

12000X778 series

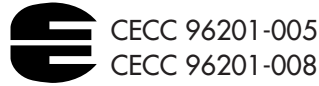
High performance toggle switches - threaded bushing Ø 11,9 (15/32)

Distinctive features

A



Approval and lists



MUAHAG and QPL listed (Europe only)

French defence approved : DAT list No A5999 X001.

This range of professional toggle switches is suitable for use in military and other high specification environments.

Contacts

Highly reliable contacts suitable for low level applications (10mA 50mV - 10µA 5VDC min.) or power applications (2A 250VAC - 4A 125VAC - 4A 30VDC max.)

Pinned lever

The base of the switch lever is pinned to the bushing, thus earthing the lever to the bushing. This also provides strain relief to protect the switch if accidentally knocked.

Double shell case

For high mechanical strength and high electrical insulation.

Compact size

The small rear end of the switch allows space saving behind the panel.

Finish

Matt black finish on body, bushing, lever and hardware.

Sealing

Panel sealed to IP 67, these switches are frontal sealed by two O-rings and have full rear end sealing.

Accessories

A comprehensive range of protection boots (both full and half length), locking levers and security caps are available.



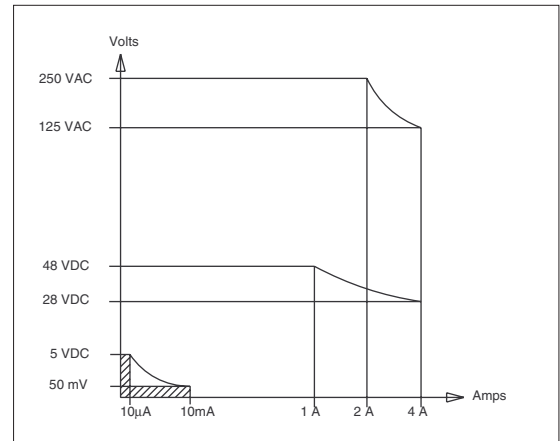
12000X778 series

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Specifications

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 2A 250VAC - 4A 125VAC - 4A 28VDC
- Minimum load : 10mA 50mV, 10µA 5VDC
When used above 300mA 28VDC, the gold plating is removed on contact areas and is considered only as a protection against oxidation during storage.
- 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
 - 2.000 Vrms 50 Hz min. between terminals and frame
- Contact bounce : 2 ms max.
- Electrical life :
 - At 2A 250VAC - 4A 28VDC :
20.000 cycles (10.000 for functions 5, 4.1R, 4.2R)
 - At low level (50mV 10mA) :
40.000 cycles (20.000 for functions 5, 4.1R, 4.2R)

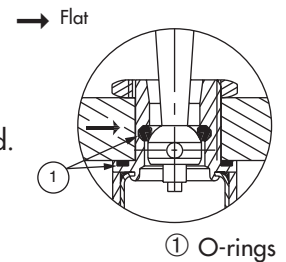


MATERIALS

- Case : diallylphthalate (DAP) with plastic external shell (epoxy sealed)
- Actuator : brass, black chrome plated
- Bushing : brass, black chrome plated
- Contacts : solid rivet - gold plated silver/nickel alloy

SEALING

- Front panel sealing by two O-rings
Flatted bush for precise orientation
- Panel seal withstands 1 bar pressure and remains sealed even when the switch is operated.
- Epoxy sealed terminals
- Splash-proof case



GENERAL SPECIFICATIONS

- Torque : 1,50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness : 8 mm (.314) max. - 3 mm (.118) min.
- Shock test : 50g - 11ms (IEC 68-2-27)
- Vibrations : 10-500 Hz - 10g (IEC68-2-6)
- Operating temperature : -40°C to +85°C
- Humidity test : 56 days, 93 % R.H., 40°C (IEC 68-2-3)
- Salt spray test : 96 hours (IEC 68-2-11)

APPROVALS

Many models within this range have full CECC approval and are marked CECC. Please consult factory for list of approved models.

12000X778 series

High performance toggle switches - threaded bushing Ø 11,9 (15/32)

Overview

MODEL
STRUCTURE

12

SERIES

Terminals and bushings

- 1 Solder lug terminals, threaded bushing Ø 11,9 (15/32)
- 2 Straight PC terminals, threaded bushing Ø 11,9 (15/32)

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
4	ON	ON	ON
	ON	ON	MOM Δ
	MOM	ON	MOM Δ
5		ON	MOM

Function 4

- . For 2 and 4 poles only.
- . Δ Must not have blank in "momentary" box.

Momentary

1R ON ON MOM
2R MOM ON MOM

. For function 4 only.
. Leave blank for other functions.

OPTIONS

Fluorescent tip

Blank	None
0.38	White fluorescent tip to lever

Levers

Blank	Standard lever
-12	Short lever

Locking levers

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

X778

High performance fully sealed matt black switches.

Approval

CECC

Availability :
Consult factory for details of approved models.

ABOUT THIS SERIES

On the following pages, you will find successively :

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

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



Sealing boots can be used to further protect the switches against dust and water. They are presented in section H.



Mounting accessories : standard hardware supplied with all models : 1 hex nut 1.4 mm (.551) across flats, part number U41. This nut is presented after model structure of switches.

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



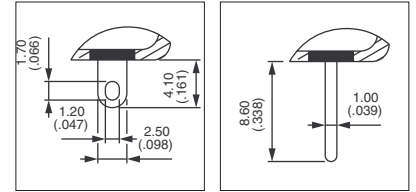
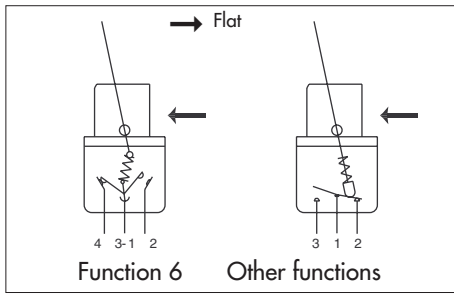
Packaging unit : 2 pole models : 25 pieces
3 and 4 pole models : 20 pieces



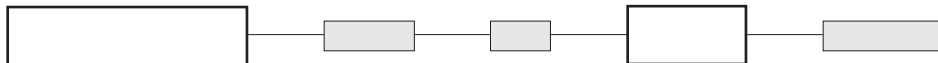
12000X778 series

High performance toggle switches - threaded bushing \varnothing 11,9 (15/32)

Fully sealed - matt black



MODEL STRUCTURE



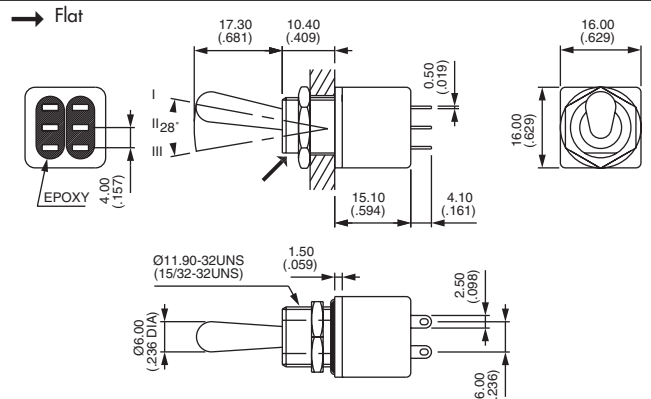
Shown with standard lever

Solder lug terminals - double pole



- 12146 X778
- 12149 X778
- 12147 X778
- 12148 X778
- 12144 X778
- 12144 1R X778
- 12144 2R X778
- 12145 X778

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

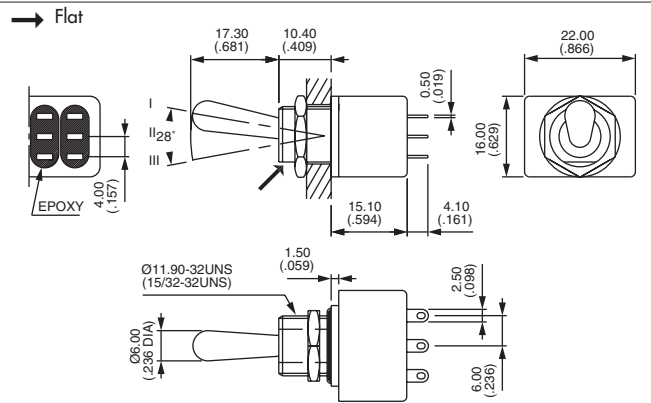


Solder lug terminals - three pole



- 12156 X778
- 12159 X778
- 12157 X778
- 12158 X778

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

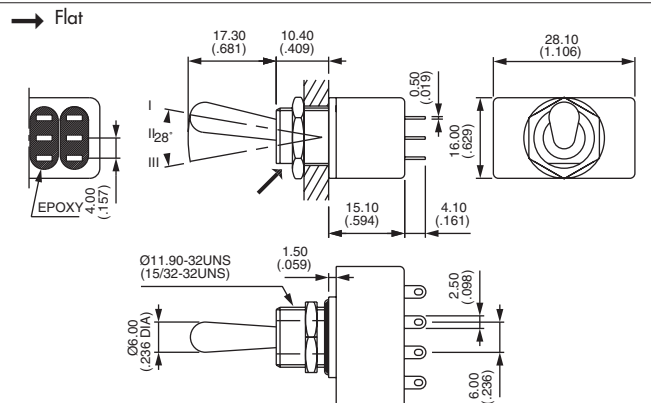


Solder lug terminals - four pole



- 12166 X778
- 12169 X778
- 12167 X778
- 12168 X778
- 12164 X778
- 12164 1R X778
- 12164 2R X778

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



12000X778 series

High performance toggle switches - threaded bushing \varnothing 11,9 (15/32)

Fully sealed - matt black



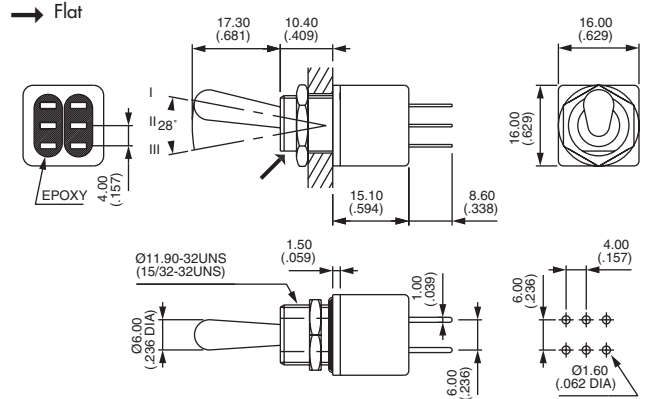
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Straight PC terminals - double pole ▲



12246 X778

I II III
ON - ON

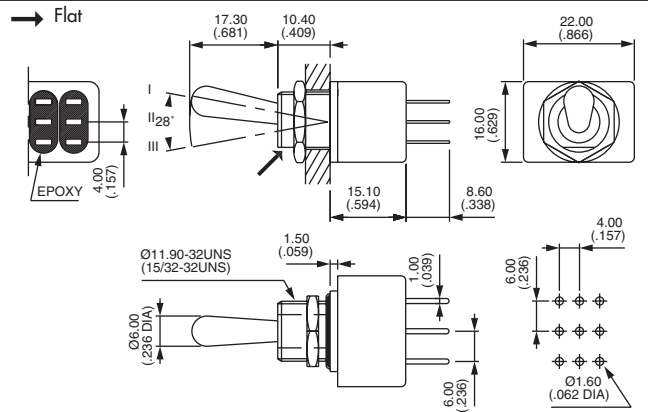


Straight PC terminals - three pole ▲



12256 X778

I II III
ON - ON

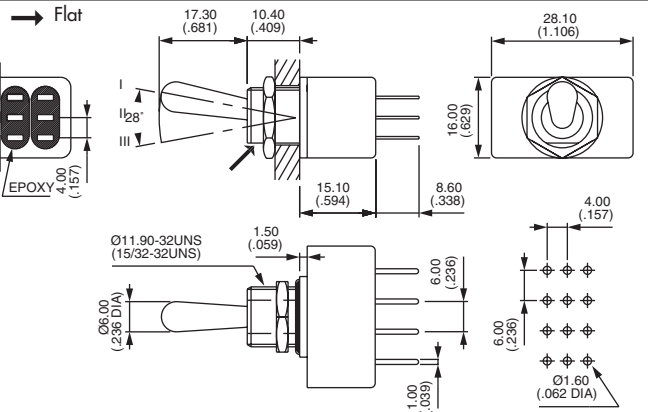


Straight PC terminals - four pole ▲



12266 X778

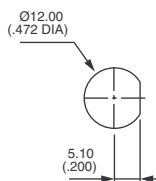
I II III
ON - ON



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

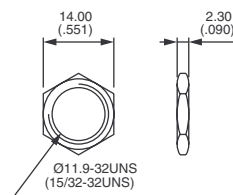
Positions and connections, see next page.

PANEL CUT-OUT



STANDARD HARDWARE

Hex nut

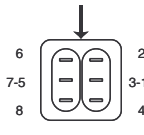
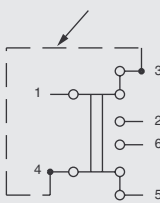
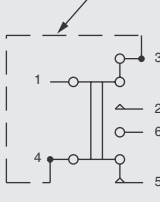
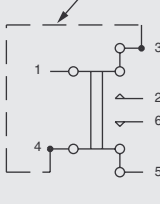
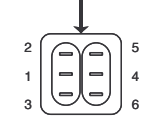
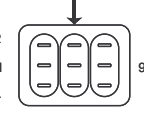
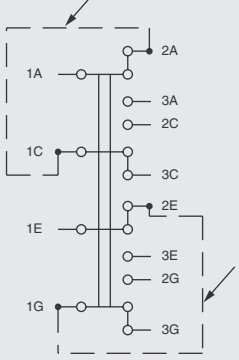
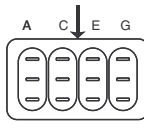


U41 (matt black)

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Positions and connections

FUNCTION	LEVER POSITION AND CONNECTIONS			TERMINAL IDENTIFICATION	WIRING FOR 3-WAY SWITCHES (FUNCTION 4)	
	I	II	III (Flat)			
12146	ON (1-3)-4 (5-7)-8	-	ON (1-3)-2 (5-7)-6		<p>→ External jumper (added by customer)</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>12144</p>  </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>12144-1R</p>  </div> <div style="border: 1px solid black; padding: 5px;"> <p>12144-2R</p>  </div>	
12147 12148 12149 12148CT	MOM ON ON MOM	OFF OFF OFF OFF	MOM MOM ON ON	→ Flat		
12145	-	ON 1-2 4-5	MOM 1-3 4-6			
12144 12144-1R 12144-2R	ON MOM MOM	ON ON ON	ON ON MOM			
	1-2 4-5	1-3 4-5	1-3 4-6			
12156	ON (1-3)-4 (5-7)-8 (9-11)-12	-	ON (1-3)-2 (5-7)-6 (9-11)-10			<div style="border: 1px solid black; padding: 5px;"> <p>12164</p>  </div>
12166	ON 1A - 3A 1C - 3C 1E - 3E 1G - 3G	-	ON 1A - 2A 1C - 2C 1E - 2E 1G - 2G			
12164	ON 1A - 2A 1C - 2C 1E - 2E 1G - 2G	ON 1A - 2A 1C - 3C 1E - 2E 1G - 3G	ON 1A - 3A 1C - 3C 1E - 3E 1G - 3G			

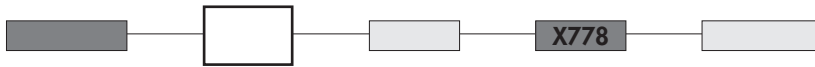
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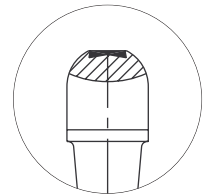
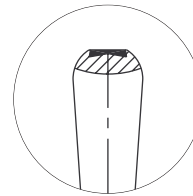


FLUORESCENT TIP



Standard lever

Locking lever

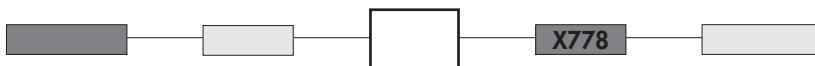


Blank None

0.38 White fluorescent tip.
Becomes luminous when submitted to ultra-violet rays.

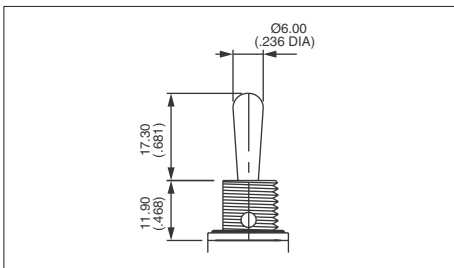
A

LEVERS / LOCKING LEVERS

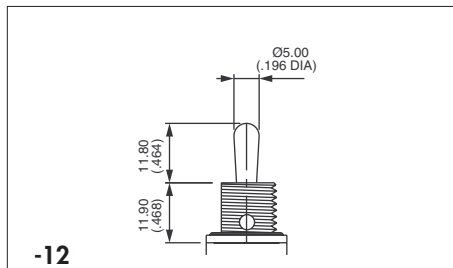


Dash compulsory before lever code.

Levers



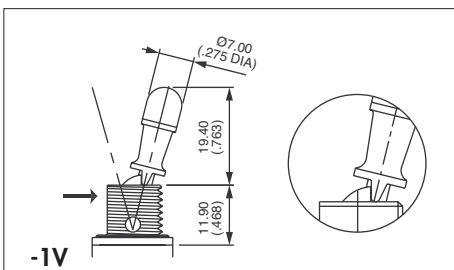
Standard (leave blank)



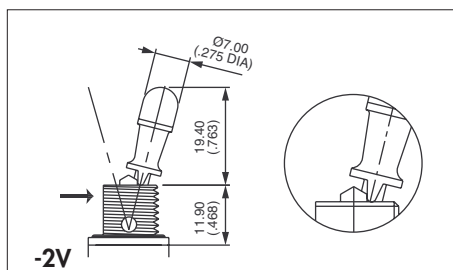
-12 Short lever

Sealing boots : see section H.
Security caps : see section I.

Locking levers

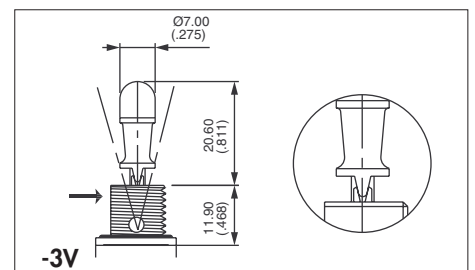


-1V 1 locked position (function 6)



-2V 2 locked positions (function 6)

→ Flat



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

Consult factory for other locking lever options.

AGENCY APPROVAL



CECC CECC 96201-005 and CECC 96201-008

Availability : consult factory for details of approved models.

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