

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.

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.

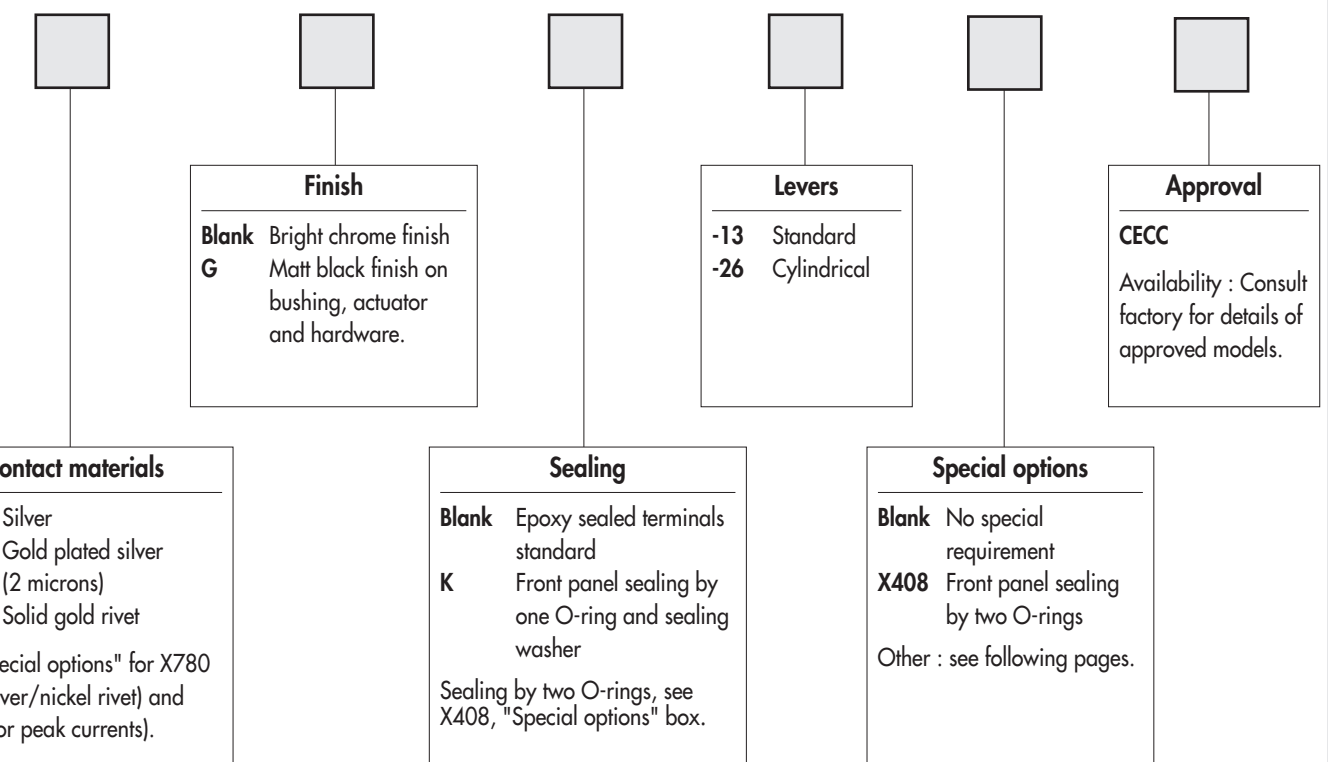
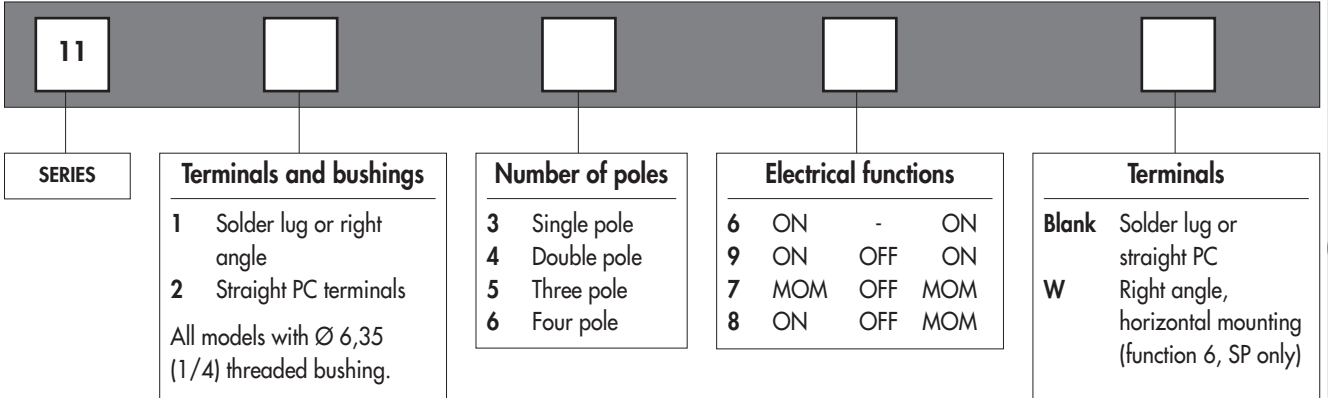


Packaging unit : 25 pieces or 50 pieces depending on models.

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.

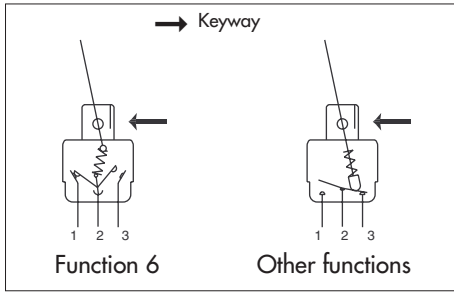


Mounting accessories : standard hardware supplied with all models : 2 hex nuts 8 (.314) across flats, 1 locking ring and 1 lockwasher. Standard and special hardware available are presented in section I.

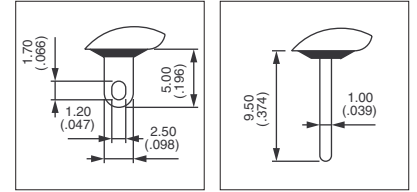
11000 series

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

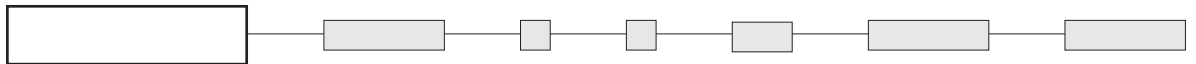
MODEL
STRUCTURE



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



MODEL
STRUCTURE



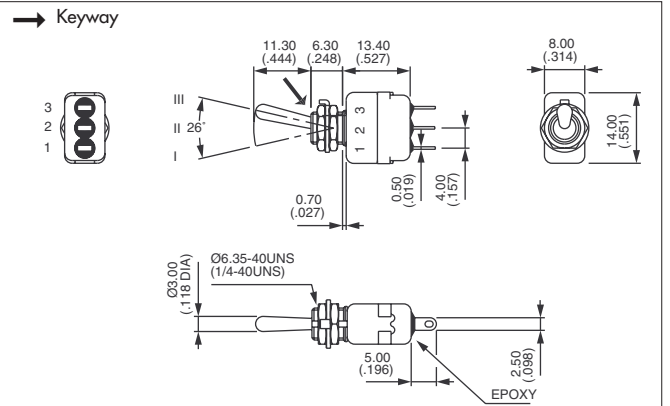
Shown with standard lever (-13)

Solder lug terminals - single pole



11136
11139
11137
11138

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

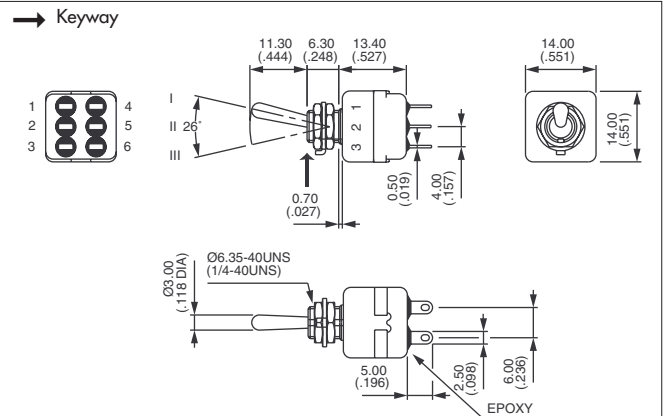


Solder lug terminals - double pole



11146
11149
11147
11148

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

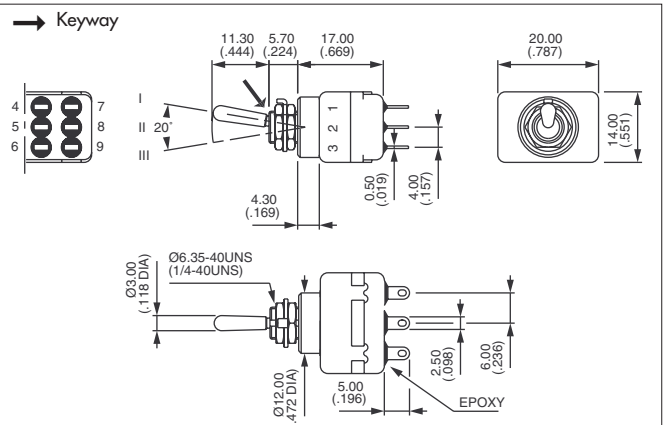


Solder lug terminals - three pole



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)

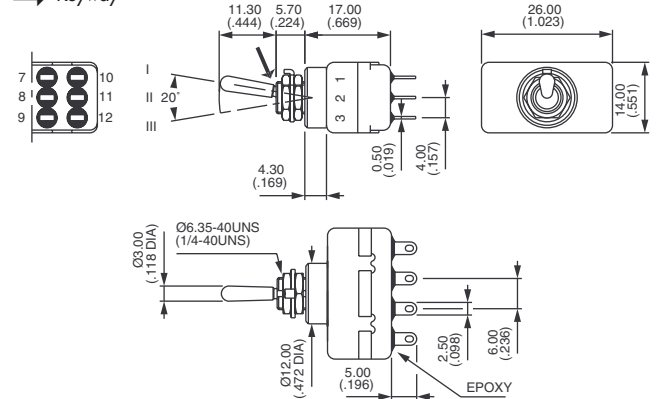
Solder lug terminals - four pole



11166
11169
11167
11168



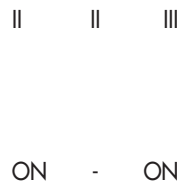
→ Keyway



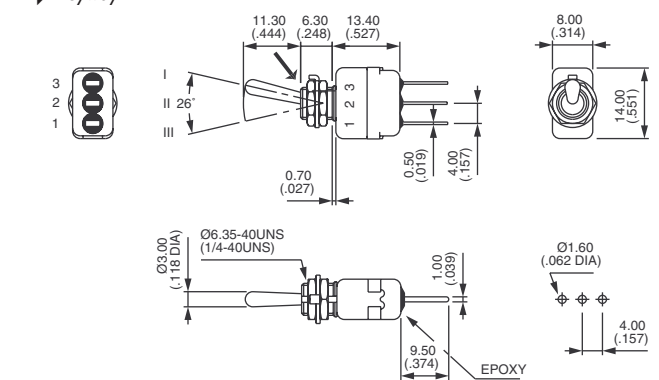
Straight PC terminals - single pole ▲



11236



→ Keyway



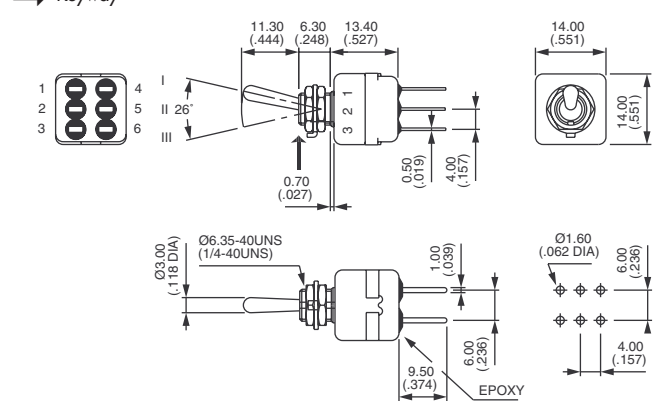
Straight PC terminals - double pole ▲



11246



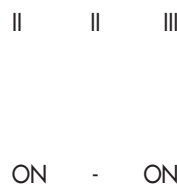
→ Keyway



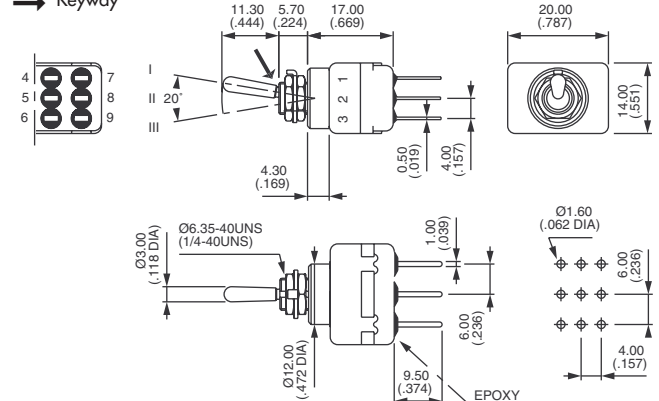
Straight PC terminals - three pole ▲



11256



→ Keyway



11000 series

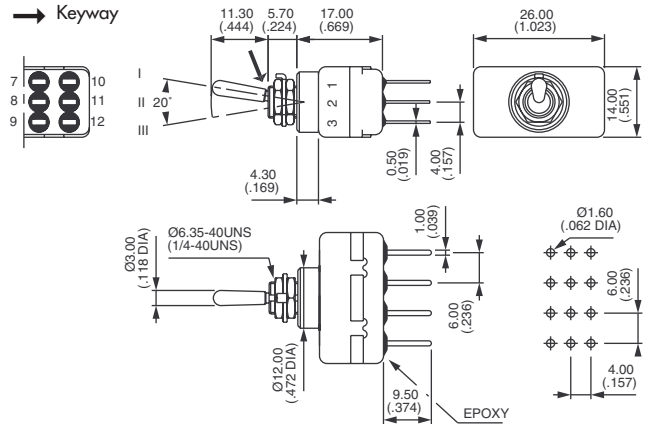
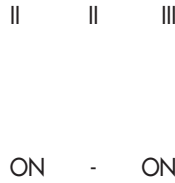
Professional toggle switches - threaded bushing $\varnothing 6,35$ (1/4)



Straight PC terminals - four pole ▲



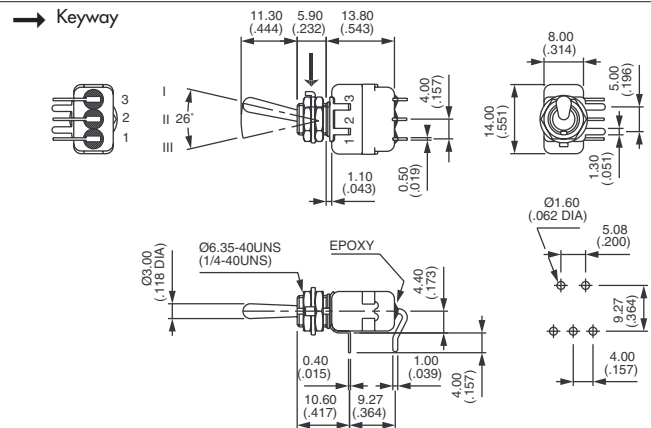
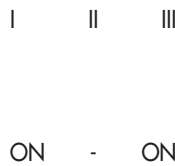
11266



Right angle terminals - horizontal - single pole

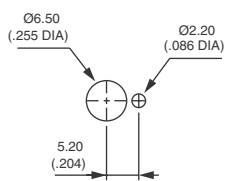


11136W

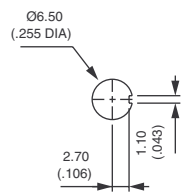


▲ Models with straight PC terminals are also available with 3,5 mm (.138) short terminals, functions 6, 9, 7 and 8. On request.

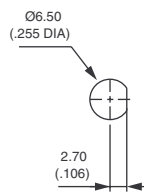
PANEL CUT-OUT



Standard



With K sealing option



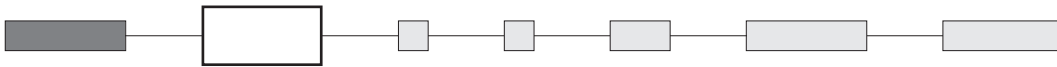
With X408 sealing option



11000 series

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

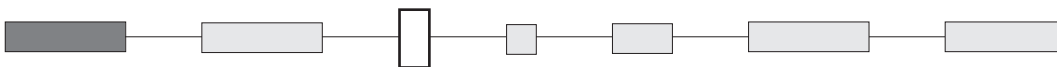
CONTACT MATERIALS



- 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).

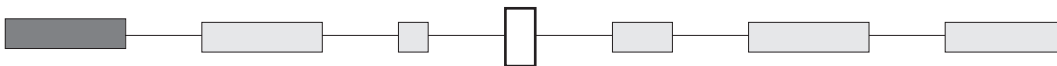
FINISH



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

Other finish, consult factory.

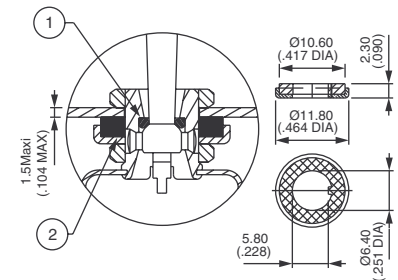
SEALING



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.

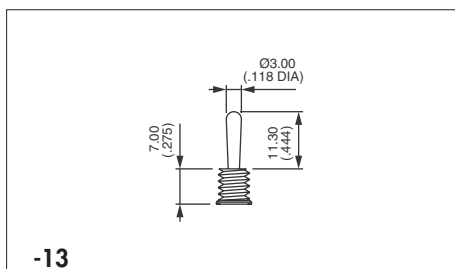
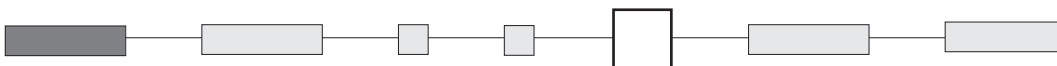
Not available on 11000W model.



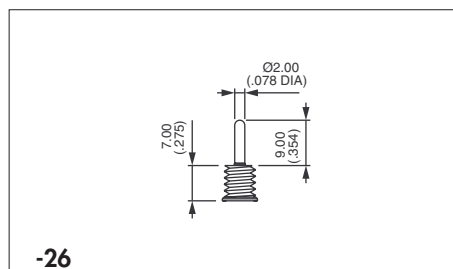
① O-ring ② Sealing washer

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

LEVERS



-13
Standard



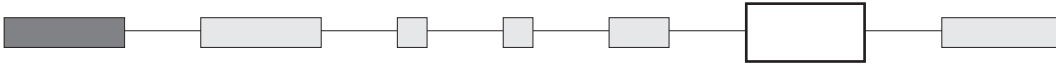
-26
Cylindrical

11000 series

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



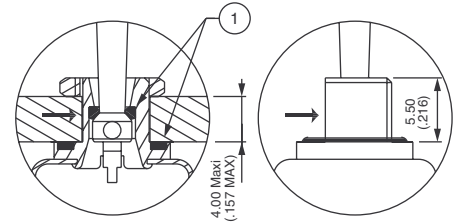
SPECIAL OPTIONS



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
11136 X910

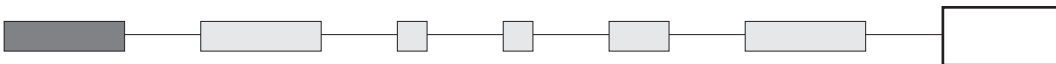
ON - ON

Double pole
11146 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 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 \varnothing 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, 10 μ A 5V min.
- Initial contact resistance : 10 m Ω max.
- Insulation resistance : 1.000 M Ω 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.

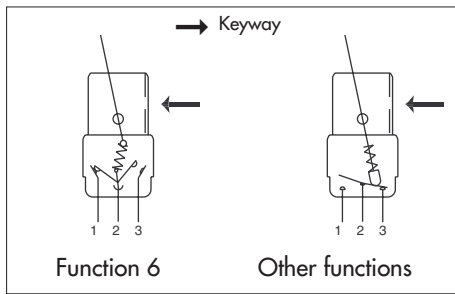
Security caps are available to prevent inadvertent lever operation. They are presented in section I.



12000 series

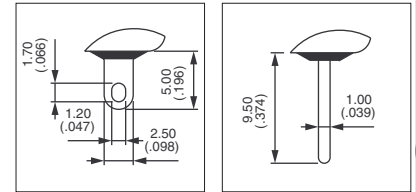
Professional toggle switches - threaded bushing \varnothing 11.9 (15/32)

Solder lug terminals : 12100

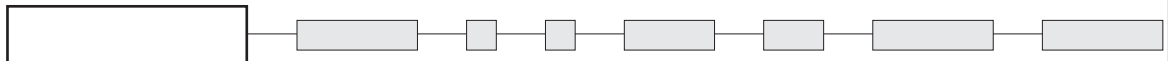


• Epoxy sealed terminals standard

Typical angle of throw (A)	
Function 6	24°
Functions 9, 7, 8, 4	20°
Function 5	12°



MODEL STRUCTURE

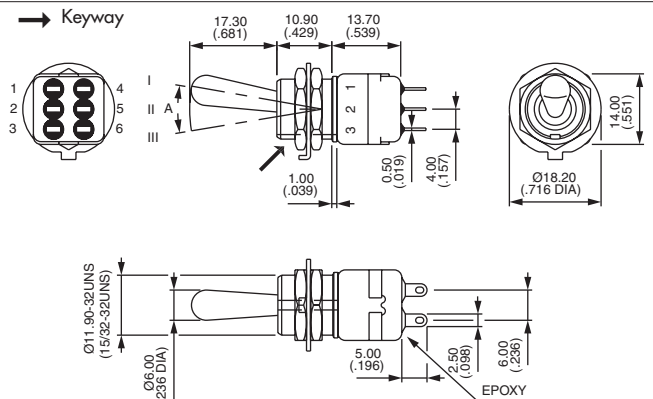


Shown with standard lever (-13)

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

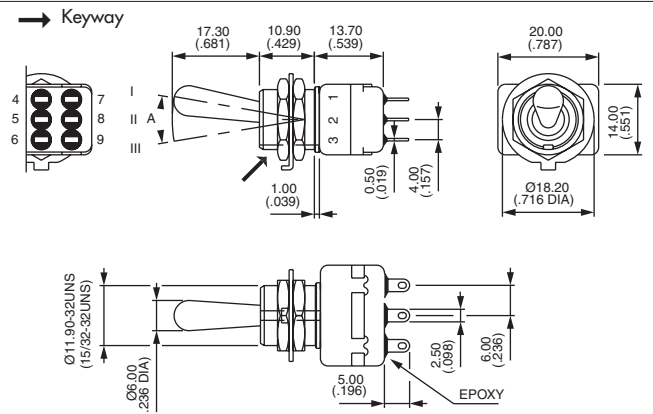


* Function 4 : SP in DP case - connections, see end of catalogue.

Solder lug terminals - three pole



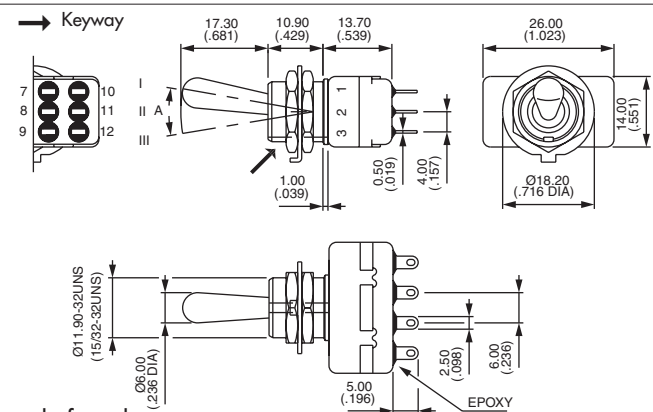
	I	II	III
12156	ON	-	ON
12159	ON	OFF	ON
12157	MOM	OFF	MOM
12158	ON	OFF	MOM



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)

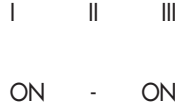
Straight PC terminals : 12200



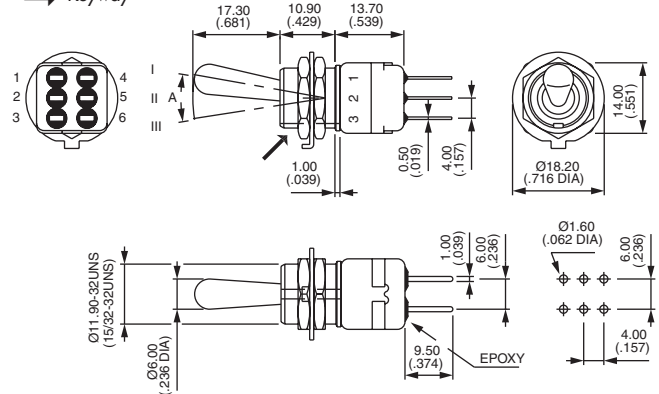
Straight PC terminals - double pole ▲



12246



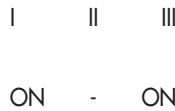
→ Keyway



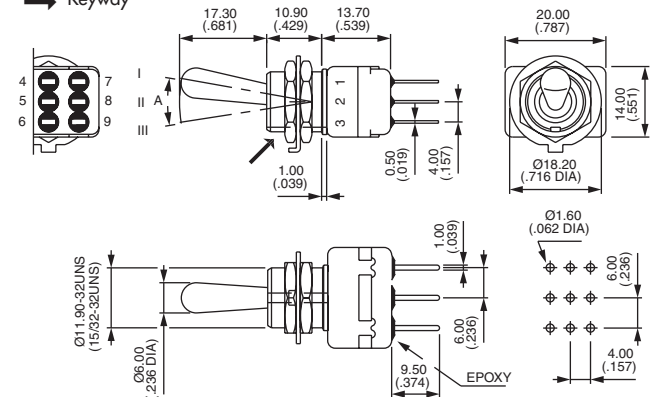
Straight PC terminals - three pole ▲



12256



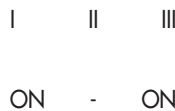
→ Keyway



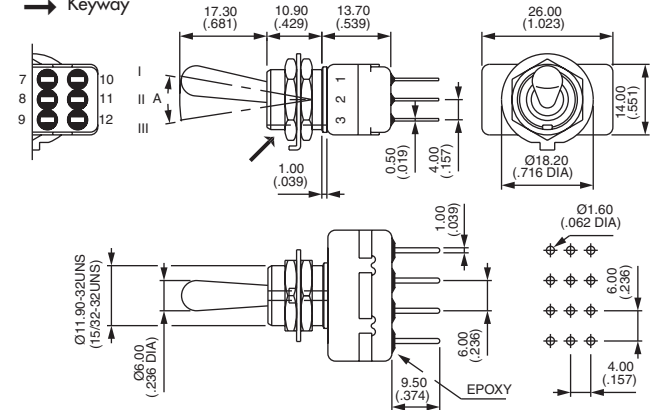
Straight PC terminals - four pole ▲



12266

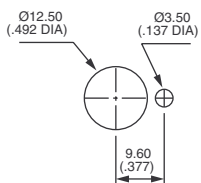


→ Keyway

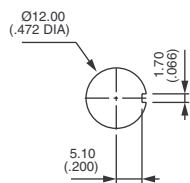


▲ Models with straight PC terminals are also available with 3,5 mm (.138) short terminals, functions 6, 9, 7 and 8. On request.

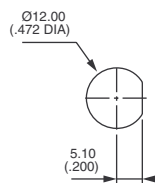
PANEL CUT-OUT



Standard



With K
sealing option



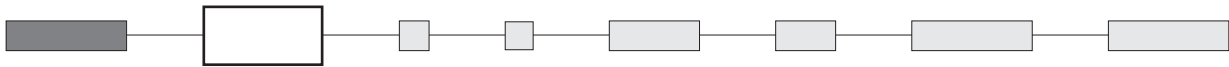
With X408
sealing option



12000 series

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

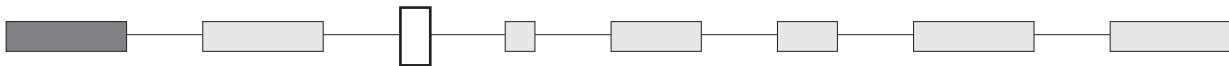
CONTACT MATERIALS



- 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).

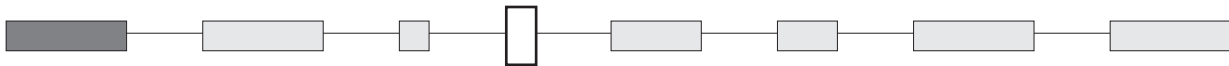
FINISH



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

For satin chrome finish, see "Special options".

SEALING

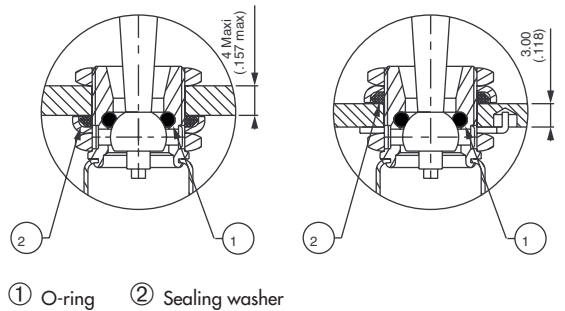


Epoxy sealed terminals are standard.

- 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.



FLUORESCENT TIP



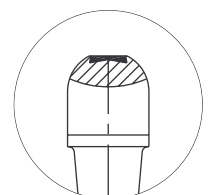
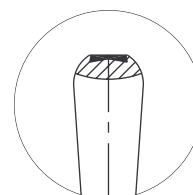
- Blank** None
- 0.38** White fluorescent tip. Becomes luminous when submitted to ultra-violet rays.



Available with matt black finish (option G) only.

Standard lever

Locking lever



A

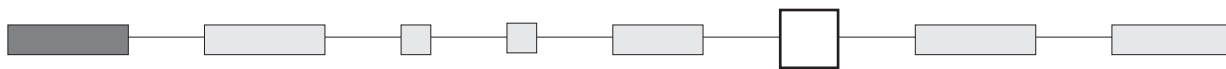
12000 series

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

OPTIONS



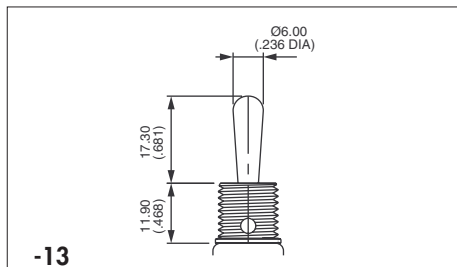
ACTUATORS



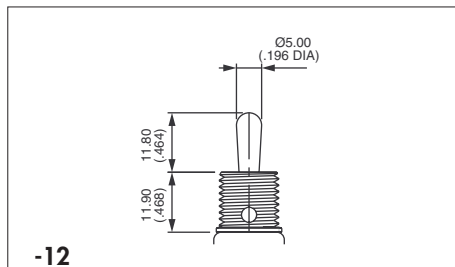
Dash compulsory before lever code.

Levers

A



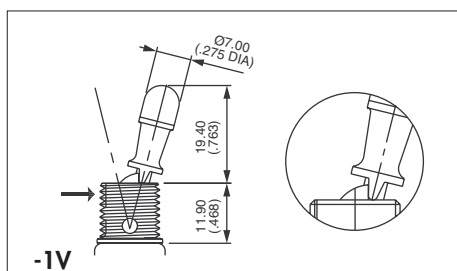
-13
Standard



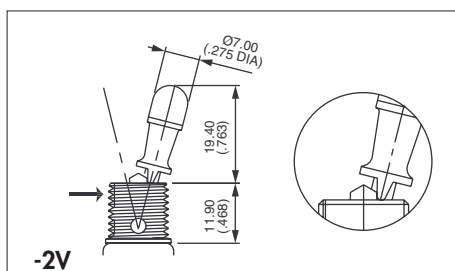
-12
Short lever

Security caps : see section I.

Locking levers

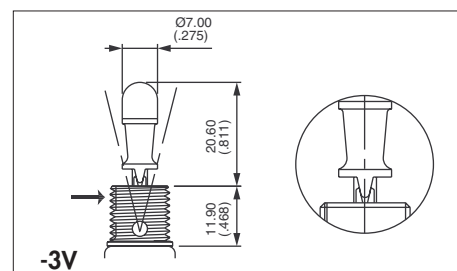


-1V
1 locked position (function 6)
Typical angle of throw : 26°



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

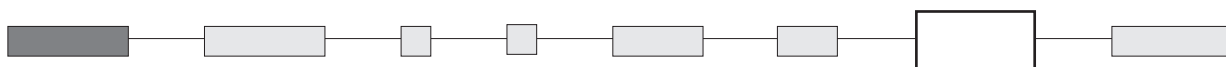
→ Keyway



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

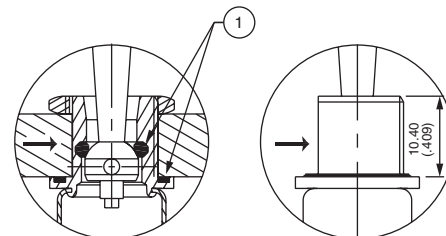
Consult factory for other locking lever options.

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.



→ Flat ① O-rings

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



12000 series

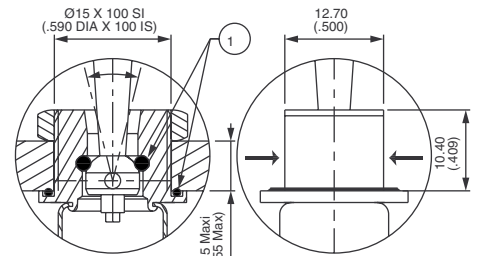
Professional toggle switches - threaded bushing \varnothing 11.9 (15/32)

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.

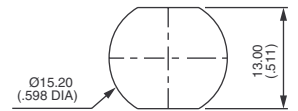
X910 Switches for peak currents



X822

→ Flat

① O-rings



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

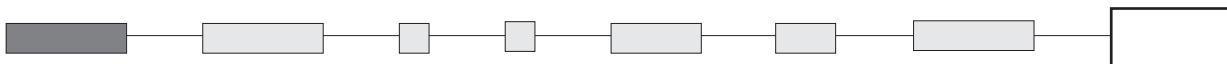


12146 X910

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.