

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



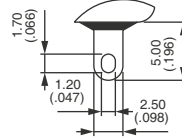
CECC 96201-005
CECC 96201-008

Designed to MIL specifications

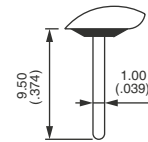
Availability: consult factory for details of approved models.

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

TERMINALS



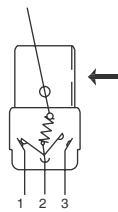
Solder lugs



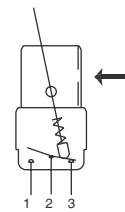
Straight PC

ELECTRICAL FUNCTIONS

→ KEYWAY

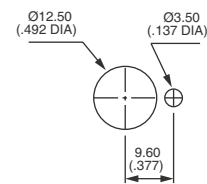


Function 6

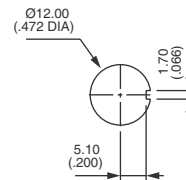


Other functions

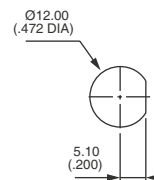
PANEL CUT-OUT



Standard



With K sealing option



With X408 sealing option

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BUILD YOUR PART NUMBER

BASIC PART NUMBER

<div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto; text-align: center; line-height: 20px;">12</div> <p>SERIES</p>	<div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <p>TERMINALS AND BUSHINGS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">1</td> <td>Solder lug terminals</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">2</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>	1	Solder lug terminals	2	Straight PC terminals	<div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <p>NUMBER OF POLES</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">4</td> <td>Double pole</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">5</td> <td>Three pole</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">6</td> <td>Four pole</td> </tr> </table>	4	Double pole	5	Three pole	6	Four pole	<div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <p>ELECTRICAL FUNCTIONS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">6</td> <td>ON</td> <td>-</td> <td>ON</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">9</td> <td>ON</td> <td>OFF</td> <td>ON</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">7</td> <td>MOM</td> <td>OFF</td> <td>MOM</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">8</td> <td>ON</td> <td>OFF</td> <td>MOM</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">5</td> <td>-</td> <td>ON</td> <td>MOM</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">4</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>Function 4 ▲ Must not have blank in "momentary" box.</p>	6	ON	-	ON	9	ON	OFF	ON	7	MOM	OFF	MOM	8	ON	OFF	MOM	5	-	ON	MOM	4	ON	ON	ON		ON	ON	MOM ▲		MOM	ON	MOM ▲	<div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div> <p>MOMENTARY FOR FUNCTION 4</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">1R</td> <td>ON</td> <td>ON</td> <td>MOM</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">2R</td> <td>MOM</td> <td>ON</td> <td>MOM</td> </tr> </table> <p>Leave blank for other functions.</p>	1R	ON	ON	MOM	2R	MOM	ON	MOM
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OPTIONS

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<p>CONTACT MATERIALS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">A</td> <td>Silver</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">AD2</td> <td>Silver, gold plated (2 micron gold)</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">D</td> <td>Solid gold rivet</td> </tr> </table> <p>See "Special options" for X780 (solid silver/nickel rivet) and X910 (for peak currents).</p>	A	Silver	AD2	Silver, gold plated (2 micron gold)	D	Solid gold rivet	<p>SEALING</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">Blank</td> <td>Epoxy sealed terminals standard</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">K</td> <td>Front panel sealing by one O-ring and sealing washer</td> </tr> </table> <p>Sealing by two O-rings, see X408, "Special options" box.</p>	Blank	Epoxy sealed terminals standard	K	Front panel sealing by one O-ring and sealing washer	<p>LEVERS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">Blank</td> <td>Standard lever</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">-12</td> <td>Short lever</td> </tr> </table> <p>LOCKING LEVERS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">-1V</td> <td>1 locked position</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">-2V</td> <td>2 locked positions</td> </tr> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">-3V</td> <td>3 locked positions</td> </tr> </table> <p>Other: see following pages.</p>	Blank	Standard lever	-12	Short lever	-1V	1 locked position	-2V	2 locked positions	-3V	3 locked positions	<p>APPROVALS</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center; border: 1px solid black;">CECC</td> <td>Availability: Consult factory for details of approved models.</td> </tr> </table>	CECC	Availability: Consult factory for details of approved models.
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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.

12000 series

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

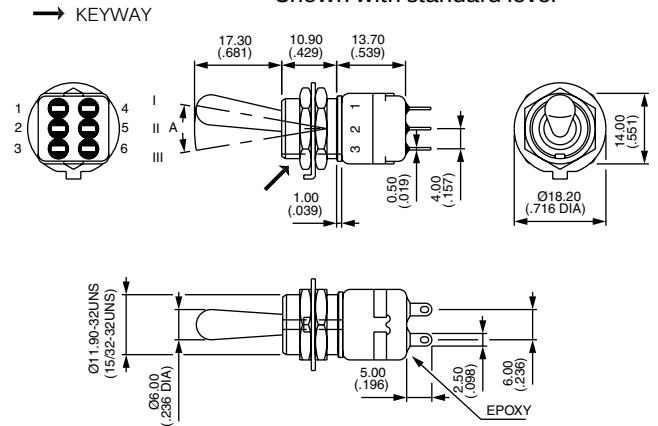
*Function 4: DP in 4P case - connections, see "Technical information" on website

STRAIGHT PC TERMINALS - DOUBLE POLE ▲

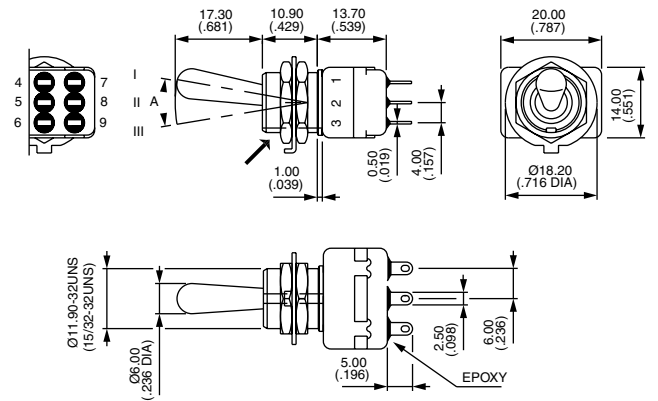


BASIC P/N	Angle of throw (A)	I	II	III
12246	26°	ON	-	ON

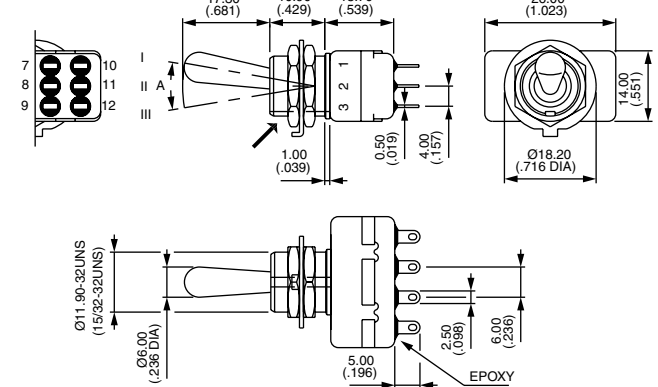
Shown with standard lever



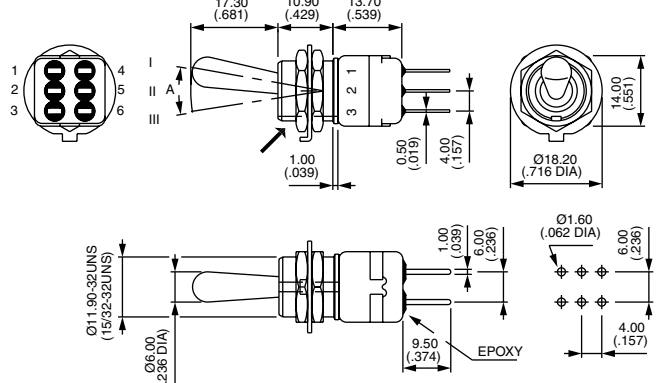
KEYWAY



KEYWAY



KEYWAY



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STRAIGHT PC TERMINALS - THREE POLE ▲



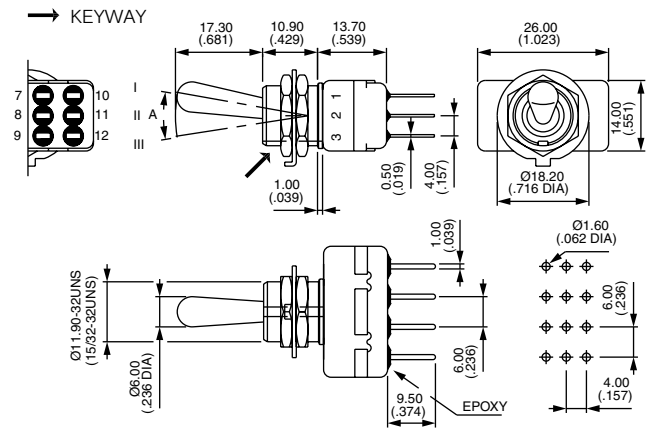
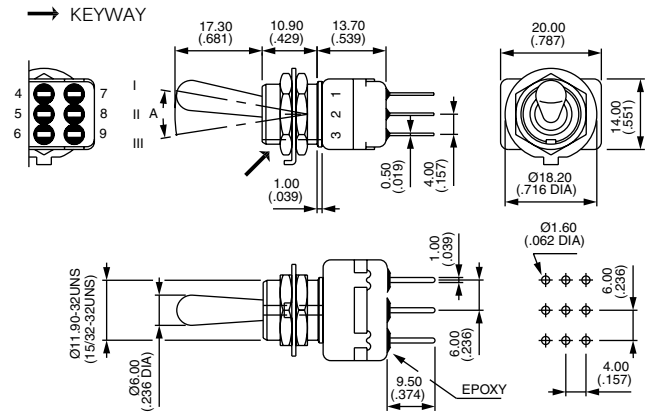
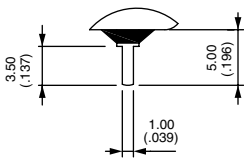
BASIC P/N	Angle of throw (A)	I	II	III
12256	26°	ON	-	ON

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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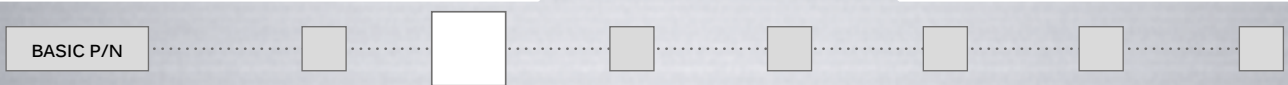
CONTACT MATERIALS



- 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).

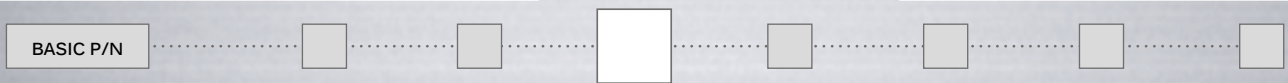
FINISH



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

For satin chrome finish, see "Special options".

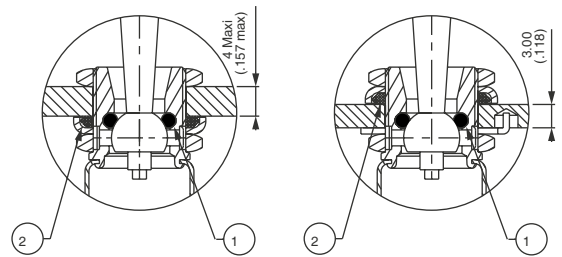
SEALING



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.

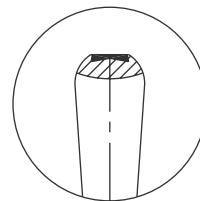


① O-ring ② Sealing washer

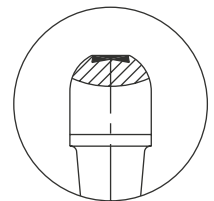
FLUORESCENT TIP



- 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

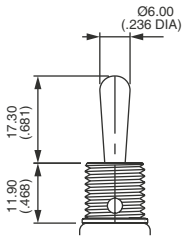
Professional toggle switches • threaded bushing Ø 11.9 mm

ACTUATORS

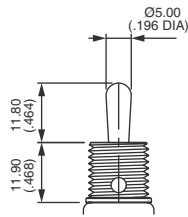
BASIC P/N

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

LEVERS

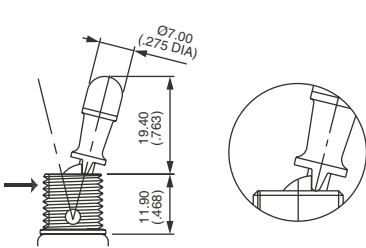


Blank Standard



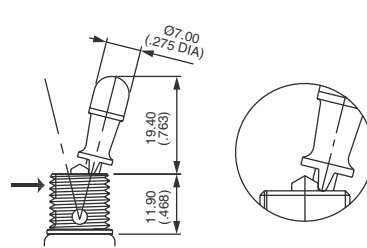
-12 Short lever

LOCKING LEVERS



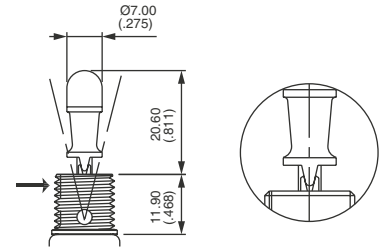
-1V

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



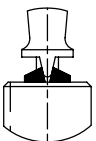
-2V

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



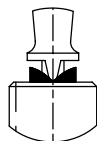
-3V

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



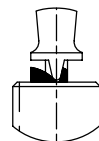
-4V

Functions 9 & 4



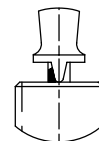
-5V

Functions 7 & 442R



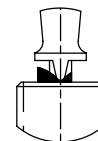
-7V

Functions 8 & 441R



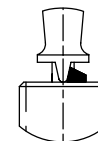
-8V

Functions 9 & 44



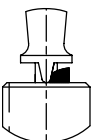
-9V

Functions 8 & 441R



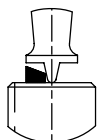
-11V

Functions 8, 9, 44 & 441R



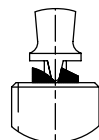
-12V

Functions 7 & 8



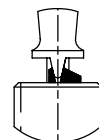
-13V

Funct. 5, 7 & 442R



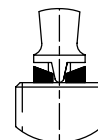
-15V

Functions 8 & 441R



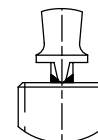
-16V

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.

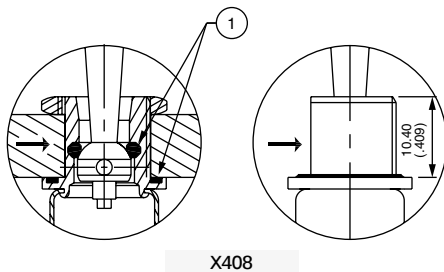
12000 series

Professional toggle switches • threaded bushing Ø 11.9 mm

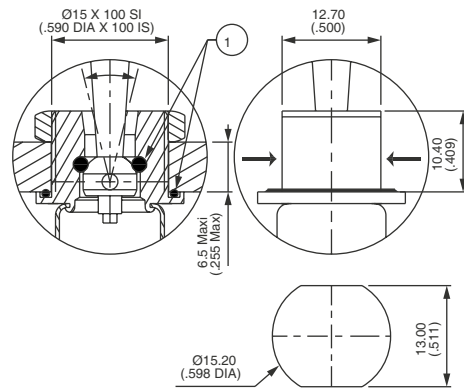
SPECIAL OPTIONS



- 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.

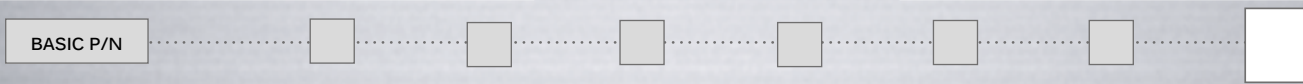


X408



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

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