

# 11000 and 12000 series

Professional toggle switches

*Distinctive features*



## Applications

These switches are specially manufactured for defence, avionics, space and telecommunications applications.

## Approvals and lists



CECC 96201-005  
CECC 96201-008

- QPL (in Europe) and MUAHAG listed
- meeting the requirements of MIL standard (MIL 3950)



## Robust switches for high specification environments

## Toggle action on 2-position models giving smooth mechanical operation

## Plastic material with high insulation resistance

## Several front panel sealing options

## Several locking lever options (12000 series)

## Bright chrome, satin chrome or matt black finish



# 11000 series

## Professional toggle switches - threaded bushing Ø 6,35 (1/4)

### Specifications

#### ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : Peak currents, refer to "Special options".
  - silver contacts (A-AD2-X780) : 2A 250VAC - 4A 125VAC - 4A 30VDC
  - gold contacts (D) : 200mA 250VAC - 400mA 125VAC
- Minimum load : AD2-X780-D contacts : 10mA 50mV, 10µA 5V min.
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- 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	2A 250VAC - 4A 125VAC - 4A 30VDC	50.000	50.000
AD2 X780	2A 250VAC - 4A 125 VAC - 4A 30VDC (Gold plating : 100mA 30VDC max.)	20.000	20.000
D	200mA 250VAC - 400mA 125VAC	80.000	50.000
	Low level or mechanical life	150.000	100.000

#### 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

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. Tin dipped terminals available, see "Special options".

#### GENERAL SPECIFICATIONS

- Torque : 1,25 Nm (.92 Ft.lb) max. applied between the 2 nuts
- Standard panel thickness : 2,5 mm (.098) max.
- Operating temperature : -40°C to +85°C

#### RELIABILITY - RUN-IN TEST

Upon request, each individual switch can be submitted to a low level run-in test of 50 or 250 cycles to ensure suitability for special applications requiring a very high level of reliability (military, space, etc.).

#### AGENCY APPROVALS/PREFERENTIAL LISTS



CECC 96201-005  
CECC 96201-008

**QPL** (Europe only)  
**MUAHAG**

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

**Marking** : to order switches marked CECC, complete appropriate box of ordering format. Preferential lists do not appear on the switches.

**Dimensions** : first dimensions are in mm while inches are shown as bracketted numbers.

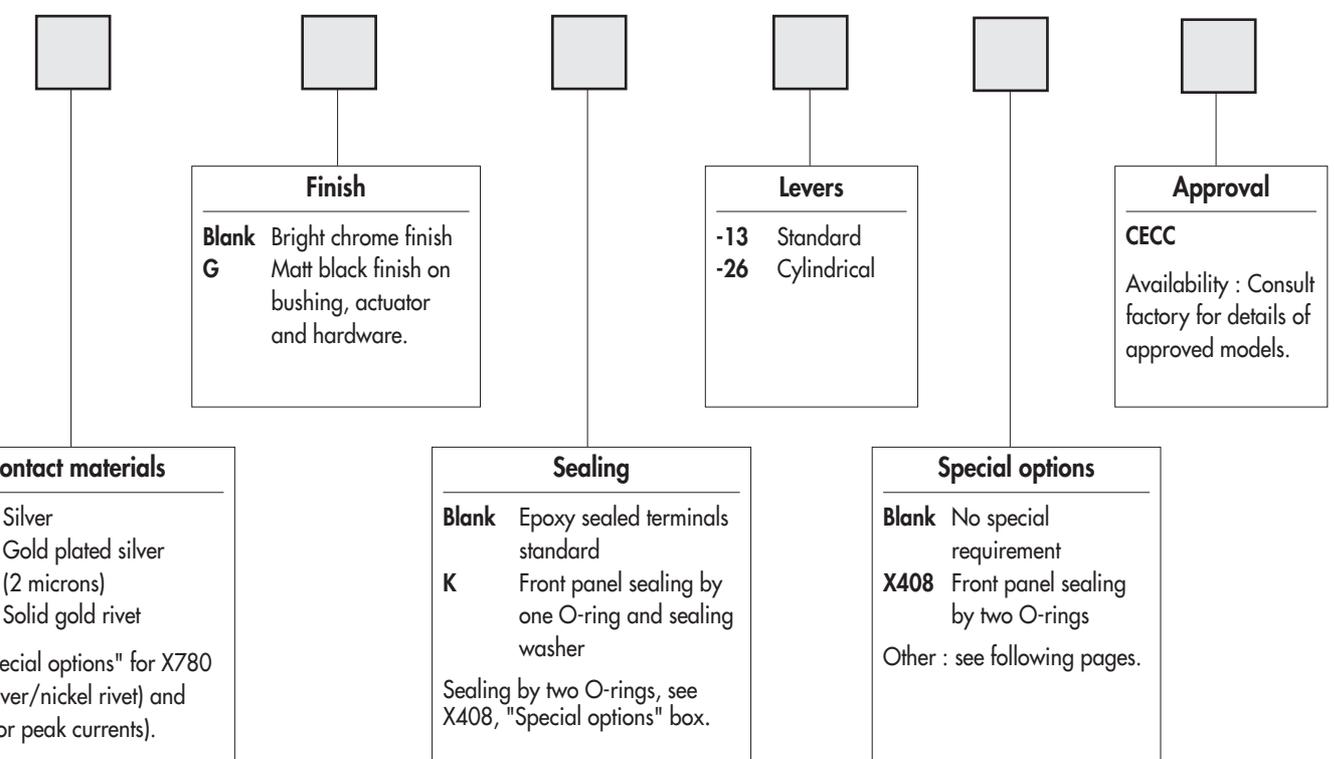
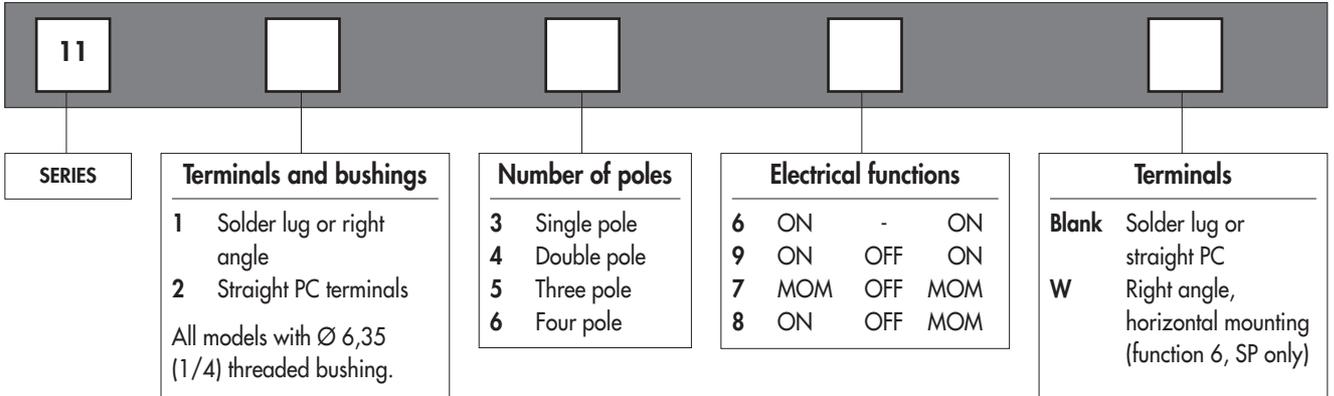


**Packaging unit** : 25 pieces or 50 pieces depending on models.

# 11000 series

Professional toggle switches - threaded bushing Ø 6,35 (1/4)

Overview



**NOTICE** : please note that not all combinations of above numbers are available. Refer to the following pages for further information.

## ABOUT THIS SERIES

On the following pages, you will find successively :

- model structure of switches
- options in the same order as in above chart



**Sealing boots** are available to protect the switches against dust and water. They are presented in section H.



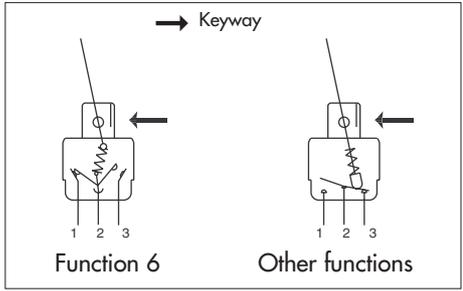
**Mounting accessories** : standard hardware supplied with all models : 2 hex nuts 8 (.314) across flats, 1 locking ring and 1 lockwasher. Standard and special hardware available are presented in section I.

# 11000 series

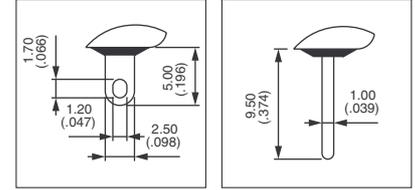
Professional toggle switches - threaded bushing  $\varnothing 6,35$  (1/4)

MODEL STRUCTURE

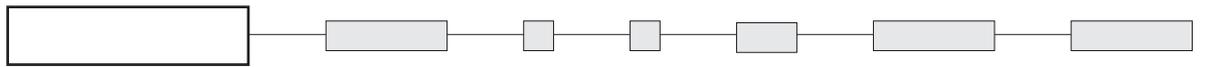
A



- Solder lug, straight PC or right angle terminals
- Epoxy sealed terminals standard



MODEL STRUCTURE



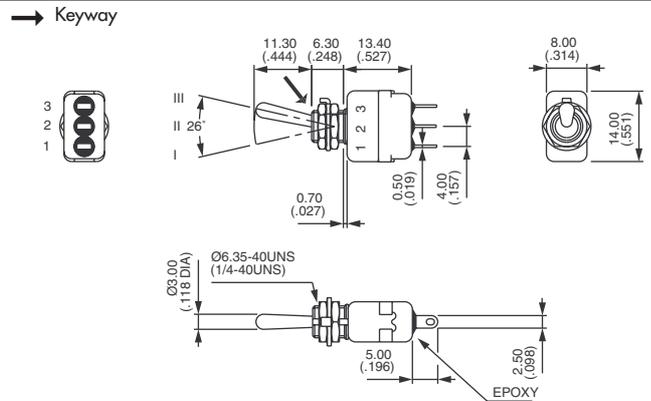
Shown with standard lever (-13)

## Solder lug terminals - single pole



11136  
11139  
11137  
11138

	I	II	III
ON	-	ON	
ON	OFF	ON	
MOM	OFF	MOM	
ON	OFF	MOM	

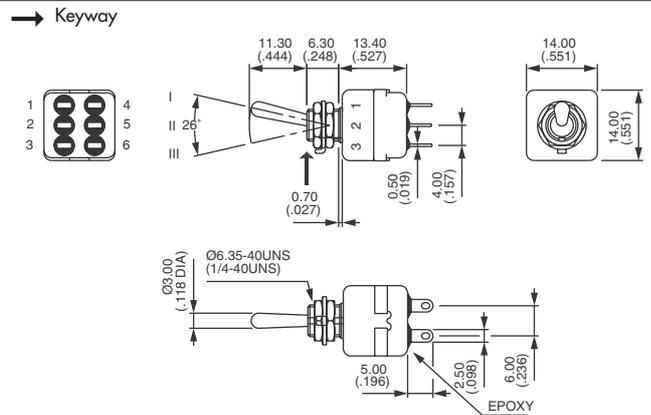


## Solder lug terminals - double pole



11146  
11149  
11147  
11148

	I	II	III
ON	-	ON	
ON	OFF	ON	
MOM	OFF	MOM	
ON	OFF	MOM	

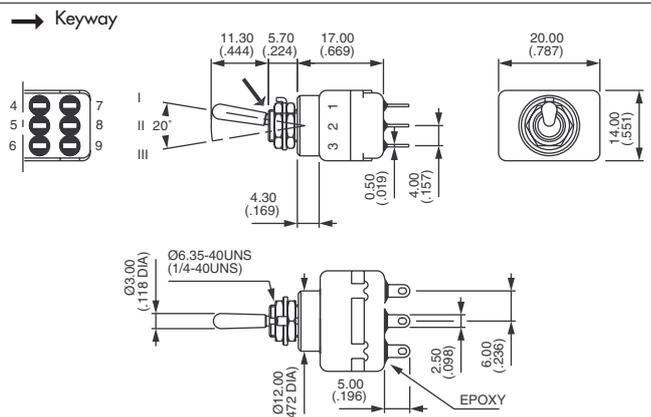


## Solder lug terminals - three pole



11156  
11159  
11157  
11158

	I	II	III
ON	-	ON	
ON	OFF	ON	
MOM	OFF	MOM	
ON	OFF	MOM	





# 11000 series

Professional toggle switches - threaded bushing  $\varnothing 6,35$  (1/4)

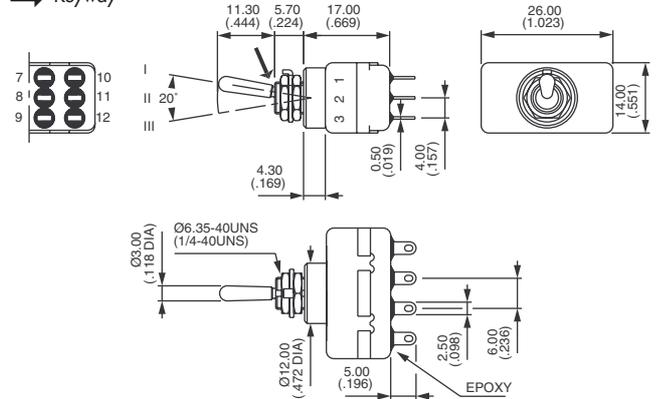
## Solder lug terminals - four pole



11166  
11169  
11167  
11168

II	II	III
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM

→ Keyway



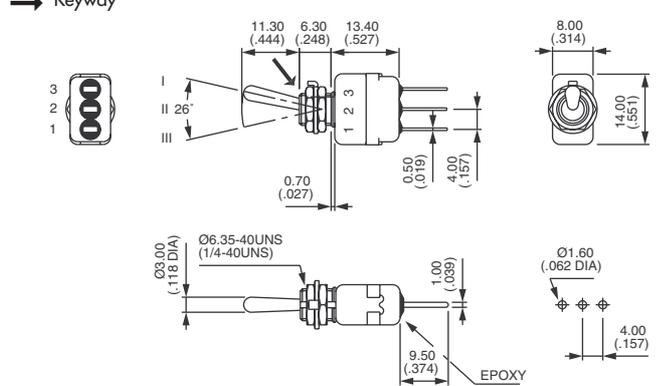
## Straight PC terminals - single pole ▲



11236

II	II	III
ON	-	ON

→ Keyway



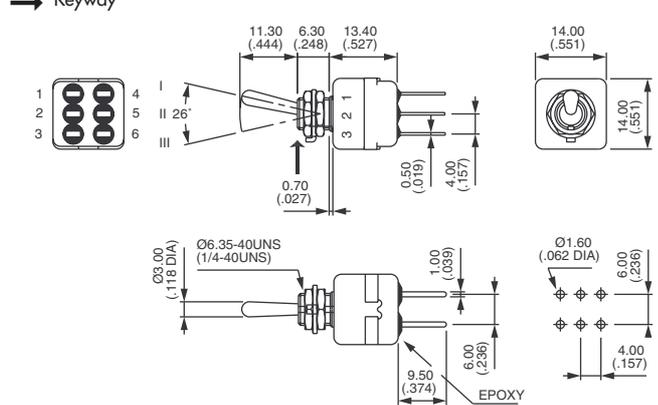
## Straight PC terminals - double pole ▲



11246

II	II	III
ON	-	ON

→ Keyway



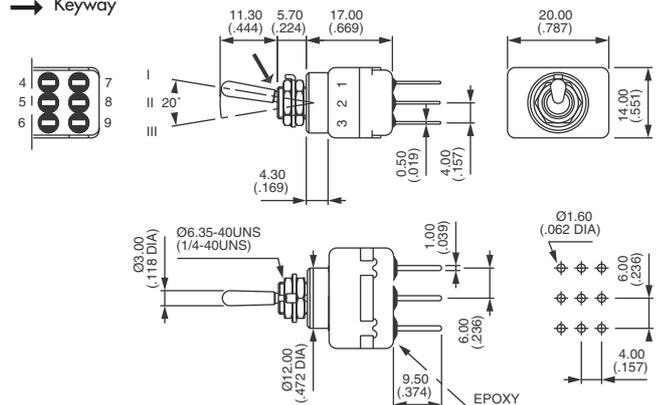
## Straight PC terminals - three pole ▲



11256

II	II	III
ON	-	ON

→ Keyway



# 11000 series

Professional toggle switches - threaded bushing  $\varnothing 6,35$  (1/4)

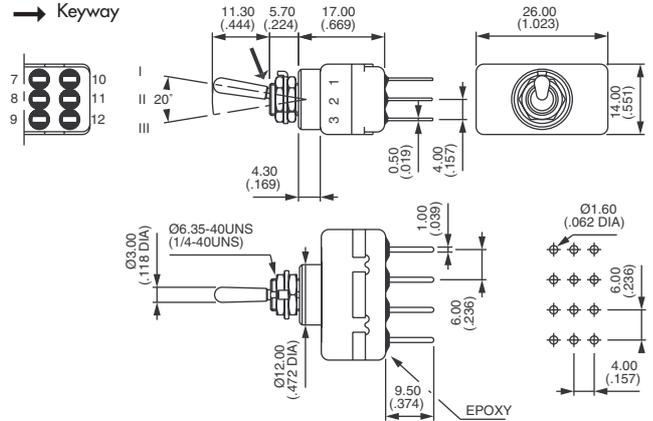
MODEL  
STRUCTURE

## Straight PC terminals - four pole ▲



11266

II II III  
ON - ON

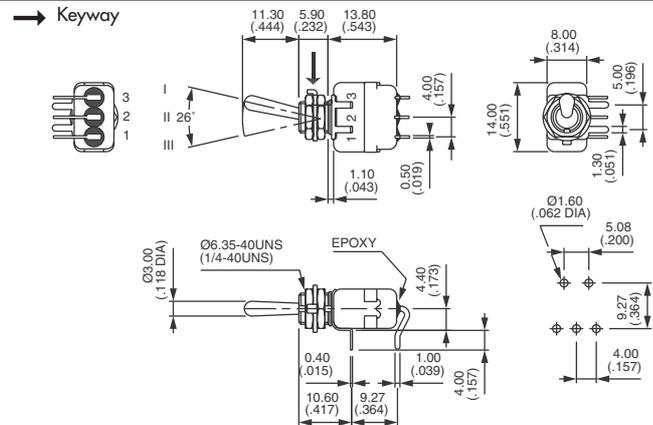


## Right angle terminals - horizontal - single pole



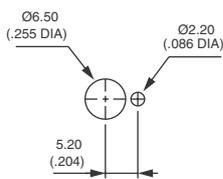
11136W

I II III  
ON - ON

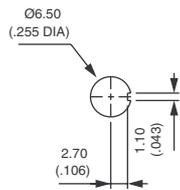


▲ Models with straight PC terminals are also available with 3,5 mm (.138) short terminals, functions 6, 9, 7 and 8. On request.

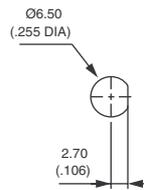
### PANEL CUT-OUT



Standard



With K  
sealing option



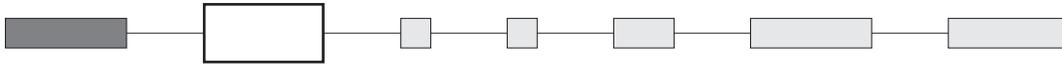
With X408  
sealing option



# 11000 series

Professional toggle switches - threaded bushing  $\varnothing 6,35 (1/4)$

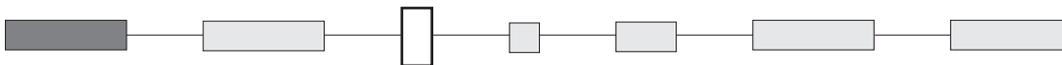
## CONTACT MATERIALS



- A** Silver
- AD2** Gold plated silver (2 micron gold)
- D** Solid gold rivet

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

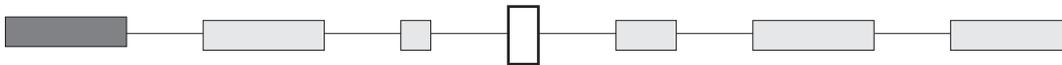
## FINISH



- Blank** Bright chrome finish
- G** Matt black finish on bushing, lever and hardware.

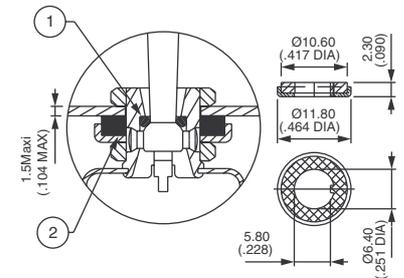
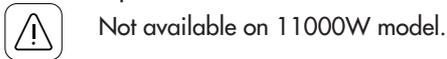
Other finish, consult factory.

## SEALING



Epoxy sealed terminals are standard.

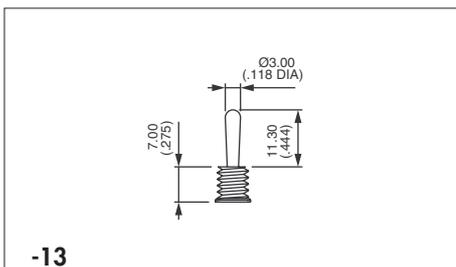
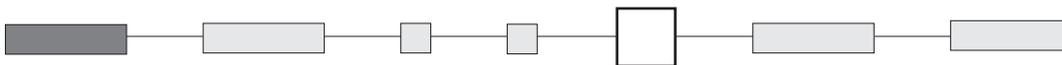
- Blank** No sealing except standard
- K** Front panel sealing by O-ring and sealing washer. Protects the switch against water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.



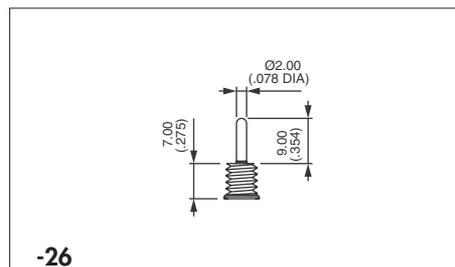
① O-ring ② Sealing washer

Sealing by two O-rings, see X408 under "Special options".  
Sealing boots : see section H.

## LEVERS



**-13**  
Standard



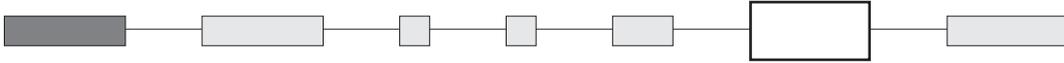
**-26**  
Cylindrical

# 11000 series

Professional toggle switches - threaded bushing  $\varnothing 6,35$  (1/4)



## SPECIAL OPTIONS

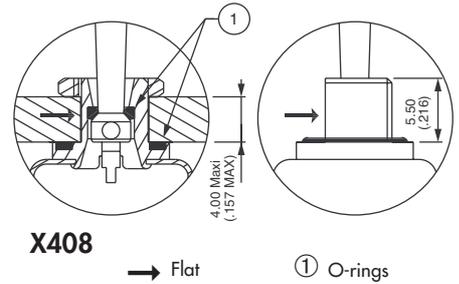


**F Tin dipped terminals**  
For PC terminal models with gold plated contacts only.

**X408** Front panel sealing by two O-rings. Flatted bushing for precise orientation.  
Protects the switch against water and dust.  
Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.



Not available on 11000W model.



**X408**

→ Flat

① O-rings

**X780** Solid rivet, gold plated silver/nickel alloy

**X910** Switches for peak currents

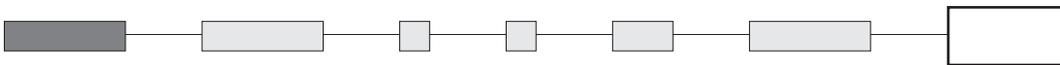
Peak current up to 80A (1 ms) 60VDC - single/double pole



Single pole			
<b>11136 X910</b>	ON	-	ON
Double pole			
<b>11146 X910</b>	ON	-	ON

- Contacts : solid rivet - silver/nickel alloy (AgNi)
- Max. current/voltage rating :  
3/80A (1 ms) 60VDC - 10.000 cycles  
2/30A 250VAC - 10.000 cycles
- Further specifications and dimensions : see previous pages
- General information on peak currents : see end of catalogue.

## AGENCY APPROVALS



**CECC** CECC 96201-005 (high level - contacts X780)  
CECC 96201-008 (low level - contacts AD2 or D)

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

**Marking** : to order switches marked CECC , complete above box with "CECC".  
Blank : no agency approval required.

Preferential lists : see specifications.

# 12000 series

Professional toggle switches - threaded bushing ø 11.9 (15/32)

Specifications

## ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : Peak currents, refer to "Special options".
  - silver contacts (A-AD2-X780) : 2A 250VAC - 4A 125VAC - 4A 30VDC
  - gold contacts (D) : 200mA 250VAC - 400mA 125VAC
- Minimum load : AD2-X780-D contacts : 10mA 50mV, 10µA 5V min.
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- 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	2A 250VAC - 4A 125VAC - 4A 30VDC	50.000	50.000
AD2 X780	2A 250VAC - 4A 125 VAC - 4A 30VDC (Gold plating : 100mA 30VDC max.)	20.000	20.000
D	200mA 250VAC - 400mA 125VAC	80.000	50.000
	Low level or mechanical life	150.000	100.000

## 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

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.  
Tin dipped terminals available, see "Special options".

## 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

## RELIABILITY - RUN-IN TEST

Upon request, each individual switch can be submitted to a low level run-in test of 50 or 250 cycles to ensure suitability for special applications requiring a very high level of reliability (military, space, etc.).

## AGENCY APPROVALS/PREFERENTIAL LISTS



CECC 96201-005  
CECC 96201-008

**QPL** (Europe only)

**MUAHAG**

Designed to **MIL** specifications

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

**Marking** : to order switches marked CECC, complete appropriate box of ordering format. Preferential lists do not appear on the switches.

**Dimensions** : first dimensions are in mm while inches are shown as bracketted numbers.



**Packaging unit** : 2 pole models : 25 pieces - 3 & 4 pole models : 20 pieces.

# 12000 series

Professional toggle switches - threaded bushing  $\varnothing$  11.9 (15/32)

Overview



**SERIES**

**12**

**Terminals and bushings**

1 Solder lug terminals  
2 Straight PC terminals

All models with threaded bushing  $\varnothing$  11,9 (15/32).  
Bushing  $\varnothing$  15 (.590), see X822 under "Special options".

**Number of poles**

4 Double pole  
5 Three pole  
6 Four pole

**Electrical functions**

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 ▲

**Function 4**  
. ▲ Must not have blank in "momentary" box.

**Momentary for function 4**

1R	ON	ON	MOM
2R	MOM	ON	MOM

Leave blank for other functions.



**Finish**

**Blank** Bright chrome finish  
**G** Matt black finish on bushing, actuator and hardware.  
Satin chrome finish, see "Special options".

**Fluorescent tip**

**Blank** None  
**0.38** White fluorescent tip to lever  
Available with matt black finish (G) only.

**Special options**

**Blank** No special requirement  
**X408** Front panel sealing by two O-rings  
**X822** Bushing  $\varnothing$  15 (.590)  
Other : see foll. pages.

**Contact materials**

**A** Silver  
**AD2** Silver, gold plated (2 micron gold)  
**D** Solid gold rivet  
See "Special options" for X780 (solid silver/nickel rivet) and X910 (for peak currents).

**Sealing**

**Blank** Epoxy sealed terminals standard  
**K** Front panel sealing by one O-ring and sealing washer  
Sealing by two O-rings, see X408, "Special options" box.

**Levers**

-13	Standard lever
-12	Short lever

**Locking levers**

-1V	1 locked position
-2V	2 locked positions
-3V	3 locked positions

Other, consult factory.

**Approvals**

**CECC**  
Availability :  
Consult factory for details of approved models.



**NOTICE** : please note that not all combinations of above numbers are available. Refer to the following pages for further information.

## ABOUT THIS SERIES

On the following pages, you will find successively :

- model structure of switches
- options in the same order as in above chart



**Sealing boots** are available to protect the switches against dust and water. They are presented in section H.



**Mounting accessories** : standard hardware supplied with all models : 2 hex nuts 14 (.551) across flats and 1 locking ring. Standard and special hardware available are presented in section I.

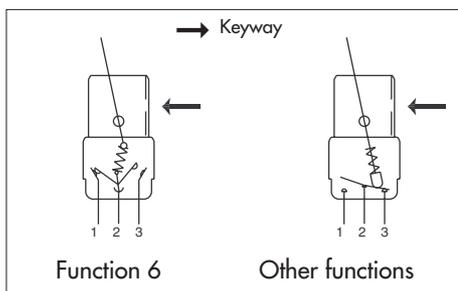
**Security caps** are available to prevent inadvertent lever operation. They are presented in section I.



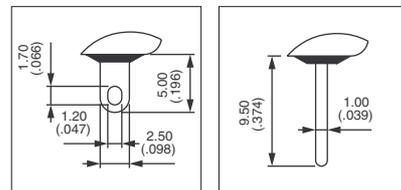
# 12000 series

Professional toggle switches - threaded bushing  $\varnothing$  11.9 (15/32)

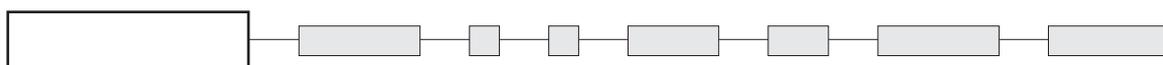
Solder lug terminals : 12100



• Epoxy sealed terminals standard



MODEL STRUCTURE

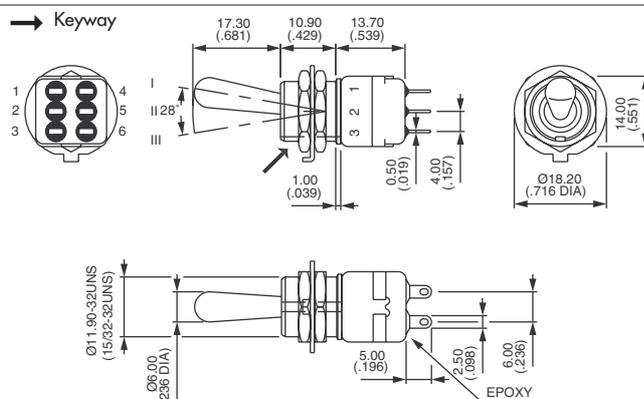


Shown with standard lever (-13)

## Solder lug terminals - double pole



	I	II	III
12146	ON	-	ON
12149	ON	OFF	ON
12147	MOM	OFF	MOM
12148	ON	OFF	MOM
12144*	ON	ON	ON
12144 1R*	ON	ON	MOM
12144 2R*	MOM	ON	MOM
12145	-	ON	MOM

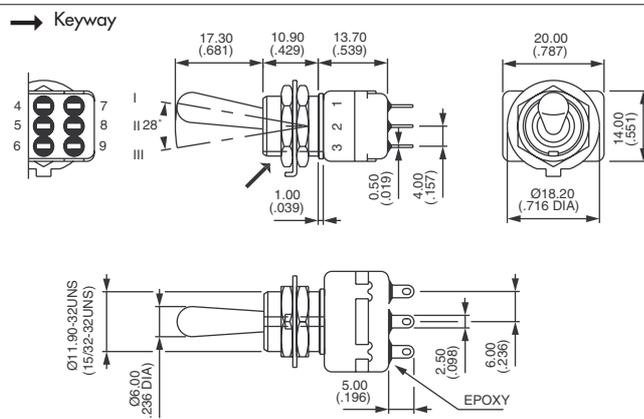


\* Function 4 : SP in DP case - connections, see end of catalogue.

## Solder lug terminals - three pole



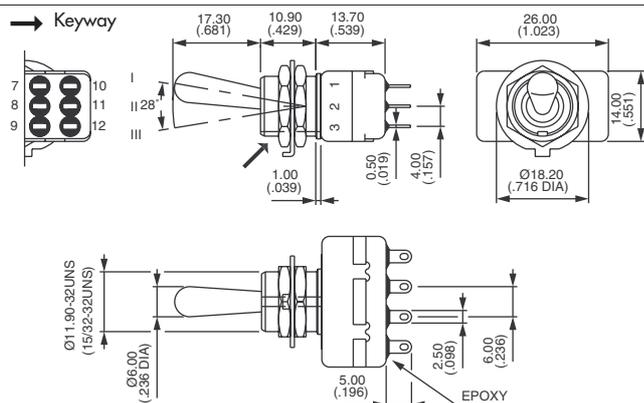
	I	II	III
12156	ON	-	ON
12159	ON	OFF	ON
12157	MOM	OFF	MOM
12158	ON	OFF	MOM



## Solder lug terminals - four pole



	I	II	III
12166	ON	-	ON
12169	ON	OFF	ON
12167	MOM	OFF	MOM
12168	ON	OFF	MOM
12164*	ON	ON	ON
12164 1R*	ON	ON	MOM
12164 2R*	MOM	ON	MOM



\* Function 4 : DP in 4P case - connections, see end of catalogue.

# 12000 series

Professional toggle switches - threaded bushing  $\varnothing$  11.9 (15/32)

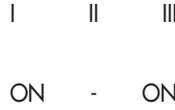
Straight PC terminals : 12200

MODEL  
STRUCTURE

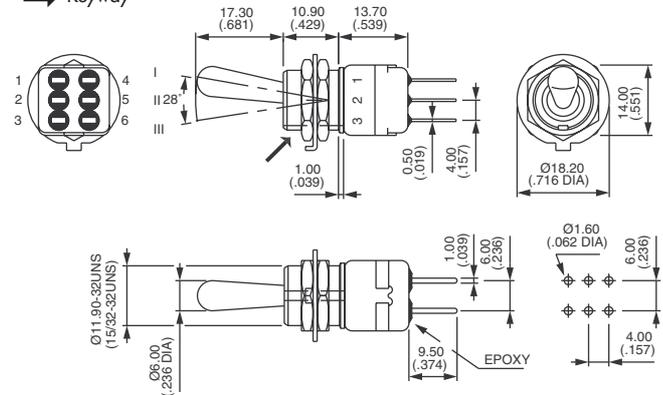
## Straight PC terminals - double pole ▲



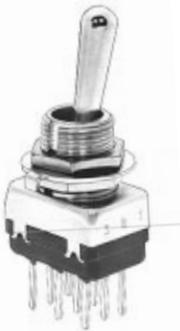
12246



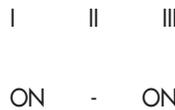
→ Keyway



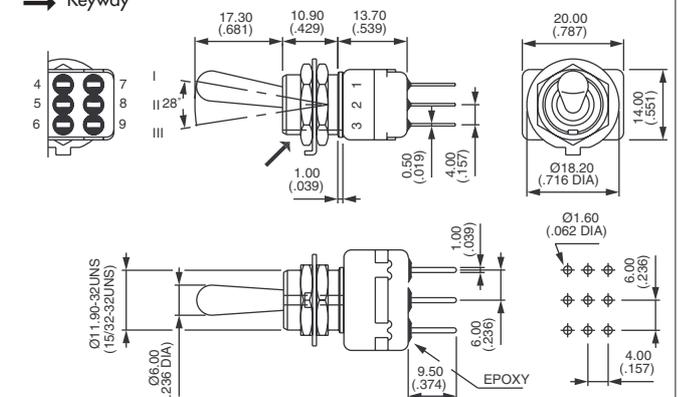
## Straight PC terminals - three pole ▲



12256



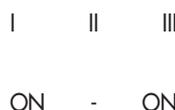
→ Keyway



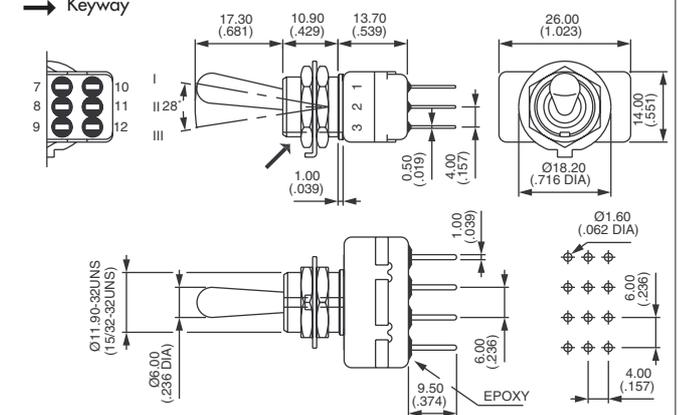
## Straight PC terminals - four pole ▲



12266

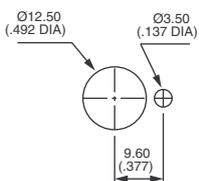


→ Keyway

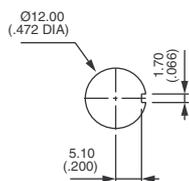


▲ Models with straight PC terminals are also available with 3,5 mm (.138) short terminals, functions 6, 9, 7 and 8. On request.

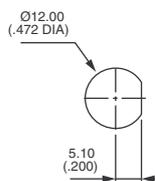
### PANEL CUT-OUT



Standard



With K  
sealing option



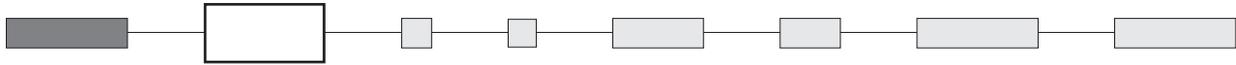
With X408  
sealing option



# 12000 series

Professional toggle switches - threaded bushing  $\varnothing$  11.9 (15/32)

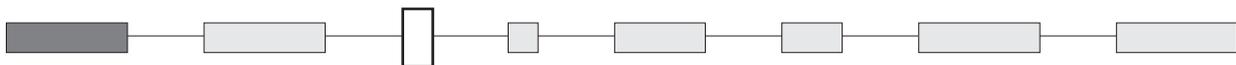
## CONTACT MATERIALS



- 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).

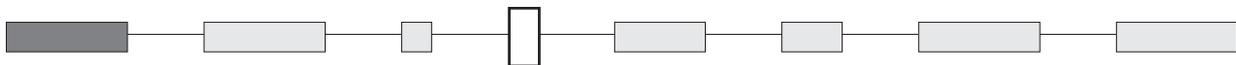
## FINISH



- Blank** Bright chrome finish
- G** Matt black finish on bushing, lever and hardware.

For satin chrome finish, see "Special options".

## SEALING



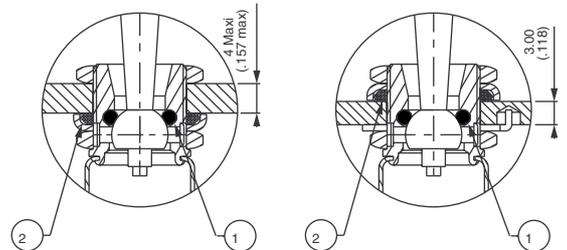
Epoxy sealed terminals are standard.

- 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.

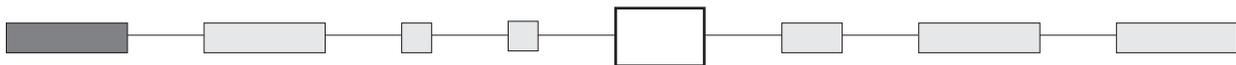
Sealing by two O-rings, see X408 under "Special options".

Sealing boots : see section H.



① O-ring ② Sealing washer

## FLUORESCENT TIP



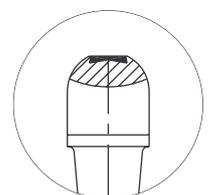
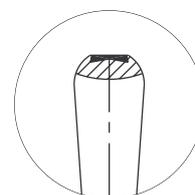
- Blank** None
- 0.38** White fluorescent tip. Becomes luminous when submitted to ultra-violet rays.



Available with matt black finish (option G) only.

Standard lever

Locking lever



A

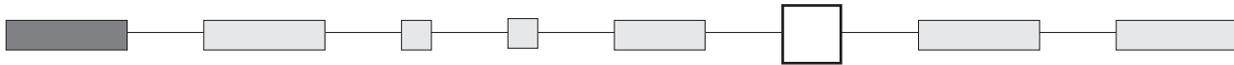
# 12000 series

Professional toggle switches - threaded bushing  $\varnothing$  11.9 (15/32)

OPTIONS



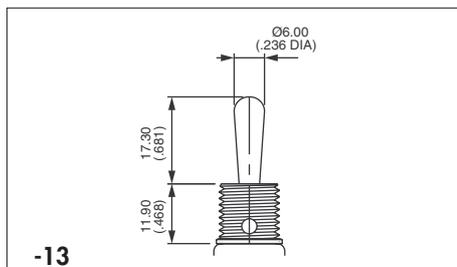
## ACTUATORS



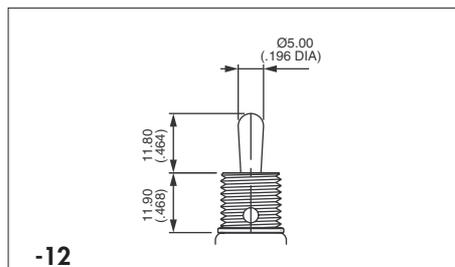
Dash compulsory before lever code.

## Levers

A



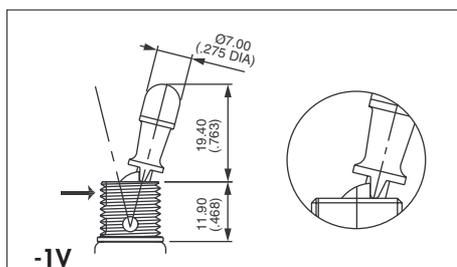
**-13**  
Standard



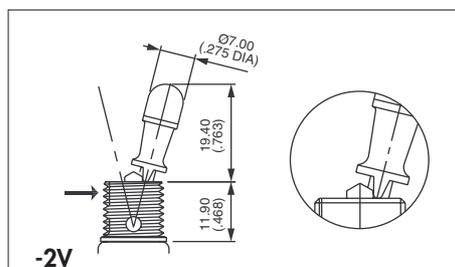
**-12**  
Short lever

Security caps : see section I.

## Locking levers

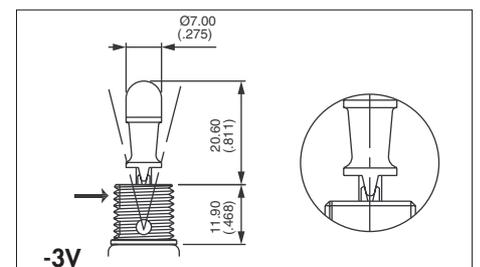


**-1V**  
1 locked position (function 6)



**-2V**  
2 locked positions (function 6)

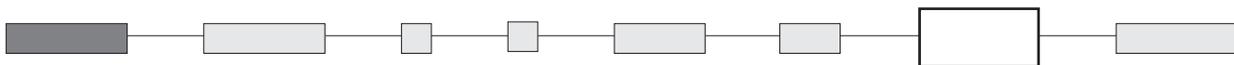
→ Keyway



**-3V**  
3 locked positions (functions 9 and 4)

Consult factory for other locking lever options.

## SPECIAL OPTIONS

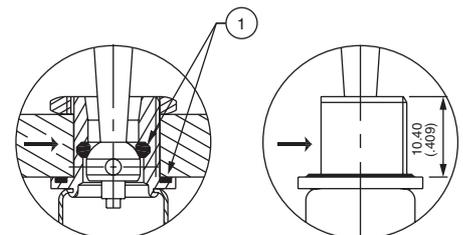


**Blank** No special requirement.

**F** **Tin dipped terminals**  
For PC terminal models with gold plated contacts only.

**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.**



→ Flat ① O-rings



# 12000 series

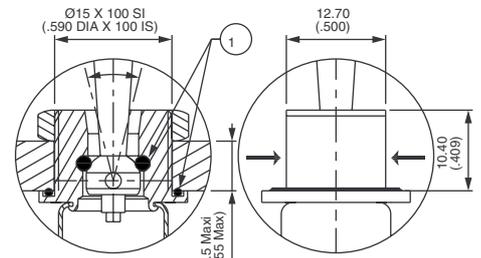
Professional toggle switches - threaded bushing  $\varnothing$  11.9 (15/32)

## SPECIAL OPTIONS (continued)

**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.

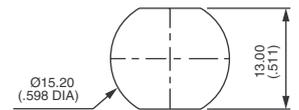
**X910** Switches for peak currents



**X822**

→ Flat

① O-rings



Peak current up to 80A (1 ms) 60VDC - double pole

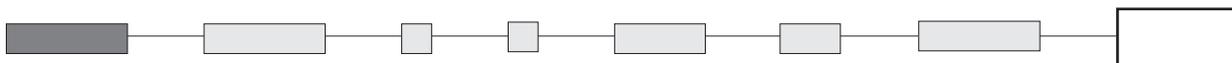


12146 X910

ON - ON

- Contacts : solid rivet - silver/nickel alloy (AgNi)
- Max. current/voltage rating :  
3/80A (1 ms) 60VDC - 10.000 cycles  
2/30A 250VAC - 10.000 cycles
- Further specifications and dimensions : see previous pages
- General information on peak currents : see end of catalogue.

## AGENCY APPROVAL



**CECC** CECC 96201-005 (high level - contacts X780)  
CECC 96201-008 (low level - contacts AD2 or D)

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

**Marking** : to order switches marked CECC, complete above box with "CECC".  
Blank : no agency approval required.

Preferential lists : see specifications.