

# 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.
- 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

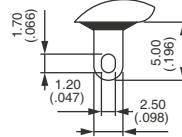
Designed to MIL specifications

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

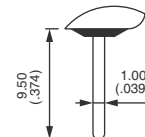
**Marking:** to order switches marked CECC, complete appropriate box of ordering format.



## TERMINALS



Solder lugs

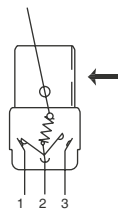


Straight PC

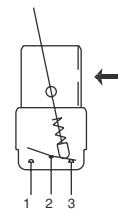


## ELECTRICAL FUNCTIONS

→ KEYWAY



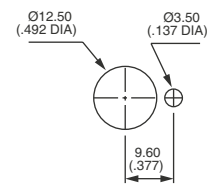
Function 6



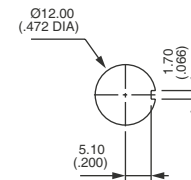
Other functions



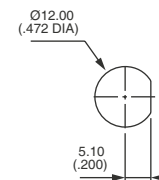
## PANEL CUT-OUT



Standard



With K sealing option



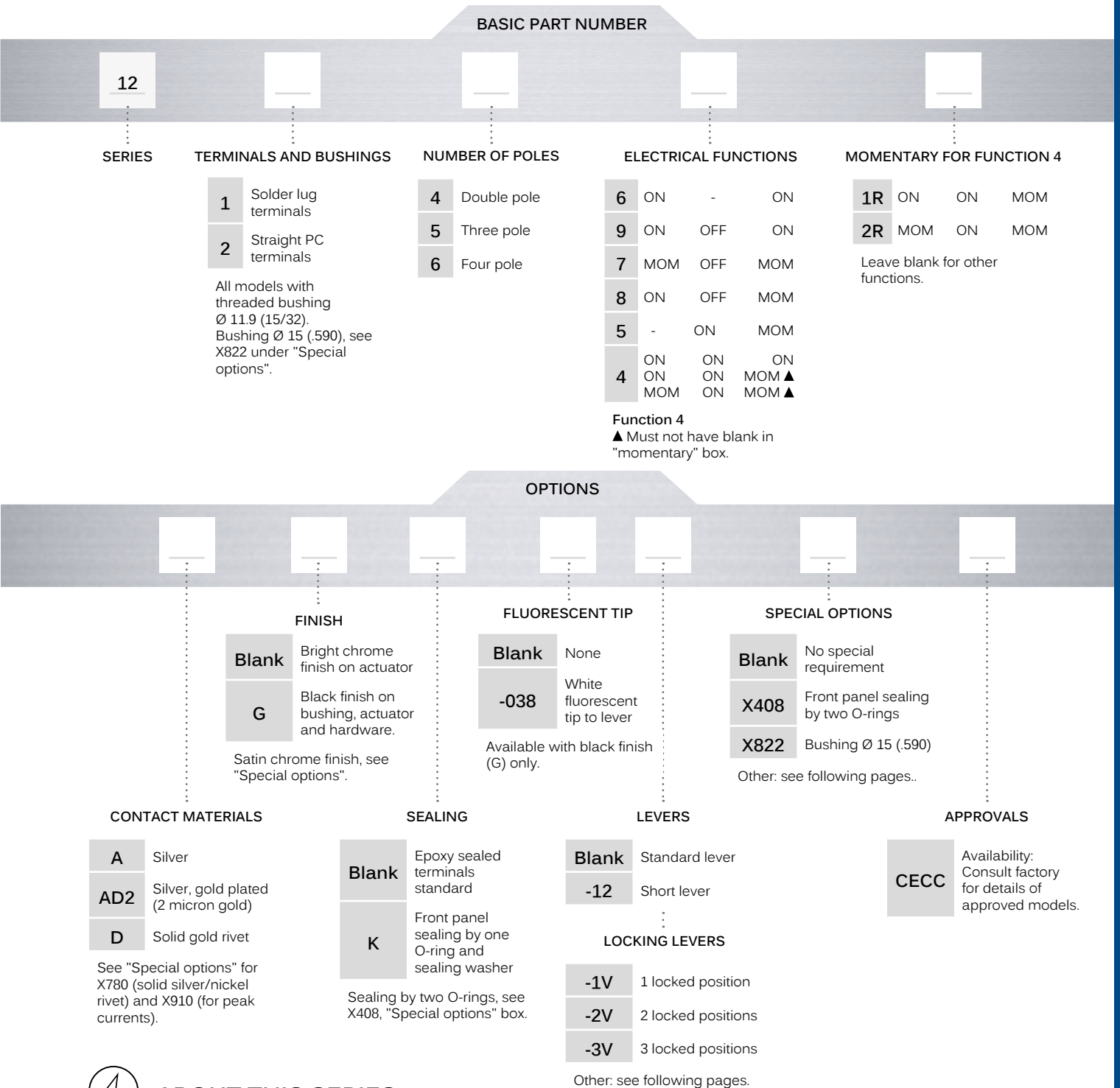
With X408 sealing option

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## BUILD YOUR PART NUMBER



## 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



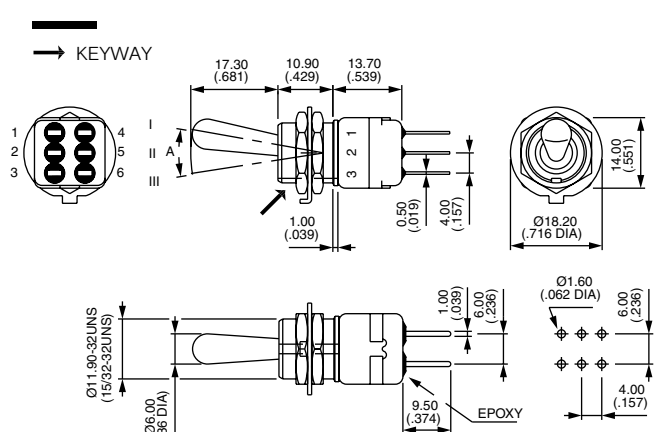
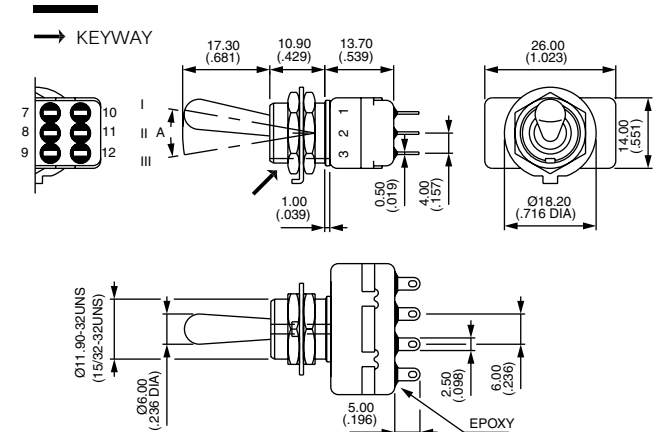
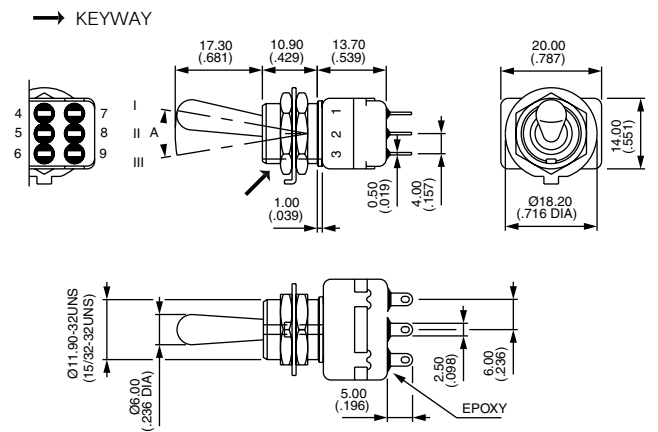
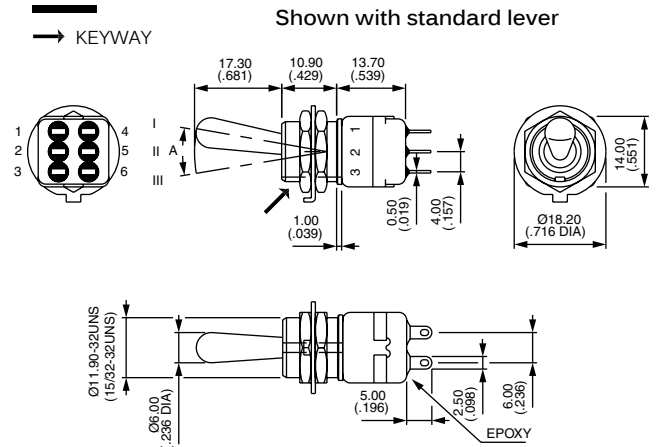
BASIC P/N	Angle of throw (A)	I	II	III
12166	26°	ON	-	ON
12169	20°	ON	OFF	ON
12167	20°	MOM	OFF	MOM
12168	20°	ON	OFF	MOM
12164*	20°	ON	ON	ON
12164 1R*	20°	ON	ON	MOM
12164 2R*	20°	MOM	ON	MOM

\*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 ▲



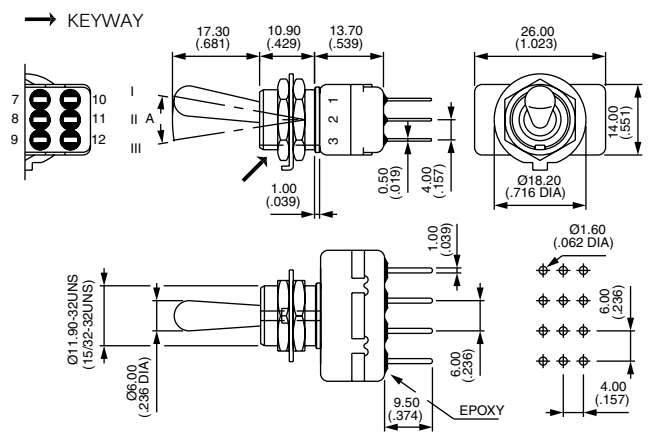
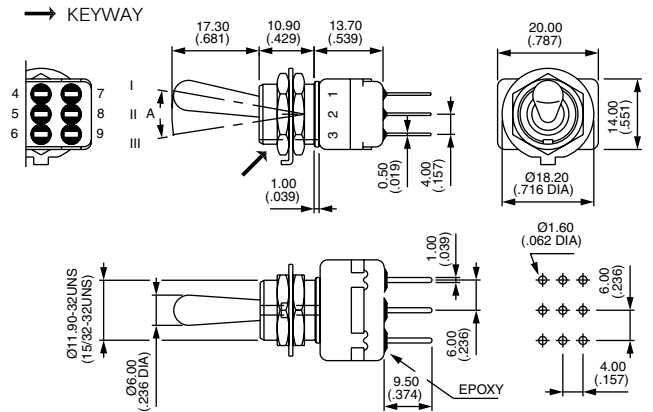
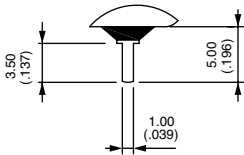
BASIC P/N	Angle of throw (A)	I	II	III
12256	26°	ON	-	ON

## 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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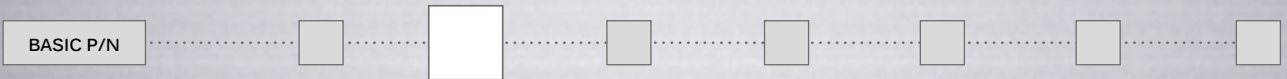
## CONTACT MATERIALS



- 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".

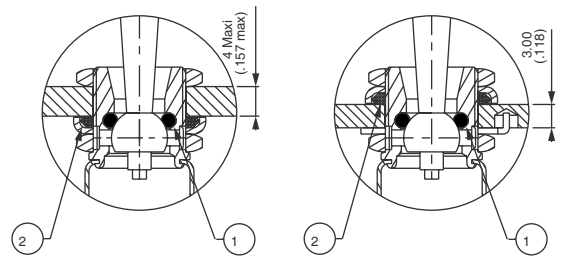
## SEALING



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.

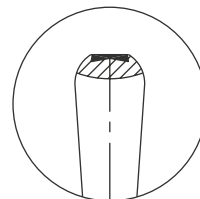


① O-ring    ② Sealing washer

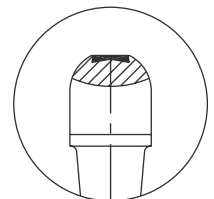
## FLUORESCENT TIP



- 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

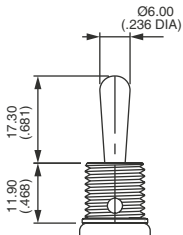
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## ACTUATORS

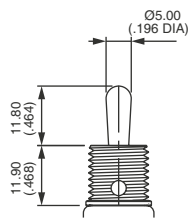
BASIC P/N

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

### LEVERS

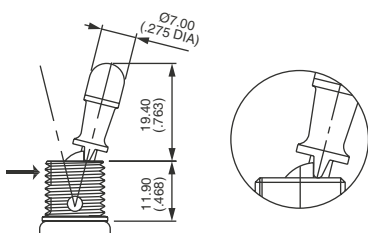


Blank Standard



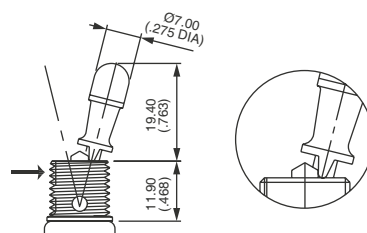
-12 Short lever

### LOCKING LEVERS



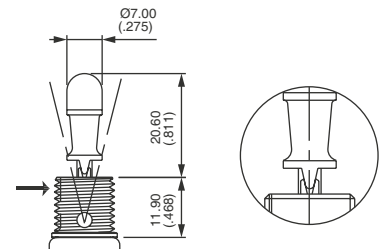
-1V

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



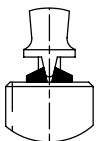
-2V

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



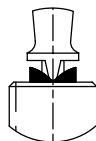
-3V

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



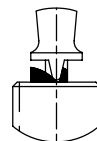
-4V

Functions 9 & 4



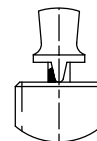
-5V

Functions 7 & 442R



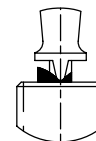
-7V

Functions 8 & 441R



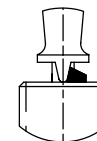
-8V

Functions 9 & 44



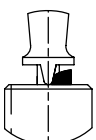
-9V

Functions 8 & 441R



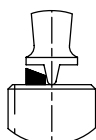
-11V

Functions 8, 9, 44 & 441R



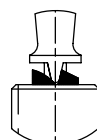
-12V

Functions 7 & 8



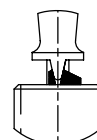
-13V

Funct. 5, 7 & 442R



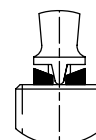
-15V

Functions 8 & 441R



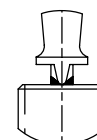
-16V

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.



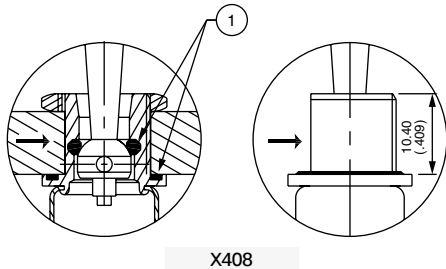
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## SPECIAL OPTIONS

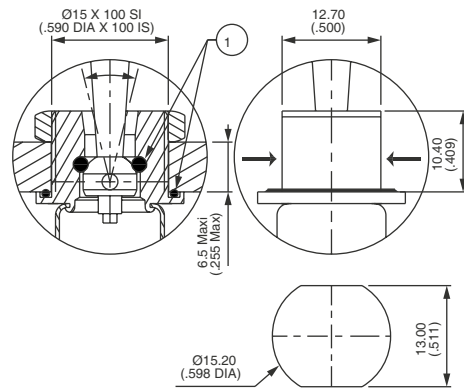


- Blank** No special requirement
- X408** Front panel sealing by two O-rings. Flatted bushing for precise orientation. Panel thickness: 8 mm (.314) max., 3 mm (.118) min. Protects the switch against water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.
- 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.



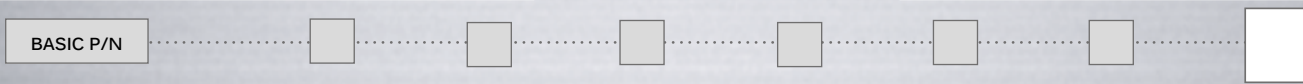
X408

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".



# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## Apem:

[12148A](#) [12147A](#) [12144X778](#) [12145X778](#) [12146AX408](#) [12146X778](#) [12148X778](#) [12149A](#) [12156X778](#) [12159X778](#)  
[12169X778](#) [12246X778](#) [12247A](#) [121441R7V/1X778](#) [121443VX778](#) [12146AD2G](#) [12146AD2GK](#) [12146AK](#)  
[12147AX408](#) [12156X780X545](#) [12249A](#) [12146AD2K](#) [12146AGX408](#) [12149A-3V](#) [12145A](#) [12146A](#) [12146K2VX910](#)  
[12164A](#) [12146A2V](#) [12147AGKX759](#) [12147AGX408](#) [12247AK](#) [12146AG2VX408](#) [12146AD2G2V](#) [12145AD2K](#)  
[121562VX778](#) [121460382VX778](#) [12156AX408](#) [12147AD2GK](#) [12146AD2](#) [12145AX408](#) [12246AK](#) [12246AD2K2V](#)  
[12148AD2K](#) [12149AD2K](#) [12265038X778](#) [12146AK2VX545](#) [12145AGX408](#) [12248038X778](#) [12246AD2G12X408](#)  
[12169A](#) [12146038X778](#) [12145CT13V/1X778](#) [121461VX778](#) [12144AD2K8V](#) [12146AG-2V](#) [12146AD2K2V](#)  
[12166AD2](#) [12146AD2GK2V](#) [12146AGK](#) [12159AD2](#) [12144AD2GK](#) [12146AG](#) [121642RX778](#) [121442RX778](#)  
[121641RX778](#) [121441RX778](#) [12144AD2G3V](#) [12149DGK3V](#) [12144AK](#) [12156AD2GK](#) [12147GX780](#) [12145AGK](#)  
[12145AK](#) [12146AD2GK1V](#) [12146AGK0382V](#) [12147AD2G038](#) [12146AD2G038](#) [12148AD2G038](#) [12144AD2GK3V](#)  
[121441R038X778](#) [12146AD2K1V](#) [12167AD2GK](#) [12146AGK037](#) [12259AD24VX545](#) [12249A3V](#) [12149AGX408](#)  
[122441R12X778](#) [12144AGX408](#) [12147AD2](#) [12166AD2GK](#) [12166GKX910](#) [121441RAGX408](#) [122441RAD2G12X408](#)  
[12146AD2G12X408](#) [12147AGKX679](#) [12144AD23V](#) [12146AD2G1V](#) [12147AGK](#) [12147AG22X408](#)