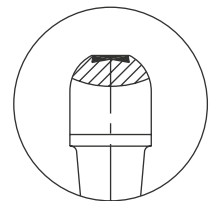
## FLUORESCENT TIP

BASIC P/N

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



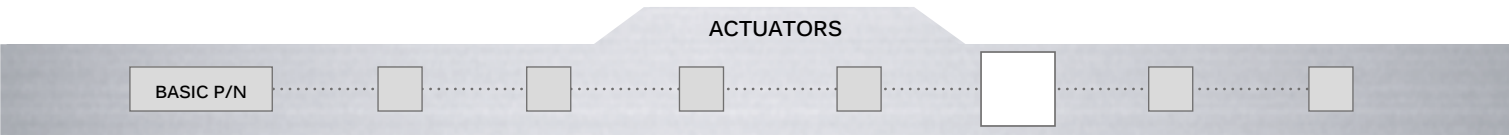
Standard lever



Locking lever

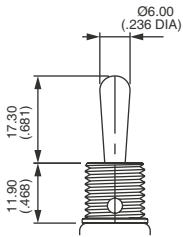
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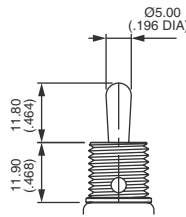


Dash compulsory before lever code.  
Switch guards : see "Switch Guards" section of website.

## LEVERS

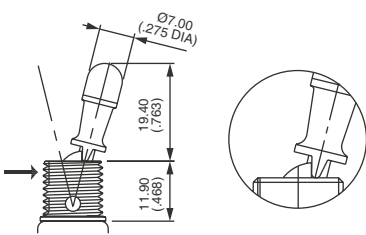


Blank Standard

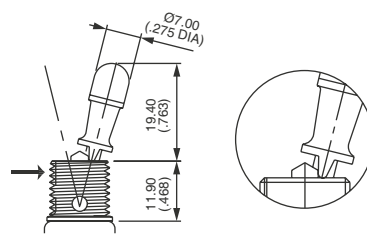


-12 Short lever

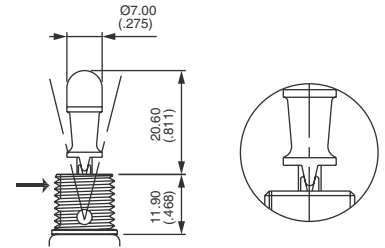
## LOCKING LEVERS



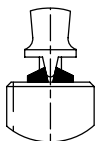
-1V  
1 locked position (function 6)  
Typical angle of throw : 26°



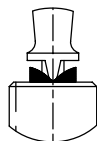
-2V  
2 locked positions (function 6)  
Typical angle of throw : 26°



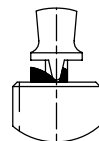
-3V  
3 locked positions (functions 9 and 4)  
Typical angle of throw : 20°



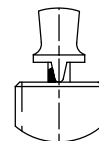
-4V  
Functions 9 & 4



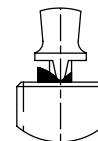
-5V  
Functions 7 & 442R



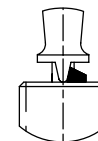
-7V  
Functions 8 & 441R



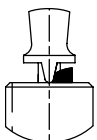
-8V  
Functions 9 & 44



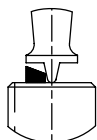
-9V  
Functions 8 & 441R



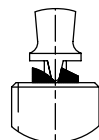
-11V  
Functions 8, 9, 44 & 441R



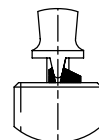
-12V  
Functions 7 & 8



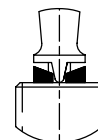
-13V  
Funct. 5, 7 & 442R



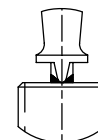
-15V  
Functions 8 & 441R



-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.

# 12000 series

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

## SPECIAL OPTIONS

BASIC P/N

**Blank** No special requirement

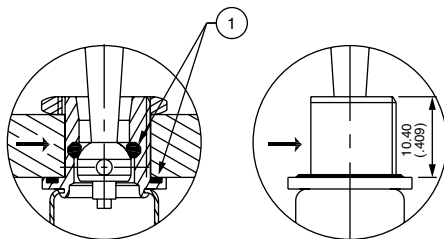
**X408** Front panel sealing by two O-rings. Flatted bushing for precise orientation. Panel thickness: 8 mm (.314) max., 3 mm (.118) min. Protects the switch against water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.

**X545** Lever, bushing, housing, nuts and washers with **satín chrome finish**

**X822** Threaded bushing  $\varnothing$  15 (.590), with double flat Not available with function 5 or locking levers. Includes front panel sealing and X780 contact material

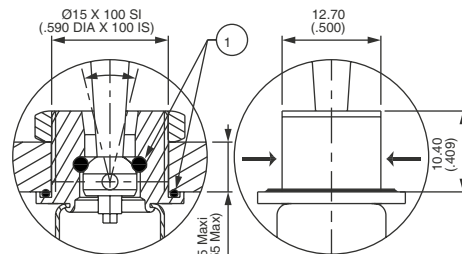
**X780** Solid rivet - gold plated silver/nickel alloy contacts. Not available with function 5.

**X910** Switches for peak currents - double pole - on request.



X408

① O-ring  
→ Flat



X822

## AGENCY APPROVAL

BASIC P/N

**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".