

12000X778 series

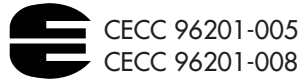
High performance toggle switches - threaded bushing Ø 11,9 (15/32)

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.

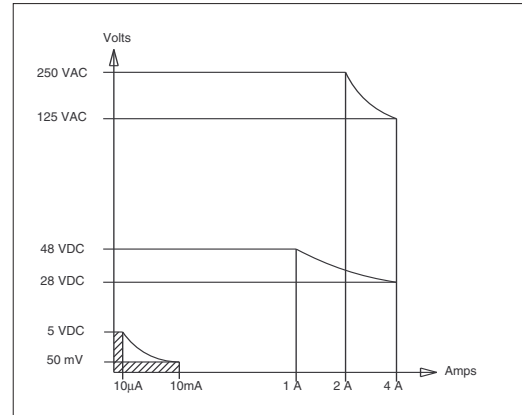
12000X778 series

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

Specifications

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 2A 250VAC - 4A 125VAC - 4A 28VDC
- Minimum load : 10mA 50mV, 10 μ A 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 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
 - 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) : 150.000 cycles (switches with 2 maintained positions)
 - 100.000 cycles (switches with 3 maintained positions)
 - 50.000 cycles (momentary functions 7, 8, 4-1R, 4-2R, 5)

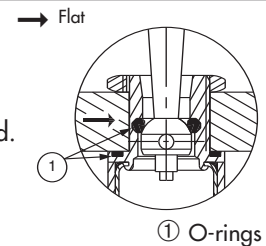


MATERIALS

- 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)

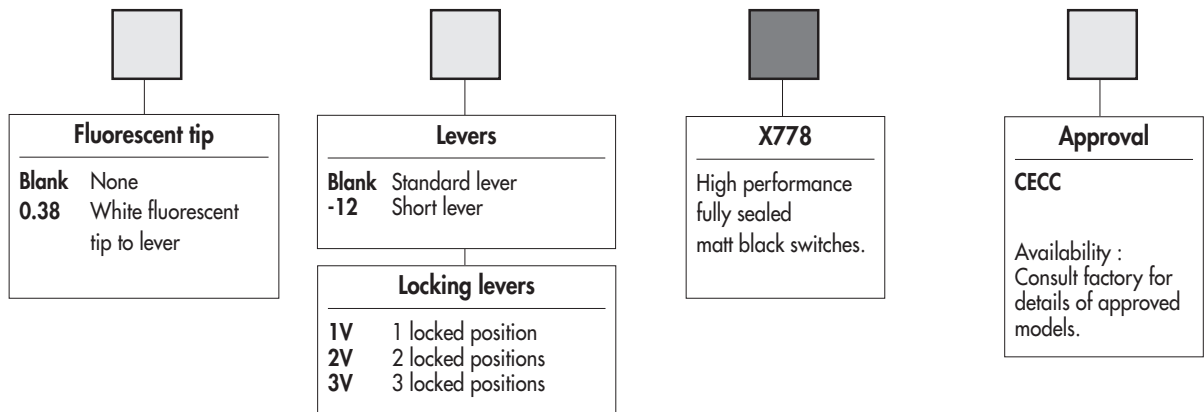
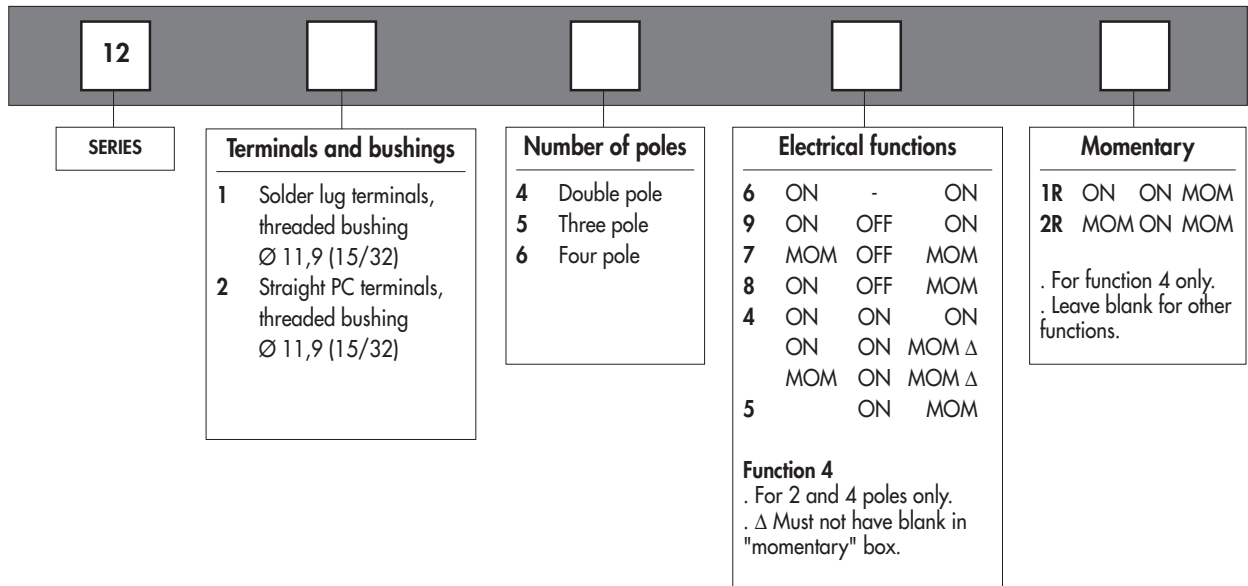
APPROVALS

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



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 14 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.



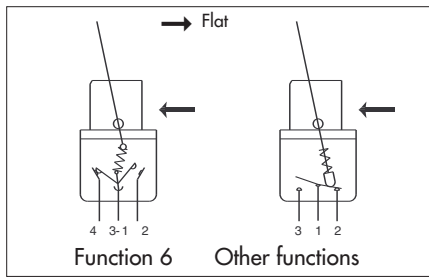
Packaging unit : 2 pole models : 25 pieces
 3 and 4 pole models : 20 pieces



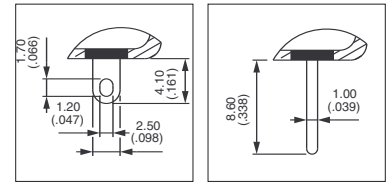
12000X778 series

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

Fully sealed - matt black



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



A

MODEL STRUCTURE



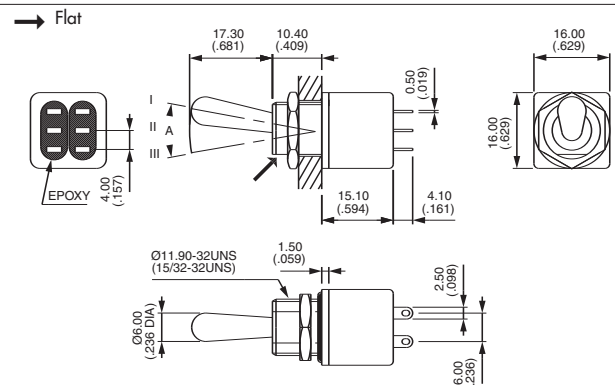
Shown with standard lever

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	MOM

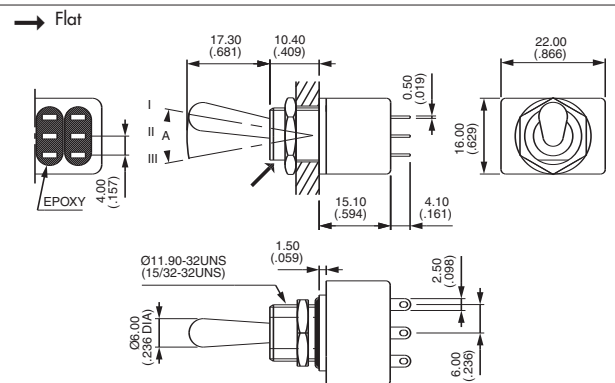


Solder lug terminals - three pole



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

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

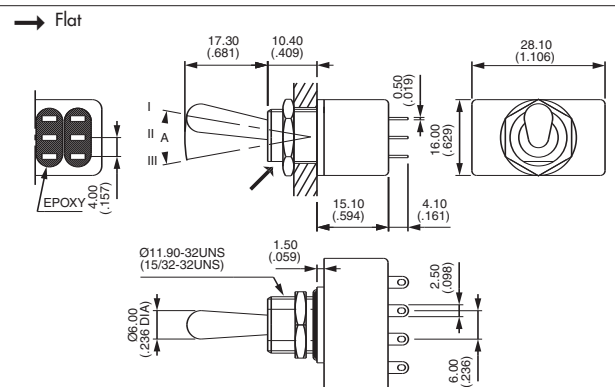


Solder lug terminals - four pole



- 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

A

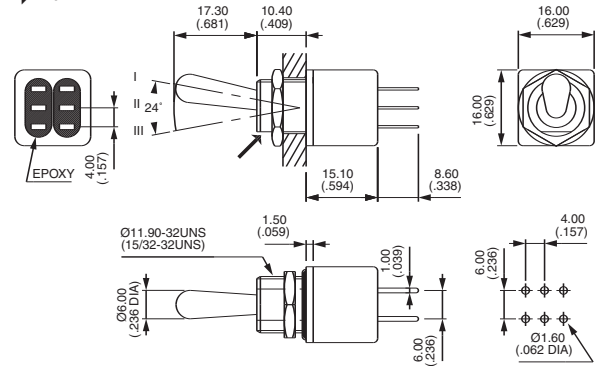
Straight PC terminals - double pole ▲



12246 X778

I II III
ON - ON

→ Flat



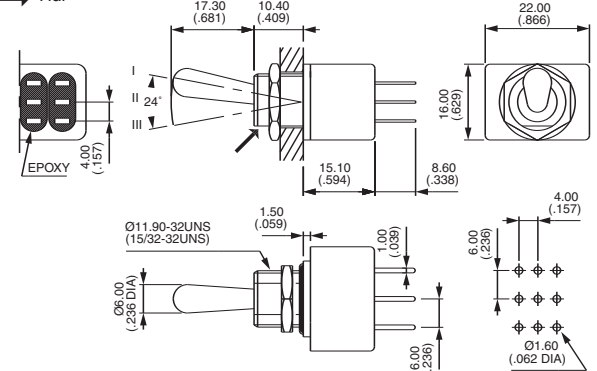
Straight PC terminals - three pole ▲



12256 X778

I II III
ON - ON

→ Flat



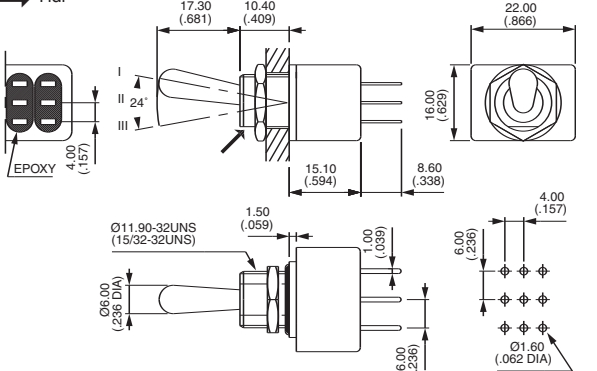
Straight PC terminals - four pole ▲



12266 X778

I II III
ON - ON

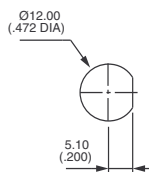
→ Flat



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

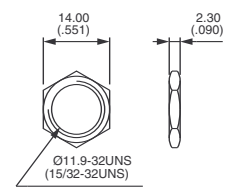
Positions and connections, see next page.

PANEL CUT-OUT



STANDARD HARDWARE

Hex nut

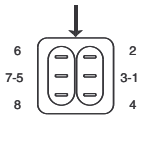
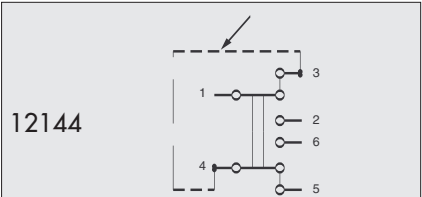

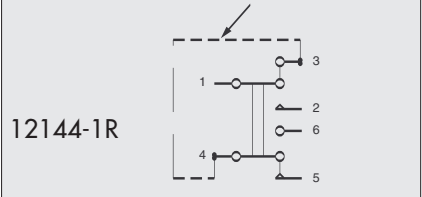
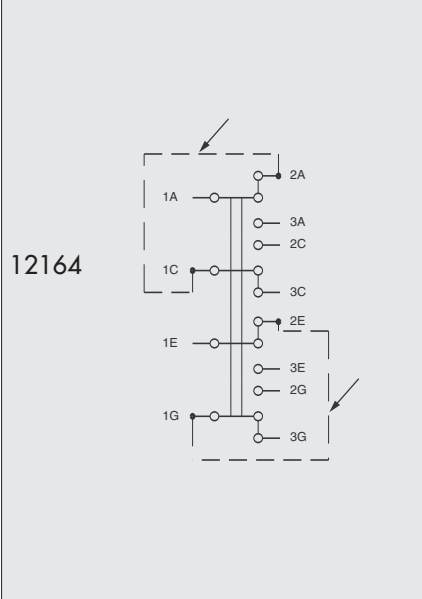
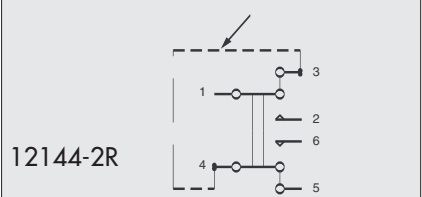


U41 (matt black)

12000X778 series

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

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		→ External jumper (added by customer) 
12147 12148 12149 12148CT	MOM ON ON MOM	OFF OFF OFF OFF	MOM MOM ON ON	→ Flat 	12144 12144-1R 12144-2R
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		
12166	ON 1A - 3A 1C - 3C 1E - 3E 1G - 3G	-	ON 1A - 2A 1C - 2C 1E - 2E 1G - 2G		12164
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		

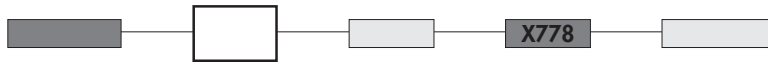
A

12000X778 series

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



FLUORESCENT TIP

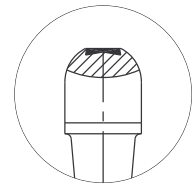
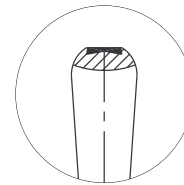


Standard lever

Locking lever

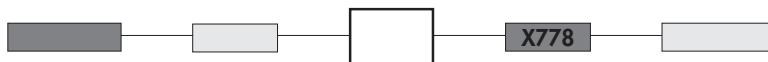
Blank None

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



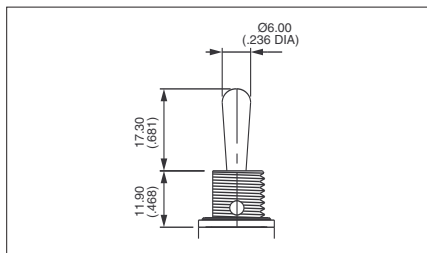
A

LEVERS / LOCKING LEVERS

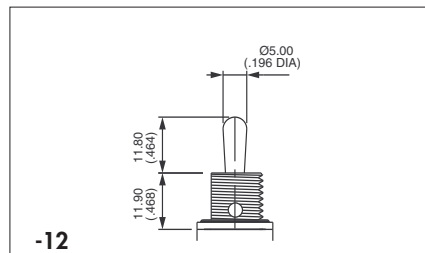


Dash compulsory before lever code.

Levers



Standard (leave blank)

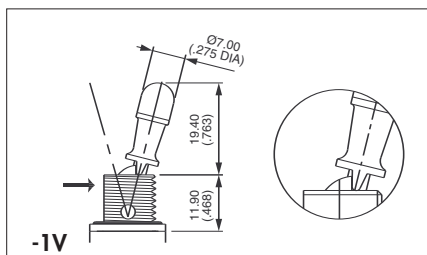


-12

Short lever

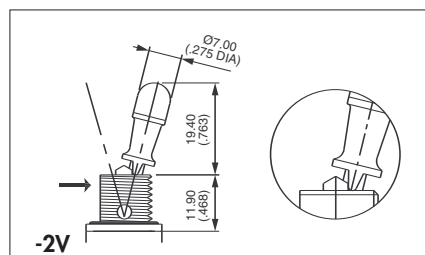
Sealing boots : see section H.
Security caps : see section I.

Locking levers



-1V

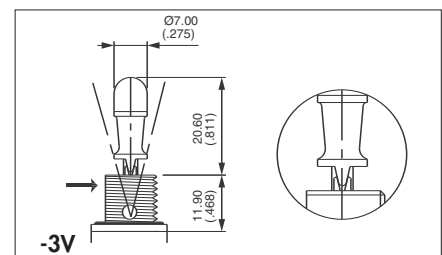
1 locked position (function 6)
Typical angle of throw : 26°



-2V

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

→ Flat



-3V

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

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.