

# 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<br>(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: diallylphthalate (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

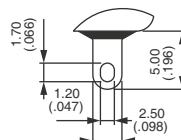
Designed to MIL specifications

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

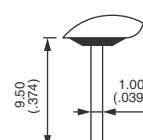
**Marking:** to order switches marked CECC, complete appropriate box of ordering format.



## TERMINALS



Solder lugs

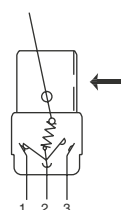


Straight PC

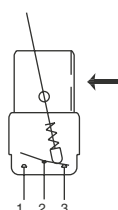


## ELECTRICAL FUNCTIONS

→ KEYWAY



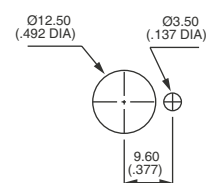
Function 6



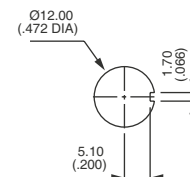
Other functions



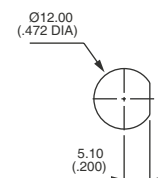
## PANEL CUT-OUT



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                                                        |
|                                                                                                                                                                                                                        | <b>1</b> Solder lug terminals<br><b>2</b> Straight PC terminals<br>All models with threaded bushing Ø 11.9 (15/32). Bushing Ø 15 (.590), see X822 under "Special options".                  | <b>4</b> Double pole<br><b>5</b> Three pole<br><b>6</b> Four pole                                                                                                                                                                     | <b>6</b> ON - ON<br><b>9</b> ON OFF ON<br><b>7</b> MOM OFF MOM<br><b>8</b> ON OFF MOM<br><b>5</b> - ON MOM<br><b>4</b> ON ON ON MOM ▲<br>MOM ON MOM ▲                              | <b>1R</b> ON ON MOM<br><b>2R</b> MOM ON MOM<br>Leave blank for other functions. |
| <b>Function 4</b><br>▲ Must not have blank in "momentary" box.                                                                                                                                                         |                                                                                                                                                                                             |                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                 |
| OPTIONS                                                                                                                                                                                                                |                                                                                                                                                                                             |                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                 |
|                                                                                                                                                                                                                        |                                                                                                                                                                                             |                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                 |
|                                                                                                                                                                                                                        | <b>FINISH</b><br><b>Blank</b> Bright chrome finish on actuator<br><b>G</b> Black finish on bushing, actuator and hardware.<br>Satin chrome finish, see "Special options".                   | <b>FLUORESCENT TIP</b><br><b>Blank</b> None<br><b>-038</b> White fluorescent tip to lever<br>Available with black finish (G) only.                                                                                                    | <b>SPECIAL OPTIONS</b><br><b>Blank</b> No special requirement<br><b>X408</b> Front panel sealing by two O-rings<br><b>X822</b> Bushing Ø 15 (.590)<br>Other: see following pages.. |                                                                                 |
| <b>CONTACT MATERIALS</b><br><b>A</b> Silver<br><b>AD2</b> Silver, gold plated (2 micron gold)<br><b>D</b> Solid gold rivet<br>See "Special options" for X780 (solid silver/nickel rivet) and X910 (for peak currents). | <b>SEALING</b><br><b>Blank</b> Epoxy sealed terminals standard<br><b>K</b> Front panel sealing by one O-ring and sealing washer<br>Sealing by two O-rings, see X408, "Special options" box. | <b>LEVERS</b><br><b>Blank</b> Standard lever<br><b>-12</b> Short lever<br>:<br><b>LOCKING LEVERS</b><br><b>-1V</b> 1 locked position<br><b>-2V</b> 2 locked positions<br><b>-3V</b> 3 locked positions<br>Other: see following pages. | <b>APPROVALS</b><br><b>CECC</b> Availability: Consult factory for details of approved models.                                                                                      |                                                                                 |



## 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



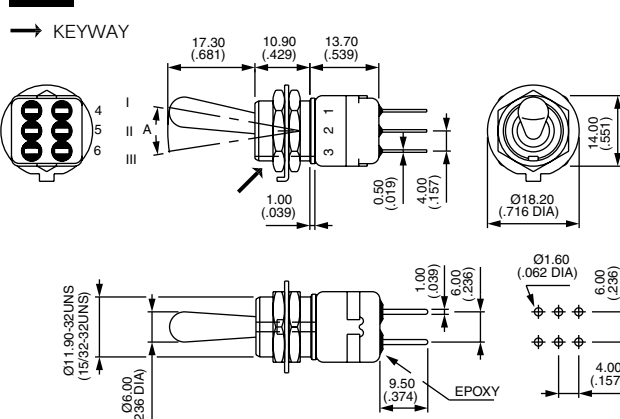
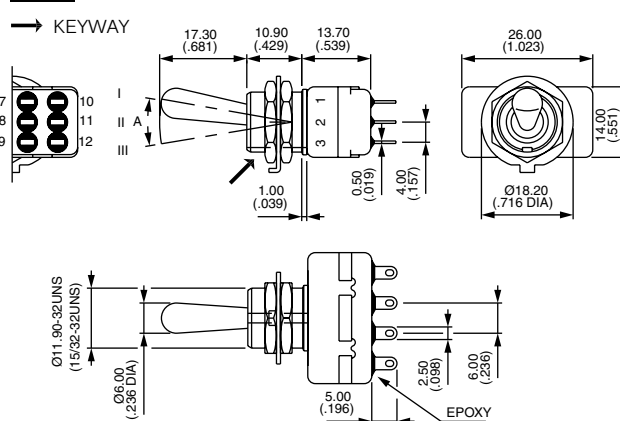
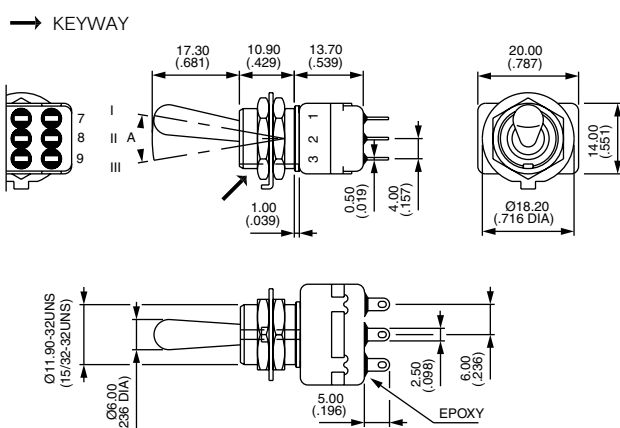
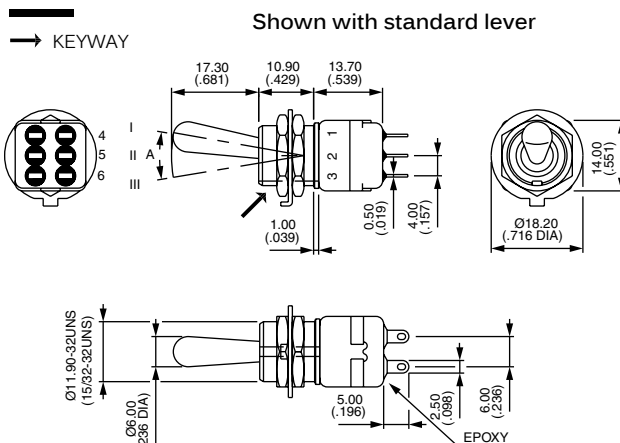
| BASIC P/N | Angle of throw (A) | I   | II  | III |
|-----------|--------------------|-----|-----|-----|
| 12166     | 26°                | ON  | -   | ON  |
| 12169     | 20°                | ON  | OFF | ON  |
| 12167     | 20°                | MOM | OFF | MOM |
| 12168     | 20°                | ON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

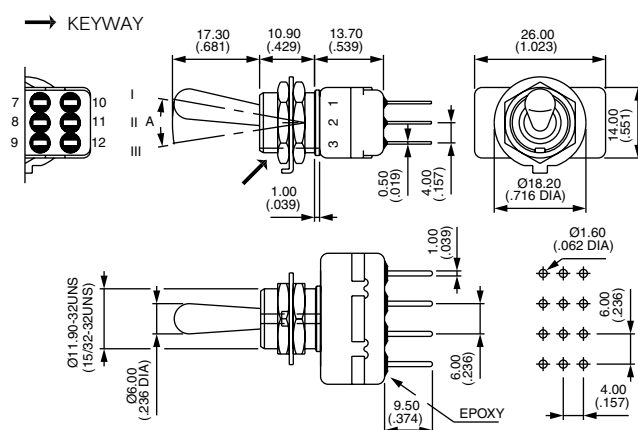
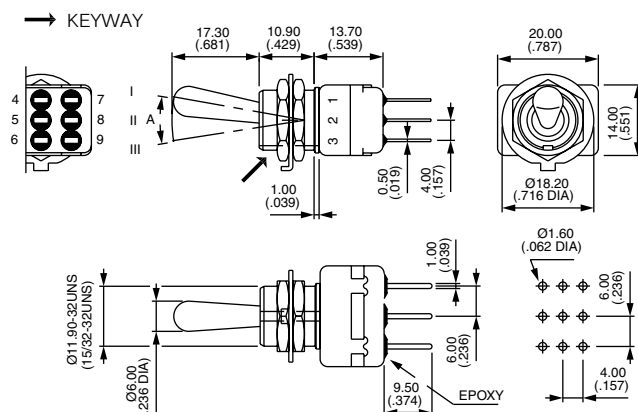
## STRAIGHT PC TERMINALS - DOUBLE POLE ▲



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



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## 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".

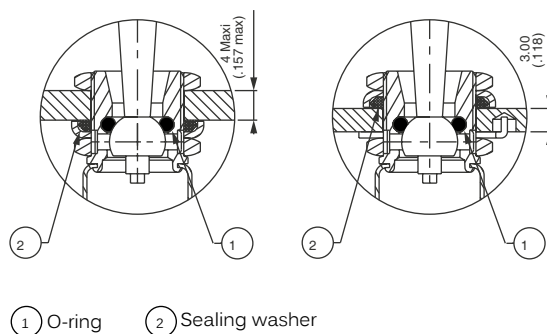
## SEALING

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.

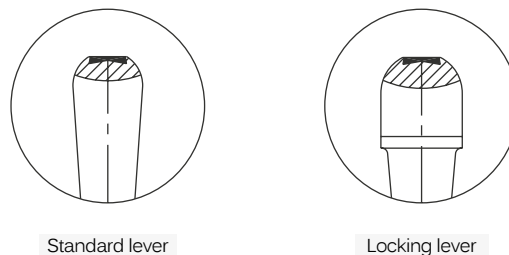
Sealing by two O-rings, see X408 under "Special options".  
See "Sealing Boots" section of website.



## 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



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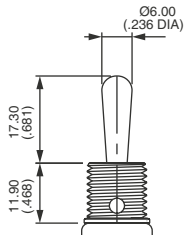
## ACTUATORS

BASIC P/N

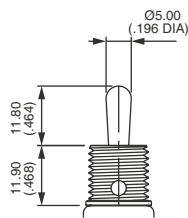
Dash compulsory before lever code.

Switch guards : see "Switch Guards" section of website.

## LEVERS

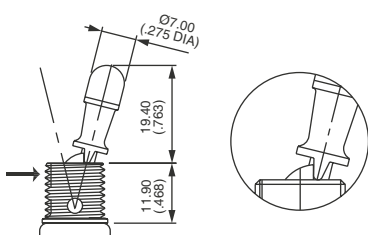


Blank Standard



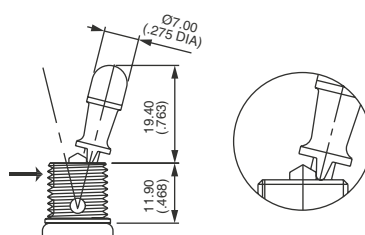
-12 Short lever

## LOCKING LEVERS



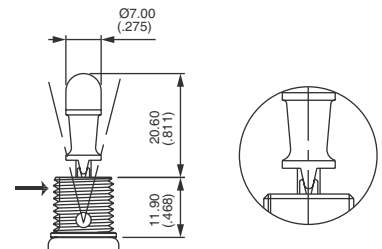
-1V

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



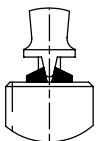
-2V

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



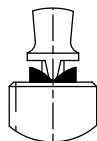
-3V

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



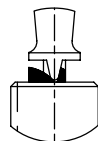
-4V

Functions 9 & 4



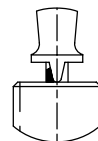
-5V

Functions 7 & 442R



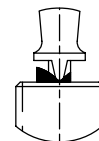
-7V

Functions 8 & 441R



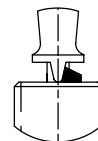
-8V

Functions 9 & 44



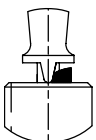
-9V

Functions 8 & 441R



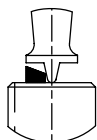
-11V

Functions 8, 9,  
44 & 441R



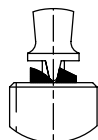
-12V

Functions 7 & 8



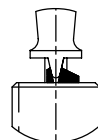
-13V

Funct. 5, 7 & 442R



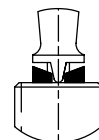
-15V

Functions 8 & 441R



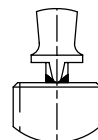
-16V

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

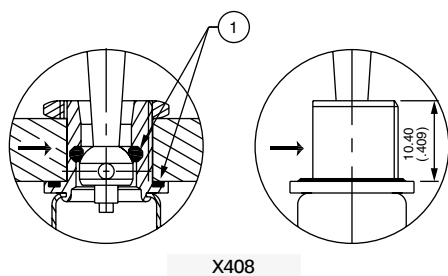
**X408** Front panel sealing by two O-rings. Flatted bushing for precise orientation. Panel thickness: 8 mm (.314) max., 3 mm (.118) min. Protects the switch against water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.

**X545** Lever, bushing, housing, nuts and washers with **satin 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

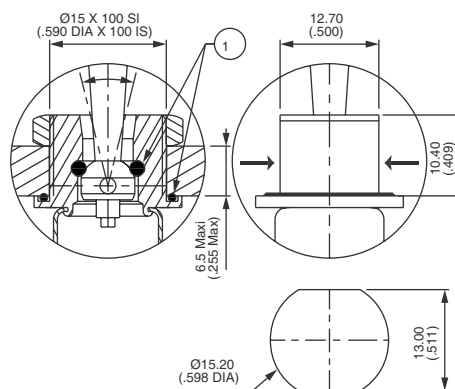
**X780** Solid rivet - gold plated silver/nickel alloy contacts. Not available with function 5.

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



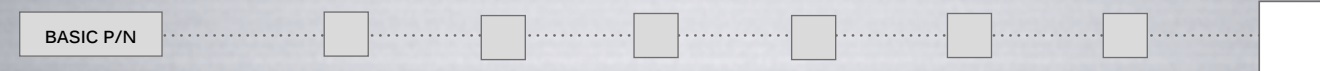
X408

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".