



APEM

SWITCHES 2013/2014

PANEL MOUNTED SWITCHES

PCB MOUNTED SWITCHES



A WORLD OF
SWITCHING CAPABILITIES

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RoHS
compliant

By series

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APEM

A world of switching capabilities

APEM is a worldwide manufacturer of professional switches, joysticks, switch panels and LED indicators.

A switch specialist since its creation, the company sells products to multiple industrial markets including: instrumentation, medical, security, communications, industrial automation, military and transport.

APEM serves more than **20 000** customers, including international industrial groups, directly or through its sales network of **7** subsidiaries and **130** distributors and agents.

From raw material transformation to finished products - through the design and production of tooling - **APEM** controls all phases of production in its **9** switch manufacturing plants, located in France, the **UK**, Tunisia, China, Mexico and the **US**.

APEM has a strong reputation for quality, confirmed by the **ISO 9001** certification, 2008 version. Our products are designed and produced in accordance with quality standards and environmental requirements.

IN THE CATALOGUE

In this catalogue you will find more than **15 000** possible part numbers of switches with low or high current ratings, generally classified by actuator type. New products - mainly pushbutton switches - have been added.

These configurations highlight our basic offering of standard models and options, which are continuously supplemented to satisfy our customers' special requests.

Product selection guides will help you select the most appropriate switch series for your application.

General technical information and a glossary are available on the last pages.

CUSTOM PRODUCTS

APEM's experienced switch design team, advanced development tools and vertical integration enable the company to develop products beyond conventional switches. Our solutions range from special actuators or terminals to innovative products developed entirely to customer's specifications. The highest level of integration is achieved with modules combining several technologies to offer added value and reduced cost.

Some examples are shown in the dedicated section.

New products, Selection Guides sections A to G Approvals, Production process

**5 to 15
16 to 19**



TOGGLE SWITCHES

A

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21000N	See website		600NH	Industrial, insulated lever	A-99
10600	Professional min., bushing Ø 10 (.393)	A-54	660	Industrial, metal lever, four pole	A-100
11000	Professional miniature, bushing Ø 6,35 (1/4)	A-57	3500	High performance industrial, environmentally sealed.	A-102
12000	Professional miniature, bushing Ø 11,9 (15/32)	A-65	3600NF	Industrial, sealed for outdoor applications.	A-107
12000X778	High performance miniature, bushing Ø 11,9 (15/32)	A-72	6000	Industrial for military applications	A-110



PUSHBUTTON SWITCHES - "I" RANGE

B1

IC <i>New!</i>	Miniature for harsh environments, short case, momentary	B1-2	IQ <i>New!</i>	Miniature, sealed, snap-in mounting, mom. or latching, illuminated or not	B1-35
IL <i>New!</i>	Miniature, sealed, for thick panels, momentary, illuminated or not	B1-6	IZ	Miniature, rear mount, sealed, mom. or latching, illuminated or not	B1-48
IM <i>New!</i>	Miniature, sealed, snap-action, mom.	B1-11	IR	Miniature, sealed, mom. or latching, illuminated or not	B1-66
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PUSHBUTTON SWITCHES

B2

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TACT SWITCHES

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S and SR	Miniature, washable	D-9	KL	Industrial, locking, sealed	D-62
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A02	Pushbutton, rotary lever, keylock & emergency stop switches - Indicators - Panel cut-out Ø 22 (.866) or 30 (1.181)	G-15			

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SEALING BOOTS

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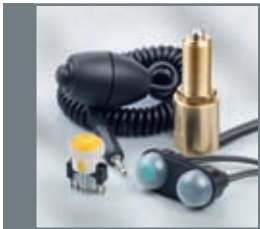
For toggle, pushbutton and rocker switches H 2



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CUSTOM PRODUCTS

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Available for sale or customer exclusivity
New models! J 2

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New products



IC series

- Short case
- For harsh environments
- Momentary
- Square or round actuator

Page B1-2



IL series

- Long bushing for thick panels
- Momentary
- Round actuator
- Illuminated or non-illuminated

Page B1-6



IM series

- Snap-action
- Momentary
- Round actuator

Page B1-11



IH series

- Hall effect
- Linear (IHL) or momentary (IHS)
- 5 million cycles
- Round actuator

Page B1-29



IQ series

- Snap-in mounting
- Dia. 16 mm bushing
- Momentary or latching
- Square or round actuator
- Illuminated or non-illuminated

Page B1-35



13000X778 series

New models :

- 3-pole versions of momentary switches
- Alternate action models

Pages B2-52 and B2-58



CG series

- Capacitive for underlay applications
- 50 million cycles
- Custom colours and marking

Page B2-120



CP series

- Capacitive
- 50 million cycles
- Bushing dia. 16, 19 or 22 mm
- Momentary or latching
- Illuminated or non-illuminated

Page B2-125



FP series

- Fully illuminated actuator
- Suited for integrated designs
- Large but lightweight
- Bushing dia. 24 mm
- Momentary or latching

Page B2-145



MP series

- Two-steps
- SIL2 safety level
- For harsh environments
- Easy to integrate

Page B2-150



MT series

- Sealed selector switch
- Multiple single functions
- Up to 4A

Page D-22













ES series











- Heavy-duty emergency stop
- 2 and 3-pole configurations
- 100.000 cycles
- Lower behind-panel depth

Page G-25

Selection guide - Section A

Toggle switches

										
Series	ZL	SMT TL	TL	S and SF	5000	21000N	10600	11000	12000	12000X778
Page	A-2	A-4	A-6	A-12	A-21	See website	A-54	A-57	A-65	A-72
Poles	1	1	1,2	1,2	1,2,3,4	1,2	1,2	1,2,3,4	2,3,4	2,3,4
Maximum current	500mA 48VDC	0,4VA 20V AC/DC	0,5A 48V AC/DC	(2A 250VAC)* 4A 30VDC	(3A 250VAC)* 4A 30VDC	4A 30VDC	3A 24VDC	4A 30VDC	4A 30VDC	4A 30VDC
Bushing dimension										
Ø4,83 (10-48)	X									
Ø6 (.236)					X					
Ø6,35 (1/4)				X	X	X		X		
Ø10 (.393)							X			
Ø11,9 (15/32)					X				X	X
Mounting options										
Horizontal SMT		X								
Vertical right angle SMT		X								
Vertical - Through hole	X		X	X	X			X	X	X
Horizontal - Through hole			X	X	X	X		X		
Vert. right angle Through hole			X	X	X					
Panel	X			X	X	X	X	X	X	X
Terminal options										
PCB	X	X	X	X	X	X		X	X	X
Solder lugs	X			X	X		X	X	X	X
Quick-connect					X					
Wire wrap			X		X					
Sealing	No	Process sealed	Process sealed	Process sealed	Optional	Optional	No	Optional	Optional	IP67

										
Series	1000	1500	1600/1700	4600/4400	600H	600NH	660	3500	3600NF	6000
Page	A-79	A-82	A-85	A-88	A-94	A-99	A-100	A-102	A-107	A-110
Poles	1	1	1	1,2,3	1,2,3	1,2,3	4	1,2	1,2	1,2,3,4
Maximum current	6A 30VDC	(6A 250VAC)* 5A 12VDC	4A 30VDC	(4A 250VAC)*	(15A 250VAC)* 10A 24VDC	(15A 250VAC)* 10A 24VDC	10A 30VDC	15A 28VDC	(6A 250VAC)* 15A 28VDC	6,5A 30VDC
Bushing dimension										
Ø11,9 (15/32)								X		X
Ø12 (.472)	X	X	X	X	X	X	X		X	
Mounting options										
Vertical Through hole				X						
Panel	X	X	X	X	X	X	X	X	X	X
Terminal options										
PCB				X						
Solder lugs	X	X	X	X	X	X	X	X	X	X
Quick-connect	X	X	X	X	X	X	X	X	X	X
Screw	X		X		X	X	X	X	X	X
Sealing	No	No	No	No	Optional	No	Optional	IP67, IP69K	Yes	Optional

()* See applicable approvals

Selection guide - Section B1

«I» range

	<i>New!</i> 	<i>New!</i> 	<i>New!</i> 			<i>New!</i> 	<i>New!</i> 	<i>New!</i> 
Series	IC	IL	IM	IP mom. & latching	IB-IS	IHS hall effect	IHL hall effect	IQ momentary
Page	B1-2	B1-6	B1-11	B1-15	B1-25	B1-29	B1-32	B1-35
Poles	1	1	1	1	1	1 NPN	1	1
Maximum current	5A 28VDC	2A 24VDC	3A 28VDC	5A 28VDC 4A 12VDC	100mA 24VDC	5mA 24VDC	1,25mA 4,5VDC	4A 28VDC
Illuminated		X		X				X
Bushing dimension								
Ø12 (.472)	X	X	X	X	X	X	X	
Ø16 (.629)								X
Mounting options								
Panel	X	X	X	X	X	X	X	
Snap-in					X			X
Terminal options								
PCB	X	X	X	X	X			X
Solder lugs	X	X		X	X			X
Quick-connect	X		X	X	X			X
Screw								X
Flying leads	X	X		X		X	X	X
Sealing	IP67	IP67	IP67	IP67	IP54 or IP67	IP67	IP67	IP54



	<i>New!</i> 	<i>New!</i> 	<i>New!</i> 	<i>New!</i> 	<i>New!</i> 	<i>New!</i> 	<i>New!</i> 	<i>New!</i> 
Series	IQ latching	IZ metal	IZ plastic	IR standard	IR microswitch	IR latching	IA	IF
Page	B1-42	B1-48	B1-58	B1-66	B1-73	B1-79	B1-85	B1-88
Poles	1	1	1	1	1	1	1	1
Maximum current	100mA 24VDC	4A 48VDC 100mA 24VDC	4A 48VDC 100mA 24VDC	4A 48VDC	5A 250VAC	100mA 24VDC	2A 24VDC	100mA 48VDC
Illuminated	X	X	X	X	X	X		
Bushing dimension								
Ø12 (.472)								
Ø16 (.629)	X	X	X	X	X	X	X	X
Mounting options								
Panel		X	X	X	X	X	X	X
Snap-in	X							X
Terminal options								
PCB	X	X	X	X		X		
Solder lugs	X	X	X	X		X		
Quick-connect	X	X	X	X	X	X		X
Screw		X	X	X				
Flying leads	X	X	X	X		X	X	
Sealing	IP54	IP67	IP67	IP67	IP67	IP67	IP67	IP67

Selection guide - Section B2

Pushbutton switches


								
Series	ZP	SMT TP	TP	9500	PHAP40	SP	8000	9400/9600
Page	B2-2	B2-4	B2-6	B2-12	B2-20	B2-22	B2-28	B2-34
Poles	1	1	1,2	1	2	1,2	1,2	1
Maximum current	500mA 48VDC	0,4VA 20V AC/DC	0,5A 48V AC/DC	100mA 30VDC	100mA 30VDC	1A 30VDC	(3A 250VAC)* 4A 30VDC	1A 30VDC
Bushing dimension								
Ø4 (.157)				X				
Ø4,83 (10-48)	X							
Ø6,35 (1/4)						X	X	X
Ø11,9 (15/32)							X	
Ø16 (.629)								X
Mounting options								
Horizontal SMT		X						
Vertical right angle SMT		X						
Vertical Through hole	X		X	X	X	X	X	X
Horizontal Through hole			X			X	X	
Vert. right angle Thr. hole			X	X		X		
Panel	X			X		X	X	X
Terminal options								
PCB	X	X	X	X	X	X	X	X
Solder lugs	X			X			X	X
Quick-connect								X
Sealing	No	Process	Process	Optional	No	Process	Optional	Optional

() * See applicable approvals

								
Series	10400	13000	13000X778	18000	IT	1200	1400	4700/4800
Page	B2-42	B2-44	B2-52	B2-63	see website	B2-107	B-114	B-117
Poles	1,2	1,2	2	1,2	2	1	1	1,2
Maximum current	3A 24VDC	4A 30VDC *2A 250VAC)*	4A 30VDC	7A 30VDC	1,5A 250VAC	(4A 250VAC)* 4A 24VDC	6A 12VDC	(3A 250VAC)*
Bushing dimension								
Ø6,35 (1/4)		X		X				
Ø10 (.393)	X							
Ø11,9 (15/32)		X	X					
Ø 12 (.472)						X		X
Mounting options								
Vertical Through hole		X	X	X			X	X
Horizontal Through hole		X		X	X			
Vert. right angle Through hole				X				
Panel	X	X	X	X		X	X	X
Snap-in				X			X	
Terminal options								
PCB		X	X	X				
Solder lugs	X	X	X	X		X	X	X
Quick-connect						X	X	X
Screw						X		
Sealing	No	Optional	IP67	No	No	No	No	No

Selection guide - Section B2

Pushbutton switches

















	<i>New!</i> 	<i>New!</i> 		<i>New!</i> 	<i>New!</i> 			
Series	CG	CP	PBA	FP	MP	LPI		
Page	B2-120	B2-125	B2-129	B2-145	B2-150	B2-156		
Poles	1 NPN	1 NPN	1	1,2	1,2	1		
Maximum current	200mA 24VDC	200mA 24VDC	1A 24VDC	200mA 12VDC	20mA 5VDC	5A 12VDC 100mA 12VDC		
Illuminated	X	X	X	X		X		
Bushing dimension								
Ø15,20 (.598)					X			
Ø16 (.629)		X	X					
Ø19 (.748)		X	X					
Ø22 (.866)		X	X					
Ø24 (.944)				X				
Ø38 (1.496)						X		
Ø44 (1.732)						X		
Mounting options								
Panel	X	X	X	X	X	X		
Terminal options								
Solder lugs				X				
Screw						X		
Flying leads		X	X					
Cable		X	X	X				
Connector	X	X			X			
Sealing	N/A	IP68, IP69K	IP68,IP69K	No	IP68	IP53		

«|» range selection guide : page 7

AV series selection guide : page 10

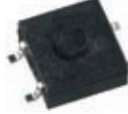

Selection guide - Section B2

AV series

								
Page	B2-78	B2-79	B2-80	B2-81	B2-83	B2-86	B2-87, B2-100	B2-89
General specifications								
Anti-vandal (IK08/IK10)	X	X						
Security			X	X		X	X	X
Approval (optional)	UL/CSA	UL/CSA			UL/CSA			
Sealing	Up to IP65	Up to IP65	Up to IP65	Up to IP65	Up to IP65	IP65, IP69K	Up to IP67	Up to IP65
Illumination							X	X
Marking					X			
Electrical specifications								
Maximum current	2A 48VDC (4A 250VAC)*	2A 48VDC (4A 250VAC)*	0,2A 48VDC	1A 24VDC	2A 48VDC (4A 250VAC)*	5A 15VDC 5A 250VAC	1A 30VDC	2A 48VDC
Momentary (NO)	X	X			X			
Momentary (NO) tactile			X					
Momentary (NO/NC)						X	X	
Latching				X				X
Diameter and shape								
Ø 16 (.629)	Flat		AV063	AV061				
	Curved		AV163	AV161				
Ø 19 (.748)	Flat	AV09			AV09	AV19LP	AV9	AV09..EA
	Curved	AV19			AV19	AV19LB		AV19..EA
Ø 22 (.866)	Flat		AV03				AV3	
	Curved		AV02					
       								
() * See applicable approvals								
Page	B2-91	B2-93, B2-95	B2-97	B2-98	B2-98	B2-102	B2-104	B2-106
General specifications								
Security	X	X	X	X	X	X	X	X
Approval (optional)			UL/CSA					
Sealing	Up to IP65	Up to IP67, IP69K	Up to IP65	Up to IP65	Up to IP65	Up to IP65	IP65	IP65
Illumination	X	X				X		
Marking	X	X		X	X			
Electrical specifications								
Maximum current	50mA 24VDC	50mA 24VDC	2A 48VDC (4A 250VAC)*	2A 250VAC	3(1,5)A 250VAC	2A 48VDC	5A 250VAC	5A 250VAC
Momentary (NO)			X					
Momentary (NC)				X				
Momentary (NO) tactile	X	X	Mom. (NO)					
Momentary (NO/NC)							X	X
Latching						X		
Alternate action					X			
Diameter and shape								
Ø 19 (.748)	Flat	AV09C7	AV9S					
	Curved	AV19C7						
Ø 22 (.866)	Flat		AV3S	AV03	AV031200	AV044700	AV03..EA	AV22LP
	Curved			AV02	AV021200		AV02..EA	AV22LB
Ø 24 (.944)	Flat							AV24LP
	Curved							AV24LB
	Concave							AV24LC

Selection guide - Section C

Tact switches

								
Series	D162	PHAP3390 PHAP3391	PHAP3380	PHAP3371 PHAP3372 PHAP3373 PHAP3374	PHAP3378	PHAP3361	PHAP3355	PHAP3366 PHAP3365
Page	C 2	C-4	C-5	C-6	C-8	C-9	C-9	C-10
Type (SMT/Through hole)	SMT	SMT	SMT	SMT	SMT	SMT	SMT	SMT
Contact	N.O.	N.O.	N.O.	N.O.	N.C.	N.O.	N.O.	N.O.
Case format	6x6mm	4,2x4,2mm	6x6mm	6,2x6,2mm	7,6x7,6mm	6x3,5mm	6x3,5mm	6,1x3,7mm
Button height from PCB	3,96mm	1,5mm	1,6mm	2,6 to 3,4mm	4,3mm	4,3 and 5mm	1,8mm	2,5mm
Grounding tab	Yes	-	Yes	Yes	-	-	Yes	-
Packaging	T/R	T/R - Bags	T/R - Bags	T/R - Bags	T/R	T/R - Bags	T/R	T/R
Maximum ratings	50mA 12VDC	50mA 12VDC	50mA 12VDC	50mA 12VDC	50mA 12VDC	50mA 12VDC	50mA 12VDC	50mA 12VDC
Mounting options								
SMT	X	X	X	X	X	X		X
Right angle SMT							X	
								
Series	PHAP3368	PHAP3305	PHAP3362 PHAP3363	PHAP3301 to PHAP3308	PHAP3307	PHAP3350 PHAP3351 PHAP3352	PHAP3353	PHAP3320 PHAP3321
Page	C-11	C-11	C-12	C-13	C-14	C-15	C-15	C-16
Type (SMT/Through hole)	SMT	SMT	Through hole	Through hole	Through hole	Through hole	Through hole	Through hole
Contact	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.
Case format	6x6mm	6x6mm	6x3,5mm	6x6mm	6,1x6,1mm	7,2x7,2mm	10x10mm	12x12mm
Button height from PCB	4,3 to 13mm	5,9mm	4,3 and 5mm	4,3 to 13mm	4,3 to 7mm	4,35 to 13mm	13mm	4,3 to 12mm
Grounding tab	-	Yes	-	Yes	-	Yes	-	Yes
Caps	Yes	-	-	Yes	-	-	-	Yes
Packaging	T/R - Bags	T/R	Bags	Bags	Tape	Bags	Bags	Bags
Process sealed						Yes	Yes	
Maximum ratings	50mA 12VDC	50mA 12VDC	50mA 12VDC	50mA 12VDC	50mA 12VDC	50mA 12VDC	50mA 12VDC	50mA 12VDC
Mounting options								
SMT	X							
Right angle SMT		X						
Through hole			X	X	X	X	X	X
Right angle Through hole			X	X		X		

Selection guide - Section D

Rocker and paddle switches

					<i>New!</i> 		
Series	SMT TR	TR	S-SR	AS	MT	7000	FM
Page	D-2	D-4	D-9	D-19	D22	D-24	D-42
Poles	1	1,2	1,2	1	1	1,2	1
Maximum ratings	0,4VA 20V AC/DC	0,5A 48V AC/DC	(2A 250VAC)* 4A 30VDC	(2A 250VAC)*	4A 30VDC	(3A 250VAC)* 4A 30VDC	(10A 250VAC)*
Illuminated							X
Mounting options							
Horizontal SMT	X						
Vertical Through hole		X	X	X	X	X	X
Horizontal Through hole		X	X			X	
Vert. right angle TH		X	X			X	
Snap-in			X	X		X	X
Rear mounting			X			X	
Panel cut-out				18,65X8,9	Ø 17,65		19,2x12,9
Terminal options							
PCB	X	X	X	X	X	X	X
Solder lugs			X	X	X	X	X
Quick-connect							X
Sealing	Process sealed	Process sealed	Process sealed	No	No	No	Optional boot

						() * See applicable approvals
Series	2600	KR	KL	KI	KG	
Page	D-45	D-53	D-62	D-71	D-76	
Poles	1,2	1,2	1,2	1,2	1,2	
Maximum ratings	(16A 250VAC)*	10A 24VDC	10A 24VDC	24VDC	(12A 250VAC)* 15A 12VDC	
Illuminated	X	X	X	X	X	
Mounting options						
Snap-in	X	X	X	X	X	
Panel cut-out	30 x 22	36,8 X 21,08	36,8 X 21,08	36,8 X 21,08	36,8 X 21,08	
Terminal options						
Solder lugs	X	X	X	X	X	
Quick-connect	X	X	X	X	X	
Screw	X	X	X		X	
Sealing	Optional boot	IP68	IP68	IP68	IP65	

Selection guide - Section E

Slide switches



Series	NK	SMT TG	TG	G	25000N
Page	E-2	E-3	E-5	E-8	E-14
Poles	1	1	1	1,2	1,2
Maximum ratings	500mA 12VDC	0,4VA 20V AC/DC	0,5A 48V AC/DC	3A 30VDC	(2A 250VAC)* 1A 30VDC
Mounting options					
Horizontal SMT		X			
Vertical Through hole	X		X	X	X
Horizontal Through hole	X		X	X	X
Vert. right angle Through hole				X	
Panel				X	
Terminal options					
PCB	X	X	X	X	X
Solder lugs				X	
Sealing	No	Process sealed	Process sealed	No	No

()* See applicable approvals

Selection guide - Section F








DIP and coded rotary switches



Series	P36 (CR36)	PT65 (CR65)	DS-DSR	DP-DPL	DA	IKN	IKE	IKH
Type	Coded rotary			DIP				
Page	F-2	F-4	F-7	F-9	F-10	F-11	F-14	F-16
Number of positions	10 & 16	10 & 16	2-12 (except 11)	2-12 (except 11)	2-12 (except 11)	2-8 (even only)	1-12 (except 11)	2-10 (even only)
Maximum ratings	400mA 24VDC	400mA 24VDC	100mA 50VDC	100mA 50VDC	100mA 50VDC	100mA 48VDC	25mA 24VDC	100mA 50VDC
Process Sealed	Yes	Yes	W. optional tape	W. optional tape	W. optional tape	W. optional tape	No	W. optional tape
Profile off PCB	Through hole : 3,65mm SMT: 3,85mm	6,5mm	5,85mm	10,3mm	9,9mm	Through hole: 4mm SMT: 2,85mm	Through hole : 3,4 mm SMT : 3,80mm	1,6mm
Mounting options								
SMT	X					X	X	X
Through hole	X	X	X	X	X	X	X	
Right angle Through hole		X						

Selection guide - Section G

Industrial controls

							
Series	A1	A01	A01	A01	A01	A01ES	A01
Type	Pushbutton	Pushbutton	Indicator	Rotary	Keylock	Emergency Stop	Mushroom Head Pushbutton
Page	G-4	G-5	G-6	G-7	G-8	G-9	G-11
Poles	1,2,3,4	1,2,3,4		1,2,3,4	1,2,3,4	1,2	1,2,3,4
Sealing	IP65	IP65	IP65	IP65	IP65	IP65	IP65
Back panel sealing	Option	Option	Option	Option	Option	Option	Option
Illuminated	Yes	Yes	Yes	No	No	No	No
Maximum current	6A 250VAC 6A 12VDC	6A 250VAC 6A 12VDC	N/A	6A 250VAC 6A 12VDC	6A 250VAC 6A 12VDC	1,5A 250VAC AC-15	6A 250VAC 6A 12VDC
Panel cut-out							
Ø16mm		X	X	X	X	X	X
Ø22mm	X	X	X	X	X		X
Flush mounting	Yes	Option	Option	Option	Option	No	Option
Terminal options							
Solder lugs	X	X	X	X	X	X	X
Quick-connect	X	X	X	X	X	X	X
PCB Mounting	Option	Option	Option	Option	Option	Option	Option
							 New!
Series	A02	A02	A02	A02ES	A02	A03	ES
Type	Pushbutton	Indicator	Rotary / Keylock	Emergency Stop	Mushroom Head Pushbutton	Pushbutton	Emergency Stop
Page	G-15	G-18	G-19 - G-20	G-21	G-22	G-24	G-25
Poles	1,2,3,4,n		1,2,3,4,n	1,2	1,2,3,4	1,2,3,4	2,3
Sealing	IP65	IP65	IP65	IP65	IP65	IP65	IP65
Back panel sealing	No	No	No	No	No	Option	No
Illuminated	Yes	Yes	No	No	No	Yes	No
Maximum current	16A 250VAC 12A 12VDC	16A 250VAC 12A 12VDC	16A 250VAC 12A 12VDC	2,5A 380VAC AC-15	16A 250VAC 12A 12VDC	6A 250VAC 6A 12VDC	1A 24VDC
Panel cut-out							
Ø22mm	X	X	X	X	X	X	X
Ø30mm	X	X	X			X	Ø 28mm
Flush mounting	Yes	Yes	Option	No	Option	Yes	No
Terminal options							
Solder lugs						X	X
Quick-connect	Option	Option	Option	Option	Option	X	
Screw	X	X	X	X	X		
Straight PC							X
PCB Mounting	No	No	No	No	No	Option	IP65,IP67,IP69K

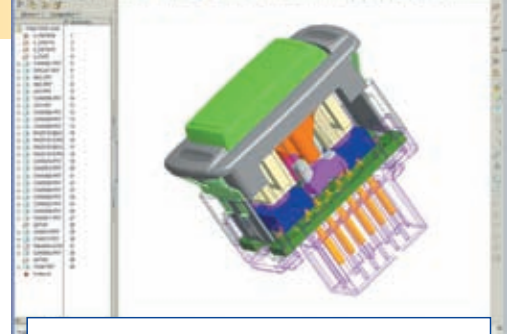
Production process

APEM, vertically integrated manufacturing

Design and development capabilities



CAD/CAM stations



Graphic design

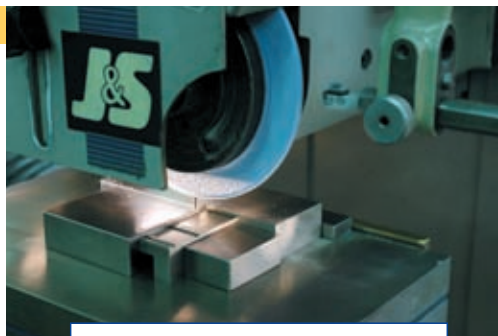


Fabrication of tooling



Qualification

Tooling and automatic assembly



Grinding machine



Electro-erosion



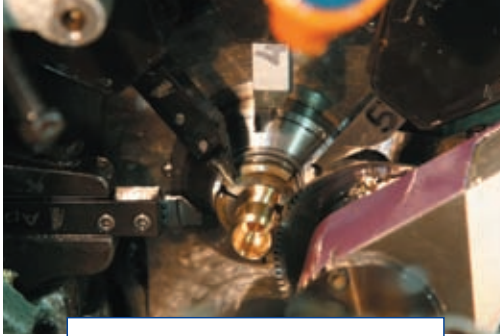
Tooling



Milling

Production process

Switch manufacturing process



Screw machining



Stamping



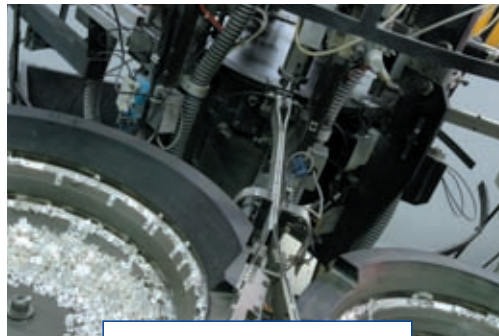
Plating



Moulding



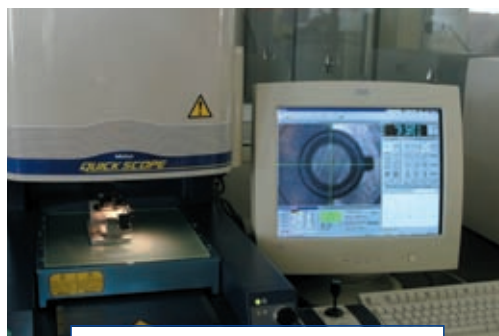
Soldering



Assembly



Marking



Testing

Approvals

QUALITY SYSTEM CERTIFICATES



ISO 9001- 2008 version
AFAQ No 1992/776f

FACTORIES

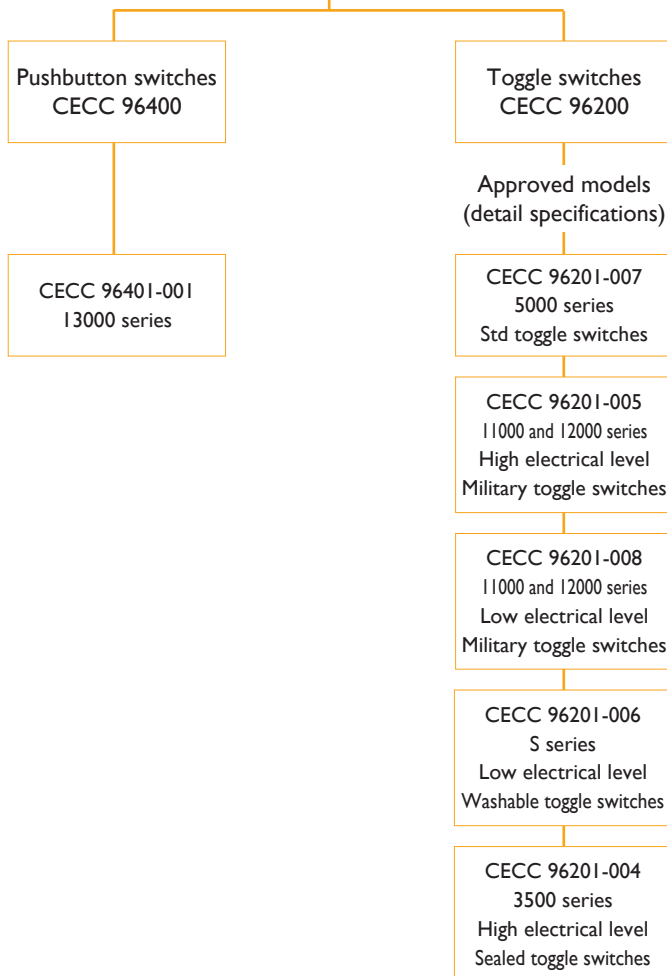
- Caussade (miniature switches)
- Montpezat (industrial switches)
- Montauban (membrane and specific switch panels)

EUROPEAN STANDARDS



Generic specification
CECC 96000

Intermediate specifications



See our cross reference list MCL02 for CECC models.

APEM factories and test laboratories are qualified by :

- MIL** DLA land and maritime letter VQ (VQH-11-022447)
Standards MIL-DTL-3950 and MIL-DTL-83731
- SNQ** Service National de Qualité - No 121
- LCIE** Laboratoire Central des Industries Electriques



CECC-IECQ (European)- No 008-95
Standard : CECC 96000



Underwriters Laboratories



Canadian Standards Association



NF - Normes françaises



VDE - Germany

Other product qualifications



ATEX - PBA series - No INERIS08ATEXQ408

PREFERENTIAL LISTS






NATO — User code No F7507

QPL — QPL 3950 and QPL 83731

Consult factory for details of listed models.

Approvals

For our products, the approvals are usually delivered by the French agency (NF) or the German agency (VDE) according to EN 61058-1, which is recognized by all European countries.

SERIES	SAFETY STANDARDS				QUALITY STD	
	USE - France NF - EN 61058-1	VDE - Germany DIN - EN61058-1	UL - U.S.A. UL 1054	CSA - Canada C22.2 N° 55	CECC (European) No 9600-05 CECC 96000	MIL-DTL-3850 MIL-DTL-88351
						MIL
A01-A02		•	•	•		
AS			•	•		
AV			•	•		
FM		•	•			
IP-IB-IS			•			
S			•		•	
SP			•			
KG		•				
10400					•	
10600					•	
11000					•	
1200	•		•	•		
12000					•	•
13000			•		•	
1500			•			
2200			•	•		
25000N			•			
2600	•	•	•	•		
3500					•	
3600			•			
4100-4200			•	•		
4600		•	•	•		
4400		•				
4700		•	•	•		
4800		•				
5000			•	•	•	
55000		•	•	•		
57000		•	•	•		
600H	•	•	•	•		
600NH	•	•	•	•		
7000			•	•		
8000			•			

Availability : consult factory for details of approved models.

LAB TEST

APEM's laboratory is approved by the National Standard Office (LCIE) as well as Underwriters Laboratories (UL).

Qualification tests and periodical tests are conducted according to European Standard (CECC 96000), International Standards (IEC 1020, IEC 512, IEC 68...) and other safety standards like UL 1054, CSA 55, CEE 24, EN 61058-1.

CECC - IEC TYPICAL TESTS

Visual examination:	IEC 512-2 test 1a	Shock:	IEC 512-4 test 6c
Outline dimensions:	IEC 512-2 test 1b	Climatic sequence:	IEC 512-6 test 11a
Functional operation:	CECC 96000 - § 4-3-1-7	Insulation resistance:	CECC 96000 § 4-3-3-1
Initial contact resistance:	IEC 512-2 test 2a or 2b	Voltage proof:	CECC 96000 § 4-3-4-1
Impact on actuator:	CECC 96000 § 4-3-7-1	Temperature rise (if applicable):	IEC 512-3 test 5a
Robustness of actuator:	CECC 96000 § 4-3-8-1	Soldering:	IEC 512-6
Robustness of mounting:	CECC 96000 § 4-3-8-2	Operating force:	IEC 512-7 test 13c
Robustness of terminals:	IEC 512-8 test 16f	Sealing (air leakage):	IEC 68-2-17 test Qa
Mechanical endurance:	IEC 512-5 test 9a and CECC96000 § 4-3-9-1	Sealing water proof:	CECC 96000 § 4-3-14-2
Electrical endurance:	IEC 512-5 test 9c	Sealing immersion proof:	IEC 68-2-17 test Qf
Electrical overload:	IEC 512-5 test 10a	Sealing (bubble test):	IEC 68-2-17 test Qc
Damp heat, steady state:	IEC 512-6 test 11c	Low air pressure (if required):	IEC 512-6 test 11k
Rapid change of temperature:	IEC 512-6 test 11d	Corrosion (salt resist) (if required):	IEC 512-6 test 11f
Vibration:	IEC 512-4 test 6d	Dry heat:	IEC 512-6 test 11i
Bump (if required):	IEC 512-4 test 6b	Cold:	IEC 512-6 test 11j

 All switches approved according to EN 61058-1 are compatible with CE marked equipment.

Toggle switches



Section A

ZL series

Tiny toggle switches - metal bushing

Distinctive features - Specifications - Overview



☐ Ø 4,83 mm threaded bushing

☐ Solder lug and straight PC terminals

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - gold plated contacts : 0,4VA 20V max. AC or DC
 - silver plated contacts : 0,5A 48V max. AC or DC
- Minimum load : 10mA 50mV - 10µA 5VDC
- Contact resistance : 20 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength: 1.000 Vrms 50 Hz min. between terminals and frame
500 Vrms 50 Hz min. between terminals
- Electrical life at full load :

Contacts	Number of cycles	
	2 positions	3 positions
Gold plated	60.000	30.000
Silver plated	20.000	10.000

GENERAL SPECIFICATIONS

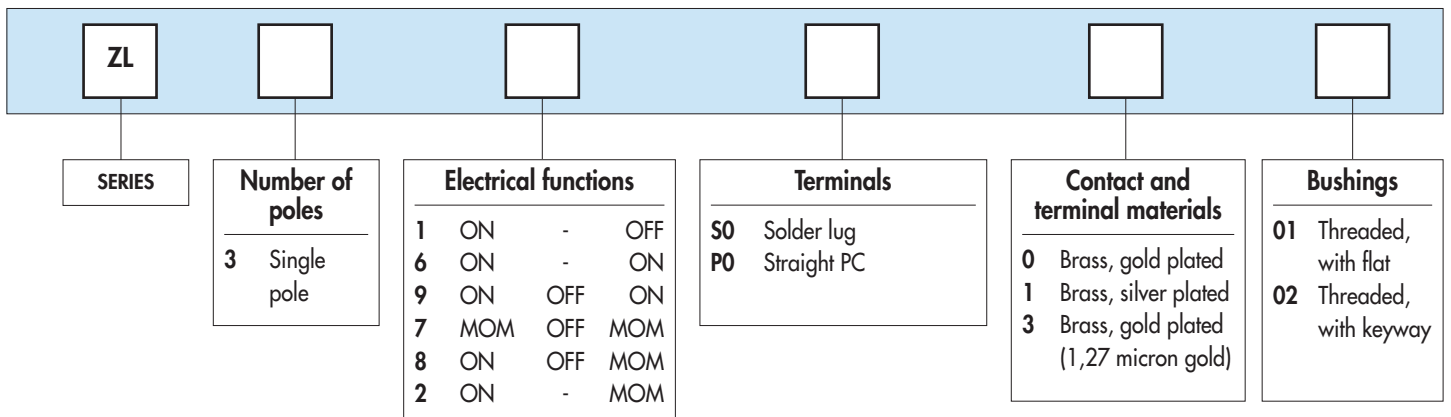
- Strength of terminals : pull-out force 10N max.
- Torque : 1 Nm max. applied between the 2 nuts
- Max. panel thickness : 1,5 mm (.059) with 2 nuts
- Operating temperature : -30°C to +85°C
- Moisture : 21 days 95 % (NFC 20-603 - IEC 8-2-3)

MATERIALS

- Case : thermoplastic UL94-V0
- Actuator : brass, nickel plated
- Bushing : zamac, tin plated
- Contacts and terminals :
 - 0 : brass, gold plated (standard)
 - 1 : brass, silver plated
 - 3 : brass, gold plated (1,27 micron gold)
- Terminal seal : epoxy

SOLDERING

- Hand soldering : 280°C max. for 5 seconds max.
- Wave soldering : 260°C max. for 5 seconds max.



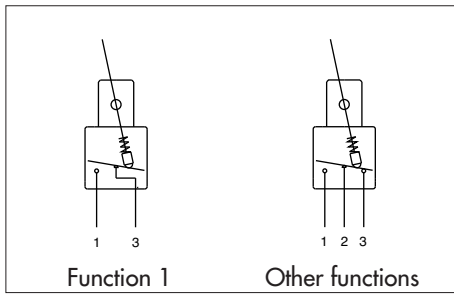
Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.

Packaging unit : 100 pieces

Mounting accessories : Standard hardware supplied with all models : 2 hex nuts 7 mm (.275) across flats P/N U5731, 1 locking ring P/N U5821 (with keyway) or U5831 (with flat) and 1 lockwasher P/N U5841.

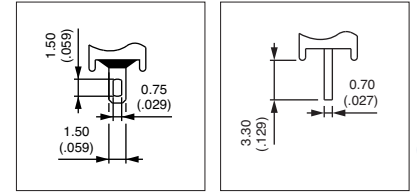
ZL series

Tiny toggle switches - metal bushing



- Single pole
- Gold plated or silver plated contacts
- Epoxy sealed terminals

Other actuator lengths available on request.



MODEL STRUCTURE



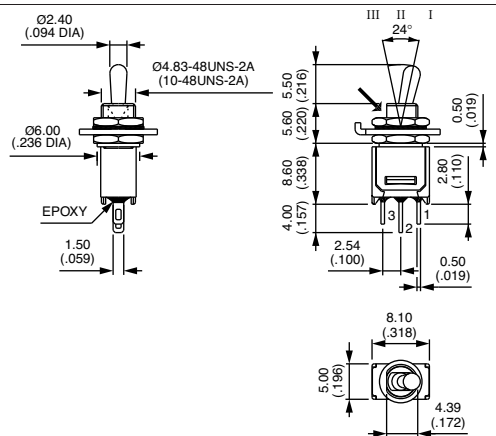
Shown with threaded bushing code 01

Solder lug terminals : ZL..S0



ZL31S0
ZL36S0
ZL39S0
ZL37S0
ZL38S0
ZL32S0

	III	II	I
ZL31S0	ON	-	OFF
ZL36S0	ON	-	ON
ZL39S0	ON	OFF	ON
ZL37S0	MOM	OFF	MOM
ZL38S0	MOM	OFF	ON
ZL32S0	MOM	-	ON



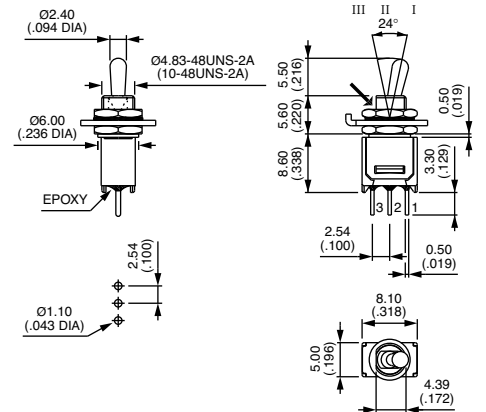
→ Flat

Straight PC terminals : ZL..P0



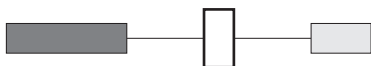
ZL31P0
ZL36P0
ZL39P0
ZL37P0
ZL38P0
ZL32P0

	III	II	I
ZL31P0	ON	-	OFF
ZL36P0	ON	-	ON
ZL39P0	ON	OFF	ON
ZL37P0	MOM	OFF	MOM
ZL38P0	MOM	OFF	ON
ZL32P0	MOM	-	ON



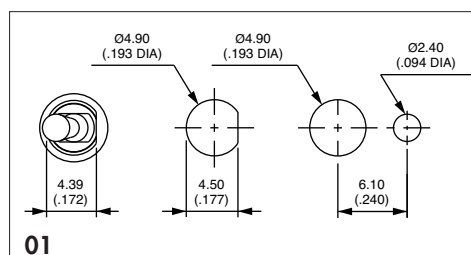
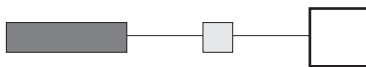
→ Flat

CONTACT & TERMINAL MATERIALS



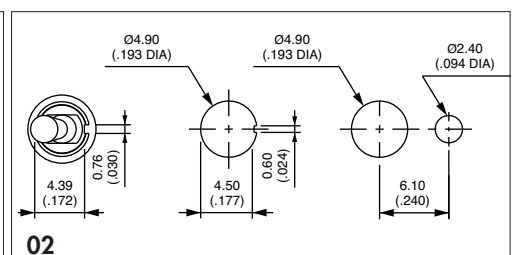
0 : Brass, gold plated (standard) - 1 : Brass, silver plated - 3 : Brass, gold plated (1,27µ gold)

BUSHINGS



01

Threaded, with flat



02

Threaded, with keyway

SMT TL series

Surface mount tiny washable toggle switches

Distinctive features and specifications

A



- ❑ Entirely designed for surface mount
- ❑ Tape and reel packaging
- ❑ Reflow solderable
 - High temperature plastic materials
 - Tin plated ground plate
 - Terminal coating : tin alloy over nickel plating
 - Terminals turned to the outside, preventing the shadow effect in infrared soldering and permitting visual inspection of solder joints
 - Distance between case and circuit : 0,55 mm (.021)
 - End stackable with 10,16 mm (.40) pitch
 - Available with positioning pins to ensure switch orientation during the reflow process and increasing switch mechanical resistance
- ❑ Protected against electrostatic discharges (ESD) up to 10 KV
- ❑ Washable
 - Construction withstands cleaning processes, including hot water under pressure

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 0,4VA 20V max. AC or DC
- Minimum load : 10mA 50mV or 10µA 5VDC
- Initial contact resistance : 20 mΩ max
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 1.000 Vrms. 50 Hz min. between terminals and frame 500 Vrms. 50 Hz min. between terminals
- Electrical life at full load :
 - 2 position switches : 60.000 cycles
 - 3 position switches : 30.000 cycles
- Static resistance : 10 KV (Schaffner equipment)

GENERAL SPECIFICATIONS

- Operating temperature : -40°C to +85°C
- Moisture resistance : 21 days per IEC 512-6 test 11c
- Vibration resistance : 10-500 Hz / 10 g per IEC 512-4 test 6d
- Shock resistance : 50 g per IEC 512-4 test 6c

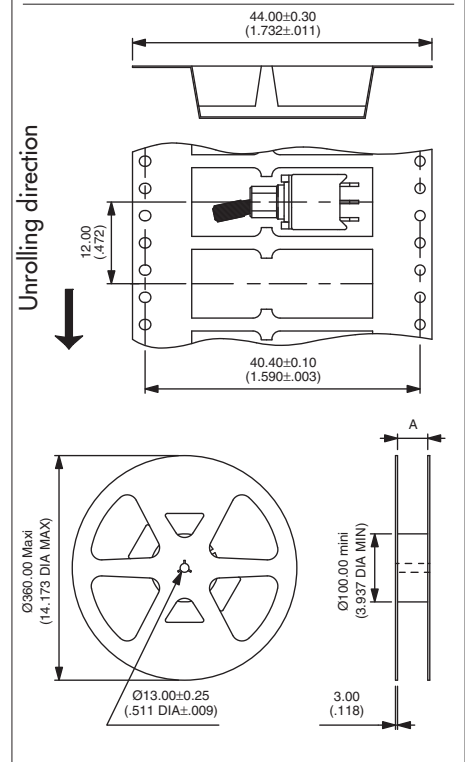
MATERIALS

- Case : high temperature plastic material UL94-V0
- Actuator : brass, nickel plated, with high temperature UL94-V0 plastic cap
- Ground plate and positioning pins : steel, tin plated
- Contacts : brass, gold plated
- Terminals : brass, with pure tin plating over nickel barrier

SOLDERING AND CLEANING

- Reflow soldering : infrared, vapor phase or infrared convection
- Washable per IEA-RS448-2 :
 - water + detergent - preferred
 - solvents
- Further information on reflow soldering : see end of catalogue.

PACKAGING



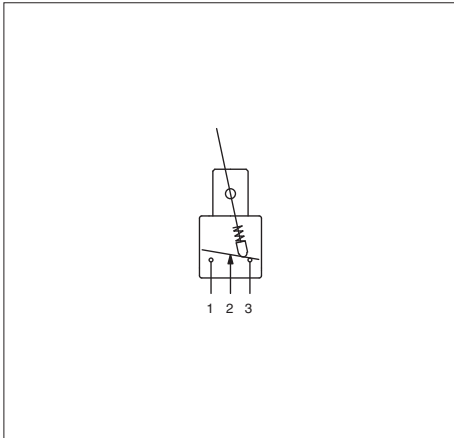
Tape width	24.00 (.944)	44.00 (1.732)
Reel (dimension A)	24.40+2.00/0.00 (.960+.078/.000)	44.40+2.00/0.00 (1.748+.078/.000)

Standard packaging unit : 700 pieces
 Tape meeting international standard IEC - Publication 286-3 (EIA481A)
 Start leader : 400 mm min.

Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.

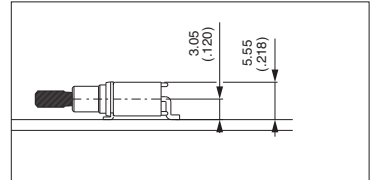
SMT TL series

Surface mount tiny washable toggle switches



- With or without positioning pins
- Single pole

Also available for vertical mounting. On request.

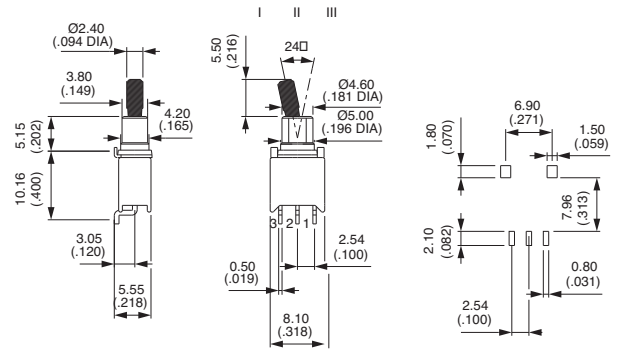


Without positioning pins



TL36WS84000
TL39WS84000
TL37WS84000
TL38WS84000
TL32WS84000

	III	II	I
TL36WS84000	ON	-	ON
TL39WS84000	ON	OFF	ON
TL37WS84000	MOM	OFF	MOM
TL38WS84000	ON	OFF	MOM
TL32WS84000	ON	-	MOM

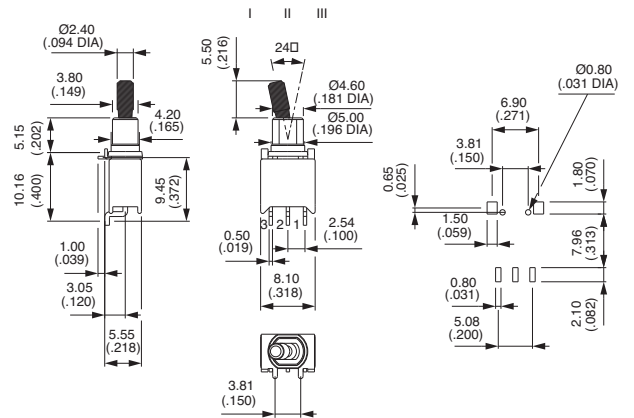


With positioning pins



TL36WS84065
TL39WS84065
TL37WS84065
TL38WS84065
TL32WS84065

	III	II	I
TL36WS84065	ON	-	ON
TL39WS84065	ON	OFF	ON
TL37WS84065	MOM	OFF	MOM
TL38WS84065	ON	OFF	MOM
TL32WS84065	ON	-	MOM



TL series

Tiny washable toggle switches

Distinctive features and specifications



- Process sealed**
 - Single piece case
 - O-ring seal between actuator and bushing
 - Epoxy sealed terminals
- Wide variety of contact materials**
- Same PCB layout as TP, TR and TG tiny switches**

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - gold plated contacts : 0,4VA 20V max. AC or DC
 - silver plated contacts : 0,5A 48V max. AC or DC
- Minimum load : 10mA 50mV - 10 μ A 5VDC
- Contact resistance : 20 m Ω max.
- Insulation resistance : 1.000 M Ω min. at 500VDC
- Dielectric strength :
 - 1.000 Vrms 50 Hz min. between terminals and frame
 - 500 Vrms 50 Hz min. between terminals
- Electrical life at full load :

Contacts	Number of cycles	
	2 positions	3 positions
Gold plated	60.000	30.000
Silver plated	20.000	10.000

MATERIALS

- Case : PBT
- Actuator : brass, nickel plated
- Contacts and terminals :
 - 0** : brass, gold plated
 - 1** : brass, silver plated
 - 3** : brass, gold plated (1,27 micron gold)
 - 8** : contact brass, gold plated + tin plated terminals
 - 9** : contact brass, gold plated (1,27 micron gold) + tin plated terminals
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

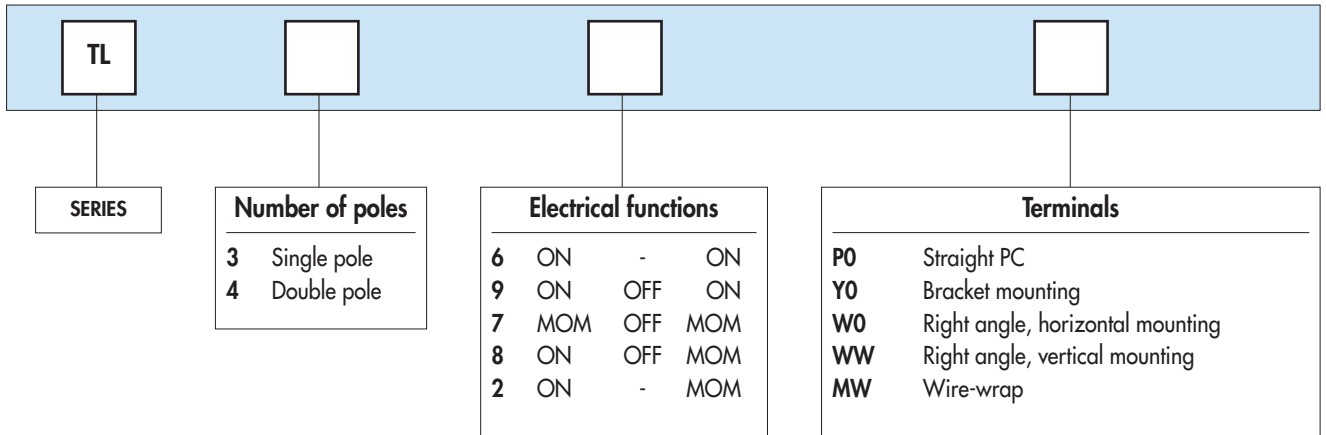
- Strength of terminals : pull-out force - 10N max.
- Operating temperature : -30°C to +85°C
- Moisture : 21 days 95 % (NFC 20-603 - IEC 68-2-3)
- Cleaning : solvents or water + detergent
- Wave soldering : 260°C - 5 sec.

TL series

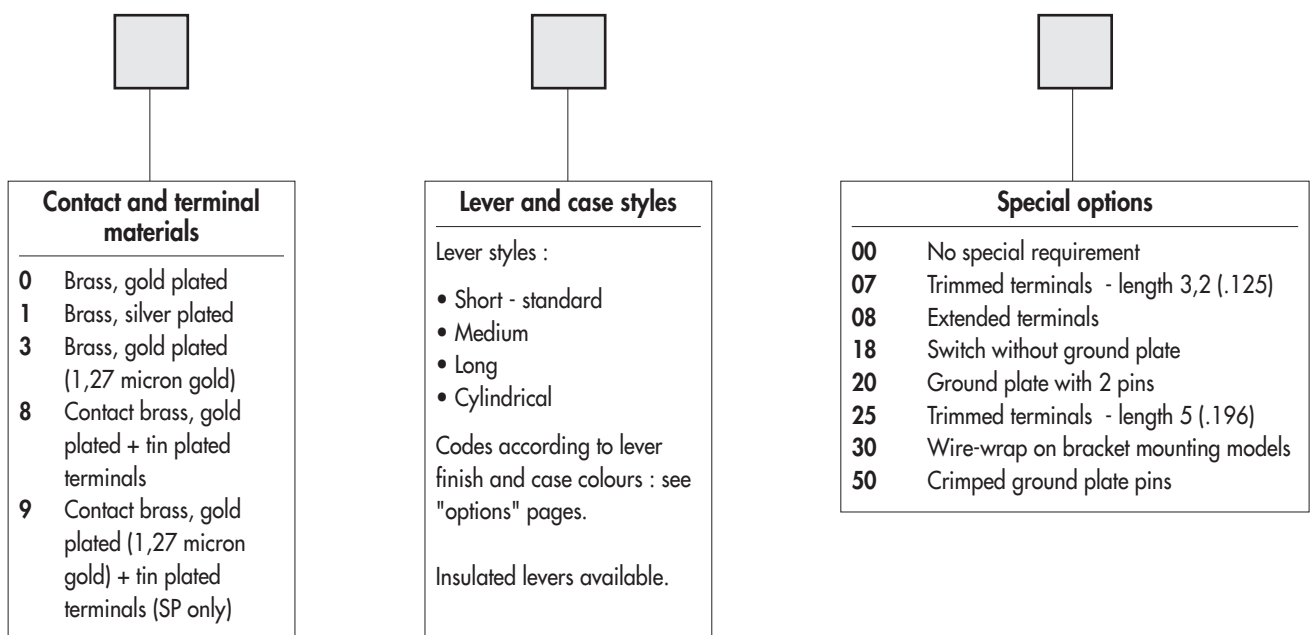
Tiny washable toggle switches

Overview

MODEL
STRUCTURE



OPTIONS



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 bracketed numbers.



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



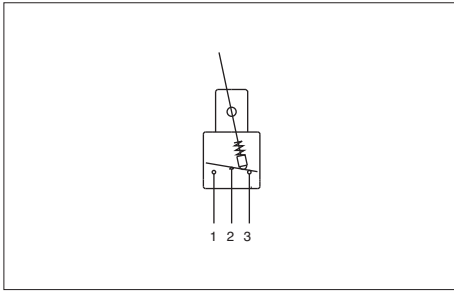
Packaging unit : 100 pieces, except for models with WW terminals (50 pieces)

TL series

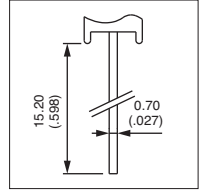
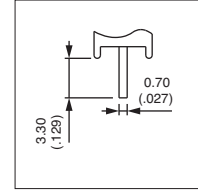
Tiny washable toggle switches



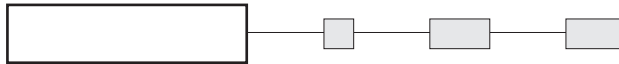
A



- Straight PC, right angle or wire-wrap terminals
- 1 and 2 pole configurations



MODEL STRUCTURE



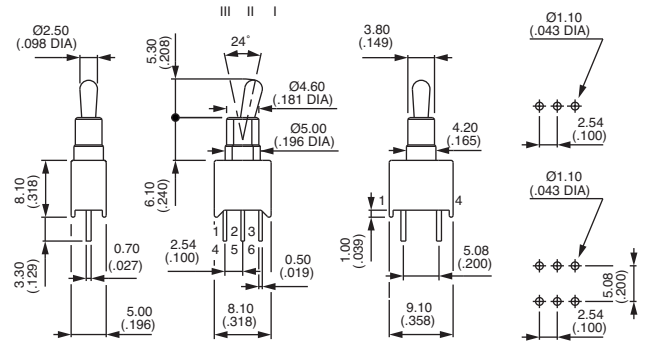
Shown with standard lever

Straight PC terminals : TL..P0



Single pole	Double pole
TL36P0	TL46P0
TL39P0	TL49P0
TL37P0	TL47P0
TL38P0	TL48P0
TL32P0	TL42P0

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

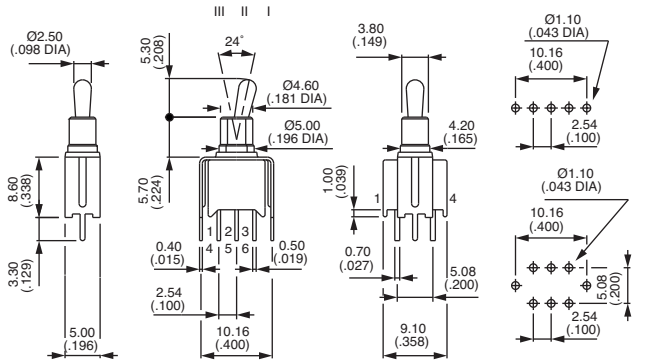


Straight PC terminals - bracket mounting : TL..Y0



Single pole	Double pole
TL36Y0	TL46Y0
TL39Y0	TL49Y0
TL37Y0	TL47Y0
TL38Y0	TL48Y0
TL32Y0	TL42Y0

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

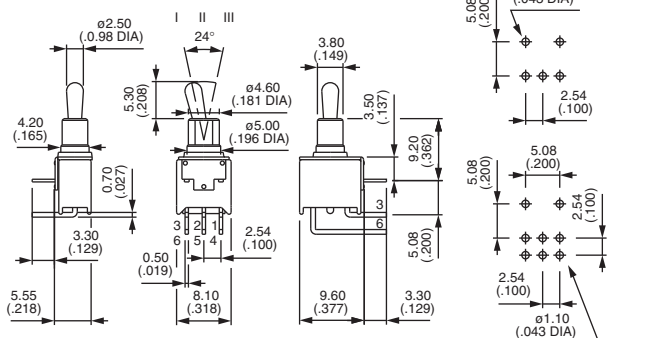


Right angle terminals - horizontal mounting : TL..W0



Single pole	Double pole
TL36W0	TL46W0
TL39W0	TL49W0
TL37W0	TL47W0
TL38W0	TL48W0
TL32W0	TL42W0

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





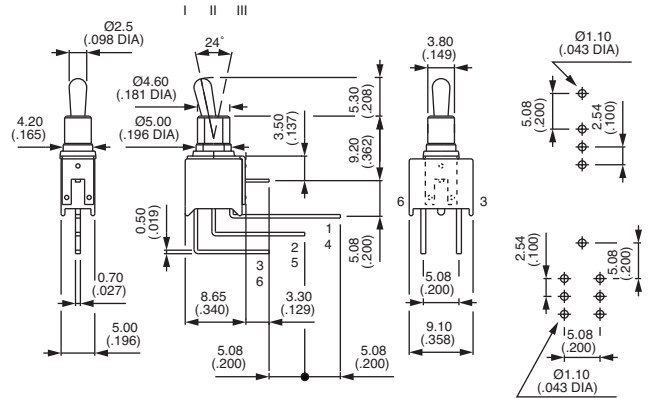
TL series

Tiny washable toggle switches

Right angle terminals - vertical mounting : TL..WW



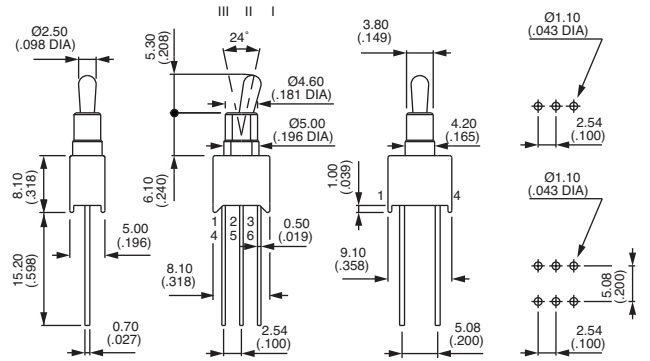
Single pole	Double pole	III	II	I
TL36WW	TL46WW	ON	-	ON
TL39WW	TL49WW	ON	OFF	ON
TL37WW	TL47WW	MOM	OFF	MOM
TL38WW*	TL48WW*	ON	OFF	MOM
TL32WW*	TL42WW*	ON	-	MOM



Wire-wrap terminals : TL..MW

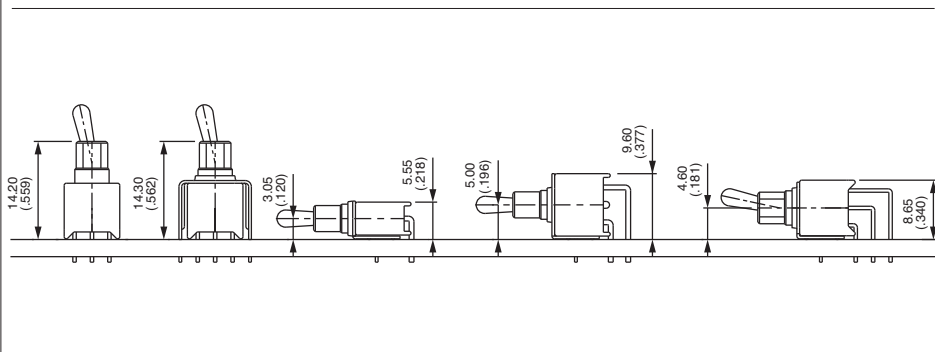


Single pole	Double pole	III	II	I
TL36MW	TL46MW	ON	-	ON
TL39MW	TL49MW	ON	OFF	ON
TL37MW	TL47MW	MOM	OFF	MOM
TL38MW	TL48MW	ON	OFF	MOM
TL32MW	TL42MW	ON	-	MOM



* Functions 2 and 8 : reversed connection available. Consult factory.

PCB MOUNTING



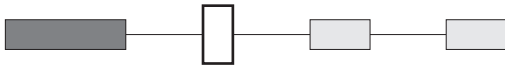
TL series

Tiny washable toggle switches

OPTIONS

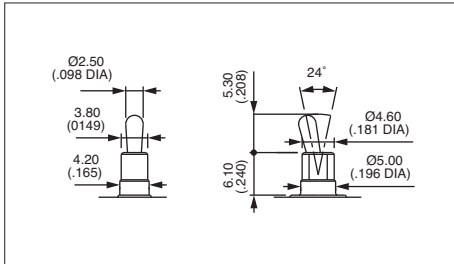
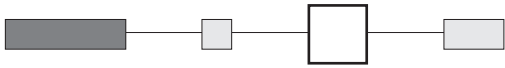


CONTACT AND TERMINAL MATERIALS



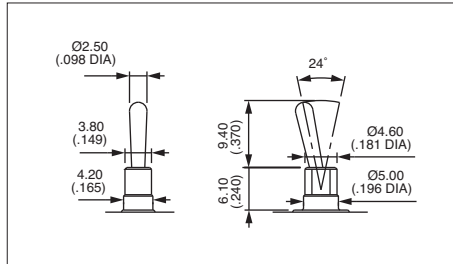
- 0 Brass, gold plated
- 1 Brass, silver plated
- 3 Brass, gold plated (1,27 micron gold)
- 8 Contact brass, gold plated + tin plated terminals
- 9 Contact brass, gold plated (1,27 micron gold) + tin plated terminals (single pole only)

LEVER AND CASE STYLES



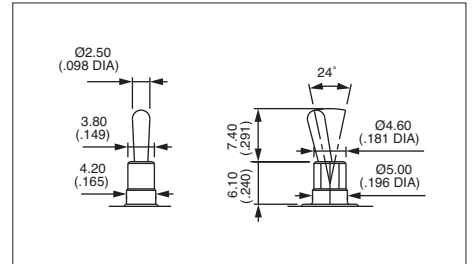
Short - standard

LEVER \ CASE	Blue	Black
	Nickel plated	00
Matt black	01	51



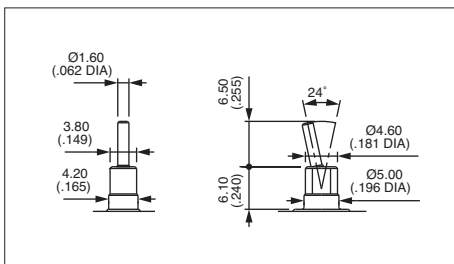
Long

LEVER \ CASE	Blue	Black
	Nickel plated	02
Matt black	03	53



Medium

LEVER \ CASE	Blue	Black
	Nickel plated	04
Matt black	05	55



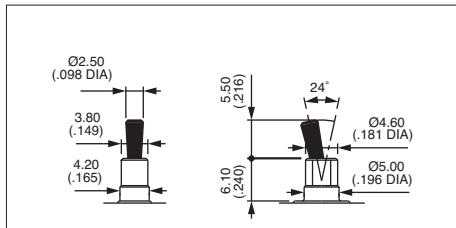
Cylindrical

LEVER \ CASE	Blue	Black
	Nickel plated	-

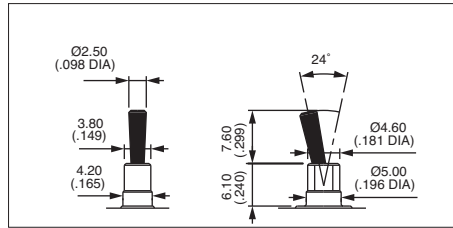


LEVER AND CASE STYLES (continued)

Insulated levers - Protected against electrostatic discharges (ESD) up to 10KV. Black colour.

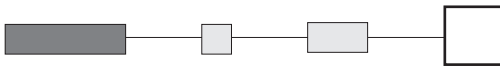


40 With blue case
94 With black case

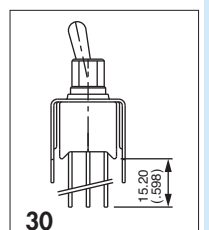
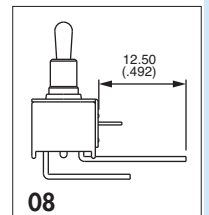
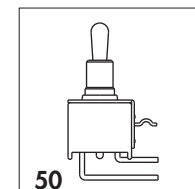
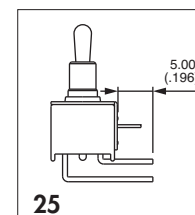
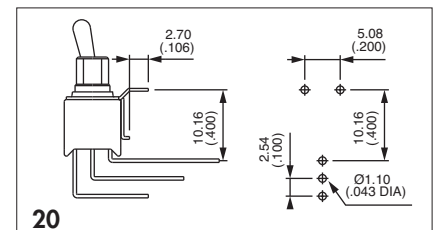
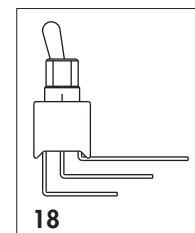
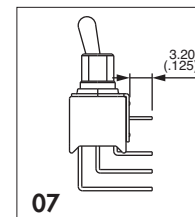


30 With blue case
90 With black case

SPECIAL OPTIONS



- 00** No special requirement
- 07** **Trimmed terminals** - length 3,2 mm (.125) for TL..WW models only
- 08** **Extended terminals** for TL..W0 models only
- 18** Switch **without ground plate** for TL..WW models only
- 20** **Ground plate with 2 pins** for TL..WW models only
- 25** **Trimmed terminals** - length 5 mm (.196) for all models, except TL..WW
- 30** **Wire-wrap terminals** on models with mounting **bracket**
- 50** **Crimped ground plate pins.**
Retains switch on PCB during handling and wave soldering.
For models TL..W0, TL..WW and TL..Y0 single and double pole.

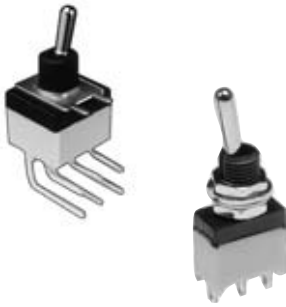


A

S and SF series

Washable miniature toggle switches

Distinctive features and specifications



- ❑ **Sealed**
 - Secure assembly of the two case parts
 - Internally sealed bushing
 - Epoxy sealed terminals
- ❑ **Process compatible (S series)**
 - Wave solderable
 - Washable
- ❑ **Optional ESD protection**

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts (A or 1) : 4A 30VDC
 - gold plated brass contacts (CD or 0) : 0,4VA 20VAC or DC
 - gold plated silver contacts (AD or 2) : 4A 30VDC (300mA 30VDC for gold plating)
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min.
- Dielectric strength : 1.000 Vrms 50 Hz min.
- Electrical life at full load :

Contacts	Number of cycles	
	2 positions	3 positions
A or 1	40.000	40.000
CD or 0	100.000	50.000
AD or 2	40.000	40.000

MATERIALS

- Case and cover : UL94-VO, polyamide, glass filled or PES
- Actuator : brass, nickel plated
- Contacts
 - CD or 0 : brass, gold plated
 - A or 1 : silver
 - AD or 2 : silver, gold plated
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

- Mechanical strength :
 - Terminals are strengthened by a bracket or a ground plate ensuring the rigidity of the switch on the board.
 - Actuator strength is 10N max.
- Operating temperature : -20°C to +85°C
- Storage temperature : -40°C to +85°C
- Moisture :
 - The insulating materials employed and the complete seal permit the switches to withstand a 56 days moisture test (IEC 68-2-3).
- Soldering - thermal shock (S series only) :
 - The switches are especially designed for flow soldering at 260°C during 5 seconds owing to high temperature polymer parts.
- Iron soldering (SF series) : 300°C 5 sec. max.
- Solderability : The switches are tested at 235°C according to IEC 68-2-20 after accelerated aging.

AGENCY APPROVALS



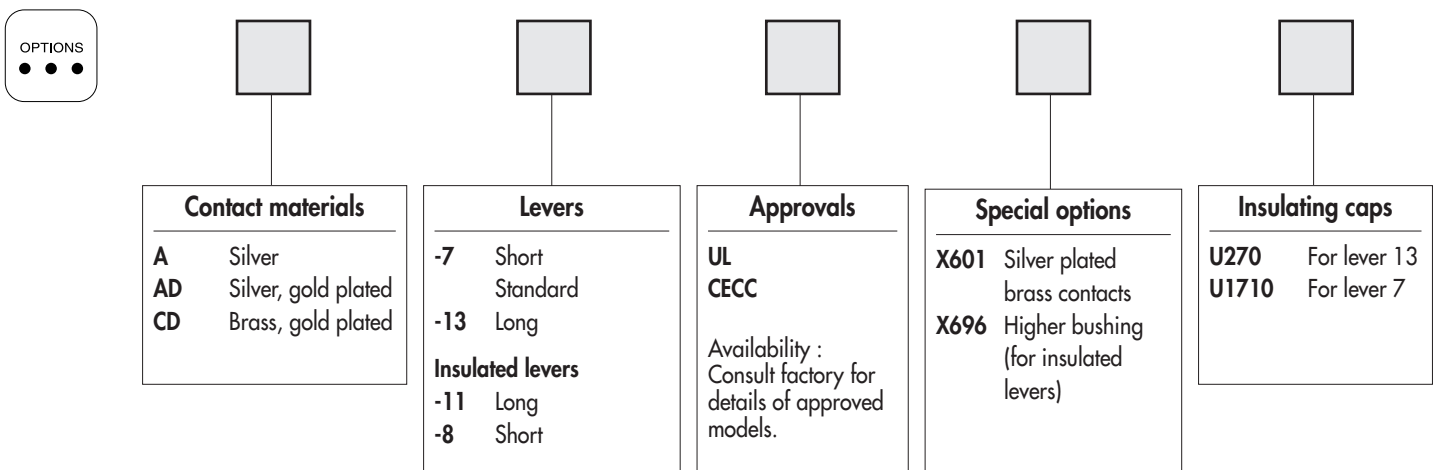
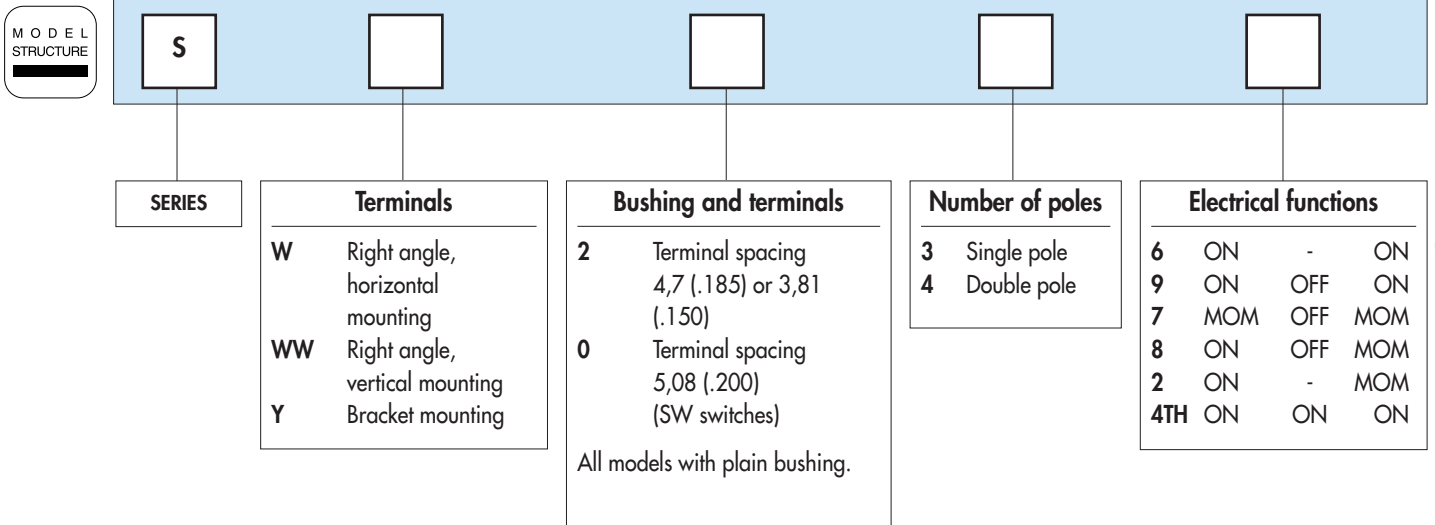
Availability : consult factory for details of approved models.

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

S series

Washable toggle switches - plain bushing

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :

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

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



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



Packaging unit : 50 or 25 pieces depending on model.

S series

Washable toggle switches - plain bushing

MODEL
STRUCTURE

A



- Straight PC or right angle terminals
- Terminal spacing 4,7 (.185) or 5,08 (.200) on SW switches
- 1 and 2 pole configurations

MODEL
STRUCTURE



Shown with lever (-7)

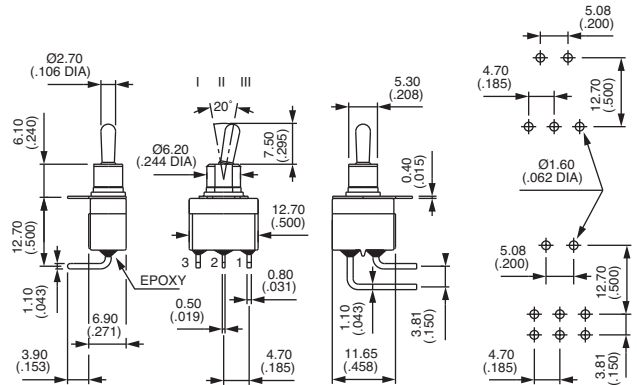
Right angle terminals - horizontal - spacing 4,7 (.185)



Single pole Double pole

SW236	SW246
SW239	SW249
SW237	SW247
SW238	SW248
SW232	SW242
	SW244TH*

III	II	I
2-3		2-1
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON



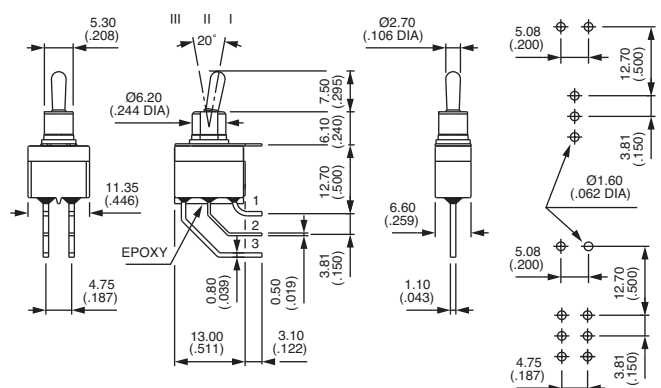
Right angle terminals - vertical



Single pole Double pole

SWW236	SWW246
SWW239	SWW249
SWW237	SWW247
SWW238	SWW248**
SWW232	SWW242**
	SWW244TH*

I	II	III
2-3		2-1
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON



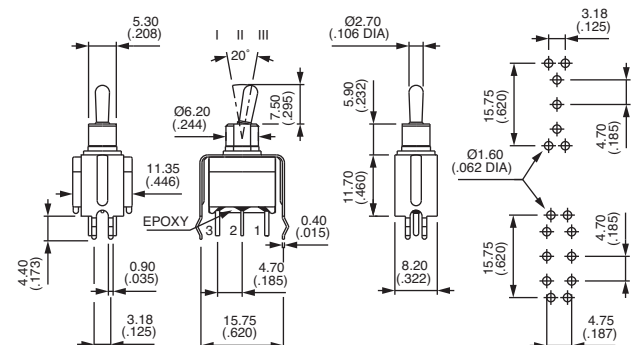
Bracket mounting



Single pole Double pole

SY236	SY246
SY239	SY249
SY237	SY247
SY238	SY248
SY232	SY242
	SY244TH*

III	II	I
2-3		2-1
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON



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

** Functions 2 and 8 : reversed connection available. Consult factory.



S series

Washable toggle switches - plain bushing

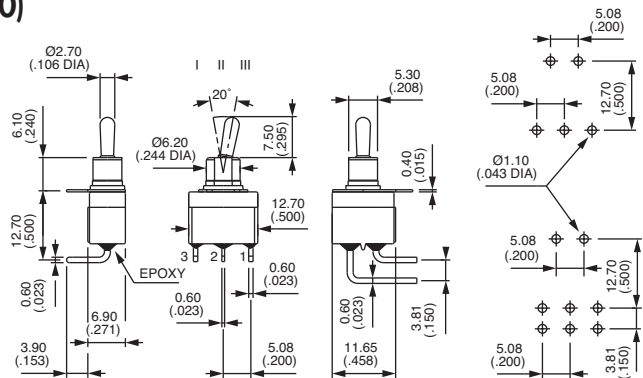
Right angle terminals - horizontal - spacing 5,08 (.200)



Single pole Double pole

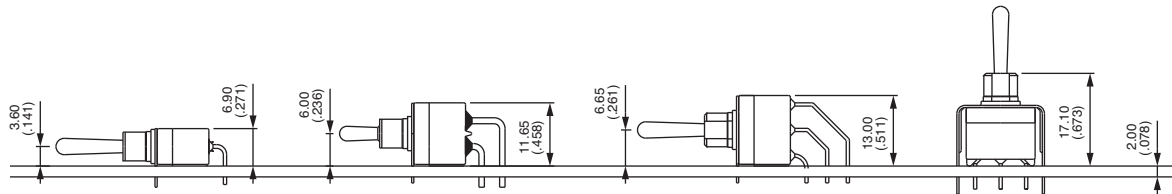
SW036	SW046
SW039	SW049
SW037	SW047
SW038	SW048
SW032	SW042
	SW044TH*

III	II	I
2-3		2-1
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON



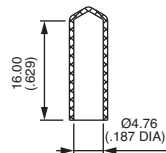
* Function 4 : SP in DP case, see end of catalogue.

PCB MOUNTING



CAP FOR PCB PROCESSING

Provide additional protection during PCB processing.
Supplied mounted on the switch or separately.
Material : vinyl



U3012

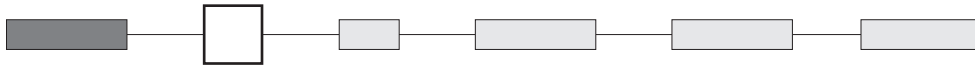
S series

Washable toggle switches - plain bushing

OPTIONS



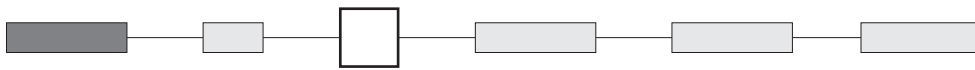
CONTACT MATERIALS



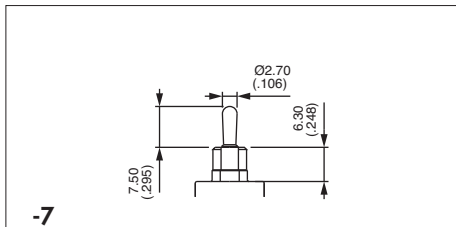
- A Silver
- AD Silver, gold plated
- CD Brass, gold plated

A

LEVERS

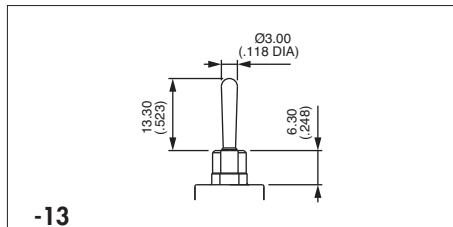


Dash compulsory before lever code.



-7

Standard



-13

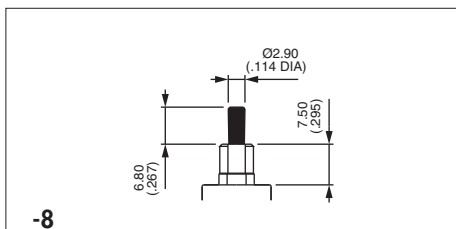
Long



If actuator not specified, we supply former default option -13.

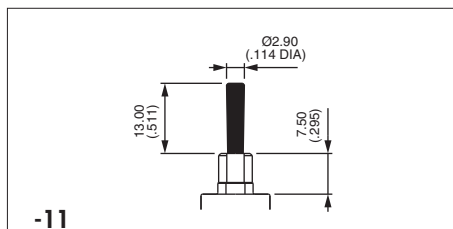
Insulated levers

Protected against electrostatic discharges (ESD) up to 12 KV. Black colour.



-8

Short



-11

Long



To combine with option X696.

SPECIAL OPTIONS

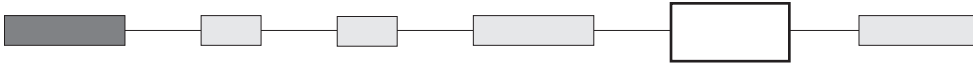


X601 Silver plated brass contacts
Lower rating - Minimum quantity : 5.000 pieces per model and shipment.

X696 Higher bushing 7,50 (.295). Compulsory for insulated levers 11 and 8.



AGENCY APPROVALS

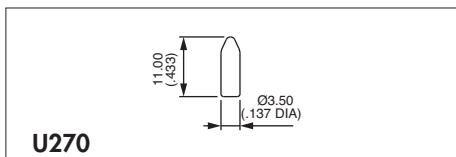
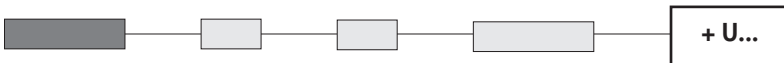


UL
CECC

Availability : consult factory for details of approved models.

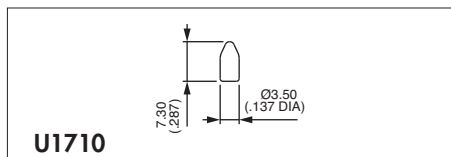
Marking : to order switches marked UL or CECC, please complete above box with desired approvals.
Blank : no agency approval required.

INSULATING CAPS



U270

For lever 13



U1710

For lever 7

Cap colours

Replace "0" by number

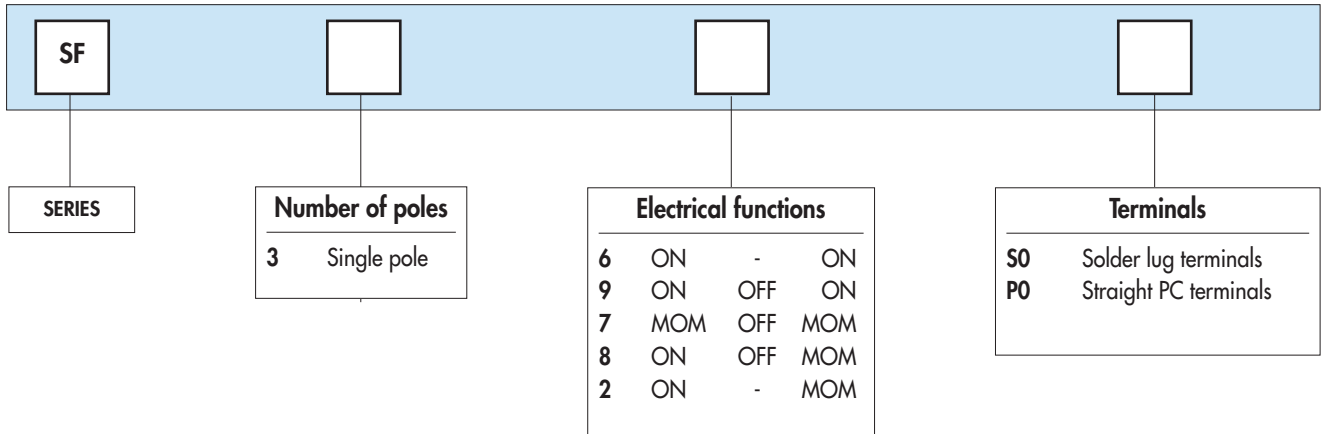
- | | |
|-----|-----------|
| 1 | blue |
| 1/4 | dark blue |
| 2 | black |
| 3 | green |
| 4 | grey |
| 5 | yellow |
| 6 | red |
| 7/1 | white |
| 9 | orange |

SF series

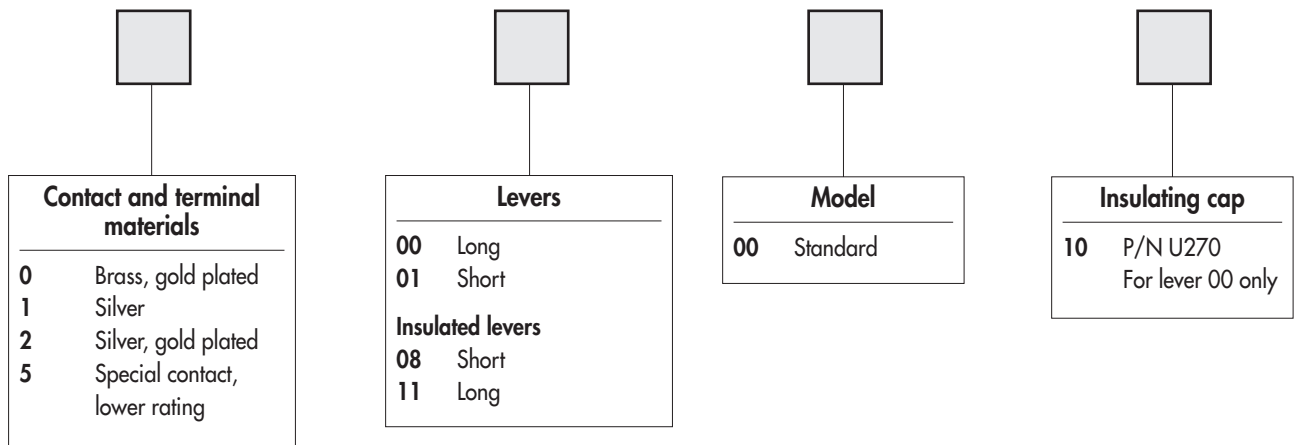
Washable toggle switches - insulated threaded bushing

Overview

MODEL
STRUCTURE



OPTIONS



ABOUT THIS SERIES

On the following pages, you will find successively :

- model structure of switches

- options in the same order as above

Specifications are at the beginning of the S series.

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



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



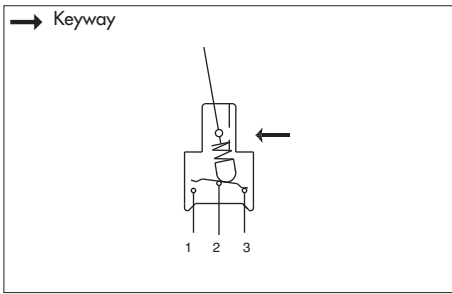
Packaging unit : 50 to 25 pieces depending on model.



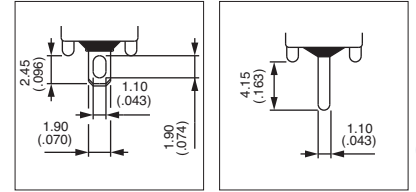
SF series

Washable toggle switches - insulated threaded bushing

Solder lug or straight PC terminals



- Single pole configurations
- Max. torque : 0,25 Nm (.184 Ft.lb)
- Iron soldering : 300°C max. 5 sec. max.
- Max. panel thickness :
2,5 mm (.098) with 2 nuts
4 mm (.157) with 1 nut



MODEL STRUCTURE



Shown with standard lever 00

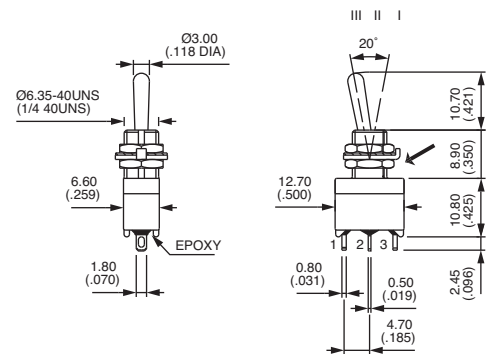
Solder lugs : SF..S0

→ Keyway



SF36S0
SF39S0
SF37S0
SF38S0
SF32S0

III	II	I
2-3		1-2
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM



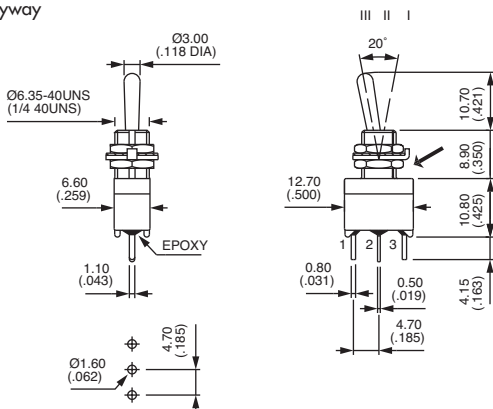
Straight PC terminals : SF..P0

→ Keyway

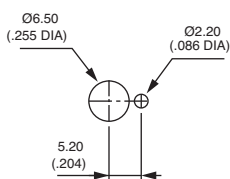


SF36P0
SF39P0
SF37P0
SF38P0
SF32P0

III	II	I
2-3		1-2
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM



PANEL CUT-OUT



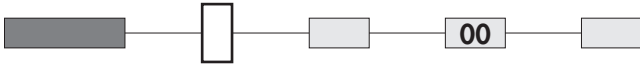
SF series

Washable toggle switches - insulated threaded bushing

OPTIONS

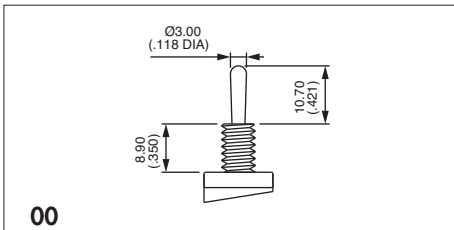
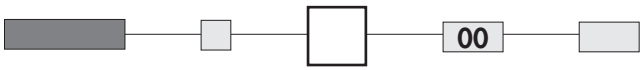


CONTACT AND TERMINAL MATERIALS



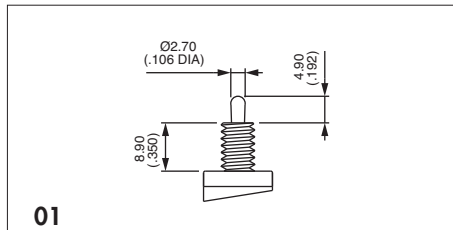
- 0 Brass, gold plated (standard)
- 1 Silver
- 2 Silver, gold plated
- 5 Special contact, lower rating, minimum quantity : consult factory.

LEVERS



00

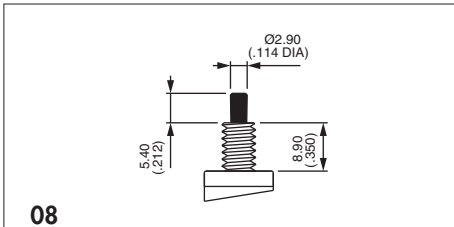
Standard



01

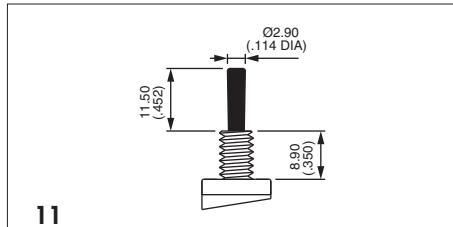
Insulated levers

Protected against electrostatic discharges (ESD) up to 12KV. Black colour.



08

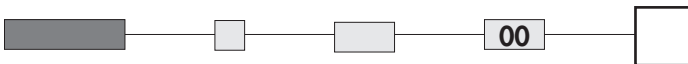
Short



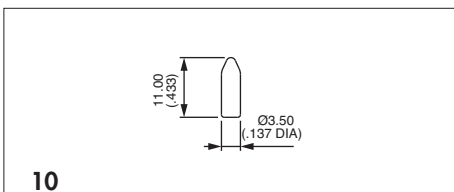
11

Long

INSULATING CAP



Blank Without cap



10

P/N U270 - For lever 00

To order cap separately, use its part number (U270).

Cap colours

Replace "0" by number

- 1 blue
- 1/4 dark blue
- 2 black
- 3 green
- 4 grey
- 5 yellow
- 6 red
- 7/1 white
- 9 orange

THE WIDEST RANGE IN MINIATURE SWITCHES



- 17 actuators including toggles, paddle levers and locking levers in different lengths.
- Various contact materials for low and high currents.
- 8 functions including maintained and momentary versions.
- 1 to 4 pole configurations.



- 12 terminal types including 9 for PC board mounting. Other types include quick-connect and wire-wrap.
- 6 bushing styles from 6 (.236) plain to 11,9 (15/32) threaded.
- 3 types of finish including military black.



- 3 approvals (UL - CSA - CECC).
- 4 types of sealing for terminal or front panel requirements.
- Numerous accessories available for actuator and bushing options.

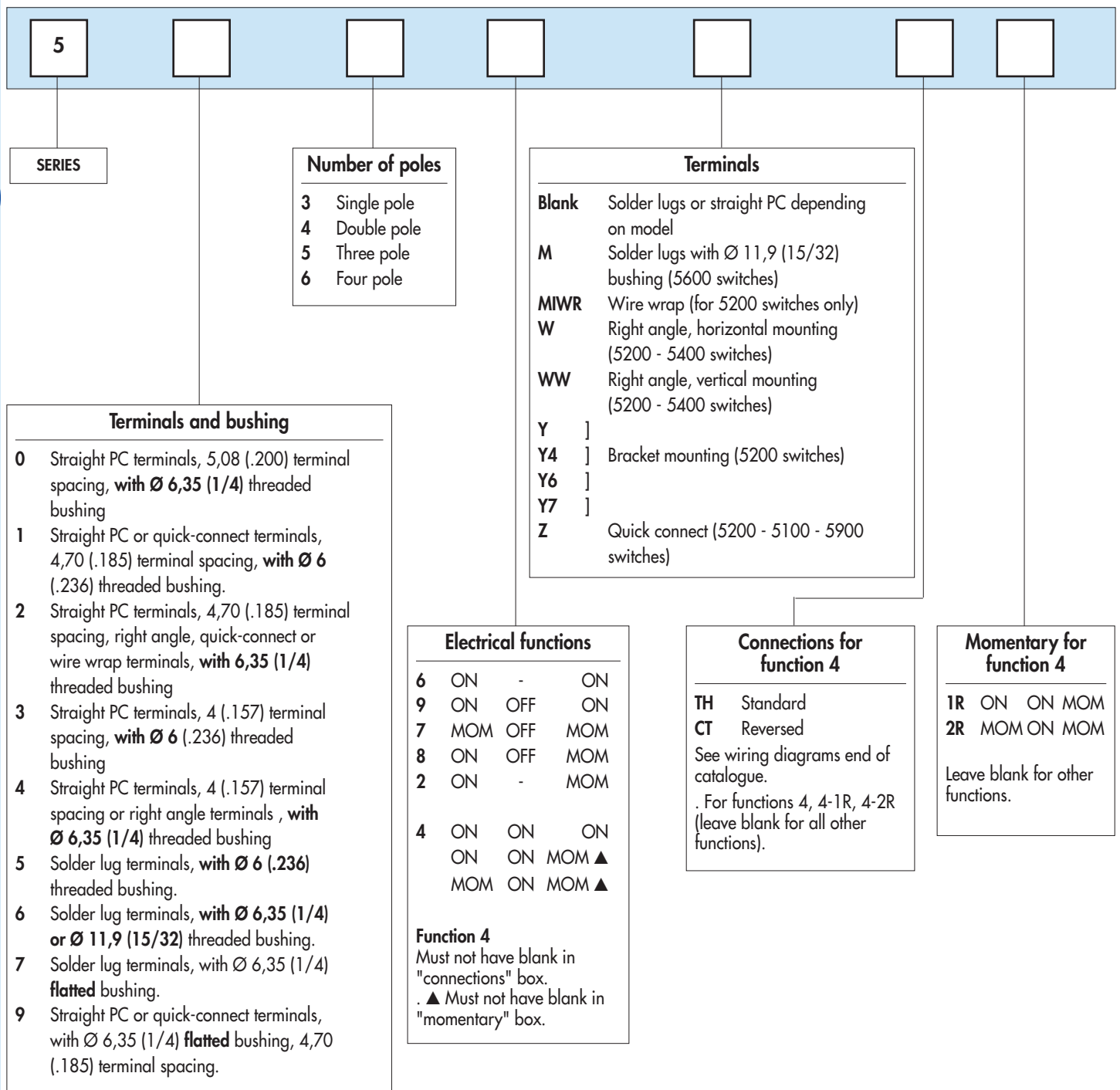
5000 series

Toggle switches

Overview

OPTIONS
● ● ●

A



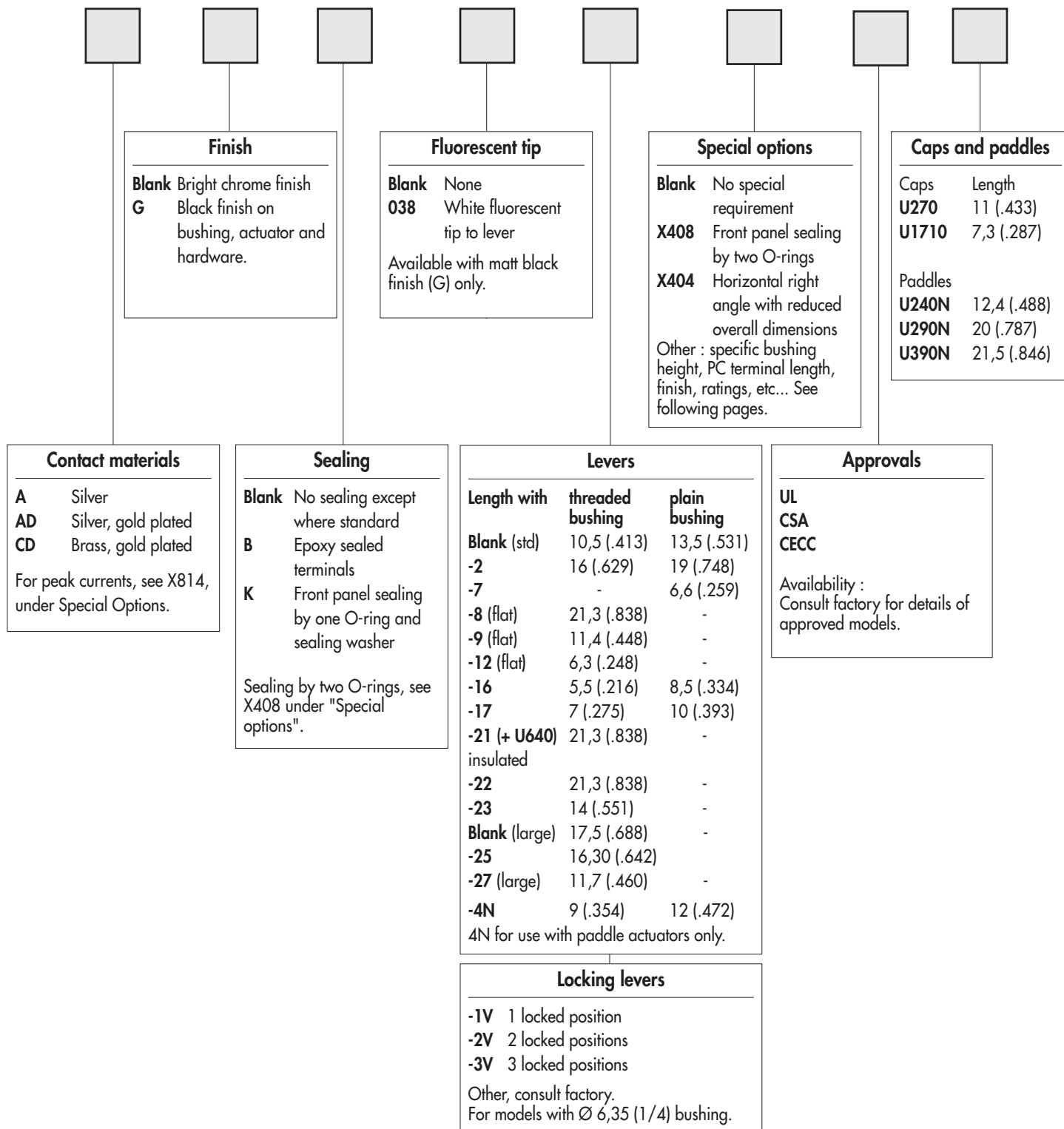
ABOUT THIS SERIES

- On the following pages, you will find successively :
- model structure of switches with threaded bushing
 - model structure of switches with plain bushing
 - options in the same order as in above chart

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



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



Sealing boots are available. They are presented in section H.



Mounting accessories : standard hardware supplied with all models with Ø 6,35 (1/4) or Ø 6 (.236) threaded bushing : 2 hex nuts 8 mm (.314) across flats, 1 locking ring and 1 lockwasher. Standard and special hardware available are presented in section I.



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

5000 series

Toggle switches

Specifications

ELECTRICAL SPECIFICATIONS

- Current/voltage rating with resistive load :

Contact	Maximum	Minimum	Level*
Silver (A)	4A 30VDC	50mA 10VDC	III and IV
Silver, gold plated (AD)	4A 30VDC Gold plating withstands up to 100mA 30VDC	10mA 50mV 10µA 5V	I to IV
Brass, gold plated (CD)	0,4 VA at 20VAC or DC	10mA 50mV 10µA 5V	I and II

- For inductive, lamp or capacitive load, consult factory. * For details, see Technical Information, end of catalogue.
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 1.000 Vrms 50 Hz min. between terminals
 - 1.500 Vrms 50 Hz min. between poles
 - 1.500 Vrms 50 Hz min. between terminals and frame
- Contact bounce : 2 ms max.
- Electrical life at full load :
 - 50.000 cycles for single and double pole
 - 40.000 cycles for 3 pole
 - 30.000 cycles for 4 pole
- Low level or mechanical life : 100.000 cycles

MATERIALS

- Case : diallylphthalate (DAP) or high temperature plastic material (UL94-V0)
- Actuator : brass, nickel plated
- Paddles : UL94HB polyamide
- Lever caps : vinyl
- Bushing : brass, nickel plated
- Housing : stainless steel or steel tin plated
- Contacts
 - A** : silver
 - AD** : silver, gold plated
 - CD** : brass, gold plated
 - X814** : for peak currents, see "Special options".
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

- Torque : 1,25 Nm (.922 Ft.lb) max. applied to nut
- Panel thickness : 2,5 mm (.098) with 2 nuts - 4 mm (.157) with 1 nut
- Operating temperature : -40°C to +85°C

AGENCY APPROVALS/PREFERENTIAL LIST



CECC 96201-007

3A 250VAC, 6A 125VAC

For **VDE**, refer to 55000 series.

NATO

Availability : consult factory for details of approved models.

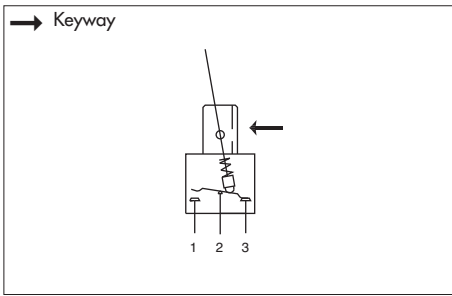
Marking : to order switches marked UL, CSA or CECC, complete appropriate box of ordering format. The preferential list does not appear on the switches.



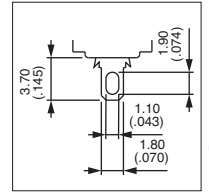
5000 series

Toggle switches - solder lug terminals

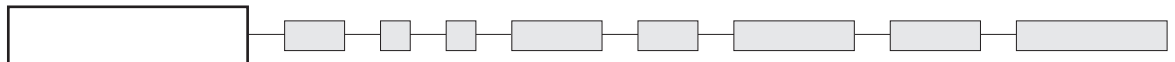
Threaded bushing $\varnothing 6,35$ (1/4) : 5600



- 1, 2, 3 and 4 pole configurations



MODEL STRUCTURE



Shown with standard lever

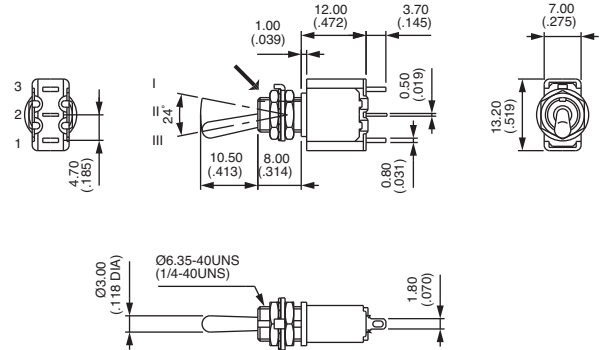
Single pole



5636
5639
5637
5638
5632

III	II	I
2-3		1-2
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

→ Keyway



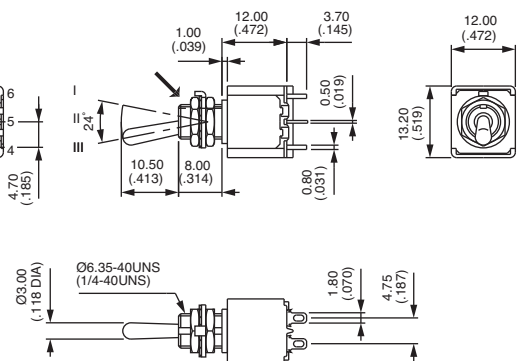
Double pole



5646
5649
5647
5648
5642
5644*
5644 1R*
5644 2R*

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM

→ Keyway



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

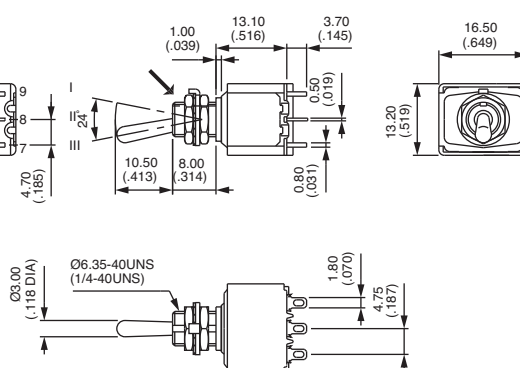
Three pole



5656
5659
5657
5658
5652

III	II	I
2-3		1-2
5-6		4-5
8-9		7-8
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

→ Keyway



5000 series

Toggle switches - solder lug terminals

Threaded bushing $\varnothing 6,35$ (1/4) : 5600

MODEL
STRUCTURE

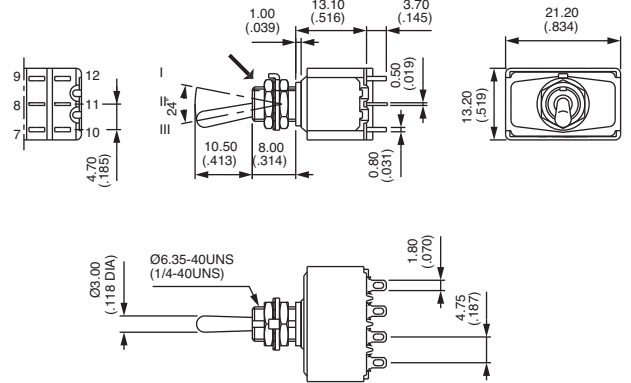
Four pole



5666
5669
5667
5668
5662
5664*
5664 1R*
5664 2R*

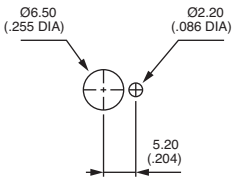
III	II	I
2-3		1-2
5-6		4-5
8-9		7-8
11-12		10-11
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM

→ Keyway

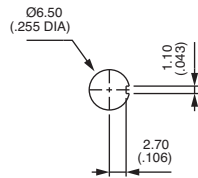


*Function 4 : DP in 4P case - specify CT or TH connections, see end of catalogue.

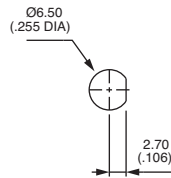
PANEL CUT-OUT



Standard



With K
sealing option



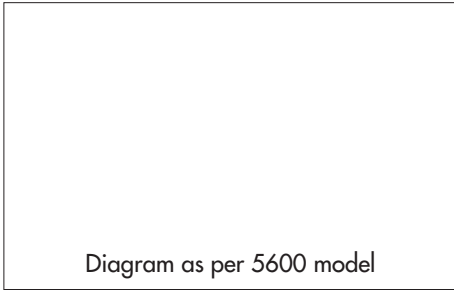
With X408
sealing option



5000 series

Toggle switches - solder lug terminals

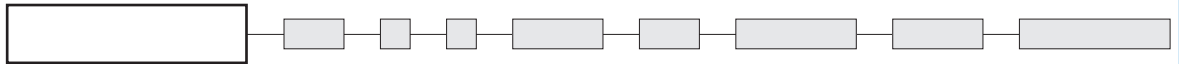
A



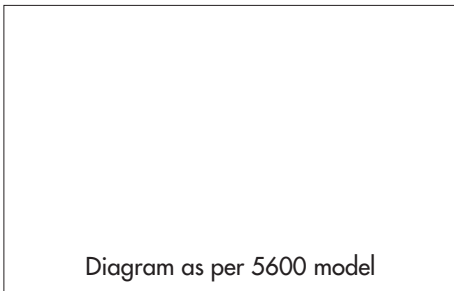
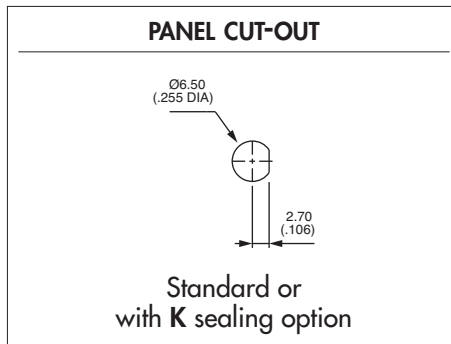
5700 models

- Flatted bushing $\varnothing 6,35$ mm (1/4)
- 1, 2, 3 and 4 pole configurations

MODEL STRUCTURE



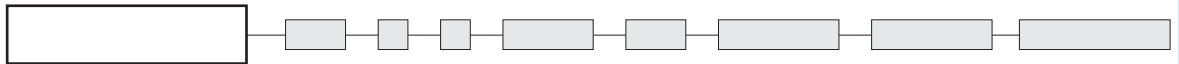
For model structure numbers, refer to 5600 models and replace 6 with 7.



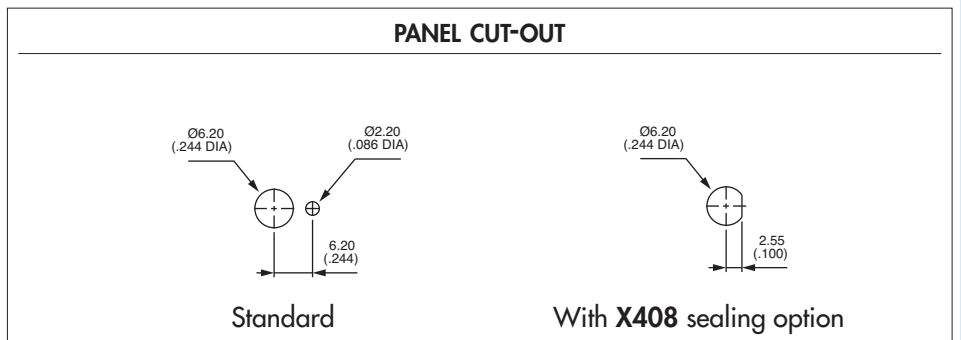
5500 models

- Threaded bushing $\varnothing 6$ mm x 0.75 SI (.236 x 0.75 IS)
- 1, 2, 3 and 4 pole configurations

MODEL STRUCTURE



For model structure numbers, refer to 5600 models and replace 6 with 5.



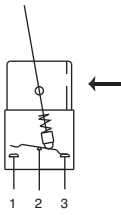
5000 series

Toggle switches - solder lug terminals

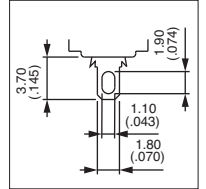
Threaded bushing \varnothing 11,9 (15/32) : 5600M

MODEL
STRUCTURE

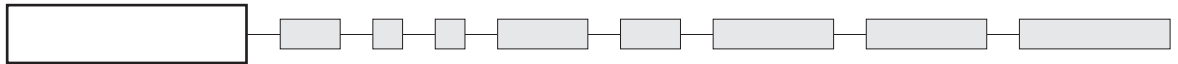
→ Keyway



- 1, 2, 3 and 4 pole configurations
- Supplied with 2 hex nuts and 1 locking ring
- Panel thickness up to 6 mm (.236)



MODEL
STRUCTURE



Shown with standard lever

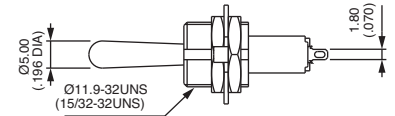
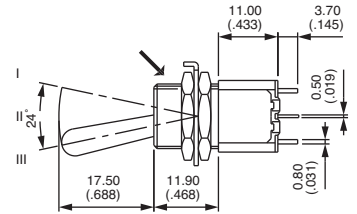
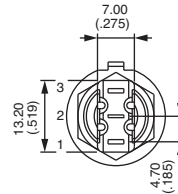
Single pole



5636M
5639M
5637M
5638M
5632M

III	II	I
2-3		1-2
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

→ Keyway



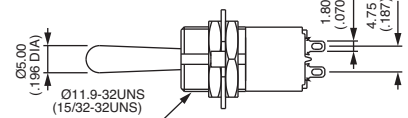
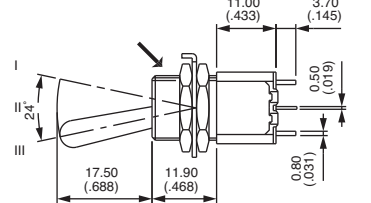
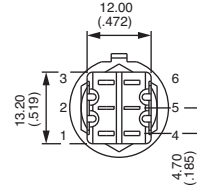
Double pole



5646M
5649M
5647M
5648M
5642M
5644M*
5644M 1R*
5644M 2R*

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM

→ Keyway



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

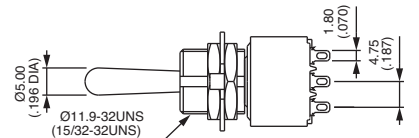
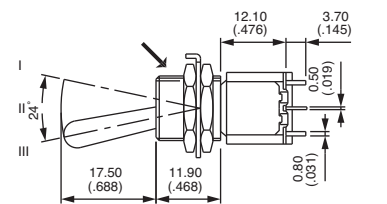
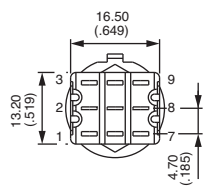
Three pole



5656M
5659M
5657M
5658M
5652M

III	II	I
2-3		1-2
5-6		4-5
8-9		7-8
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

→ Keyway





5000 series

Toggle switches - solder lug terminals

Threaded bushing $\varnothing 11,9$ (15/32) : 5600M

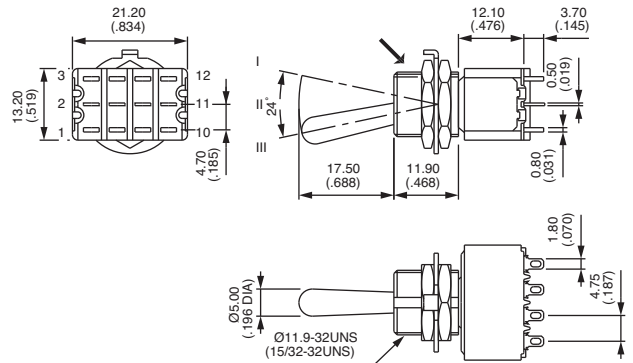
Four pole



5666M
5669M
5667M
5668M
5662M
5664M*
5664M 1R*
5664M 2R*

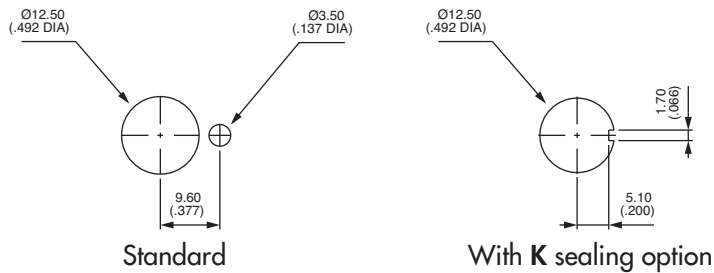
III	II	I
2-3		1-2
5-6		4-5
8-9		7-8
11-12		10-11
	ON	- ON
	ON	OFF ON
	MOM	OFF MOM
	ON	OFF MOM
	ON	- MOM
	ON	ON ON
	ON	ON MOM
	MOM	ON MOM

→ Keyway



*Function 4 : DP in 4P case - specify CT or TH connections, see end of catalogue.

PANEL CUT-OUT



OTHER : M bushing can be combined with other types such as : 5200, Z, MIWR... Consult factory.

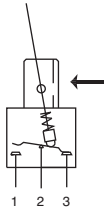
5000 series

Toggle switches - straight PC terminals

Threaded bushing \varnothing 6,35 (1/4) : 5200

MODEL
STRUCTURE

→ Keyway

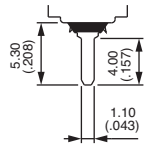


- Terminal spacing 4,7 mm (.185)
- 1, 2, 3 and 4 pole configurations
- Epoxy sealed terminals standard

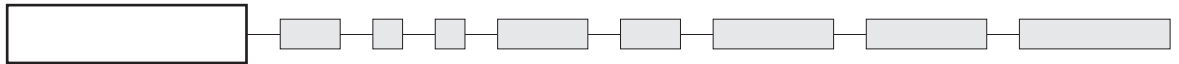
For new projects, we recommend switches with support bracket (option Y) which holds the switch securely on the PCB.

Other terminal lengths presented under "Special options".

Also available with plain bushing, see "Special options" X371



MODEL
STRUCTURE



Shown with standard lever

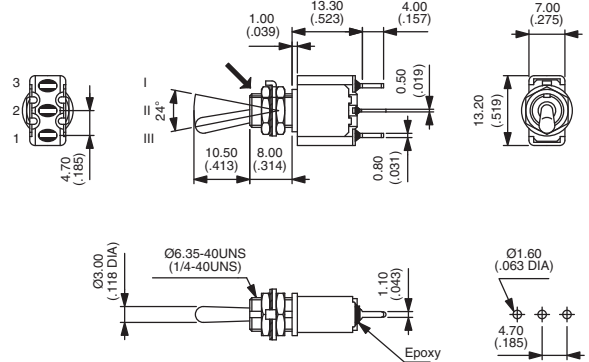
Single pole



5236 B
5239 B
5237 B
5238 B
5232 B

III	II	I
2-3		1-2
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

→ Keyway



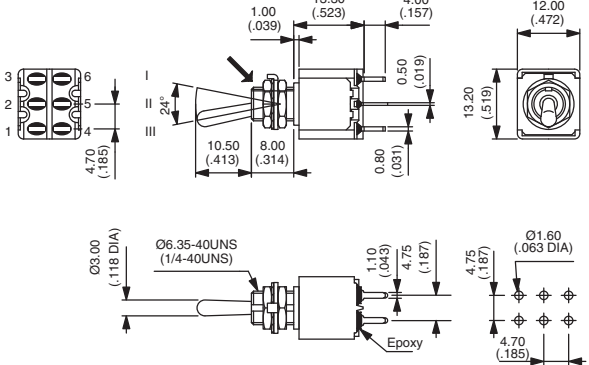
Double pole



5246 B
5249 B
5247 B
5248 B
5242 B
5244 B*
5244 1R B*
5244 2R B*

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM

→ Keyway



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

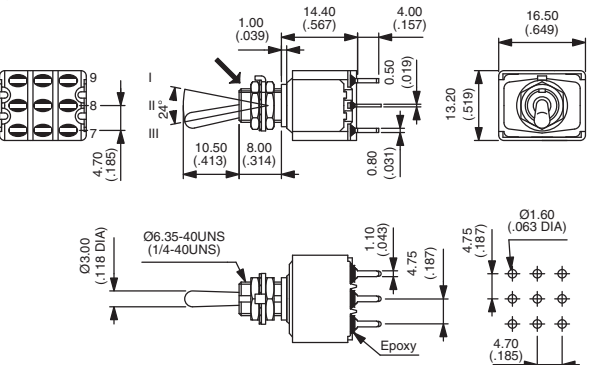
Three pole



5256 B
5259 B
5257 B
5258 B
5252 B

III	II	I
2-3		1-2
5-6		4-5
8-9		7-8
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

→ Keyway



5000 series

Toggle switches - straight PC terminals



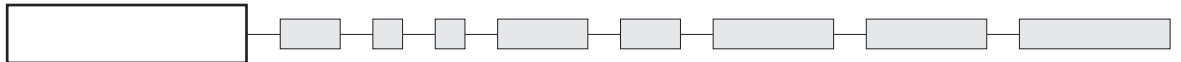
A

Diagram, as per 5200 model

5400 models

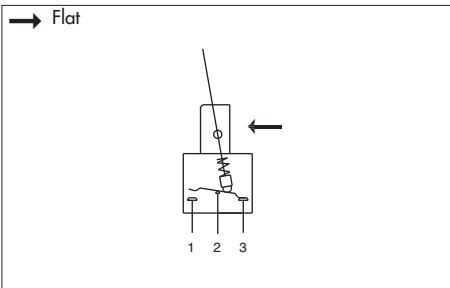
- Threaded bushing \varnothing 6,35 mm (1/4)
- Terminal spacing 4 mm (.157)
- 1, 2, 3 and 4 pole configurations

MODEL STRUCTURE



For model structure numbers, refer to 5200 models and replace 2 with 4.

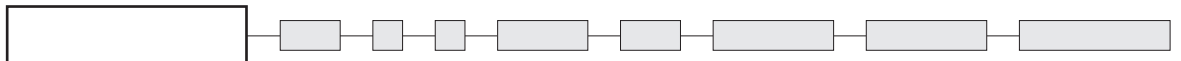
Panel cut-out, see 5200.



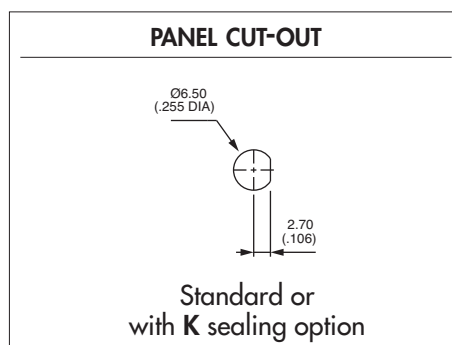
5900 models

- Flatted bushing \varnothing 6,35 mm (1/4)
- Terminal spacing 4,7 mm (.185)
- 1, 2, 3 and 4 pole configurations

MODEL STRUCTURE



For model structure numbers, refer to 5200 models and replace 2 with 9.



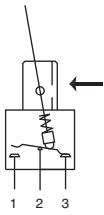
5000 series

Toggle switches - quick-connect terminals

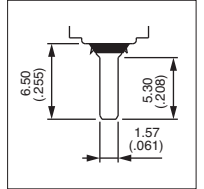
Threaded bushing \varnothing 6,35 (1/4) : 5200Z

MODEL
STRUCTURE

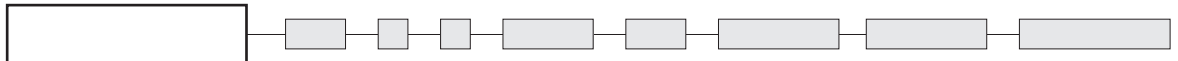
→ Keyway



- Terminal spacing 4,7 mm (.185)
- Epoxy sealed terminals standard
- 1 and 2 pole configurations



MODEL
STRUCTURE



Shown with standard lever

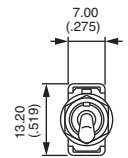
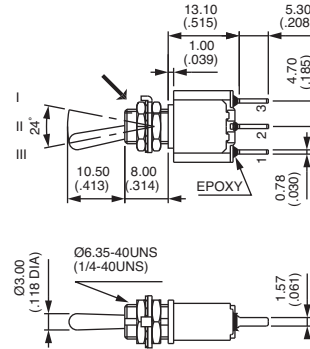
Single pole



5236Z
5239Z
5237Z
5238Z
5232Z

III	II	I
2-3		1-2
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

→ Keyway



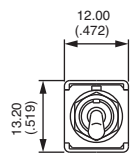
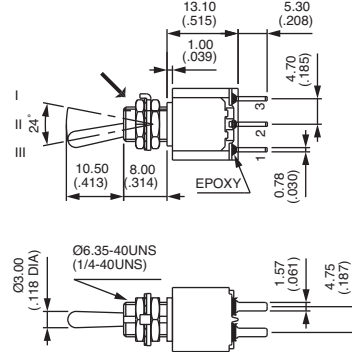
Double pole



5246Z
5249Z
5247Z
5248Z
5242Z
5244Z*
5244Z 1R*
5244Z 2R*

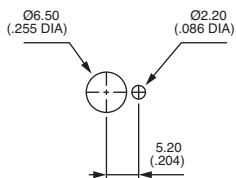
III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM

→ Keyway

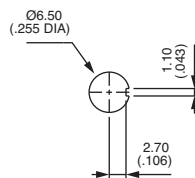


*Function 4 : SP in DP case - specify CT or TH connections, see end of catalogue.

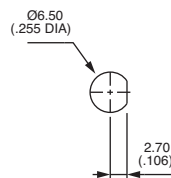
PANEL CUT-OUT



Standard



With K
sealing option



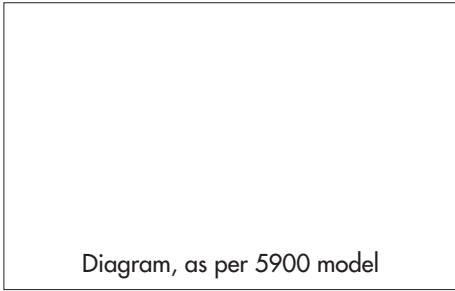
With X408
sealing option



5000 series

Toggle switches - quick-connect terminals

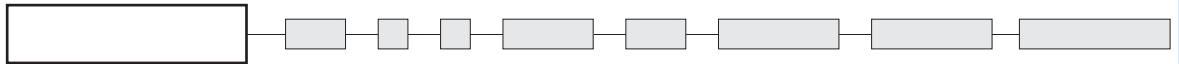
A



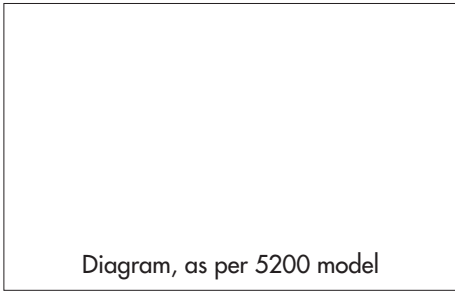
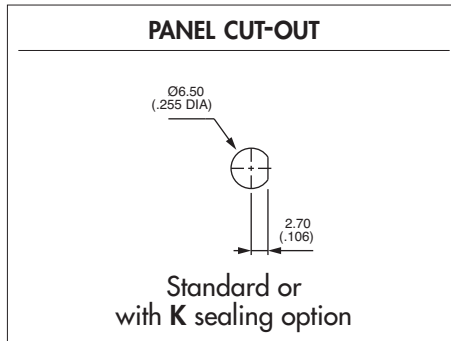
5900Z models

- Flatted bushing \varnothing 6,35 mm (1/4)
- Terminal spacing 4,7 mm (.185)
- Epoxy sealed terminals standard
- 1 and 2 pole configurations

MODEL STRUCTURE



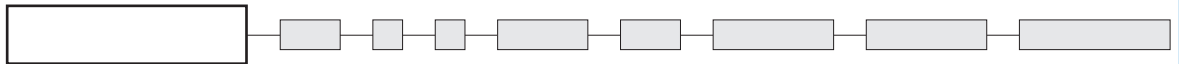
For model structure numbers, refer to 5200Z models and replace 2 with 9.



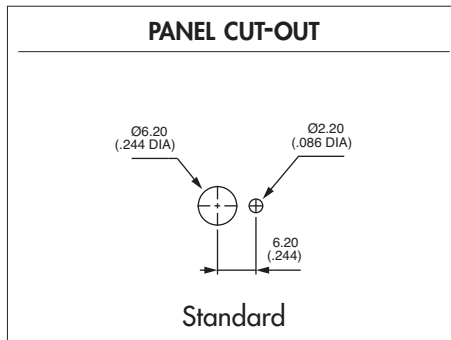
5100Z models

- Threaded bushing \varnothing 6 mm x 0.75 SI (.236 x 0.75 IS)
- Terminal spacing 4,7 mm (.185)
- Epoxy sealed terminals standard
- 1 and 2 pole configurations

MODEL STRUCTURE



For model structure numbers, refer to 5200Z models and replace 2 with 1.

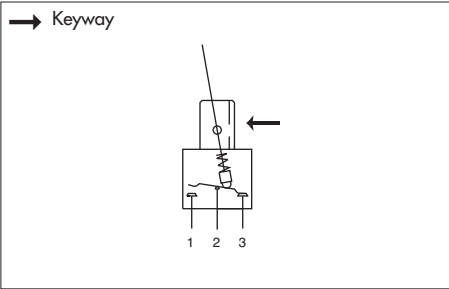


5000 series

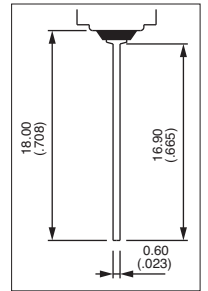
Toggle switches - wire-wrap terminals

Threaded bushing $\varnothing 6,35$ (1/4) : 5200MIWR

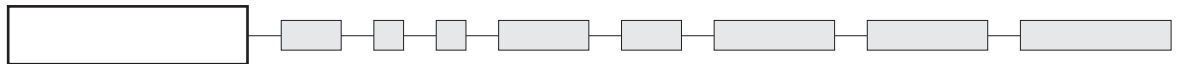
MODEL
STRUCTURE



- Terminal spacing 5,08 mm (.200)
- Epoxy sealed terminals standard
- 1 and 2 pole configurations
- Can also be used as extended PCB terminals



MODEL
STRUCTURE



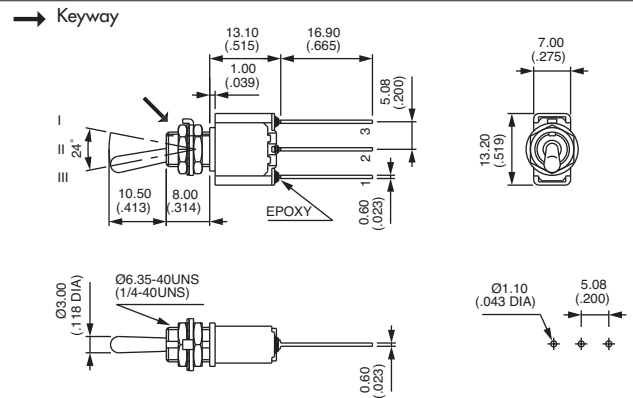
Shown with standard lever

Terminal spacing 5,08 (.200) - single pole



5236MIWR
5239MIWR
5237MIWR
5238MIWR
5232MIWR

III	II	I
2-3		1-2
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

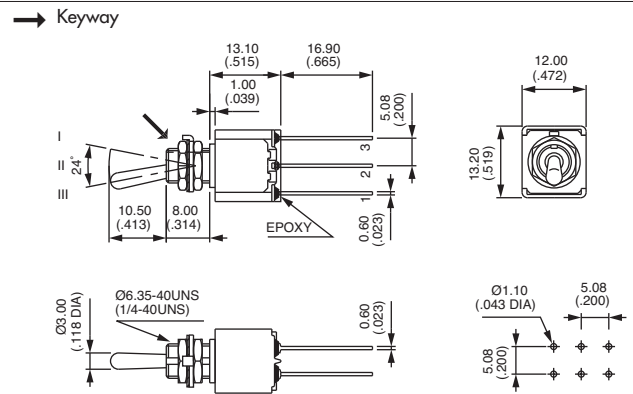


Terminal spacing 5,08 (.200) - double pole



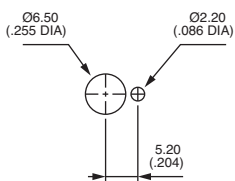
5246MIWR
5249MIWR
5247MIWR
5248MIWR
5242MIWR
5244 1R MIWR*
5244 1R MIWR*
5244 2R MIWR*

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM

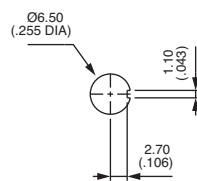


*Function 4 : SP in DP case - specify CT or TH connections, see end of catalogue.

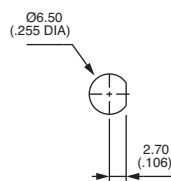
PANEL CUT-OUT



Standard



With K
sealing option



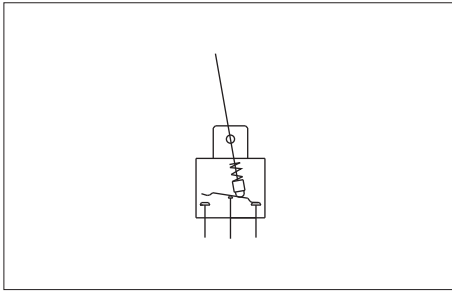
With X408
sealing option



5000 series

Toggle switches - plain bushing

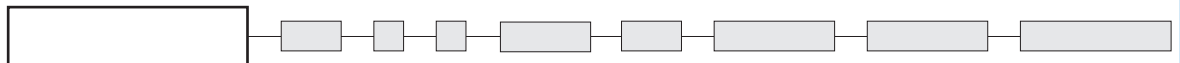
Right angle terminals - horizontal : 5200W



- Terminal spacing 4,7 mm (.185)
- 1, 2 and 3 pole configurations

Special switch **5200WX404** with reduced overall dimensions is presented under "Special options".

MODEL STRUCTURE



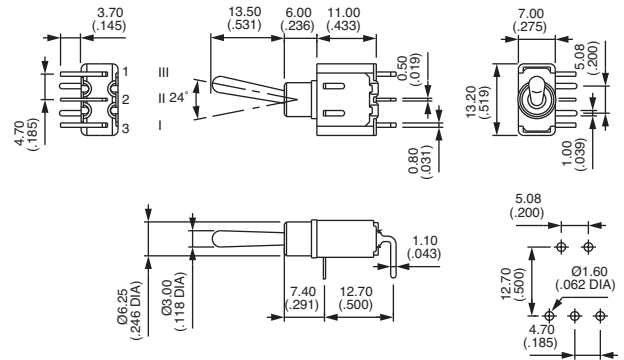
Shown with standard lever

Single pole



5236W
5239W
5237W
5238W
5232W

III	II	I
2-3		1-2
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

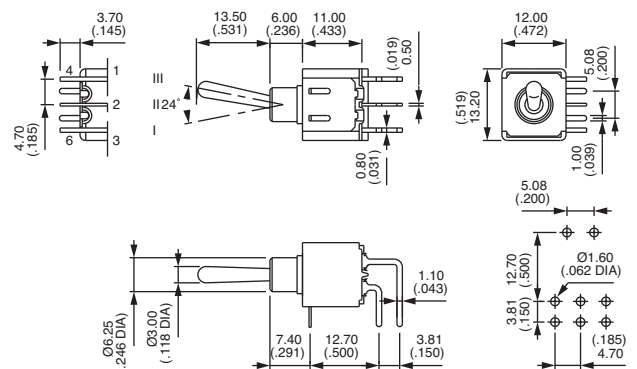


Double pole



5246W
5249W
5247W
5248W
5242W
5244W*
5244W 1R*
5244W 2R*

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM



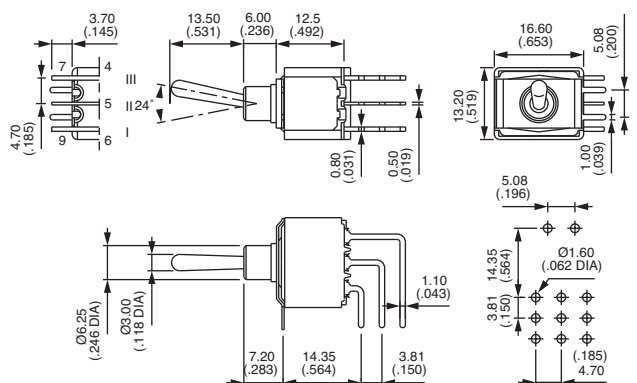
*Function 4 : SP in DP case - specify CT or TH connections, see end of catalogue.

Three pole



5256W
5259W
5257W
5258W
5252W

III	II	I
2-3		1-2
5-6		4-5
8-9		7-8
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM



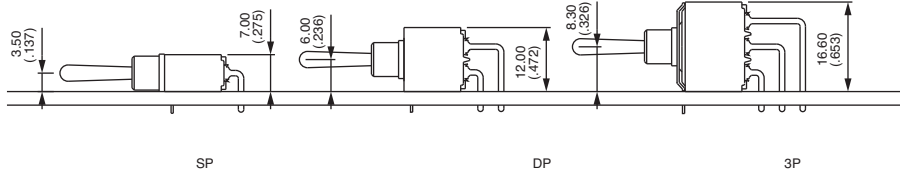
5000 series

Toggle switches - plain bushing

Right angle terminals - horizontal : 5400W

MODEL
STRUCTURE

PCB MOUNTING FOR 5200W



A

5400W models

- Terminal spacing 4 mm (.157)
- 1 and 2 pole configurations

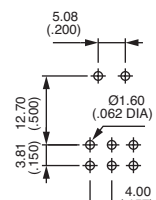
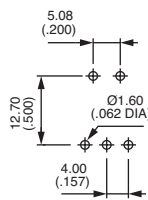
Diagram, as per 5200W model

MODEL STRUCTURE



For model structure numbers, refer to **5200W** single and double pole and replace 2 with 4.

PC LAYOUT

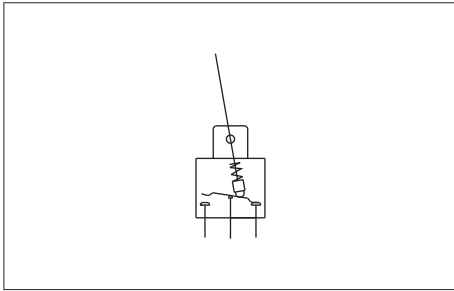




5000 series

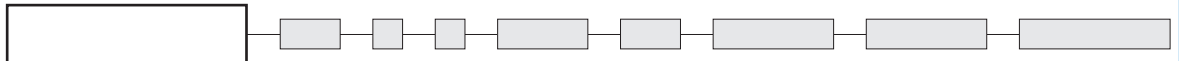
Toggle switches - plain bushing

Right angle terminals - vertical : 5200WW



- Pin spacing 3,81 mm (.150)
- 1, 2, 3 and 4 pole configurations

MODEL STRUCTURE



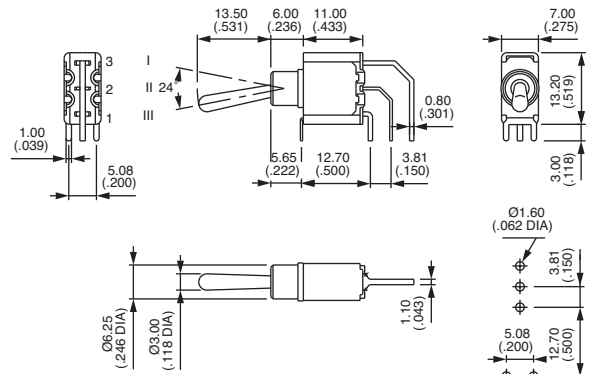
Shown with standard lever

Single pole



5236WW
5239WW
5237WW
5238WW**
5232WW**

III	II	I
2-3		1-2
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

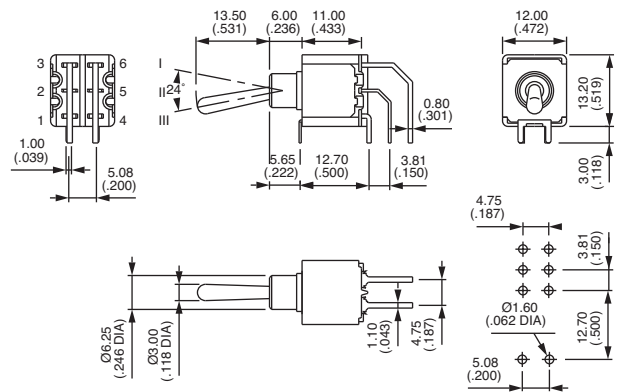


Double pole



5246WW
5249WW
5247WW
5248WW**
5242WW**
5244WW*
5244WW 1R*
5244WW 2R*

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM

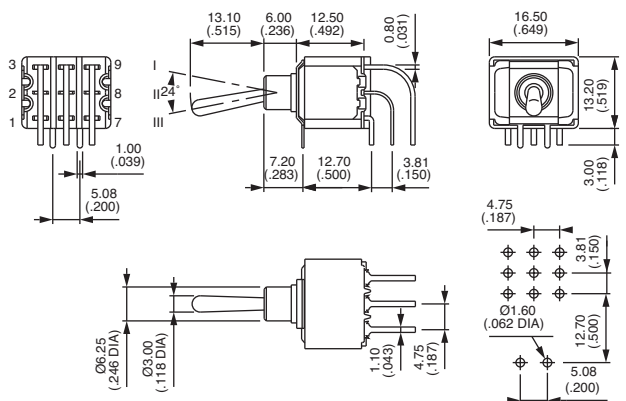


Three pole



5256WW
5259WW
5257WW
5258WW**
5252WW**

III	II	I
2-3		1-2
5-6		4-5
8-9		7-8
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM



* and ** : see notes next page.

5000 series

Toggle switches - plain bushing

Right angle terminals - vertical : 5200WW - 5400WW

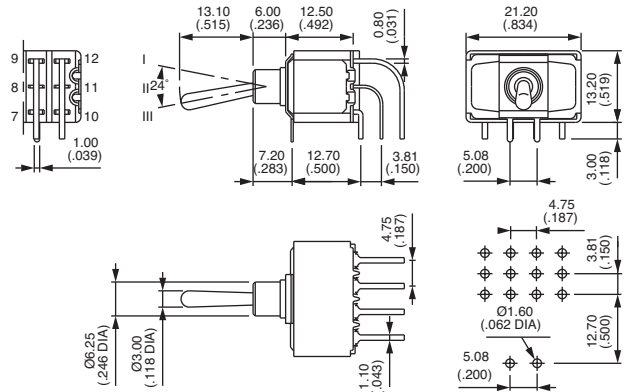


Four pole



5266WW
5269WW
5267WW
5268WW**
5262WW**
5264WW*
5264WW 1R*
5264WW 2R*

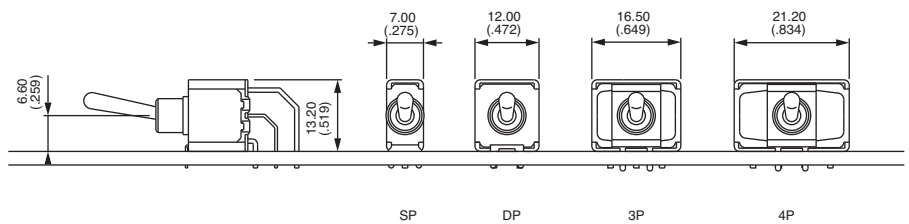
III	II	I
2-3		1-2
5-6		4-5
8-9		7-8
11-12		10-11
	ON	- ON
	ON	OFF ON
	MOM	OFF MOM
	ON	OFF MOM
	ON	- MOM
	ON	ON ON
	ON	ON MOM
	MOM	ON MOM



* Function 4 : SP in DP case, DP in 4P case - specify CT or TH connections, see end of catalogue.

** Functions 2 and 8 : reversed connection available, consult factory.

PCB MOUNTING

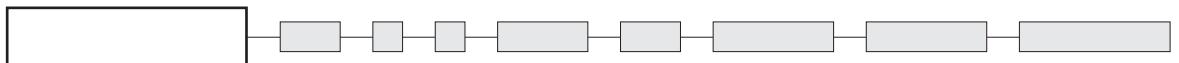


5400WW models

- Pin spacing 2,54 mm (.100)
- 1, 2, 3 and 4 pole configurations

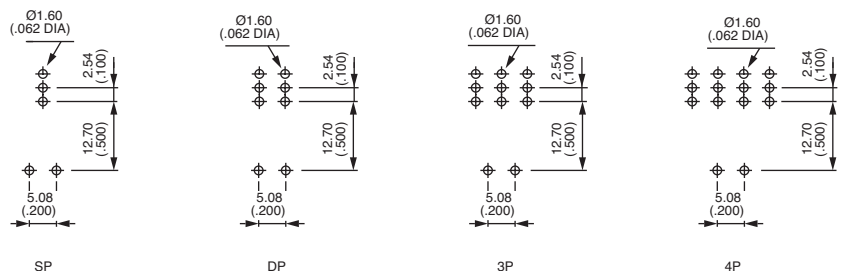
Diagram as per 5200WW model

MODEL STRUCTURE



For model structure numbers, refer to 5200WW models and replace 2 with 4.

PC LAYOUT

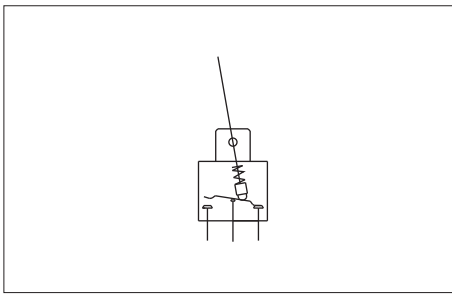




5000 series

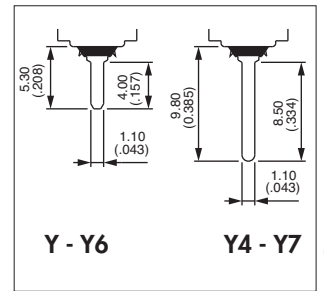
Toggle switches - plain bushing

Straight PC terminals - bracket mounting : 5200Y

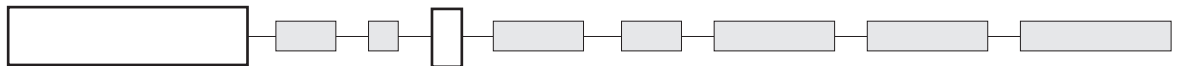


Brackets reduce mechanical stress on solder joints and increase resistance to vibrations.
Bracket material : tin plated steel.

- Epoxy sealed terminals standard
- 1 and 2 pole configurations



MODEL
STRUCTURE



Shown with standard lever

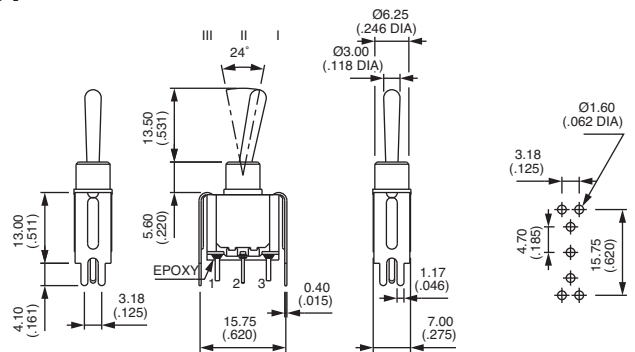
Short bracket - width 15,75 (.620) - single pole : 5230Y



5236Y B
5239Y B
5237Y B
5238Y B
5232Y B

III	II	I
2-3		1-2

ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM



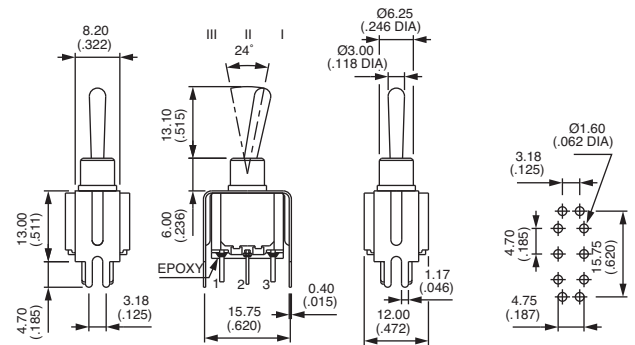
Short bracket - width 15,75 (.620) - double pole : 5240Y



5246Y B
5249Y B
5247Y B
5248Y B
5242Y B
5244Y B*
5244Y 1R B*
5244Y 2R B*

III	II	I
2-3		1-2
5-6		4-5

ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM



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

5000 series

Toggle switches - plain bushing

Straight PC terminals - bracket mounting : 5200Y4 - Y6 - Y7

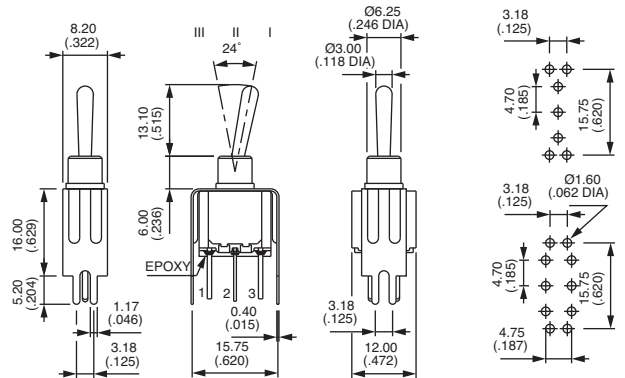


A

Tall bracket - width 15,75 (.620) : 5200Y4



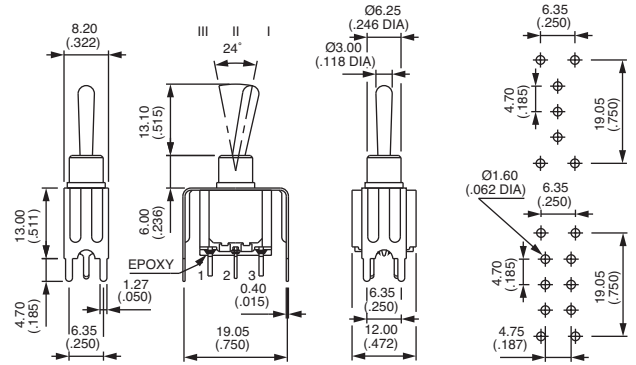
	Single pole	Double pole	III	II	I
5236Y4 B	5246Y4 B	ON	-	ON	
5239Y4 B	5249Y4 B	ON	OFF	ON	
5237Y4 B	5247Y4 B	MOM	OFF	MOM	
5238Y4 B	5248Y4 B	ON	OFF	MOM	
5232Y4 B	5242Y4 B	ON	-	MOM	
	5244Y4 B*	ON	ON	ON	
	5244Y4 1R B*	ON	ON	MOM	
	5244Y4 2R B*	MOM	ON	MOM	



Short bracket - width 19,05 (.750) : 5200Y6



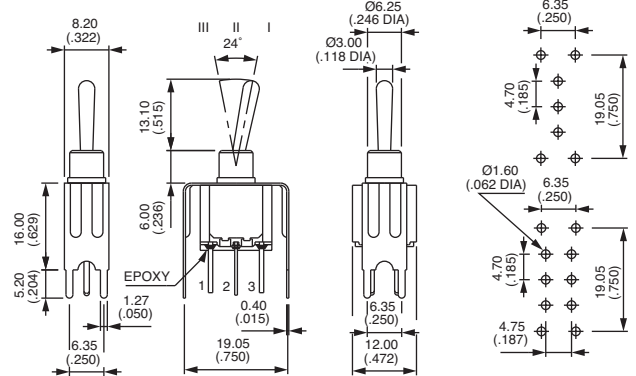
	Single pole	Double pole	III	II	I
5236Y6 B	5246Y6 B	ON	-	ON	
5239Y6 B	5249Y6 B	ON	OFF	ON	
5237Y6 B	5247Y6 B	MOM	OFF	MOM	
5238Y6 B	5248Y6 B	ON	OFF	MOM	
5232Y6 B	5242Y6 B	ON	-	MOM	
	5244Y6 B*	ON	ON	ON	
	5244Y6 1R B*	ON	ON	MOM	
	5244Y6 2R B*	MOM	ON	MOM	



Tall bracket - width 19,05 (.750) : 5200Y7



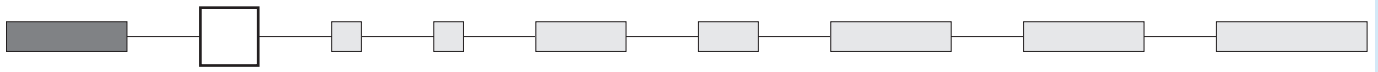
	Single pole	Double pole	III	II	I
5236Y7 B	5246Y7 B	ON	-	ON	
5239Y7 B	5249Y7 B	ON	OFF	ON	
5237Y7 B	5247Y7 B	MOM	OFF	MOM	
5238Y7 B	5248Y7 B	ON	OFF	MOM	
5232Y7 B	5242Y7 B	ON	-	MOM	
	5244Y7 B*	ON	ON	ON	
	5244Y7 1R B*	ON	ON	MOM	
	5244Y7 2R B*	MOM	ON	MOM	



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



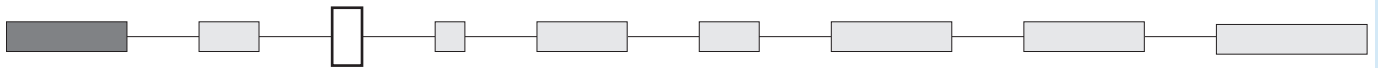
CONTACT MATERIALS



- A Silver
- AD Silver, gold plated
- CD Brass, gold plated

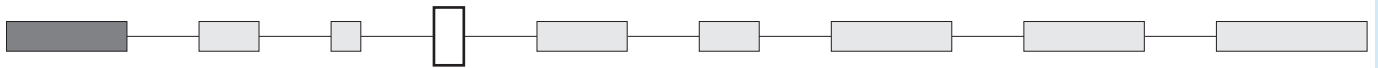
Special contacts for peak currents : see X814, under "Special Options".

FINISH



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

SEALING



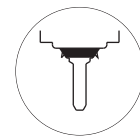
- Blank
 - For 5000 - 5200Z and 5200MIWR models : epoxy sealed terminals standard
 - Other models : no sealing required

- B Epoxy sealed terminals

- 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.

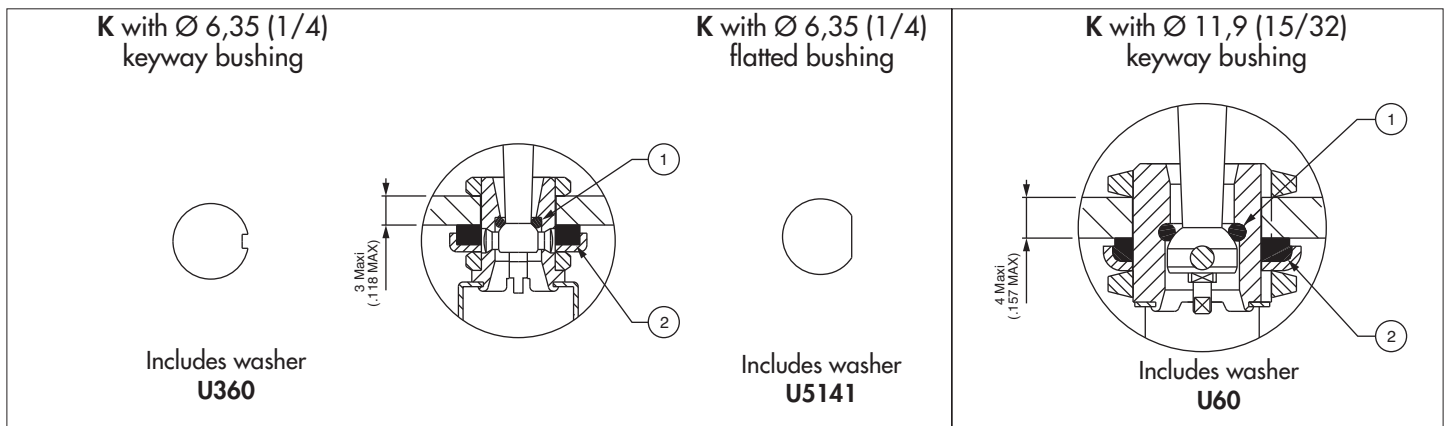


Available on models with $\varnothing 6,35 (1/4)$ or $11,9 (15/32)$ threaded bushing only.
Not available with levers 8, 9, 12, 22, 23.



- KB Combined sealings

- ① O-ring
- ② Sealing washer



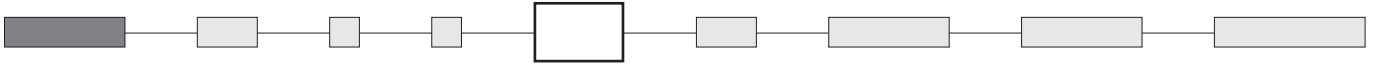
Sealing by two O-rings, see X408 under "Special options".

5000 series

Toggle switches



FLUORESCENT TIP



Blank None

Standard lever

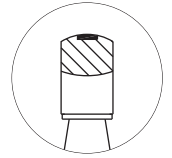
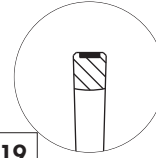
Locking lever

038 White fluorescent tip.
Becomes luminous when submitted to ultraviolet rays.



Available with matt black finish (option G) only.

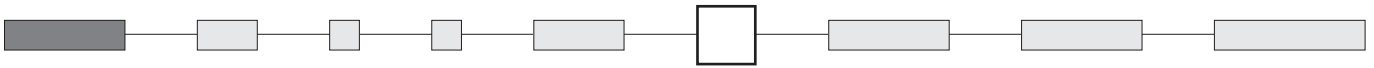
Consult factory for levers available with this option.



-19

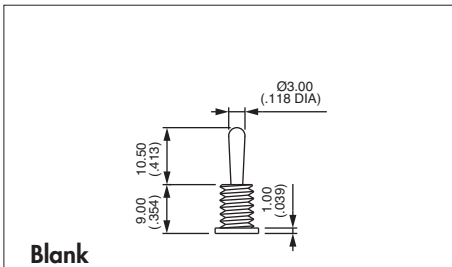
Same dimensions as standard actuator below.

ACTUATORS

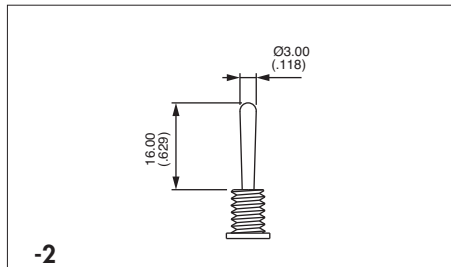


Levers for threaded bushing models $\varnothing 6,35$ (1/4) or $\varnothing 6$ (.236)

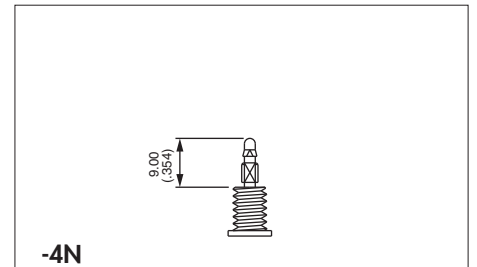
Dash compulsory before lever code.



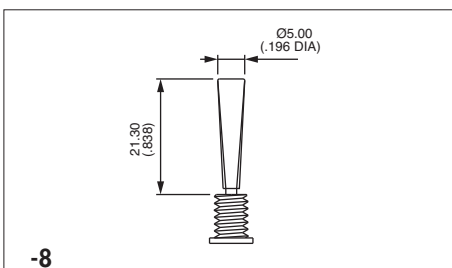
Blank
Standard



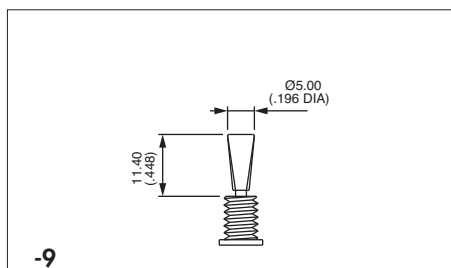
-2



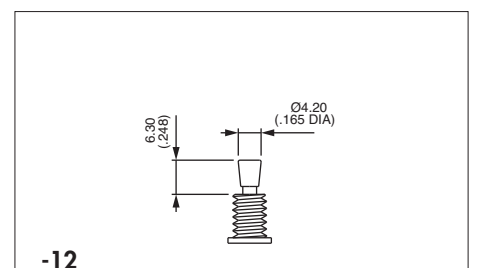
-4N
For use with paddles only



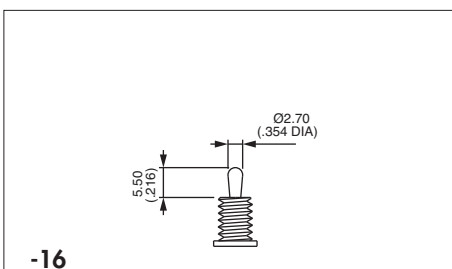
-8
Not available with sealing options K or X408



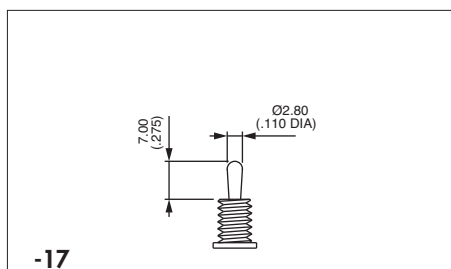
-9
Not available with sealing options K or X408



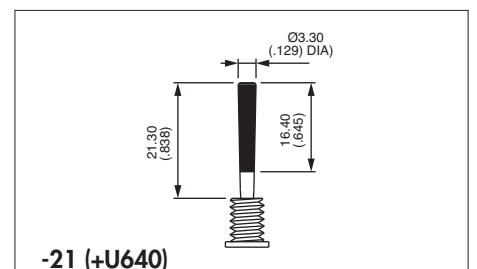
-12
Not available with sealing options K or X408



-16



-17

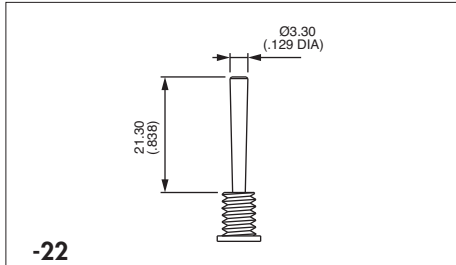


-21 (+U640)
U640 to be placed in last box of ordering format. Replace 0 by colour code.



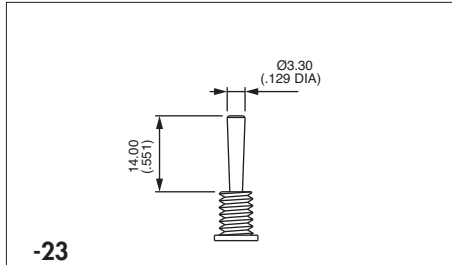
A

ACTUATORS (continued)



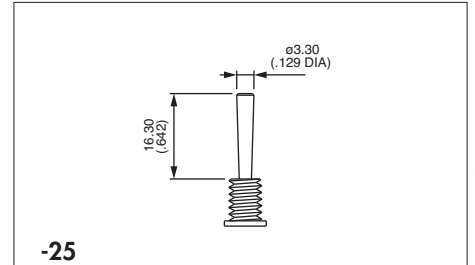
-22

Not available with sealing options K or X408



-23

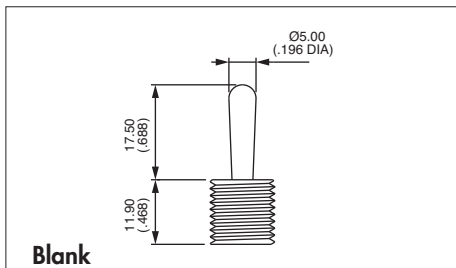
Not available with sealing options K or X408



-25

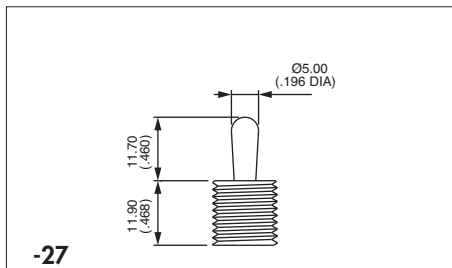
Not available with sealing options K or X408

Levers for threaded bushing models $\varnothing 11,9$ (15/32) : 5600M



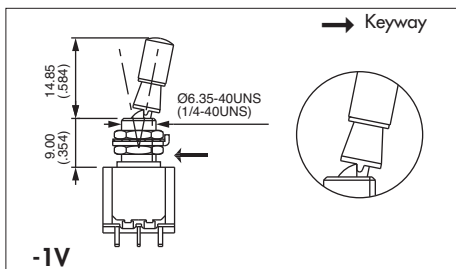
Blank

Standard



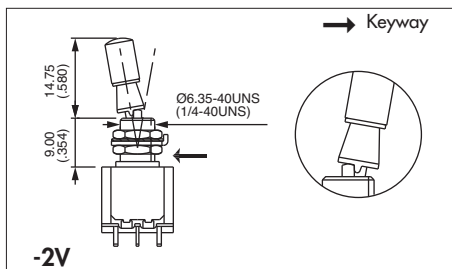
-27

Locking levers



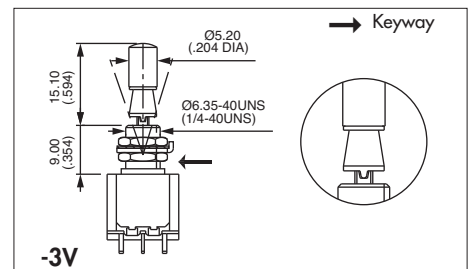
-1V

1 locked position (function 6)



-2V

2 locked positions (function 6)



-3V

3 locked positions (functions 9 and 4)

Consult factory for other locking lever options.



Available with $\varnothing 6,35$ mm (1/4) threaded bushing models only.
For plain bushing models, see X386 or X916 under "Special options" on the following pages.

5000 series

Toggle switches

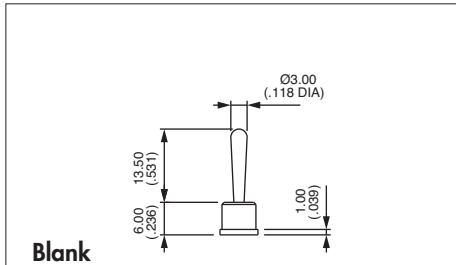
OPTIONS



ACTUATORS (continued)

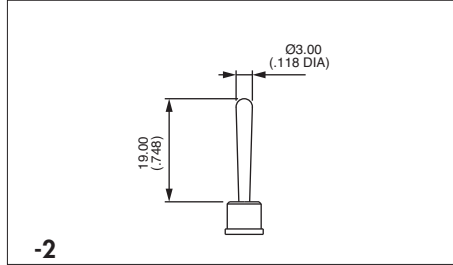
For plain bushing models : W - WW and Y

A

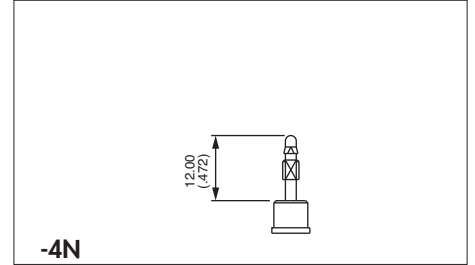


Blank

Standard

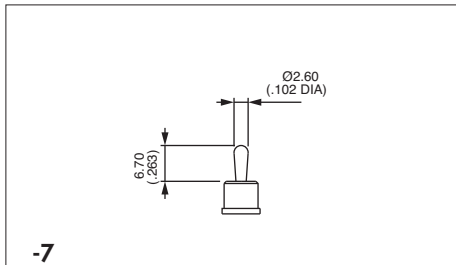


-2

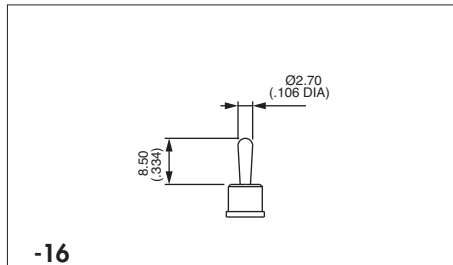


-4N

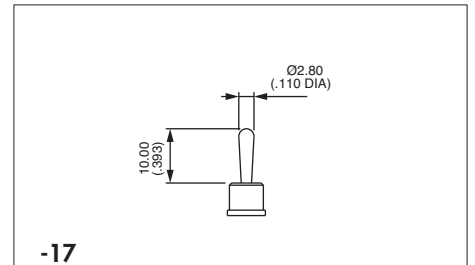
For use with paddles only



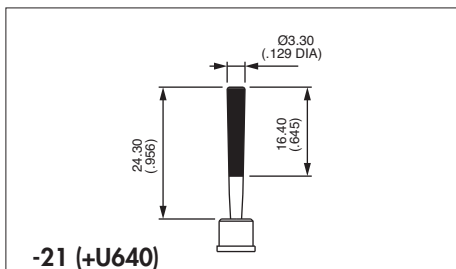
-7



-16



-17



-21 (+U640)

U640 to be placed in last box of ordering format. Replace 0 by colour code.

Actuator colours

Replace "0" by number

- | | |
|-----|-----------|
| 1 | blue |
| 1/4 | dark blue |
| 2 | black |
| 3 | green |
| 4 | grey |
| 5 | yellow |
| 6 | red |
| 7 | ivory |
| 7/1 | white |
| 9 | orange |



LEVER LENGTH

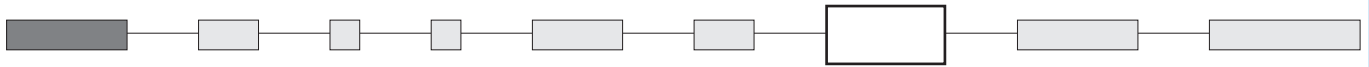
With bracket or mounting plate lever length will be reduced by 0,4 mm (.015) as a rule. Please refer to switch technical drawings in "Model Structure" pages for details.



5000 series

Toggle switches

SPECIAL OPTIONS

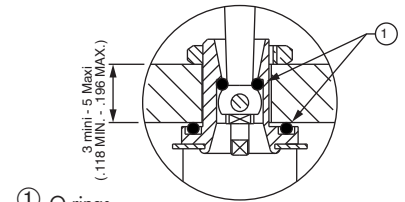


Blank No special requirement

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. Includes sealed terminals (option B).

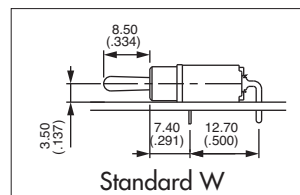


Available only on models with threaded bushing except 5600M. Not available with levers 8, 9, 12, 22, 23.

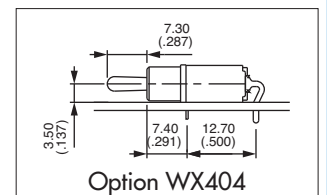


① O-rings

X404 Horizontal right angle with reduced overall dimensions (shown with lever -16)



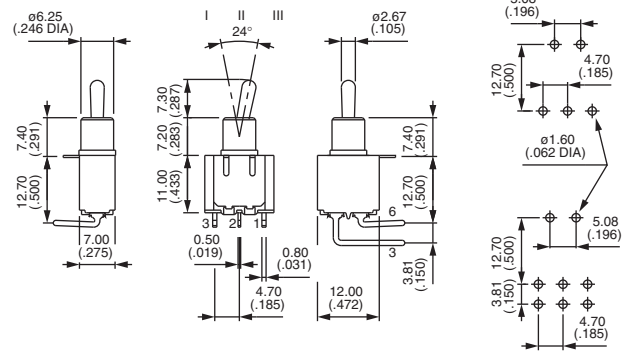
Standard W



Option WX404

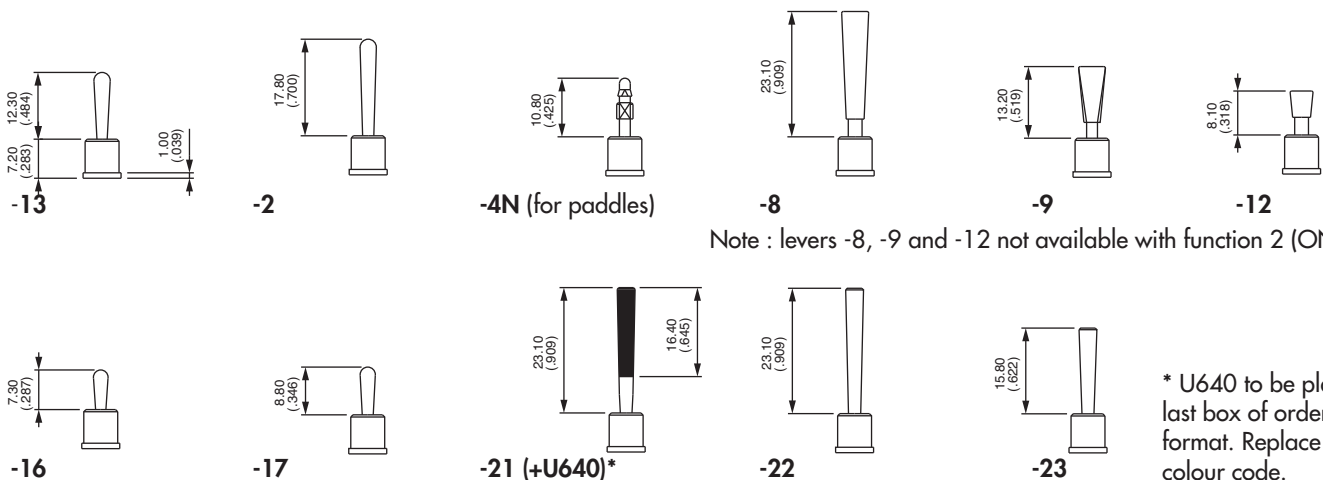


	III	II	I
	2-3		1-2
	5-6		4-5
Single pole			
5236W X404	5246W X404	ON -	ON
5239W X404	5249W X404	ON OFF	ON
5237W X404	5247W X404	MOM OFF	MOM
5238W X404	5248W X404	ON OFF	MOM
5232W X404	5242W X404	ON -	MOM
	5244W X404*	ON ON	ON
	5244W1R X404*	ON ON	MOM
	5244W2R X404*	MOM ON	MOM



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

Levers lengths for WX404 (also available with X445 option)



Note : levers -8, -9 and -12 not available with function 2 (ON-MOM)

* U640 to be placed in last box of ordering format. Replace 0 by colour code.

Insulating caps and paddles for X404 :

Insulating cap U1710 available with lever style 16.

Paddles U240N, U290N and U390N available with lever style 4N. See details on next pages.

5000 series

Toggle switches

OPTIONS

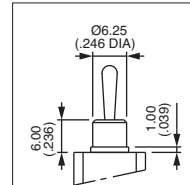


SPECIAL OPTIONS (continued)



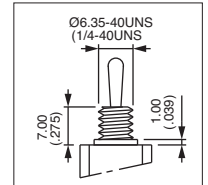
With options X372, X386, X442 and X445, the lever lengths indicated on previous pages will be modified.

X371 Plain bushing \varnothing 6,25 mm (.246) (instead of standard threaded bushing).



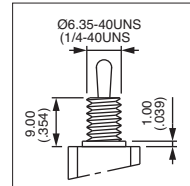
X371

X372 Threaded bushing \varnothing 6,35 (1/4). **Height 7 mm (.274).**



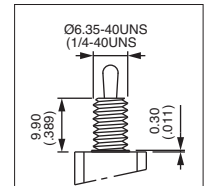
X372

X386 Threaded bushing \varnothing 6,35 mm (1/4) to replace plain bushing on models W - WW and Y.



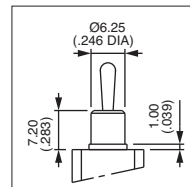
X386

X442 Threaded bushing \varnothing 6,35 mm (1/4) - **Height 9,9 mm (.389).**



X442

X445 Plain bushing. **Height 7,2 mm (.283)** - for W, WW and Y models. Available with the same levers, insulating cap and paddles as X404.



X445

X601 **Silver plated brass contacts.**
Current/voltage rating for an electrical life of 20.000 cycles : 0,5A 30VDC.
Minimum quantity : 5.000 pieces per model and shipment.

X681 **Satin chrome** actuator

X814 **Switches for peak currents**

Peak current up to 120A (1 ms) 60VDC - single/double pole



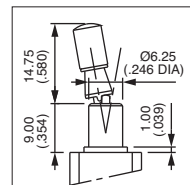
Single pole
5636A X814 ON - ON

Double pole
5646A X814 ON - ON

- Contacts : silver/nickel alloy (AgNi)
- Max. current/voltage rating : 2/120A (1 ms) 60VDC - 10.000 cycles
- Further specifications and dimensions : see 5600 series.
- General information on peak currents : see end of catalogue.

X902 Plain bushing \varnothing 6,25 mm (.246) - **Height 9 mm (.354).**

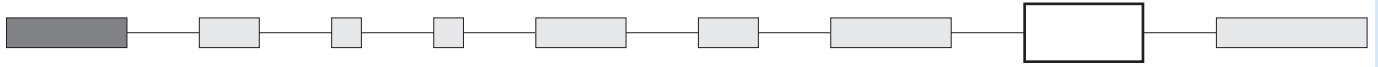
X916 Locking lever on model with plain bushing.



X916



AGENCY APPROVALS



UL All standard models, except 5200MIWR
CSA
CECC Standard models 5600 - 5200

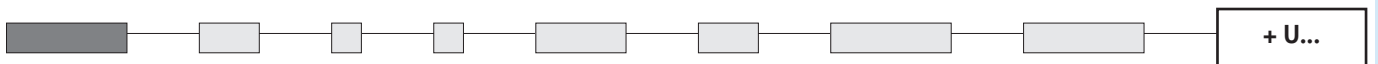
Availability : consult factory for details of approved combinations or options.

Marking : to order switches marked UL, CSA or CECC, complete above box with desired approvals, in this order & without space (ex. : ULCSACECC). Blank : no agency approval required.

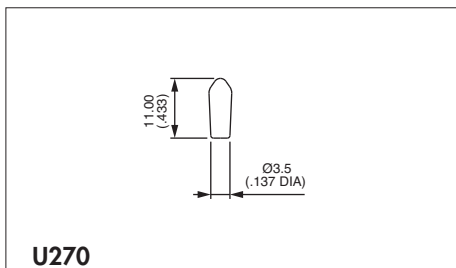
VDE (with UL & CSA) Refer to 55000 series on the following pages.

Preferential lists : see specifications.

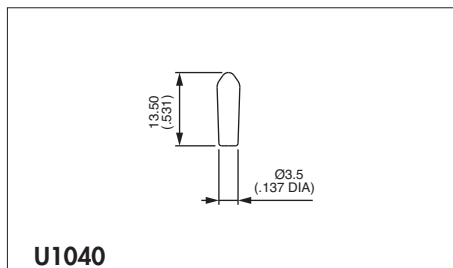
INSULATING CAPS AND PADDLES



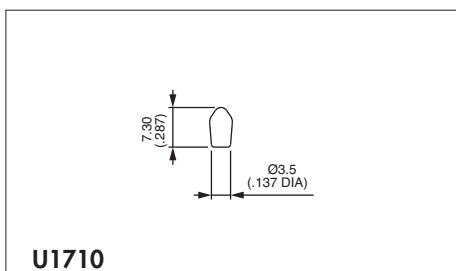
Insulating caps



U270
For standard lever & threaded bushing only



U1040
For standard lever & plain bushing only



U1710
For lever 17 and threaded bushing
For lever 7 and plain bushing

Cap colours	
Replace last "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
6	red
7/1	white
9	orange



Insulating caps are not available in ivory colour.

5000 series

Toggle switches

OPTIONS

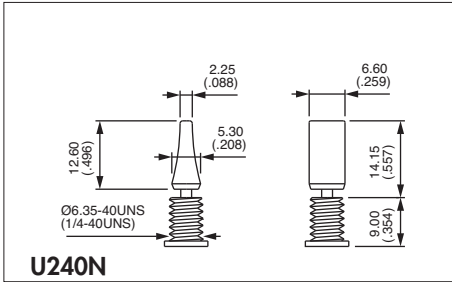


INSULATED CAPS AND PADDLES (continued)

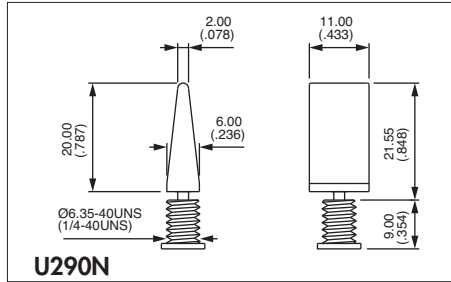
Paddles

For use with lever 4N only. Shown with standard threaded bushing. Order separately.

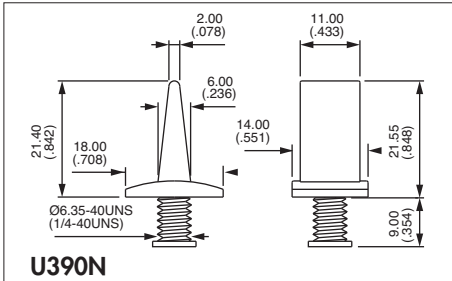
A



U240N



U290N



U390N

Paddle colours

Replace last "0" by number

- 1 blue
- 1/4 dark blue
- 2 black
- 3 green
- 4 grey
- 5 yellow
- 6 red
- 7 ivory
- 7/1 white
- 9 orange



55000 series

VDE approved toggle switches



EN 61058-1



- The switches described below are marked VDE as standard.
- UL and CSA agency approvals are also available. To order a switch marked UL or CSA, please complete "Other agency approvals" box.

ELECTRICAL SPECIFICATIONS

- Class I (normal insulation)
- Small contact opening : μ (< 3 mm (.118))
- Current/voltage rating with resistive load : 3A 250VAC - 6A 125VAC
- Dielectric strength :
2.000 Vrms 50 Hz min. between poles and between terminals and frame
1.000 Vrms 50 Hz min. between terminals
- Special body for increased creepage distance and air gap : 3 mm (.118)

MATERIALS

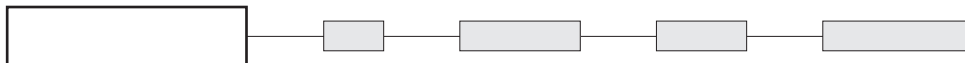
- Contacts : silver
- Case : diallylphthalate (DAP)
- Actuator : brass, chrome plated with insulating vinyl cap
- Bushing : brass, nickel plated
- Housing : stainless steel
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

- Insulating cap, compulsory, supplied glued on the lever :
U270 for models 55600A, 55200A and 55200ZA
U1040 for models 55200WA and 55200WA X433
- Ground connector :
U721 compulsory if the panel is not metallic or not connected to ground
- Epoxy sealed terminals standard

Further specifications, see 5000 series.

MODEL STRUCTURE



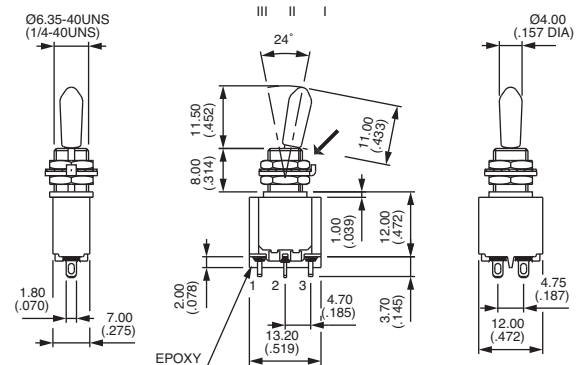
Solder lugs

→ Keyway

III	II	I
2-3		1-2
5-6		4-5

Single pole Double pole

55636A	55646A	ON	-	ON
55639A	55649A	ON	OFF	ON



Also available with \varnothing 6 mm (.236) bushing : **55500**.

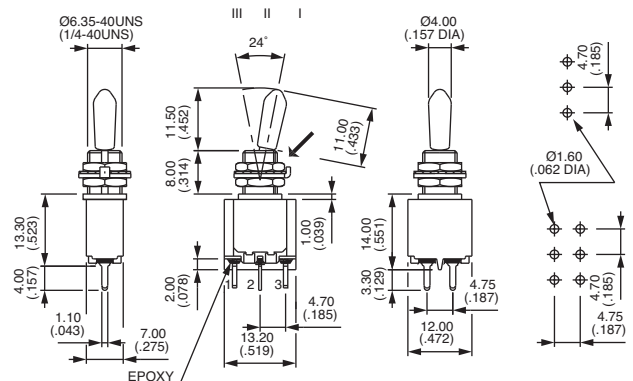
Straight PC terminals

→ Keyway

III	II	I
2-3		1-2
5-6		4-5

Single pole Double pole

55236A	55246A	ON	-	ON
55239A	55249A	ON	OFF	ON



Also available with \varnothing 6 mm (.236") bushing : **55100**.

55000 series

VDE approved toggle switches



A

Right angle terminals - horizontal

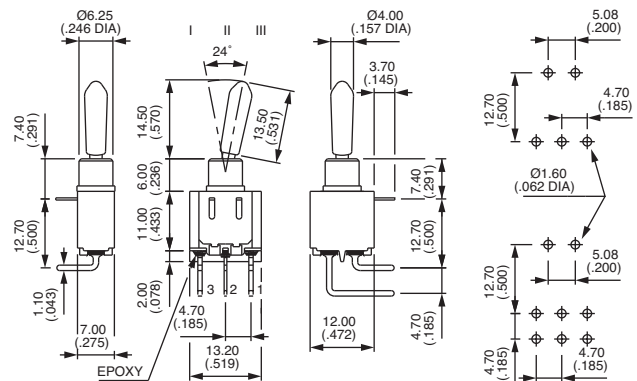
III	II	I
2-3		1-2
5-6		4-5

Single pole Double pole*

55236WA	55246WA X433	ON	-	ON
55239WA	55249WA X433	ON	OFF	ON

"X433" to be placed in the third box of ordering format.

Also available for VERTICAL mounting (on request).



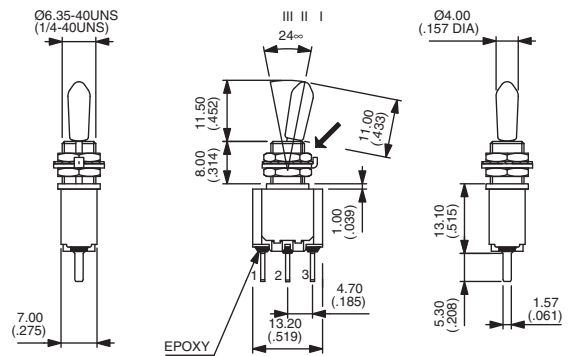
Quick-connect terminals

→ Keyway

III	II	I
2-3		1-2

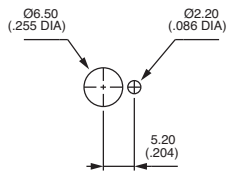
Single pole

55236Z	ON	-	ON
55239ZA	ON	OFF	ON

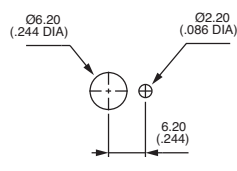


PANEL CUT-OUT

Bushing Ø 6,35 (1/4)

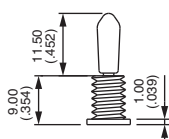


Bushing Ø 6 (.236)



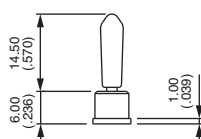
* In double pole W models, spacing between poles on PCB is different from standard : 4,7 mm (.185) instead of 3,81 mm (.150)

LEVERS



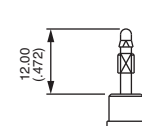
Blank

For threaded bushing models
Cap U270 compulsory



Blank

For plain bushing models
Cap U1040 compulsory



-4N

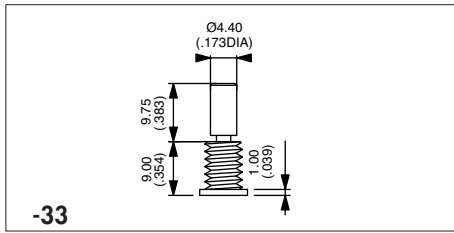
For use with paddles only



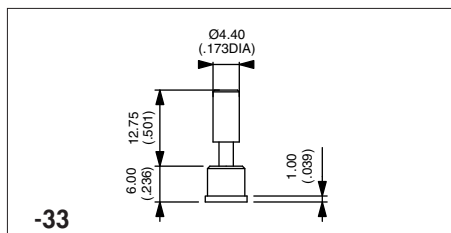
55000 series

VDE approved toggle switches

LEVERS (continued)



-33 For threaded bushing models



-33 For plain bushing models

OTHER AGENCY APPROVALS



UL
CSA

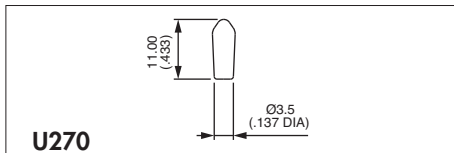
To order a switch additionally marked UL and/or CSA, complete above box with desired approvals (ex. ULCSA).

INSULATING CAPS AND PADDLES

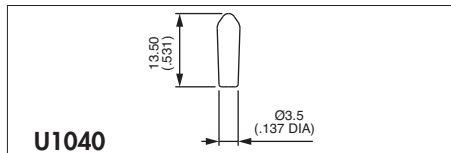


Insulating caps

Compulsory - delivered assembled on the lever - not available in ivory colour



U270 For threaded bushing models

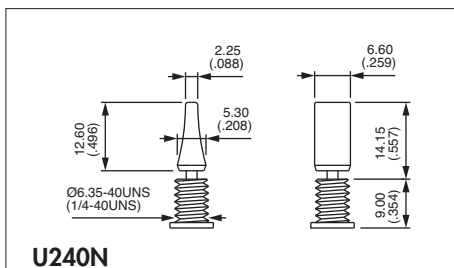


U1040 For plain bushing models

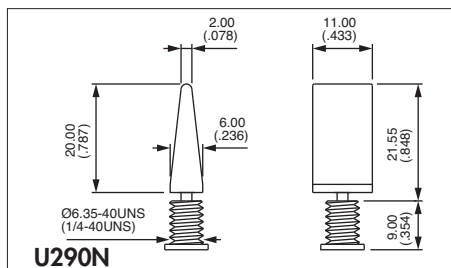
Cap/paddle colours	
Replace last "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
7	ivory
7/1	white
9	orange

Paddles

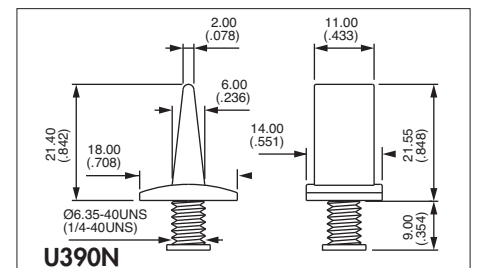
For use with lever 4N only. Shown with threaded bushing. Order separately.



U240N



U290N

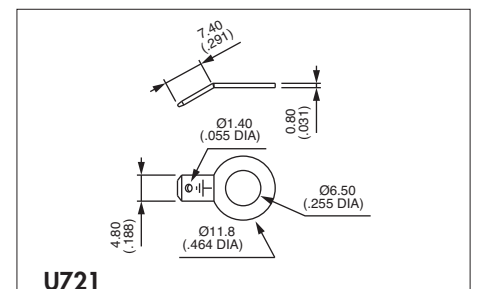


U390N



GROUND CONNECTOR

IMPORTANT : compulsory on models with threaded bushing if the panel is not metallic or not connected to ground. Order separately.



U721

10600 series

Professional toggle switches - threaded bushing Ø 10 (.393)

Distinctive features and specifications



☐ CECC approved

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 3A 24VDC
- Minimum load : 100µA 10mV
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 1.000 Vrms 50 Hz min. between terminals of the same pole
 - 2.000 Vrms 50 Hz min. between terminals and frame
 - 2.000 Vrms 50 Hz min. between terminals of adjacent poles
- Electrical life : 50.000 cycles

MATERIALS

- Case : diallylphthalate (DAP) or high temperature plastic material (UL94-V0)
- Actuator : brass, nickel plated
- Bushing : brass, nickel plated
- Housing : stainless steel
- Contacts :
 - silver
 - silver, gold plated
- Terminal seal : epoxy

HOMOLOGATION



CECC 96201-007

Availability : consult factory for details of approved models.

Marking : to order switches marked CECC, add "CECC" to model number.

GENERAL SPECIFICATIONS

- Torque : 1,50 Nm (1.106 Ft.lb) max. applied to nut
- Max. panel thickness : 4 mm (.157)
- Operating temperature : -40 °C to +85 °C

ABOUT THIS SERIES

Complete part numbers are shown on the following pages.

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



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 : 1 knurled cap nut, 1 hex nut, 1 locking ring and 1 lockwasher. They are presented in section I.

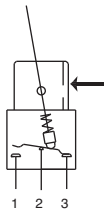


Packaging unit : 25 pieces.

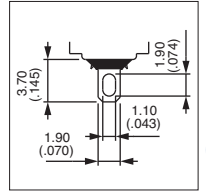
10600 series

Professional toggle switches - threaded bushing Ø 10 (.393)

→ Keyway



- Solder lug terminals
- 2 and 3 positions
- 1 and 2 pole configurations
- Available with matt black finish : consult factory for model number



2 positions - single pole

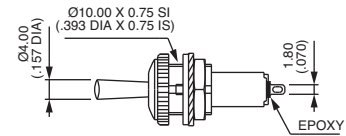
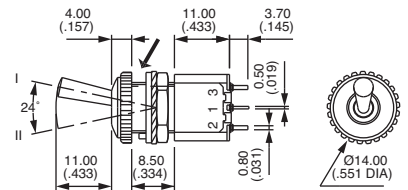
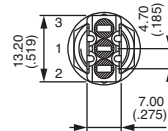


Silver contacts
106362103
106322103

Gold plated silver contacts
106361175
106321175

	II	I
	1-3	1-2
	ON - ON	ON - MOM
	ON - ON	ON - MOM

→ Keyway



2 positions - double pole

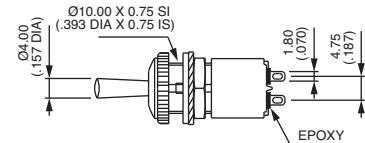
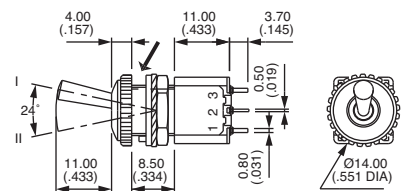
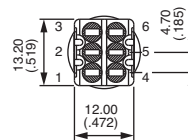


Silver contacts
106462103
106422103

Gold plated silver contacts
106461175
106421175

	II	I
	2-3	2-1
	5-6	5-4
	ON - ON	ON - MOM
	ON - ON	ON - MOM

→ Keyway



3 positions - single pole

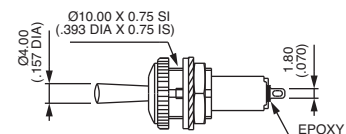
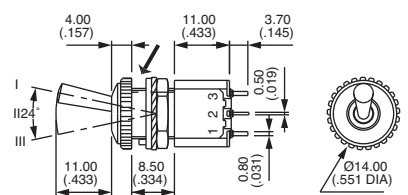
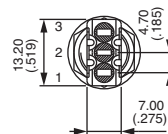


Silver contacts
106392103
106372103
106382103

Gold plated silver contacts
106391175
106371175
106381175

	III	II	I
	2-3		2-1
	ON OFF ON		ON
	MOM OFF MOM		MOM
	ON OFF MOM		MOM
	ON OFF ON		ON
	MOM OFF MOM		MOM
	ON OFF MOM		MOM

→ Keyway



10600 series

Professional toggle switches - threaded bushing $\varnothing 10 (.393)$

3 positions - double pole

III	II	I	
2-3		2-1	→ Keyway
5-6		5-4	

Silver contacts

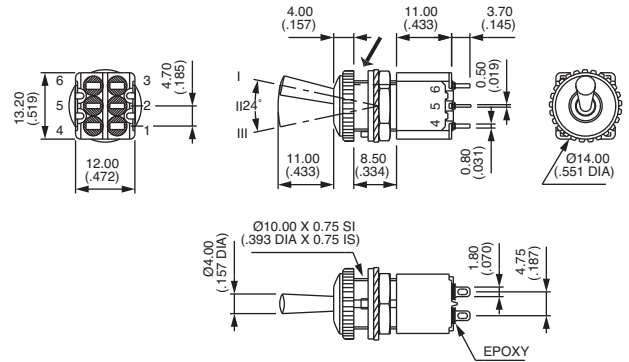
106492103	ON	OFF	ON
106472103	MOM	OFF	MOM
106482103	ON	OFF	MOM

106440886*	ON	ON	ON
		(2-3)	
		(5-4)	

Gold plated silver contacts

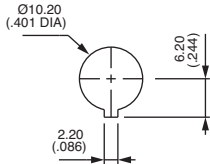
106491175	ON	OFF	ON
106471175	MOM	OFF	MOM
106481175	ON	OFF	MOM

106440944*	ON	ON	ON
		(2-3)	
		(5-4)	



* Function 4 : SP in DP case. Jumper between terminals 2 and 4 to be wired by the user.

PANEL CUT-OUT



11000 and 12000 series

Professional toggle switches

Distinctive features



Applications

These switches are specially manufactured for defence, telecommunications and other professional applications.

Approvals



CECC 96201-005
CECC 96201-008

- 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 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, nickel 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, etc.).

AGENCY APPROVALS



CECC 96201-005
CECC 96201-008

Availability : consult factory for details of approved models.
Marking : to order switches marked CECC, complete appropriate box of ordering format.

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

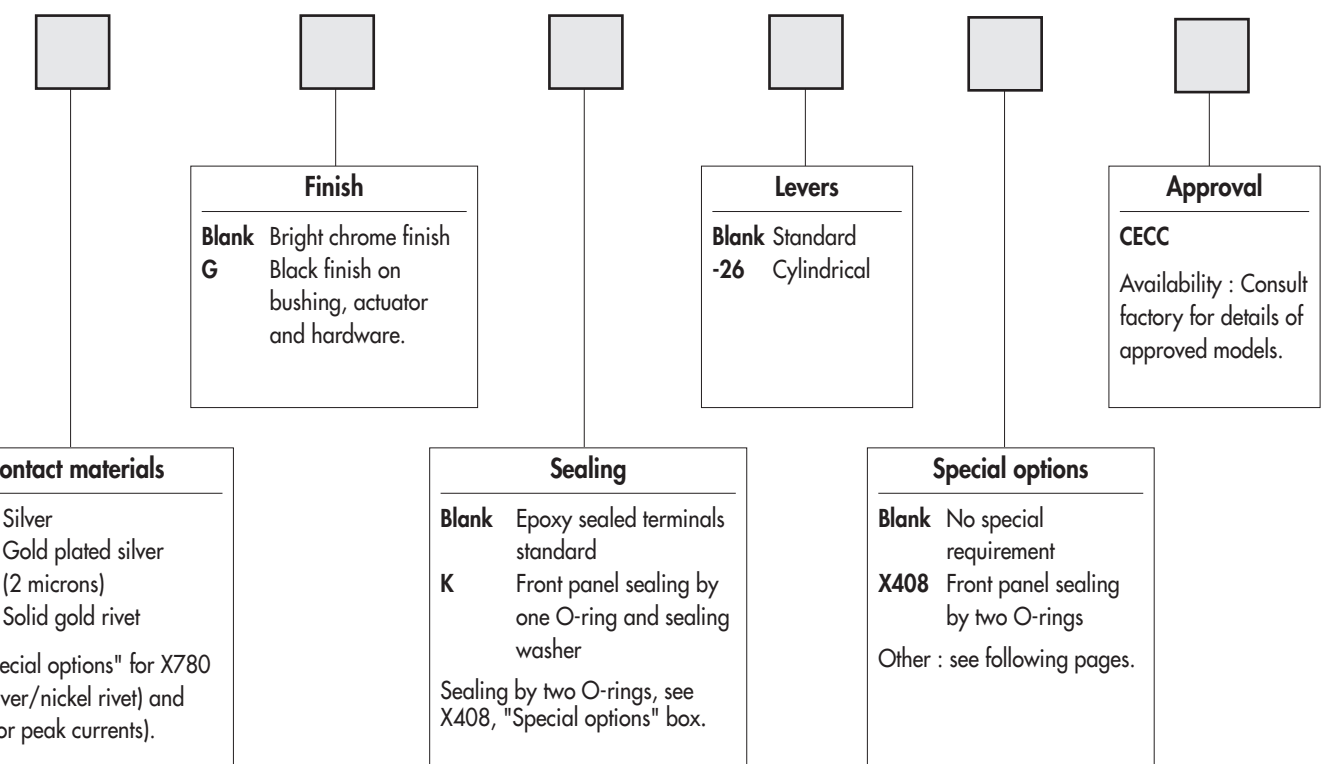
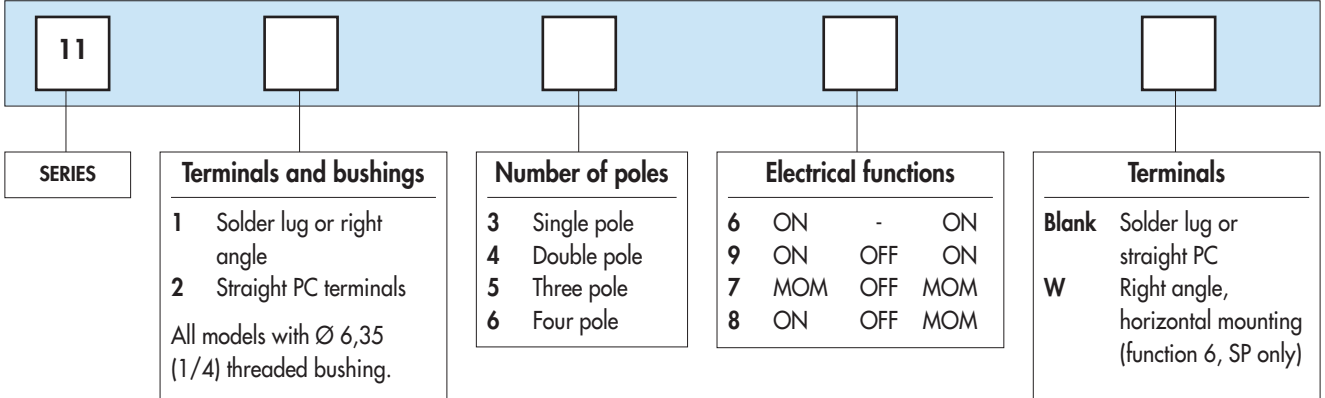


Packaging unit : 25 pieces or 50 pieces depending on models.

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.



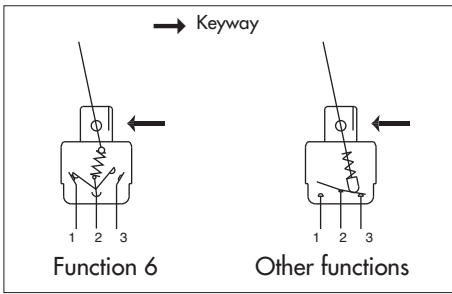
Mounting accessories : standard hardware supplied with all models : 2 hex nuts 8 (.314) across flats, 1 locking ring and 1 lockwasher. Standard and special hardware available are presented in section I.

11000 series

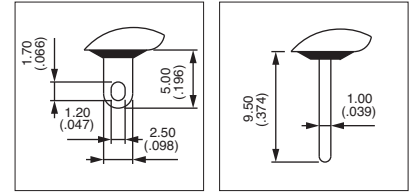
Professional toggle switches - threaded bushing $\varnothing 6,35$ (1/4)

MODEL
STRUCTURE

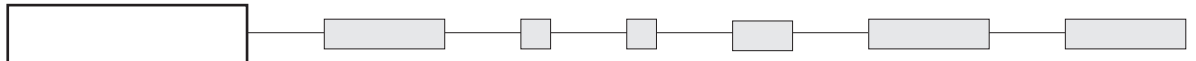
A



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



MODEL
STRUCTURE



Shown with standard lever

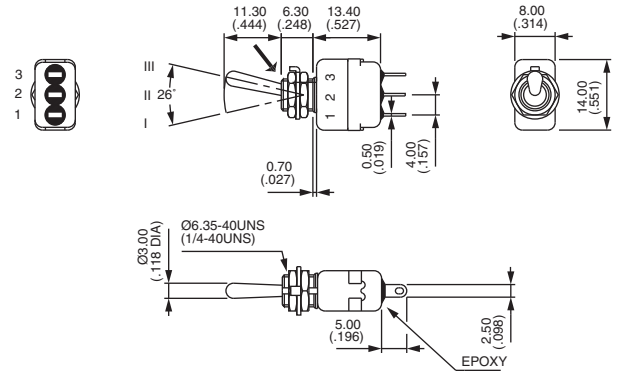
Solder lug terminals - single pole



11136
11139
11137
11138

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

→ Keyway



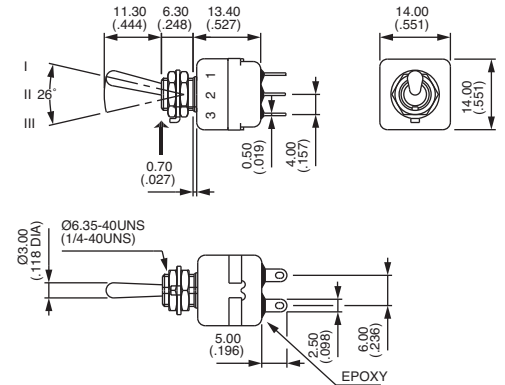
Solder lug terminals - double pole



11146
11149
11147
11148

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

→ Keyway



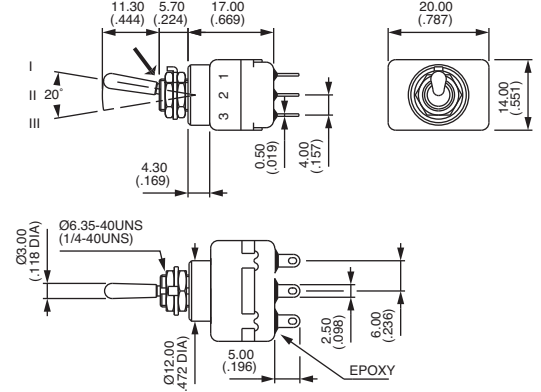
Solder lug terminals - three pole



11156
11159
11157
11158

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

→ Keyway

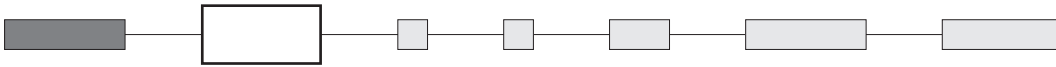




11000 series

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

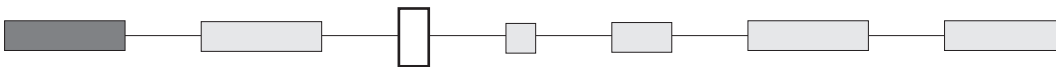
CONTACT MATERIALS



- 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** Black finish on bushing, lever and hardware.

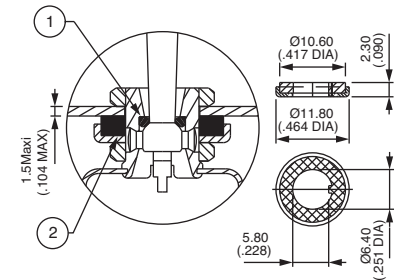
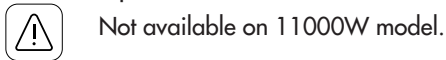
Other finish, consult factory.

SEALING



Epoxy sealed terminals are standard.

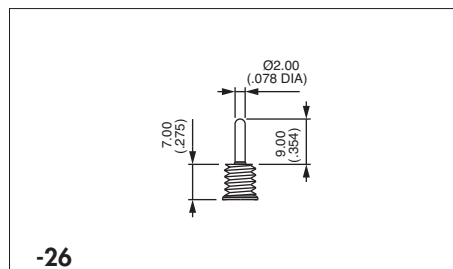
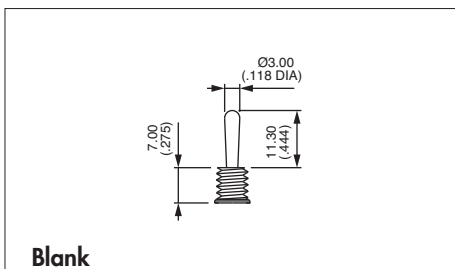
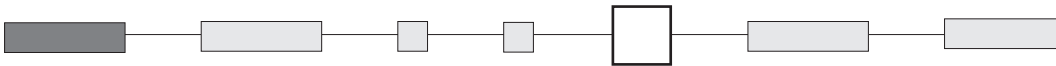
- Blank** No sealing except standard
- K** Front panel sealing by O-ring and sealing washer. Protects the switch against panel water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.



① O-ring ② Sealing washer

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

LEVERS

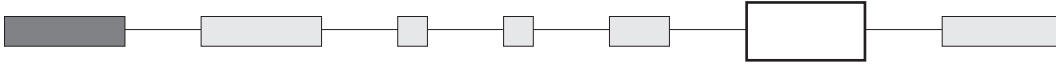


11000 series

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



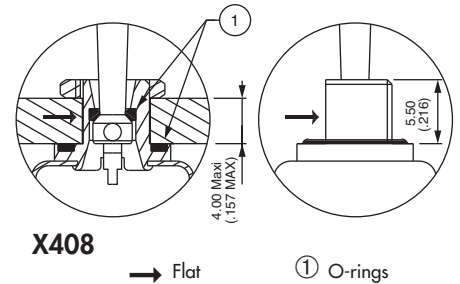
SPECIAL OPTIONS



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

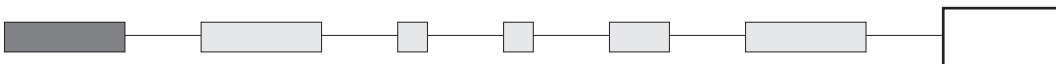
ON - ON

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
- 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.

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) : 4A 30VDC
 - gold contacts (D) : 100mA 30VDC
- 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	4A 30VDC	50.000	50.000
AD2 X780	4A 30VDC (Gold plating : 100mA 30VDC max.)	20.000	20.000
D	100mA 30VDC	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



CECC 96201-005
CECC 96201-008

Designed to MIL specifications

Availability : consult factory for details of approved models.

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

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

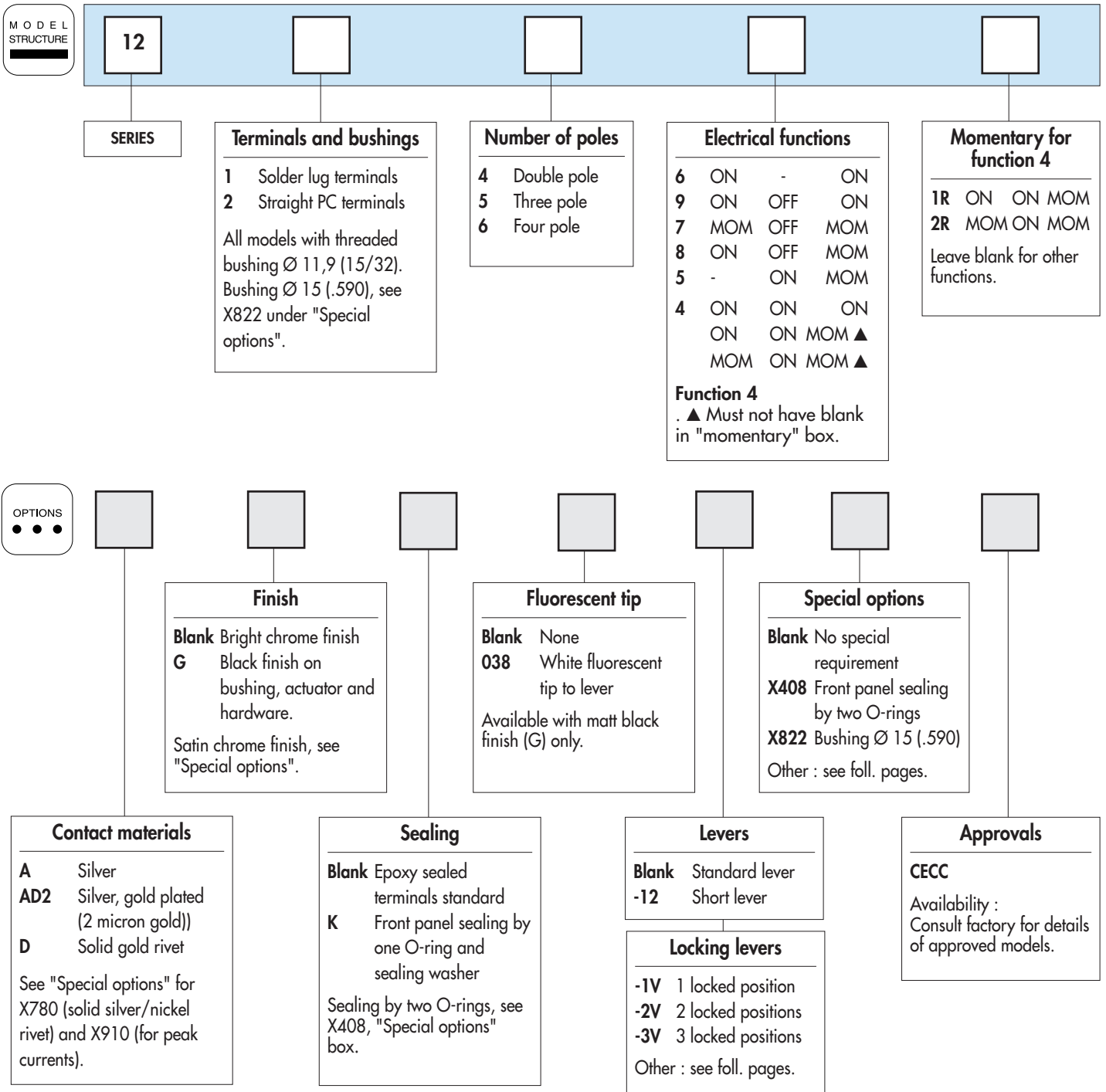


Packaging unit : 2 pole models : 25 pieces - 3 & 4 pole models : 20 pieces.

12000 series

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

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 14 (.551) across flats and 1 locking ring. Standard and special hardware available are presented in section I.

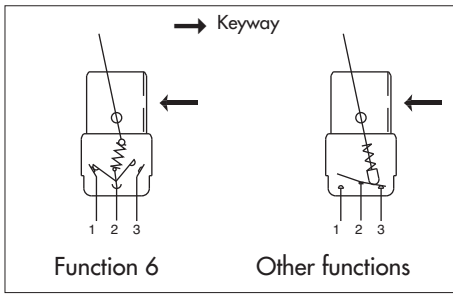
Security caps are available to prevent inadvertent lever operation. They are presented in section I.



12000 series

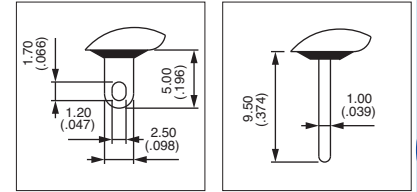
Professional toggle switches - threaded bushing $\varnothing 11,9$ (15/32)

Solder lug terminals : 12100

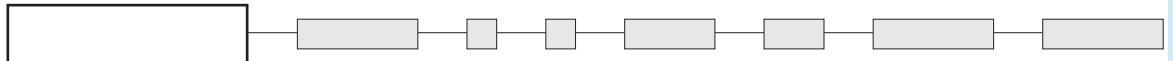


• Epoxy sealed terminals standard

Typical angle of throw (A)	
Function 6	26°
Functions 9, 7, 8, 4	20°
Function 5	12°



MODEL STRUCTURE

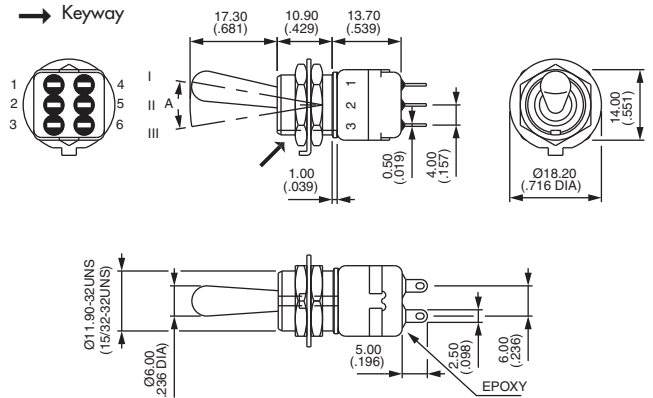


Shown with standard lever

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

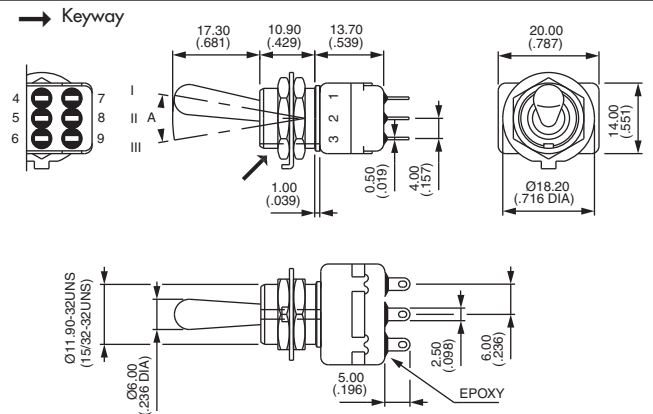


* Function 4 : SP in DP case - connections, see end of catalogue.

Solder lug terminals - three pole



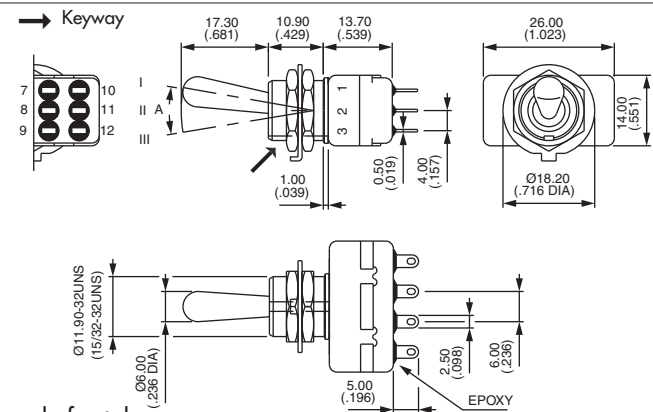
	I	II	III
12156	ON	-	ON
12159	ON	OFF	ON
12157	MOM	OFF	MOM
12158	ON	OFF	MOM



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

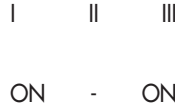
MODEL
STRUCTURE

A

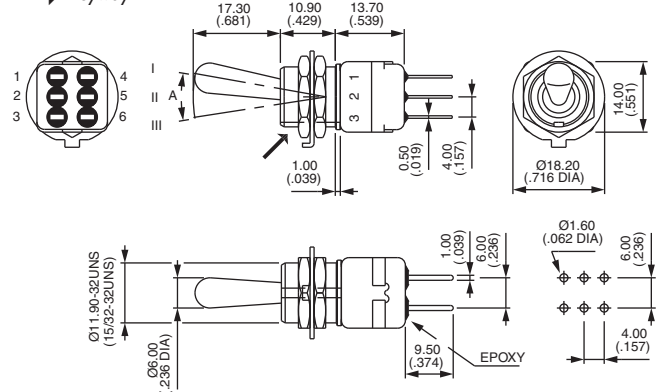
Straight PC terminals - double pole ▲



12246



→ Keyway



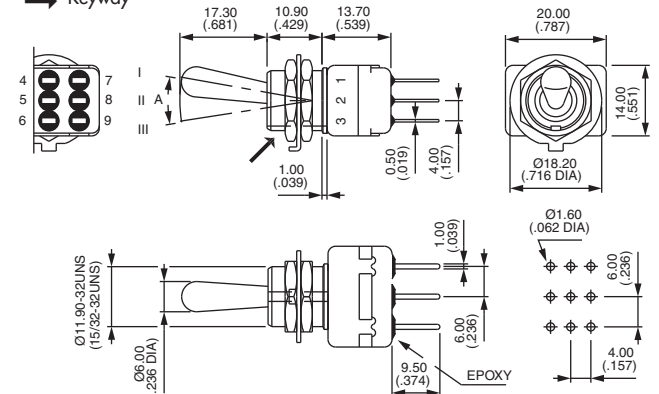
Straight PC terminals - three pole ▲



12256



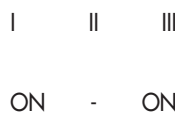
→ Keyway



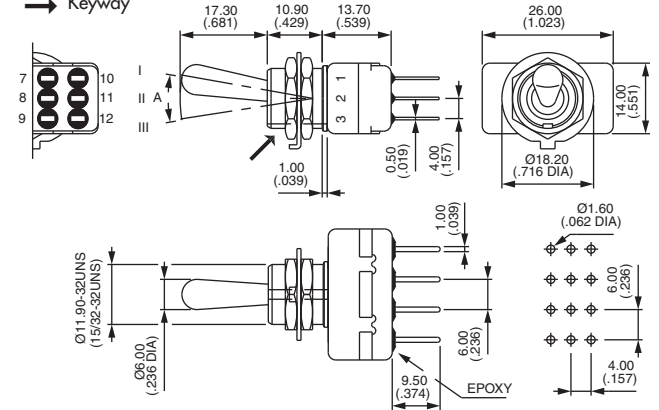
Straight PC terminals - four pole ▲



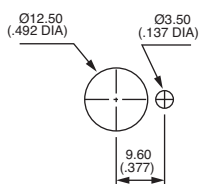
12266



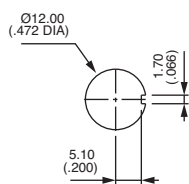
→ Keyway



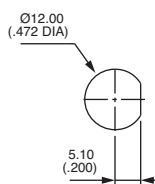
PANEL CUT-OUT



Standard

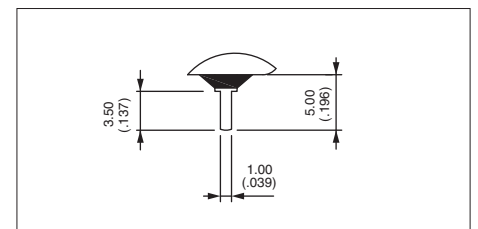


With K
sealing option



With X408
sealing option

▲ 3,5 mm (.138) short terminals available for function 6, as well as for functions 9, 7, 8, 4 and 5. On request.

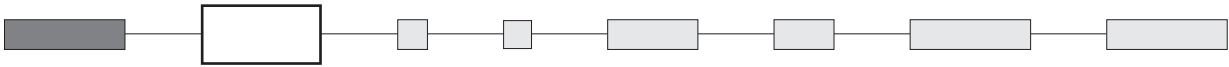




12000 series

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

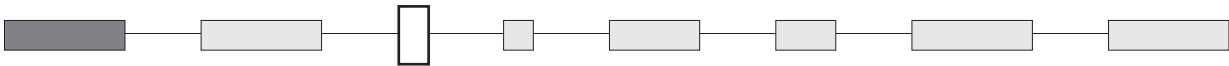
CONTACT MATERIALS



- 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).

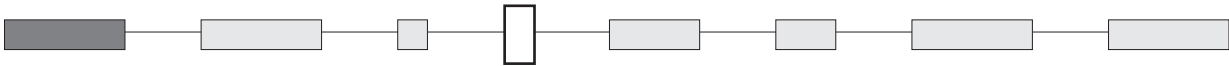
FINISH



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

For satin chrome finish, see "Special options".

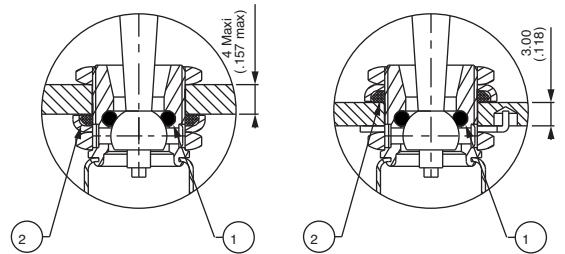
SEALING



Epoxy sealed terminals are standard.

- Blank** No sealing except standard.

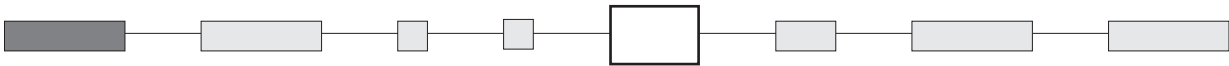
- K** Front panel sealing by one O-ring and sealing washer. Protects the switch against water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.



① O-ring ② Sealing washer

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

FLUORESCENT TIP



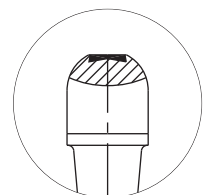
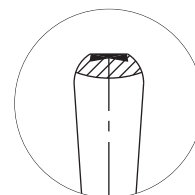
- Blank** None
- 038** White fluorescent tip. Becomes luminous when submitted to ultra-violet rays.



Available with matt black finish (option G) only.

Standard lever

Locking lever



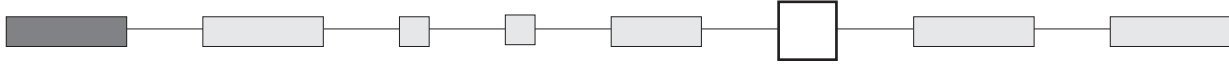
12000 series

Professional toggle switches - threaded bushing $\varnothing 11,9$ (15/32)

OPTIONS

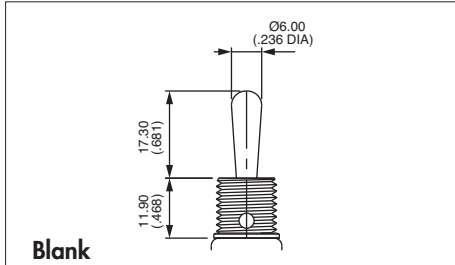


ACTUATORS



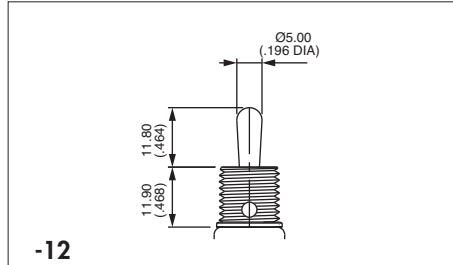
Levers

Dash compulsory before lever code.



Blank

Standard



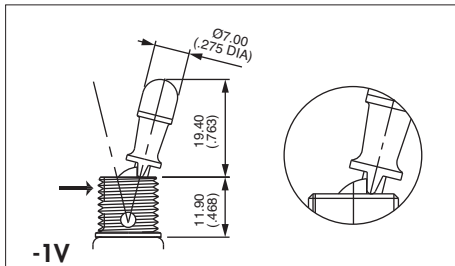
-12

Short lever

Security caps : see section I.

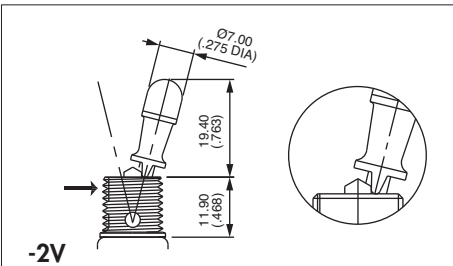
Locking levers

→ Keyway



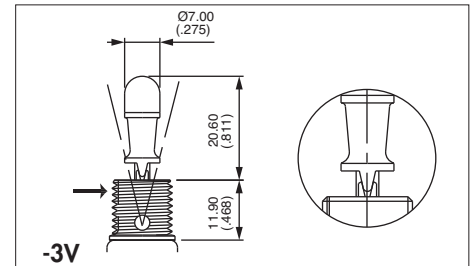
-1V

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



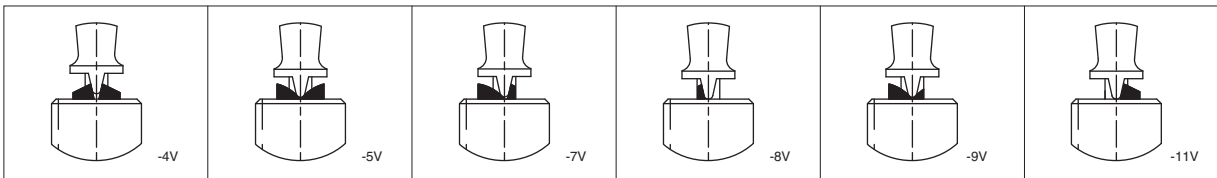
-2V

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



-3V

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



Functions 9 & 4

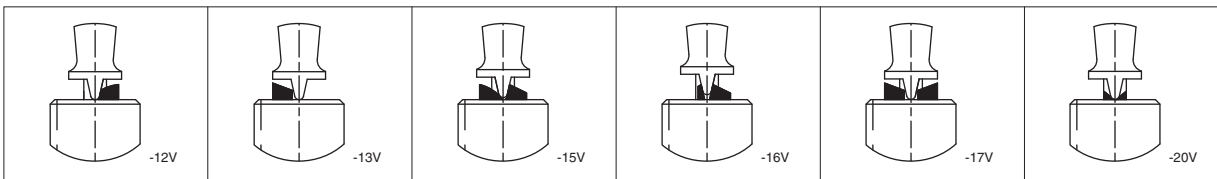
Functions 7 & 442R

Functions 8 & 441R

Functions 8, 9, 44 & 441R

Functions 8 & 441R

Functions 8, 9, 44 & 441R



Functions 8 & 441R

Functions 8 & 441R

Functions 8 & 441R

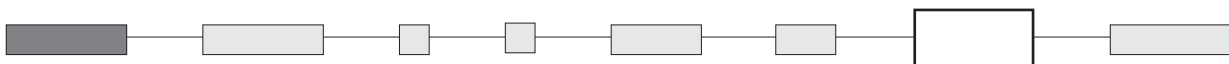
Functions 4 & 9

Functions 7 & 442R

Functions 9 & 44

Note : -5V and -12V are not true locking levers : no pulling is required before actuation.

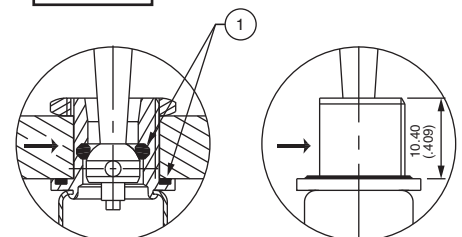
SPECIAL OPTIONS



Blank No special requirement.

X408 Front panel sealing by two O-rings. Flatted bushing for precise orientation. Panel thickness : 8 mm (.314) max., 3 mm (.118) min. Protects the switch against water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.

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



→ Flat ① O-rings



12000 series

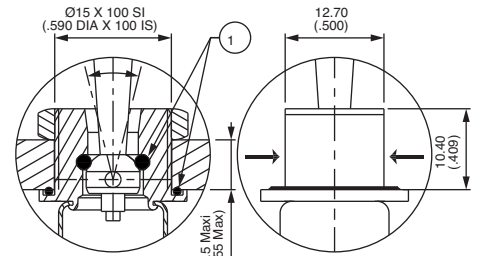
Professional toggle switches - threaded bushing Ø 11,9 (15/32)

SPECIAL OPTIONS (continued)

X822 Threaded bushing Ø 15 (.590), with double flat
Not available with function 5 or locking levers.
Includes front panel sealing and X780 contact material.

X780 Solid rivet - gold plated silver/nickel alloy contacts
Not available with function 5.

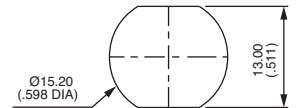
X910 Switches for peak currents



X822

→ Flat

① O-rings



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

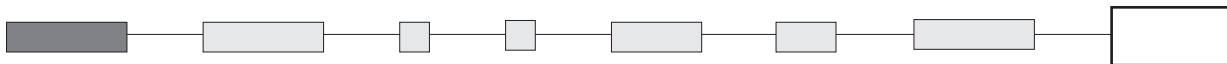


12146 X910

ON - ON

- Contacts : solid rivet - silver/nickel alloy (AgNi)
- Max. current/voltage rating :
3/80A (1 ms) 60VDC - 10.000 cycles
- 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.

12000X778 series

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

Distinctive features

A



Approvals



CECC 96201-005
CECC 96201-008

MIL Standards MIL STD 3950 and MIL STD 83731

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 (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

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.

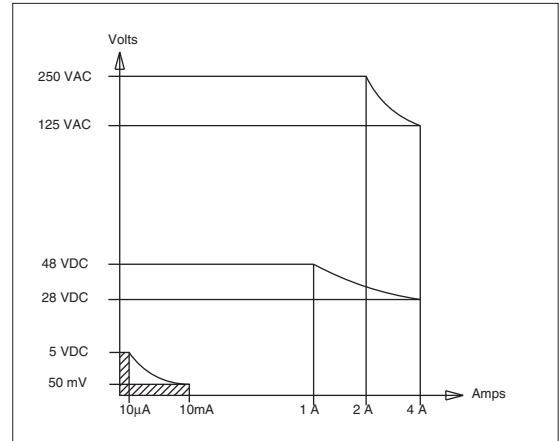
12000X778 series

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

Specifications

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 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 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)

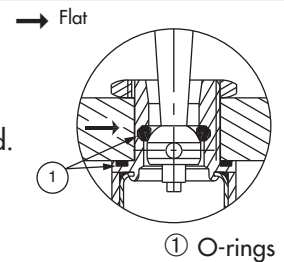


MATERIALS

- 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 - 11 ms (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)

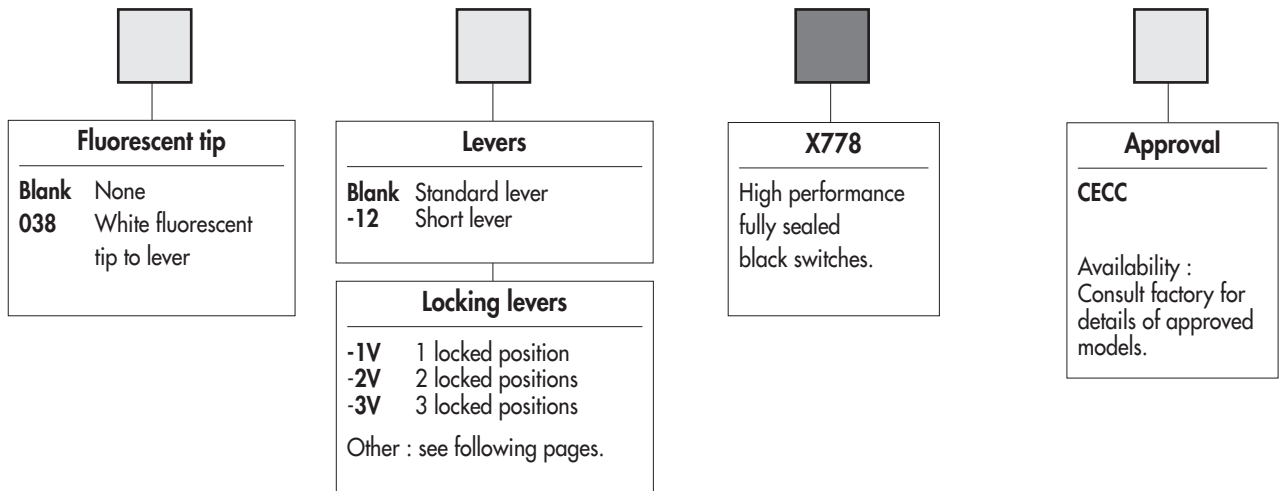
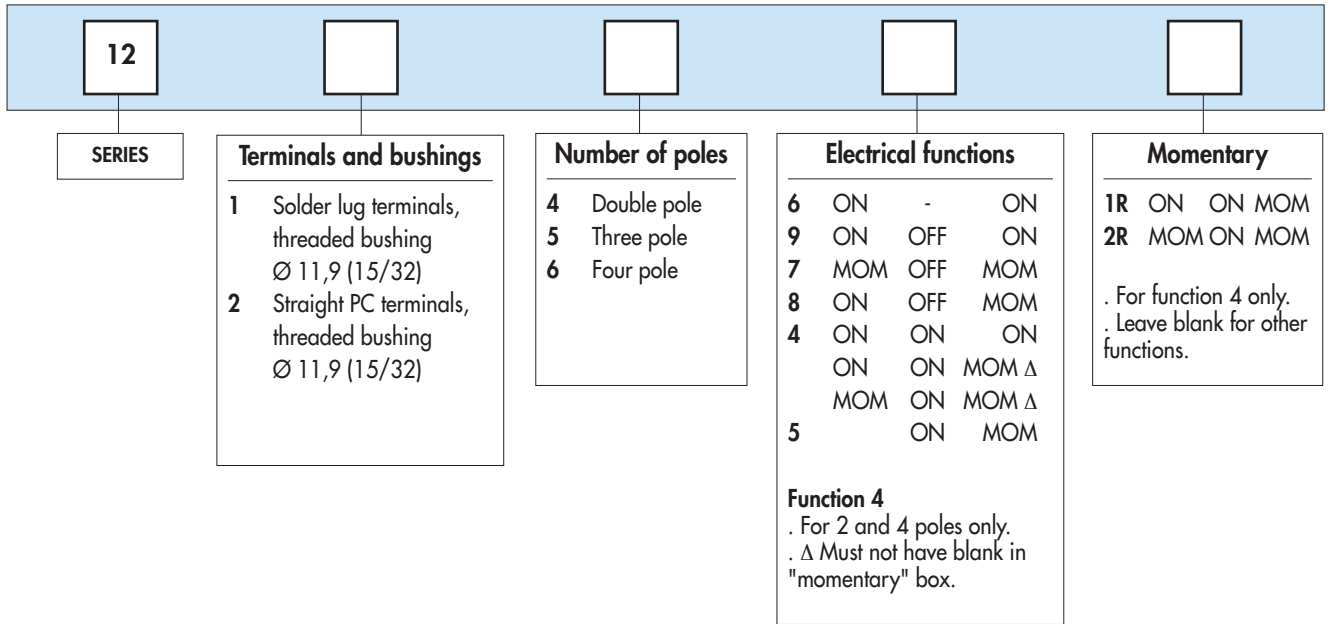
APPROVALS

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 bracketed 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.



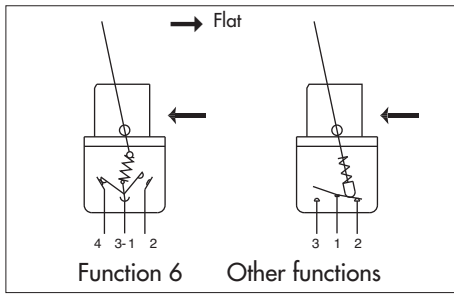
Packaging unit : 2 pole models : 25 pieces
 3 and 4 pole models : 20 pieces



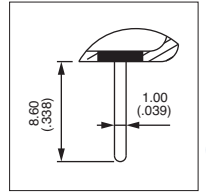
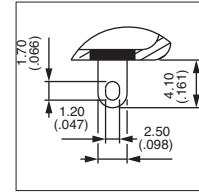
12000X778 series

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

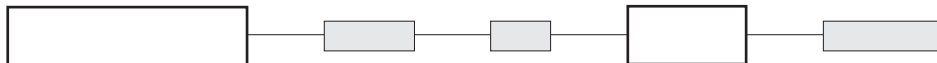
Fully sealed - black



Typical angle of throw (A)	
Function 6	26°
Functions 9, 7, 8, 4	20°
Function 5	12°



MODEL STRUCTURE



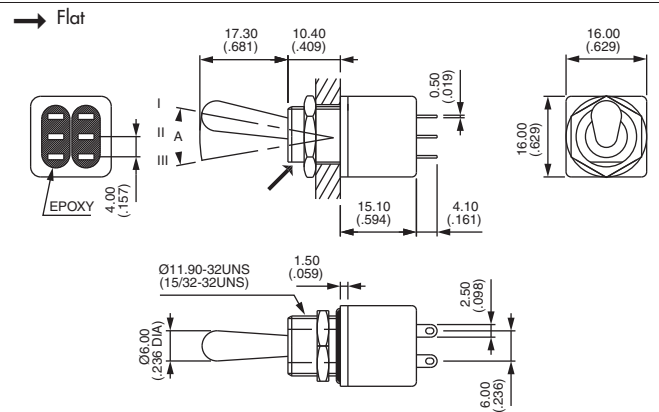
Shown with standard lever

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

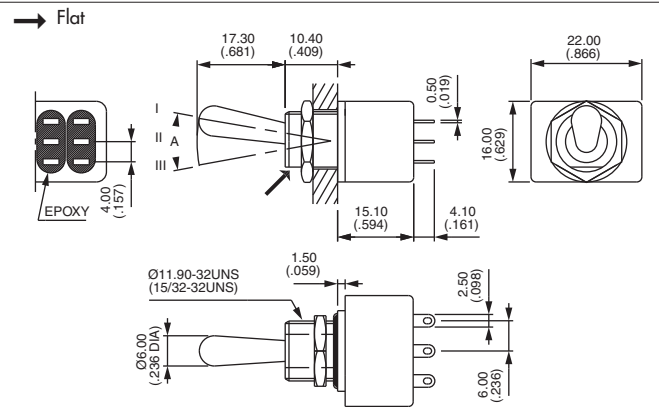


Solder lug terminals - three pole



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

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

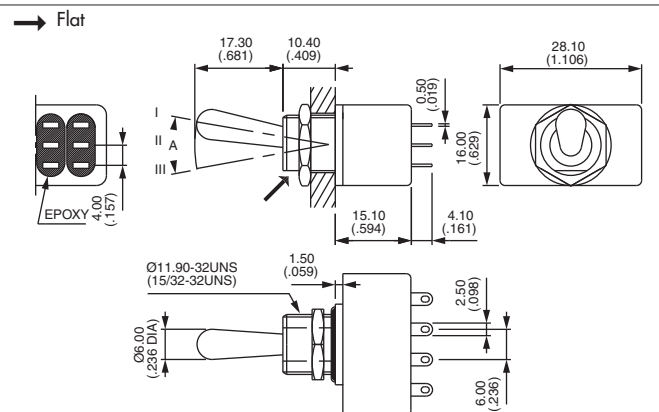


Solder lug terminals - four pole



- 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 - black



A

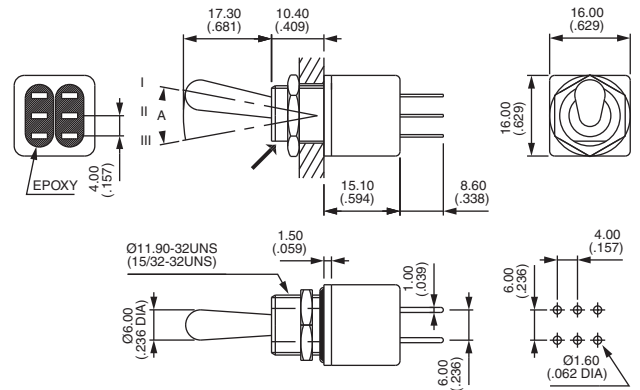
Straight PC terminals - double pole ▲



12246 X778

I II III
ON - ON

→ Flat



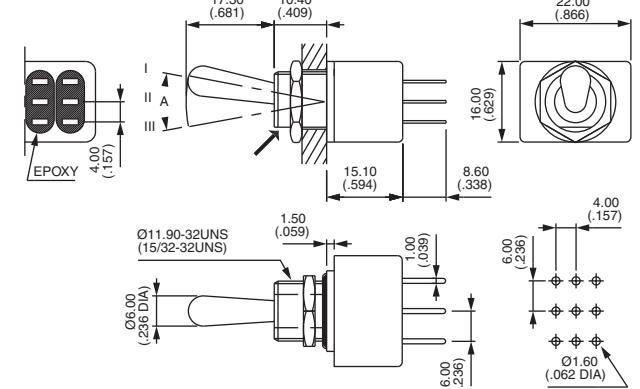
Straight PC terminals - three pole ▲



12256 X778

I II III
ON - ON

→ Flat



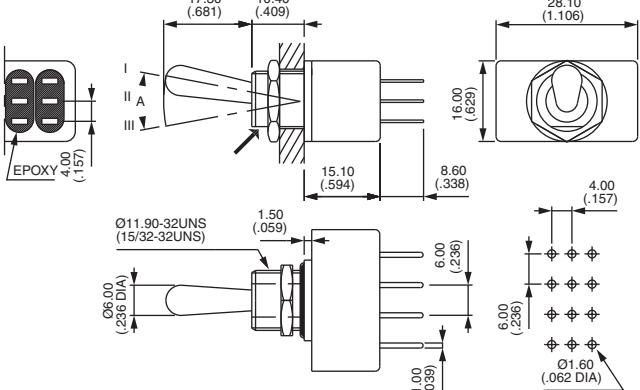
Straight PC terminals - four pole ▲



12266 X778

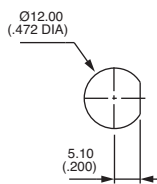
I II III
ON - ON

→ Flat



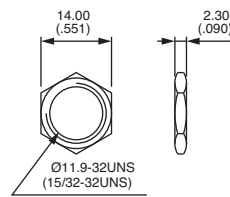
Positions and connections, see next page.

PANEL CUT-OUT



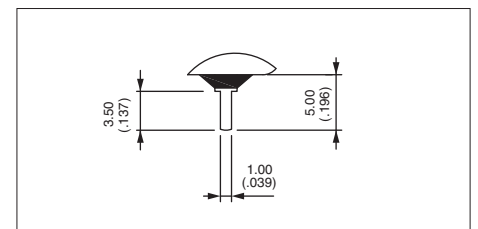
STANDARD HARDWARE

Hex nut



U41 (matt black)

▲ 3,5 mm (.138) short terminals available for function 6, as well as for functions 9, 7, 8, 4 and 5. On request.



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) 12144
12147 12148 12149 12148CT	MOM ON ON MOM 1-2 4-5	OFF OFF OFF OFF	MOM MOM ON ON 1-3 4-6	→ Flat	12144-1R
12145	-	ON 1-2 4-5	MOM 1-3 4-6		12144-2R
12144 12144-1R 12144-2R	ON MOM MOM 1-2 4-5	ON ON ON	ON ON MOM 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)



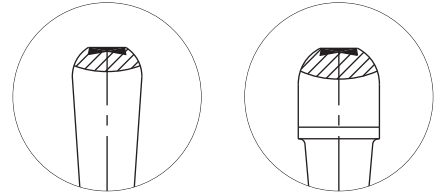
FLUORESCENT TIP



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

Standard lever

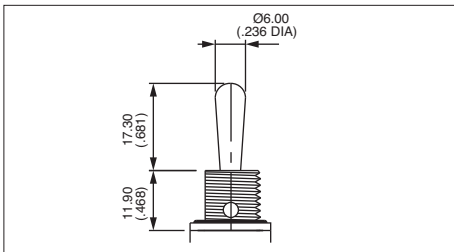
Locking lever



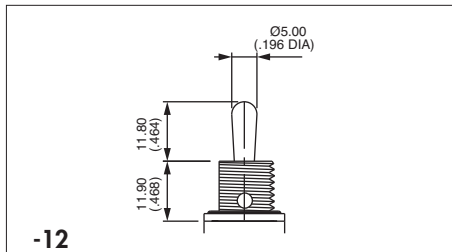
LEVERS / LOCKING LEVERS



Dash compulsory before lever code.



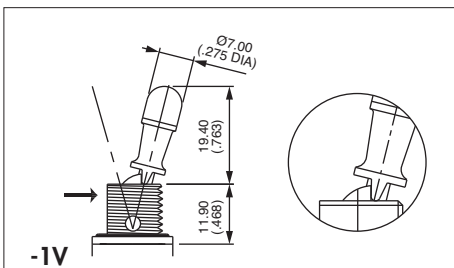
Standard lever (leave blank)



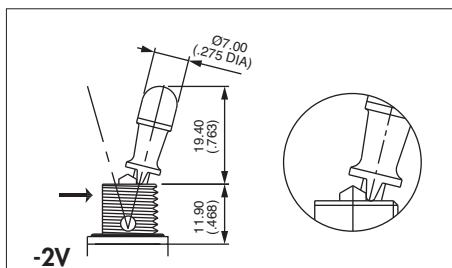
-12 Short lever

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

Locking levers

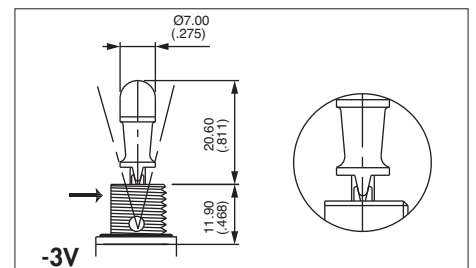


-1V 1 locked position (function 6)
Typical angle of throw : 26°

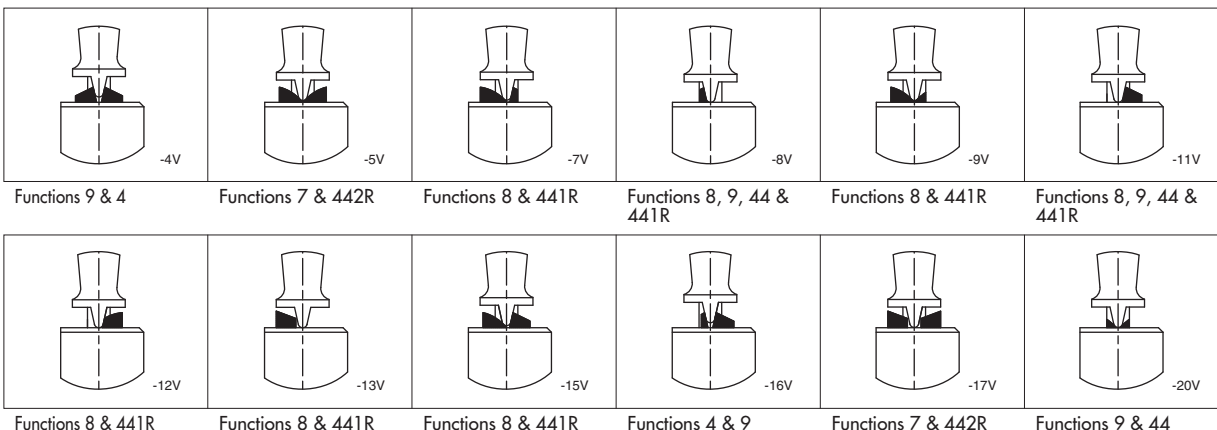


-2V 2 locked positions (function 6)
Typical angle of throw : 26°

→ Flat

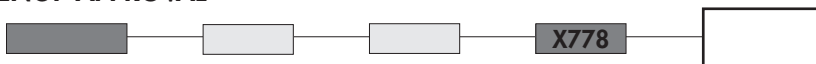


-3V 3 locked positions (functions 9 and 4)
Typical angle of throw : 20°



Note : -5V and -12V are not true locking levers : no pulling is required before actuation.

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.

1000 series

Toggle switches - metal lever - economy range

Distinctive features and specifications



- Butt action contacts
- Optional insulated levers (X213 and X490)

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts (A) : 6A 30VDC
 - silver plated copper contacts (C) : 1A 30VDC
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 2.000 Vrms 50 Hz min. between terminals
 - 2.500 Vrms 50 Hz min. between terminals and frame
- Electrical life : 10.000 cycles at full load

MATERIALS

- Case :
 - function 1 : phenolic resin
 - funct. 6 & 9 : polyamide
- Actuator :
 - brass, nickel plated (1010 and 1020 models)
 - polyamide (1030 models)
- Bushing : brass, nickel plated
- Contacts :
 - A : silver
 - C : copper, silver plated

GENERAL SPECIFICATIONS

- Torque : 1,50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness : 5 mm (.196) max.
- Operating temperature : -20°C to +55°C

ABOUT THIS SERIES

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



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



Mounting accessories : standard hardware supplied :

- silver contact models : 1 hex nut U166 + 1 knurled nut U411
- copper contact models : 1 hex nut U42 + 1 knurled nut U411



Packaging unit : 25 or 40 pieces depending on model.

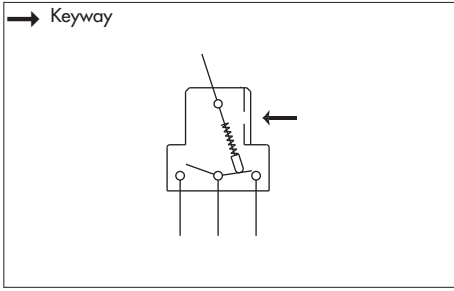
1000 series

Toggle switches - metal lever - economy range

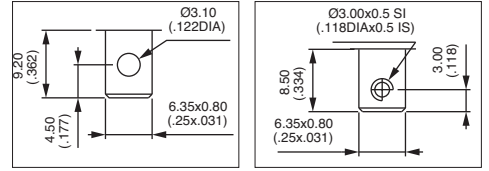
Solder lug and quick-connect terminals - screw terminals



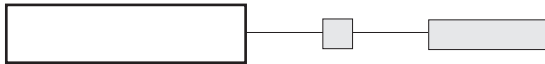
A



- 2 and 3 positions
- Single pole configurations



MODEL STRUCTURE

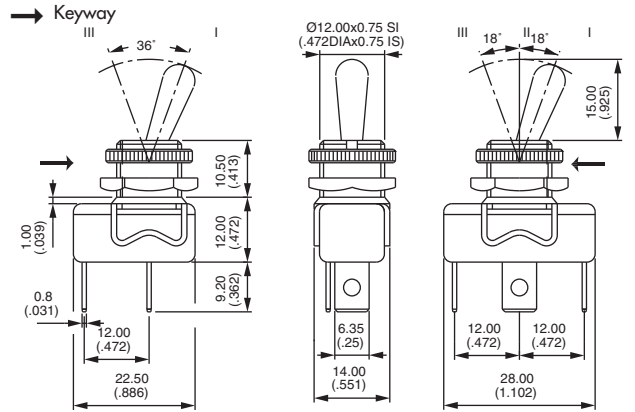


Solder lug and quick-connect terminals



1011
1016
1019

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

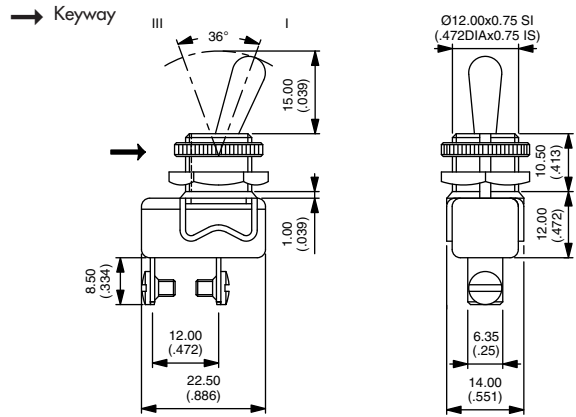


Screw terminals

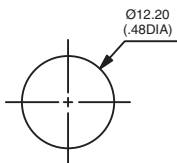


1021

I	II	III
ON	-	OFF



PANEL CUT-OUT



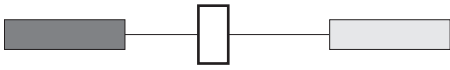


1000 series

Toggle switches - metal lever - economy range

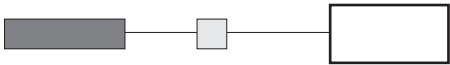
Solder lug and quick-connect terminals - screw terminals

CONTACT MATERIALS




- A Silver
- C Copper, silver plated

SPECIAL OPTIONS WITH INSULATED LEVER



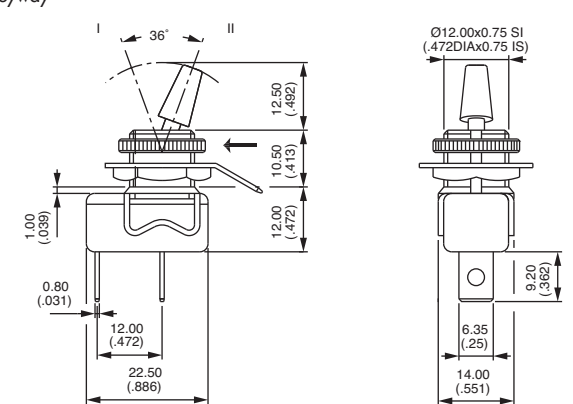
X213 Silver plated copper contacts (C)



1031CX213


I	II
OFF	ON

→ Keyway



Ground connector **U187** compulsory if the panel is not metallic or not connected to ground. Order separately, see section I.

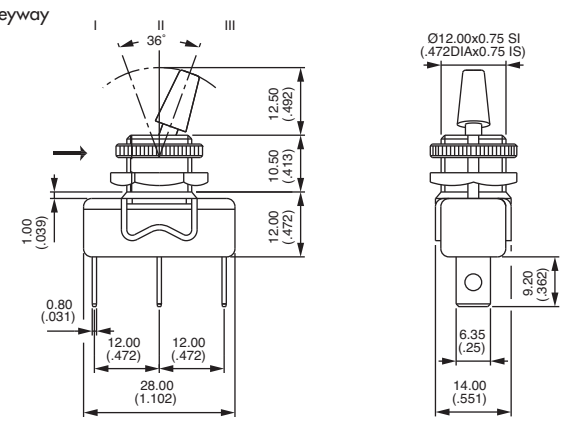
X490 Available with silver contacts (A) or silver plated copper contacts (C)



1036 X490
1039 X490

I	II	III
ON	- OFF	ON

→ Keyway



1500 series

Toggle switches - insulated lever and bushing

Distinctive features and specifications



- UL approved
- Variety of actuator styles and colours

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 5A 12VDC (10.000 cycles)
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000MΩ min. at 500VDC
- Dielectric strength :
2.000 Vrms 50 Hz min. between terminals and between terminals and metal panel

MATERIALS

- Case : polyamide
- Actuator : polyamide
- Bushing : polyamide
- Contacts : silver

GENERAL SPECIFICATIONS

- Torque : 0,95 Nm (.700 Ft.lb) max. applied to nut
- Panel thickness : 4,5 mm (.177) between 2 nuts
- Operating temperature : -20°C to +55°C

AGENCY APPROVALS



6A 125VAC/250VAC

Availability : all models

Marking : To order switches marked UL, complete appropriate box of ordering format.

ABOUT THIS SERIES

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



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 : 1 hex nut U166 and 1 knurled nut U411. Standard and special hardware available are presented in section I.



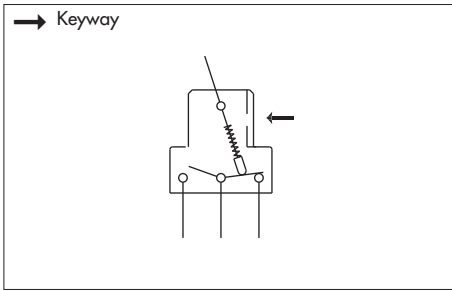
Packaging unit : 50 pieces per type and colour.



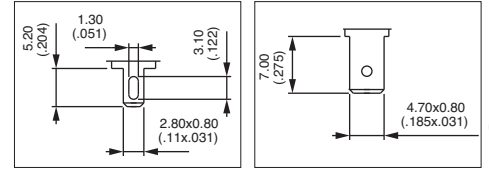
1500 series

Toggle switches - insulated lever and bushing

Solder lug or quick-connect terminals



- 2 and 3 maintained positions
- Silver contacts standard
- Single pole configurations



MODEL STRUCTURE



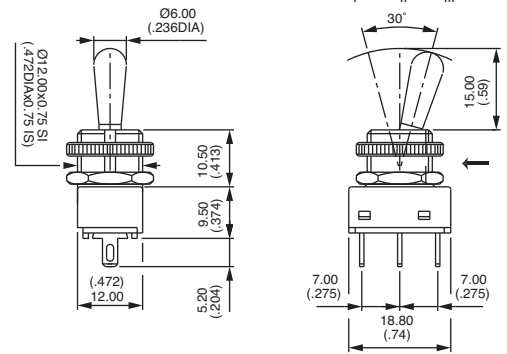
Solder lug terminals

→ Keyway



1531A2
1536A2
1539A2

	I	II	III
1531A2	ON	-	OFF
1536A2	ON	-	ON
1539A2	ON	OFF	ON



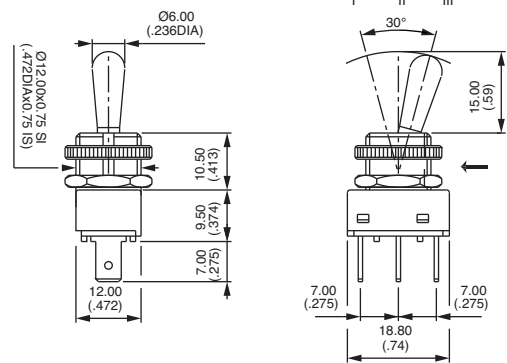
Quick-connect terminals 4,7 x 0,8 (.185 x .031)

→ Keyway

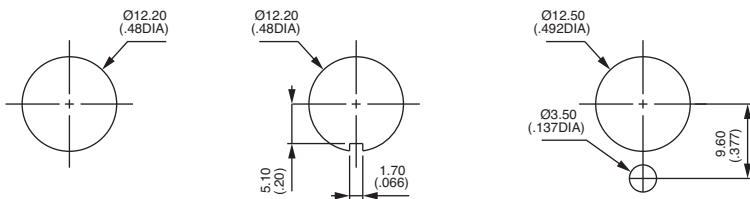


1531A8
1536A8
1539A8

	I	II	III
1531A8	ON	-	OFF
1536A8	ON	-	ON
1539A8	ON	OFF	ON



PANEL CUT-OUT



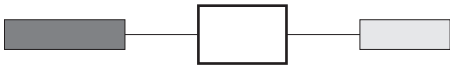
1500 series

Toggle switches - insulated lever and bushing

OPTIONS

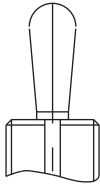


ACTUATORS



Polyamide

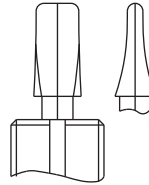
Black L12
Red L16
White L17
Orange L19



Standard

Polyamide

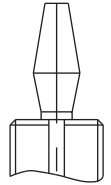
Black L22
Red L26
White L27
Orange L29



Flat

Polyamide

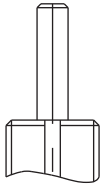
Black L32
Red L36
White L37
Orange L39



Dual cone

Polyamide

Black L42
Red L46
White L47
Orange L49



Cylindrical

AGENCY APPROVALS



UL

Availability : all models.

Marking : to order switches marked UL, complete above box with desired approvals.

1600 and 1700 series

Toggle switches - metal lever

Distinctive features and specifications



- Reduced behind-panel space requirement (models with side terminals)
- Optional insulated lever

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 4A 30VDC
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 2.000 Vrms 50 Hz min. between terminals
 - 2.000 Vrms 50 Hz min. between poles and between terminals and lever
- Electrical life : 10.000 cycles at full load

MATERIALS

- Case : phenolic resin
- Actuator :
 - 1600 models : brass nickel plated
 - 1700 models : polyamide
- Bushing : brass, nickel plated
- Contacts : phosphor bronze and brass, silver plated.

GENERAL SPECIFICATIONS

- Torque : 1,50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness : 5 mm (.196) max.
- Operating temperature : -20°C to +55°C

ABOUT THIS SERIES

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



Sealing boots are available on models 1600 to protect the switches against dust and water. They are presented in section H.



Mounting accessories : standard hardware supplied with all models : 1 hex nut U42 and 1 knurled nut U411. They are presented in section I.



Packaging unit : 25 or 50 pieces depending on model.

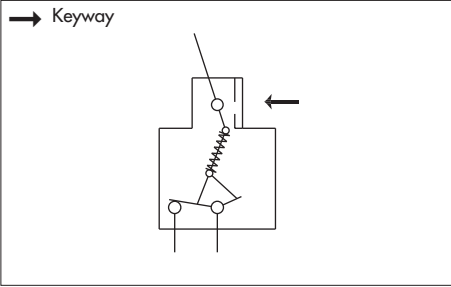
1600 and 1700 series

Toggle switches - metal lever

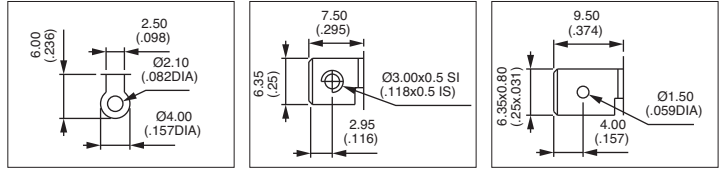
Solder lug or screw terminals



A



- Wiping contacts
- Single pole configurations

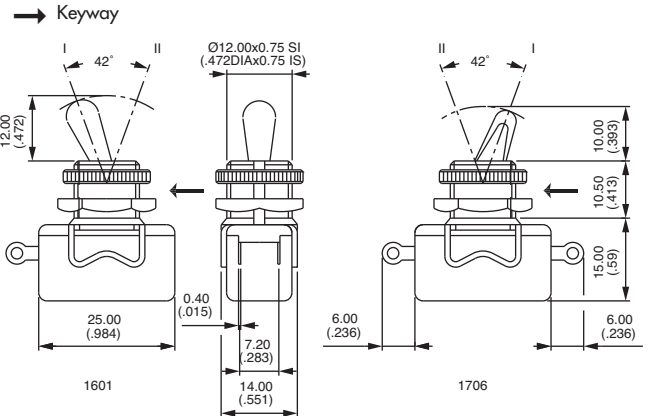


Horizontal solder lug terminals



Metal lever	Insulated black lever
1601	1701
1606	1706

I	ON	-	OFF
II	ON	-	ON

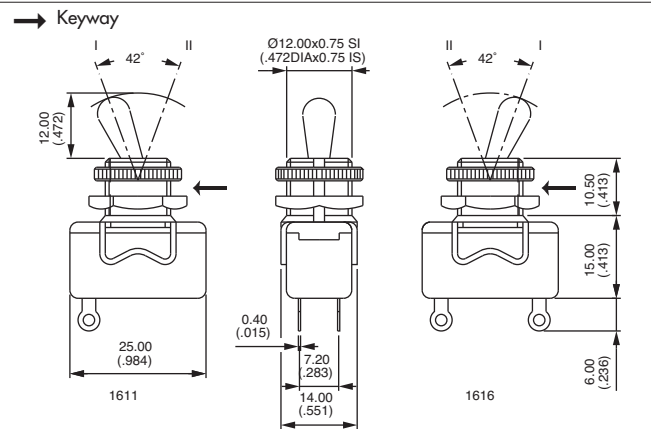


Metal lever - vertical solder lug terminals



1611	1616
-------------	-------------

I	ON	-	OFF
II	ON	-	ON

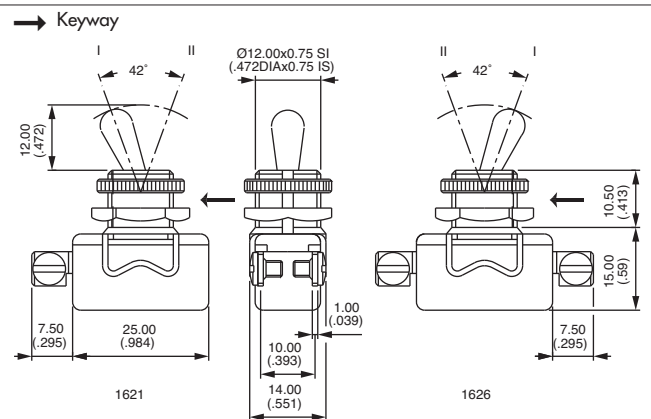


Metal lever - horizontal screw terminals



1621	1626
-------------	-------------

I	ON	-	OFF
II	ON	-	ON





1600 and 1700 series

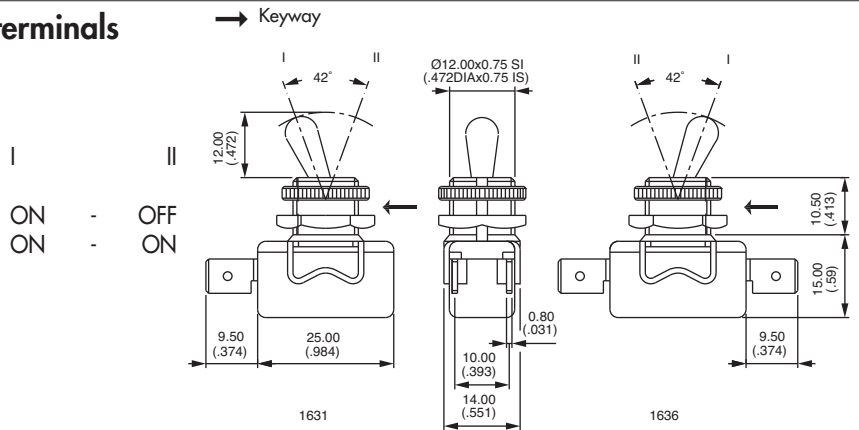
Toggle switches - metal lever

Quick-connect terminals

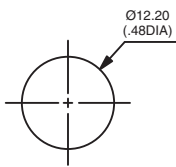
Metal lever - horizontal quick-connect terminals



1631
1636



PANEL CUT-OUT



4600 and 4400 series

Toggle switches

Distinctive features and specifications



- High current/voltage rating in a small case
- Butt action contacts
- Insulated or metal lever
- UL, CSA and VDE (EN 61058-1) approved

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load (silver contacts A) : 4A 250VAC - 6A 125VAC
- Approved electrical ratings : see table below
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 2.000 Vrms 50 Hz min. between terminals
 - 2.500 Vrms 50 Hz min. between poles and between terminals and frame
- Electrical life : 10.000 cycles at full load

APPROVALS	MODELS	POLES	FUNCTIONS	APPROVED RATINGS
UL/CSA	4600A	1-2	1-6-9	3A 250VAC - 6A 125VAC
VDE (EN 61058-1)	4400A	1-2	1-6	4(2)A 250VAC
	4600A	1-2-3	1-6	4(2)A 250VAC

MATERIALS

- Case : melamine phenolic
- Actuator :
 - insulated : polyamide ,6-6
 - non-insulated : brass, nickel plated
- Bushing :
 - insulated : polyamide 6-6
 - non-insulated : brass, nickel plated
- Contacts : silver

GENERAL SPECIFICATIONS

- Torque : 0,95 Nm (.70 Ft.lb) max. applied to nut
- Panel thickness : 5 mm (.196) between 2 nuts
- Operating temperature : -20°C to +55°C
- Hand soldering : 270°C max. for 10 seconds max. - iron Ø3 (.118)

AGENCY APPROVALS



EN 61058-1

Availability : see above chart.

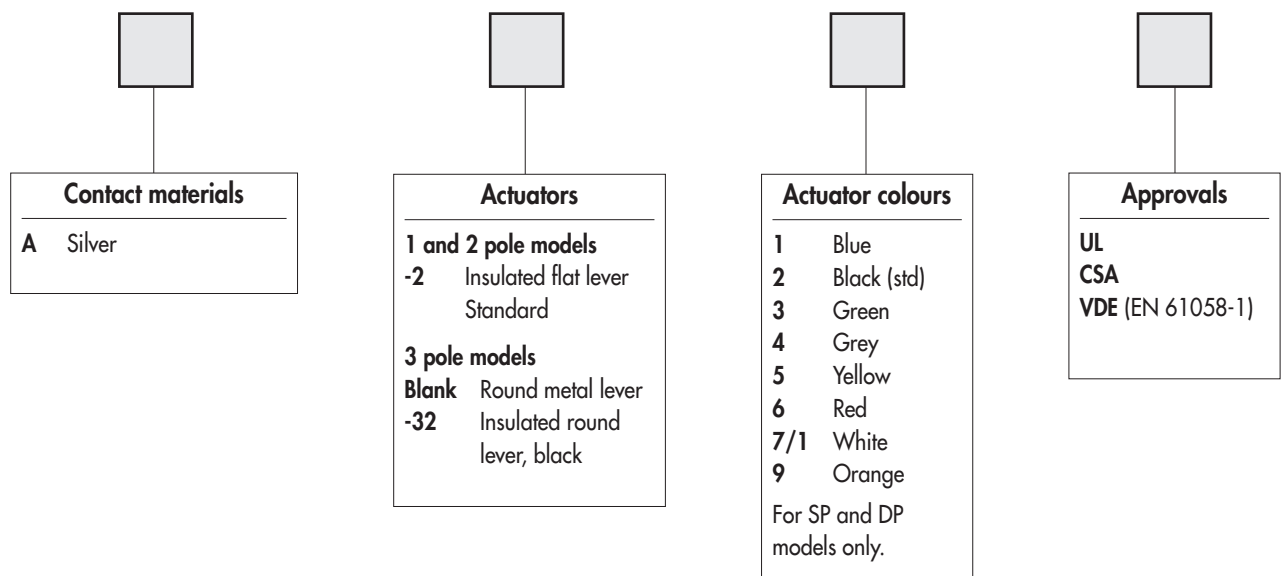
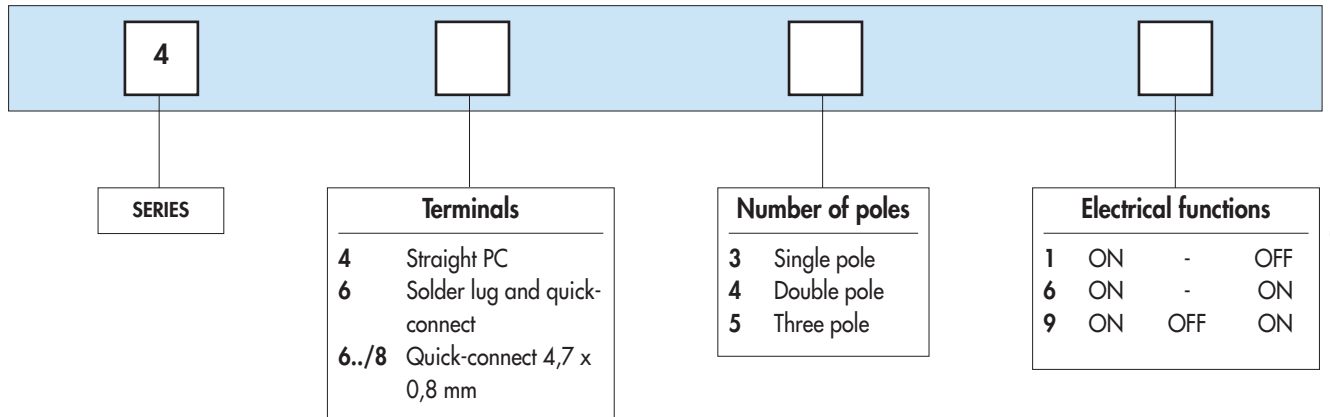
Marking : VDE approved models are standard marked.

To order switches marked UL-CSA, complete appropriate box of ordering format.

4600 and 4400 series

Toggle switches

Overview



ABOUT THIS SERIES

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



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



Sealing boots are available on 3 pole models to protect the switches against dust and water. They are presented in section H.



Mounting accessories : standard hardware supplied with all models : 1 hex nut U166 and 1 knurled nut U520 in the same colour as the lever (insulated models) or U411 nickel plated (metal lever models). Standard and special hardware available are presented in section I.



Packaging unit : 20 pieces.

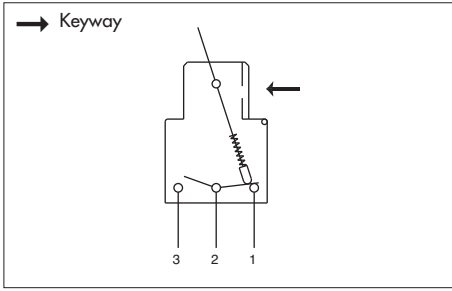
4600 and 4400 series

Toggle switches

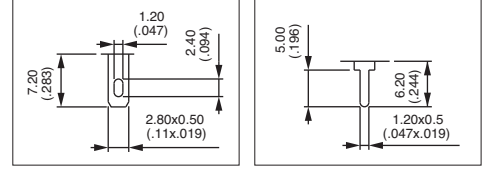
Insulated flat lever



A



- Solder lug/quick-connect terminals 2,8 x 0,5 (.110 x .019)
- Straight PC terminals or quick-connect terminals 4,7 x 0,8 (.185 x .031)
- 2 and 3 maintained positions
- 1 and 2 pole configurations



MODEL STRUCTURE



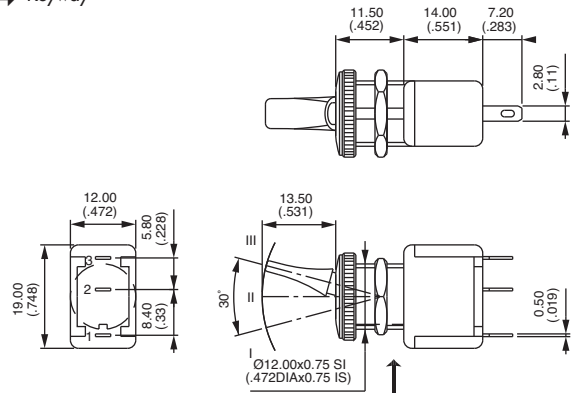
Solder lug/quick-connect terminals - single pole

→ Keyway



4631 -2
4636 -2
4639 -2

	III	II	I
4631 -2	ON	-	OFF
4636 -2	ON	-	ON
4639 -2	ON	OFF	ON



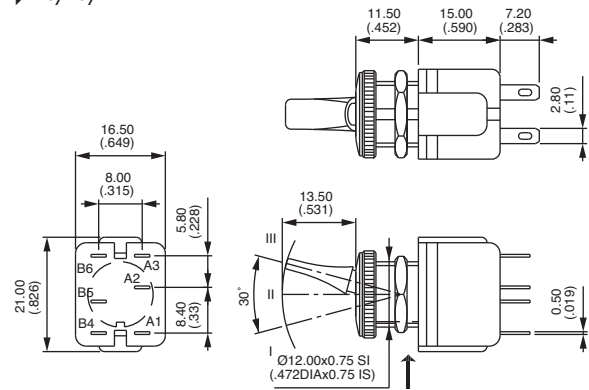
Solder lug/quick-connect terminals - double pole

→ Keyway



4641 -2
4646 -2
4649 -2

	III	II	I
4641 -2	ON	-	OFF
4646 -2	ON	-	ON
4649 -2	ON	OFF	ON



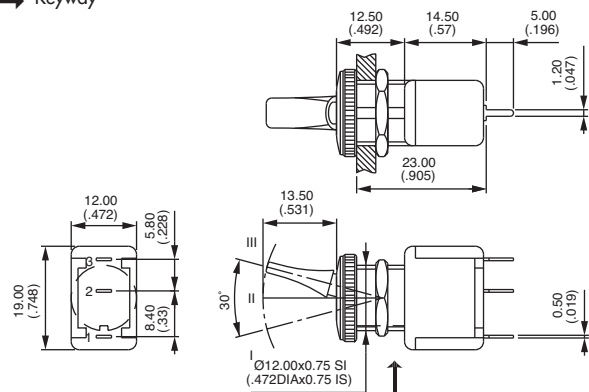
Straight PC terminals - single pole

→ Keyway



4431 -2
4436 -2
4439 -2

	III	II	I
4431 -2	ON	-	OFF
4436 -2	ON	-	ON
4439 -2	ON	OFF	ON





4600 and 4400 series

Toggle switches

Insulated flat lever

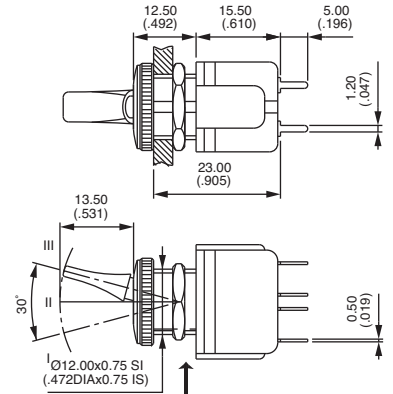
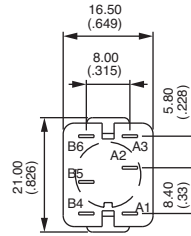
Straight PC terminals - double pole

→ Keyway



4441 -2
4446 -2
4449 -2

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



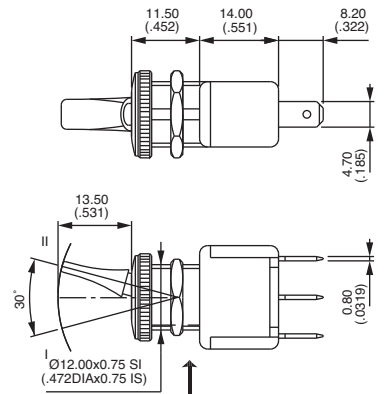
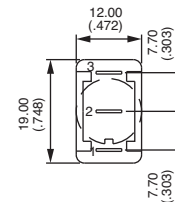
Quick-connect terminals 4,7 x 0,8 (.185 x .031) - single pole

→ Keyway

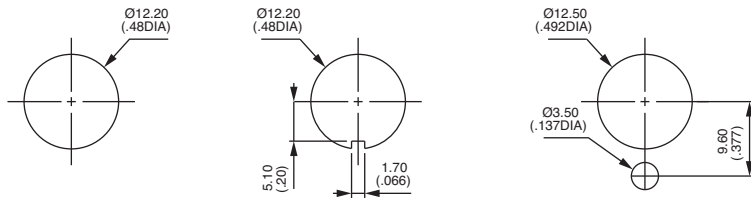


4631/8 -2
4636/8 -2

I	II	
ON	-	OFF
ON	-	ON



PANEL CUT-OUT



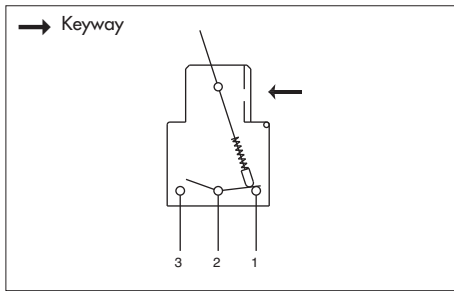
4600 and 4400 series

Toggle switches

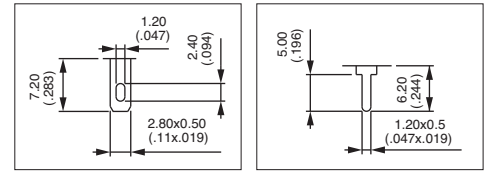
Round lever - three pole



A



- Solder lug or straight PC terminals
- 2 and 3 maintained positions



MODEL STRUCTURE



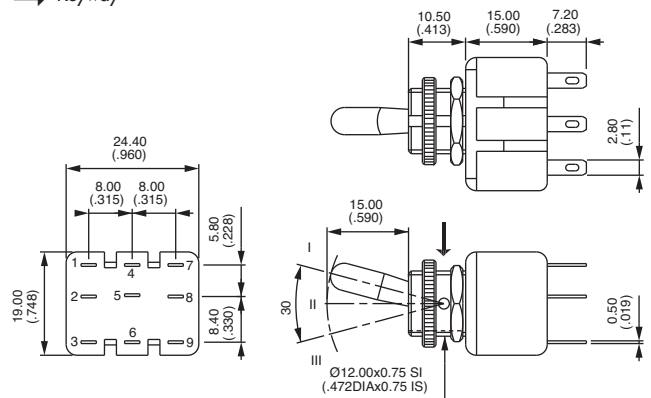
Solder lug terminals - metal lever

→ Keyway



4651
4656
4659

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



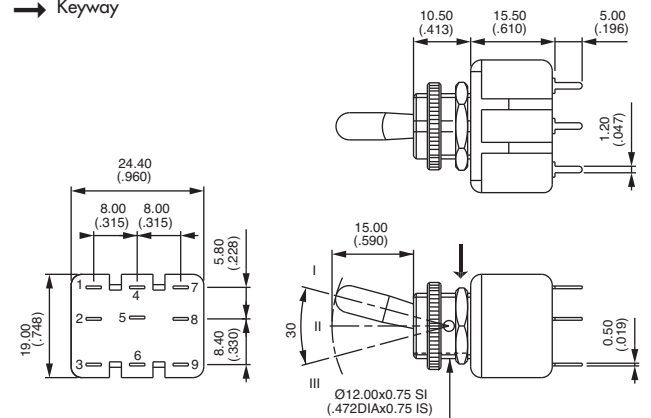
Straight PC terminals - metal lever

→ Keyway



4451
4456
4459

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



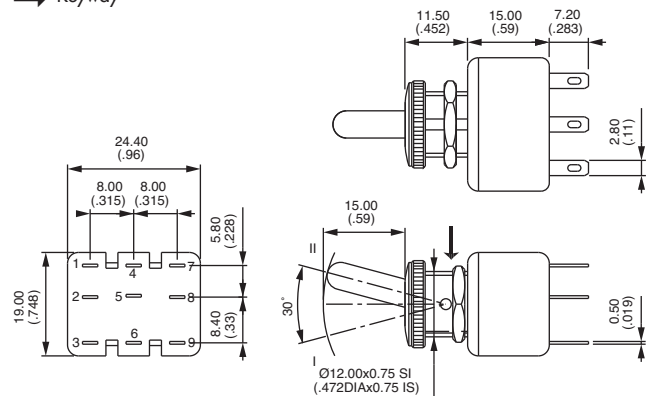
Solder lug terminals - insulated lever - silver contacts

→ Keyway



4651A-32
4656A-32

I	II	
ON	-	OFF
ON	-	ON

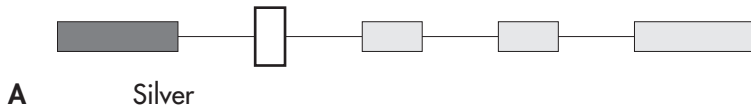




4600 and 4400 series

Toggle switches

CONTACT MATERIAL

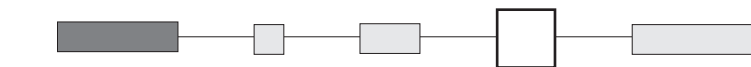


ACTUATORS



- Blank** Round, metal lever for 3 pole only
- 2** Insulated flat lever (for single and double pole only)
- 32** Black insulated round lever (for 3 pole only)

ACTUATOR COLOURS

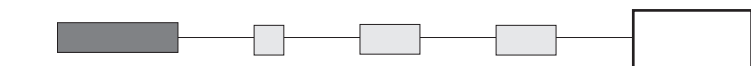


- 1** Blue
- 2** Black (standard)
- 3** Green
- 4** Grey
- 5** Yellow
- 6** Red
- 7/1** White
- 9** Orange



For insulated flat lever
 Black : standard colour - reduced delivery time
 Minimum order of 500 pieces for non-standard colours.

APPROVALS



UU (UL-CSA) Single and double pole only

Availability : see specifications for details of approved models.

Marking : to order switches marked UL-CSA, complete above box with 'UU'.
 Other approvals available as standard, see specifications.

600H and 600NH series

Toggle switches - high amperage

Distinctive features and specifications



❑ Construction

Terminal and contact support are manufactured from a single piece of metal. The contacts are resistance-welded to the terminal for increased mechanical strength.

❑ Rating

These switches are suitable for motor loads and power applications up to 15A 250VAC or 10A 400VAC

❑ Metal or insulated lever

❑ UL, CSA and NF-VDE (EN 61058-1) approved

ELECTRICAL SPECIFICATIONS

- Max. current/voltage ratings : see tables below
- Peak current : 30A max. during 1/2 sine, 250VAC
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
2.000 Vrms 50 Hz min. between terminals
2.500 Vrms 50 Hz min. between terminals and frame
- Electrical life : 10.000 cycles at full load

APPROVED RATINGS

MODELS	FUNCTIONS	600H - 600NH		
		UL	CSA	NF-VDE
		UL 1054	CSA 22-2	EN 61058-1
Single and double pole	ON - OFF (1)	15A 1/2 HP 125-250VAC		10(4)A 400VAC T 85/55 (600H)
	ON - ON (6)			
	Other (4-5-7-8-9)	10A 1/2 HP 125-250VAC		
Three pole	ON - OFF (1) & ON - ON (6)	15A 1/2 HP 125-250VAC		T 125/55 (600NH)
	Other (4-5-7-8-9)	10A 1/2 HP 125-250VAC		

- FOR INFORMATION-

Max. current/voltage rating w. resistive load

Functions	Ratings	Electrical life
ON - OFF ON - ON	15A 250VAC 10A 24VDC 15A 12VDC	10.000 cycles
ON OFF ON	15A 250VAC 5A 24VDC	6.000 cycles 10.000 cycles
Other	15A 125VAC 12A 250VAC 5A 24VDC	10.000 cycles

MATERIALS

- Case : polyester UL94-V0
- Actuator :
- 600H : brass, nickel plated
- 600NH : black polyamide
- Bushing : brass, nickel plated
- Contacts : silver/nickel alloy

GENERAL SPECIFICATIONS

- Torque : 1,50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness : 4,5 mm (.177) max. between 2 nuts
- Operating temperature : -20°C to +55°C

600H and 600NH series

Toggle switches - high amperage

Specifications

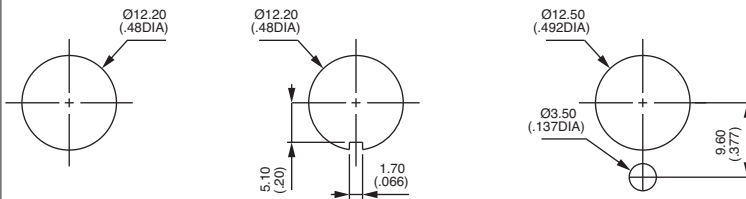
AGENCY APPROVALS



Availability : see chart on previous page.

Marking : approved models are standard marked.

PANEL CUT-OUT



MOUNTING RECOMMENDATIONS

Connection

- For quick-connect terminals, use 6,3 x 0,8 mm normalized female connectors.
- For screw terminals, use :
either 1,5 mm² or 2,5 mm² rigid wires,
or prepared stripped and tin plated flexible wires,
or prepared flexible wires with crimped termination per EN 50027 (DIN 46228)

Ground connector

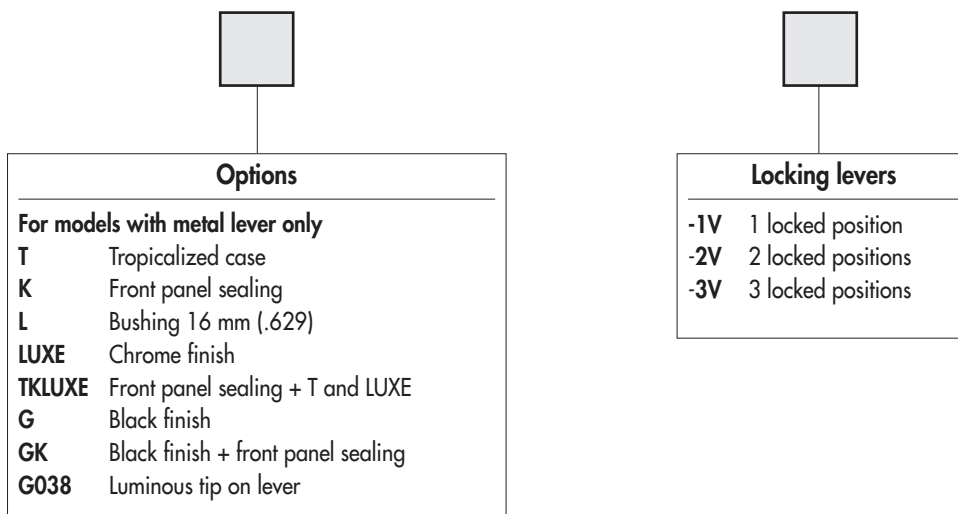
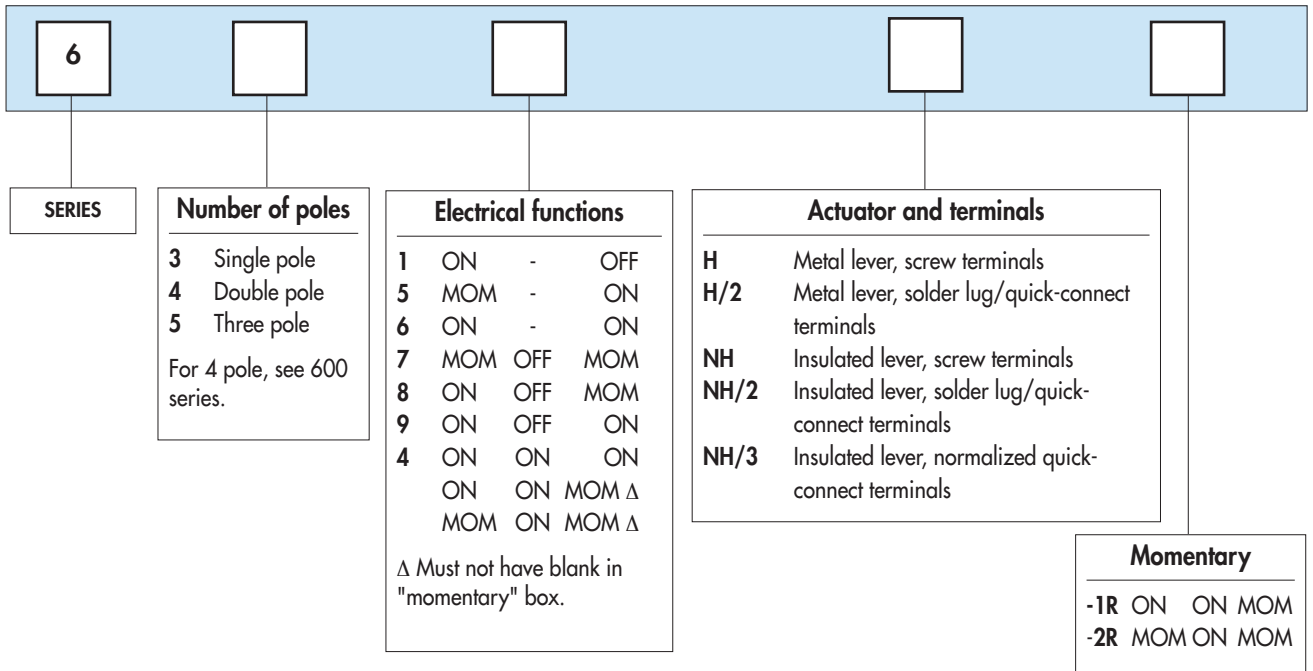
Compulsory if the panel is not metallic or not connected to ground. Should also be used when front face nut is of plastic material.

Order separately, see section I.

600H and 600NH series

Toggle switches - high amperage

Overview



ABOUT THIS SERIES

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



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

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



Sealing boots are available on 600H series to protect the switches against dust and water. They are presented in section H.



Mounting accessories : standard hardware supplied with all models :

- 600H and series : 1 hex nut U166 and 1 knurled nut U411
 - 600NH series : 1 hex nut U166 and 1 knurled nut U522
- Standard and special hardware are presented in section I.



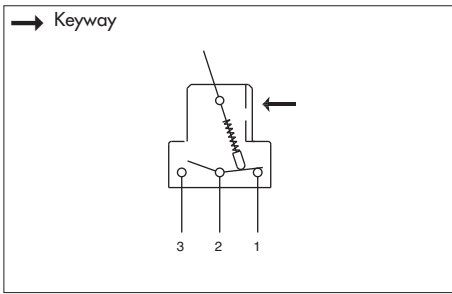
Packaging unit : 25 pieces.



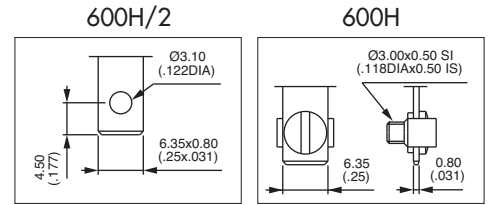
600H series

Toggle switches - high amperage - metal lever

Solder lug/quick-connect terminals - screw terminals



- 2 and 3 maintained or momentary positions
- Solder lug/quick-connect terminals 6,35 x 0,8 (.250 x .031) or screw terminals + clamp
- 1, 2 and 3 pole configurations
- Normalized quick-connect terminals (/3) optional. On request.



MODEL STRUCTURE

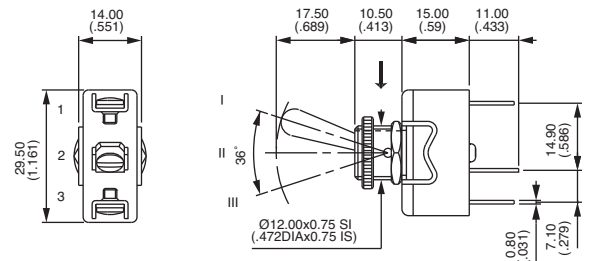


Single pole



	III	II	I
Solder lug	2-1		2-3
Screw term.	631H		639H
	ON	-	OFF
	635H		637H
	MOM	-	ON
	636H		638H
	ON	-	ON
	637H		639H
	MOM	OFF	MOM
	638H		639H
	ON	OFF	MOM
	639H		639H
	ON	OFF	ON

→ Keyway

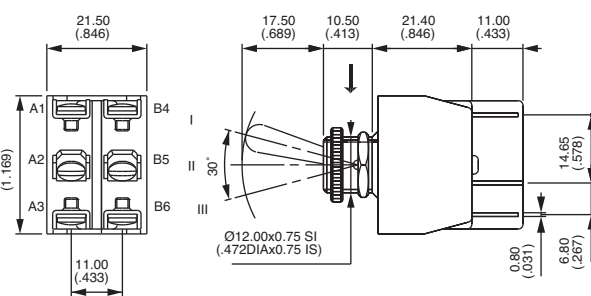


Double pole



	III	II	I
Solder lug	2-1		2-3
Screw term.	641H		649H
	ON	-	OFF
	644H*	ON	ON
	644H/2-1R	ON	ON
	644H-1R*	MOM	ON
	644H/2-2R	MOM	ON
	644H-2R*	MOM	ON
	645H/2	MOM	-
	645H	MOM	-
	646H/2	ON	-
	646H	ON	-
	647H/2	MOM	OFF
	647H	MOM	OFF
	648H/2	ON	OFF
	648H	ON	OFF
	649H/2	ON	OFF
	649H	ON	OFF

→ Keyway



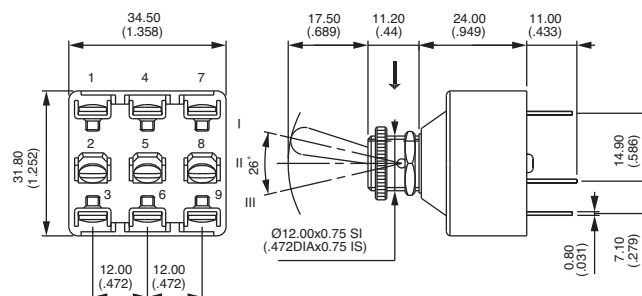
* Function 4 : SP in DP case - see end of catalogue.

Three pole



	III	II	I
Solder lug	2-1		2-3
Screw term.	651H		659H
	ON	-	OFF
	655H		657H
	MOM	-	ON
	656H		658H
	ON	-	ON
	657H		659H
	MOM	OFF	MOM
	658H		659H
	ON	OFF	MOM
	659H		659H
	ON	OFF	ON

→ Keyway

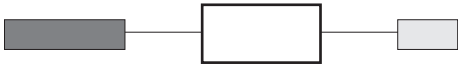


600H series

Toggle switches - high amperage - metal lever

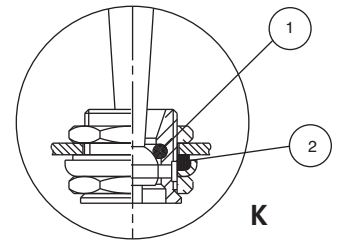


OPTIONS FOR 600H SERIES ONLY

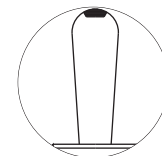


Complete above box with desired options in the same order as below

- T** Tropicalized diallylphthalate case (-40°C to +85°C)
- K** Front panel sealing by 1 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
- L** Special threaded bushing, length 16 mm (.629)
- LUXE** Chrome plated lever and cap nut U117
- TK LUXE** Options T, K and LUXE.
- G** Black finish on bushing, lever and nuts. Includes tropicalization (option T)
- GK** Front panel sealing by O-ring and sealing washer (as described in option TK LUXE) + option G
- G038** Option G + fluorescent tip on lever. White fluorescent tip becomes luminous when submitted to ultra violet rays.



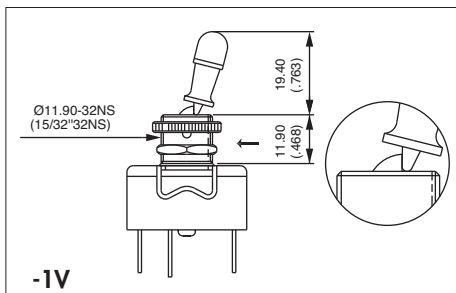
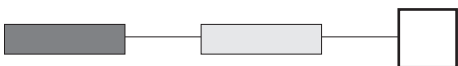
① O-ring ② Sealing washer



G038

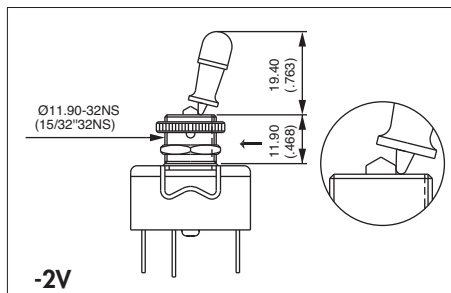
LOCKING LEVERS (1 and 2 pole models)

For 3-pole models, refer to 6000 series.



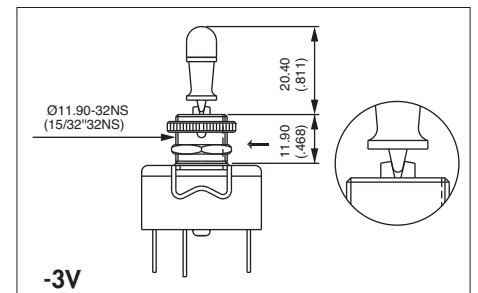
-1V

1 locked position



-2V

2 locked positions



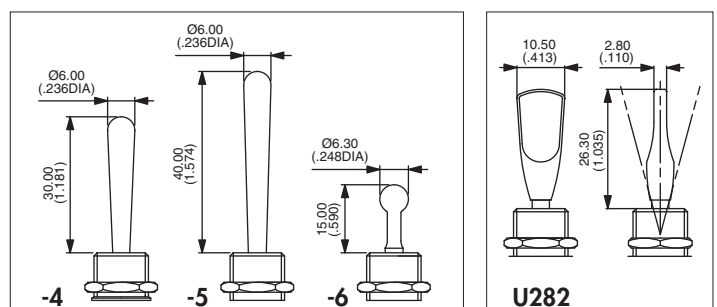
-3V

3 locked positions

→ Keyway

ACTUATOR OPTIONS (1 and 2 pole models)

- 4** 30 mm (1.181) long actuator
- 5** 40 mm (1.574) long actuator
- 6** Retro style actuator (gold plated or chrome plated : on request)
- Ergonomic flat plastic actuator : add U282 at the end of switch model number.

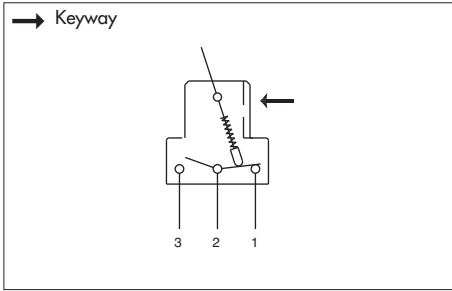




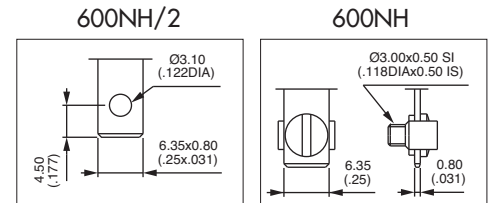
600NH series

Toggle switches - high amperage - insulated lever

Solder lug/quick-connect terminals - screw terminals



- 2 and 3 maintained or momentary positions
- Solder lug/quick-connect terminals 6,35 x 0,8 (.250 x .031) or screw terminals + clamp
- 1, 2 and 3 pole configurations
- Normalized quick-connect terminals (/3) optional. On request.



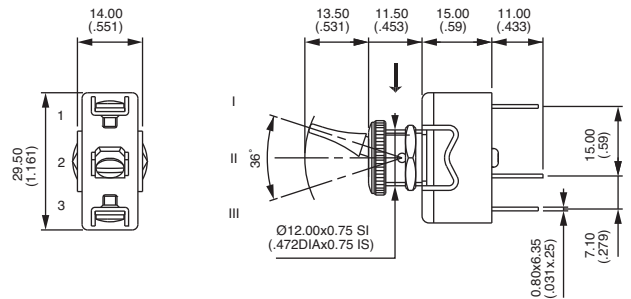
Single pole



Solder lug	Screw term.
631NH/2	631NH
635NH/2	635NH
636NH/2	636NH
637NH/2	637NH
638NH/2	638NH
639NH/2	639NH

III	II	I
2-1		2-3
ON	-	OFF
MOM	-	ON
ON	-	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	OFF	ON

→ Keyway



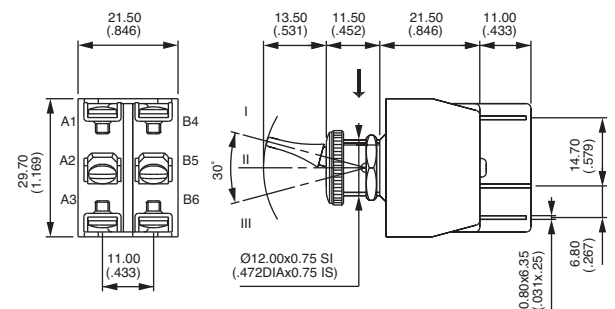
Double pole



Solder lug	Screw term.
641NH/2	641NH
644NH/2	644NH
644NH/2-1R	644NH-1R*
644NH/2-2R	644NH-2R*
645NH/2	645NH
646NH/2	646NH
647NH/2	647NH
648NH/2	648NH
649NH/2	649NH

III	II	I
2-1		2-3
5-4		5-6
ON	-	OFF
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM
MOM	-	ON
ON	-	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	OFF	ON

→ Keyway



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

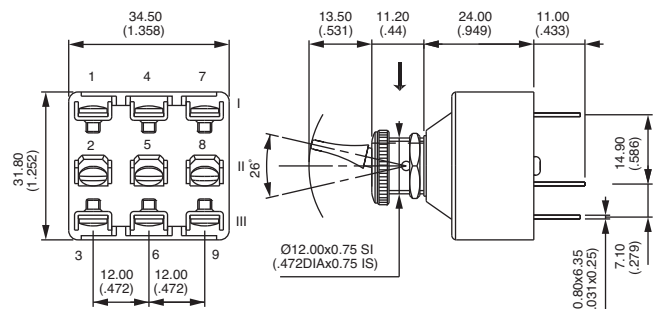
Three pole



Solder lug	Screw term.
651NH/2	651NH
655NH/2	655NH
656NH/2	656NH
657NH/2	657NH
658NH/2	658NH
659NH/2	659NH

III	II	I
2-1		2-3
5-4		5-6
8-7		8-9
ON	-	OFF
MOM	-	ON
ON	-	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	OFF	ON

→ Keyway



660 series

Power toggle switches - metal lever

Specifications

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 10A 30VDC
- Decrease by 50 % for inductive load
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 2.500 Vrms 50 Hz min. between terminals
 - 2.500 Vrms 50 Hz min. between terminals and frame
- Electrical life : 10.000 cycles at full load

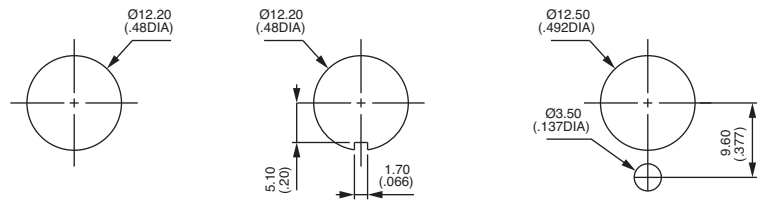
MATERIALS

- Case : melamine/polyester
- Actuator : brass, nickel plated
- Bushing : brass, nickel plated
- Contacts : silver

GENERAL SPECIFICATIONS

- Torque : 1,50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness : 4,5 mm (.177) max.
- Operating temperature : -20°C to +55°C

PANEL CUT-OUT



ABOUT THIS SERIES

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



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 : 1 hex nut U166, 1 knurled nut U411 and 1 lockwasher U13
Standard and special hardware are presented in section I.

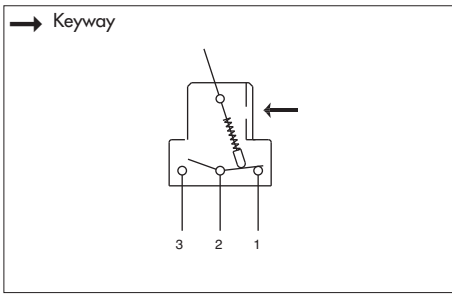


Packaging unit : 25 pieces per type.

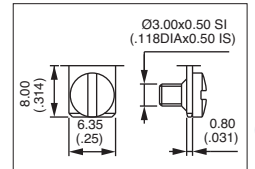
660 series

Power toggle switches - metal lever

Four pole



- 2 and 3 maintained or momentary positions
- Screw terminals



MODEL STRUCTURE



Four pole

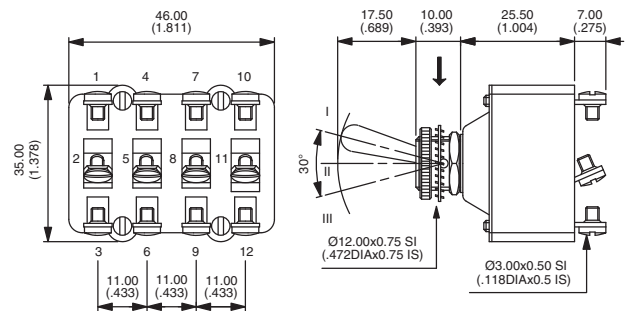


661
665
666
667
668
669

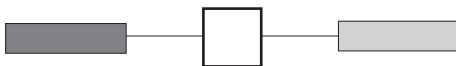
III	II	I
2-1*		2-3**
ON	-	OFF
MOM	-	ON
ON	-	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	OFF	ON

* (2-1) (5-4) (8-7) (11-10) ** (2-3) (5-6) (8-9) (11-12)

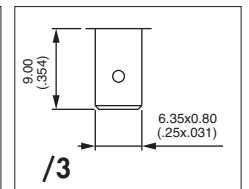
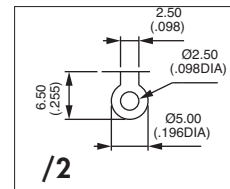
→ Keyway



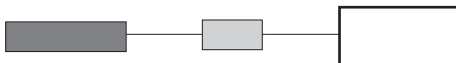
TERMINAL OPTIONS



- /2 Solder lug terminals
- /3 Quick-connect terminals 6,35 x 0,8 (.250 x .031)



OTHER OPTIONS

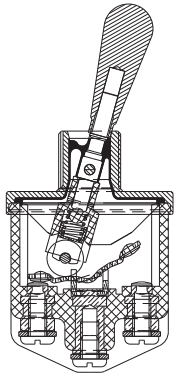


- T Tropicalized diallylphthalate case (-40°C to +85°C)
- LUXE Chrome plated lever and cap nut U117
- TK LUXE Front panel sealing by O-ring and sealing washer + options T and LUXE. See 600H series.
- G Black finish on bushing, lever and nuts. Includes tropicalization (option T)
- GK Front panel sealing by O-ring and sealing washer (as described in option TK LUXE) + option G

3500 series

High performance toggle switches - environmentally sealed

Distinctive features and specifications



- Completely sealed switches withstanding 0,1 bar pressure**
 - Frontal sealing to IP67 or IP69K by a silicone membrane (for sealed panel mounting, add washer U60, section I).
 - Rear sealing to IP 64 provided by moulded-in terminal inserts
- Approved to European standards CECC 96000**
- Three types of terminals**
- Many lever styles available**

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load and electrical life at full load: see table below
- Initial contact resistance : 10 mΩ max. at 1A 2VDC
- Insulation resistance : 1.000 MΩ
- Dielectric strength : 2.500 Vrms 50 Hz min. between terminals
3.000 Vrms 50 Hz min. between terminals and frame

FUNCTIONS	GENERAL PERFORMANCES
ON-OFF et ON-ON	10.000 cycles, T20°C 15A 28VDC resistive 15A 28VDC inductive 5A 28VDC lamp
ON OFF ON	10.000 cycles, T20°C 15A 28VDC resistive 15A 28VDC inductive 5A 28VDC lamp
AUTRES FONCTIONS	10.000 cycles, T20°C 15A 28VDC resistive 10A 28VDC inductive 3A 28VDC lamp

MATERIALS

- Case : mineral filled polyester UL94-V0
- Bushing and cover : zamac
- Actuator : brass, nickel or chrome plated, or anodized aluminium
- Contacts : silver alloy

AGENCY APPROVAL



CECC 96201-004

Availability : consult factory for details of approved models.

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

GENERAL SPECIFICATIONS

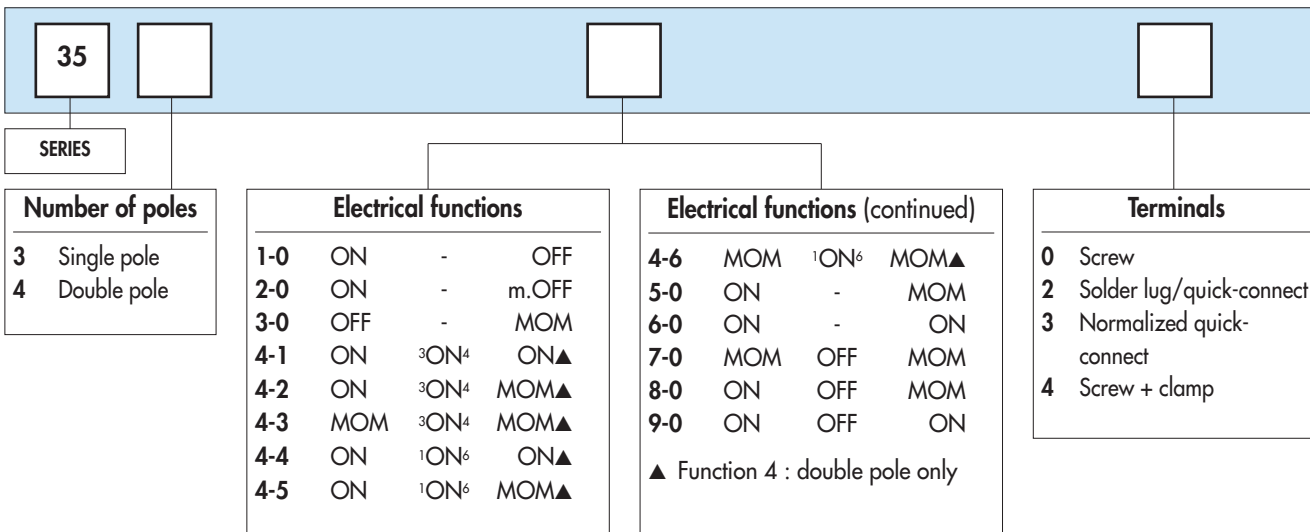
- Mechanical life : 40.000 cycles
- Torque : 2 Nm (1.47 Ft.lb) max. applied to nut
- Panel thickness : see "Mounting Accessories" on the following pages
- Operating temperature : -40°C to +85°C
- Moisture resistance : 56 days

3500 series

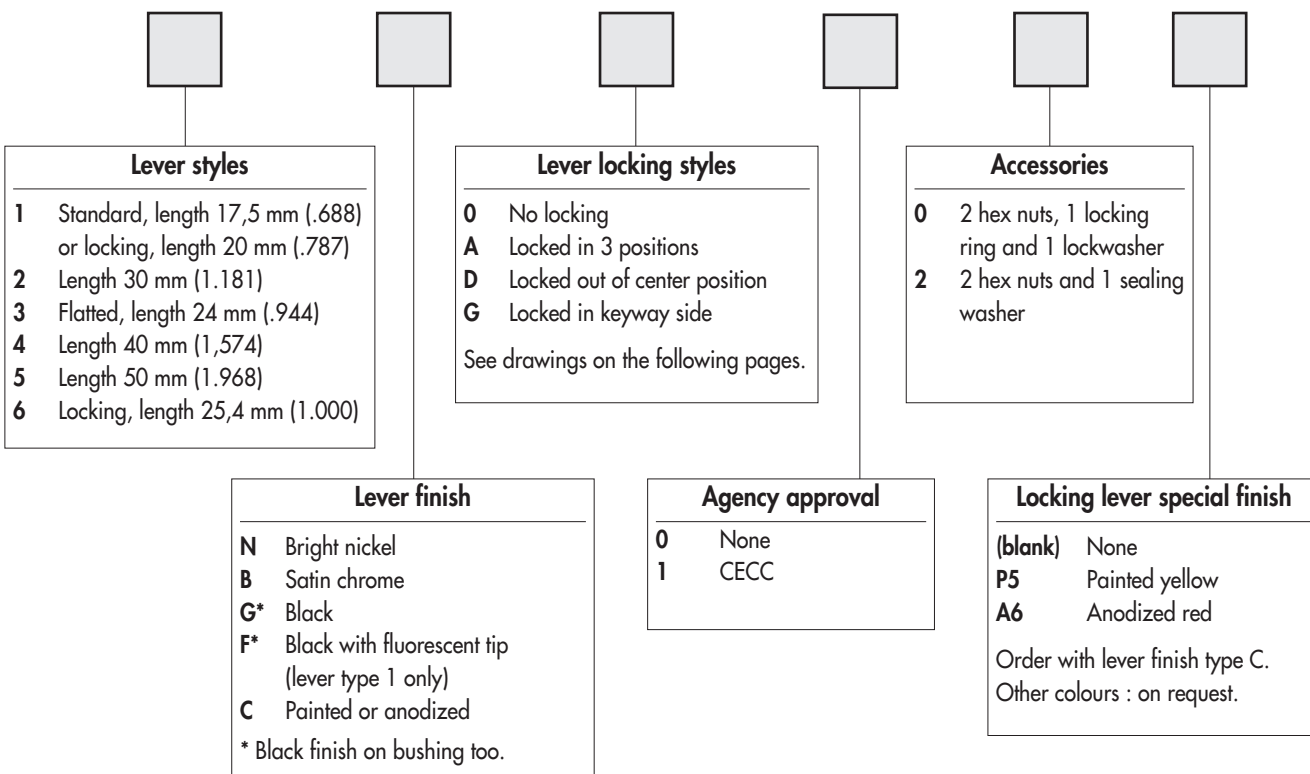
High performance toggle switches - environmentally sealed

Overview

MODEL
STRUCTURE



OPTIONS



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
 - their options in the same order as in above chart

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

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

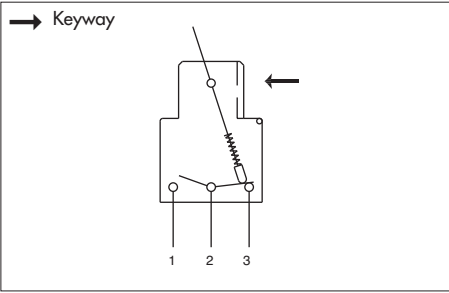


Packaging unit : 25 pieces

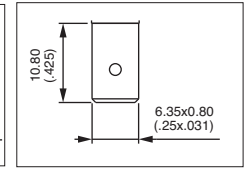
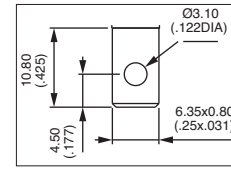
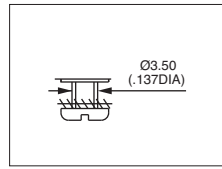
3500 series

High performance toggle switches - environmentally sealed

MODEL
STRUCTURE

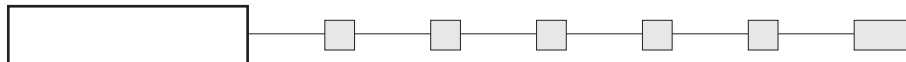


- Screw, solder lug or quick-connect terminals
- Also available with threaded terminals : consult factory
- Screw terminals + clamp : on request.



A

MODEL STRUCTURE



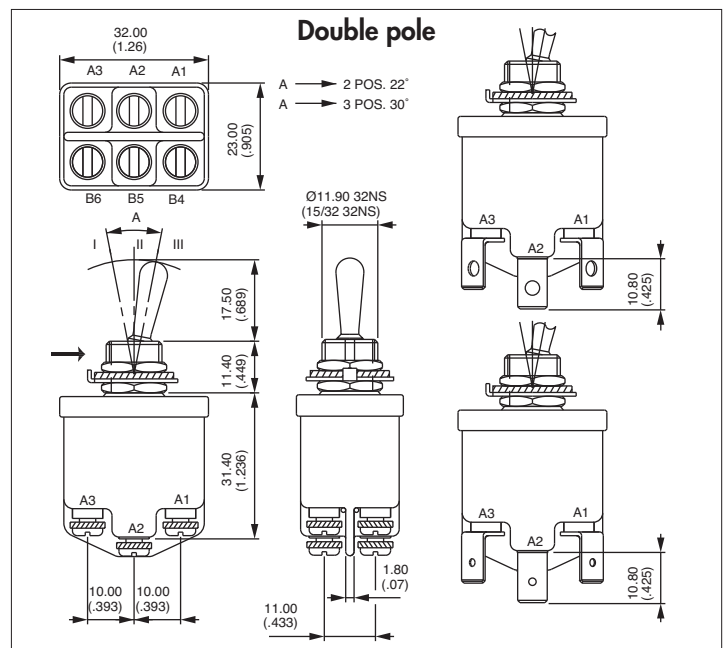
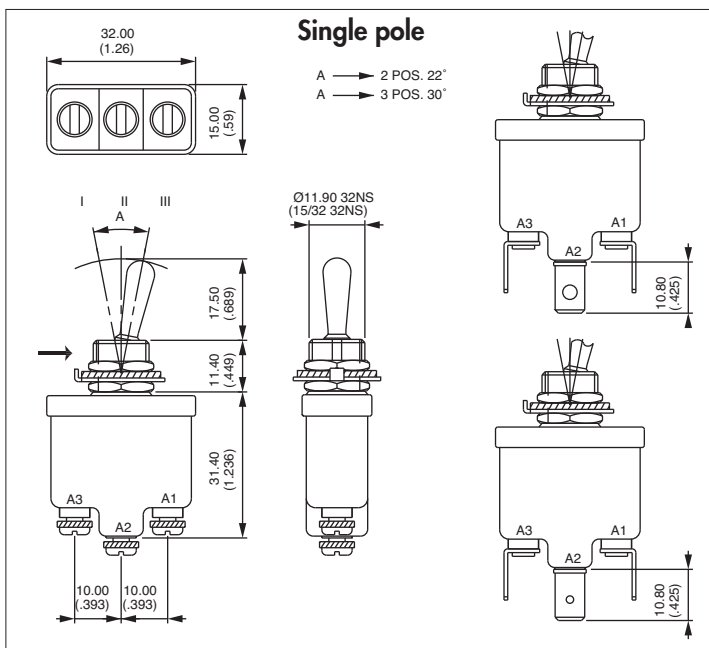
Shown with standard lever



FUNCTIONS			BASIC PART NUMBER					
III	II	I	Screw terminals		Solder lugs and quick-connect term.		Normalized quick-connect terminals	
A2-A3	* A3-B5	A1-A2	Single pole	Double pole	Single pole	Double pole	Single pole	Double pole
B5-B6	** A1-B5	B5-B4						
ON	-	OFF	3531-00	3541-00	3531-02	3541-02	3531-03	3541-03
ON	-	m.OFF	3532-00	3542-00	3532-02	3542-02	3532-03	3542-03
OFF	-	MOM	3533-00	3543-00	3533-02	3543-02	3533-03	3543-03
ON	ON *	ON		3544-10		3544-12		3544-13
ON	ON *	MOM		3544-20		3544-22		3544-23
MOM	ON *	MOM		3544-30		3544-32		3544-33
ON	ON **	ON		3544-40		3544-42		3544-43
ON	ON **	MOM		3544-50		3544-52		3544-53
MOM	ON **	MOM		3544-60		3544-62		3544-63
ON	-	MOM	3535-00	3545-00	3535-02	3545-02	3535-03	3545-03
ON	-	ON	3536-00	3546-00	3536-02	3546-02	3536-03	3546-03
MOM	OFF	MOM	3537-00	3547-00	3537-02	3547-02	3537-03	3547-03
ON	OFF	MOM	3538-00	3548-00	3538-02	3548-02	3538-03	3548-03
ON	OFF	ON	3539-00	3549-00	3539-02	3549-02	3539-03	3549-03

→ Keyway

* and **: A2-B4 and A2-B6 = jumper to be wired by the user.

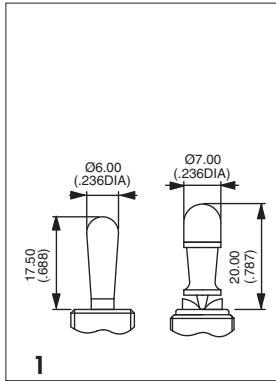
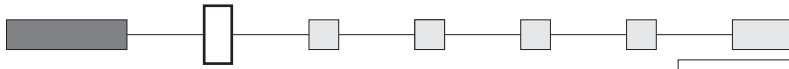




3500 series

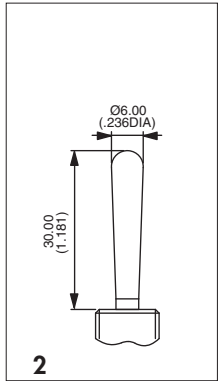
High performance toggle switches - environmentally sealed

LEVER STYLES

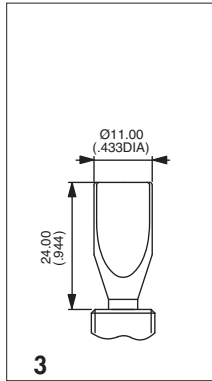


1

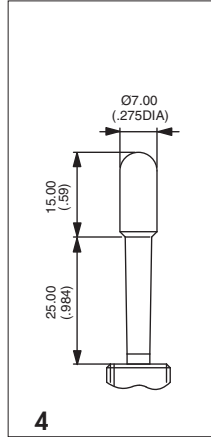
Standard



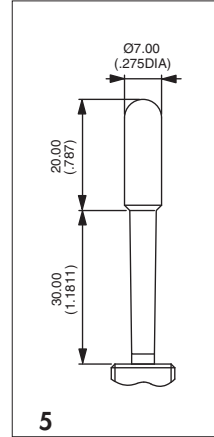
2



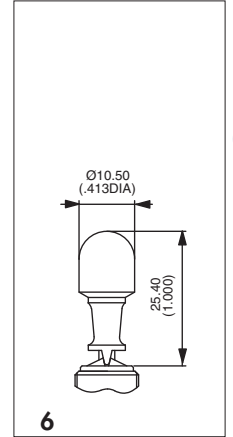
3



4

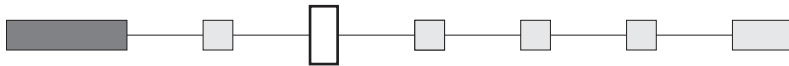


5



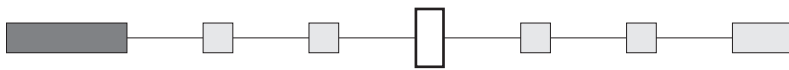
6

LEVER FINISH

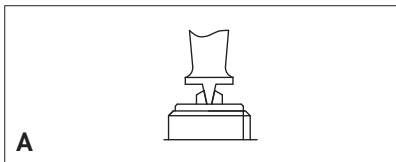
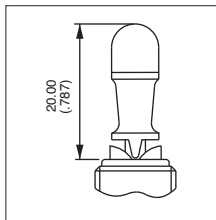


- N Bright nickel
 - B Satin chrome
 - G* Black
 - F* Black with fluorescent tip (available with lever type 1 only)
 - C Painted or anodized (for locking lever only)
- * Black finish on bushing too.

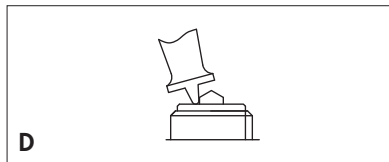
LOCKING LEVER STYLES



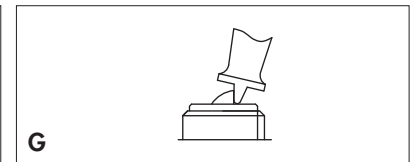
0 No locking



A Locked in 3 positions.
For functions 4-1, 4-4 and 9-0.



D Locked out of center position.
For functions 1-0 and 6-0.



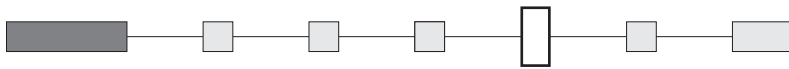
G Locked in keyway.
For functions 1-0 and 6-0.

3500 series

High performance toggle switches - environmentally sealed

OPTIONS
● ● ●

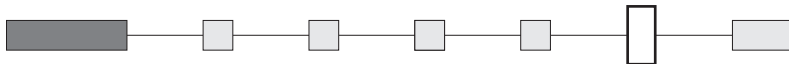
AGENCY APPROVAL



- 0 None
- 1 CECC

A

MOUNTING ACCESSORIES



- 0 For NON-SEALED mounting (panel cut-out fig. 1, 2 or 3)
2 hex nuts 14 mm (.551) across flats, 1 locking ring U121 or U12, 1 lockwasher U13
Panel thickness : 5 mm (.196) max.
- 2 For SEALED mounting (panel cut-out fig. 2)
2 hex nuts 14 mm (.551) across flats and 1 sealing washer U60
Panel thickness : 4 mm (.157) max.

Special hardware : black cap nut U129. Order separately. See section I.

PANEL CUT-OUT

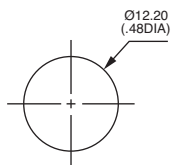


Figure 1

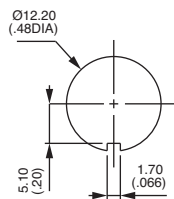


Figure 2

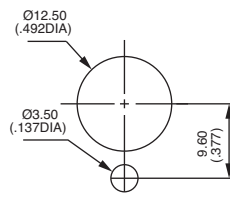
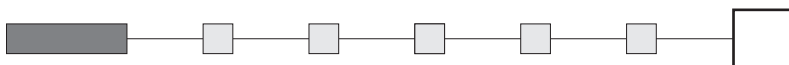


Figure 3

LOCKING LEVER SPECIAL FINISH



- (blank) None
- P5 Painted yellow
- A6 Anodized red

Order with lever finish type C.
Other colours on request.

3600NF series

Sealed toggle switches for outdoor applications

Distinctive features and specifications



- Sealing obtained by :**
 - O-ring between lever and bushing
 - half-length boot and nylon washer (supplied mounted)
 - elastomer gasket between cover and case
 - molded-in terminal inserts
 - sealing washer U60
- Solid silver contacts**
- UL approved**

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 12A 28VDC
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 2.500 Vrms 50 Hz min. between terminals
 - 3.000 Vrms 50 Hz min. between terminals and frame
- Electrical life : 10.000 cycles at full load

MATERIALS

- Case : phenolic resin
- Actuator : brass, nickel plated
- Bushing : brass, nickel plated
- Contacts : solid silver

GENERAL SPECIFICATIONS

- Torque : 1,50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness : 2 mm (.079) max. with all accessories
- Operating temperature : -40°C to +85°C

AGENCY APPROVAL



6A 125VAC/250VAC

Availability : consult factory for details or approved models.

Marking : to order switches marked UL, complete last box of ordering format.

ABOUT THIS SERIES

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



Mounting accessories : 1 sealing boot U1151, 1 hex nut U166, 1 nylon washer U21 and 1 sealing washer U60. See section I.



Packaging unit : 25 pieces per type and colour.

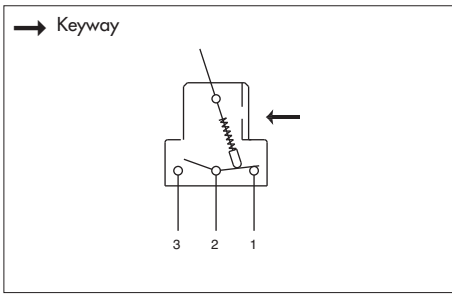
3600NF series

Sealed toggle switches for outdoor applications

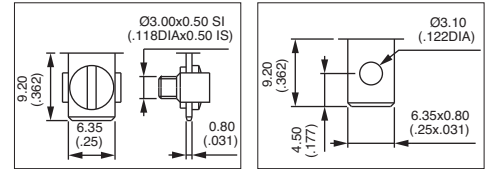
Screw terminals - solder lug/quick-connect terminals



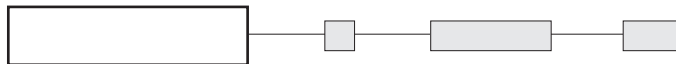
A



- 1 and 2 pole configurations



MODEL STRUCTURE



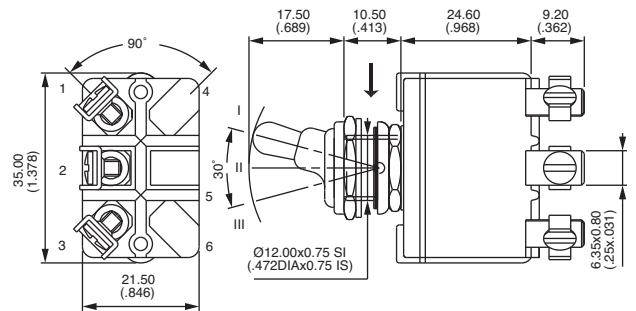
Screw terminals - single pole

→ Keyway



3631NF
3635NF
3636NF
3637NF
3638NF
3639NF

III	II	I
2-1		2-3
ON	-	OFF
MOM	-	ON
ON	-	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	OFF	ON



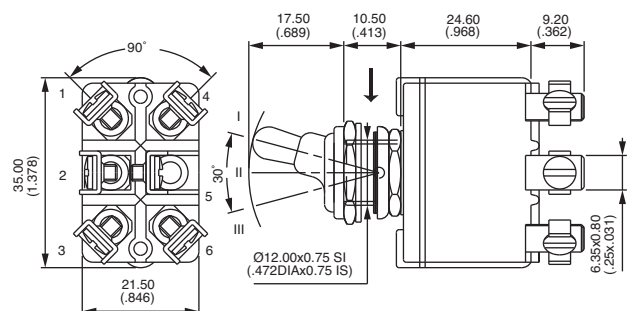
Screw terminals - double pole

→ Keyway



3641NF
3644NF*
3645NF
3646NF
3647NF
3648NF
3649NF

III	II	I
2-1		2-3
5-4		5-6
ON	-	OFF
ON	ON	ON
MOM	-	ON
ON	-	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	OFF	ON



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

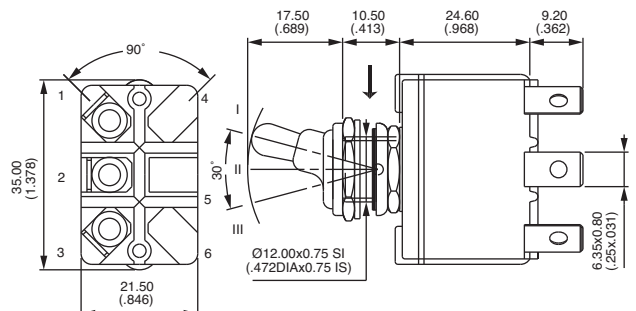
Solder lug/quick-connect terminals - single pole

→ Keyway



3631NF/2
3635NF/2
3636NF/2
3637NF/2
3638NF/2
3639NF/2

III	II	I
2-1		2-3
ON	-	OFF
MOM	-	ON
ON	-	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	OFF	ON





3600NF series

Sealed toggle switches for outdoor applications

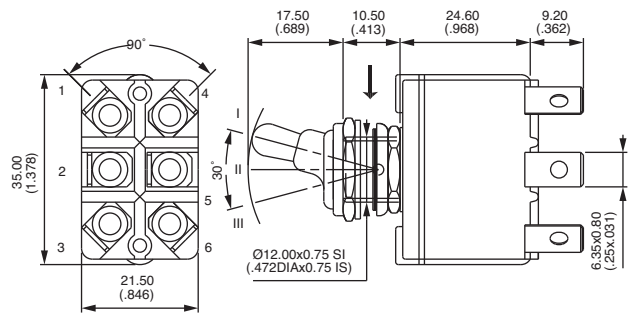
Solder lug/quick-connect terminals

Solder lug and quick-connect terminals - double pole



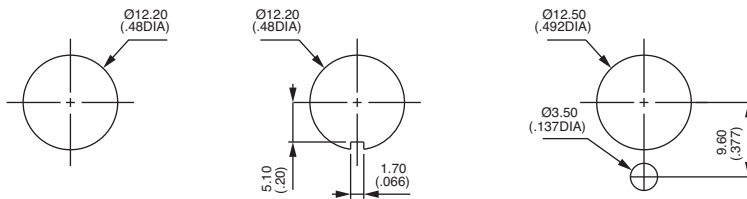
- 3641NF/2
- 3644NF/2*
- 3645NF/2
- 3646NF/2
- 3647NF/2
- 3648NF/2
- 3649NF/2

III	II	I
2-1		2-3
5-4		5-6
ON	-	OFF
ON	ON	ON
MOM	-	ON
ON	-	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	OFF	ON

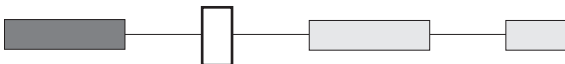


* Function 4 : DP in 4P case, see end of catalogue.

PANEL CUT-OUT



FINISH

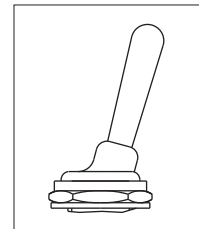


G Black finish on lever and nut of sealing boot

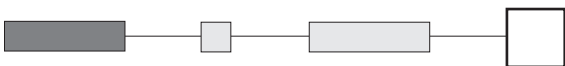
SPECIAL LEVER



X1052 30 mm (1.181) long lever



AGENCY APPROVAL



UL

Marking : to order switches marked UL, complete above box with "UL".



6000 series

Toggle switches for military applications

Distinctive features and specifications



- Suitable for military or industrial applications
- Sealing and locking lever options available
- Matt black finish on actuator and bushing

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating : see table below
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
2.000 Vrms 50 Hz min. between terminals
3.000 Vrms 50 Hz min. between terminals and frame
- Electrical life : 10.000 cycles at full load

CURRENT/VOLTAGE RATING	
	30VDC
Resistive load	6,5A
Inductive load	5A
Lamp load	3A

MATERIALS

- Case : diallyphthalate (DAP)
- Actuator : brass, chrome plated, black
- Bushing : brass, chrome plated, black
- Contacts : A : silver

GENERAL SPECIFICATIONS

- Torque : 1,50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness : 5 mm (.196) max.
- Operating temperature : -40°C to +85°C

ABOUT THIS SERIES

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

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



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 matt black nuts U41, matt black locking ring U12, zinc plated lockwasher U13
They are presented in section I.

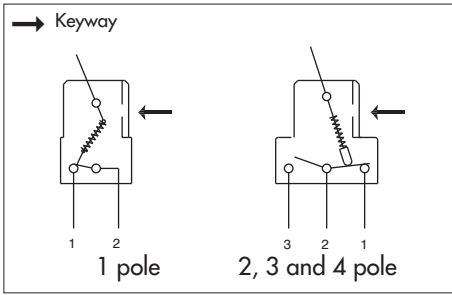


Packaging unit : 25 pieces, except model 6421 (20 pieces)

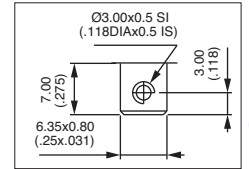


6000 series

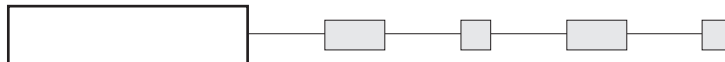
Toggle switches for military applications



- Screw terminals standard
- Solder lug or quick-connect terminals optional
- 1, 2, 3 and 4-pole configurations



MODEL STRUCTURE



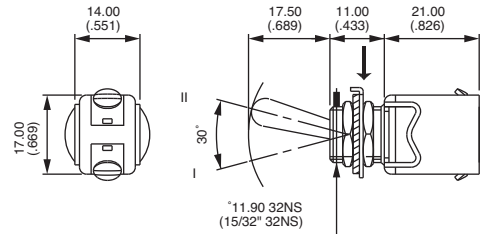
Single pole



6421A-03

	I	II
	ON	OFF

→ Keyway



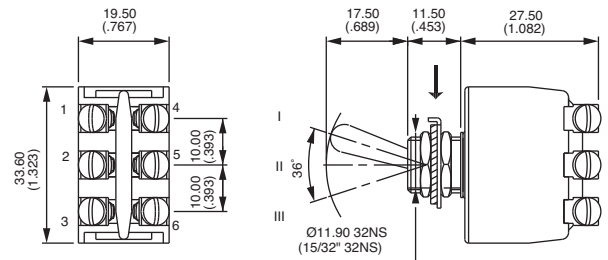
Double pole



6641-03
6642-03
6643-03
6644-03 ▲
6645-03
6646-03
6647-03
6648-03
6649-03

	III	II	I
	2-1		2-3
	5-4		5-6
	ON	-	OFF
	ON	-	mom.OFF
	MOM	-	OFF
	ON	ON	ON
	MOM	-	ON
	ON	-	ON
	MOM	OFF	MOM
	ON	OFF	MOM
	ON	OFF	ON

→ Keyway



▲ Function 4 : SP in DP case, see end of catalogue.

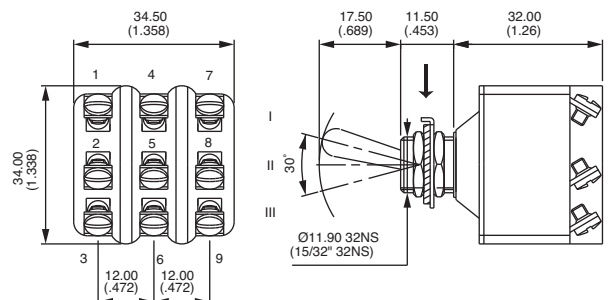
Three pole



6651-03
6652-03
6653-03
6655-03
6656-03
6657-03
6658-03
6659-03

	III*	II	I**
	ON	-	OFF
	ON	-	mom.OFF
	MOM	-	OFF
	MOM	-	ON
	ON	-	ON
	MOM	OFF	MOM
	ON	OFF	MOM
	ON	OFF	ON

→ Keyway



* (2-1) (5-4) (8-7) ** (2-3) (5-6) (8-9)

6000 series

Toggle switches for military applications

OPTIONS



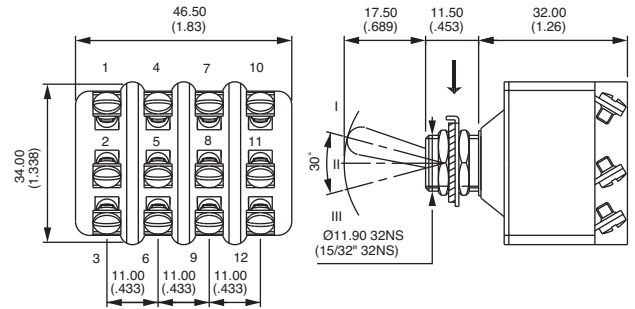
Four pole

→ Keyway



6661-03
6662-03
6663-03
6664-03 ▲
6665-03
6666-03
6667-03
6668-03
6669-03

	III*	II	I**
6661-03	ON	-	OFF
6662-03	ON	-	mom.OFF
6663-03	MOM	-	OFF
6664-03 ▲	ON	ON	ON
6665-03	MOM	-	ON
6666-03	ON	-	ON
6667-03	MOM	OFF	MOM
6668-03	ON	OFF	MOM
6669-03	ON	OFF	ON

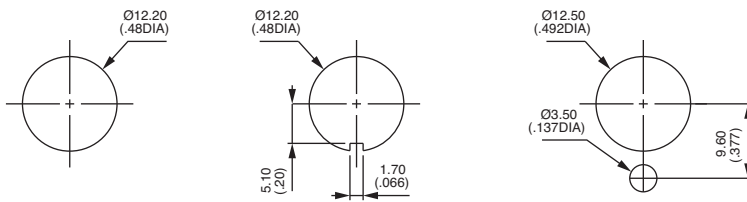


* (2-1) (5-4) (8-7) (11-10)

** (2-3) (5-6) (8-9) (11-12)

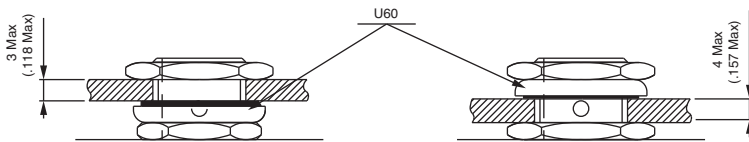
▲ Function 4 : 2P in 4P case, see end of catalogue.

STANDARD PANEL CUT-OUT

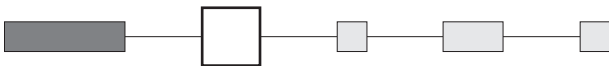


PANEL CUT-OUT WITH "K" SEALING

Recommended cut-out and mounting depending on panel thickness



FINISH



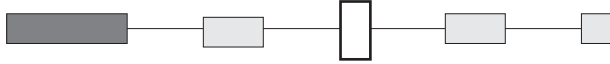
- B** Lever and bushing with grey satin chrome finish
- LM** Nickel plated bushing - lever and upper nut bright chrome plated
- 8** Black lever with fluorescent tip



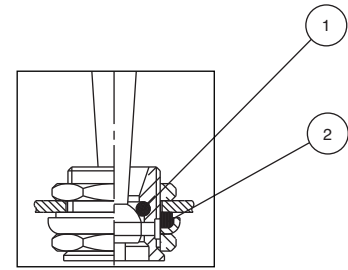
6000 series

Toggle switches for military applications

SEALING

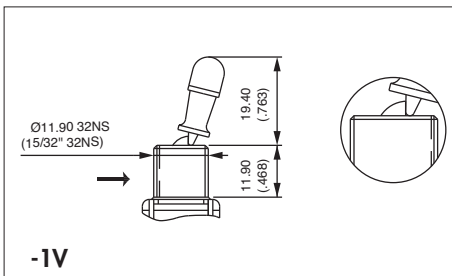


K Frontal sealing by O-ring and sealing washer. Protects the switch against water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated



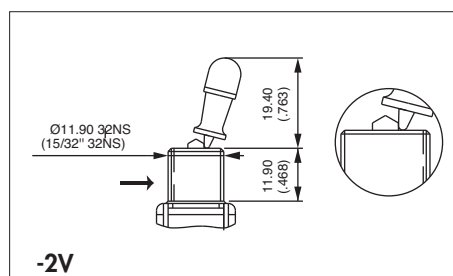
① O-ring ② Sealing washer

LOCKING LEVERS



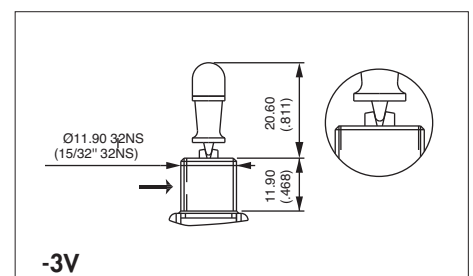
-1V

1 locked position



-2V

2 locked positions



-3V

3 locked positions

→ Keyway

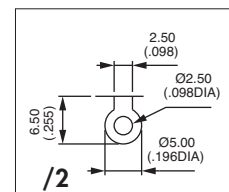
TERMINALS



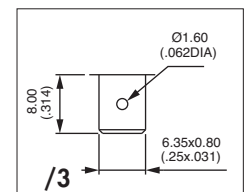
- Blank** Screw terminals
- /2** Solder lug terminals
- /3** Quick-connect terminals 6,35 x 0,8 (.250 x .031)



Not available on single pole models.



/2



/3

NEOPRENE PROTECTION CAPS

These caps are designed to insulate terminals against electrical short circuit.



For 1-pole models

U58

For 2-pole models

U120

For 3-pole models

U46

For 4-pole models

U47

To be ordered separately. Example : PROTECTION CAP U58

«I» range pushbuttons



Section B1

IC series

New!

Pushbutton switches for harsh environments - short case - bushing \varnothing 12 mm - momentary

Distinctive features and specifications



- Momentary with short case, reduced behind-panel depth
- Tactile feedback
- Flat round actuator for optional marking
- Glossy actuator option (round curved only)
- Sealed to IP67

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Robustness : IK06 according to EN 50102 (1 joule)
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
5A 28VDC, 70.000 cycles
0,2A 48VDC, 500.000 cycles
0,5A 48VAC, 500.000 cycles
- Initial contact resistance : 50 m Ω max.
- Insulation resistance : 1 G Ω min. at 500VDC
- Dielectric strength : 1.500 Vrms 50 HZ between terminals

GENERAL SPECIFICATIONS

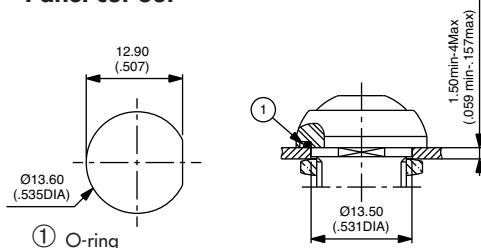
- Panel thickness : 1,5 mm (.059) min.
4 mm (.157 max.)
- Total travel : 1,7 mm (.067)+/- 0,3 mm
- Typical operating force : 4N +/- 2N
- Low level or mechanical life :
1.000.000 cycles
- Torque : 1,5 Nm max. applied to nut
- Soldering : 320°C max. for 3 sec.

MATERIALS

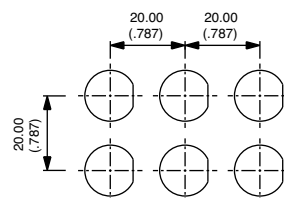
- Case : thermoplastic UL94-V0
- Actuator : polyamide 6/6
- Bushing/bezel : zinc die-cast (zamac), black painted
- Contacts : silver, gold plated
- Multi-wire lead AWG20, section 0,6 mm²
- Terminal seal : epoxy

MOUNTING

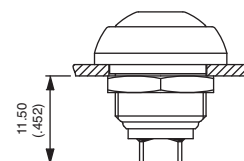
Panel cut-out



Matrix mounting



Back of panel space requirement

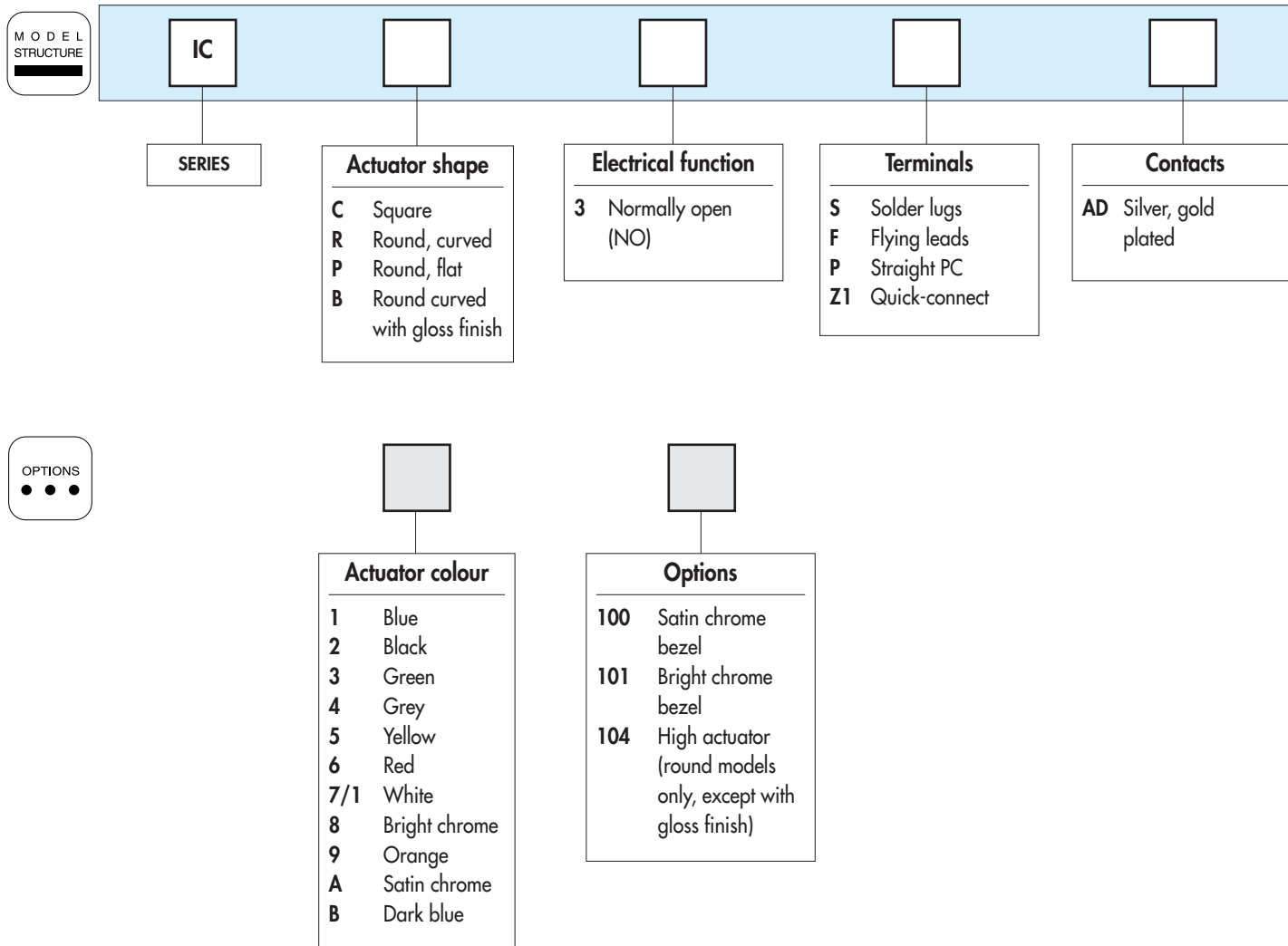


New!

IC series

Pushbutton switches for harsh environments - short case - bushing Ø 12 mm - momentary

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



A sealing boot is available to protect the switches against frost and sand. It is presented after the IA series and in Section H.



Mounting accessories : Standard hardware supplied : 1 hex nut 14 mm (.551) across flats and 1 O-ring. Hex nut part number U166.



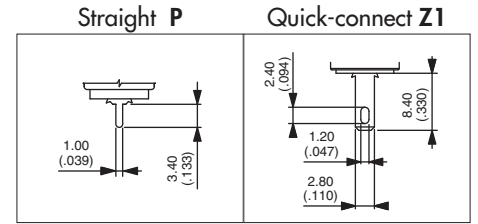
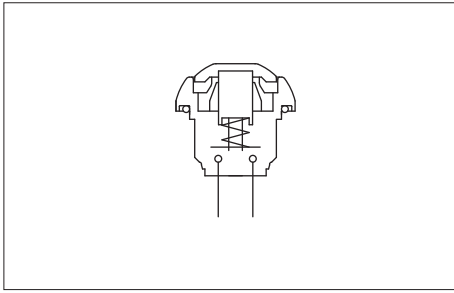
Packaging unit : 25 pieces

IC series

New!

Pushbutton switches for harsh environments - short case - bushing \varnothing 12 mm - momentary

Square - non-illuminated



MODEL STRUCTURE



B1

Solder lug terminals

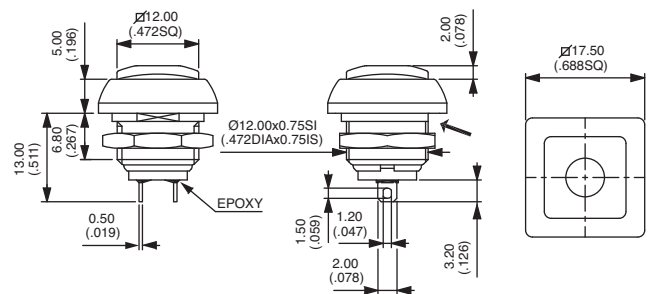


ICC3SAD



Normally Open

→ Flat



Also available with straight PC terminals : **ICC3PAD**
and quick-connect terminals : **ICC3Z1AD**

Sealed flying lead terminals

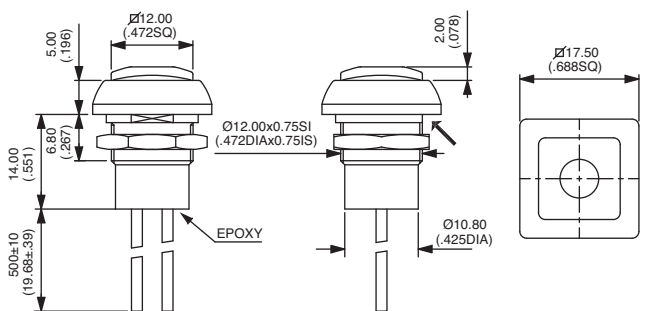


ICC3FAD

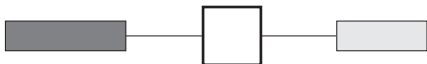


Normally Open

→ Flat

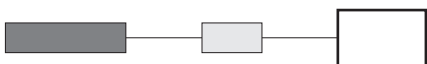


ACTUATOR COLOUR



1 : blue - 2 : black - 3 : green - 4 : grey - 5 : yellow - 6 : red - 7/1 : white - 8 : bright chrome - 9 : orange
A : satin chrome - B : dark blue

OPTIONS



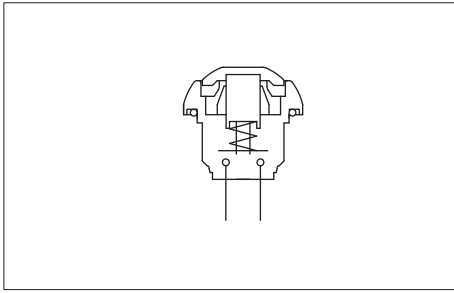
100 : Satin chrome bezel
101 : Bright chrome bezel

New!

IC series

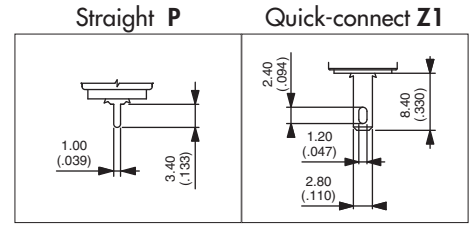
Pushbutton switches for harsh environments - short case - bushing \varnothing 12 mm - momentary

Round - non-illuminated



• Gloss actuator finish

Curved actuator also available with gloss finish - replace ICR by ICB in the part numbers below.
Not available with option 104 (high actuator).



MODEL STRUCTURE



Actuator marking available on ICP models (symbol 10 mm max.). On request.

Solder lug terminals



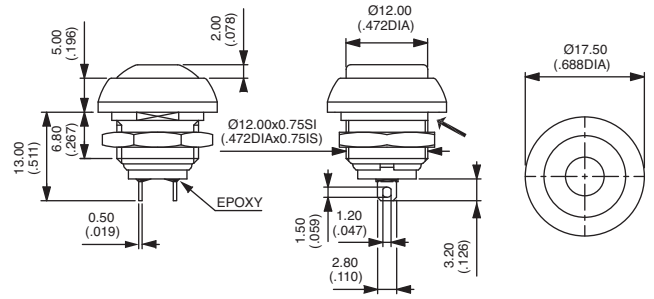
Curved actuator
ICR3SAD



Flat actuator
ICP3SAD



→ Flat



Also available with straight PC terminals : **IC•3PAD**
and quick-connect terminals : **IC•3Z1AD**

Sealed flying lead terminals



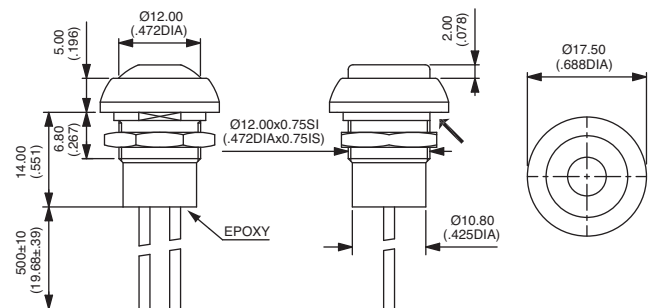
Curved actuator
ICR3FAD



Flat actuator
ICP3FAD



→ Flat

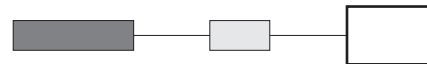


ACTUATOR COLOUR

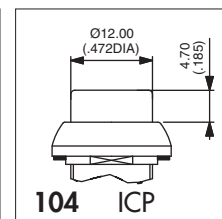
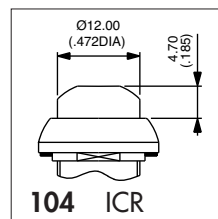


1 : blue - 2 : black - 3 : green - 4 : grey - 5 : yellow
6 : red - 7/1 : white - 8 : bright chrome - 9 : orange
A : satin chrome - B : dark blue -

OPTIONS



100 : Satin chrome bezel
101 : Bright chrome bezel
104 : High actuator (round models, except w. gloss finish)



IL series

New!

Sealed pushbutton switches for thick panels - long bushing Ø 12 mm - momentary

Distinctive features and specifications



- Momentary pushbuttons for thick panels
- Illuminated or non-illuminated
- Tactile feedback
- Flat round actuator for optional marking
- Sealed to IP67 (standard models only)

B1

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing according to IEC 60529 : IP67 (standard models) IP54 (options X1242 and 234)
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500 Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 2A 24VDC, 200.000 cycles
- Initial contact resistance : 50 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.000 Vrms

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	2,1V	2,3V
Yellow (LOY)	20mA	2,1V	2,3V
Green (LOG)	20mA	2,1V	2,3V
Blue (LOB)	20mA	3,2V	3,8V
White (LOW)	20mA	3,35V	4,25V

A resistor must be series-connected by the user.

$$\text{Resistor value} = \frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$$

GENERAL SPECIFICATIONS

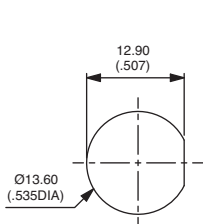
- Panel thickness : 1,50 mm (.059) min. 10 mm (.393) max.
- Total travel : 1,7 mm (.067) +/- 0,3 mm
- Typical operating force : 4N +/- 2N
- Low level or mechanical life : 1.000.000 cycles
- Torque : 1 Nm max. applied to nut
- Soldering : 300°C max. for 3 seconds

MATERIALS

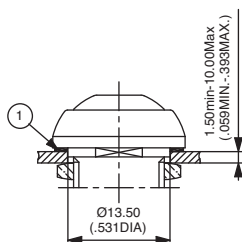
- Case : thermoplastic UL94-V0
- Actuator : polyamide 6/6
- Bushing/bezel : polyamide 6/6
- Contacts : silver, gold plated
- Terminal seal : epoxy

MOUNTING - STANDARD BEZEL

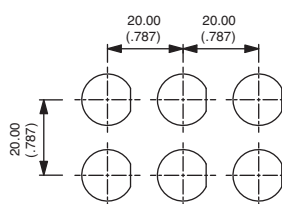
Panel cut-out



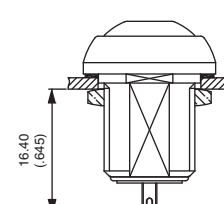
① Flat seal



Matrix mounting



Back of panel space requirement



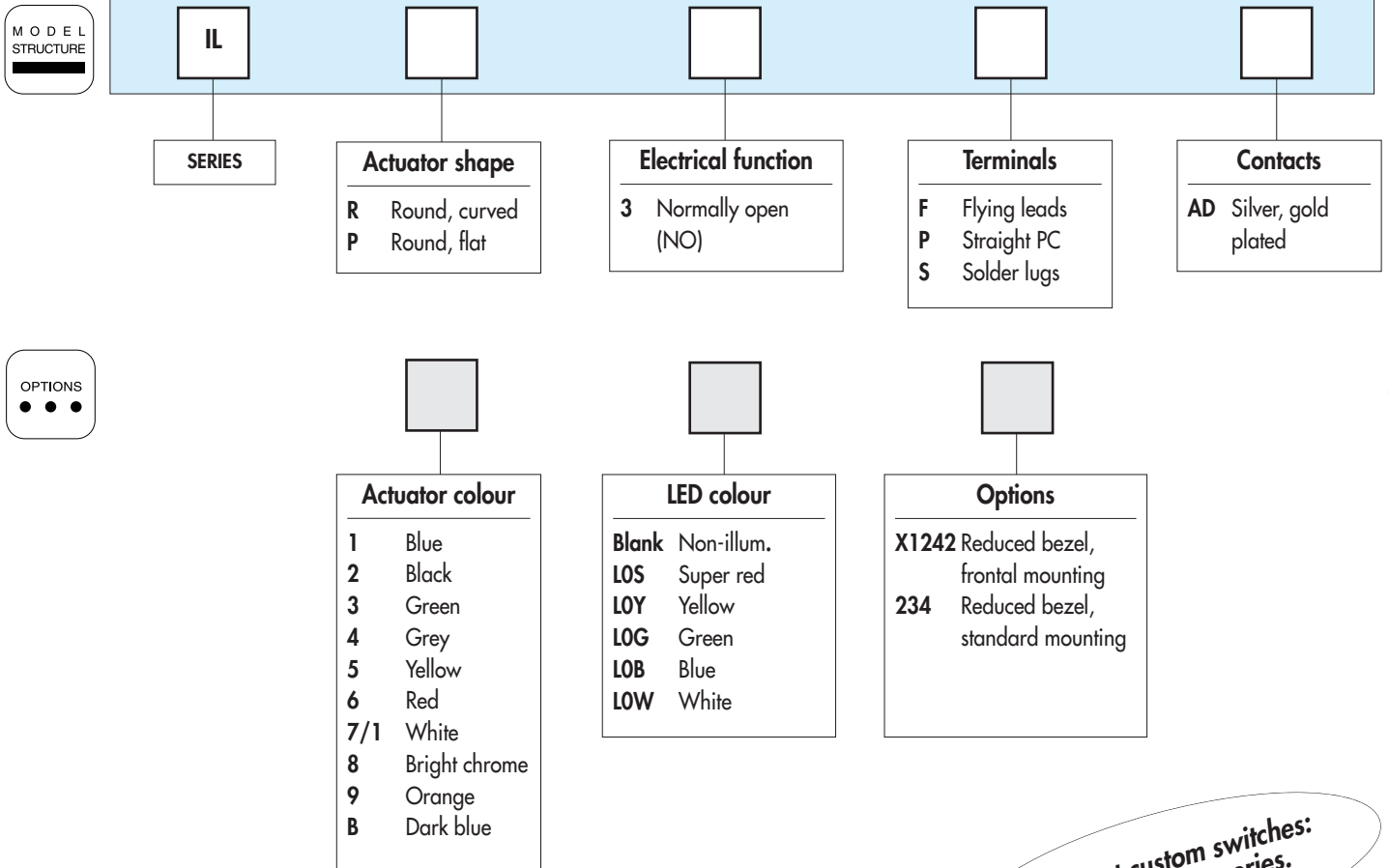
Mounting for reduced bezel : see options X1242 and 234 at the end of the series.

New!

IL series

Sealed pushbutton switches for thick panels - long bushing \varnothing 12 mm - momentary

Overview



Compact custom switches:
see end of the series.

ABOUT THIS SERIES

On the following pages, you will find successively :

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

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



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



Mounting accessories : Standard hardware supplied : 1 flat seal and 1 hex nut 14 mm (.551) across flats. Hex nut part number U166.



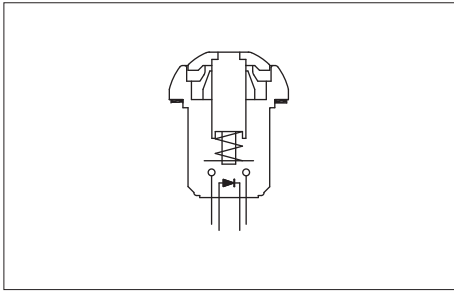
Packaging unit : 25 pieces

IL series

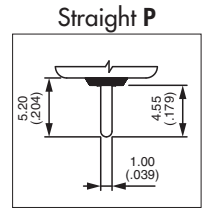
New!

Sealed pushbutton switches for thick panels - long bushing \varnothing 12 mm - momentary

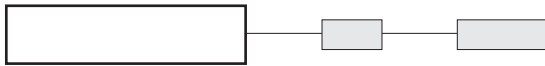
Illuminated



- Curved or flat actuator
- Antirotation bushing





MODEL STRUCTURE

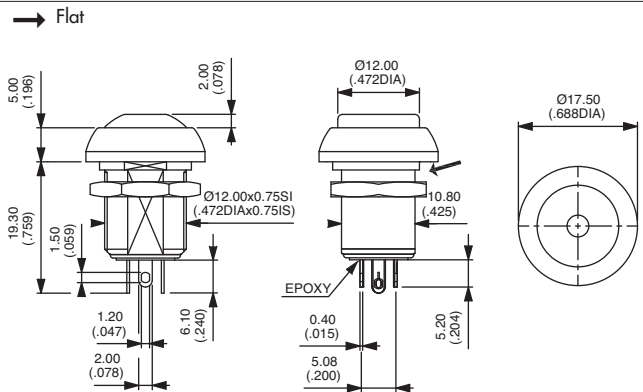


Actuator marking available on ILP models (symbol 10 mm max.). On request.

Solder lug terminals





- Curved actuator
ILR3SAD  Normally open
- Flat actuator
ILP3SAD  Normally open

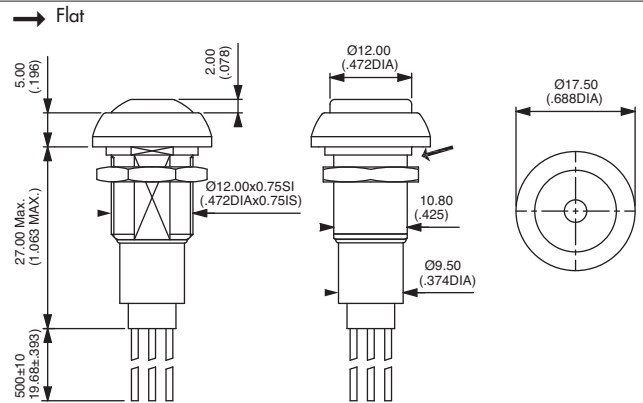


Also available with straight PC terminals : **IL•3PAD**

Flying lead terminals



- Curved actuator
ILR3FAD  Normally open
- Flat actuator
ILP3FAD  Normally open

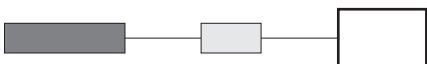


ACTUATOR COLOUR



1 : blue - 2 : black - 3 : green - 4 : grey - 5 : yellow - 6 : red - 7/1 : white - 8 : bright chrome
9 : orange - B : dark blue

LED COLOUR



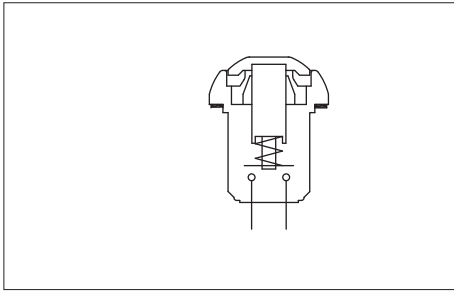
LOS : red - LOY : yellow - LOG : green - LOB : blue - LOW : white

New!

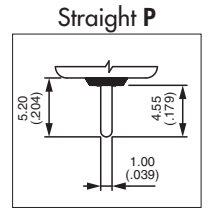
IL series

Sealed pushbutton switches for thick panels - long bushing \varnothing 12 mm - momentary

Non-illuminated



- Curved or flat actuator
- Antirotation bushing



MODEL STRUCTURE

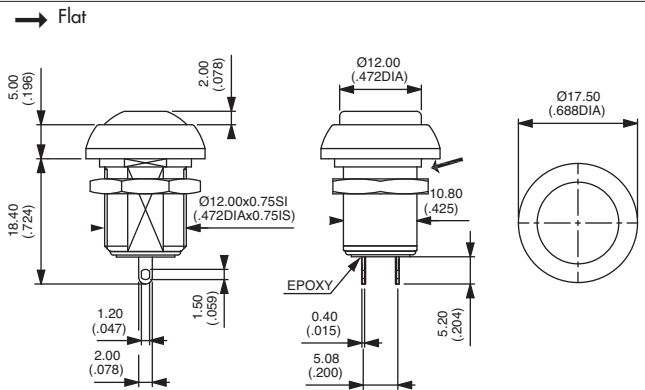


Actuator marking available on ILP models (symbol 10 mm max.). On request.

Solder lug terminals



- Curved actuator
ILR3SAD Normally open
- Flat actuator
ILP3SAD Normally open

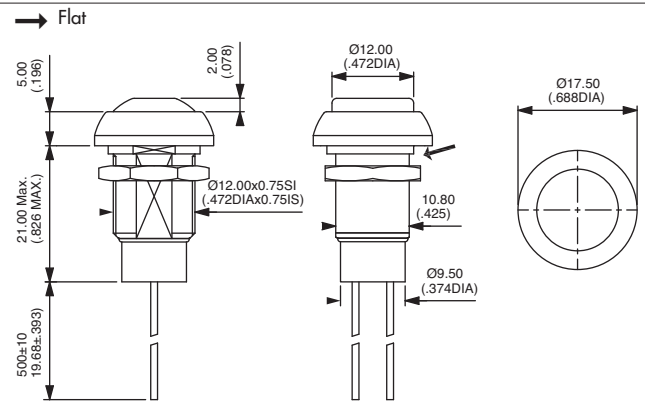


Also available with straight PC terminals : **IL•3PAD**

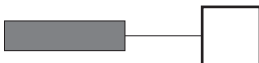
Flying lead terminals



- Curved actuator
ILR3FAD Normally open
- Flat actuator
ILP3FAD Normally open



ACTUATOR COLOUR



- 1 : blue - 2 : black - 3 : green - 4 : grey - 5 : yellow - 6 : red - 7/1 : white - 8 : bright chrome
9 : orange - B : dark blue

B1

Reduced bezel for compact matrix mounting - option X1242



ILP3FAD...X1242

- Dia. 15 (.590) reduced bezel
- **Mounting from the front into a threaded panel cut-out**
- Matrix mounting : 16 x 16 mm (.630x.630)
- Illuminated or non-illuminated
- Same terminal options and colours as standard models
- Part numbers on request.

Reduced bezel for compact matrix mounting - option 234

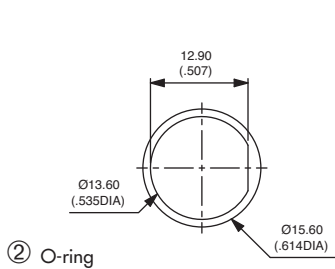


ILP3SAD...234

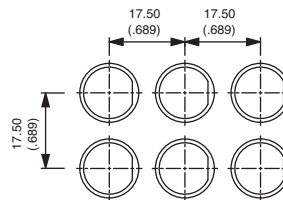
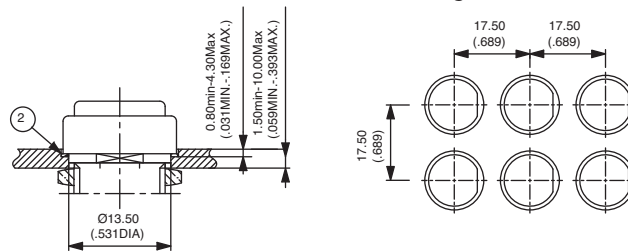
- Dia. 15 (.590) reduced bezel
- **Standard panel mounting**
- Matrix mounting : 17,5 x 17,5 mm (.689x.689)
- Illuminated or non-illuminated
- Same terminal options and colours as standard models
- Part numbers on request.

MOUNTING - REDUCED MODEL

Panel cut-out



Matrix mounting



New!

IM series

Sealed snap-action pushbutton switches - bushing \varnothing 12 mm - momentary

Distinctive features and specifications



- Snap-action : tactile feedback with audible click
- High current/voltage rating
- Sealed to IP67
- Flat round actuator for optional marking

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Shock resistance : 50 g - 11 ms according to IEC 68-2-27
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C
- Storage temperature : -40°C to +85°C

GENERAL SPECIFICATIONS

- Panel thickness : 1,5 mm (.059) to 10 mm (.394)
- Total travel : 1,7 mm (.067) +/- 0,3 mm
- Low level or mechanical life : 1.000.000 cycles
- Torque : 1,5 Nm max. applied to nut

ELECTRICAL SPECIFICATIONS

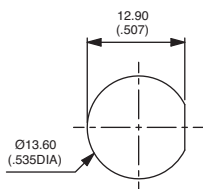
- Max. current/voltage rating with resistive load : 3A 28VDC
- Initial contact resistance : 100 m Ω max.
- Insulation resistance : 1 G Ω min. at 500VDC
- Dielectric strength : 500 Vrms between terminals
- Electrical life at full load : 25.000 cycles

MATERIALS

- Case : polyamide 4/6
- Actuator : polyamide 6/6
- Bushing/bezel : polyamide 6/6
- Contacts : silver, gold plated
- Terminal seal : epoxy

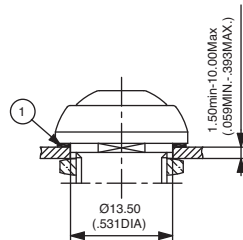
MOUNTING - STANDARD BEZEL

Panel cut-out

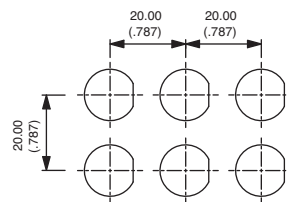
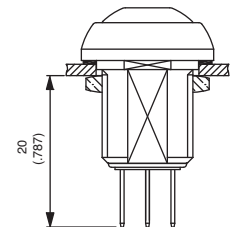


① Flat seal

Matrix mounting

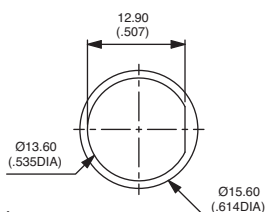


Back of panel space requirement



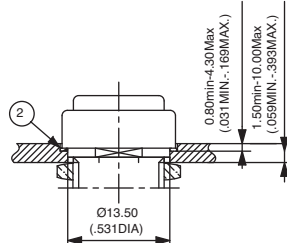
MOUNTING - REDUCED BEZEL

Panel cut-out

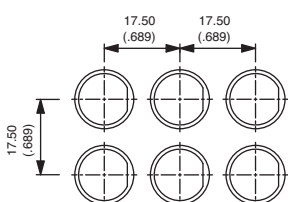
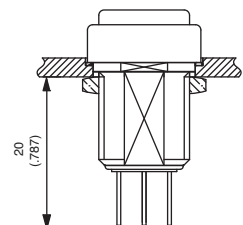


② O-ring

Matrix mounting



Back of panel space requirement

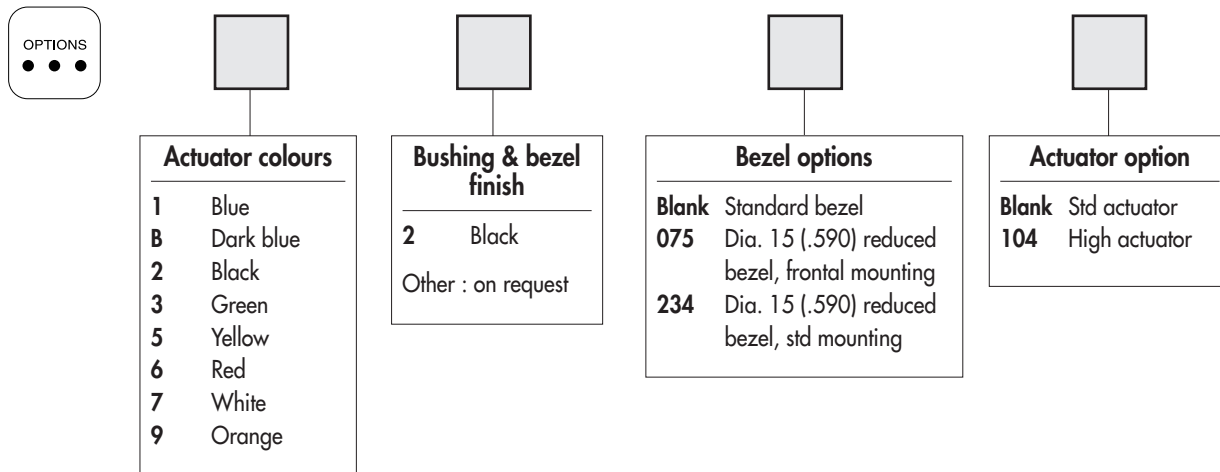
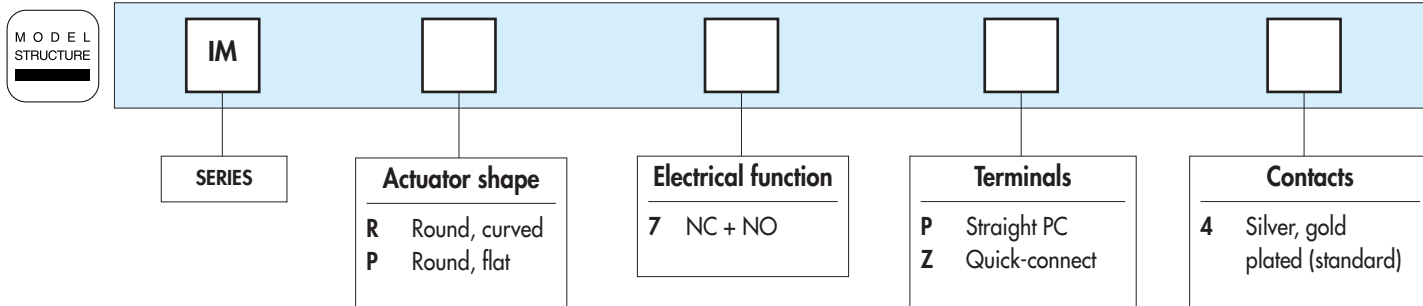


IM series

New!

Sealed snap-action pushbutton switches - bushing Ø 12 mm - momentary

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



A sealing boot is available to protect the switches against frost and sand (P/N U5125). It is presented after the IA series and in section H.



Mounting accessories : Standard hardware supplied : 1 flat seal (standard bezel) or 1 O-ring (reduced bezel) and 1 hex nut 14 mm (.551) across flats. Hex nut part number U166.



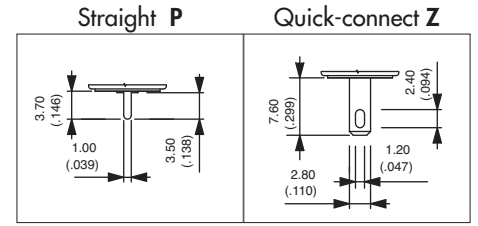
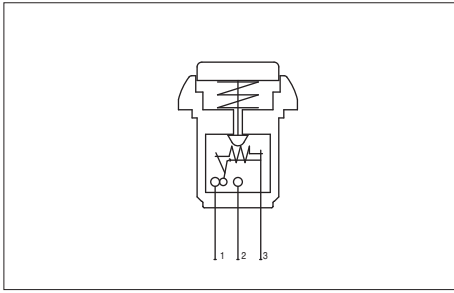
Packaging unit : 50 pieces

New!

IM series

Sealed snap-action pushbutton switches - bushing Ø 12 mm - momentary

Round - non-illuminated



MODEL STRUCTURE



Common terminal identified by a horizontal dash

Standard bezel - straight PC terminals



Curved actuator
IMR7P4



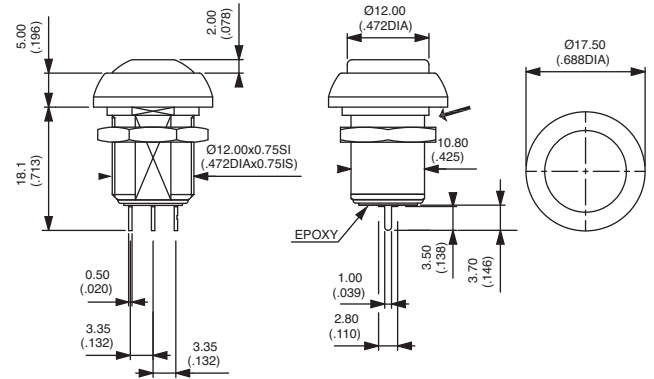
NC+NO

Flat actuator
IMP7P4



NC+NO

→ Flat



Standard bezel - quick-connect terminals



Curved actuator
IMR7Z4



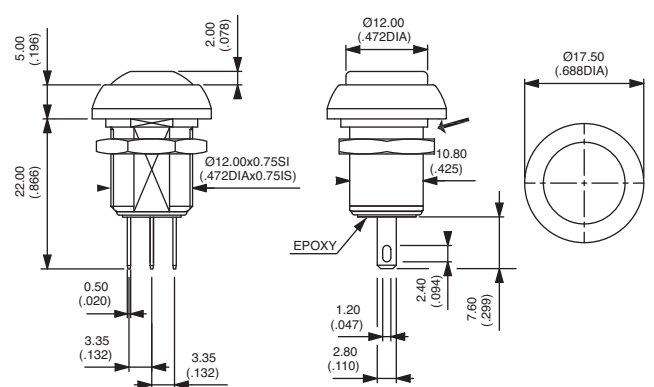
NC+NO

Flat actuator
IMP7Z4

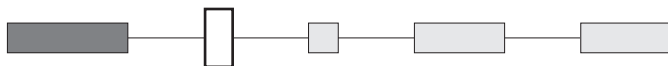


NC+NO

→ Flat



ACTUATOR COLOURS



1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange

BUSHING AND BEZEL COLOURS



2 : black (standard)
Other : on request

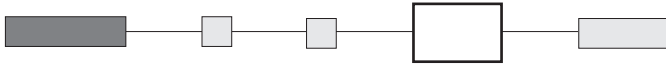
IM series

New!

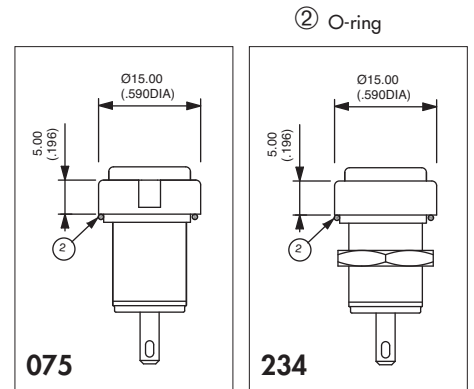
Sealed snap-action pushbutton switches - bushing \varnothing 12 mm - momentary

Options

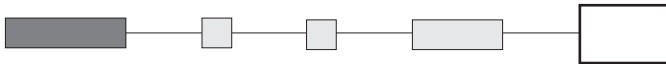
BEZEL OPTIONS



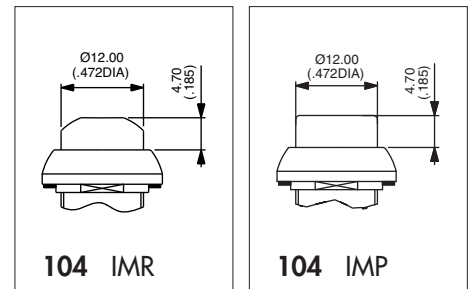
- Blank** Standard bezel
- 075** Dia. 15 (.590) reduced bezel, mounting of the switch from the front into a threaded panel cut-out
- 234** Dia. 15 (.590) reduced bezel, standard mounting



ACTUATOR OPTION



- Blank** Standard actuator
- 104** High actuator



B1



- Illuminated or non-illuminated
- Tactile feedback
- Wide variety of configurations
- Flat round actuator for optional marking
- Sealed to IP67

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
IP69K according to DIN 40050-9 (non-illuminated) with cap U5125
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Robustness (non-illuminated) : IK06 according to EN 50102 (1 joule)
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load (gold plated silver contacts):
5A 28VDC, 70.000 cycles
0,2A 48VDC, 500.000 cycles
0,5A 48VAC, 500.000 cycles
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.500 Vrms
- Contact bounce : 10 ms

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	2,1V	2,3V
Yellow (LOY)	20mA	2,1V	2,3V
Green (LOG)	20mA	2,1V	2,3V
Blue (LOB)	20mA	3,2V	3,8V
White (LOW)	20mA	3,35V	4,25V

A resistor must be series-connected by the user.
Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

GENERAL SPECIFICATIONS

- Panel thickness : 1,5 mm (.059) min.
4 mm (.157 max.)
- Total travel :
Funct. 3 : 1,7 mm (.067) +/- 0,3 mm
Funct. 5 : 1,3 mm (.051) +/- 0,3 mm
- Typical operating force : 6N +/- 2N
- Low level/mech. life : 1.000.000 cycles
- Torque : 1,5 Nm max. applied to nut
- Soldering : 320°C max. for 3 sec.

MATERIALS

- Case : thermoplastic UL94-V0
- Actuator : polyamide 6/6
- Bushing/bezel : zinc die-cast (zamac), black painted
- Contacts : silver, gold plated (std) brass, gold plated (for option 104)
- Multi-wire lead AWG20, section 0,6 mm²
- LED wire : AWG26, section 0,12 mm²
- Lens : polycarbonate
- Terminal seal : epoxy

AGENCY APPROVAL



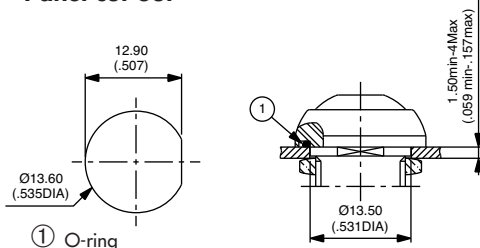
2A 125VAC/250VAC
File E83438

Availability : consult factory for details of approved models.

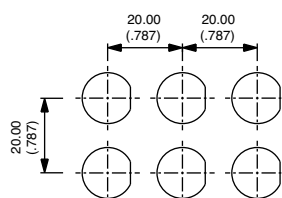
Marking : to order switches marked UL, complete ordering format.

MOUNTING

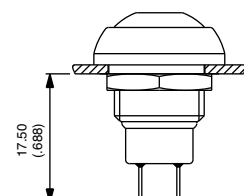
Panel cut-out



Matrix mounting



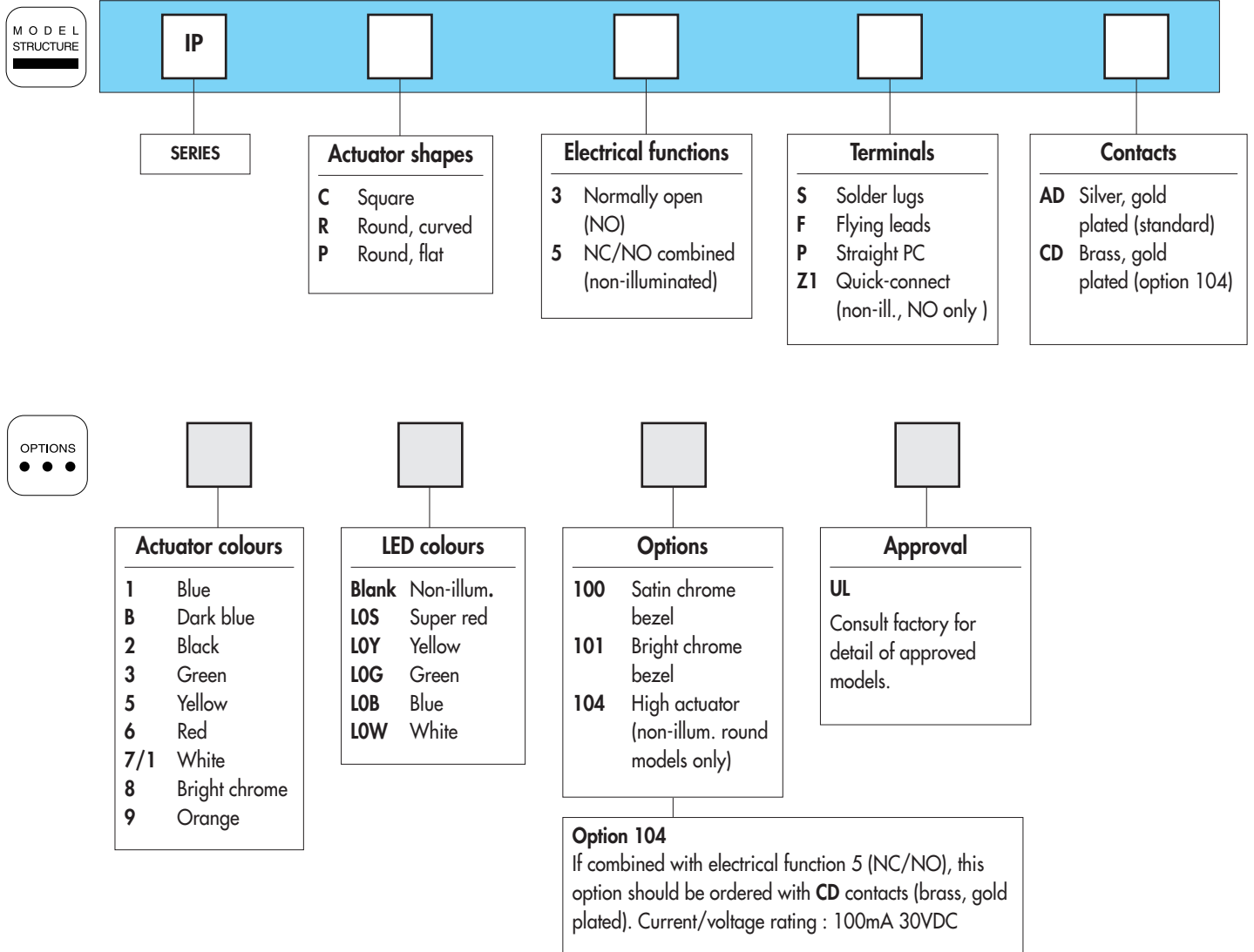
Back of panel space requirement



IP series

Pushbutton switches for harsh environments - bushing Ø 12 mm - momentary

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



A sealing boot is available to protect the switches against frost and sand. It is presented after the IA series and in section H.



Mounting accessories : Standard hardware supplied : 1 hex nut 14 mm (.551) across flats and 1 O-ring. Hex nut part number U166.

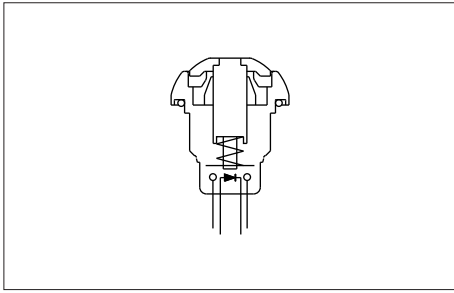


Packaging unit : 25 pieces

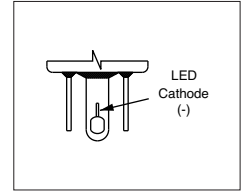
IP series

Pushbutton switches for harsh environments - bushing \varnothing 12 mm - momentary

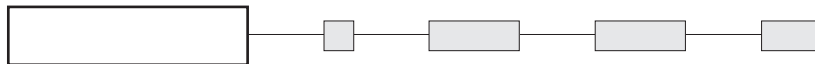
Square - illuminated



- High brightness illumination
- Five LED colours
- Tin plated LED terminals



MODEL STRUCTURE



Solder lug terminals



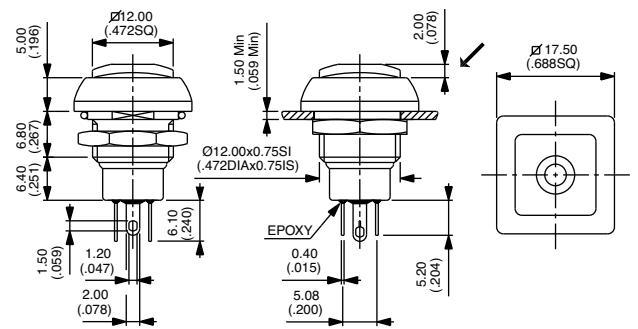
IPC3SAD



Normally Open

Also available with straight PC terminals : **IPC3PAD**
LED colour is indicated by the bottom of the switch.

→ Flat



Sealed flying lead terminals

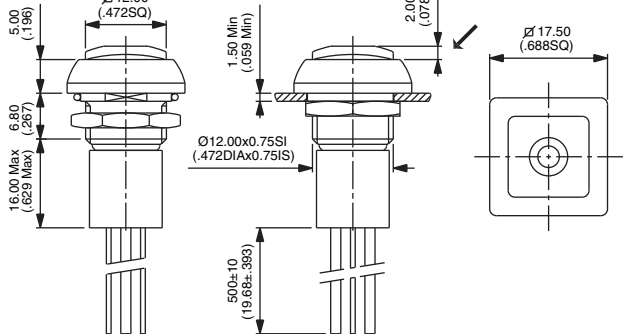


IPC3FAD



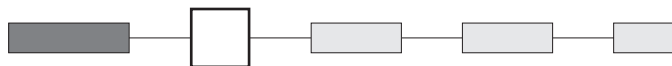
Normally Open

→ Flat



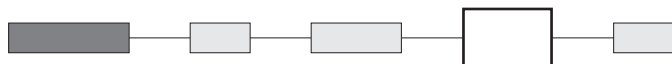
Wire colours : black : NO contact, red : LED anode(+), blue : LED cathode(-)

ACTUATOR COLOURS



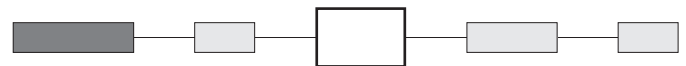
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow
6 : red - 7/1 : white - 8 : bright chrome - 9 : orange

OPTIONS



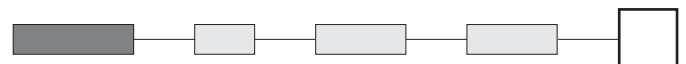
100 : Satin chrome bezel
101 : Bright chrome bezel

LED COLOURS



LOS : super red - LOY : yellow - LOG : green - LOB : blue
LOW : white

APPROVAL



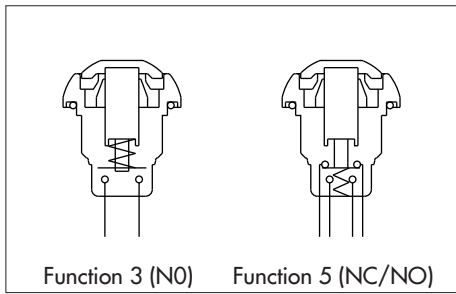
UL

Consult factory for details of approved models. To order switches marked UL, complete above box with "UL".

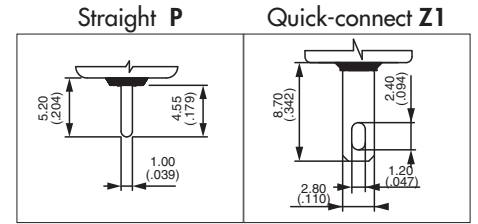
IP series

Pushbutton switches for harsh environments - bushing \varnothing 12 mm - momentary

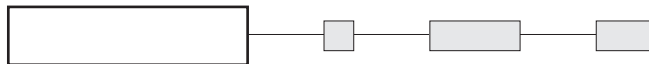
Square - non-illuminated



- Double function (NC/NO combined) with a short behind-panel depth



MODEL STRUCTURE



B1

Solder lug terminals



IPC3SAD



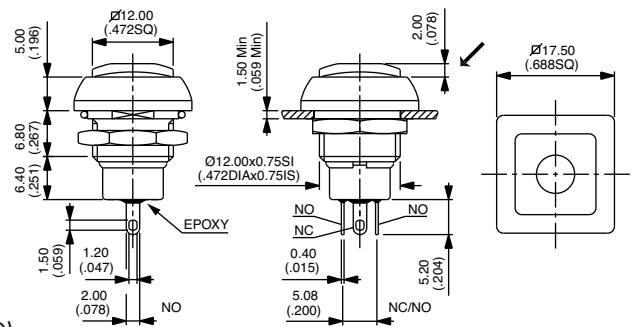
Normally Open

IPC5SAD



NC/NO combined

→ Flat



Also available with straight PC terminals : **IPC3PAD** (NO) or **IPC5PAD** (NC/NO) and quick-connect terminals : **IPC3Z1AD** (NO only)

Sealed flying lead terminals



IPC3FAD



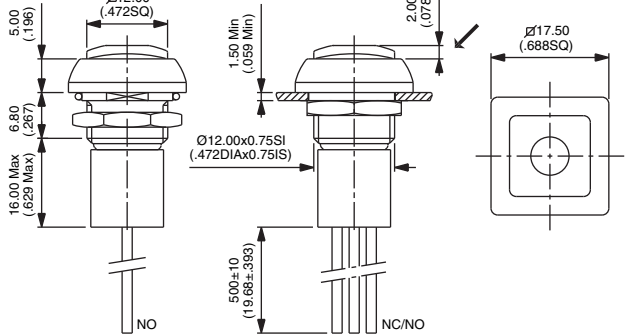
Normally Open

IPC5FAD



NC/NO combined

→ Flat



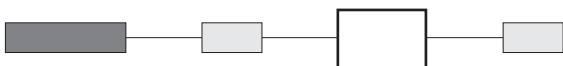
Wire colours (NC/NO) : black : NO, blue : NC

ACTUATOR COLOURS



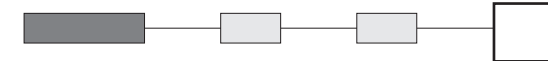
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7/1 : white - 8 : bright chrome - 9 : orange

OPTIONS



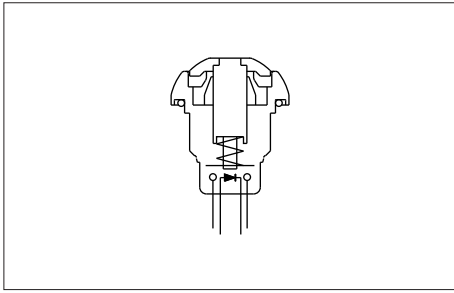
100 : Satin chrome bezel
101 : Bright chrome bezel

APPROVAL

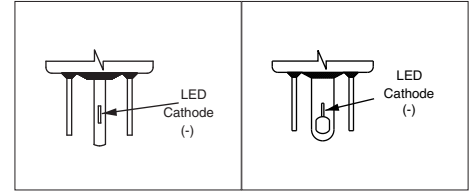


UL

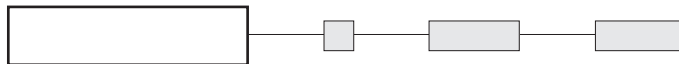
Consult factory for details of approved models. To order switches marked UL, complete above box with "UL".



- High brightness illumination
- Five LED colours
- Tin plated LED terminals



MODEL STRUCTURE



Solder lug terminals

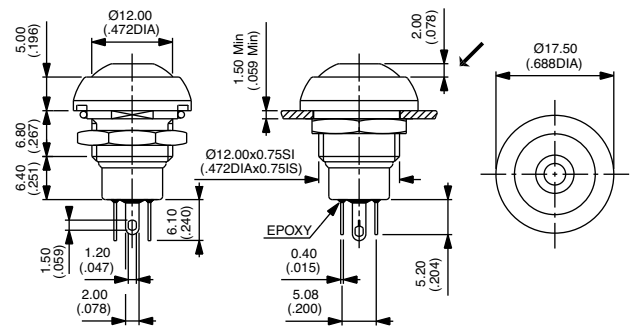


IPR3SAD



Normally Open

→ Flat



Also available with straight PC terminals : IPR3PAD
LED colour is indicated by the bottom of the switch.

Sealed flying lead terminals

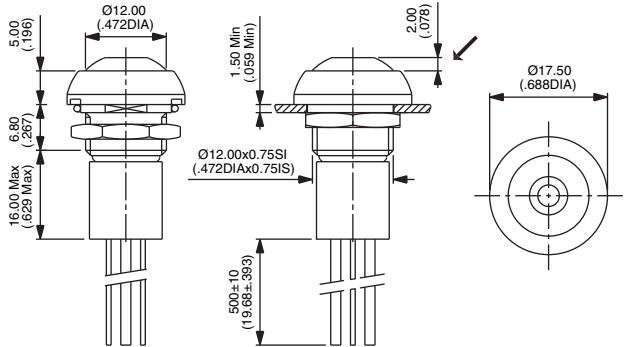


IPR3FAD



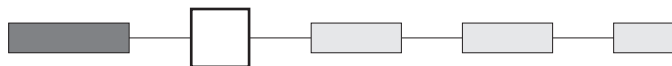
Normally Open

→ Flat



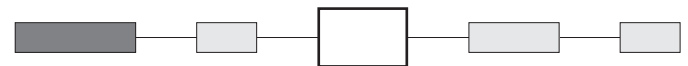
Wire colours : black : NO contact, red : LED anode(+), blue : LED cathode(-)

ACTUATOR COLOURS



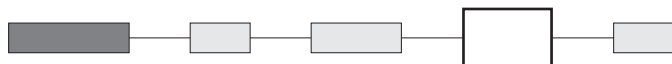
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow
6 : red - 7/1 : white - 8 : bright chrome - 9 : orange

LED COLOURS



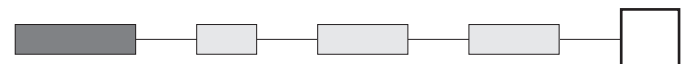
LOS : super red - LOY : yellow - LOG : green - LOB : blue
LOW : white

OPTIONS



100 : Satin chrome bezel
101 : Bright chrome bezel

APPROVAL



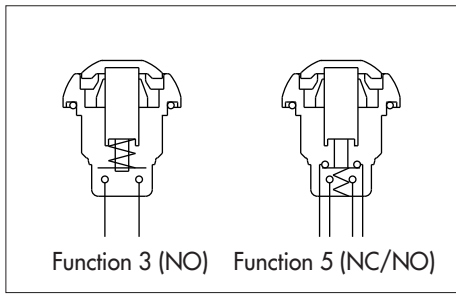
UL

Consult factory for details of approved models. To order switches marked UL, complete above box with "UL".

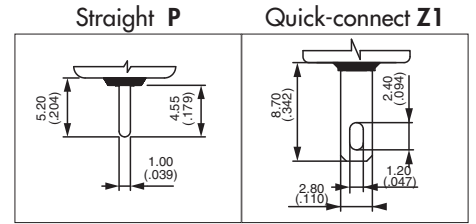
IP series

Pushbutton switches for harsh environments - bushing \varnothing 12 mm - momentary

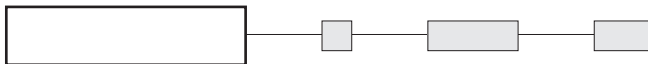
Round - non-illuminated



- Double function (NC/NO combined) with a short behind-panel depth



MODEL STRUCTURE

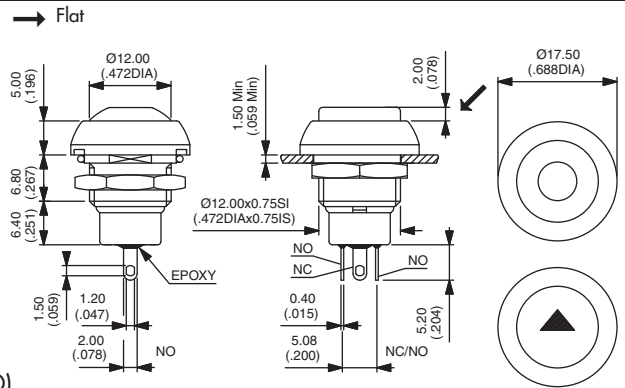


Actuator marking available on IPP models (symbol 10 mm max.). On request.

Solder lug terminals



- Curved actuator, NO
IPR3SAD
- Curved actuator, NC/NO
IPR5SAD
- Flat actuator, NO
IPP3SAD
- Flat actuator, NC/NO
IPP5SAD

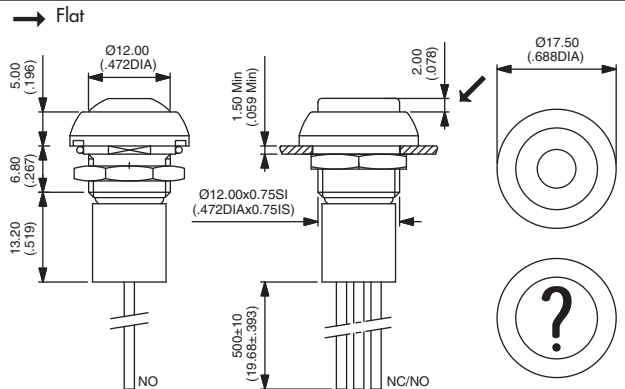


Also available with straight PC terminals : **IP•3PAD** (NO) or **IP•5PAD** (NC/NO) and quick-connect terminals : **IP•3Z1AD** (NO only)

Sealed flying lead terminals



- Curved actuator, NO
IPR3FAD
- Curved actuator, NC/NO
IPR5FAD
- Flat actuator, NO
IPP3FAD
- Flat actuator, NC/NO
IPP5FAD



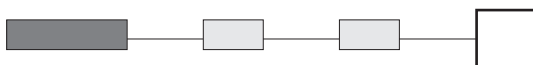
Wire colours (NC/NO) : black : NO, blue : NC

ACTUATOR COLOURS



1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow
6 : red - 7/1 : white - 8 : bright chrome - 9 : orange

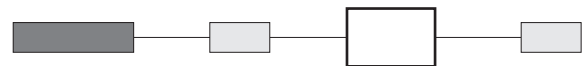
APPROVAL



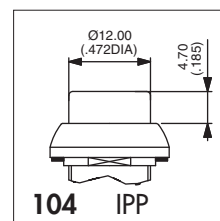
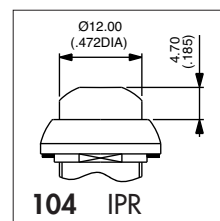
UL

Consult factory for details of approved models. To order switches marked UL, complete above box with "UL".

OPTIONS



100 : Satin chrome bezel
101 : Bright chrome bezel
104 : High actuator - If combined with function 5 (NC/NO), order with CD contacts (instead of AD contacts).





- Latching action**
Actuator remains in the low position when "ON".
- Illuminated or non-illuminated**
- Compact**
Behind-panel depth less than 20 mm (.787)
- Flat round actuator for optional marking**
- Sealed to IP67**

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Robustness (non-illuminated) : IK06 according to EN 50102 (1 joule)
- Operating temperature : -40°C to +85°C

GENERAL SPECIFICATIONS

- Panel thickness : 1,5 mm (.059) min. 5,5 mm (.217) max.
- Total travel : 2,5 mm (.098) +/- 0,3 mm
- Typical operating force : 5 N +/- 2N
- Low level/mech. life : 200.000 cycles
- Torque : 1,5 Nm max. applied to nut
- Soldering : 320°C max. for 3 sec.

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
4A 12VDC, 200.000 cycles
1A 48VDC, 200.000 cycles
2A 48VDC, 100.000 cycles
3A 48VDC, 75.000 cycles
1A 72VDC, 15.000 cycles
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.500 Vrms between terminals
1.000 VAC rms between terminals and frame

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	1,95V	1,95V
Yellow (LOY)	20mA	2V	2,05V
Green (LOG)	20mA	2,1V	2,5V
Blue (LOB)	20mA	3,2V	4V

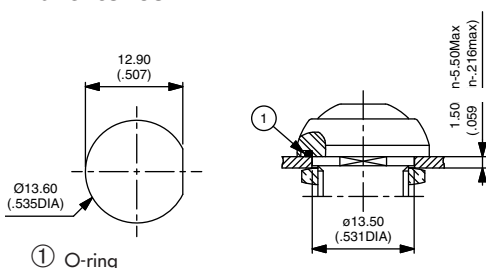
A resistor must be series-connected by the user.
Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

MATERIALS

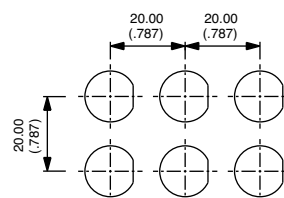
- Case : thermoplastic, UL 94-V0
- Actuator : polyamide 6/6
- Bushing/bezel : zinc die-cast (zamak), black painted
- Contacts : silver, gold plated
- Multi-wire lead AWG20, section 0,6 mm²
- LED wire : AWG26, section 0,12 mm²
- Lens : polycarbonate
- Terminal seal : epoxy

MOUNTING

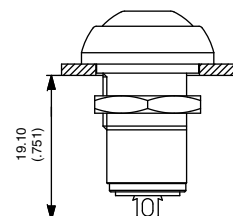
Panel cut-out



Matrix mounting



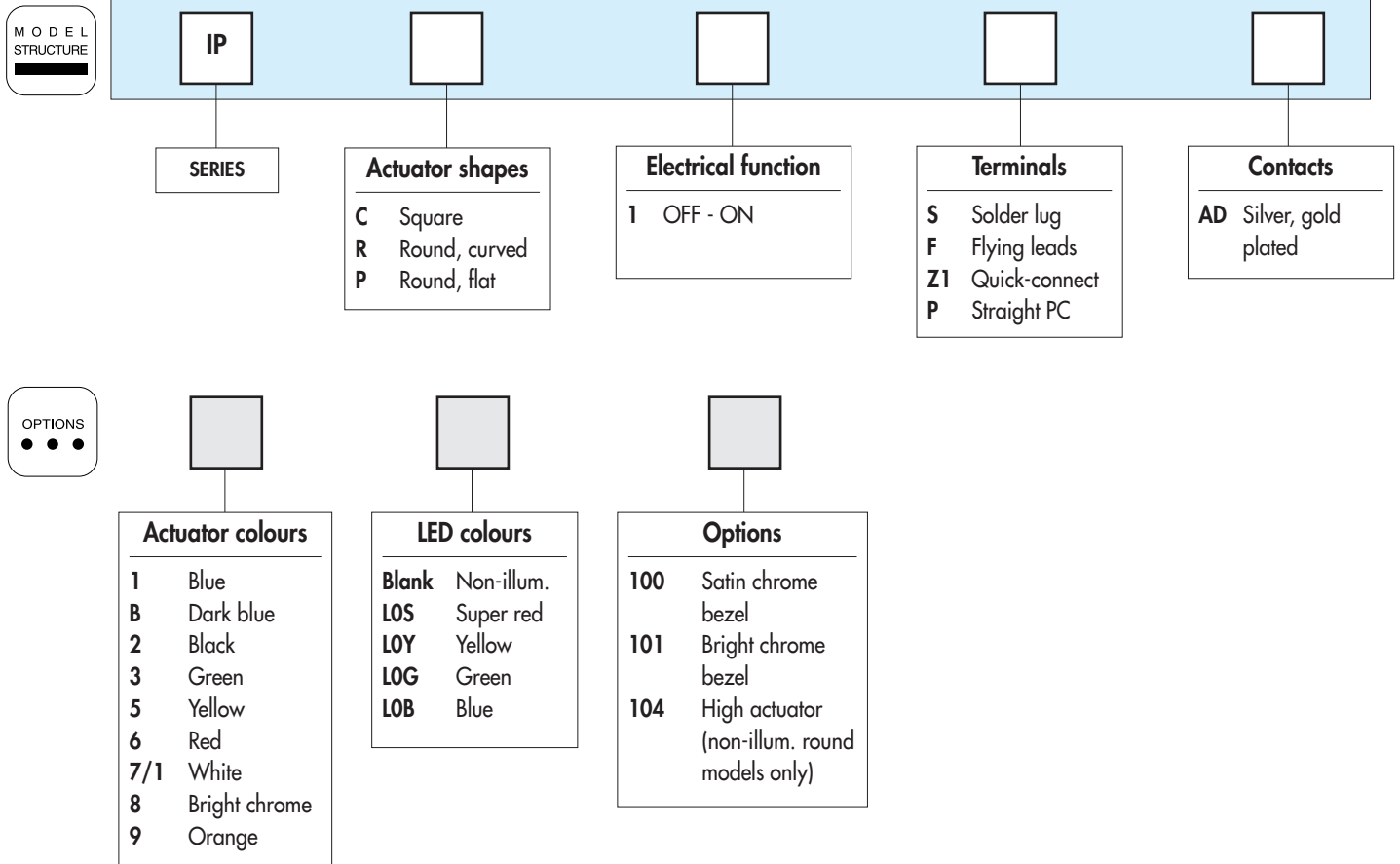
Back of panel space requirement



IP series

Pushbutton switches for harsh environments - bushing Ø 12 mm - latching

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



A sealing boot is available to protect the switches against frost and sand (P/N U5125).
It is presented after the IA series and in section H.



Mounting accessories : Standard hardware supplied : 1 hex nut 14 mm (.551) across flats and 1 O-Ring.

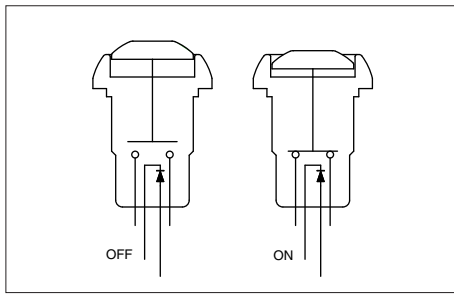


Packaging unit : 25 pieces

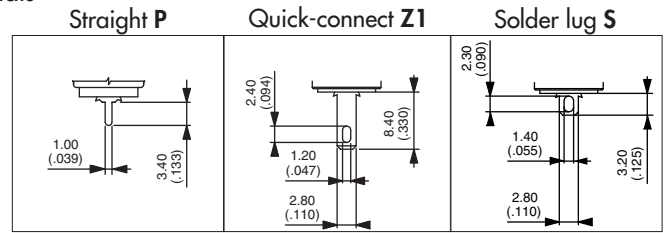
IP series

Pushbutton switches for harsh environments - bushing \varnothing 12 mm - latching

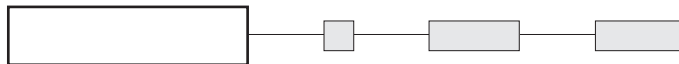
Square or round - illuminated



- Four LED colours
- Tin plated LED terminals



MODEL STRUCTURE



Square models

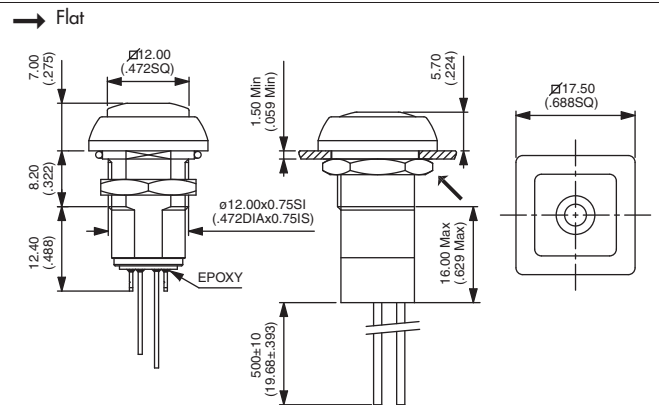


Solder lug terminals
IPC1SAD

OFF - ON

Flying lead terminals
IPC1FAD

OFF - ON



Also available with straight PC : **IPC1PAD** or quick-connect terminals : **IPC1Z1AD**

Round models

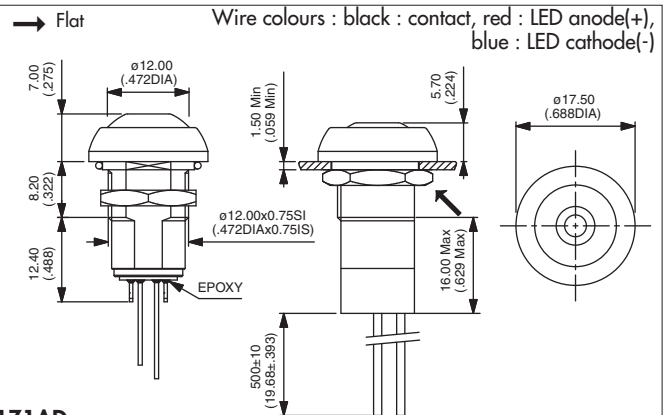


Solder lug terminals
IPR1SAD

OFF - ON

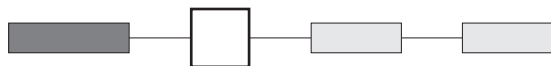
Flying lead terminals
IPR1FAD

OFF - ON



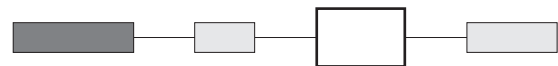
Also available with straight PC : **IPR1PAD** or quick-connect terminals : **IPR1Z1AD**

ACTUATOR COLOURS



1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow
6 : red - 7/1 : white - 8 : bright chrome - 9 : orange

LED COLOURS



LOS : super red - LOY : yellow - LOG : green - LOB : blue

OPTIONS



100 : Satin chrome bezel
101 : Bright chrome bezel

IP series

Pushbutton switches for harsh environments - bushing \varnothing 12 mm - latching

Square or round - non-illuminated

MODEL STRUCTURE



Actuator marking available on IPP models (symbol 10 mm max.). On request.

Square models



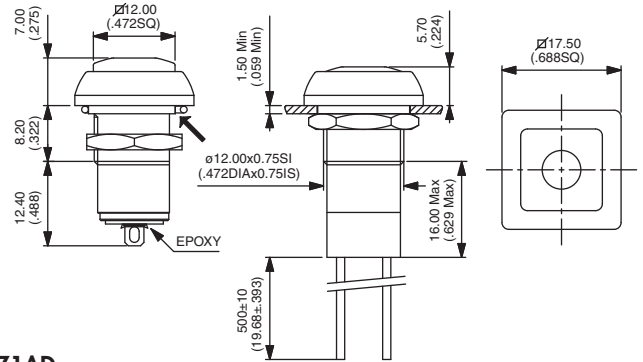
Solder lug terminals
IPC1SAD

OFF - ON

Flying lead terminals
IPC1FAD

OFF - ON

→ Flat



Also available with straight PC : **IPC1PAD** or quick-connect terminals : **IPC1Z1AD**

Round models



CURVED ACTUATOR

Solder lug terminals
IPR1SAD

OFF - ON

Flying lead terminals
IPR1FAD

OFF - ON

FLAT ACTUATOR

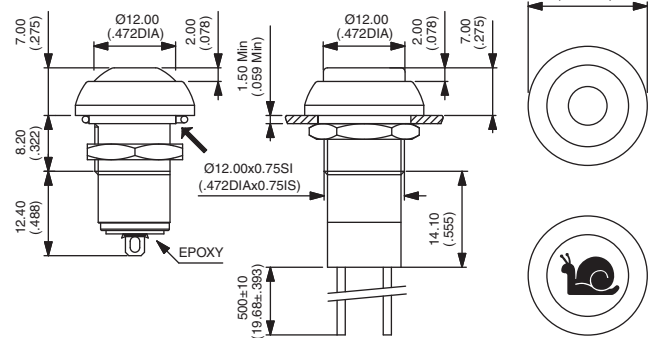
Solder lug terminals
IPP1SAD

OFF - ON

Flying lead terminals
IPP1FAD

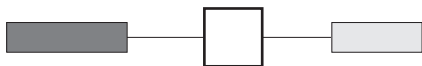
OFF - ON

→ Flat



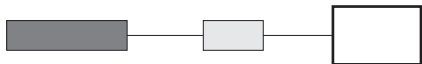
Also available with straight PC : **IP•1PAD** or quick-connect terminals : **IP•1Z1AD**

ACTUATOR COLOURS



1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7/1 : white - 8 : bright chrome - 9 : orange

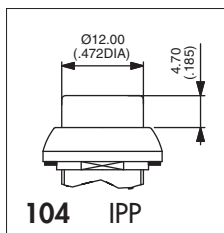
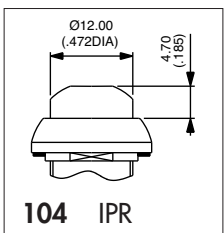
OPTIONS



100 : Satin chrome bezel

101 : Bright chrome bezel

104 : High actuator (for round model only)



IB and IS series

Sealed pushbutton switches - bushing Ø 12 mm - momentary

Distinctive features and specifications



- Snap-in and threaded bushing models
- Compact, light in weight
 - Behind-panel depth of 13 mm (.512) only
 - 50 % reduction in weight compared to metallic models
- Tactile feedback
- Sealed to IP67 (IS series) or IP54 (IB series)

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing according to IEC 60529 : IP67 (IS) or IP54 (IB)
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500 Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C

MATERIALS

- Case : thermoplastic UL94-V0
- Actuator : polyamide 6/6
- Bushing/bezel : polyamide 6/6
- Contacts : silver, gold plated
- Terminal seal : epoxy

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
400mA 32VAC - 100mA 48VDC
- Initial contact resistance : 50 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.000 Vrms
- Electrical life at full load : 500.000 cycles

AGENCY APPROVAL



2A 125VAC/250VAC
File E83438

Availability : consult factory for details of approved models.

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

GENERAL SPECIFICATIONS

- Panel thickness :
 - IB series : 0,8 mm (.031) min. - 1,8 mm (.071) max.
 - IS series : 1,5 mm (.059) min. - 4 mm (.157) max.
- Total travel : 1,7 mm (.066) +/- 0,3 mm
- Typical operating force : 4N +/- 3N
- Low level or mechanical life : 1.000.000 cycles
- Torque : 1,5 Nm max. applied to nut
- Soldering : 300°C max. for 3 seconds

Panel mounting : see next pages.

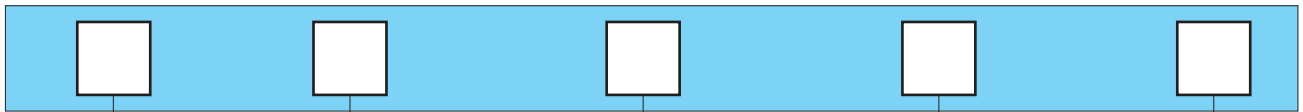
*Example of custom switch:
see end of the series.*

IB and IS series

Sealed pushbutton switches - bushing Ø 12 mm - momentary

Overview

MODEL
STRUCTURE



SERIES

IB	Snap-in
IS	Threaded bushing

Actuator shapes

R	Round, curved
P	Round, flat

Electrical function

3	Normally open (NO)
----------	--------------------

Terminals

S	Solder lug
Z1	Quick-connect 2,8 x 0,5 mm
P	Straight PC

Contacts

AD	Silver, gold plated
-----------	---------------------

OPTIONS

Actuator colours

1	Blue
B	Dark blue
2	Black
3	Green
5	Yellow
6	Red
7/1	White
8	Bright chrome
9	Orange
A	Satin chrome

Bezel finish

00	Black (std)
08	Bright chrome (IS only)
10	White
20	Satin chrome (IS only)

Option

104	High actuator
------------	---------------

Approval

UL	Consult factory for detail of approved models.
-----------	--

ABOUT THIS SERIES

On the following pages, you will find successively :

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

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



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



A sealing boot is available to protect the switches against frost and sand. It is presented after the IA series and in section H.



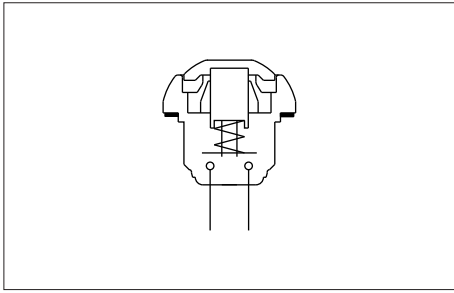
Mounting accessories : Standard hardware supplied : 1 flat seal (IB series)
1 hex nut 14 mm (.551) across flats and 1 flat seal (IS series). Hex nut part number U166.



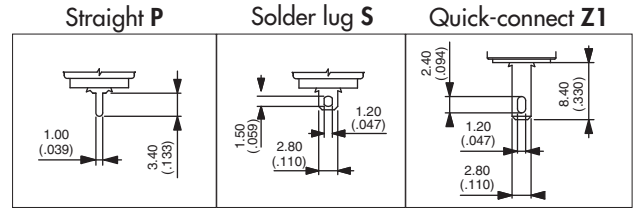
Packaging unit : 50 pieces

IB and IS series

Sealed pushbutton switches - bushing Ø 12 mm - momentary



- Ten actuator colours
- Curved or flat actuator
- Antirotation bushing



MODEL STRUCTURE



Actuator marking available on IBP and ISP models (symbol 10 mm max.). On request.

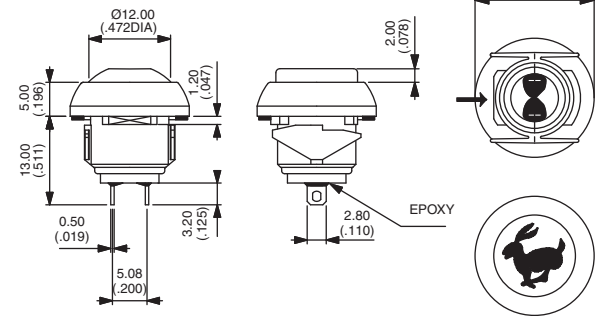
Snap-in mounting - solder lug terminals

→ Flat

Panel thickness : 0,8 mm to 1,8 mm



- Curved actuator
IBR3SAD Normally open
- Flat actuator
IBP3SAD Normally open



Also available with straight PC : **IB•3PAD** or quick-connect terminals : **IB•3Z1AD**

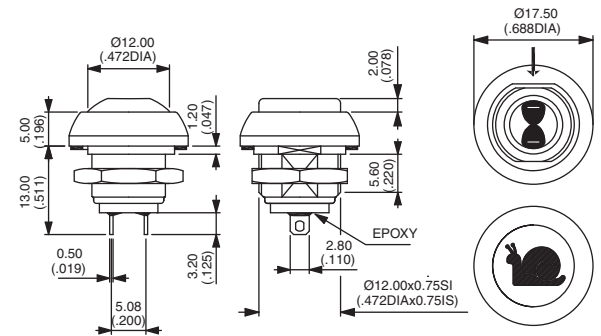
Mounting by threaded bushing - solder lug terminals

→ Flat

Panel thickness : 1,5 mm to 4 mm



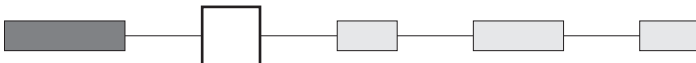
- Curved actuator
ISR3SAD Normally open
- Flat actuator
ISP3SAD Normally open



Also available with straight PC : **IS•3PAD** or quick-connect terminals : **IS•3Z1AD**

ACTUATOR COLOURS

Actuator marking available on IBP and ISP models (symbol 10 mm max.). On request.



- 1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7/1 : white - 8 : bright chrome
9 : orange - A : satin chrome

BUSHING AND BEZEL FINISH

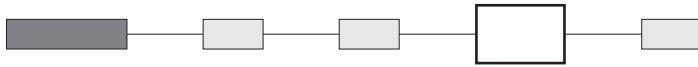


- 00 : Black (standard)
08 : Bright chrome (IS series only)
10 : White
20 : Satin chrome (IS series only)

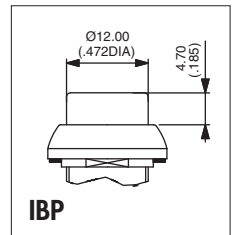
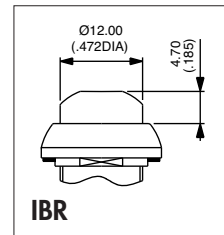
IB and IS series

Sealed pushbutton switches - bushing \varnothing 12 mm - momentary

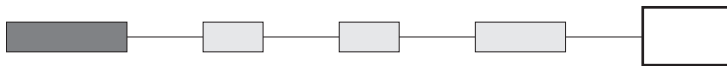
ACTUATOR OPTION



104 : High actuator



APPROVAL



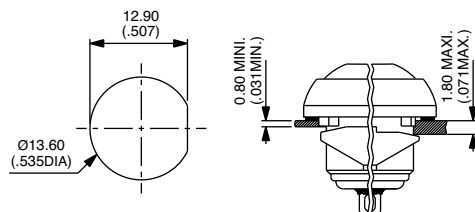
UL

Availability : consult factory for details of approved models.

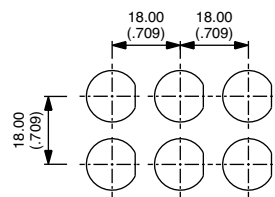
Marking : to order switches marked UL, complete above box with "UL".

IB SERIES MOUNTING

Panel cut-out

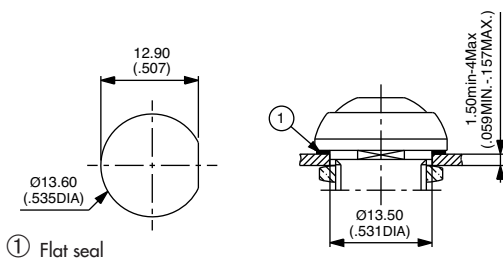


Matrix mounting

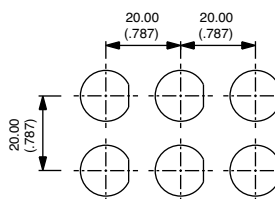


IS SERIES MOUNTING

Panel cut-out



Matrix mounting



Example of custom switch



ISR3FADB22X1248-01

- Painted bushing and actuator, soft feel
- Flying leads (55 mm) + connector
- Overmolded rear part

New!

IHS series

Hall effect pushbutton switches - bushing \varnothing 12 mm - momentary

Distinctive features and specifications



- Momentary pushbutton (NO)
- 5 million cycles
- Low behind-panel depth
- Standard and high actuator
- Sealed to IP67

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Supply voltage : 3,5VDC to 24VDC
- Supply current : VDC = 12V : 2,5mA Typ. to 5mA max. (current consumption in OFF position)
- Max. output current : 50mA
- Max. output voltage : 24VDC
- Output type : NPN

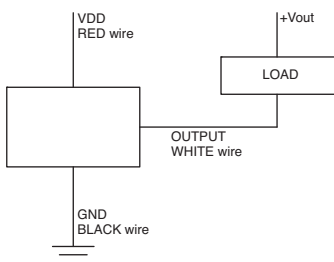
GENERAL SPECIFICATIONS

- Panel thickness : 1,5 mm (.059) min. 4 mm (.157) max.
- Total travel : 1,80 mm (.070) +/- 0,3 mm
- Typical operating force : 6N +/- 2N
- Mechanical life : 5 million cycles
- Torque : 1,5 Nm max. applied to nut

MATERIALS

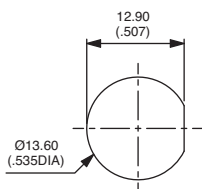
- Case : PBT, UL94-V0
- Actuator : polyamide 6/6
- Bushing/bezel : zinc die-cast (zamac), black painted
- Multi-wire lead : AWG26, 150 mm

WIRING DIAGRAM

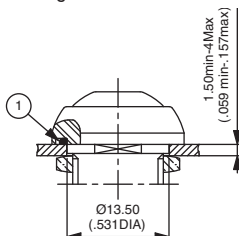


MOUNTING

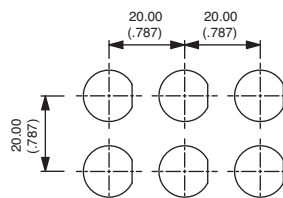
Panel cut-out



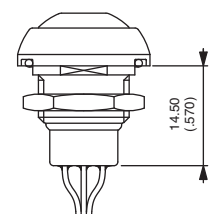
① O-ring



Matrix mounting



Back of panel space requirement

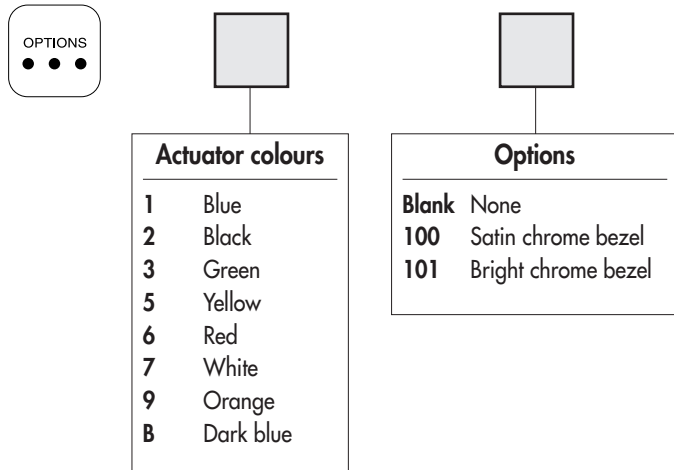
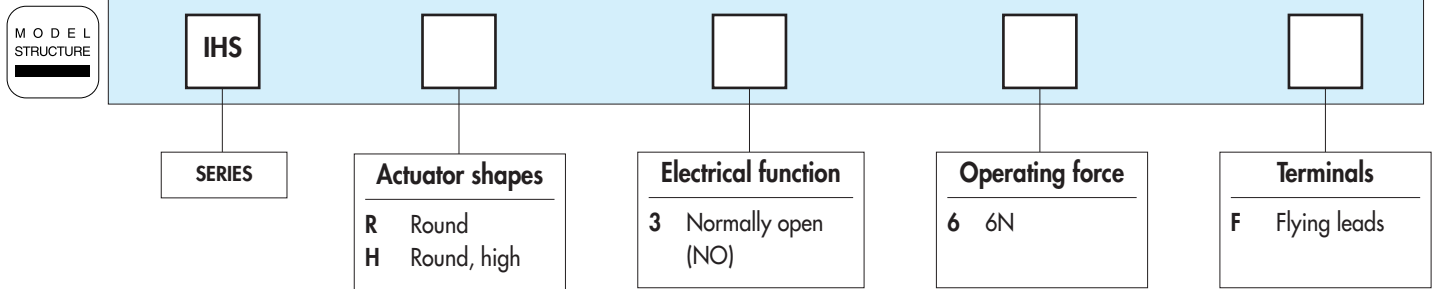


IHS series

New!

Hall effect pushbutton switches - bushing Ø 12 mm - momentary

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



A sealing boot is available to protect the switches against frost and sand (P/N U5125). It is presented after the IA series and in section H.



Mounting accessories : Standard hardware supplied : 1 hex nut 14 mm (.551) across flats and 1 O-ring.
Hex nut part number U166.



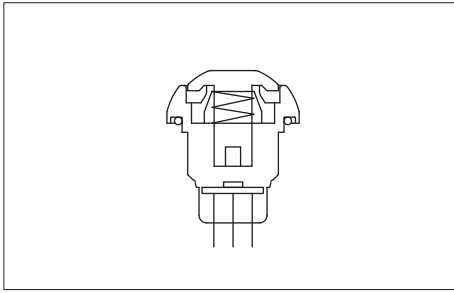
Packaging unit : 25 pieces

New!

IHS series

Hall effect pushbutton switches - bushing \varnothing 12 mm - momentary

Round - non-illuminated



- Standard or high actuator

MODEL
STRUCTURE



Standard actuator

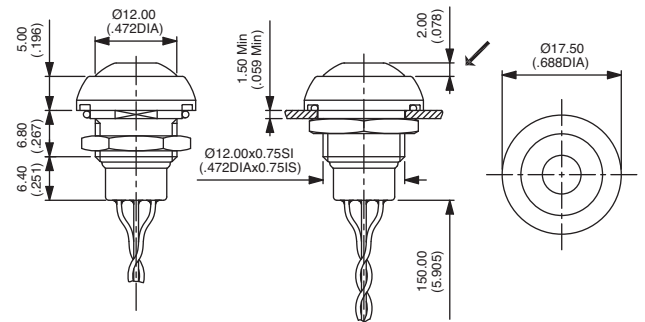


IHSR36F



Normally Open

→ Flat



High actuator

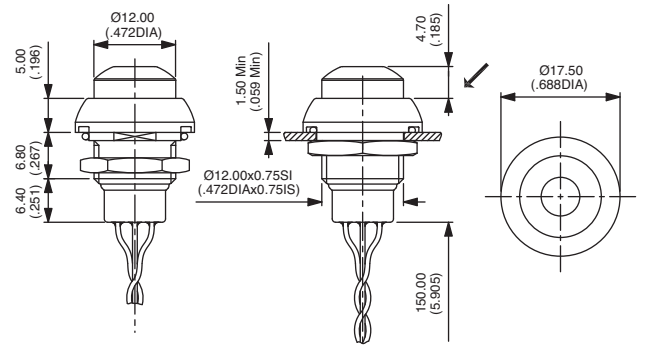


IHSH36F



Normally Open

→ Flat

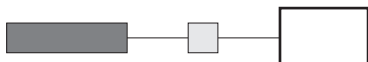


ACTUATOR COLOURS



1 : blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange - B : dark blue

OPTIONS



100 : Satin chrome bezel
101 : Bright chrome bezel

IHL series

New!

Hall effect pushbutton switches - bushing \varnothing 12 mm - linear

Distinctive features and specifications



- Linear output pushbutton
- 0,5 to 4,5 volt output
- Modular operating force
- 5 million cycles
- Sealed to IP67

B1

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Operating temperature : -40°C to +85°C
- EMC testing : 10V per meter extend to radiated fields in freq. range of 80 Mhz to 1.000 MHz. 1KHz 80 % sine wave modulation according to IEC/EN 61000-4-3

GENERAL SPECIFICATIONS

- Panel thickness : 1,5 mm (.059) min. 10 mm (.393) max.
- Total travel : 4 mm (.160) +/- 0,3 mm
- Mechanical life : 5 million cycles
- Torque : 1 Nm max. applied to nut

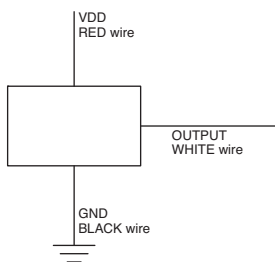
ELECTRICAL SPECIFICATIONS

- Supply voltage : 4,5VDC to 5,5VDC without regulator 6,5VDC to 24VDC with 5V regulator
- Supply current : 9mA max.
- Max. output current : 1,25mA
- Max. output voltage with or without regulator : see graph below.

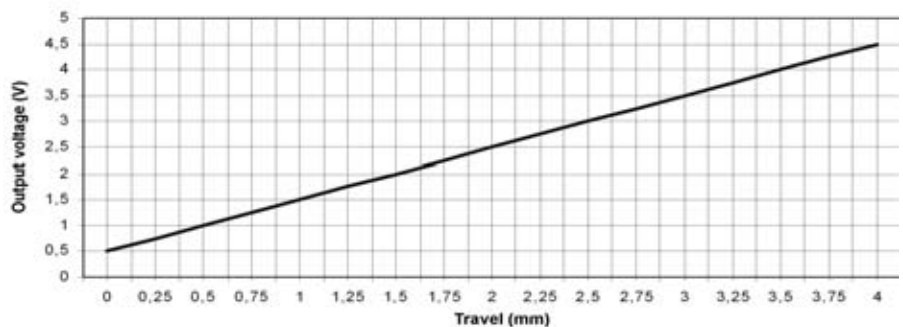
MATERIALS

- Case : PBT, UL94-V0
- Actuator : ABS
- Bushing : polyamide 6/6
- Multi-wire lead : AWG26, 150 mm

WIRING DIAGRAM



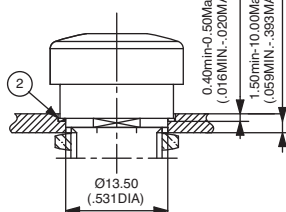
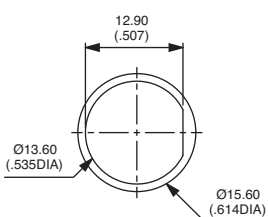
LINEAR OUTPUT GRAPH (VDC = 5V@20°C)



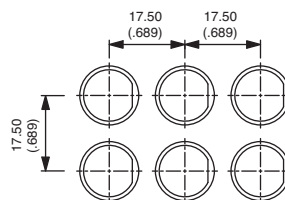
MOUNTING

Panel cut-out

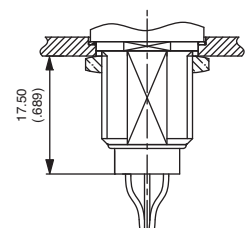
② O-ring



Matrix mounting



Back of panel space requirement

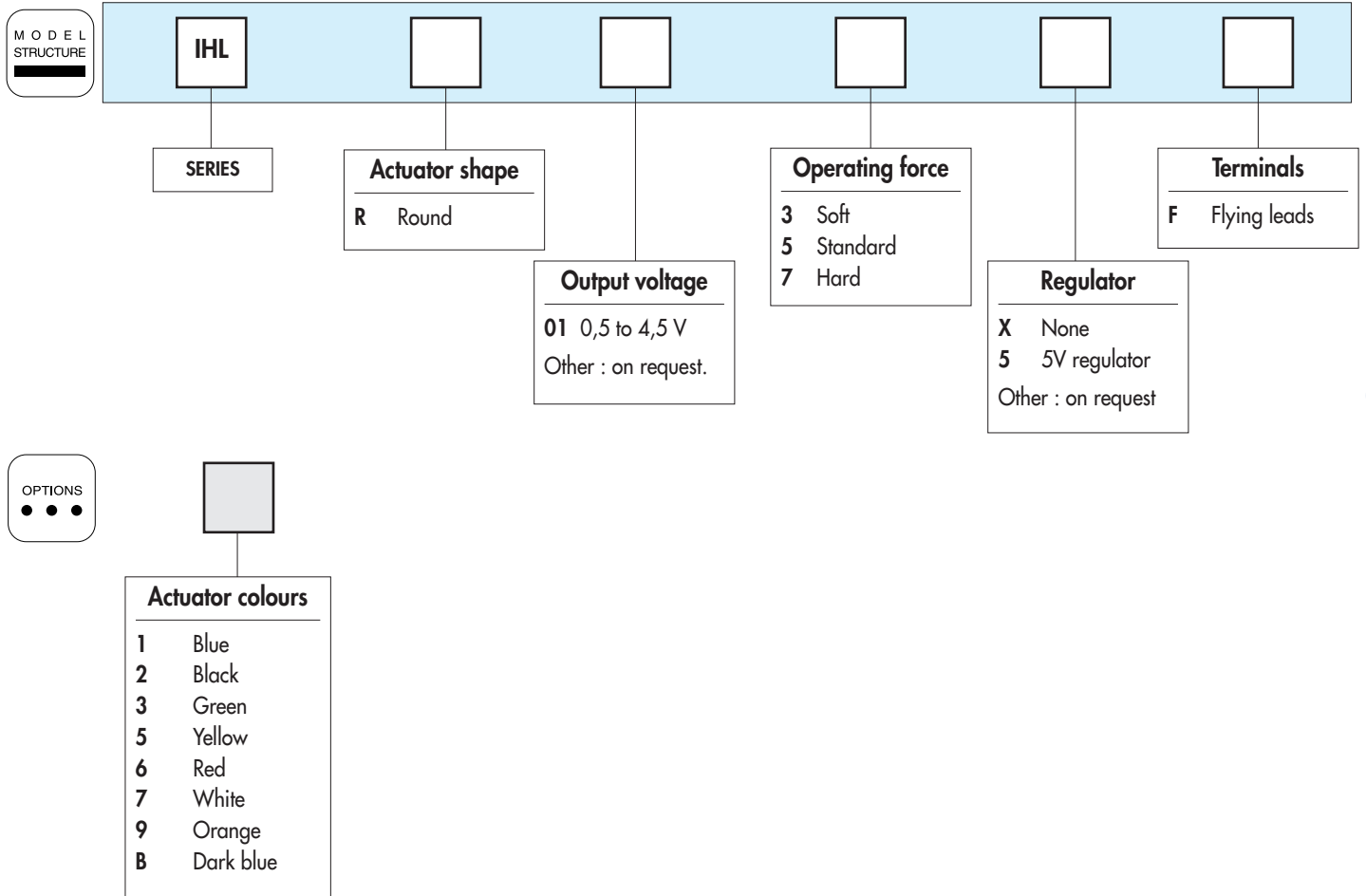


New!

IHL series

Hall effect pushbutton switches - bushing \varnothing 12 mm - linear

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



Mounting accessories : Standard hardware supplied : 1 hex nut 14 mm (.551) across flats and 1 O-ring.
Hex nut part number U166.



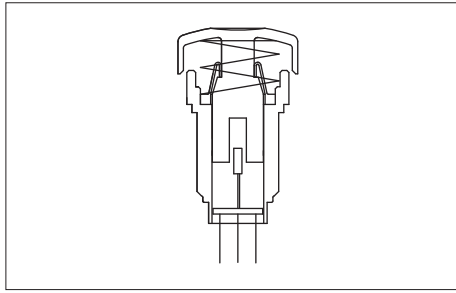
Packaging unit : 25 pieces

IHL series

New!

Hall effect pushbutton switches - bushing \varnothing 12 mm - linear

Round - non-illuminated



- With or without regulator

MODEL
STRUCTURE

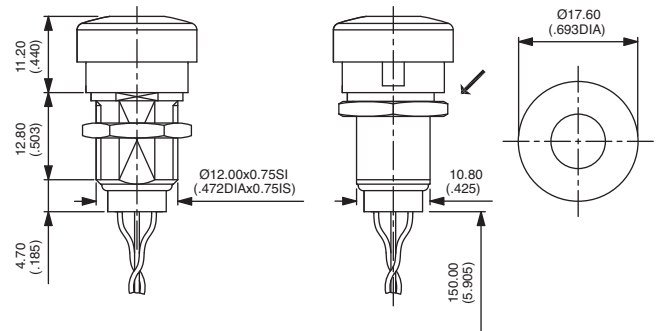


Without regulator



- Soft operating force
IHLR013XF
- Standard operating force
IHLR015XF
- Hard operating force
IHLR017XF

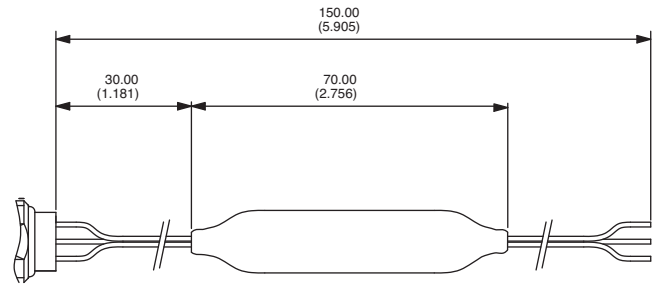
→ Flat



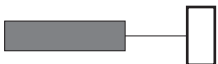
With 5V regulator



- Soft operating force
IHLR0135F
- Standard operating force
IHLR0155F
- Hard operating force
IHLR0175F



ACTUATOR COLOURS



1 : blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange - B : dark blue

New!

IQ series

Sealed pushbutton switches - bushing \varnothing 16 mm - snap-in mounting

Distinctive features

Like the IR series, the IQ series is a range of sealed pushbutton switches with dia. 16 mm bushing. But IQ pushbuttons feature snap-in mounting for easier and faster installation. Momentary and latching versions are available.

Main features

- Snap-in mounting for easy installation
- Tactile feedback
- Sealed to IP67
- Illuminated or non-illuminated
- Square or round actuator
- Wide choice of actuator and illumination colours
- Flat round actuator for optional marking

Momentary versions

- Electrical function : NO
- Five terminal options, including screw terminals
- Silver contacts for screw terminal types
- Gold plated silver contacts for other types



Solder lug terminals



Flying lead terminals



Screw terminals

Latching versions

- Electrical function : OFF-ON
- Four terminal options
- Gold plated silver contacts



Solder lug terminals



Flying lead terminals



- Snap-in mounting for easy installation
- Momentary models
- Illuminated or non-illuminated
- Flat round actuator for optional marking
- Sealed to IP54

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP54 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - Gold plated silver contacts (code 4) : 200mA 48VDC
 - Silver contacts (code 2) - screw terminals : 4A 48VDC
- Electrical life at full load : 500.000 cycles
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.500 Vrms

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	2,1V	2,3V
Yellow (LOY)	20mA	2,1V	2,3V
Green (LOG)	20mA	2,1V	2,3V
Blue (LOB)	20mA	3,2V	3,8V
White (LOW)	20mA	3,35V	4,25V

A resistor must be series-connected by the user.

Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

On flying lead versions, the LED resistor can be integrated by APEM on request.

GENERAL SPECIFICATIONS

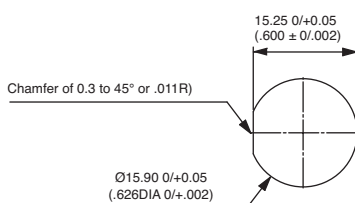
- Panel thickness :
 - with flat seal : 2,20 mm (.088) max.
 - without flat seal : 3 mm (.118) max.
- Total travel : 1,6 mm (.062) +/- 0,3 mm
- Typical operating force : 4N +/- 2N
- Low level or mechanical life : 1.000.000 cycles
- Soldering : 320°C max. for 3 sec.

MATERIALS

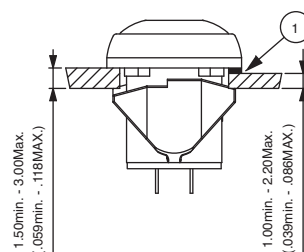
- Case : thermoplastic UL94-V0
- Actuator : polyamide 6/6
- Bushing/bezel : polyamide 6/6
- Contacts :
 - 4 : silver, gold plated
 - 2 : silver (screw terminals)
- Multi-wire lead AWG20, section 0,6 mm²
- LED wire : AWG26, section 0,12 mm²
- Lens : polycarbonate
- Terminal seal : epoxy

MOUNTING

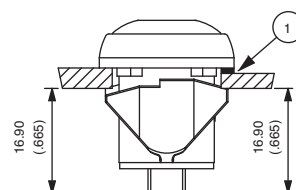
Panel cut-out



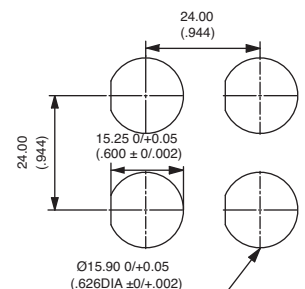
① Flat seal



Back of panel space requirement



Matrix mounting

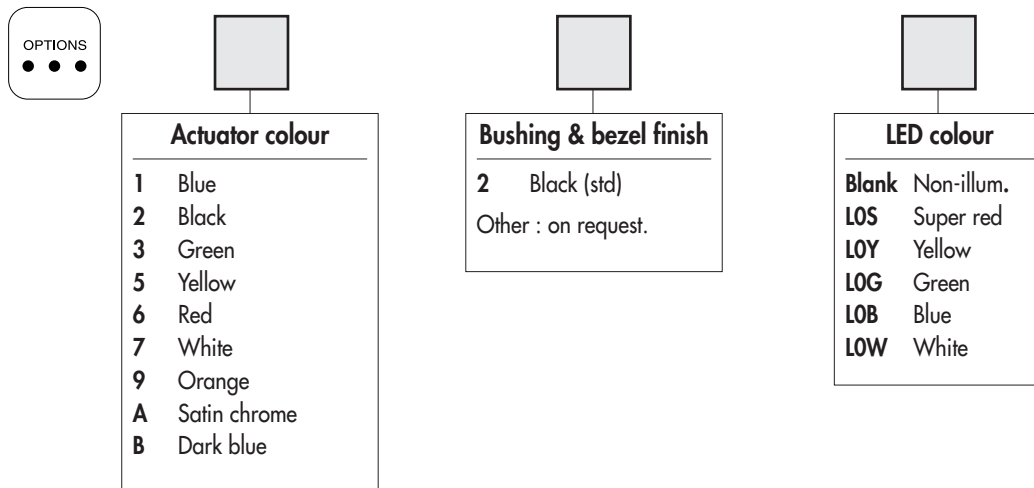
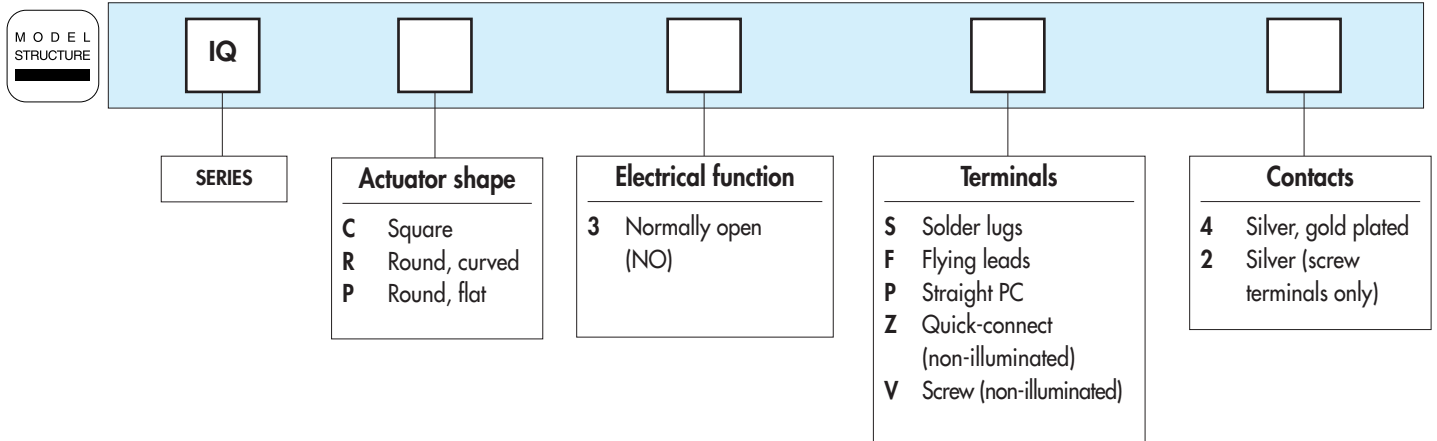


New!

IQ series

Sealed pushbutton switches - bushing Ø 16 mm - snap-in mounting - momentary

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



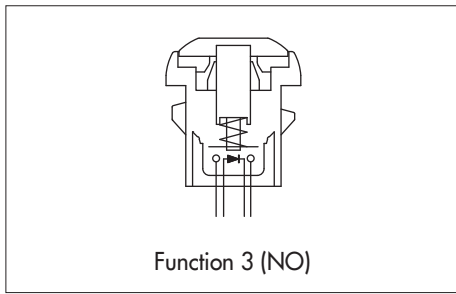
NOTICE : please note that not all combinations of above numbers are available. Refer to the following pages for further information.



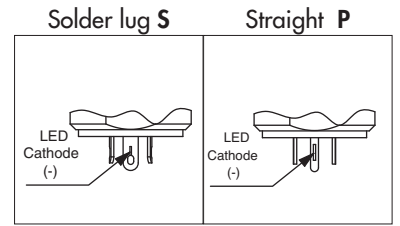
Mounting accessories : Standard hardware supplied : 1 flat seal



Packaging unit : 25 pieces for flying lead models - 40 pieces for other models



- Five LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE

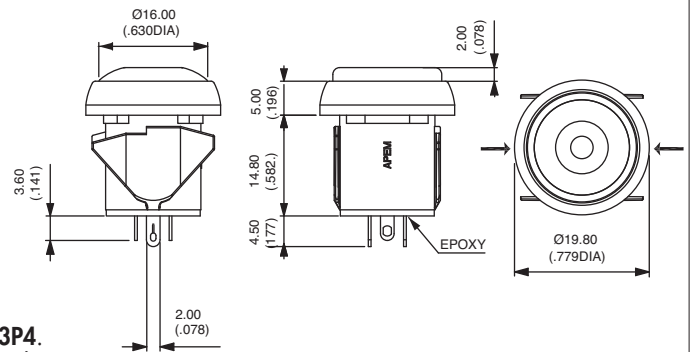
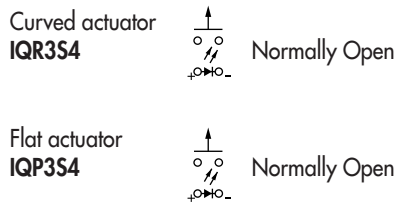


Actuator marking available on IQP models (symbol 12 mm max.). On request.

B1

Solder lug terminals

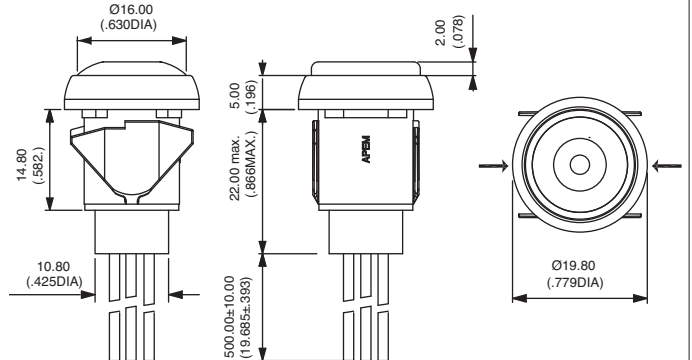
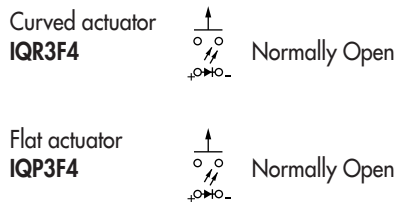
→ Flat



Also available with straight PC terminals : **IQ•3P4**.
LED colour is indicated by the bottom of the switch.

Sealed flying lead terminals

→ Flat



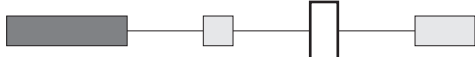
Wire colours : black : NO contact,
red : LED anode (+), blue : LED cathode (-)

ACTUATOR COLOUR



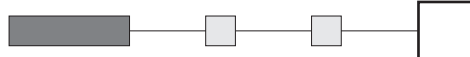
1 : blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange - A : satin chrome - B : dark blue

BUSHING AND BEZEL FINISH



2 : black (standard)

LED COLOUR



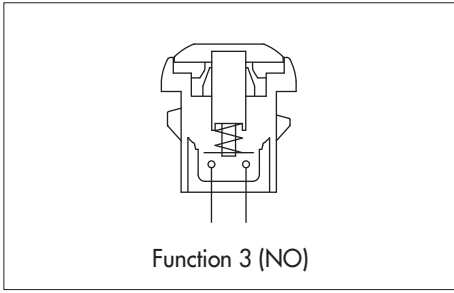
LOS : super red - LOY : yellow - LOG : green - LOB : blue
LOW : white

New!

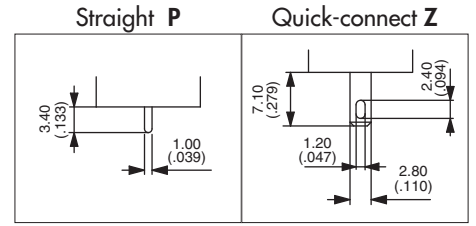
IQ series

Sealed pushbutton switches - bushing Ø 16 mm - snap-in mounting - momentary

Round - non-illuminated



- Gold plated or silver contacts depending on terminal type



MODEL STRUCTURE



Actuator marking available on IQP models (symbol 12 mm max.). On request.

Solder lug terminals - gold plated contacts



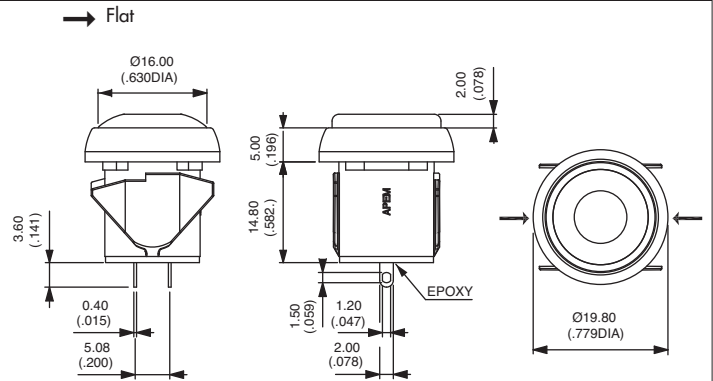
Curved actuator
IQR3S4



Flat actuator
IQP3S4



Also available with straight PC terminals : **IQ•3P4** and quick-connect terminals : **IQ•3Z4**.



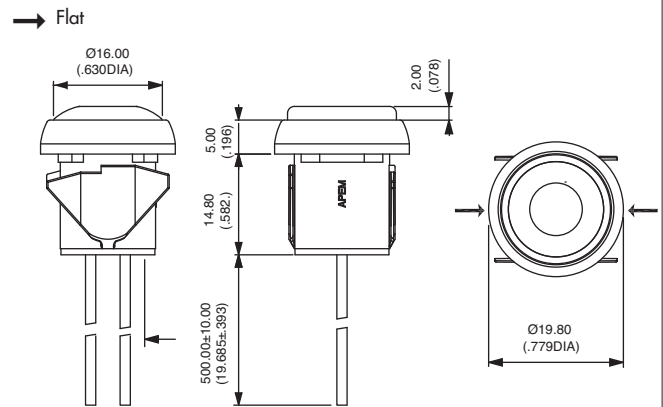
Sealed flying lead terminals - gold plated contacts



Curved actuator
IQR3F4



Flat actuator
IQP3F4



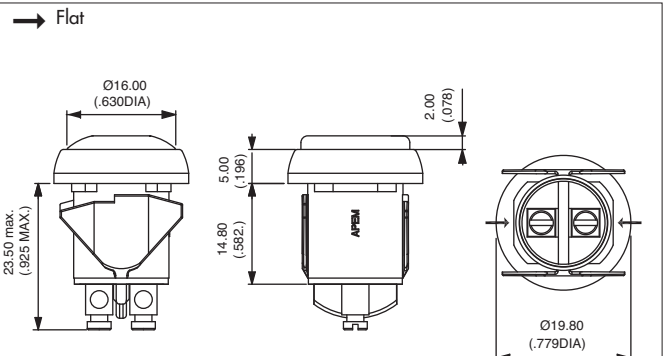
Screw terminals - silver contacts



Curved actuator
IQR3V2



Flat actuator
IQP3V2



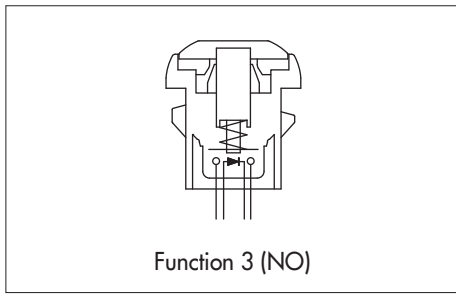
Actuator colour and bushing/bezel finish : select the desired codes on previous page.

IQ series

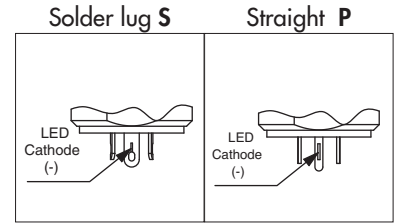
New!

Sealed pushbutton switches - bushing Ø 16 mm - snap-in mounting - momentary

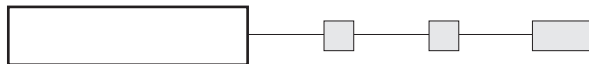
Square - illuminated



- Five LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



B1

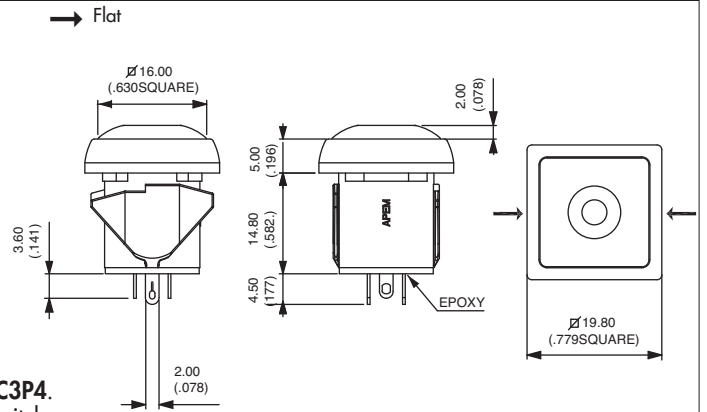
Solder lug terminals



IQC3S4



Normally Open



Also available with straight PC terminals : **IQC3P4**.
LED colour is indicated by the bottom of the switch.

Sealed flying lead terminals

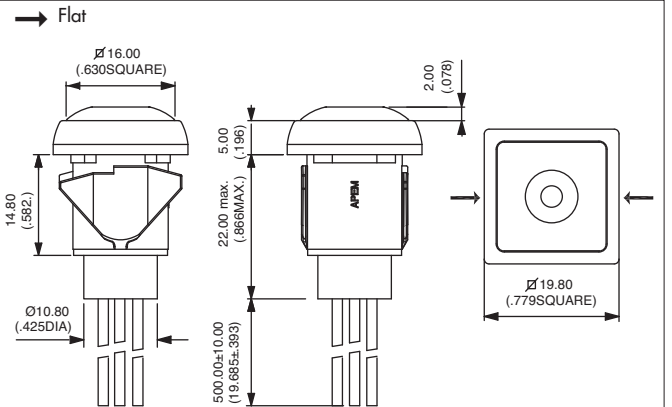


IQC3F4



Normally Open

Wire colours : black : NO contact,
red : LED anode (+), blue : LED cathode (-)

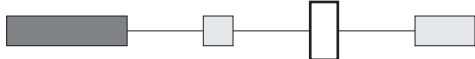


ACTUATOR COLOUR



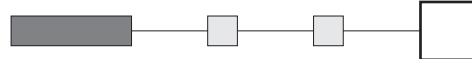
1 : blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange - A : satin chrome - B : dark blue

BUSHING AND BEZEL FINISH



2 : black (standard)

LED COLOUR



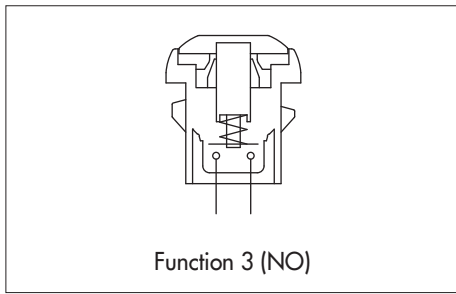
LOS : super red - LOY : yellow - LOG : green - LOB : blue
LOW : white

New!

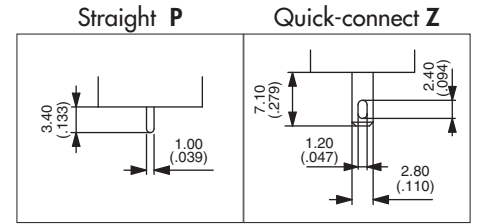
IQ series

Sealed pushbutton switches - bushing \varnothing 16 mm - snap-in mounting - momentary

Square - non-illuminated



- Gold plated or silver contacts depending on terminal type



MODEL STRUCTURE



Solder lug terminals - gold plated contacts

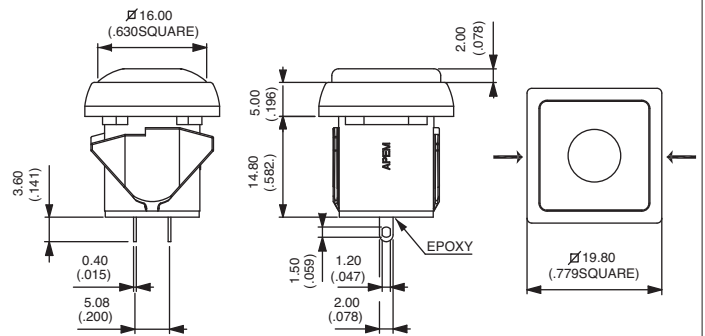
→ Flat



IQC3S4



Normally Open



Also available with straight PC terminals : IQC3P4 or quick-connect terminals : IQC3Z4.

Sealed flying lead terminals - gold plated contacts

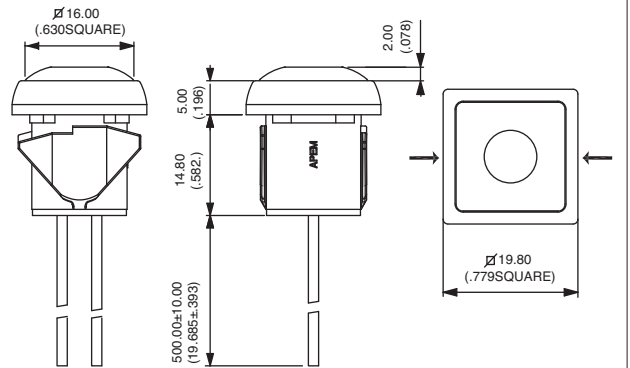
→ Flat



IQC3F4



Normally Open



Screw terminals - silver contacts

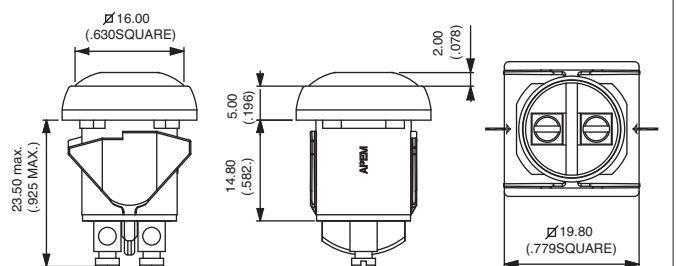
→ Flat



IQC3V2



Normally Open



Actuator colour and bushing/bezel finish : select the desired codes on previous page.



- Snap-in mounting for easy installation
- Latching action models
- Illuminated or non-illuminated
- Flat round actuator for optional marking
- Sealed to IP54

B1

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP54 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 100mA 24VDC - 200.000 cycles
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.500 Vrms between terminals

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	1,95V	1,95V
Yellow (LOY)	20mA	2V	2,05V
Green (LOG)	20mA	3,2V	3,70V
Blue (LOB)	20mA	3,2V	4V

A resistor must be series-connected by the user.

$$\text{Resistor value} = \frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$$

On flying lead versions, the LED resistor can be integrated by APEM on request.

GENERAL SPECIFICATIONS

- **Panel thickness :**
with flat seal : 2,20 mm (.088) max.
without flat seal : 3 mm (.118) max.
- Total travel : 2,5 mm (.098) +/- 0,3 mm
- Typical operating force : 5N +/- 2N
- Low level or mechanical life : 200.000 cycles
- Soldering : 320°C max. for 3 sec.

MATERIALS

- Case : thermoplastic UL94-V0
- Plunger : polyamide
- Bushing/bezel : polyamide
- Contacts : silver, gold plated
- Multi-wire lead AWG20, section 0,6 mm²
- LED wire : AWG26, section 0,12 mm²
- Lens : polycarbonate
- Terminal seal : epoxy

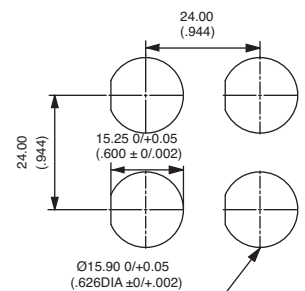
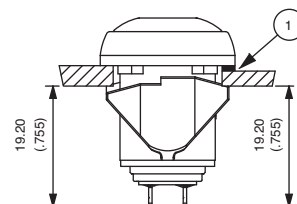
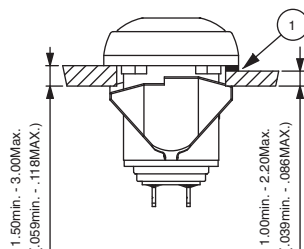
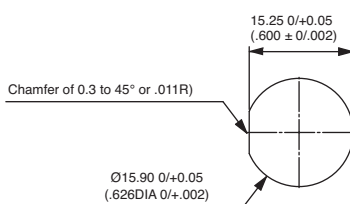
MOUNTING

Panel cut-out

① Flat seal

Back of panel space requirement

Matrix mounting

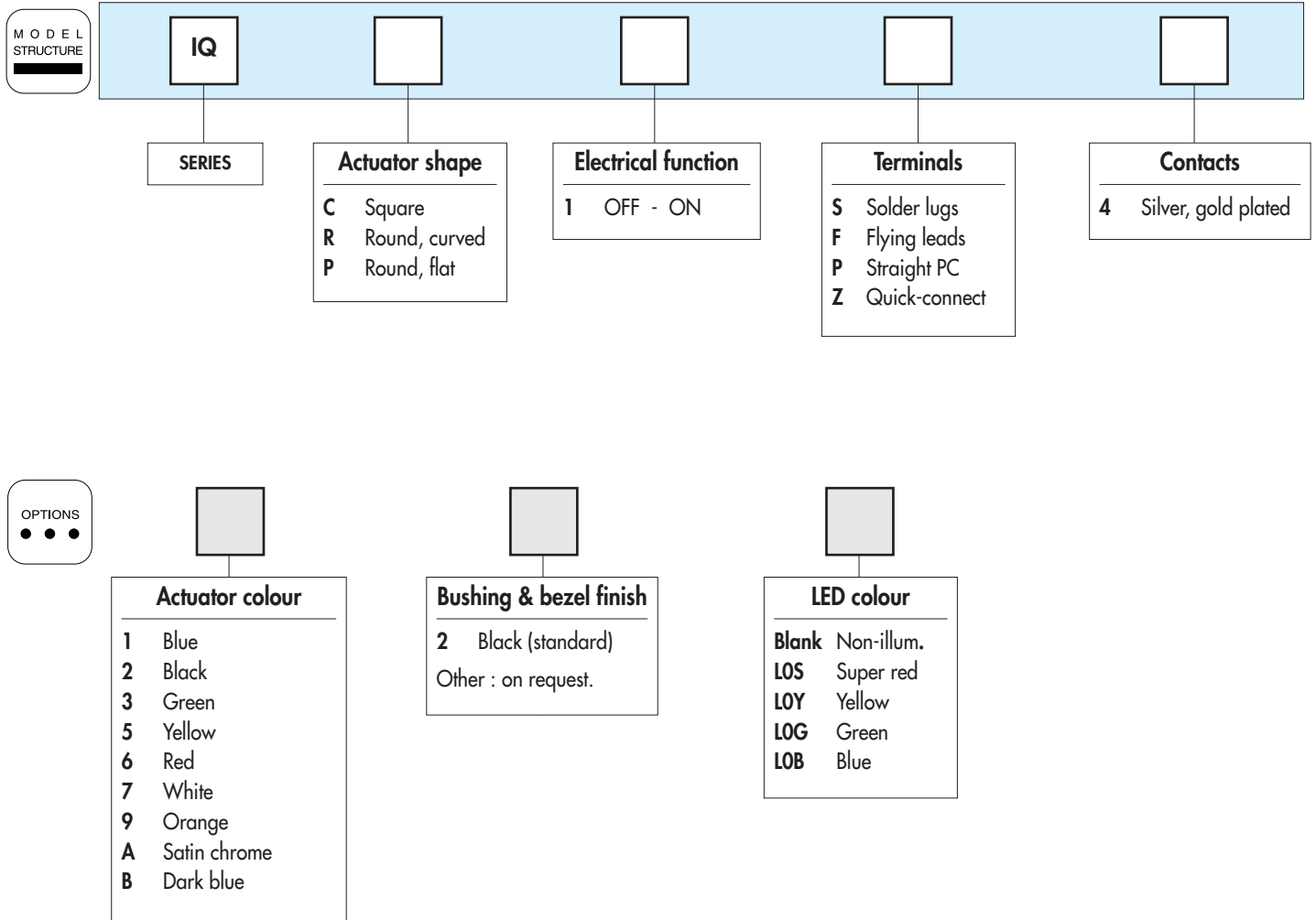


New!

IQ series

Sealed pushbutton switches - bushing Ø 16 mm - snap-in mounting - latching

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



Mounting accessories : Standard hardware supplied : 1 flat seal



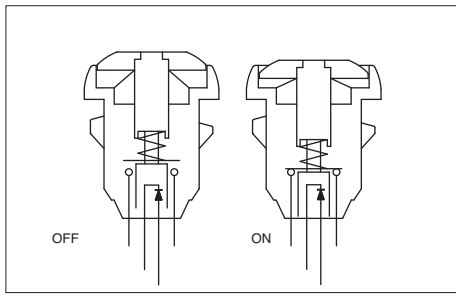
Packaging unit : 25 pieces for flying lead models - 40 pieces for other models

IQ series

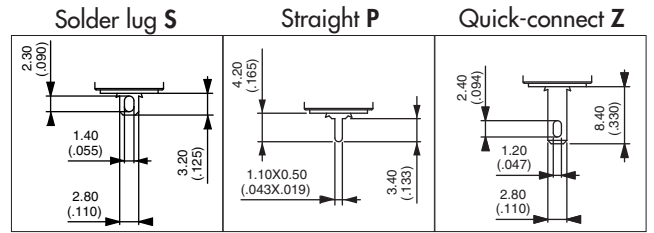
New!

Sealed pushbutton switches - bushing Ø 16 mm - snap-in mounting - latching

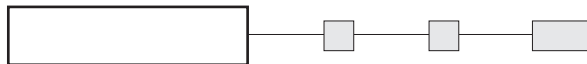
Round - illuminated



- Four LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



Plunger marking available on IRP models (symbol 12 mm max.). On request.

Solder lug terminals



Curved actuator
IQR1S4

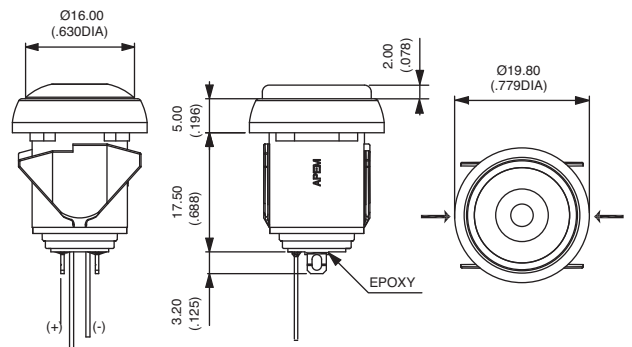
OFF - ON

Flat actuator
IQP1S4

OFF - ON

Also available with straight PC terminals : **IQ•1P4**
& quick-connect terminals : **IQ•1Z4**.

→ Flat



Sealed flying lead terminals



Curved actuator
IQR1F4

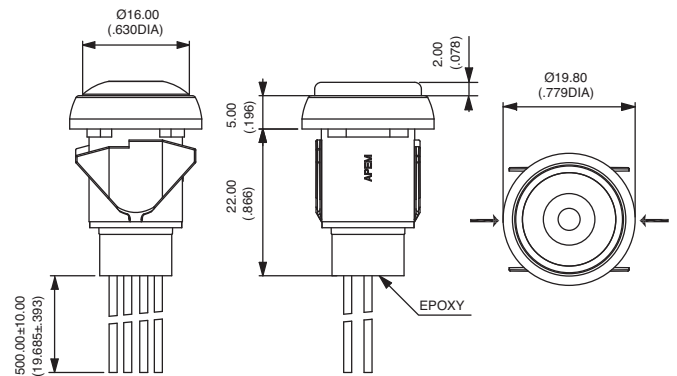
OFF - ON

Flat actuator
IQP1F4

OFF - ON

Wire colours : black : contact,
red : LED anode (+), blue : LED cathode (-)

→ Flat

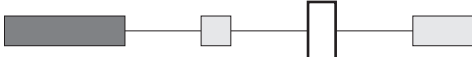


ACTUATOR COLOUR



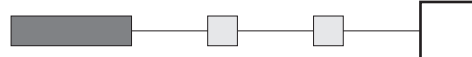
1 : blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange - A : satin chrome - B : dark blue

BUSHING AND BEZEL FINISH



2 : black (standard)

LED COLOUR



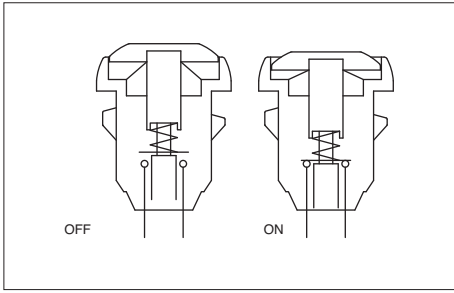
LOS : super red - LOY : yellow - LOG : green - LOB : blue

New!

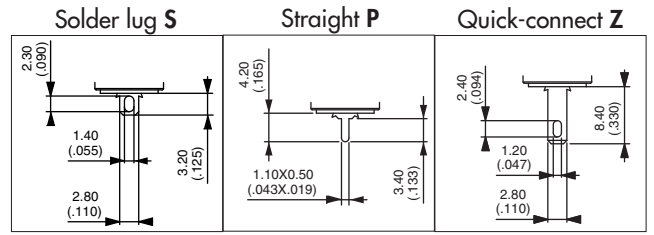
IQ series

Sealed pushbutton switches - bushing Ø 16 mm - snap-in mounting - latching

Round - non-illuminated



• Gold plated contacts



MODEL STRUCTURE



Plunger marking available on IRP models (symbol 12 mm max.). On request.

Solder lug terminals



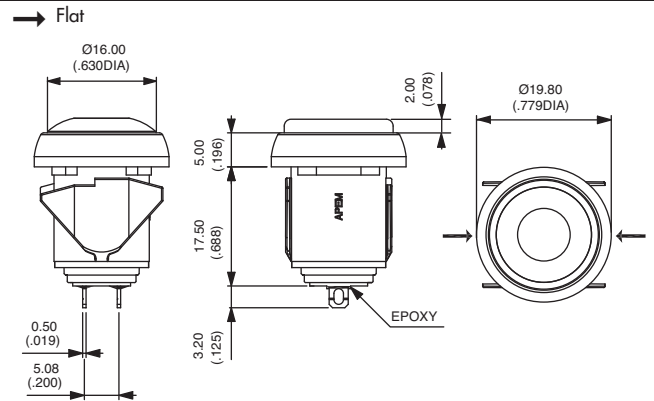
Curved actuator
IQR1S4

OFF - ON

Flat actuator
IQP1S4

OFF - ON

Also available with straight PC terminals : **IQ•1P4**
& quick-connect terminals : **IQ•1Z4**.



Sealed flying lead terminals

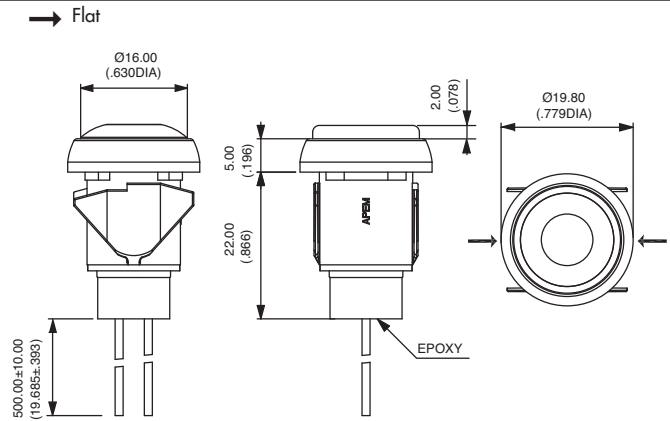


Curved actuator
IQR1F4

OFF - ON

Flat actuator
IQP1F4

OFF - ON



ACTUATOR COLOUR



1 : blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange - A : satin chrome - B : dark blue

BUSHING AND BEZEL FINISH



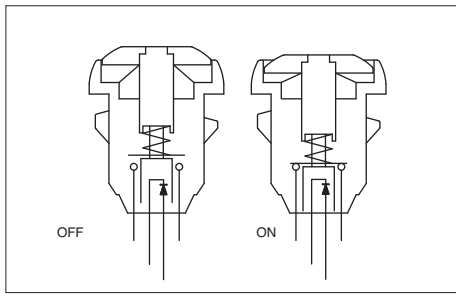
2 : black (standard)

IQ series

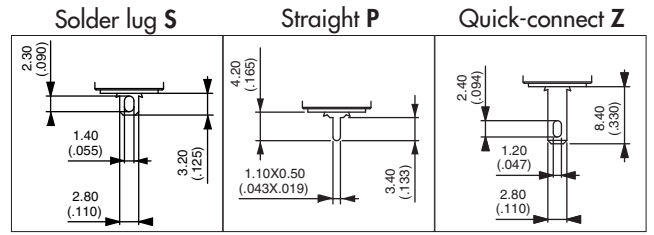
New!

Sealed pushbutton switches - bushing Ø 16 mm - snap-in mounting - latching

Square - illuminated



- Four LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



B1

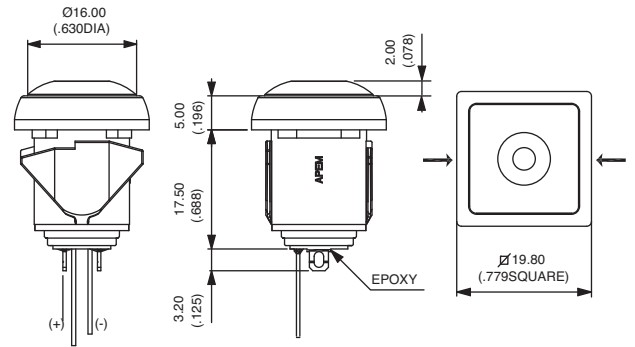
Solder lug terminals

→ Flat



Curved actuator
IQC1S4

OFF - ON



Also available with straight PC terminals : **IQC1P4**
& quick-connect terminals : **IQC1Z4**.

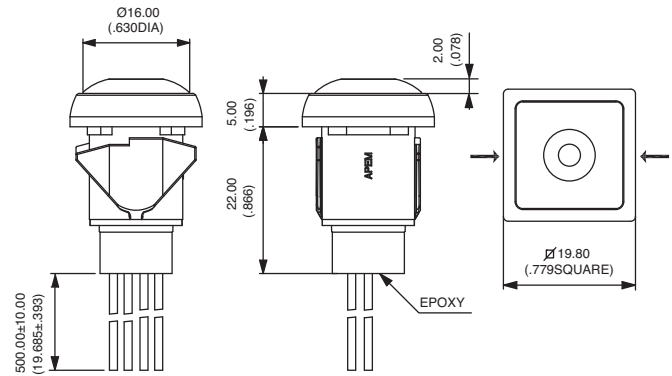
Sealed flying lead terminals

→ Flat



Curved actuator
IQC1F4

OFF - ON



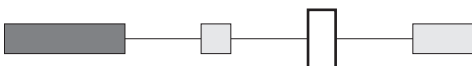
Wire colours : black : contact,
red : LED anode(+), blue : LED cathode (-)

ACTUATOR COLOUR



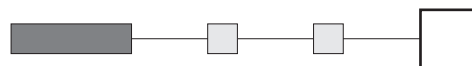
1 : blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange - A : satin chrome - B : dark blue

BUSHING AND BEZEL FINISH



2 : black (standard)

LED COLOUR



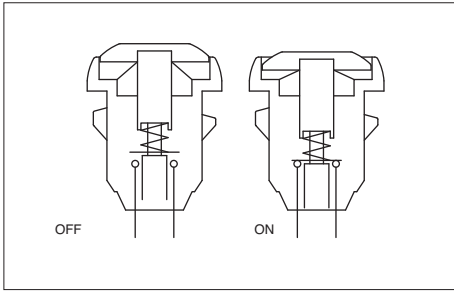
LOS : super red - LOY : yellow - LOG : green - LOB : blue

New!

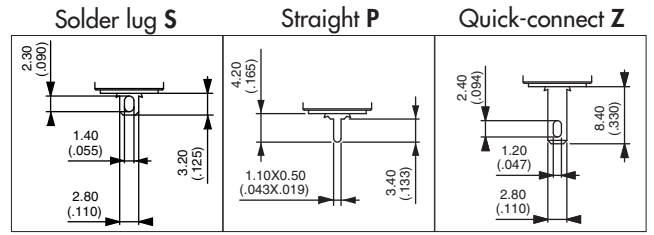
IQ series

Sealed pushbutton switches - bushing \varnothing 16 mm - snap-in mounting - latching

Square - non-illuminated



• Gold plated contacts



MODEL STRUCTURE



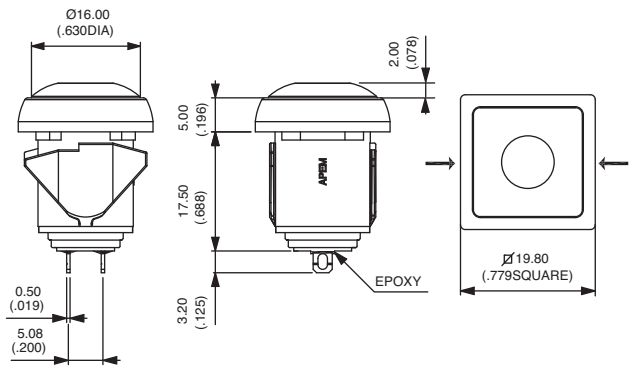
Solder lug terminals



Curved actuator
IQC1S4

OFF - ON

→ Flat



Also available with straight PC terminals : **IQC1P4**
& quick-connect terminals : **IQC1Z4**.

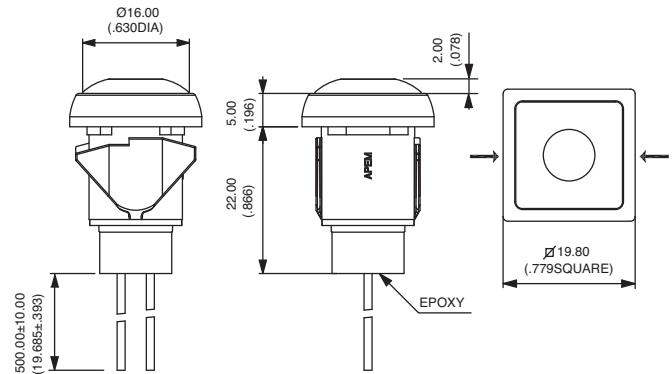
Sealed flying lead terminals



Curved actuator
IQC1F4

OFF - ON

→ Flat



ACTUATOR COLOUR



1 : blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange - A : satin chrome - B : dark blue

BUSHING AND BEZEL FINISH



2 : black (standard)

I_Z series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - metal - momentary

Distinctive features and specifications



- Rear mounting for easier installation
- Momentary metal models
- Fixed or variable panel thickness
- Screw version available up to 4A
- Sealed to IP67
- Illuminated or non-illuminated
- Flat actuator for optional marking

B1

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - Gold plated silver contacts (code 4) : 200mA 48VDC
 - Silver contacts (code 2) - screw terminals : 4A 48VDC
- Electrical life at full load : 500.000 cycles
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.000 Vrms 50 Hz

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	2,1V	2,3V
Yellow (LOY)	20mA	2,1V	2,3V
Green (LOG)	20mA	2,1V	2,3V
Blue (LOB)	20mA	3,2V	3,8V
White (LOW)	20mA	3,35V	4,25V

A resistor must be series-connected by the user.

Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

On flying lead versions, the LED resistor can be integrated by APEM on request.

GENERAL SPECIFICATIONS

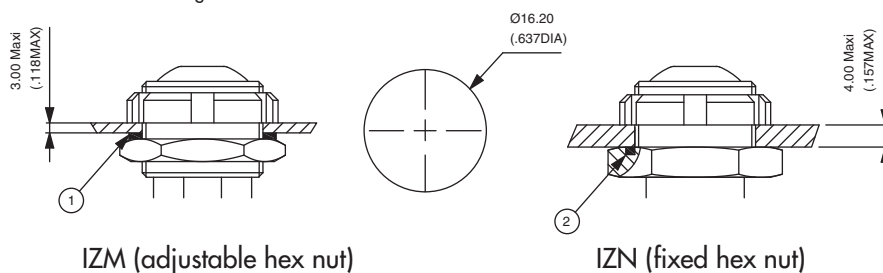
- Panel thickness :
 - IZM : 3 mm (.118) max.
 - IZN : 4 mm (.157) max.
- Total travel : 1,8 mm (.070) +/- 0,3 mm
- Typical operating force : 6N +/- 2N
- Low level or mechanical life : 1.000.000 cycles
- Torque : IZN : 1 Nm max.
IZM : 0,7 Nm max. applied to nut
- Soldering : 320°C max. for 3 sec.

MATERIALS

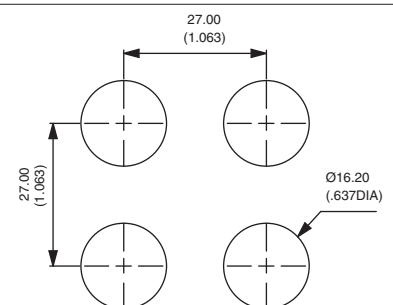
- Case : thermoplastic UL94-V0
- Plunger : polyamide
- Bushing/bezel : brass, nickel plated
- Contacts :
 - 4 : silver, gold plated
 - 2 : silver (screw terminals)
- Multi-wire lead AWG20, section 0,6 mm²
- LED wire : AWG26, section 0,12 mm²
- Lens : polycarbonate
- Terminal seal : epoxy (except screw terminals)

PANEL CUT-OUT

- ① Flat seal ② O-ring



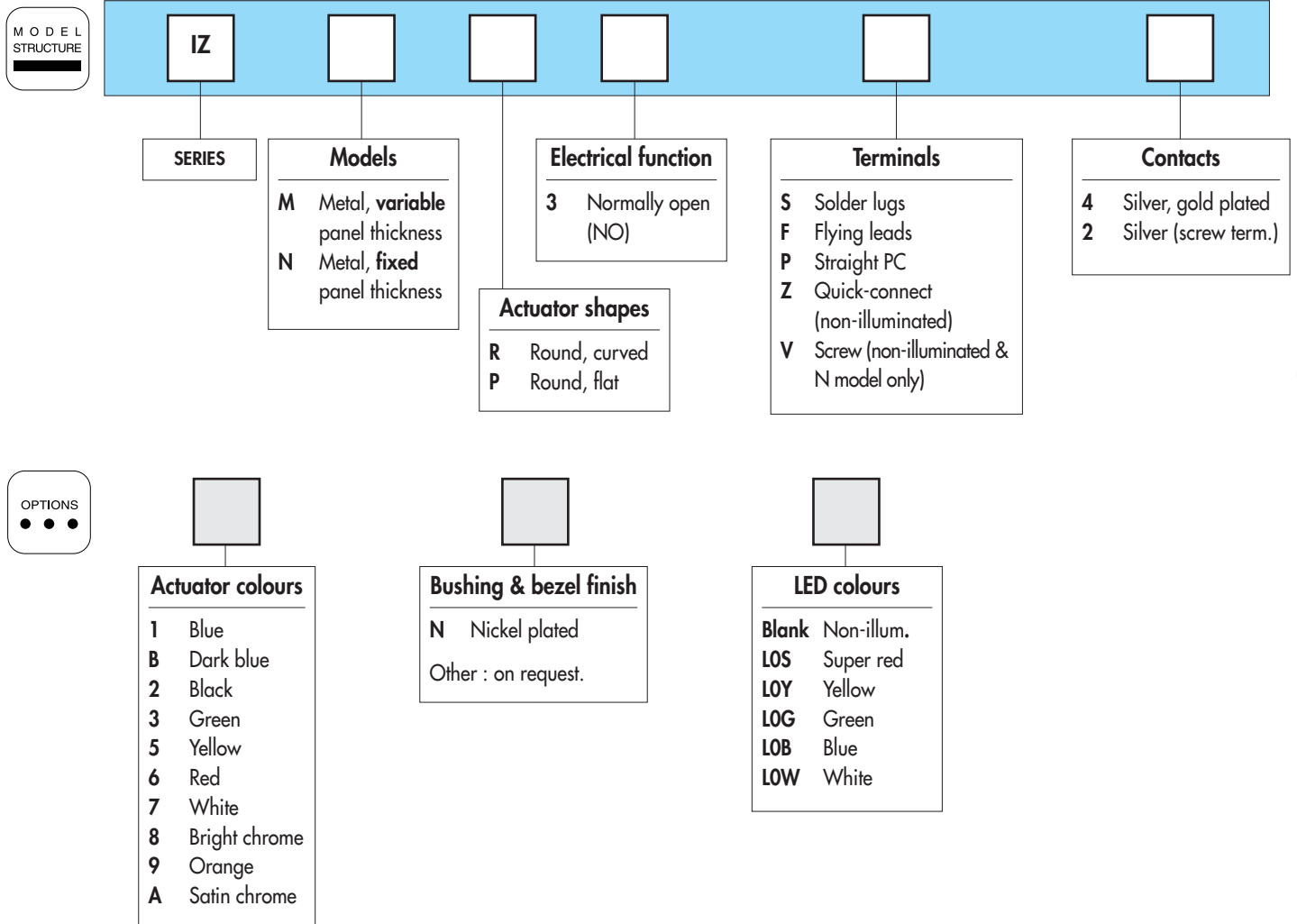
MATRIX MOUNTING



IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - metal - momentary

Overview



B1

ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



Mounting accessories : Standard hardware supplied :

- IZM : 1 castellated nickel plated brass nut U6915 + 1 silicone flat seal + 1 hex nut 19 mm (.748) across flats U4116.
- IZN : 1 castellated nickel plated brass nut U6915 + 1 O-ring

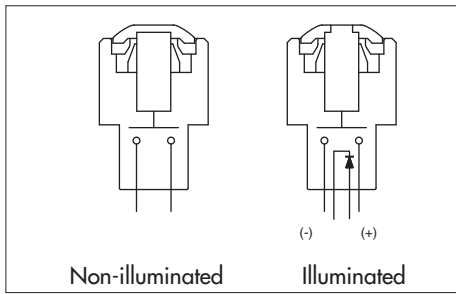


Packaging unit : 25 pieces for flying lead models - 40 pieces for other models

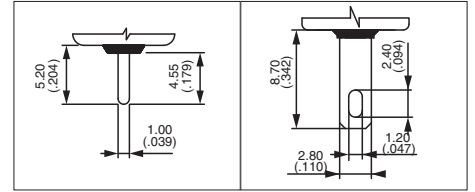
IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - metal - momentary

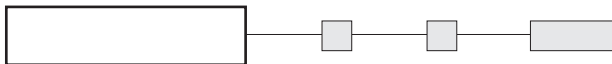
For variable panel thickness : IZM



- Five LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



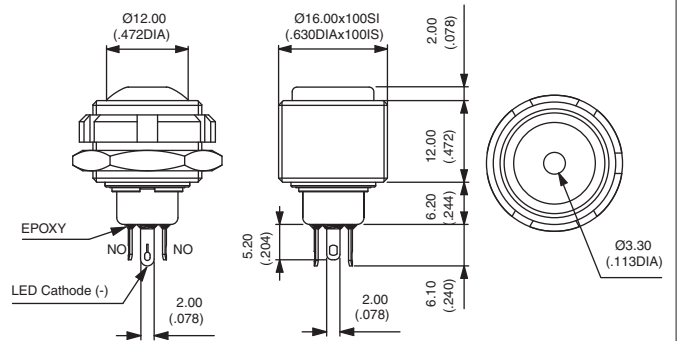
Actuator marking available on IZMP models (symbol 10 mm max.). On request.

Illuminated - solder lug terminals



Curved actuator
IZMR3S4 Normally Open

Flat actuator
IZMP3S4 Normally Open



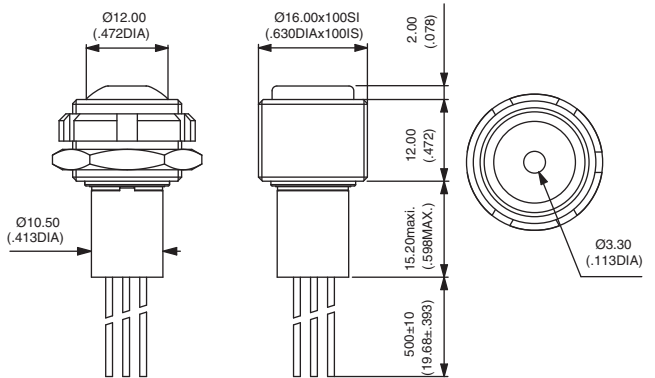
Also available with straight PC terminals : **IZM•3P4**.
LED colour is indicated by the bottom of the switch.

Illuminated - flying lead terminals



Curved actuator
IZMR3F4 Normally Open

Flat actuator
IZMP3F4 Normally Open



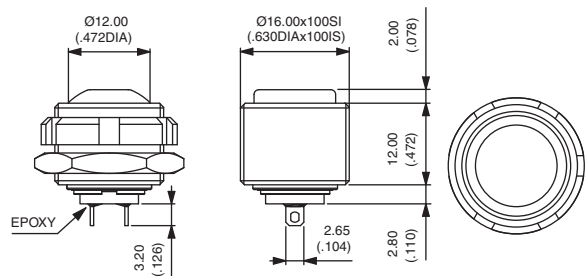
Wire colours : black : NO contact,
red : LED anode (+), blue : LED cathode (-)

Non-illuminated - solder lug terminals



Curved actuator
IZMR3S4 Normally Open

Flat actuator
IZMP3S4 Normally Open



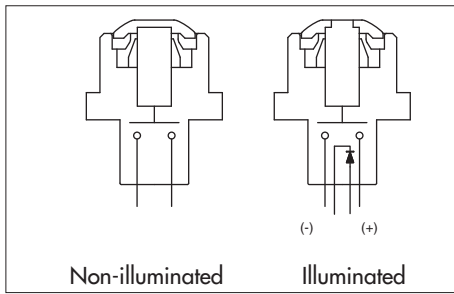
Also available with straight PC terminals :
IZM•3P4 and quick-connect terminals : **IZM•3Z4**.

For non-illuminated FLYING LEAD versions, refer to illuminated models above. Non-illuminated have 2 wires only.

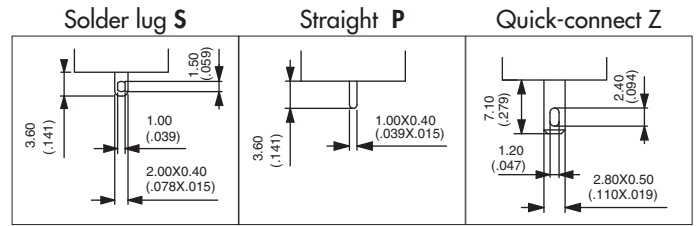
IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - metal - momentary

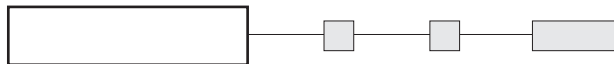
For fixed panel thickness : IZN



- Five LED colours
- Tin plated LED terminals



MODEL STRUCTURE



Actuator marking available on IZNP models (symbol 10 mm max.). On request.

Illuminated - solder lug terminals

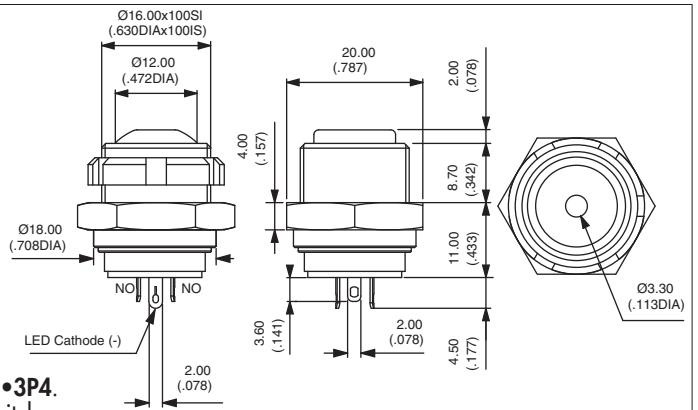


GOLD PLATED CONTACTS

Curved actuator
IZNR3S4 Normally Open

Flat actuator
IZNP3S4 Normally Open

Also available with straight PC terminals : **IZN•3P4**.
LED colour is indicated by the bottom of the switch.



Illuminated - sealed flying lead terminals

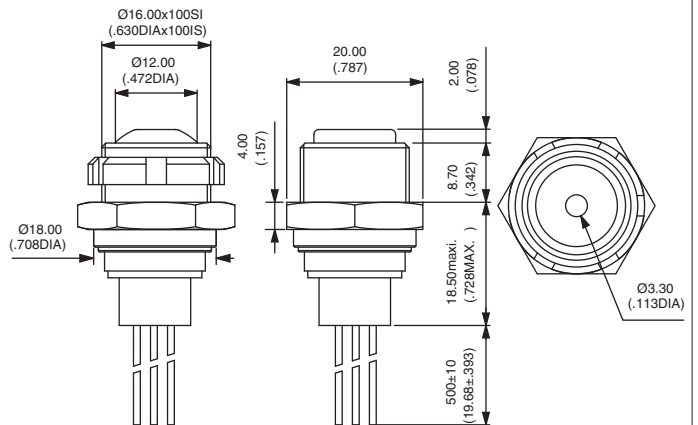


GOLD PLATED CONTACTS

Curved actuator
IZNR3F4 Normally Open

Flat actuator
IZNP3F4 Normally Open

Wire colours : black : NO contact,
red : LED anode (+), blue : LED cathode (-)



Non-illuminated - solder lug terminals

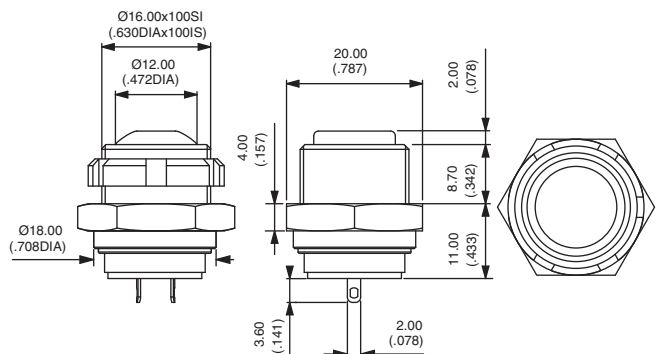


GOLD PLATED CONTACTS

Curved actuator
IZNR3S4 Normally Open

Flat actuator
IZNP3S4 Normally Open

Also available with straight PC terminals :
IZN•3P4 and quick-connect terminals : **IZN•3Z4**.



For non-illuminated FLYING LEAD versions, refer to illuminated models above. Non-illuminated have 2 wires only.

IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - metal - momentary

For fixed panel thickness : IZN - options

Non-illuminated - screw terminals



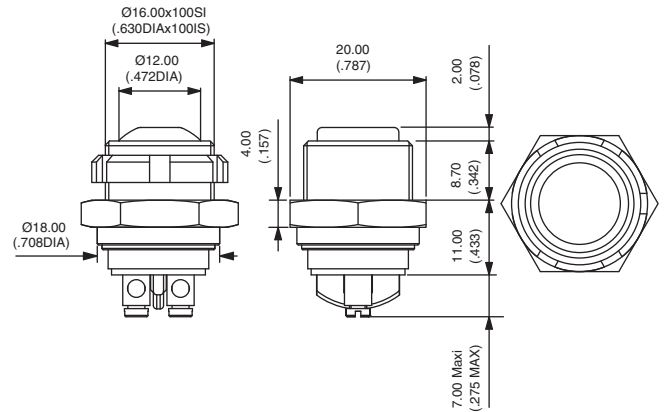
SILVER CONTACTS

Curved actuator
IZNR3V2

 Normally open

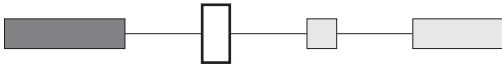
Flat actuator
IZNP3V2

 Normally open



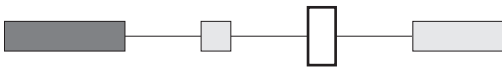
B1

ACTUATOR COLOURS



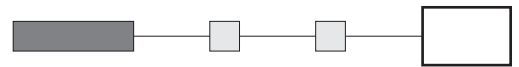
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 8 : bright chrome - 9 : orange
A : satin chrome

BUSHING AND BEZEL COLOURS



N : nickel plated (standard)
Other : on request.

LED COLOURS



Blank : non-illuminated
LOS : super red - LOY : yellow - LOG : green
LOB : blue - LOW : white



- Rear mounting for easier installation
- Latching action metal models
- Fixed or variable panel thickness
- Sealed to IP67
- Illuminated or non-illuminated
- Flat actuator for optional marking

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Robustness (non-illuminated) : IK06 according to EN 50102 (1 joule)
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 100mA 24VDC - 200.000 cycles
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.500 Vrms between terminals
1.000 Vrms between terminals and frame

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	1,95V	1,95V
Yellow (LOY)	20mA	2V	2,05V
Green (LOG)	20mA	2,1V	2,5V
Blue (LOB)	20mA	3,2V	4V

A resistor must be series-connected by the user.

Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

On flying lead versions, the LED resistor can be integrated by APEM on request.

GENERAL SPECIFICATIONS

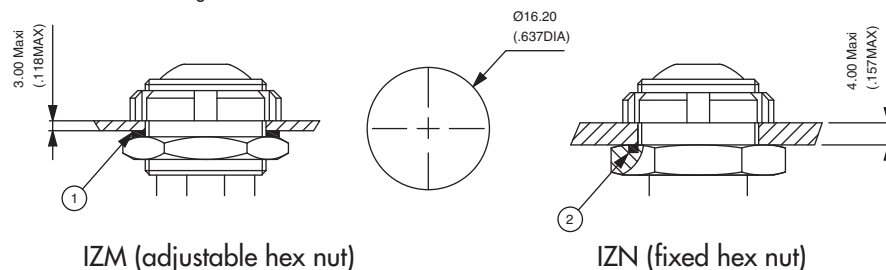
- Panel thickness :
 - IZM : 3 mm (.118) max.
 - IZN : 4 mm (.157) max.
- Total travel : 2,5 mm (.098) +/-0,3 mm
- Typical operating force : 5N +/- 2N
- Low level or mechanical life : 200.000 cycles
- Torque : IZN : 1 Nm max.
IZM : 0,7 Nm max. applied to nut
- Soldering : 320°C max. for 3 sec.

MATERIALS

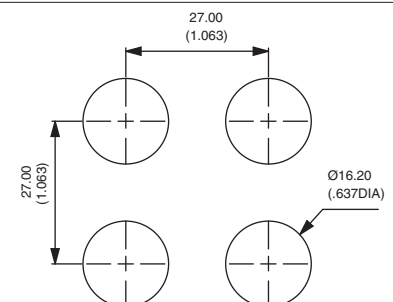
- Case : thermoplastic UL94-V0
- Plunger : polyamide
- Bushing/bezel : brass, nickel plated
- Contacts : silver, gold plated
- Multi-wire lead AWG20, section 0,6 mm²
- LED wire : AWG26, section 0,12 mm²
- Lens : polycarbonate
- Terminal seal : epoxy

PANEL CUT-OUT

- ① Flat seal ② O-ring



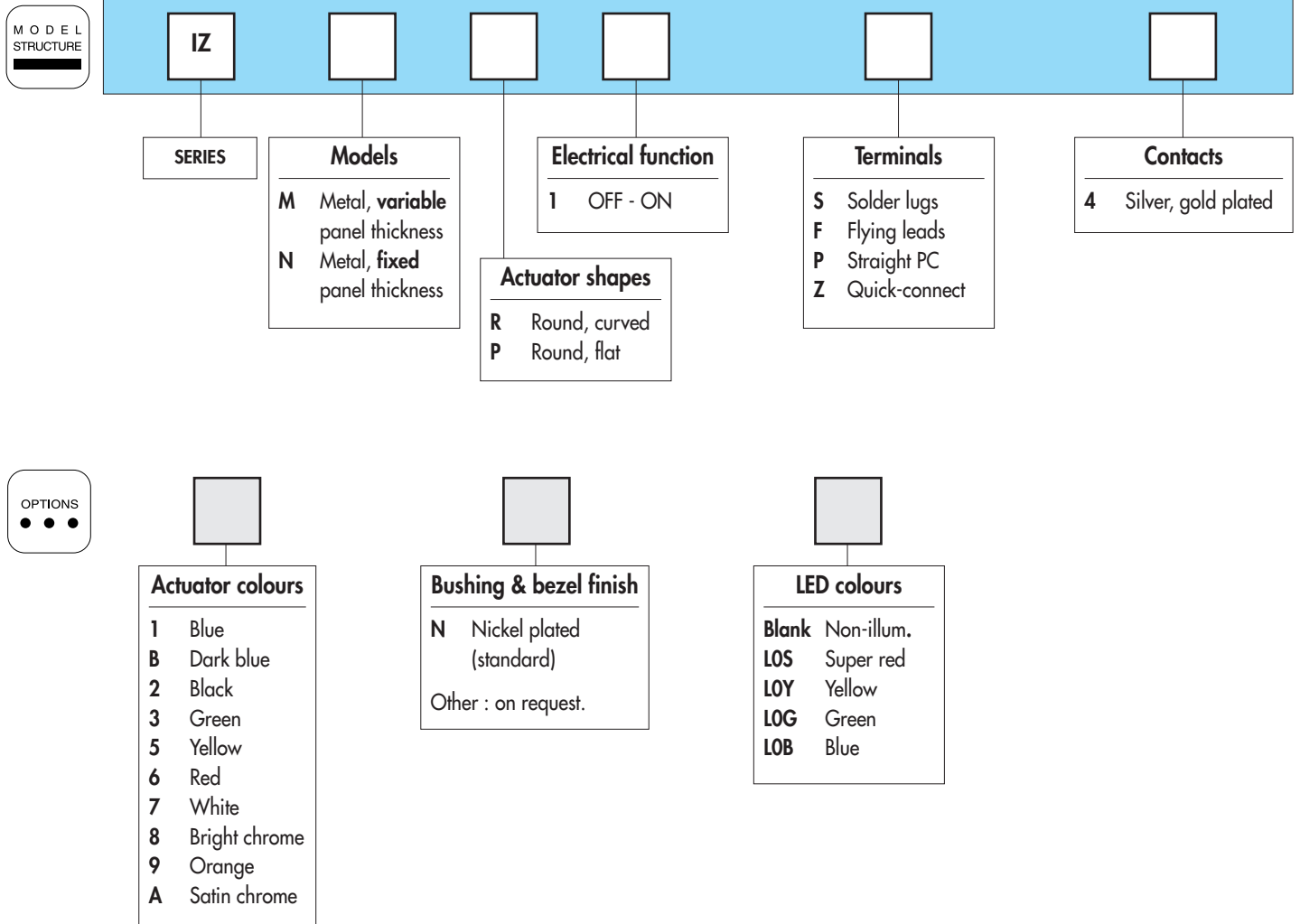
MATRIX MOUNTING



IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - metal - latching

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



Mounting accessories : Standard hardware supplied :

- IZN : 1 castellated nickel plated brass nut U6915 + 1 O-ring

- IZM : 1 castellated nickel plated brass nut U6915 + 1 silicone flat seal + 1 hex nut 19 mm (.748) across flats U4116.

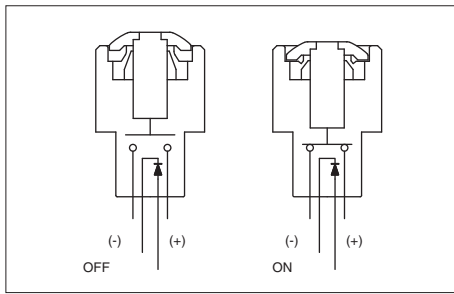


Packaging unit : 25 pieces for flying lead models - 40 pieces for other models

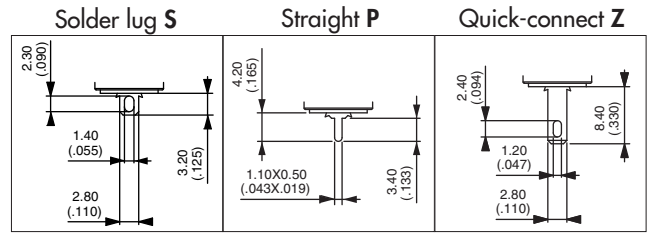
IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - metal - latching

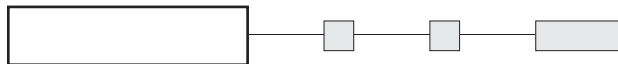
For variable panel thickness : IZM



- Four LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



Actuator marking available on IZMP models (symbol 10 mm max.). On request.

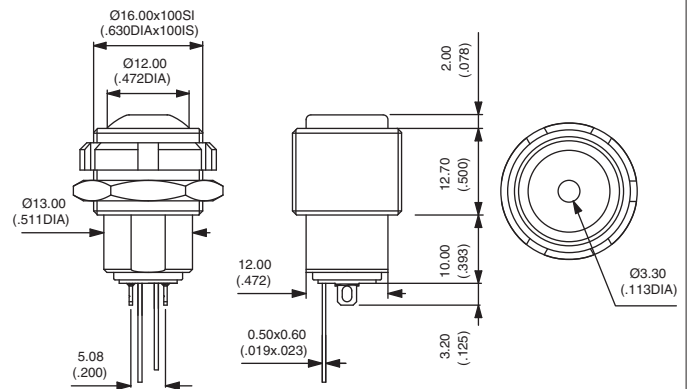
Illuminated - solder lug terminals



Curved actuator
IZMR1S4 OFF - ON

Flat actuator
IZMP1S4 OFF - ON

Also available with straight PC terminals :
IZM•1P4 & quick-connect terminals : **IZM•1Z4**.



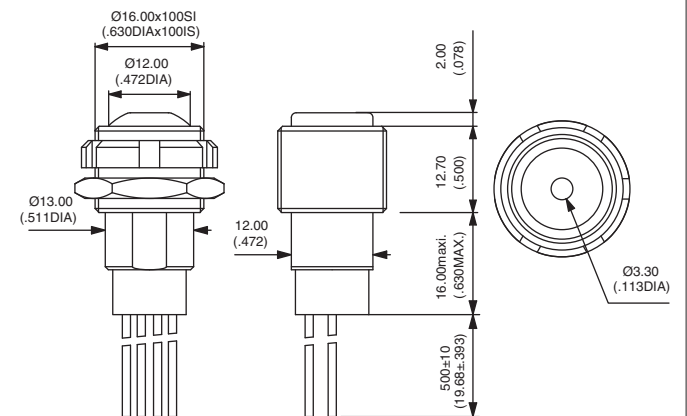
Illuminated - flying lead terminals



Curved actuator
IZMR1F4 OFF - ON

Flat actuator
IZMP1F4 OFF - ON

Wire colours : black : contact,
red : LED anode(+), blue : LED cathode (-)



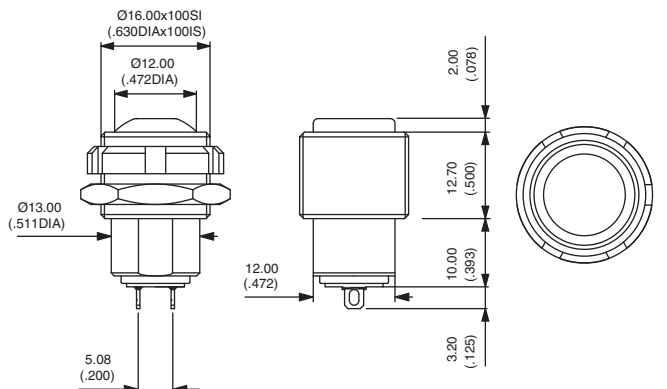
Non-illuminated - solder lug terminals



Curved actuator
IZMR1S4 OFF - ON

Flat actuator
IZMP1S4 OFF - ON

Also available with straight PC terminals :
IZM•1P4 & quick-connect terminals : **IZM•1Z4**.

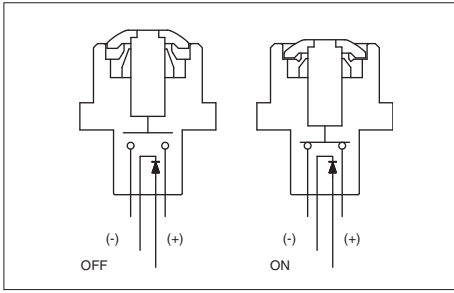


For non-illuminated FLYING LEAD versions, refer to illuminated models above. Non-illuminated have 2 wires only.

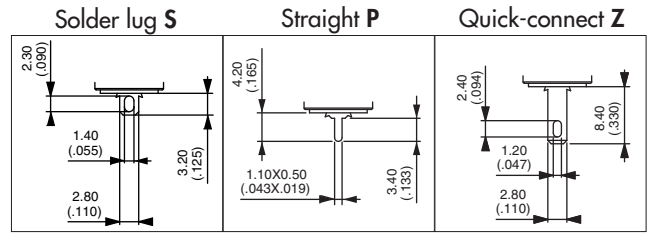
IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - metal - latching

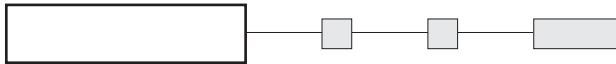
For fixed panel thickness : IZN



- Four LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



Actuator marking available on IZNP models (symbol 10 mm max.). On request.

B1

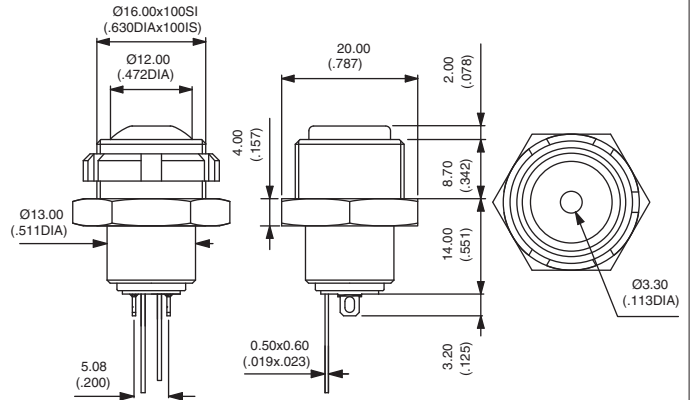
Illuminated - solder lug terminals



Curved actuator
IZNR1S4 OFF - ON

Flat actuator
IZNP1S4 OFF - ON

Also available with straight PC terminals :
IZN•1P4 & quick-connect terminals : **IZN•1Z4**.



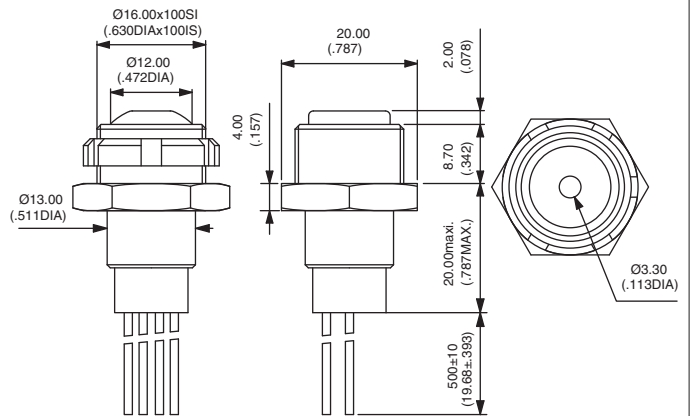
Illuminated - flying lead terminals



Curved actuator
IZNR1F4 OFF - ON

Flat actuator
IZNP1F4 OFF - ON

Wire colours : black : contact,
red : LED anode(+), blue : LED cathode (-)



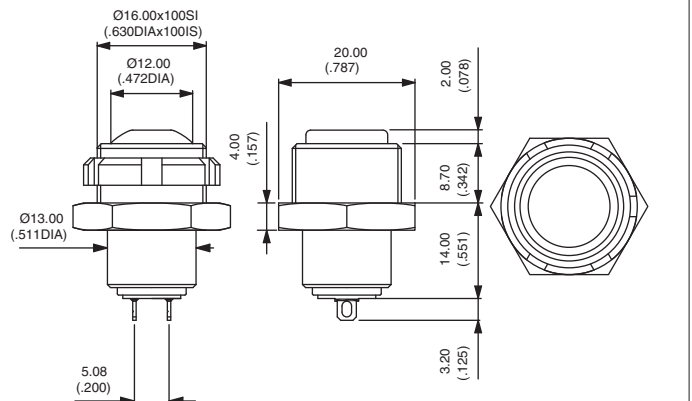
Non-illuminated - solder lug terminals



Curved actuator
IZNR1S4 OFF - ON

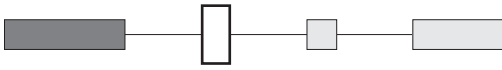
Flat actuator
IZNP1S4 OFF - ON

Also available with straight PC terminals :
IZN•1P4 & quick-connect terminals : **IZN•1Z4**.



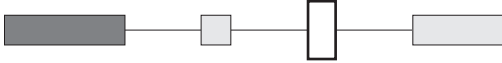
For non-illuminated FLYING LEAD versions, refer to illuminated models above. Non-illuminated have 2 wires only.

ACTUATOR COLOURS



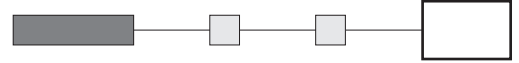
1 : blue - **B** : dark blue - **2** : black - **3** : green - **5** : yellow - **6** : red - **7** : white - **8** : bright chrome - **9** : orange
A : satin chrome

BUSHING AND BEZEL COLOURS



N : nickel plated (standard)
Other : on request.

LED COLOURS



Blank : non-illuminated
LOS : super red - **LOY** : yellow - **LOG** : green
LOB : blue

I^Z series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - momentary

Distinctive features and specifications



- Rear mounting for easier installation
- Momentary models
- Screw version available up to 4A
- Sealed to IP67
- Illuminated or non-illuminated
- Flat actuator for optional marking

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - Gold plated silver contacts (code 4) : 200mA 48VDC
 - Silver contacts (code 2) - screw terminals : 4A 48VDC
- Electrical life at full load : 500.000 cycles
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.000 Vrms 50 Hz

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	2,1V	2,3V
Yellow (LOY)	20mA	2,1V	2,3V
Green (LOG)	20mA	2,1V	2,3V
Blue (LOB)	20mA	3,2V	3,8V
White (LOW)	20mA	3,35V	4,25V

A resistor must be series-connected by the user.

Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

On flying lead versions, the LED resistor can be integrated by APEM on request.

GENERAL SPECIFICATIONS

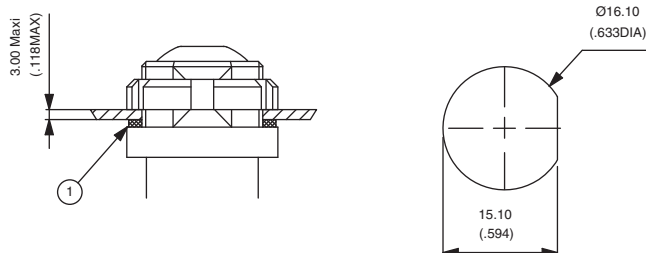
- Panel thickness : 3 mm (.118) max.
- Total travel : 1,8 mm (.070) +/- 0,3 mm
- Typical operating force : 6N +/- 2N
- Low level or mechanical life : 1.000.000 cycles
- Torque : 0,7 Nm max. applied to nut
- Soldering : 320°C max. for 3 sec.

MATERIALS

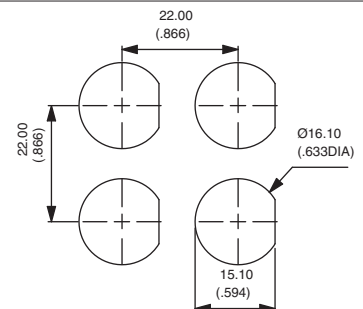
- Case : thermoplastic UL94-V0
- Plunger : polyamide
- Bushing/bezel : polyamide
- Contacts :
 - 4 : silver, gold plated
 - 2 : silver (screw terminals)
- Multi-wire lead AWG20, section 0,6 mm²
- LED wire : AWG26, section 0,12 mm²
- Lens : polycarbonate
- Terminal seal : epoxy (except screw terminals)

PANEL CUT-OUT

① Flat seal



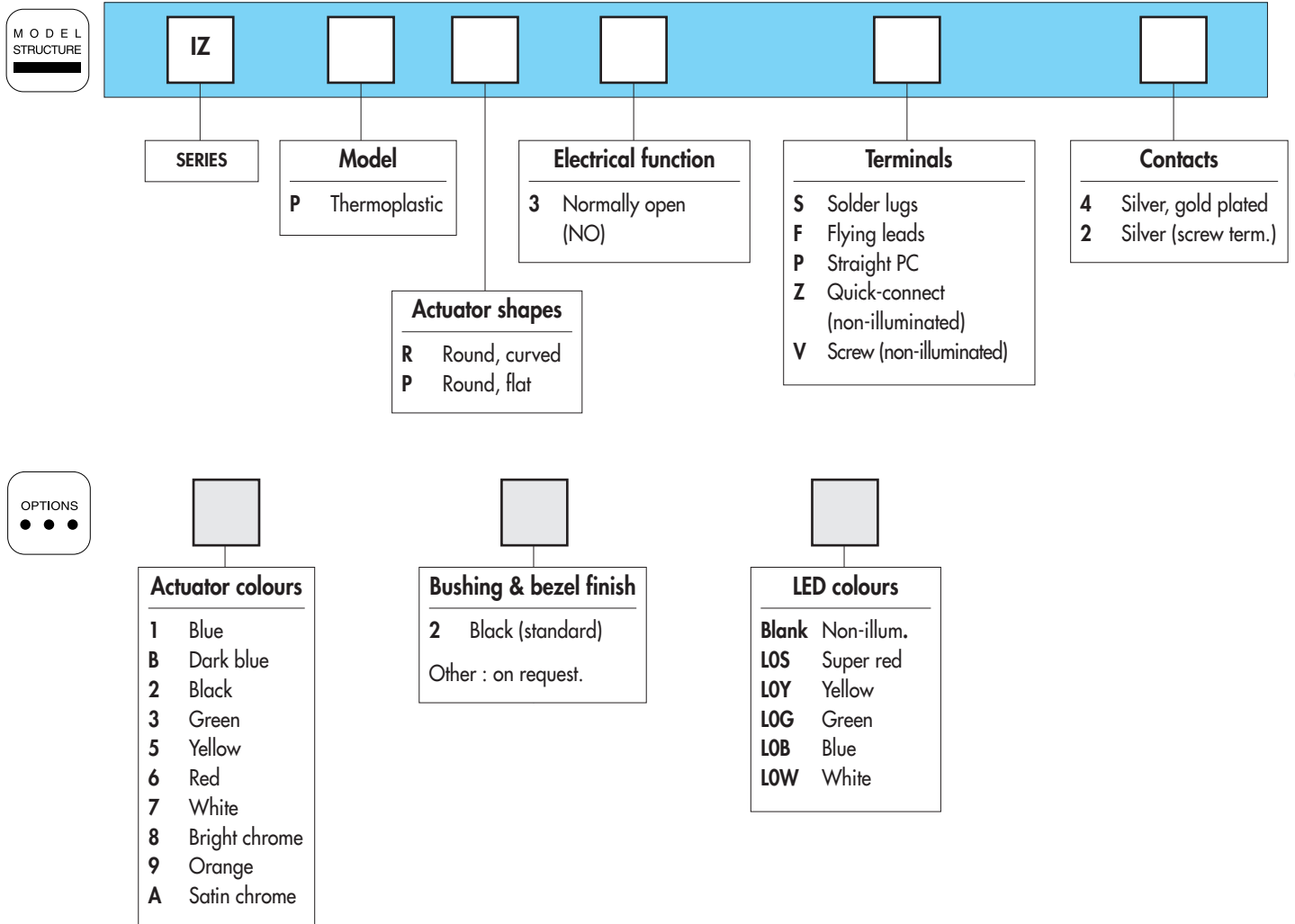
MATRIX MOUNTING



IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - momentary

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



Mounting accessories : Standard hardware supplied : 1 castellated black plastic nut U4249 and 1 silicone flat seal.

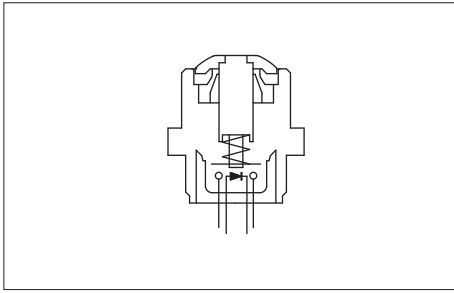


Packaging unit : 25 pieces for flying lead models - 40 pieces for other models

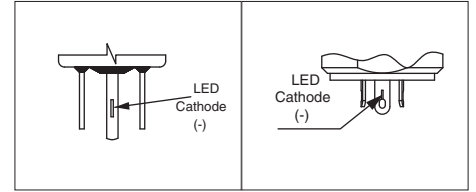
IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - momentary

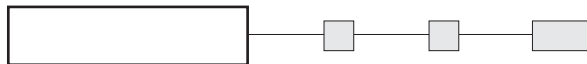
Illuminated



- Five LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



Actuator marking available on IZPP models (symbol 10 mm max.). On request.

B1

Solder lug terminals



Curved actuator
IZPR3S4



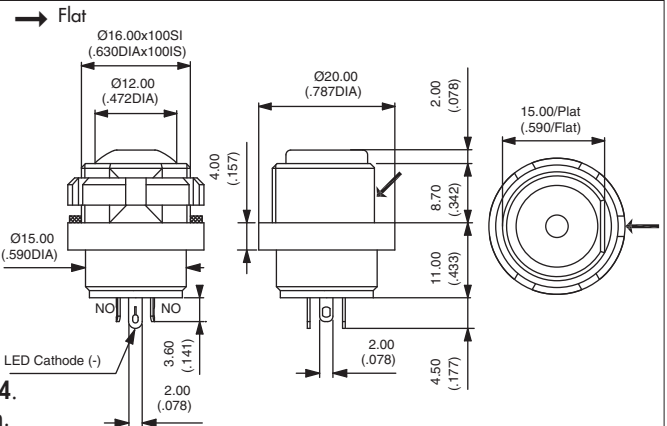
Normally Open

Flat actuator
IZPP3S4



Normally Open

Also available with straight PC terminals : **IZP•3P4**.
LED colour is indicated by the bottom of the switch.



Flying lead terminals - momentary



Curved actuator
IZPR3F4



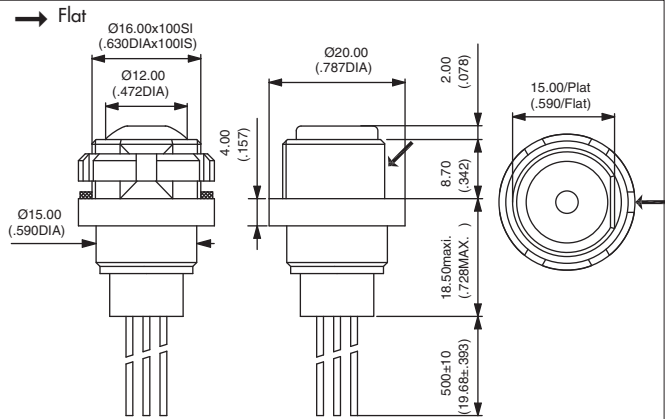
Normally Open

Flat actuator
IZPP3F4



Normally Open

Wire colours : black : NO contact,
red : LED anode(+), blue : LED cathode (-)

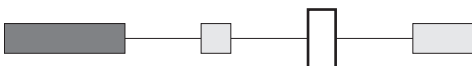


ACTUATOR COLOURS



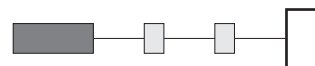
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 8 : bright chrome - 9 : orange
A : satin chrome

BUSHING AND BEZEL COLOURS

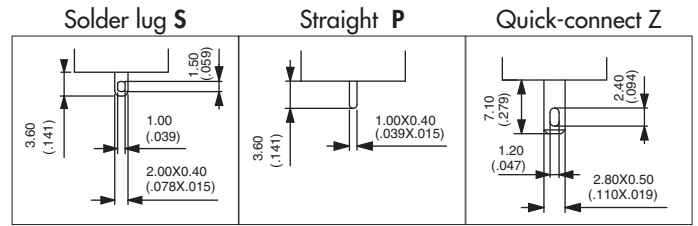
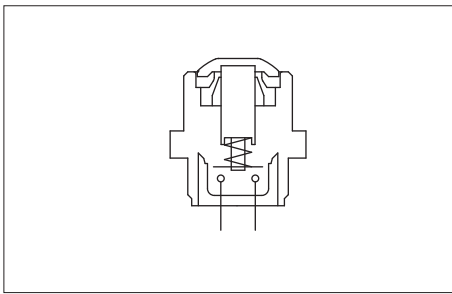


2 : black (standard)
Other : on request.

LED COLOURS



LOS : super red - LOY : yellow - LOG : green
LOB : blue - LOW : white



MODEL
STRUCTURE



Actuator marking available on IZPP models (symbol 10 mm max.). On request.

Solder lug terminals - gold plated contacts



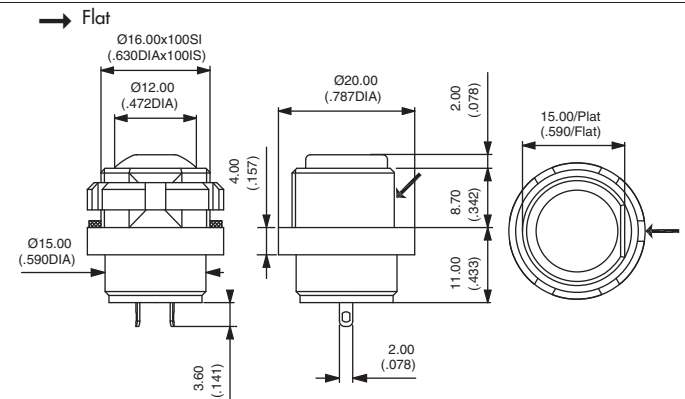
Curved actuator
IZPR3S4



Flat actuator
IZPP3S4



Also available with straight PC terminals :
IZP•3P4 and quick-connect terminals : **IZP•3Z4**.



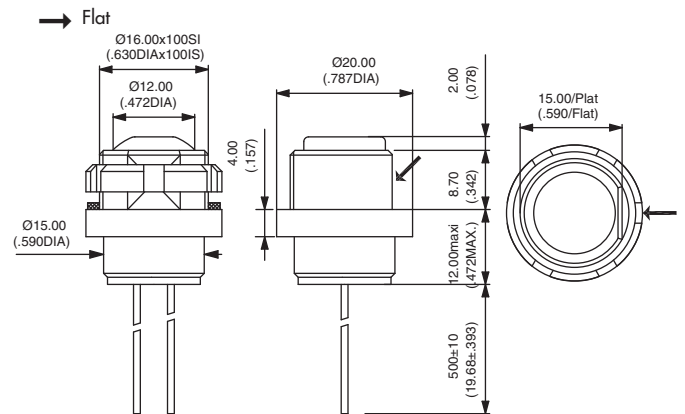
Sealed flying lead terminals - gold plated contacts



Curved actuator
IZPR3F4



Flat actuator
IZPP3F4



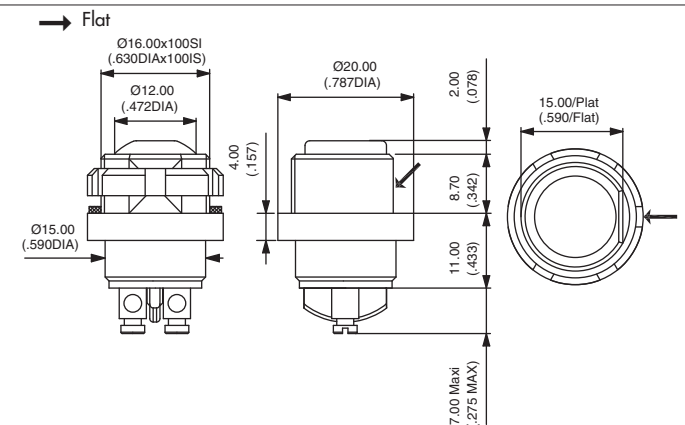
Screw terminals - silver contacts



Curved actuator
IZPR3V2



Flat actuator
IZPP3V2



Actuator colour and bushing/bezel colour : select the desired codes on previous page.

I^Z series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - latching

Distinctive features and specifications



- Rear mounting for easier installation
- Latching action models
- Sealed to IP67
- Illuminated or non-illuminated
- Flat actuator for optional marking

B1

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 100mA 24VDC - 200.000 cycles
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.500 Vrms between terminals

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	1,95V	1,95V
Yellow (LOY)	20mA	2V	2,05V
Green (LOG)	20mA	2,1V	2,5V
Blue (LOB)	20mA	3,2V	4V

A resistor must be series-connected by the user.

Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

On flying lead versions, the LED resistor can be integrated by APEM on request.

GENERAL SPECIFICATIONS

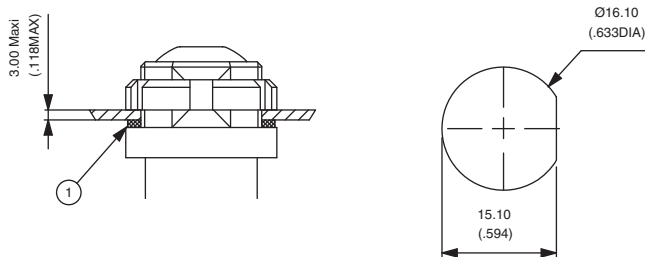
- Panel thickness : 3 mm (.118) max.
- Total travel : 2,5 mm (.098) +/- 0,3 mm
- Typical operating force : 5N +/- 2N
- Low level or mechanical life : 200.000 cycles
- Torque : 0,7 Nm max. applied to nut
- Soldering : 320°C max. for 3 sec.

MATERIALS

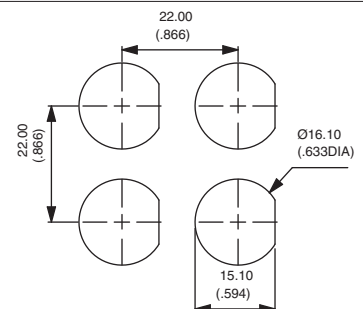
- Case : thermoplastic UL94-V0
- Plunger : polyamide
- Bushing/bezel : polyamide
- Contacts : silver, gold plated
- Multi-wire lead AWG20, section 0,6 mm²
- LED wire : AWG26, section 0,12 mm²
- Lens : polycarbonate
- Terminal seal : epoxy

PANEL CUT-OUT

① Flat seal



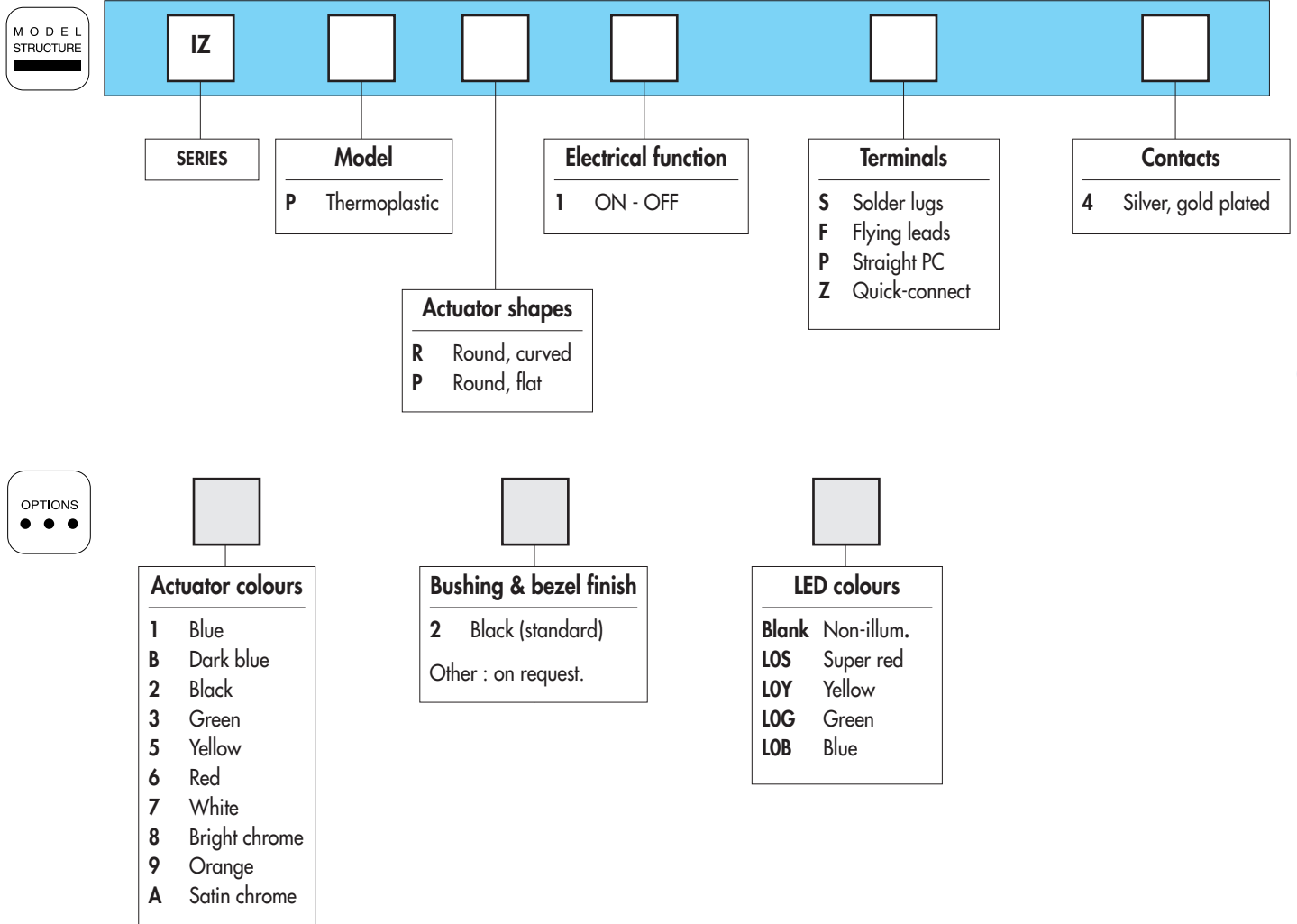
MATRIX MOUNTING



IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - latching

Distinctive features and specifications



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



Mounting accessories : Standard hardware supplied : 1 castellated black plastic nut U4249 and 1 silicone flat seal.

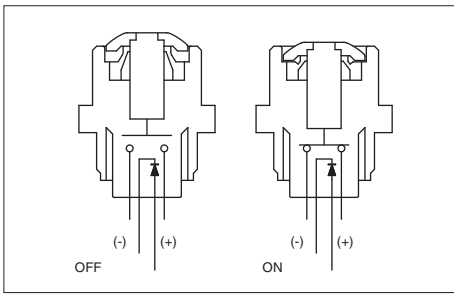


Packaging unit : 25 pieces for flying lead models - 40 pieces for other models

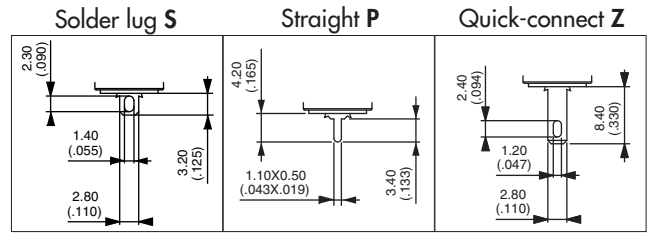
IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - latching

Illuminated



- Four LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



Actuator marking available on IZPP models (symbol 10 mm max.). On request.

Solder lug terminals



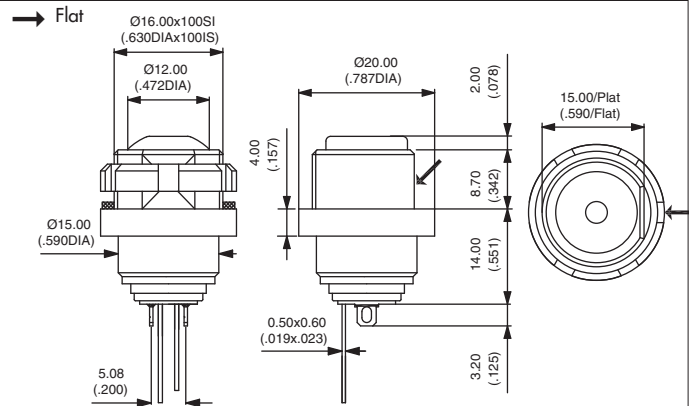
Curved actuator
IZPR1S4

ON - OFF

Flat actuator
IZPP1S4

ON - OFF

Also available with straight PC terminals : **IZP•1P4** and quick-connect terminals : **IZP•1Z4**.



Sealed flying lead terminals



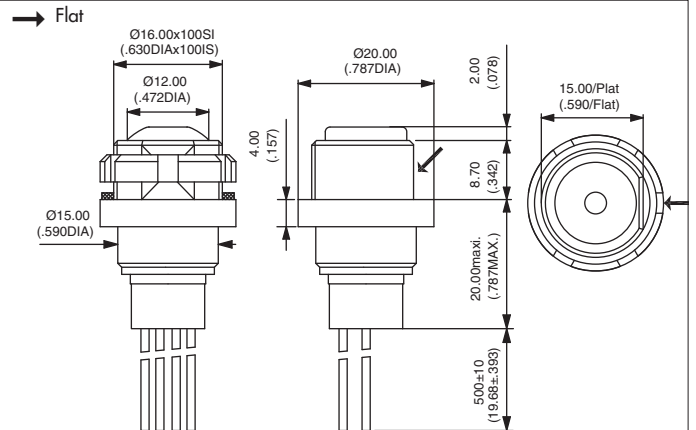
Curved actuator
IZPR1F4

ON - OFF

Flat actuator
IZPP1F4

ON - OFF

Wire colours : black : NO contact,
red : LED anode(+), blue : LED cathode (-)

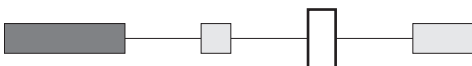


ACTUATOR COLOURS



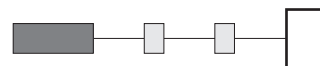
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 8 : bright chrome - 9 : orange
A : satin chrome

BUSHING AND BEZEL COLOURS



2 : black (standard)
Other : on request.

LED COLOURS

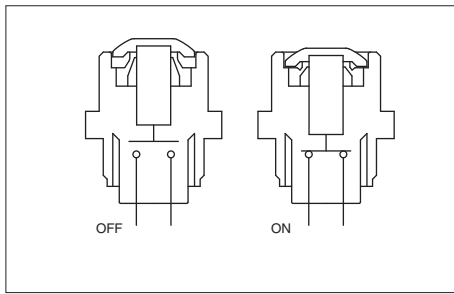


LOS : super red - LOY : yellow - LOG : green
LOB : blue

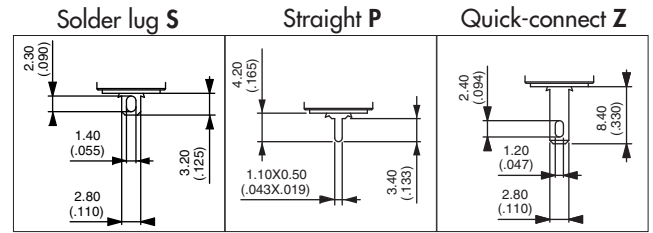
IZ series

Rear mounted sealed pushbutton switches - bushing Ø 16 mm - latching

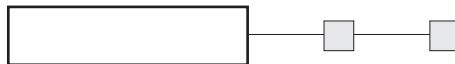
Non-illuminated



- Gold plated contacts



MODEL STRUCTURE



Actuator marking available on IZPP models (symbol 10 mm max.). On request.

Solder lug terminals



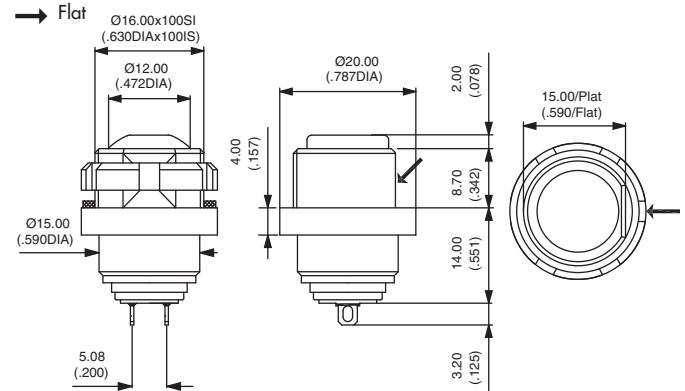
Curved actuator
IZPR1S4

ON - OFF

Flat actuator
IZPP1S4

ON - OFF

Also available with straight PC terminals : **IZP•1P4** and quick-connect terminals : **IZP•1Z4**.



Sealed flying lead terminals

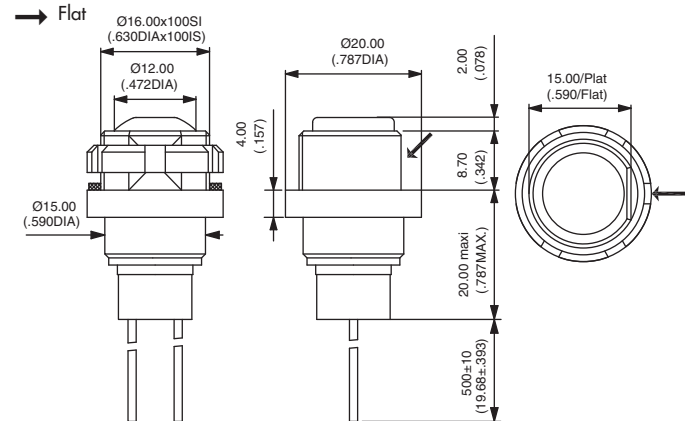


Curved actuator
IZPR1F4

ON - OFF

Flat actuator
IZPP1F4

ON - OFF



ACTUATOR COLOURS



1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 8 : bright chrome - 9 : orange
A : satin chrome

BUSHING AND BEZEL COLOURS



2 : black (standard)
Other : on request.

IR series

Sealed pushbutton switches - bushing \varnothing 16 mm - momentary

Distinctive features

The IR series is a range of sealed momentary pushbutton switches with dia. 16 mm bushing. This series is divided into 2 families : standard models and microswitch technology models.

Common features

- Sealed to IP67
- Illuminated or non-illuminated
- Tactile feedback
- Square or round actuator
- Wide choice of bezel and actuator colours
- Wide choice of illumination colours

Standard versions

- Numerous terminal options : solder, flying lead, straight PC, quick-connect, screw
- Screw versions withstanding up to 4A
- Electrical function : NO (2 terminals)



NO - Screw terminals



NO - Illuminated
Flying lead terminals



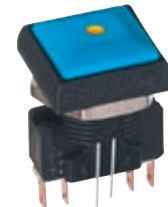
NO - Solder lug
terminals

Microswitch versions

- Withstanding up to 5A
- Two electrical functions :
NC+NO (3 terminals)
NC/NO combined (4 terminals)



NC+NO - 3 terminals



NC/NO - 4 terminals - Illuminated

Optional marking

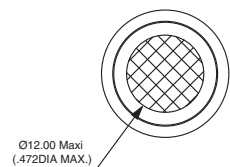
Actuator marking is available on request for models with flat round actuator.



Standard version

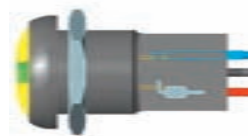


Microswitch version



Integrated resistor

On wire lead illuminated versions, the LED resistor can be integrated in the product by APEM. On request.





- Screw version up to 4A
- Tactile feedback
- Sealed to IP67
- Illuminated or non-illuminated
- Flat round actuator for optional marking

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - Gold plated silver contacts (code 4) : 200mA 48VDC
 - Silver contacts (code 2) - screw terminals : 4A 48VDC
- Electrical life at full load : 500.000 cycles
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.500 Vrms

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	2,1V	2,3V
Yellow (LOY)	20mA	2,1V	2,3V
Green (LOG)	20mA	2,1V	2,3V
Blue (LOB)	20mA	3,2V	3,8V
White (LOW)	20mA	3,35V	4,25V

A resistor must be series-connected by the user.

Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

On flying lead versions, the LED resistor can be integrated by APEM on request.

GENERAL SPECIFICATIONS

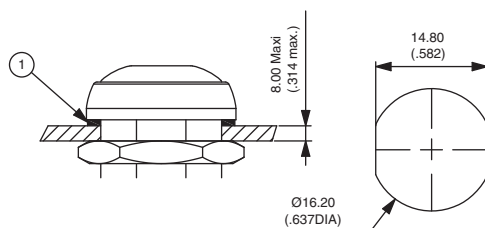
- Panel thickness : 8 mm (.314) max.
- Total travel : 1,6 mm (.062) +/- 0,3 mm
- Typical operating force : 4N +/- 2N
- Low level or mechanical life : 1.000.000 cycles
- Torque : 0,8 Nm max. applied to nut
- Soldering : 320°C max. for 3 sec.

MATERIALS

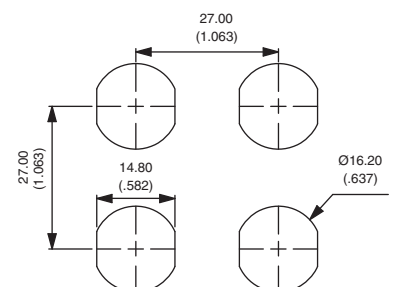
- Case : thermoplastic UL94-V0
- Actuator : polyamide 6/6
- Bushing/bezel : polyamide 6/6
- Contacts :
 - 4 : silver, gold plated
 - 2 : silver (screw terminals)
- Multi-wire lead AWG20, section 0,6 mm²
- LED wire : AWG26, section 0,12 mm²
- Lens : polycarbonate
- Terminal seal : epoxy

PANEL CUT-OUT

① Flat seal



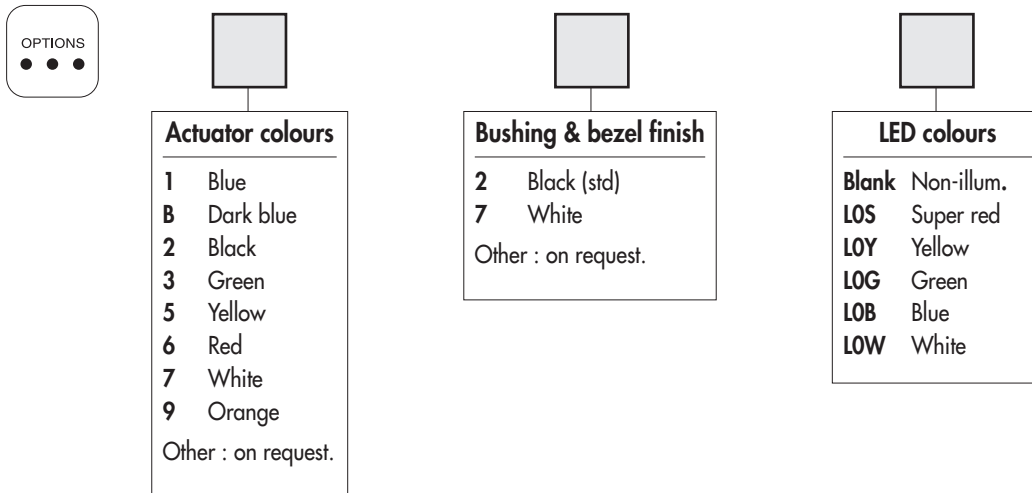
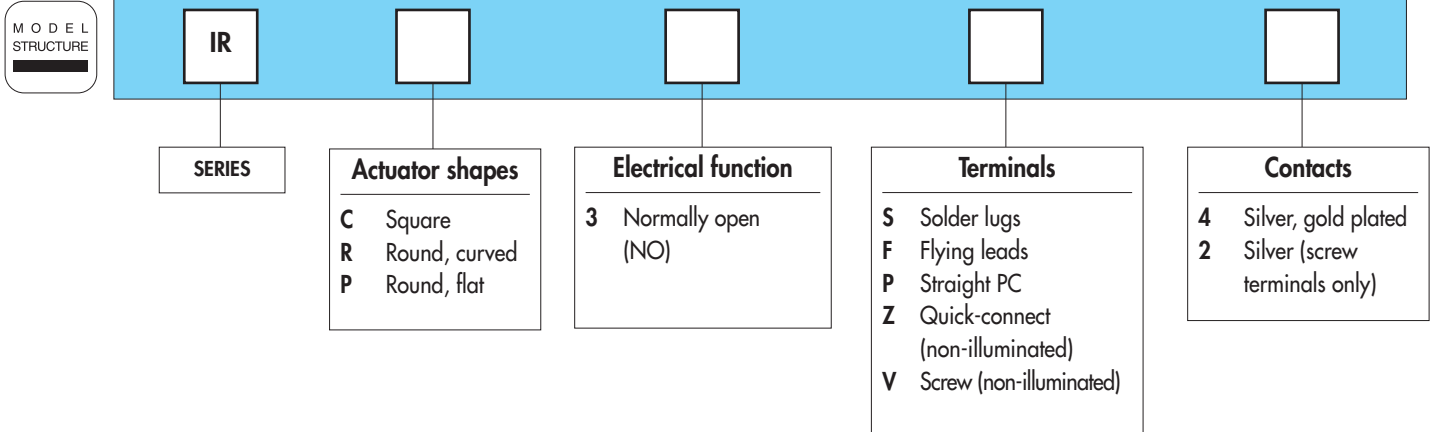
MATRIX MOUNTING



IR series

Sealed pushbutton switches - bushing Ø 16 mm - momentary - standard version

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
 model structure of switches and options in the same order as in above chart

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



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



Mounting accessories : Standard hardware supplied : 1 hex nut 19 mm (.748) across flats and 1 flat seal
 Hex nut P/N U4116.

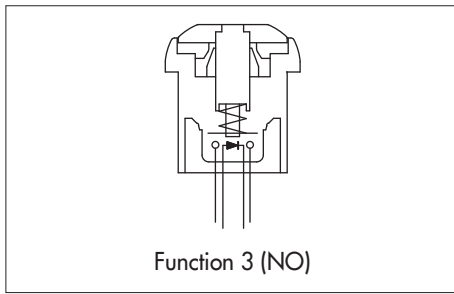


Packaging unit : 25 pieces for flying lead models - 40 pieces for other models

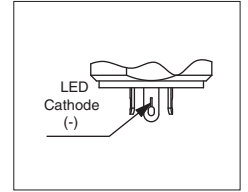
IR series

Sealed pushbutton switches - bushing Ø 16 mm - momentary - standard version

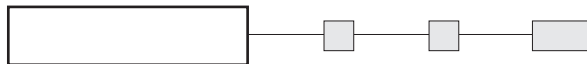
Round - illuminated



- Five LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



Actuator marking available on IRP models (symbol 12 mm max.). On request.

Solder lug terminals

→ Flat



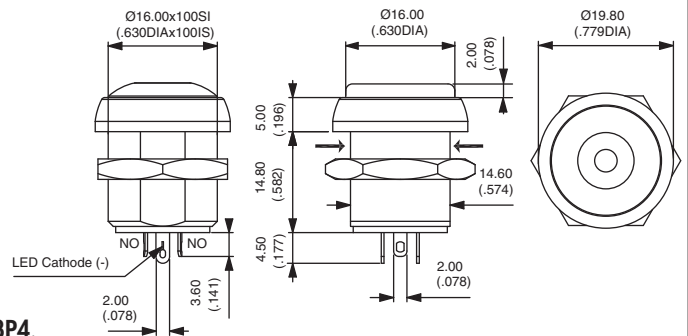
Curved actuator
IRR3S4

Normally Open

Flat actuator
IRP3S4

Normally Open

Also available with straight PC terminals : **IR•3P4**.
LED colour is indicated by the bottom of the switch.



Sealed flying lead terminals

→ Flat



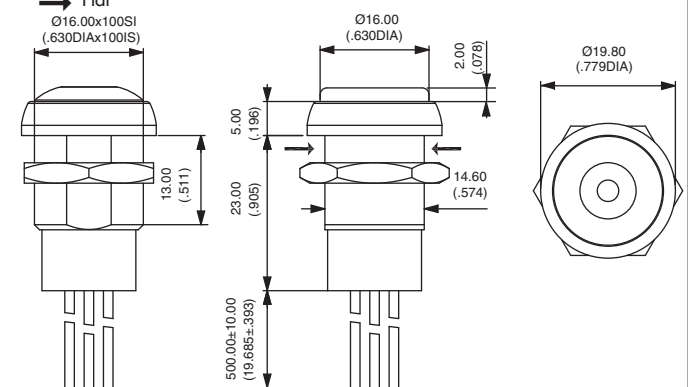
Curved actuator
IRR3F4

Normally Open

Flat actuator
IRP3F4

Normally Open

Wire colours : black : NO contact,
red : LED anode (+), blue : LED cathode (-)

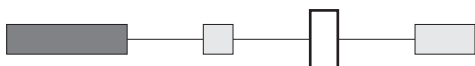


ACTUATOR COLOURS



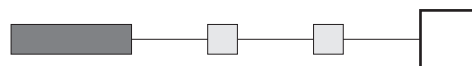
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange

BUSHING AND BEZEL FINISH



2 : black (standard) - 7 : white

LED COLOURS

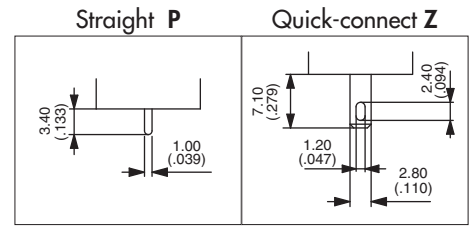
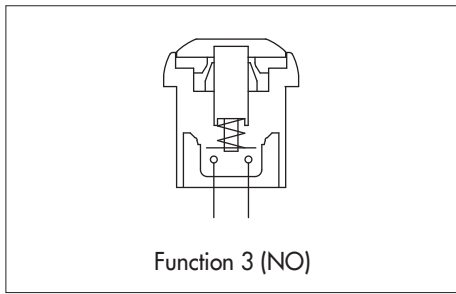


LOS : super red - LOY : yellow - LOG : green - LOB : blue
LOW : white

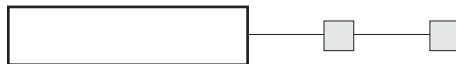
IR series

Sealed pushbutton switches - bushing Ø 16 mm - momentary - standard version

Round - non-illuminated



MODEL STRUCTURE



Actuator marking available on IRP models (symbol 12 mm max.). On request.

Solder lug terminals - gold plated contacts



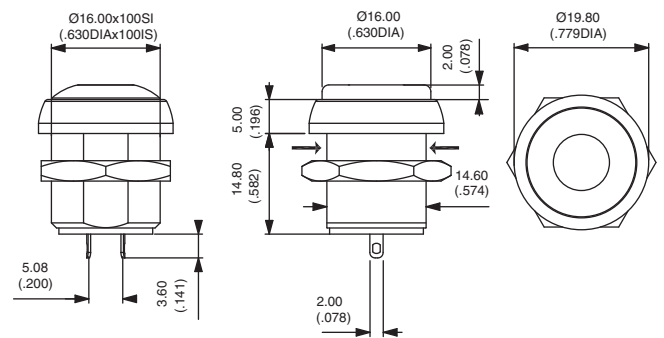
Curved actuator
IRR3S4



Flat actuator
IRP3S4



→ Flat



Also available with straight PC terminals :
IR•3P4 and quick-connect terminals : **IR•3Z4**.

Sealed flying lead terminals - gold plated contacts



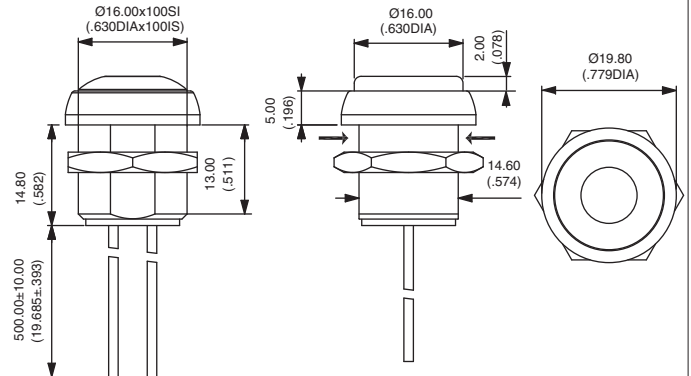
Curved actuator
IRR3F4



Flat actuator
IRP3F4



→ Flat



Screw terminals - silver contacts



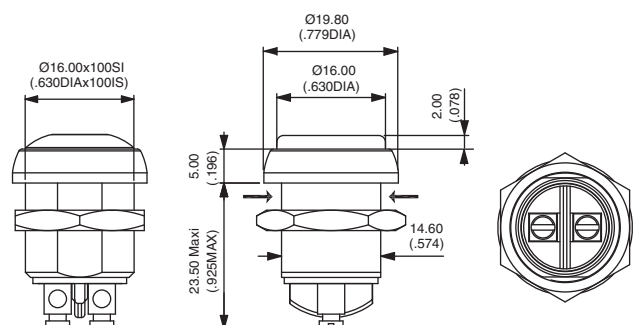
Curved actuator
IRR3V2



Flat actuator
IRP3V2



→ Flat

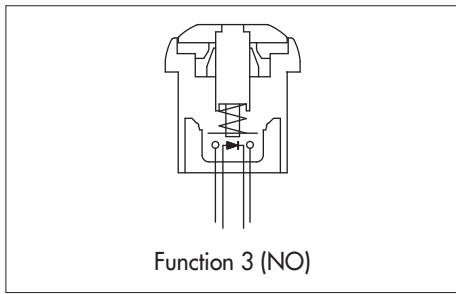


Actuator colour and bushing/bezel finish : select the desired codes on previous page.

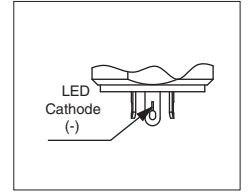
IR series

Sealed pushbutton switches - bushing \varnothing 16 mm - momentary - standard version

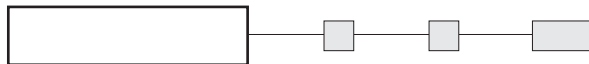
Square - illuminated



- Five LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



Solder lug terminals



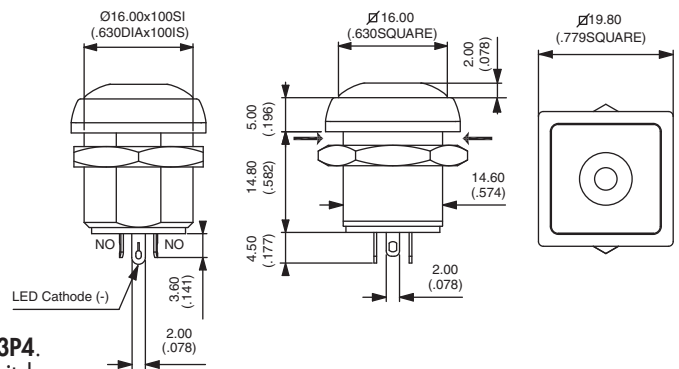
IRC3S4



Normally Open

Also available with straight PC terminals : **IRC3P4**.
LED colour is indicated by the bottom of the switch.

→ Flat



Sealed flying lead terminals



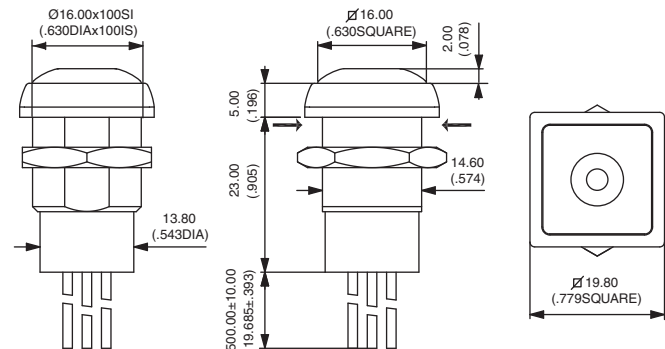
IRC3F4



Normally Open

Wire colours : black : NO contact,
red : LED anode (+), blue : LED cathode (-)

→ Flat

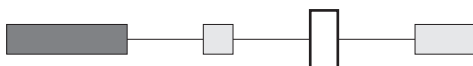


ACTUATOR COLOURS



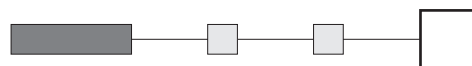
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange

BUSHING AND BEZEL FINISH



2 : black (standard) - 7 : white

LED COLOURS

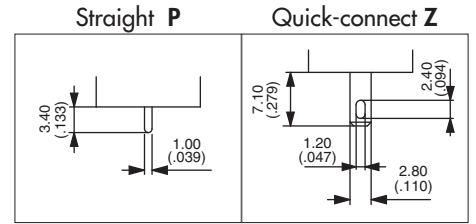
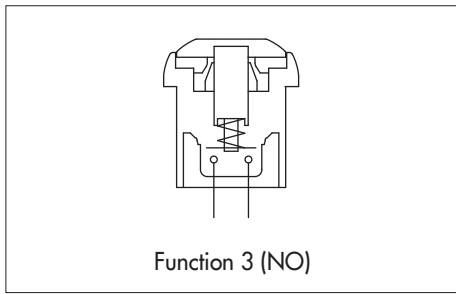


LOS : super red - LOY : yellow - LOG : green - LOB : blue
LOW : white

IR series

Sealed pushbutton switches - bushing \varnothing 16 mm - momentary - standard version

Square - non-illuminated



MODEL STRUCTURE



B1

Solder lug terminals - gold plated contacts

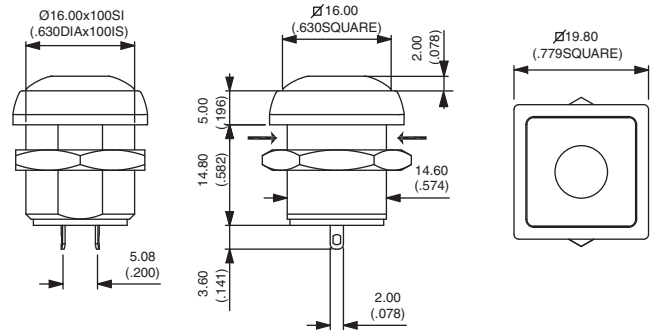


IRC3S4



Normally Open

→ Flat



Also available with straight PC terminals : IRC3P4 or quick-connect terminals : IRC3Z4.

Sealed flying lead terminals - gold plated contacts

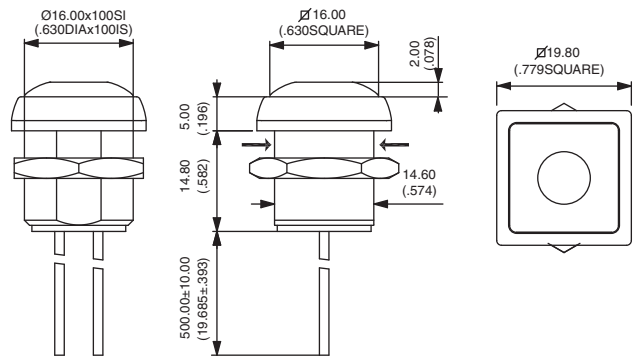


IRC3F4



Normally Open

→ Flat



Screw terminals - silver contacts

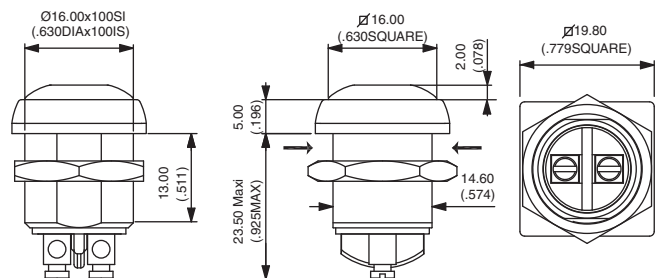


IRC3V2

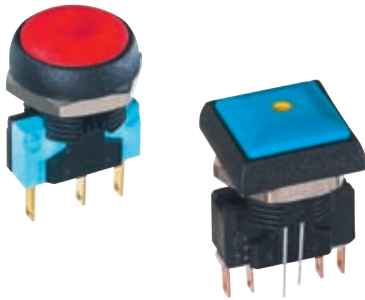


Normally Open

→ Flat



Actuator colour and bushing/bezel finish : select the desired codes on previous page.



- Microswitch technology up to 5A
- Tactile feedback
- Sealed to IP67
- Illuminated or non-illuminated
- Flat round actuator for optional marking

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -20°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
5A 250VAC, 50.000 cycles (function 7)
5A 250VAC, 25.000 cycles (function 8)
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 750 Vrms between terminals
2.000 Vrms between terminals and frame

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	2V	2,5V
Yellow (LOY)	20mA	2V	2,5V
Green (LOG)	10mA	2V	2,5V
Blue (LOB)	10mA	3,3V	3,8V

A resistor must be series-connected by the user.
Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

GENERAL SPECIFICATIONS

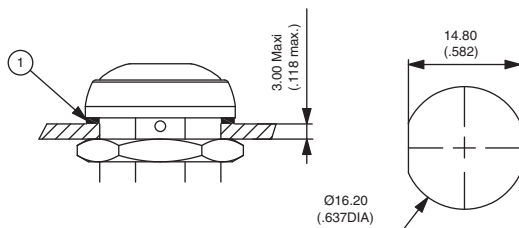
- Panel thickness : 3 mm (.118) max.
- Total travel : 1,6 mm (.062) +/- 0,3 mm
- Typical operating force : 4N +/- 2N
- Mechanical life : 1.000.000 cycles
- Torque : 0,8 Nm max. applied to nut
- Soldering : 320°C max. for 3 sec.

MATERIALS

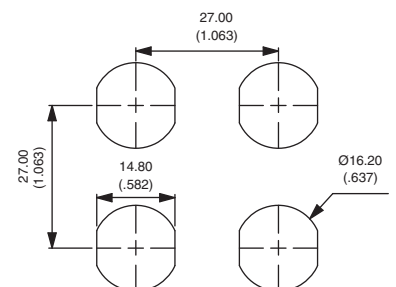
- Case : thermoplastic UL94-V0
- Actuator : polyamide 6/6
- Bushing/bezel : polyamide 6/6
- Contacts : silver
- Lens : polycarbonate

PANEL CUT-OUT

① Flat seal



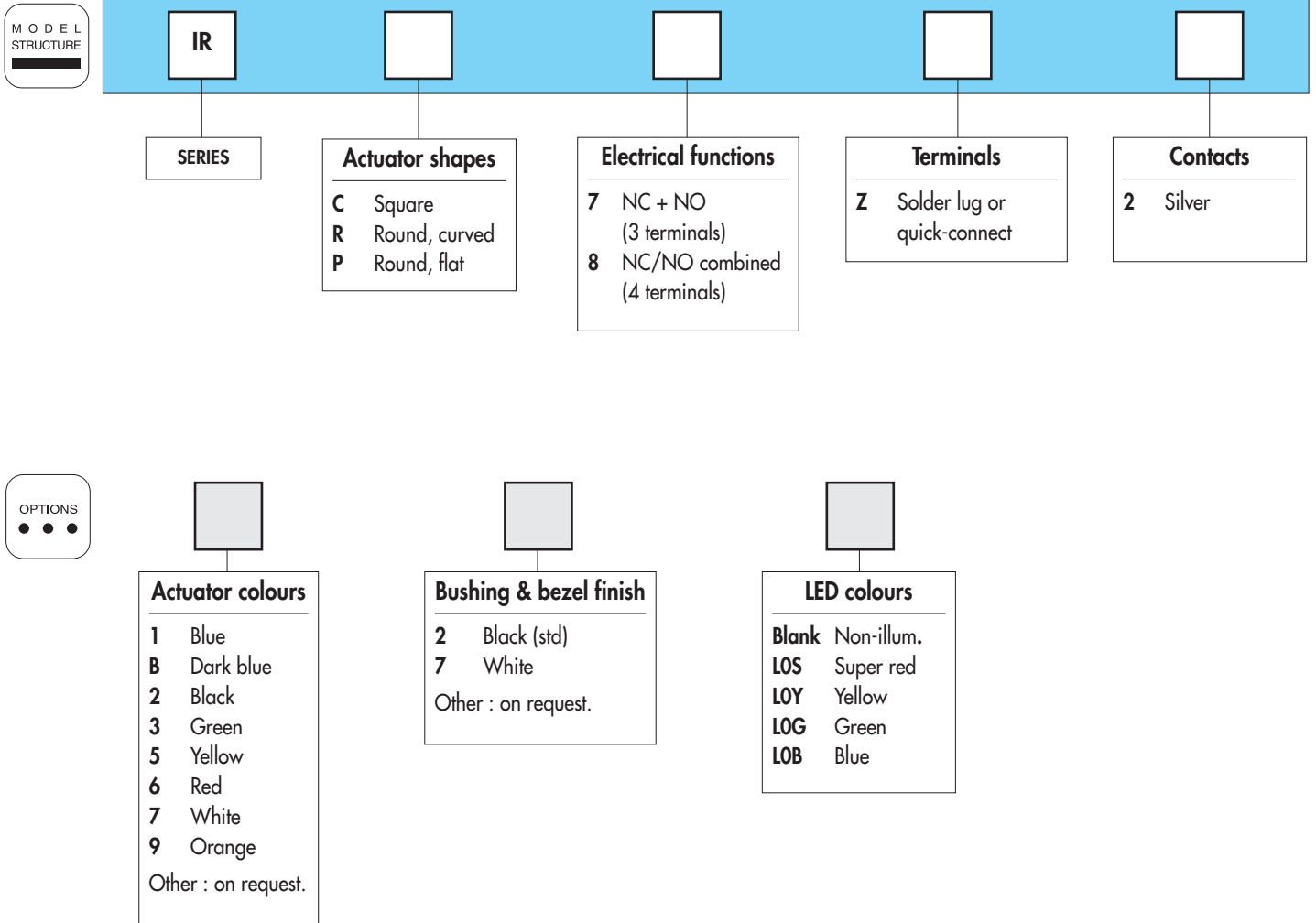
MATRIX MOUNTING



IR series

Sealed pushbutton switches - bushing Ø 16 mm - momentary - microswitch version

Overview



The IR series for high currents is based on a microswitch. Please note that this microswitch is supplied separately.

ABOUT THIS SERIES

On the following pages, you will find successively :
 model structure of switches and options in the same order as in above chart

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



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



Mounting accessories : Standard hardware supplied : 1 hex nut 19 mm (.748) across flats and 1 flat seal.
 Hex nut P/N : U4116

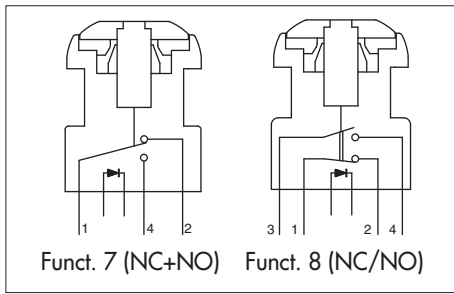


Packaging unit : 25 pieces for flying lead models - 40 pieces for other models

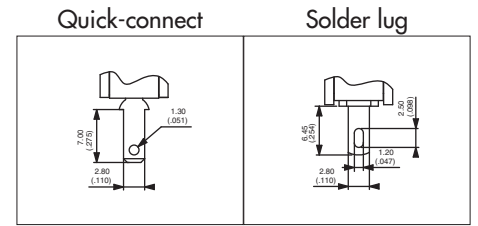
IR series

Sealed pushbutton switches - bushing Ø 16 mm - momentary - microswitch version

Round - illuminated

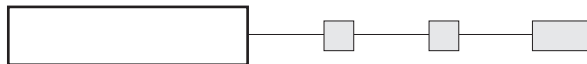


- Four LED colours
- Tin plated LED terminals
- Silver contacts



Funct. 7 (3 terminals) Funct. 8 (4 terminals)

MODEL STRUCTURE

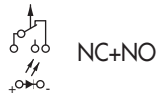


Actuator marking available on IRP models (symbol 12 mm max.). On request.

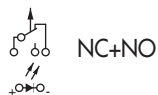
Quick-connect terminals - NC+NO - 3 terminals



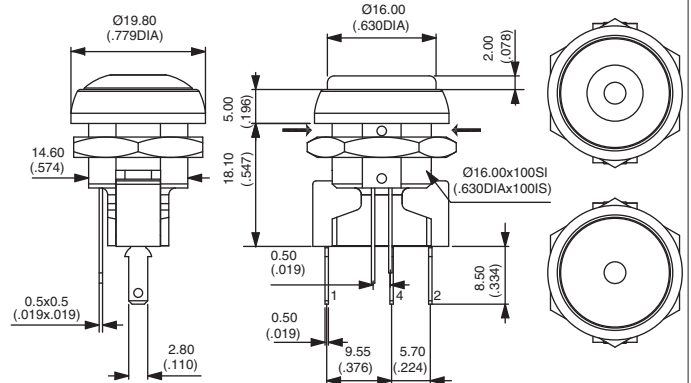
Curved actuator
IRR7Z2



Flat actuator
IRP7Z2



→ Flat



Solder lug terminals - NC/NO - 4 terminals



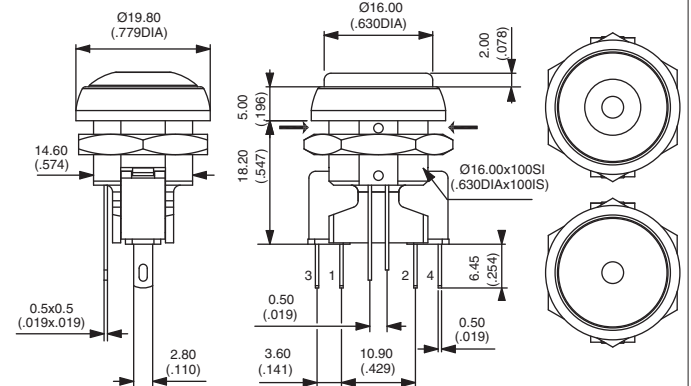
Curved actuator
IRR8Z2



Flat actuator
IRP8Z2



→ Flat



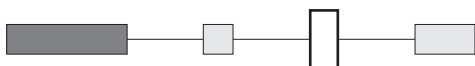
Terminals should be used as solder lugs only.

ACTUATOR COLOURS



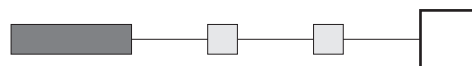
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange

BUSHING AND BEZEL FINISH



2 : black (standard) - 7 : white

LED COLOURS

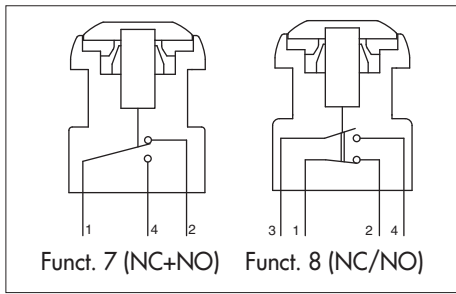


LOS : super red - LOY : yellow - LOG : green - LOB : blue

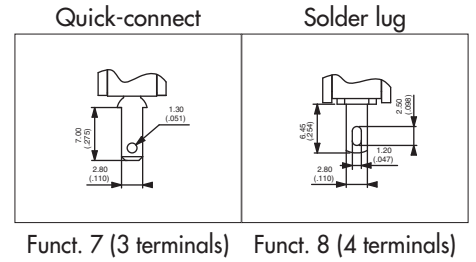
IR series

Sealed pushbutton switches - bushing Ø 16 mm - momentary - microswitch version

Round - non-illuminated



• Silver contacts



MODEL STRUCTURE



Actuator marking available on IRP models (symbol 12 mm max.). On request.

B1

Quick-connect terminals - NC+NO - 3 terminals



Curved actuator
IRR7Z2



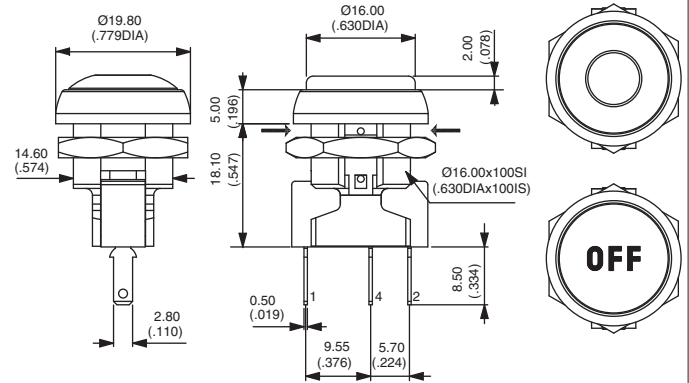
NC+NO

Flat actuator
IRP7Z2



NC+NO

→ Flat



Solder lug terminals - NC/NO - 4 terminals



Curved actuator
IRR8Z2



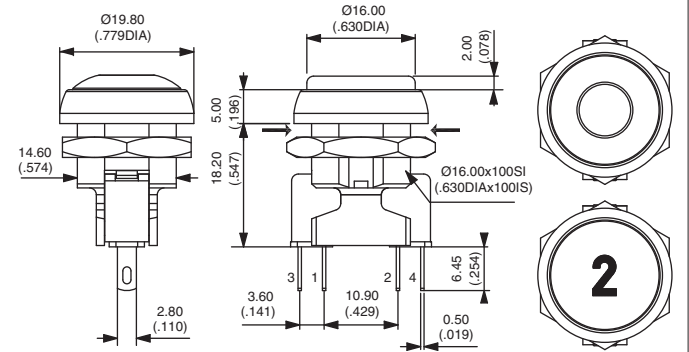
NC/NO combined

Flat actuator
IRP8Z2



NC/NO combined

→ Flat



Terminals should be used as solder lugs only.

ACTUATOR COLOURS



1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange

BUSHING AND BEZEL FINISH

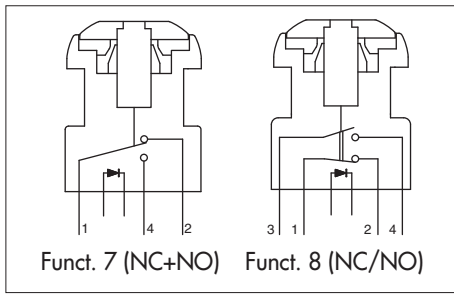


2 : black (standard) - 7 : white

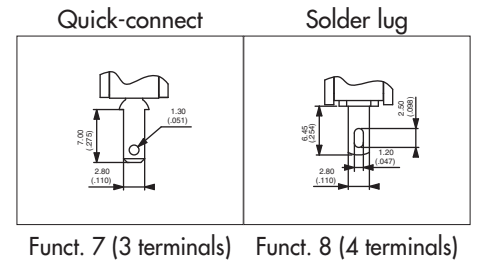
IR series

Sealed pushbutton switches - bushing Ø 16 mm - momentary - microswitch version

Square - illuminated

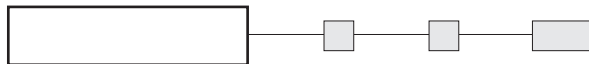


- Four LED colours
- Tin plated LED terminals
- Silver contacts



Funct. 7 (3 terminals) Funct. 8 (4 terminals)

MODEL
STRUCTURE

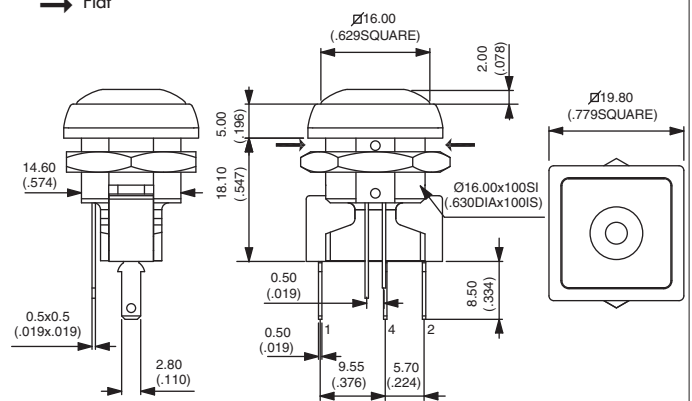
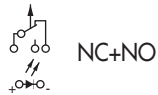


Quick-connect terminals - NC+NO - 3 terminals

→ Flat



IRC7Z2

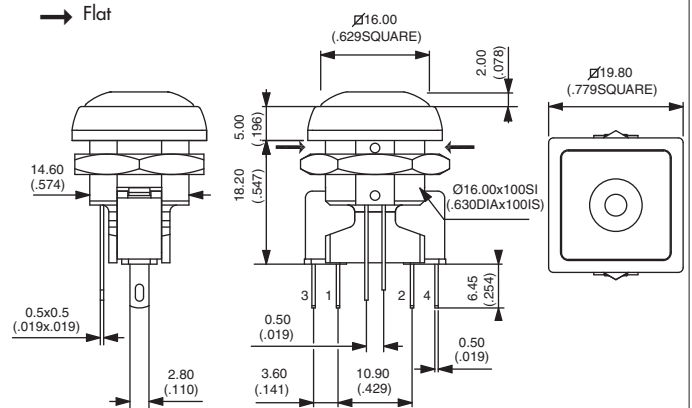


Solder lug terminals - NC/NO - 4 terminals

→ Flat



IRC8Z2



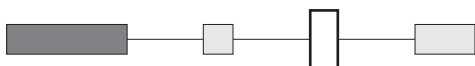
Terminals should be used as solder lugs only.

ACTUATOR COLOURS



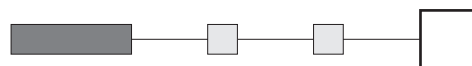
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange

BUSHING AND BEZEL FINISH



2 : black (standard) - 7 : white

LED COLOURS

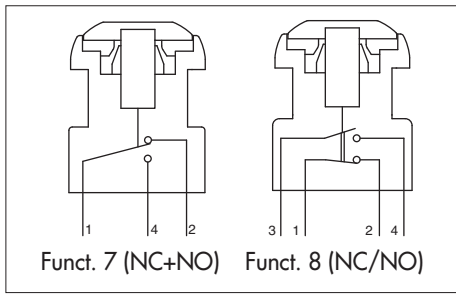


LOS : super red - LOY : yellow - LOG : green - LOB : blue

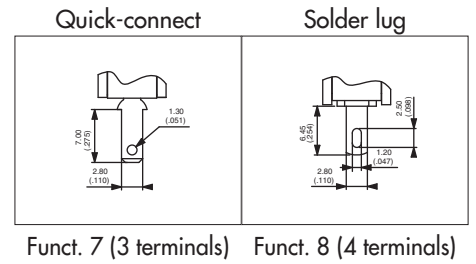
IR series

Sealed pushbutton switches - bushing Ø 16 mm - momentary - microswitch version

Square - non-illuminated



• Silver contacts



MODEL STRUCTURE



B1

Quick-connect terminals - NC+NO - 3 terminals

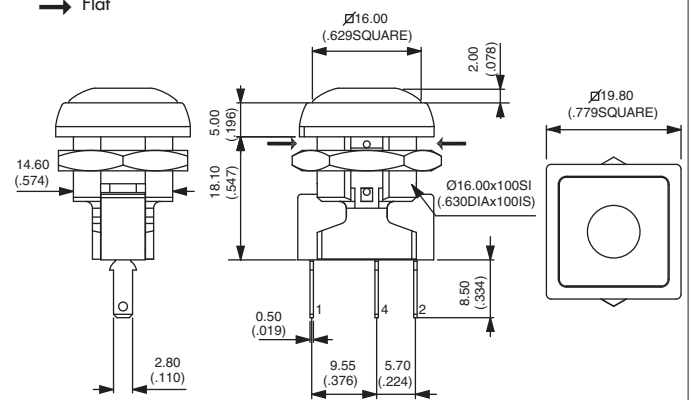


IRC7Z2



NC+NO

→ Flat



Solder lug terminals - NC/NO - 4 terminals

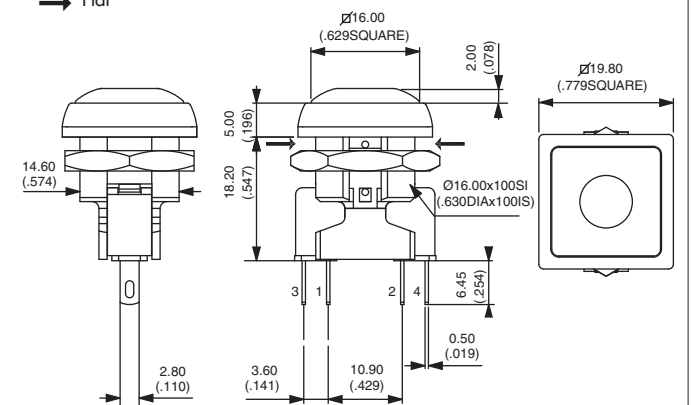


IRC8Z2



NC/NO combined

→ Flat



Terminals should be used as solder lugs only.

ACTUATOR COLOURS



1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 9 : orange

BUSHING AND BEZEL FINISH



2 : black (standard) - 7 : white

IR series

Sealed pushbutton switches - bushing Ø 16 mm - latching

Distinctive features and specifications



- Latching action models
- Sealed to IP67
- Illuminated or non-illuminated
- Flat round actuator for optional marking

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 100mA 24VDC - 200.000 cycles
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.500 Vrms between terminals

LED COMPONENT SPECIFICATIONS

LED colour	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20mA	1,95V	1,95V
Yellow (LOY)	20mA	2V	2,05V
Green (LOG)	20mA	2,1V	2,5V
Blue (LOB)	20mA	3,2V	4V

A resistor must be series-connected by the user.

Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

On flying lead versions, the LED resistor can be integrated by APEM on request.

GENERAL SPECIFICATIONS

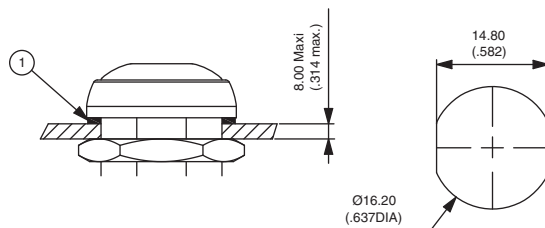
- Panel thickness : 8 mm (.314) max.
- Total travel : 2,5 mm (.098) +/- 0,3 mm
- Typical operating force : 5N +/- 2N
- Low level or mechanical life : 200.000 cycles
- Torque : 0,8 Nm max. applied to nut
- Soldering : 320°C max. for 3 sec.

MATERIALS

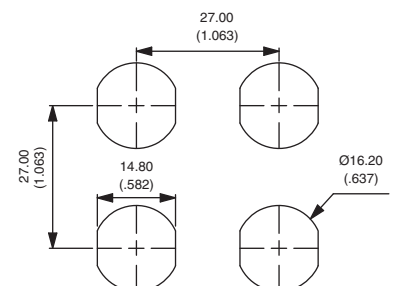
- Case : thermoplastic UL94-V0
- Plunger : polyamide
- Bushing/bezel : polyamide
- Contacts : silver, gold plated
- Multi-wire lead AWG20, section 0,6 mm²
- LED wire : AWG26, section 0,12 mm²
- Lens : polycarbonate
- Terminal seal : epoxy

PANEL CUT-OUT

① Flat seal



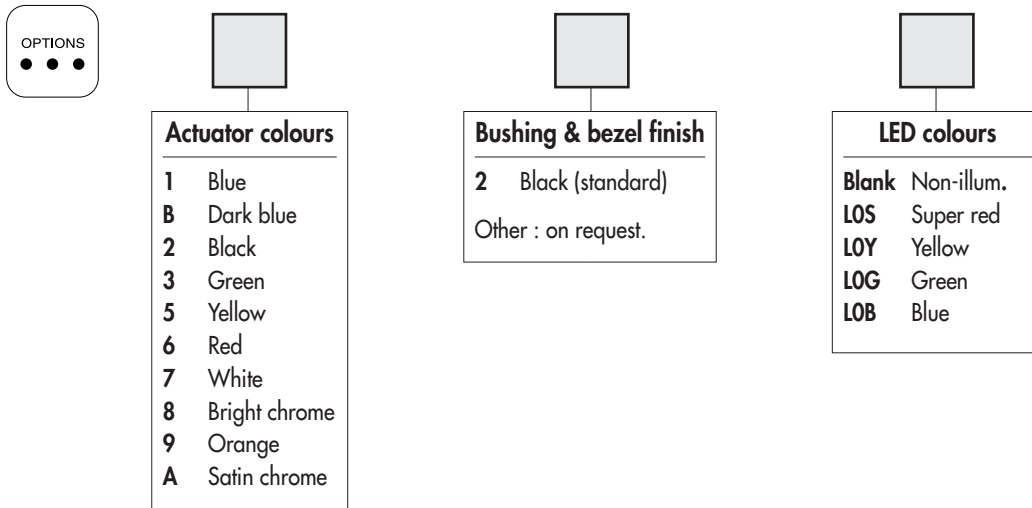
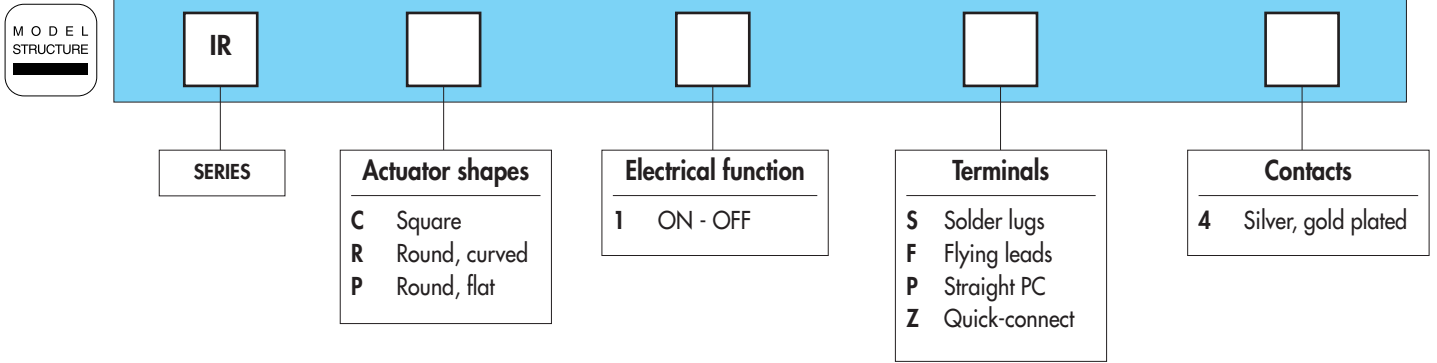
MATRIX MOUNTING



IR series

Sealed pushbutton switches - bushing Ø 16 mm - latching

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



Mounting accessories : Standard hardware supplied : 1 hex nut 19 mm (.748) across flats and 1 flat seal
Hex nut P/N U4116.

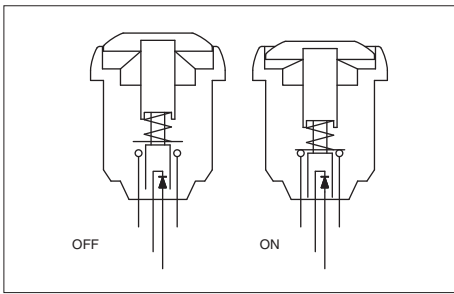


Packaging unit : 25 pieces for flying lead models - 40 pieces for other models

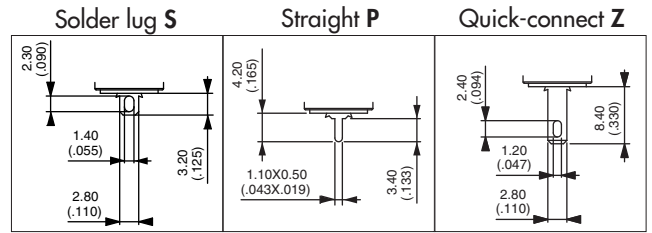
IR series

Sealed pushbutton switches - bushing Ø 16 mm - latching

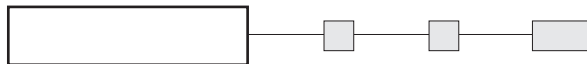
Round - illuminated



- Four LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



Plunger marking available on IRP models (symbol 12 mm max.). On request.

Solder lug terminals



Curved actuator
IRR1S4

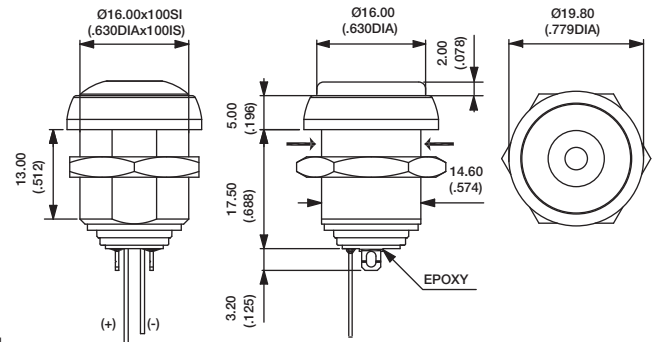
OFF - ON

Flat actuator
IRP1S4

OFF - ON

Also available with straight PC terminals : **IR•1P4**
& quick-connect terminals : **IR•1Z4**.

→ Flat



Sealed flying lead terminals



Curved actuator
IRR1F4

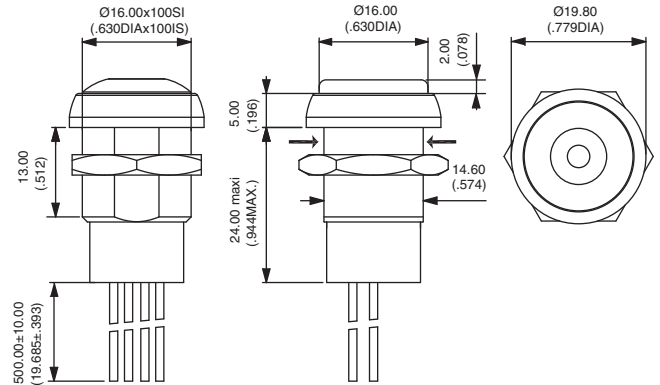
OFF - ON

Flat actuator
IRP1F4

OFF - ON

Wire colours : black : contact,
red : LED anode (+), blue : LED cathode (-)

→ Flat

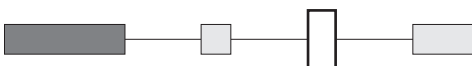


ACTUATOR COLOURS



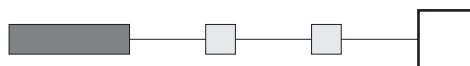
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 8 : bright chrome - 9 : orange
A : satin chrome

BUSHING AND BEZEL FINISH



2 : black (standard)

LED COLOURS

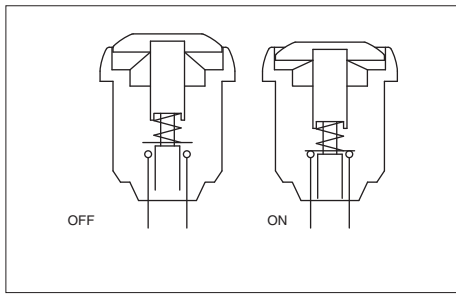


LOS : super red - LOY : yellow - LOG : green - LOB : blue

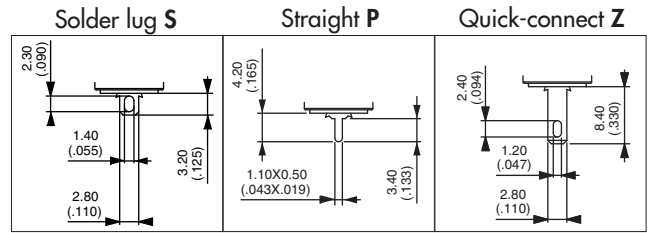
IR series

Sealed pushbutton switches - bushing Ø 16 mm - latching

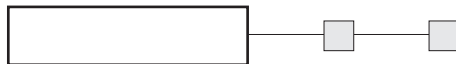
Round - non-illuminated



- Gold plated contacts



MODEL STRUCTURE



Plunger marking available on IRP models (symbol 12 mm max.). On request.

Solder lug terminals



Curved actuator
IRR1S4

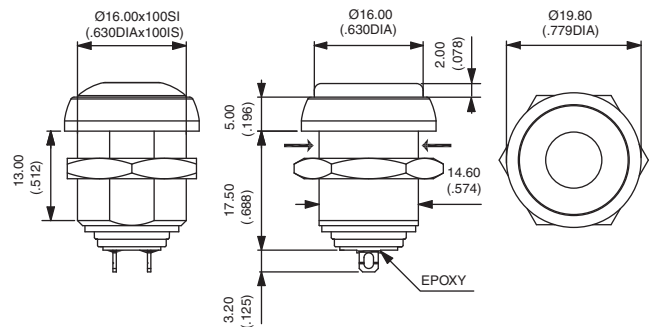
OFF - ON

Flat actuator
IRP1S4

OFF - ON

Also available with straight PC terminals : **IR•1P4**
& quick-connect terminals : **IR•1Z4**.

→ Flat



Sealed flying lead terminals



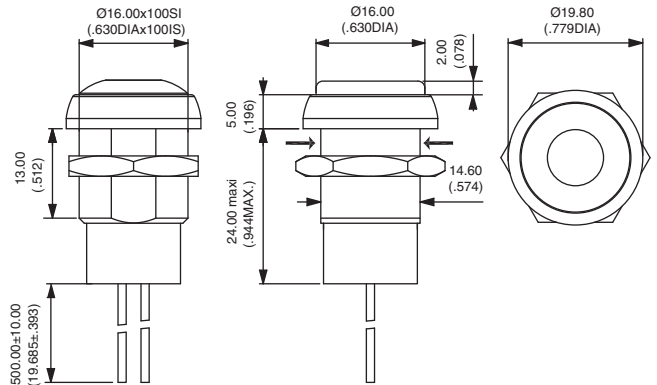
Curved actuator
IRR1F4

OFF - ON

Flat actuator
IRP1F4

OFF - ON

→ Flat



ACTUATOR COLOURS



1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 8 : bright chrome - 9 : orange
A : satin chrome

BUSHING AND BEZEL FINISH

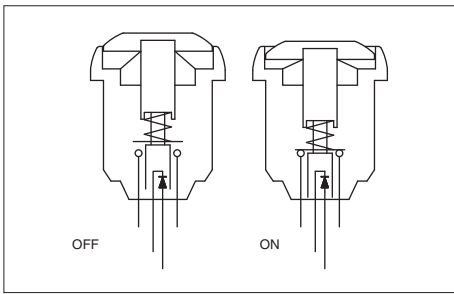


2 : black (standard)

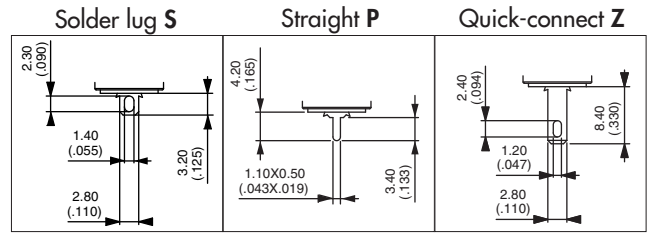
IR series

Sealed pushbutton switches - bushing Ø 16 mm - latching

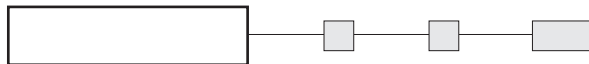
Square - illuminated



- Four LED colours
- Tin plated LED terminals
- Gold plated contacts



MODEL STRUCTURE



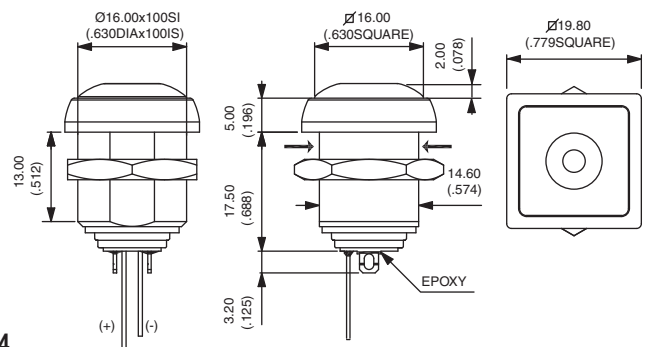
Solder lug terminals



Curved actuator
IRC154

OFF - ON

→ Flat



Also available with straight PC terminals : **IRC1P4**
& quick-connect terminals : **IRC1Z4**.

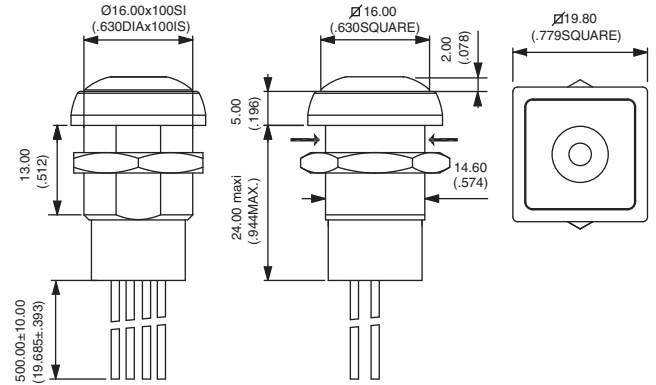
Sealed flying lead terminals



Curved actuator
IRC1F4

OFF - ON

→ Flat



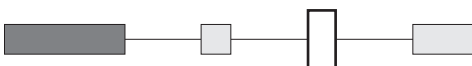
Wire colours : black : contact,
red : LED anode(+), blue : LED cathode (-)

ACTUATOR COLOURS



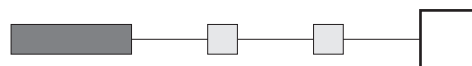
1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 8 : bright chrome - 9 : orange
A : satin chrome

BUSHING AND BEZEL FINISH



2 : black (standard)

LED COLOURS

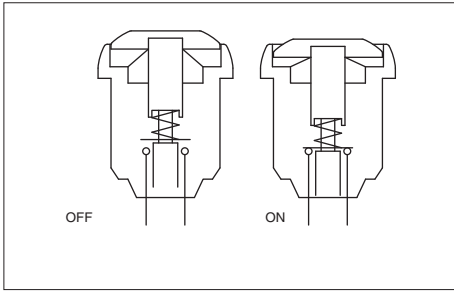


LOS : super red - LOY : yellow - LOG : green - LOB : blue

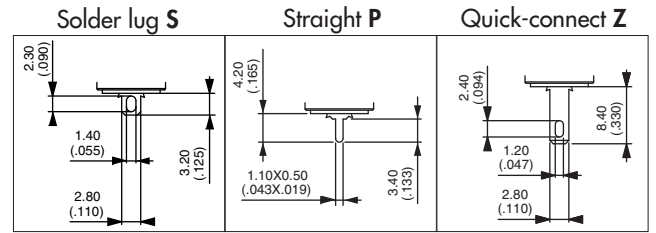
IR series

Sealed pushbutton switches - bushing Ø 16 mm - latching

Square - non-illuminated



- Gold plated contacts



MODEL STRUCTURE



B1

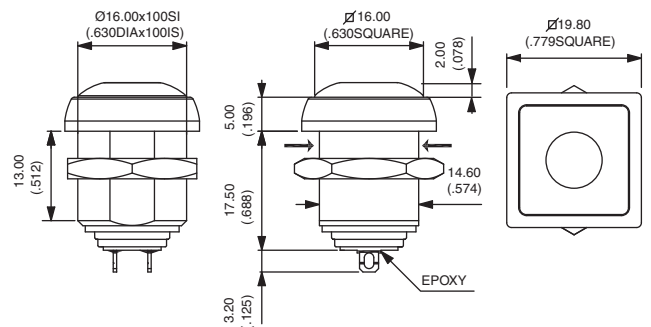
Solder lug terminals



Curved actuator
IRC154

OFF - ON

→ Flat



Also available with straight PC terminals : **IRC1P4**
& quick-connect terminals : **IRC1Z4**.

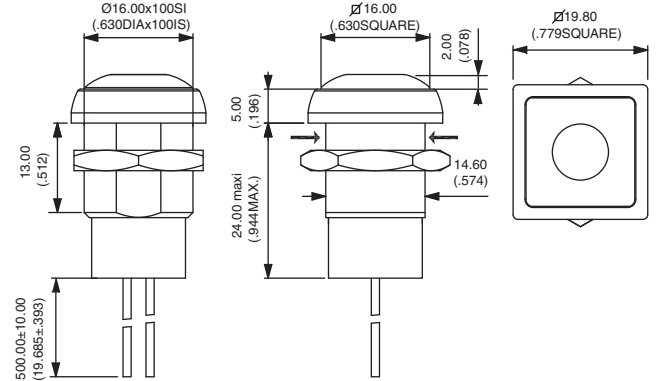
Sealed flying lead terminals



Curved actuator
IRC1F4

OFF - ON

→ Flat



ACTUATOR COLOURS



1 : blue - B : dark blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7 : white - 8 : bright chrome - 9 : orange
A : satin chrome

BUSHING AND BEZEL FINISH



2 : black (standard)

IA series

Low profile pushbutton switches for harsh environments - bushing Ø 16 mm - momentary

Distinctive features - Specifications - Overview



- Resistant to frost, sand and hydrocarbons
- Tactile feedback
- Front panel sealed to IP67

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing (see drawing opposite) : IP67
- Salt spray : IEC 512-6, test 11f
- Operating temperature : -20°C to +65°C

ELECTRICAL AND GENERAL SPECIFICATIONS

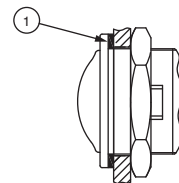
- Max. current/voltage rating with resistive load : 2A 24VDC
- Initial contact resistance : 100mΩ max.
- Insulation resistance : 100 MΩ min. at 500VDC
- Dielectric strength : 500 Vrms
- Electrical life at full load : 1.000.000 cycles
- Panel thickness : 7 mm (.276) max.
- Total travel : 1,5 mm (.059) +/- 0,3 mm
- Typical operating force : 7N +/- 2N
- Low level or mechanical life : 1.000.000 cycles
- **Torque : 0,5 to 1Nm max. applied to nut**

MATERIALS

- Case/bushing : thermoplastic
- Actuator : polyurethane
- Contacts : silver, gold plated
- Multi-wire lead AWG20, section 0,6 mm².
- Terminal seal : epoxy

PANEL MOUNTING

① Flat seal



IA							
SERIES	Actuator shape	Electrical functions	Terminals	Contacts	Actuator colours	Case colour	
	R round	3 Normally open (NO) 5 NC/NO combined	F Flying leads	1 Silver, gold plated	1 Blue 2 Black 3 Green 5 Yellow 6 Red 7/1 White 9 Orange	00 Black	

Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.



A **sealing boot** is available to protect the switches against frost and sand. See end of this catalogue.



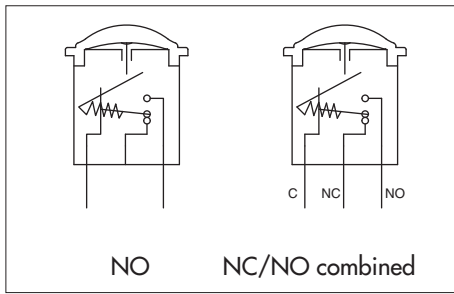
Mounting accessories : Standard hardware supplied : 1 hex nut 19 mm (.748) across flats and 1 flat seal. Knurled nut U3327 available on request.



Packaging unit : 25 pieces

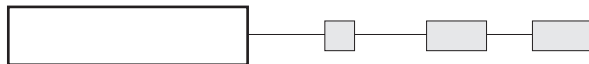
IA series

Low profile pushbutton switches for harsh environments - bushing \varnothing 16 mm - momentary



- Panel cut-out \varnothing 16,2 mm (.657)
- Min. pitch for matrix mounting :
 - with standard hex nut : 27 x 27 mm (1.062 x 1.062)
 - with knurled nut U3327: 20 x 20 mm (.787x.787)

MODEL STRUCTURE



NO model has 2 terminals only.

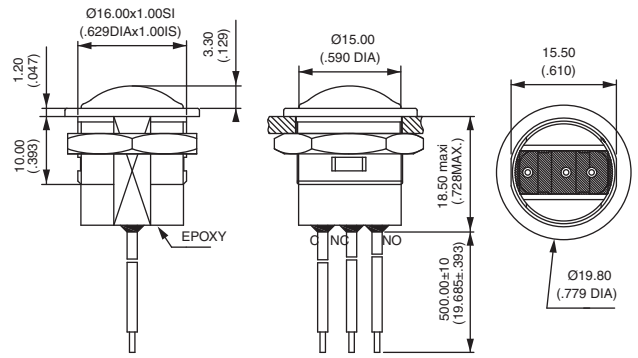
Models



Normally open (NO)
IAR3F



NC/NO combined
IAR5F



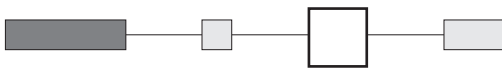
Wire colours (NC/NO) : black = common, brown = NC, blue = NO

CONTACT MATERIAL



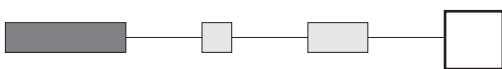
1 Silver, gold plated

ACTUATOR COLOURS



1 : blue - 2 : black - 3 : green - 5 : yellow - 6 : red - 7/1 : white - 9 : orange

CASE COLOUR



00 : black

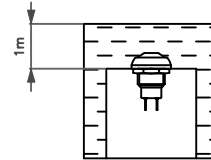
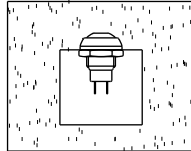
Degree of protection provided by the enclosures of electric appliances according to IEC 60529, DIN 40050 and NFC 20-010.

SEALING IP67

IP
(Ingress Protection)

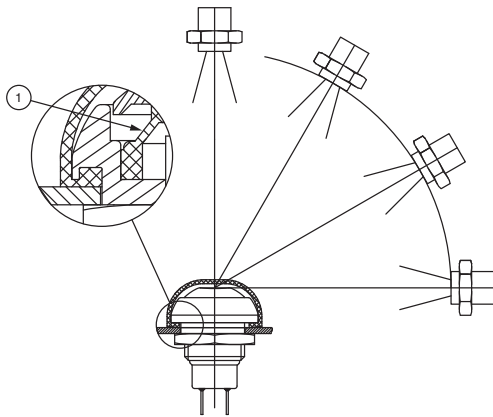
6
Totally protected
against dust

7
Protected against the effects of
immersion up to 1 m water (30 mn)



The illustrations show non-illuminated models.

SEALING IP69K



High pressure, high temperature wash down

IP69K test conditions

- . Pressure : 80 - 120 bars
- . Distance : 15 cm
- . Temperature : 80°C ± 5°C
- . Flow : 14 - 16 l/mn
- . Duration : 30 seconds per position

① Elastomeric membrane

ADDITIONAL SEALING FOR IC-IM-IP-IB-IS-IH SERIES

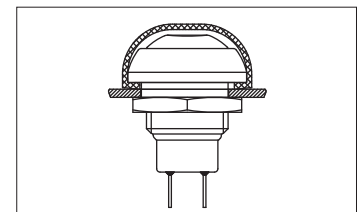
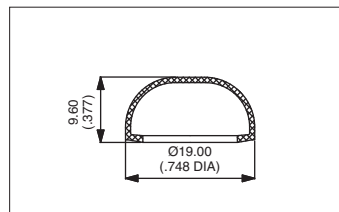
For ROUND plungers only, illuminated or non-illuminated.

By silicone boot for protection against frost and abrasion by sand. Order separately.

- transparent : **U5125**
- blue : **U5125-1**
- black : **U5125-2**
- red : **U5125-6**

Operating temperature : -40°C to +85°C
Life expectancy : 500.000 cycles

Note : the flat seal should not be used in this case.

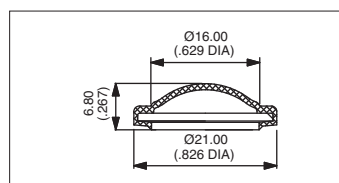


ADDITIONAL SEALING FOR IA SERIES

By silicone boot. Order separately.

- Black : **U6602**
- Yellow : **U6605**
- Red : **U6606**

Operating temperature : -40°C to +85°C
Life expectancy : 1.000.000 cycles



IF series

Sealed pushbutton switches with Ø 25 mm actuator - bushing dia. 16 mm

- Can be operated with gloved hands
- Snap-in and threaded bushing models
- Resistant to frost
- Sealed to IP54 or IP67

ELECTRICAL AND GENERAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 400mA 32VAC - 100mA 48VDC
- Initial contact resistance : 50 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.000 VAC rms. between terminals and frame
1500 VAC between terminals
- Electrical life at full load : 500.000 cycles
- Panel thickness :
 - Snap-in models : 0,8 mm (.031) min. - 2,5 mm (.098) max.
 - Threaded bushing models : 0,8 mm (.031) min. - 5 mm (.196) max.
- Total travel : 4 mm (.157)
- Typical operating force : 6,5 N +/- 2N
- Low level or mechanical life : 1.000.000 cycles
- Torque : 1,5 Nm max. applied to nut
- Soldering : 320°C max. for 3 seconds

MATERIALS

- Case : thermoplastic UL94-V0
- Actuator : polyamide 12, rubber filled
- Bushing/bezel : polyamide 6/6
- Contacts : solid silver, gold plated
- Terminal seal : epoxy

ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing (switches mounted on panel) :
 - . IP67 (threaded bushing models)
 - . IP54 (snap-in models)
- Operating temperature : -20°C to +85°C

B1


IF						
SERIES	Mounting	Electrical function	Terminals	Contacts	Actuator colours	Case colours
	B Snap-in S Threaded bushing	3 Normally open (NO)	Z1 Quick-connect or solder 2,8 x 0,5 mm	AD Solid silver, gold plated	1 Blue 5 Yellow 1/4 Dark blue 6 Red 2 Black 7/1 White 3 Green 9 Orange Grey RAL7040 : on request	00 Black 20 Red

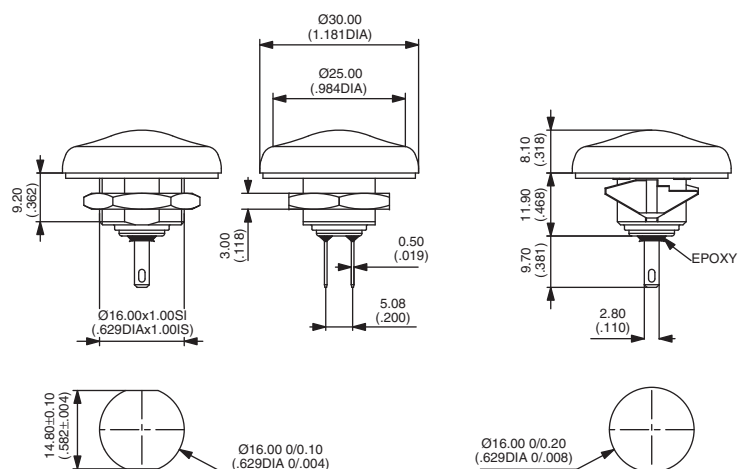
Models




Snap-in
IFB3Z1AD  NO



Threaded bushing
IFS3Z1AD  NO



 **Mounting accessories** : Standard hardware supplied : 1 flat seal (IFB series)
1 flat seal and 1 hex nut 19 mm (.748) across flats (IFS series) . The hex nut is presented in section I (part number 10-621).

 **Packaging unit** : 20 pieces

Pushbutton switches



Section B2

ZP series

Tiny pushbutton switches - metal bushing

Distinctive features - Specifications - Overview



☐ Ø 4,83 mm threaded bushing

☐ Solder lug and straight PC terminals

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - gold plated contacts : 0,4VA 20V max. AC or DC
 - silver plated contacts : 0,5A 48V max. AC or DC
- Minimum load : 10mA 50mV - 10µA 5VDC
- Contact resistance : 50 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength: 1.000 Vrms 50 Hz min. between terminals and frame
500 Vrms 50 Hz min. between terminals
- Electrical life at full load :
 - gold plated contacts : 60.000 cycles
 - silver plated contacts: 20.000 cycles

MATERIALS

- Case : thermoplastic UL94-V0
- Actuator : thermoplastic UL94-V0
- Bushing : zamac, tin plated
- Contacts and terminals :
 - 0** : brass, gold plated (standard)
 - 1** : brass, silver plated
 - 3** : brass, gold plated (1,27 micron gold)
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

- Travel :
 - function 2 (ON-MOM) : 1,2 mm (.047) ± 0,3 (.11)
 - function 3 (OFF-MOM) : 1 mm (.039) ± 0,3 (.11)
- Strength of terminals : pull-out force 10N max.
- Torque : 1Nm max. applied between the 2 nuts
- Max. panel thickness : 1,5 mm (.059) with 2 nuts
- Operating temperature : -30°C to +85°C
- Moisture : 21 days 95 % (NFC 20-603 - IEC 68-2-3)

SOLDERING

- Hand soldering : 280°C max. for 5 seconds max.
- Wave soldering : 260°C max. for 5 seconds max.

SERIES	Number of poles	Electrical functions	Terminals	Contact and terminal materials	Bushing
ZP	3 Single pole	2 ON - MOM 3 OFF - MOM	SO Solder lug PO Straight PC	0 Brass, gold plated 1 Brass, silver plated 3 Brass, gold plated (1,27 micron gold)	01 Threaded, with flat

Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.



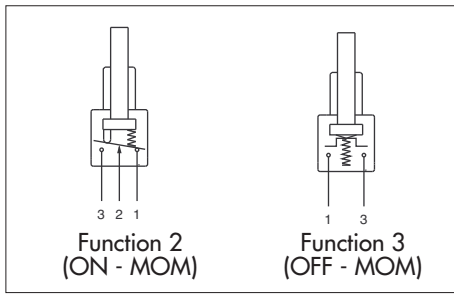
Packaging unit : 100 pieces



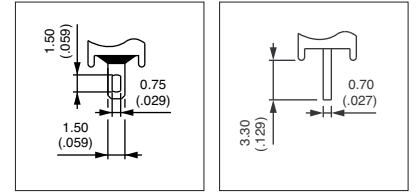
Mounting accessories : Standard hardware supplied with all models : 2 hex nuts 7 mm (.275) across flats P/N U5731, 1 locking ring P/N U5831 and 1 lockwasher P/N U5841.

ZP series

Tiny pushbutton switches - metal bushing



- Single pole
- Gold plated or silver plated contacts
- Epoxy sealed terminals



MODEL STRUCTURE



Shown in function 2 (ON-MOM)

B2

Solder lug terminals : ZP..S0

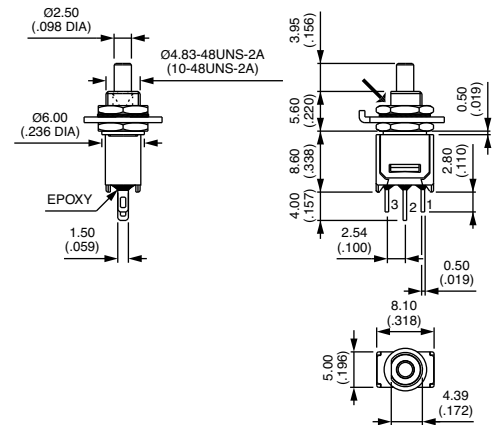
→ Flat



ZP32S0



ZP33S0



Straight PC terminals : ZP..P0

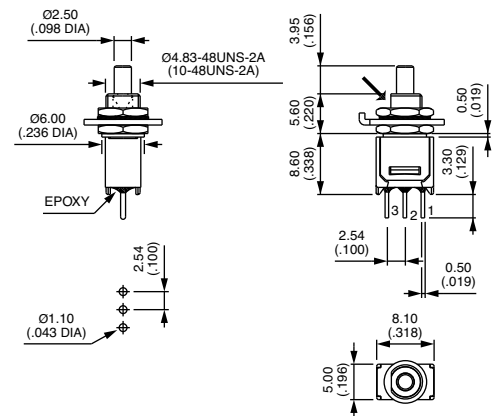
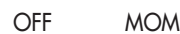
→ Flat



ZP32P0



ZP33P0

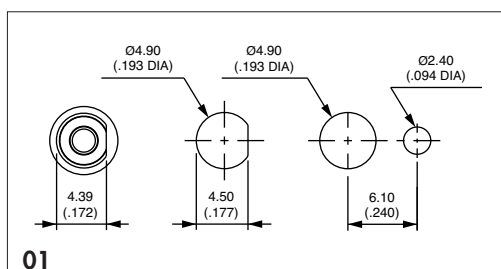
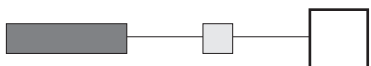


CONTACT & TERMINAL MATERIALS



0 : Brass, gold plated (standard) - 1 : Brass, silver plated - 3 : Brass, gold plated (1,27µ gold)

BUSHING



01

SMT TP series

Surface mount tiny washable pushbutton switches

Distinctive features and specifications



- ❑ Entirely designed for surface mount
- ❑ Tape and reel packaging
- ❑ Reflow solderable
 - High temperature plastic materials
 - Tin plated ground plate
 - Terminal coating : tin alloy over nickel plating
 - Terminals turned to the outside, preventing the shadow effect in infrared soldering and permitting visual inspection of solder joints
 - Distance between case and circuit : 0,55 mm (.021)
 - End stackable with 10,16 mm (.40) pitch
 - Available with positioning pins to ensure switch orientation during the reflow process and increasing switch mechanical resistance
- ❑ Protected against electrostatic discharges (ESD) up to 10 KV
- ❑ Washable
 - Construction withstands cleaning processes, including hot water under pressure

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 0,4VA 20V max. AC or DC
- Minimum load : 10mA 50mV or 10µA 5VDC
- Initial contact resistance : 50 mΩ max
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 1.000 Vrms. 50 Hz min. between terminals and frame
- 500 Vrms. 50 Hz min. between terminals
- Electrical life at full load : 60.000 cycles
- Static resistance : 10 KV (Schaffner equipment)

GENERAL SPECIFICATIONS

- Actuator travel : function 2 : 1 mm (.039) - function 3 : 0,8 mm (.031)
- Operating temperature : -40°C to +85°C
- Moisture resistance : 21 days per IEC 512-6 test 11c
- Vibration resistance : 10-500 Hz / 10 g per IEC 512-4 test 6d
- Shock resistance : 50 g per IEC 512-4 test 6c

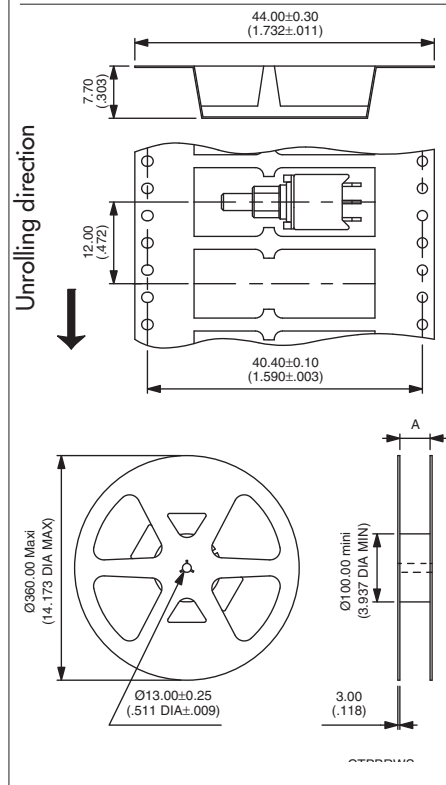
MATERIALS

- Case : high temperature plastic material UL94-V0
- Actuator : high temperature plastic material UL94-V0
- Ground plate and positioning pins : steel, tin plated
- Contacts : brass, gold plated
- Terminals : brass, with pure tin plating over nickel barrier

SOLDERING AND CLEANING

- Reflow soldering : infrared, vapor phase or infrared convection
- Washable per IEA-RS448-2 :
 - water + detergent - preferred
 - solvents
- Further information on reflow soldering : see end of catalogue.

PACKAGING



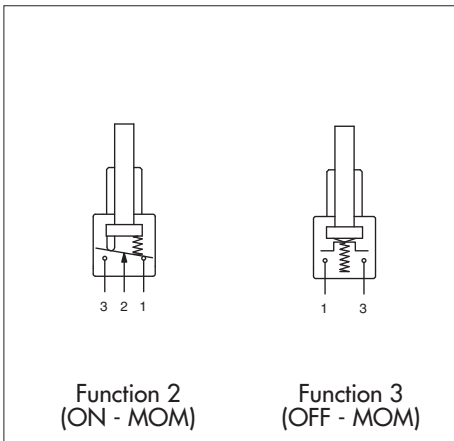
Tape width	24.00 (.944)	44.00 (1.732)
Reel (dimension A)	24.40+2.00/0.00 (.960+.078/.000)	44.40+2.00/0.00 (1.748+.078/.000)

Standard packaging unit : 700 pieces
 Tape meeting international standard IEC - Publication 286-3 (EIA481A)
 Start leader : 400 mm min.

Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.

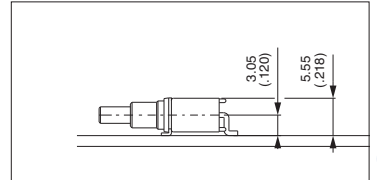
SMT TP series

Surface mount tiny washable pushbutton switches



- With or without positioning pins
- Single pole

Also available for vertical mounting. On request.



B2

Pushbutton switches



TP32WS83500



ON

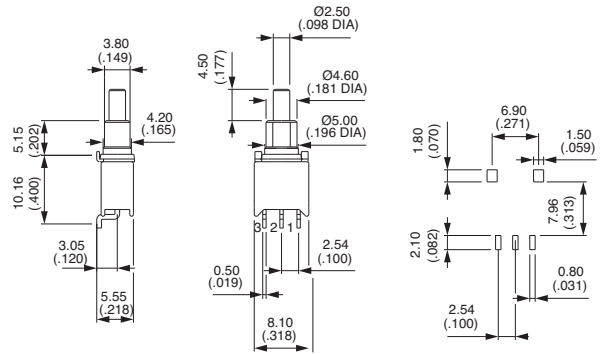


MOM

TP33WS83500

OFF

MOM



Shown in function 2

Pushbutton switches - with positioning pins



TP32WS83565



ON

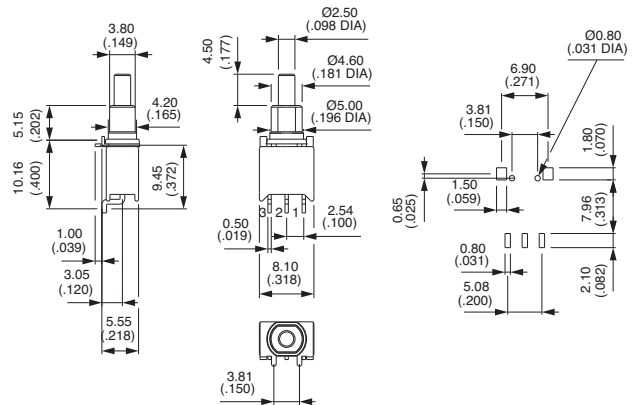


MOM

TP33WS83565

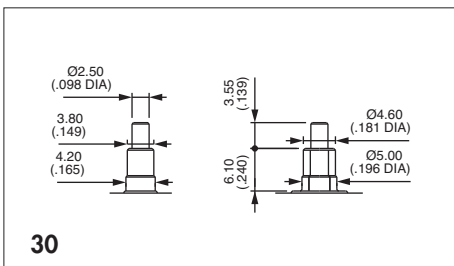
OFF

MOM

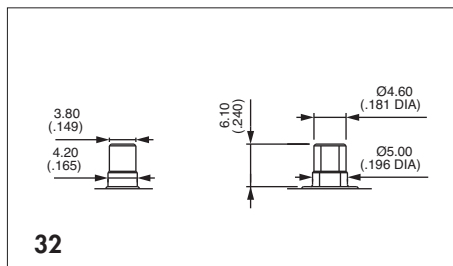


Shown in function 2

PLUNGER OPTIONS



Short
Replace 35 with 30 in the above P/N's



Flush
Replace 35 with 32 in the above P/N's.

TP series

Tiny washable momentary pushbutton switches

Distinctive features and specifications



- Process sealed**
 - Single piece case
 - O-ring seal between actuator and bushing
 - Epoxy sealed terminals
- Wide variety of contact materials**
- Same PCB layout as TL, TR and TG tiny switches**

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - gold plated contacts : 0,4VA 20V max. AC or DC
 - silver plated contacts : 0,5A 48V max. AC or DC
- Minimum load : 10mA 50mV - 10 μ A 5VDC
- Contact resistance : 50 m Ω max.
- Insulation resistance : 1.000 M Ω min. at 500VDC
- Dielectric strength :
 - 1.000 Vrms 50 Hz min. between terminals and frame
 - 500 Vrms 50 Hz min. between terminals
- Electrical life at full load :
 - gold plated contacts : 60.000 cycles
 - silver plated contacts : 20.000 cycles

GENERAL SPECIFICATIONS

- Total travel :
 - function 2 : 1 mm (.039)
 - function 3 : 0,8 mm (.031)
- Strength of terminals : pull-out force - 10N max.
- Operating temperature : -30°C to +85°C
- Moisture : 21 days 95 % (NFC 20-603 - IEC 68-2-3)
- Cleaning : solvents or water + detergent
- Wave soldering : 260°C - 5 sec.

MATERIALS

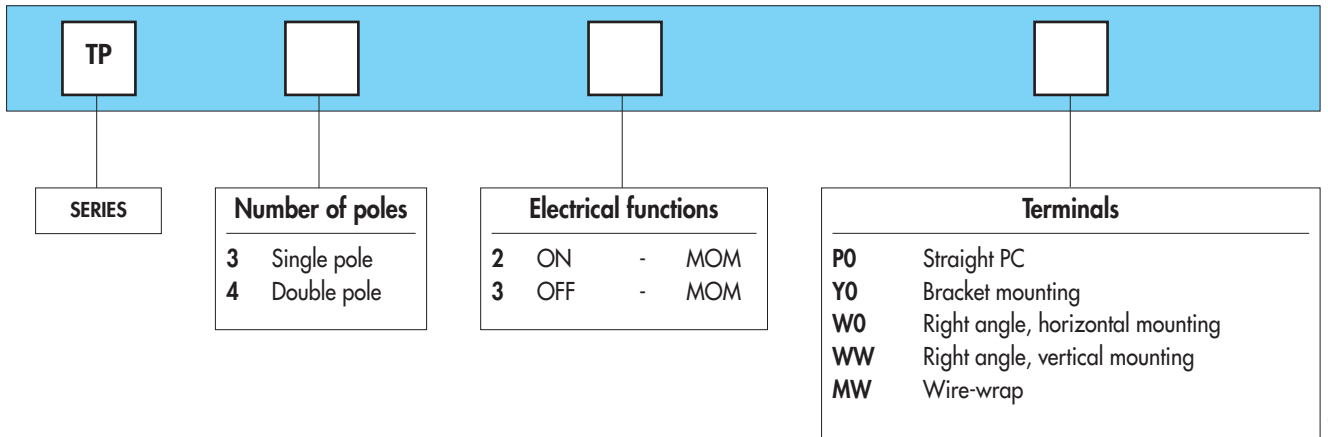
- Case : PBT
- Actuator : polyamide, glass filled
- Contacts and terminals :
 - 0 : brass, gold plated
 - 1 : brass, silver plated
 - 3 : brass, gold plated (1,27 micron gold)
 - 8 : contact brass, gold plated + tin plated terminals
 - 9 : contact brass, gold plated (1,27 micron gold) + tin plated terminals
- Terminal seal : epoxy

TP series

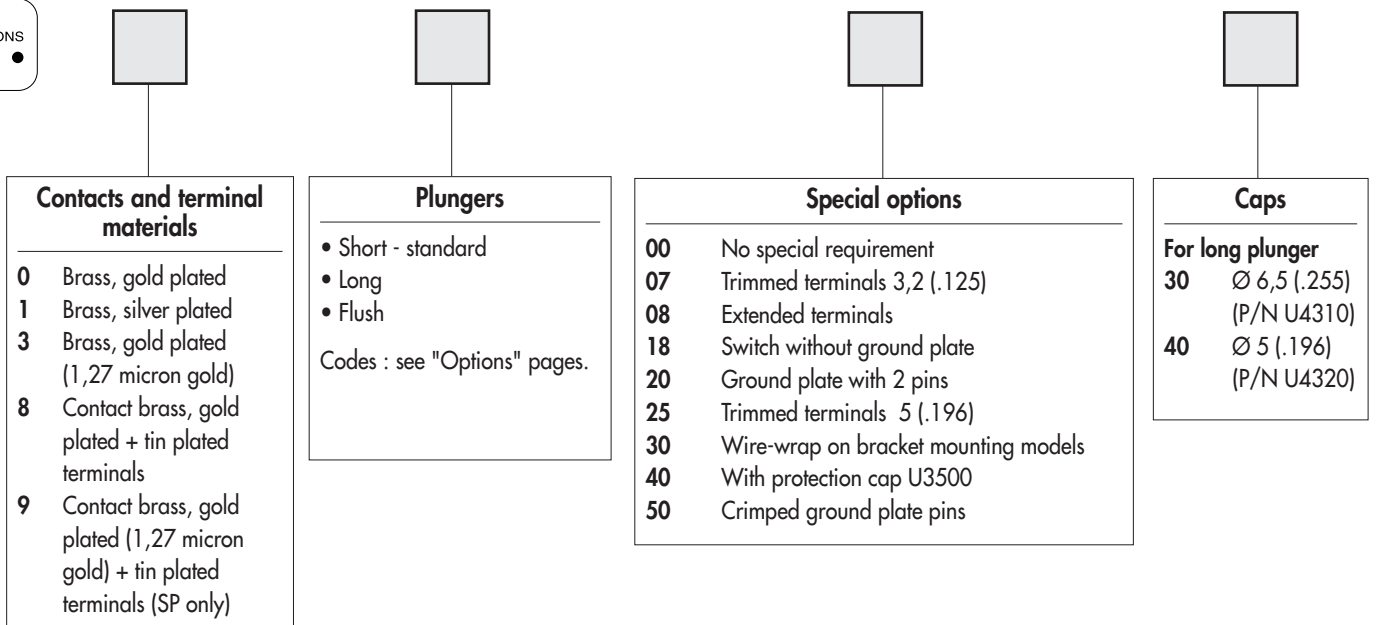
Tiny washable momentary pushbutton switches

Overview

MODEL
STRUCTURE



OPTIONS



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 bracketed numbers.



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



Packaging unit : 100 pieces, except for models with WW terminals (50 pieces).



TP series

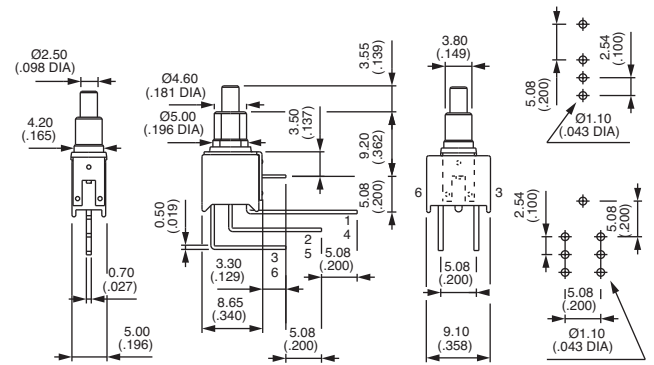
Tiny washable momentary pushbutton switches

Shown in function 2, with standard plunger

Right angle terminals - vertical mounting : TP..WW



Single pole	Double pole	ON	MOM
TP32WW	TP42WW	ON	MOM
TP33WW	TP43WW	OFF	MOM

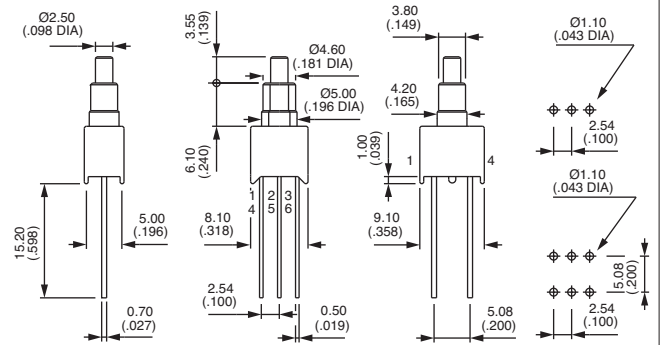


Function 3 has two terminals only (3 and 1) per pole

Wire-wrap terminals : TP..MW

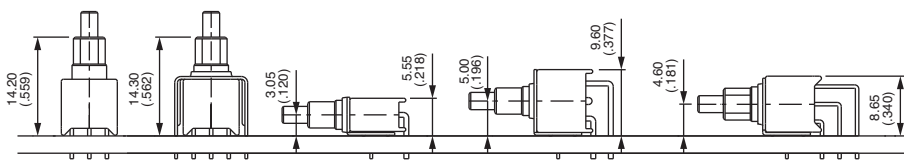


Single pole	Double pole	ON	MOM
TP32MW	TP42MW	ON	MOM
TP33MW	TP43MW	OFF	MOM



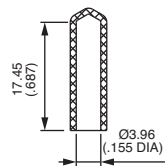
Function 3 has two terminals only (3 and 1) per pole

PCB MOUNTING



CAP FOR PCB PROCESSING

Provide additional protection during PCB processing.
Supplied separately. For cap mounted on the switch, see special option 40.
Material : vinyl



U3502

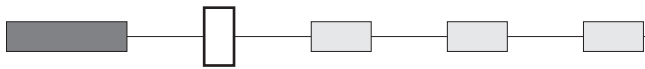
TP series

Tiny washable momentary pushbutton switches

OPTIONS



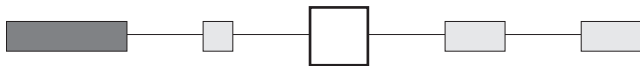
CONTACT AND TERMINAL MATERIALS



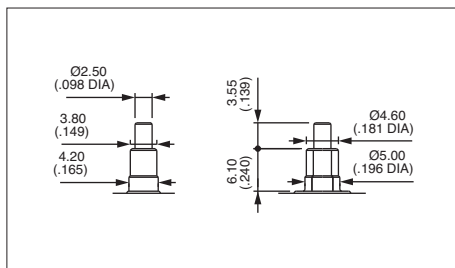
- 0 Brass, gold plated
- 1 Brass, silver plated
- 3 Brass, gold plated (1,27 micron gold)
- 8 Contact brass, gold plated + tin plated terminals
- 9 Contact brass, gold plated (1,27 micron gold) + tin plated terminals (single pole only)

B2

PLUNGERS



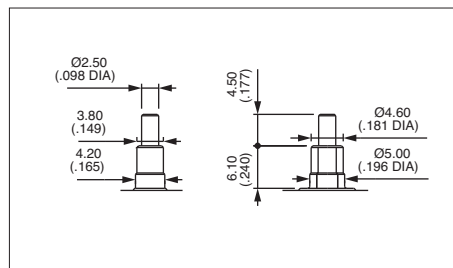
Standard plunger colour is black.



Short - standard

With blue
case
30

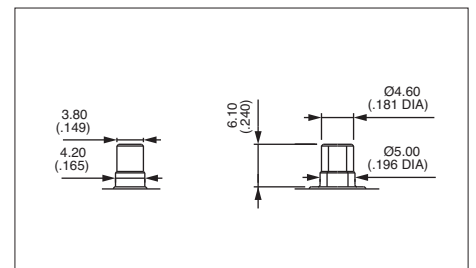
With black
case
80



Long

With blue
case
35

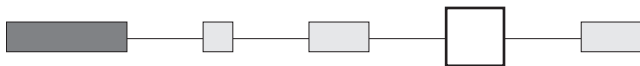
With black
case
85



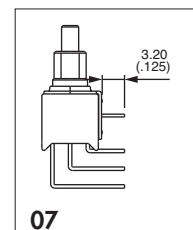
Flush

With black
case
82

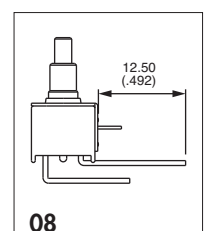
SPECIAL OPTIONS



- 00 No special requirement
- 07 **Trimmed terminals** - length 3,2 mm (.125) for TP..WW models only
- 08 **Extended terminals** for TP..WO models only



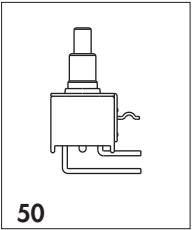
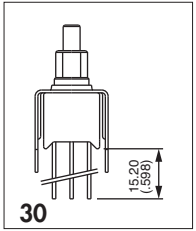
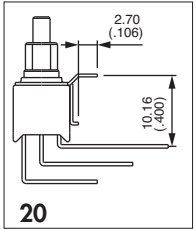
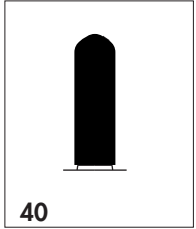
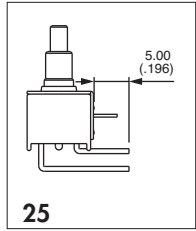
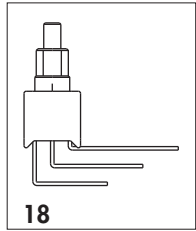
07



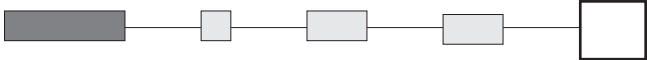
08

SPECIAL OPTIONS (continued)

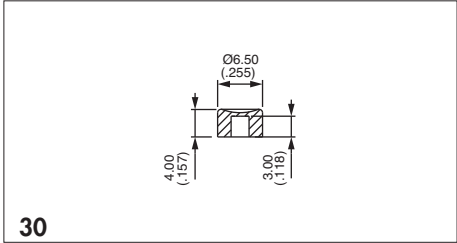
- 18** Switch **without ground plate** for TP..WW models only
- 20** **Ground plate with 2 pins** for TP..WW models only
- 25** **Trimmed terminals** - length 5 mm (.196) for all models, except TP..WW
- 30** **Wire-wrap terminals** on models with mounting **bracket**
- 40** With cap U3500 mounted over plunger and bushing
Further protects the switch during PCB processing
- 50** **Crimping of ground plate pins.**
Retains switch on PC during handling and wave soldering.
For models TP..WO, TP..WW and TP..YO single and double pole.



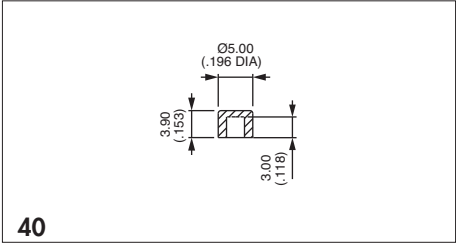
CAPS



Blank Without cap



30
P/N U4310 - for long plunger only



40
P/N U4320 - for long plunger only

To order caps separately, use their part number (U...).

Cap colours	
Replace "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
6	red
7	ivory
7/1	white
9	orange

9000 series

Subminiature momentary pushbutton switches

Distinctive features and specifications



- Panel and PC mount models, horizontal or vertical
- Self-cleaning and butt action contacts
- Several plunger options

B2

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 100mA 30VDC
- Initial contact resistance : 30 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
500 Vrms 50 Hz min. between terminals
1.000 Vrms 50 Hz min. between terminals and frame
- Electrical life at full load :
9100 - 9200N and 9500N : 250.000 cycles
9200 - 9500 : 100.000 cycles

MATERIALS

- Case : Pa6T
- Actuator : polyamide, glass filled
- Bushing : brass, nickel plated
- Contacts :
CD : brass, gold plated
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

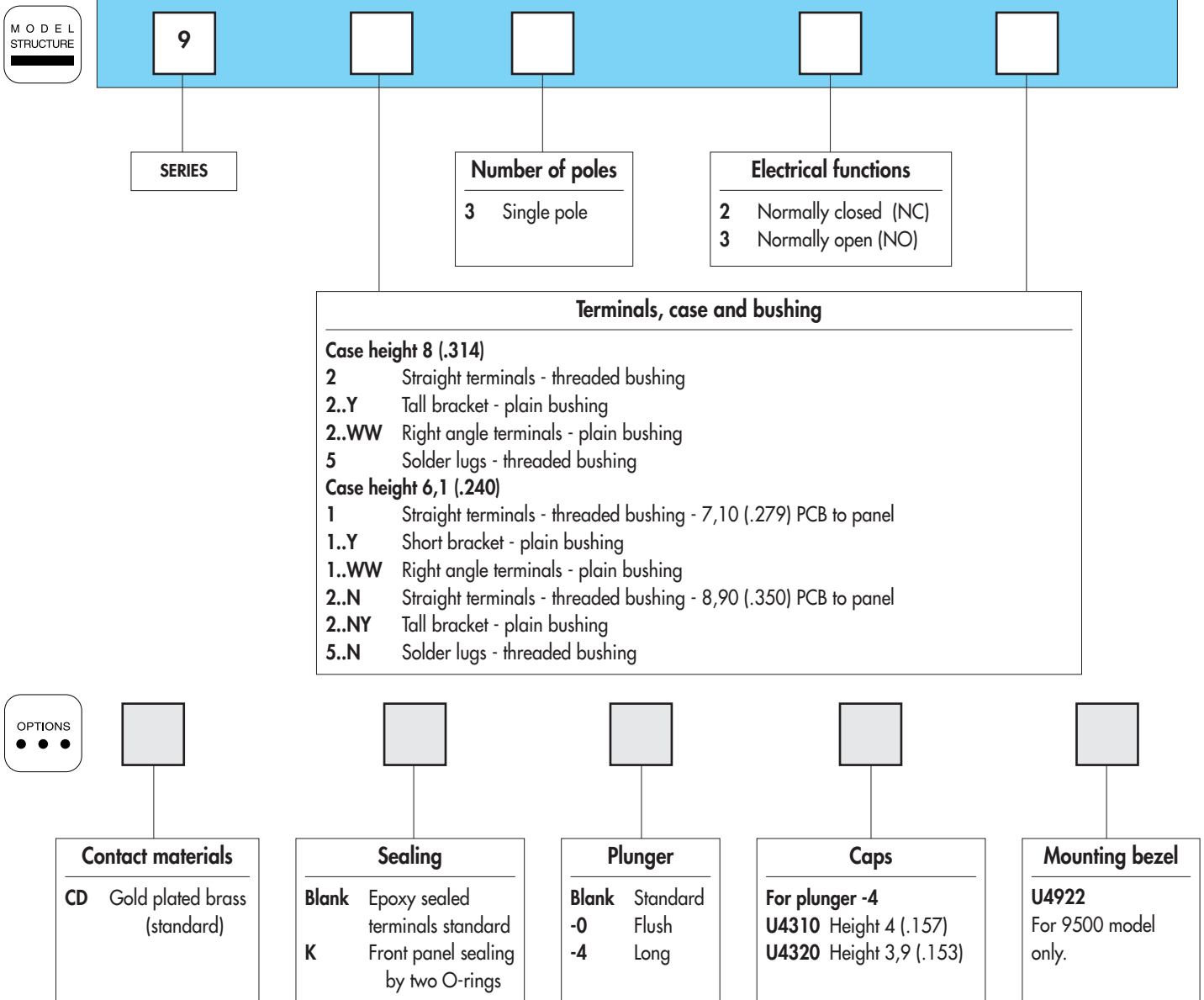
- Torque : 0,5 Nm (.590 Ft.lb) max. applied to nut
- Operating temperature : -30°C to +65°C
- Panel thickness : 1,50 mm (.059) max.
- Travels : see table below
Tolerance : +/- 0,3 mm (.011)

	9533-9233	9532-9232	9533N 9233N-9133
Total travel	1,10 (.043)	1,80 (.070)	1 (.039)
Pre-travel	0,80 (.031)	1,00 (.039)	-
Over travel	0,30 (.011)	0,75 (.029)	-

9000 series

Subminiature momentary pushbutton switches

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
- model structure of switches
- their options in the same order as in above chart

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



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



Sealing boots are available to protect the switches. They are presented in section H.



Mounting accessories : standard hardware supplied with all threaded bushing models : 1 nickel plated hex nut 5 (.196) across flats, part number U544. This nut is presented after model structure of switches.

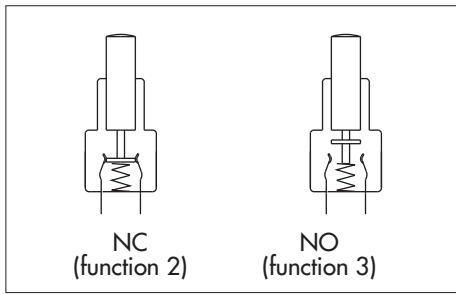


Packaging unit : 100 pieces.

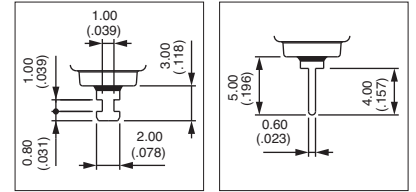
9000 series

Subminiature momentary pushbutton switches

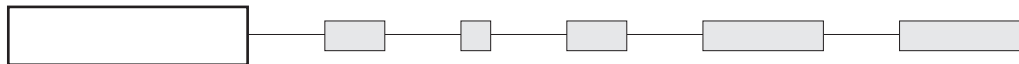
Solder lug or straight PC terminals : 9500 - 9200 - 9200Y



- Case height 8 (.314)
- With over travel
- Self-cleaning contacts
- Epoxy sealed terminals standard



MODEL STRUCTURE



B2

Threaded bushing - solder lugs : 9500

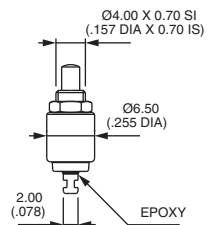
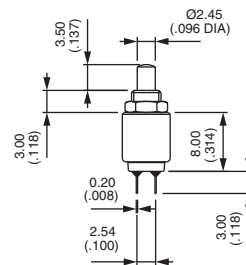


9532

Normally Closed

9533

Normally Open



Threaded bushing - straight PC terminals : 9200

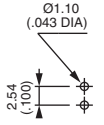
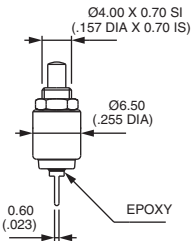
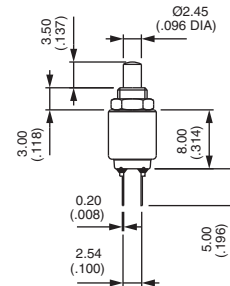


9232

Normally Closed

9233

Normally Open



Straight PC terminals - bracket mounting : 9200Y

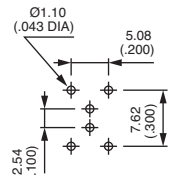
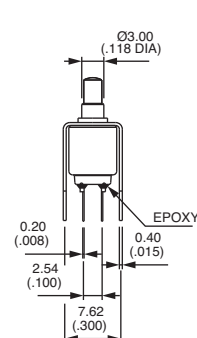
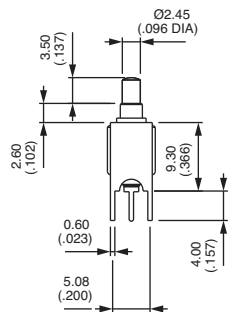


9232Y

Normally Closed

9233Y

Normally Open





9000 series

Subminiature momentary pushbutton switches

Right angle terminals : 9200WW

Right angle terminals : 9200WW

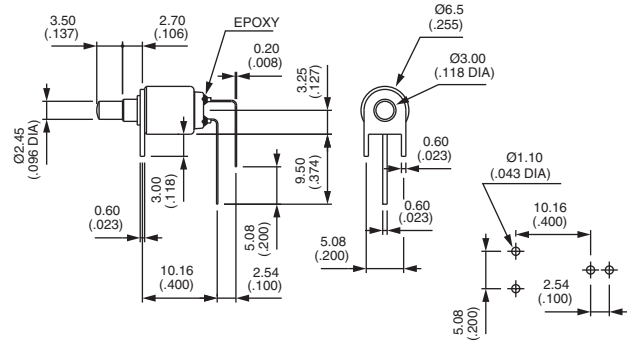


9232WW $\begin{matrix} \uparrow \\ \circ \text{---} \circ \end{matrix}$

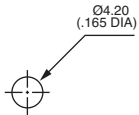
Normally Closed

9233WW $\begin{matrix} \uparrow \\ \circ \text{---} \circ \end{matrix}$

Normally Open



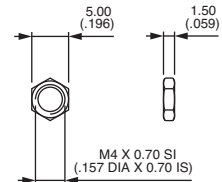
PANEL CUT-OUT



For threaded bushing models.

STANDARD HARDWARE

9500 - 9200



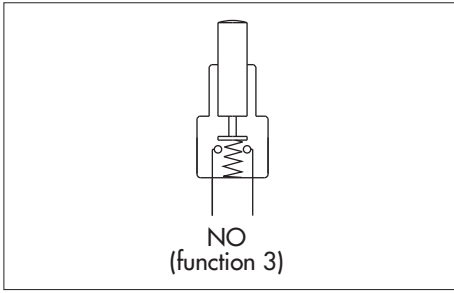
U544 (nickel plated)

B2

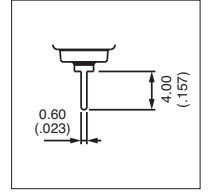
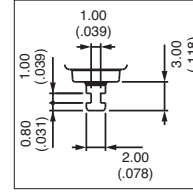
9000 series

Subminiature momentary pushbutton switches

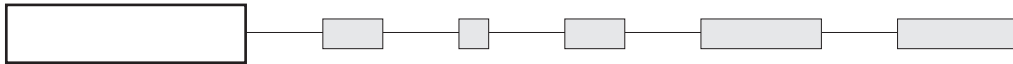
Solder lug or straight PC terminals : 9500N - 9200N - 9100



- Case height 6,1 (.240)
- Epoxy sealed terminals
- Butt action contacts



MODEL
STRUCTURE



B2

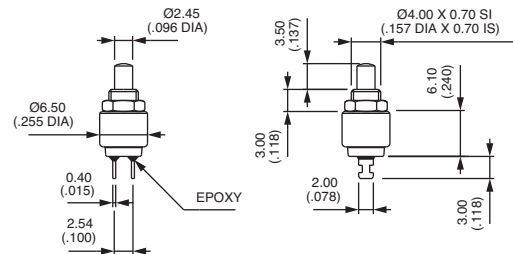
Threaded bushing - solder lugs : 9500N



9533N



Normally Open



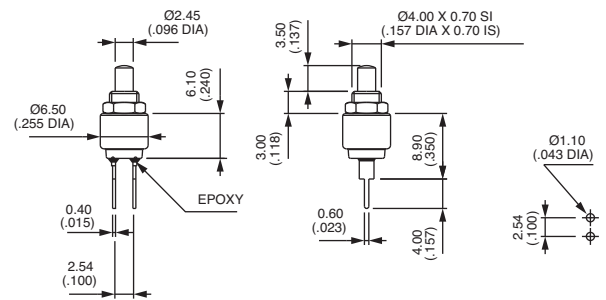
Threaded bushing - straight PC terminals - 8,90 (.350) PCB to panel



9233N



Normally Open



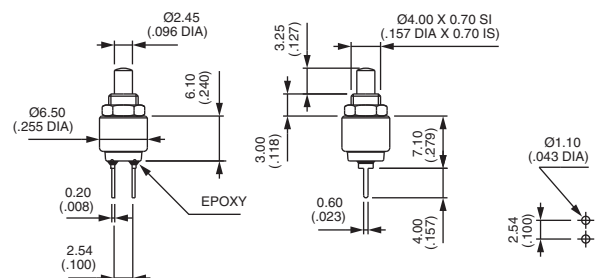
Threaded bushing - straight PC terminals - 7,10 (.279) PCB to panel



9133



Normally Open





9000 series

Subminiature momentary pushbutton switches

Straight PC or right angle terminals : 9200NY - 9100Y - 9100WW

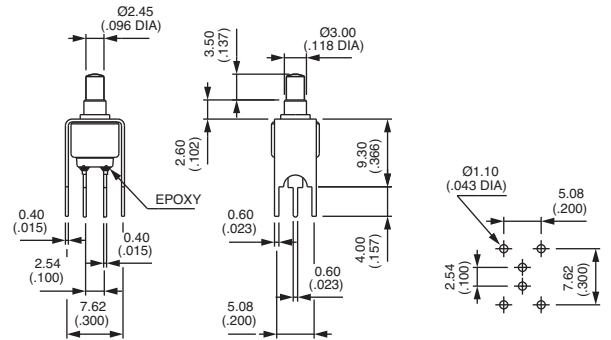
Straight PC terminals - tall bracket : 9200NY



9233NY



Normally Open



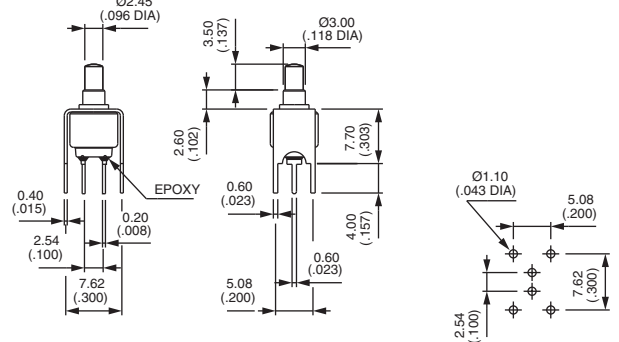
Straight PC terminals - short bracket : 9100Y



9133Y



Normally Open



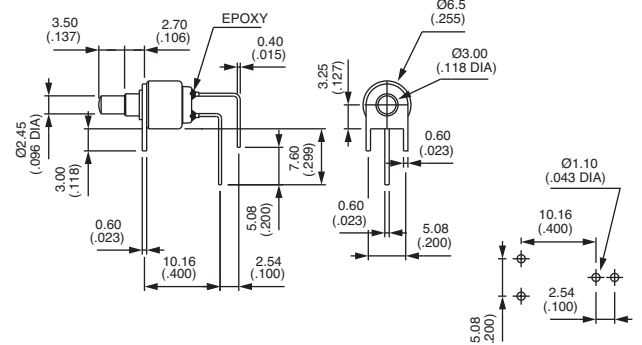
Right angle terminals - vertical : 9100WW



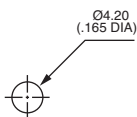
9133WW



Normally Open



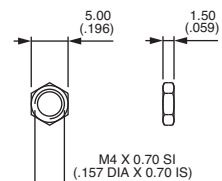
PANEL CUT-OUT



For threaded bushing models.

STANDARD HARDWARE

9500N - 9200N - 9100



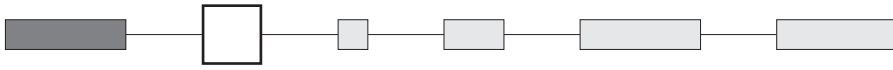
U544 (nickel plated)

9000 series

Subminiature momentary pushbutton switches

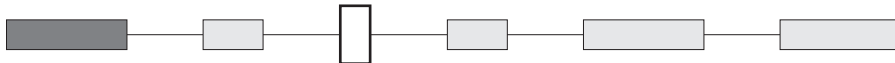
OPTIONS
● ● ●

CONTACT MATERIALS



CD Gold plated brass (standard)

SEALING

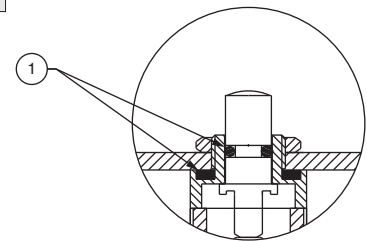


Blank Epoxy sealed terminals standard

K Front panel sealing by two O-rings. Protects the switch against water and dust. Panel seal withstands 0,1 bar pressure.

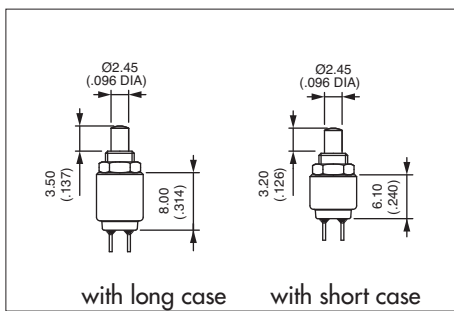


Option K for models 9533N, 9233N and 9133 only.

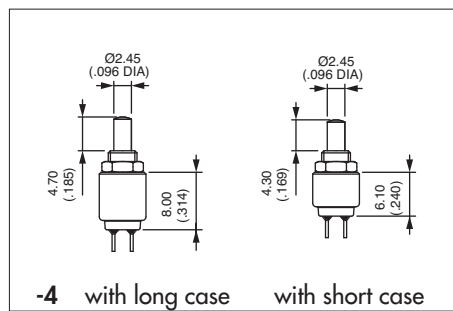


① O-rings

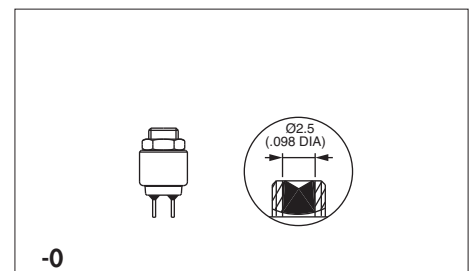
PLUNGERS



Standard



Long



-0

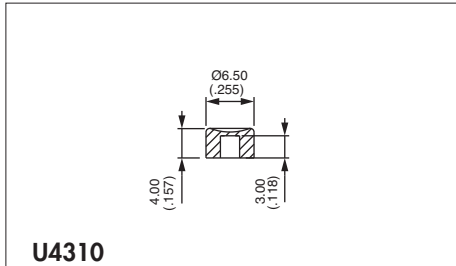
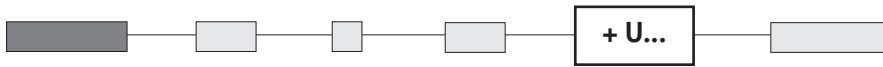
Flush



9000 series

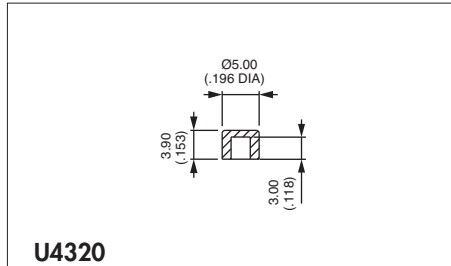
Subminiature momentary pushbutton switches

CAPS



U4310

For use with plunger -4 only



U4320

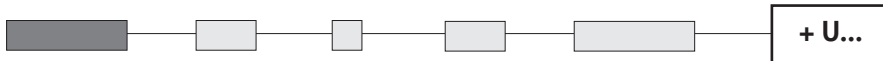
For use with plunger -4 only

Cap colours

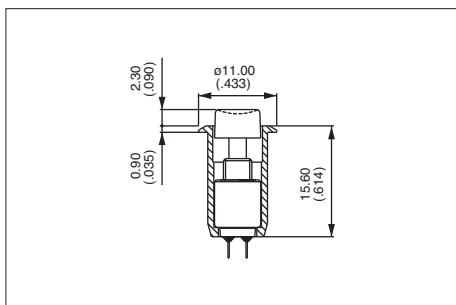
Replace "0" by number

- | | |
|-----|-----------|
| 1 | blue |
| 1/4 | dark blue |
| 2 | black |
| 3 | green |
| 4 | grey |
| 5 | yellow |
| 6 | red |
| 7 | ivory |
| 7/1 | white |
| 9 | orange |

MOUNTING BEZEL



For 9500 model (case height 8 mm) only



Shown with cap U570.

The mounting bezel U4922 has been designed to facilitate the mounting of the 9500 series pushbutton switch onto a panel. The switch + bezel assembly is snapped into the equipment through the front of the panel, then electrically connected by solder lug terminals.

Panel cut-out : $\varnothing 8,15 \text{ mm} \pm 0,05$
 (.320 DIA $\pm .002$)

PHAP40 series

Momentary or latching action key switches

Distinctive features and specifications



- The smallest latching action switch of the range
- Audible “click”
- Models with 6 x 6 mm case on request

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 100mA 30VDC
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 100 MΩ min. at 500VDC
- Dielectric strength : 500 Vrms min. (1 min.)
- Electrical life : 10.000 cycles

MATERIALS

- Case : polyamide
- Actuator : polyamide
- Contacts : brass, silver plated

GENERAL SPECIFICATIONS

- Travel : see next page.
- Wave soldering : 255°C, 5 seconds
- Manual soldering : 300°C ± 10°C, 3 seconds
- Operating force :
 - Model PHAP4673 : 1,4N ± 0,5N
 - Models PHAP4683 and PHAP4383V : 2N ± 0,5N
- Operating temperature : -20°C to +70°C

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

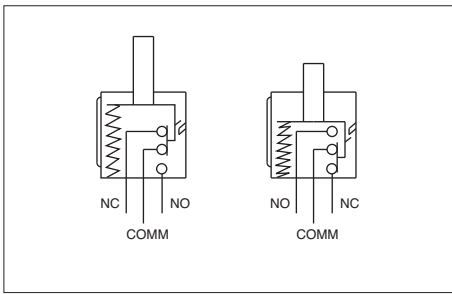


Packaging unit : 1.000 pieces.

PHAP40 series

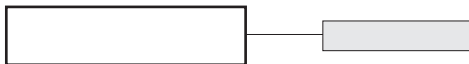
Momentary or latching action key switches

Straight PC terminals



- Double pole, double throw
- Non-shorting contacts
- Moulded-in terminals

**MODEL
STRUCTURE**

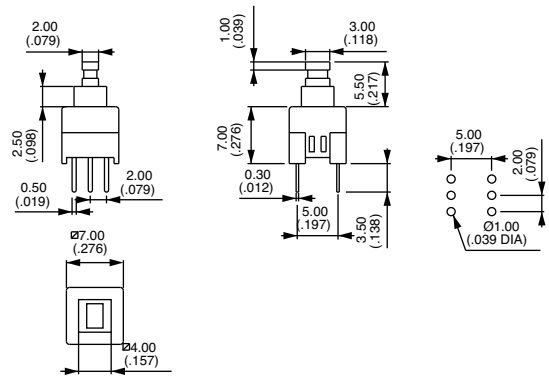


7 x 7 mm case



PHAP4673

ON - ON

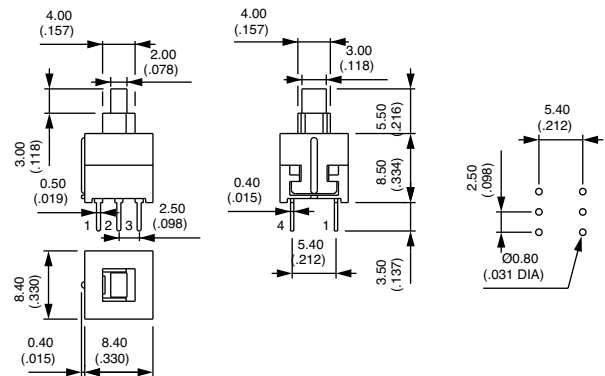
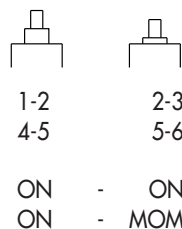


Pre-travel : 1 mm - Total travel : 1,8 mm

8,4 x 8,4 mm case

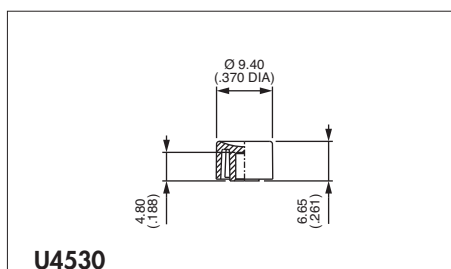
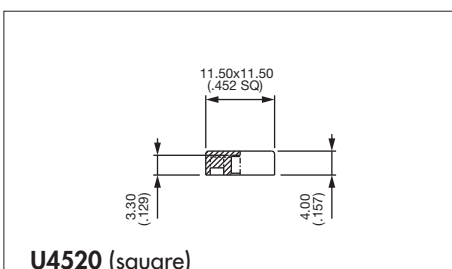


**PHAP4683
PHAP4383V ***



Total travel : 2,5 mm * Audible click

CAPS



Cap colours

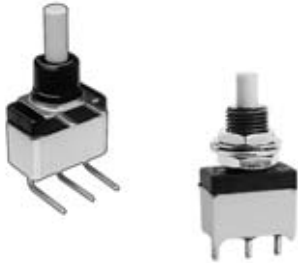
Replace "0" by number :

- 1 blue
- 2 black
- 3 green
- 4 grey
- 5 yellow
- 6 red
- 7 ivory
- 7/1 white
- 9 orange

SP series

Washable snap-action pushbutton switches

Distinctive features and specifications



❑ Process sealed

- Secure assembly of the two case parts
- Internally sealed bushing
- Epoxy sealed terminals

❑ Process compatible (plain bushing models)

- Wave solderable
- Washable

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - gold plated brass contacts : 100mA 30VDC
 - silver or gold plated silver contacts : 1A 30VDC
- Initial contact resistance : 50 mΩ max.
- Insulation resistance : 1.000 MΩ min.
- Dielectric strength : 1.000 Vrms 50 Hz min.
- Electrical life : 60.000 cycles

MATERIALS

- Case and cover : UL94-V0, polyamide, glass filled or PES
- Actuator : polyamide, glass filled
- Contacts
 - 0 : brass, gold plated
 - 1 : silver
 - 2 : silver, gold plated
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

- Torque : 0,25 Nm (.18 Ft.lb) applied to nut (threaded bushing)
- Total travel : 0,50 mm (.019)
- Mechanical strength :
Terminals are strengthened by a bracket or a ground plate ensuring the rigidity of the switch on the board. Actuator strength is 10N max.
- Operating temperature : -20°C to +85°C
- Storage temperature : -40°C to +85°C
- Moisture :
The insulating materials employed and the complete seal permit the switches to withstand a 56 days moisture test (IEC 68-2-3).
- Soldering - thermal shock (plain bushing models only) :
The switches are especially designed for flow soldering at 260°C during 5 seconds owing to high temperature polymer parts.
- Iron soldering (threaded bushing models) : 300°C max., 5 seconds max.
- Solderability : The switches are tested at 235°C according to IEC 68-2-20 after accelerated aging.

AGENCY APPROVAL



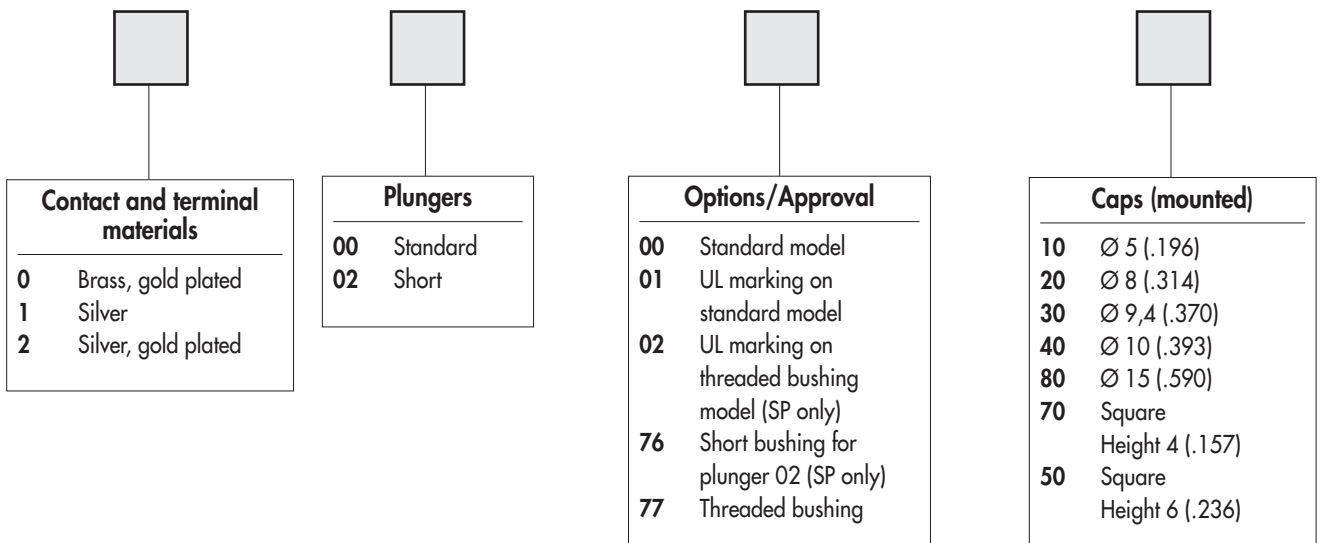
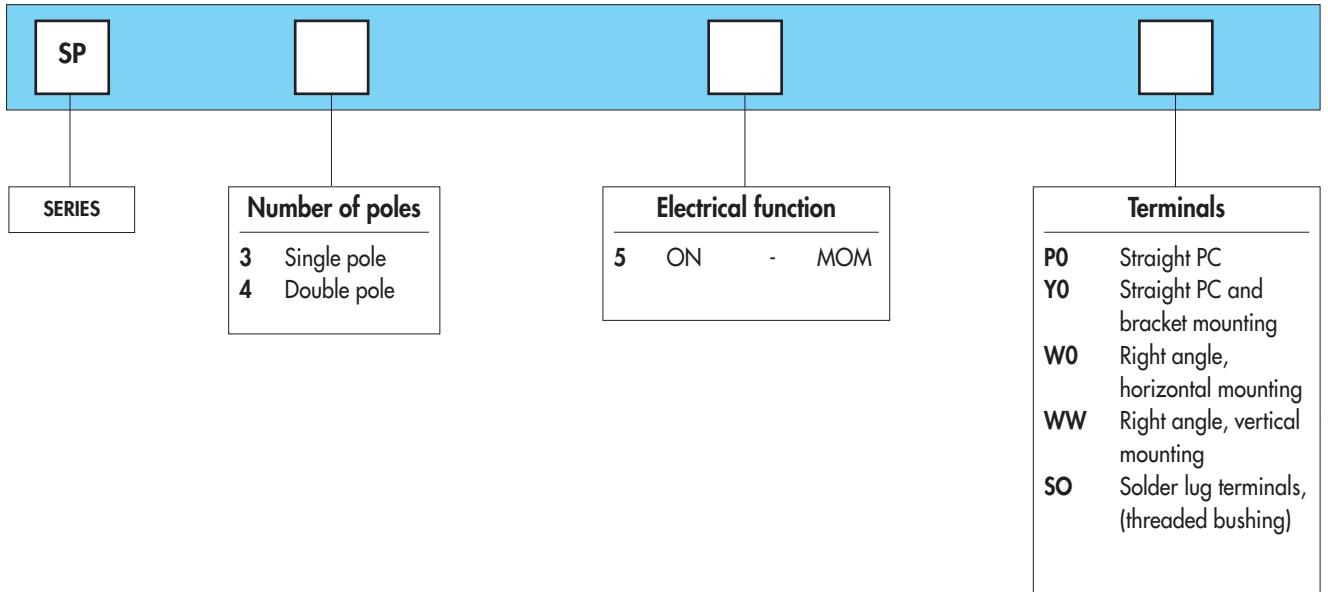
Availability : all models with silver or gold plated silver contacts.

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

SP series

Washable snap-action pushbutton switches

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :

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

Specifications are on previous page.

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



Mounting accessories : standard hardware supplied with all models with Ø 6,35 (1/4) threaded bushing :

2 hex nuts 8 mm (.314) across flats, 1 locking ring and 1 lockwasher.

Standard and special hardware available are presented in section I.

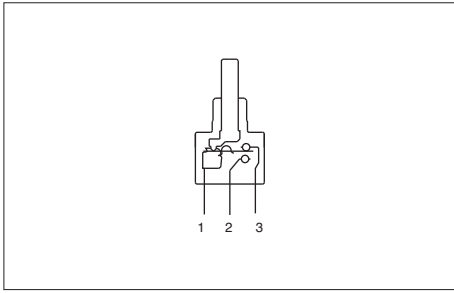


Packaging unit : 25 or 50 pieces depending on model.

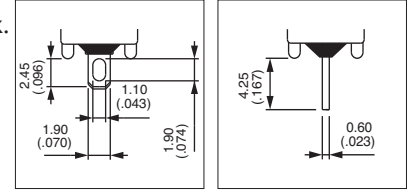
SP series

Washable snap-action pushbutton switches

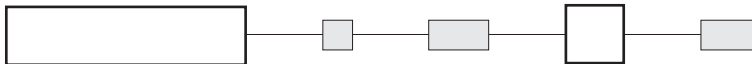
Plain or threaded bushing



- Solder lug, straight PC or right angle terminals
- Features of threaded bushing models :
 - max. torque : 0,25 Nm (.18 Ft.lb)
 - iron soldering : 300°C max., 5 seconds max.
- 1 and 2 pole configurations



MODEL STRUCTURE



Shown with standard plunger

Plain bushing - straight PC terminals

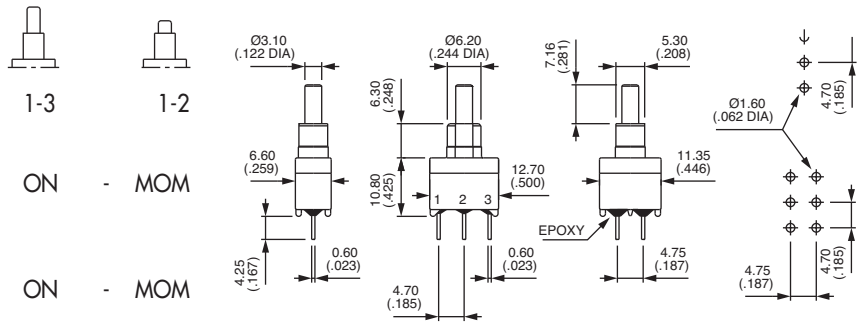


Single pole

SP35P0... 00

Double pole

SP45P0... 00



Plain bushing - bracket mounting

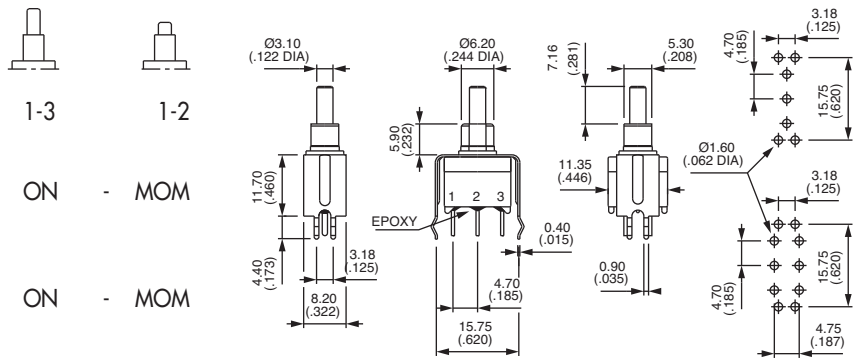


Single pole

SP35Y0... 00

Double pole

SP45Y0... 00



Plain bushing - right angle terminals - horizontal

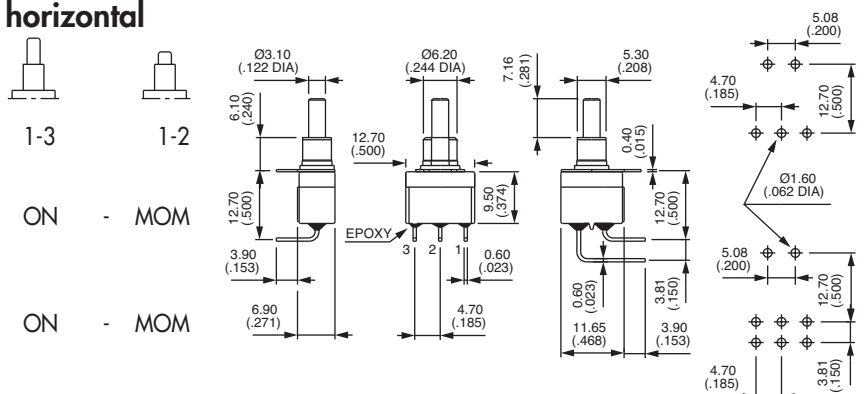


Single pole

SP35W0... 00

Double pole

SP45W0... 00





SP series

Washable snap-action pushbutton switches

Plain or threaded bushing

Shown with standard plunger

Plain bushing - right angle terminals - vertical



Single pole

SP35WW... 00

Double pole

SP45WW... 00



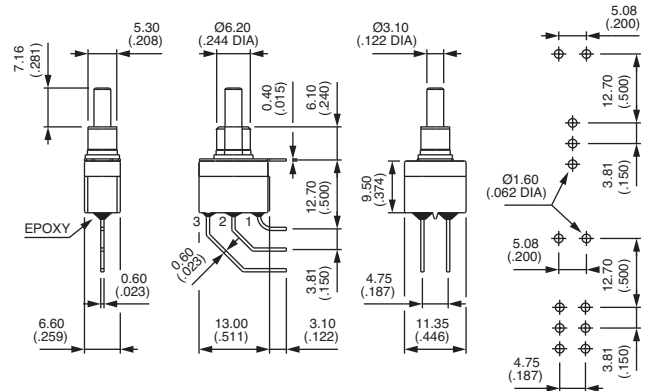
1-3



1-2

ON - MOM

ON - MOM



Threaded bushing - solder lug terminals

→ Keyway



Single pole

SP35S0... 77

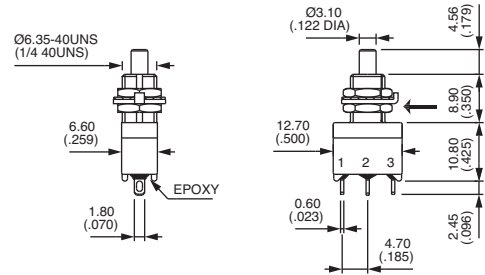


1-3



1-2

ON - MOM



Threaded bushing - straight PC terminals

→ Keyway



Single pole

SP35P0... 77

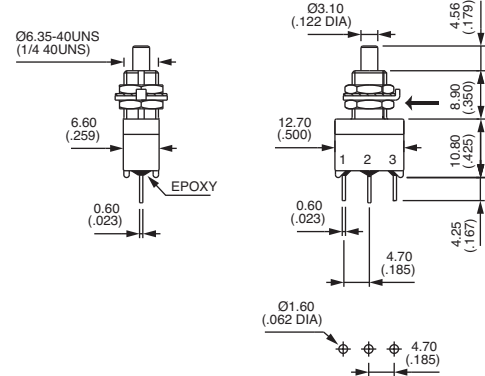


1-3



1-2

ON - MOM



PANEL CUT-OUT



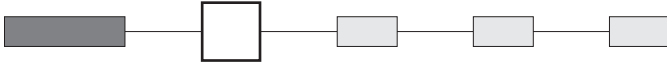
SP series

Washable snap-action pushbutton switches

OPTIONS

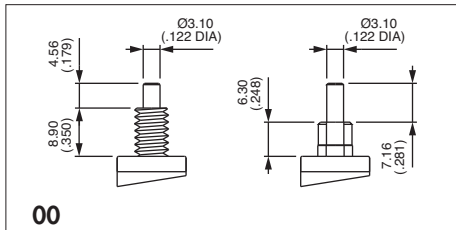


CONTACT AND TERMINAL MATERIALS

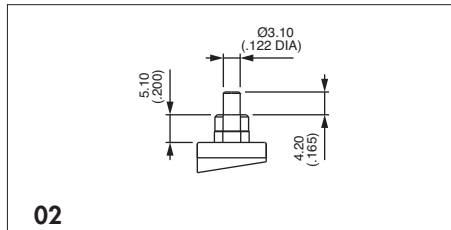


- 0 Brass, gold plated
- 1 Silver
- 2 Silver, gold plated

PLUNGERS

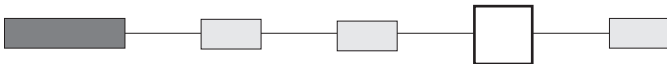


00
Standard plunger



02
Short (for models with plain bushing,
single pole only)
Order with option 76 below.

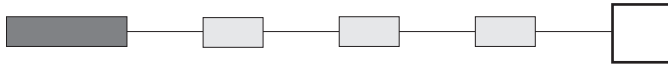
OPTIONS / AGENCY APPROVAL



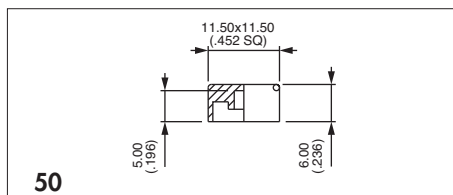
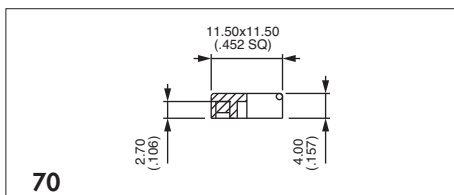
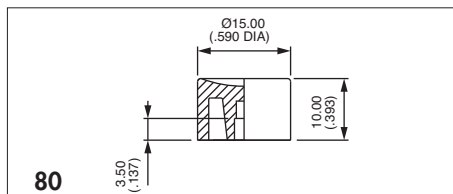
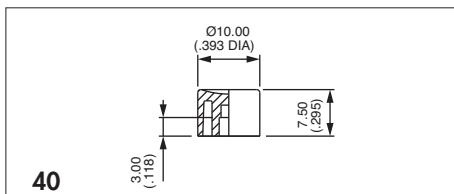
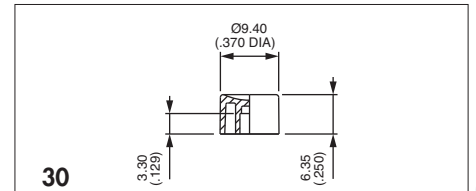
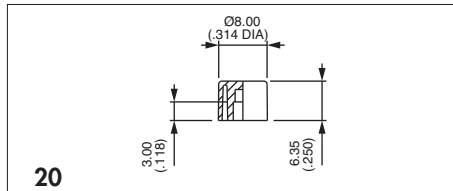
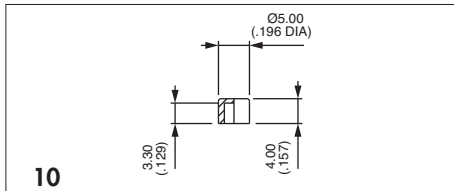
- 00 Standard model
- 01 UL marking for standard model
- 02 UL marking for threaded bushing model (single pole models only)
- 76 Short plain bushing for 02 plunger (single pole models only)
- 77 Threaded bushing
(included in model numbers on previous page)



CAPS



Blank Without cap



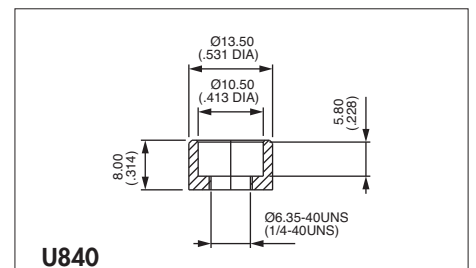
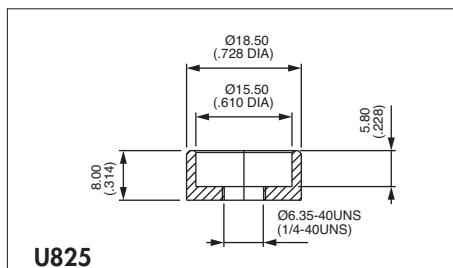
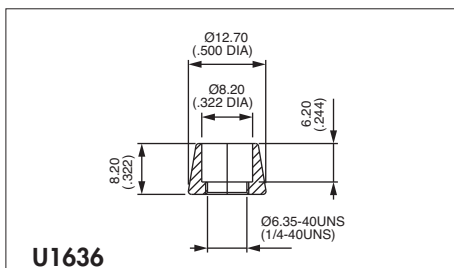
Cap colours	
Replace last "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
6	red
7	ivory
7/1	white
9	orange

To order caps separately, use their P/N (U...) (for threaded bushing order only separately).

DRESS NUTS

Chrome plated

For threaded bushing models only.



Dress nuts are to be ordered separately.

8000 series

Momentary or alternate action pushbutton switches

Distinctive features and specifications



Bushing \varnothing 6,35 (1/4) and \varnothing 11,9 (15/32)

UL approved

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts : 4A 30VDC
 - gold plated contacts : 0,4VA max. 20VAC or DC
- 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 terminals and frame
- Electrical life : 30.000 cycles at full load

MATERIALS

- Case : diallylphthalate (DAP)
- Actuator : brass, nickel plated
- Bushing : brass, nickel plated
- Housing : stainless steel
- Contacts
 - A** : silver
 - AD** : silver, gold plated
 - CD** : brass, gold plated
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

- Torque : 1,25 Nm (.922 Ft.lb) max. applied to nut
- Total travel : 2,70 mm (.106)
- Operating temperature :
 - 40°C to +85°C

AGENCY APPROVAL



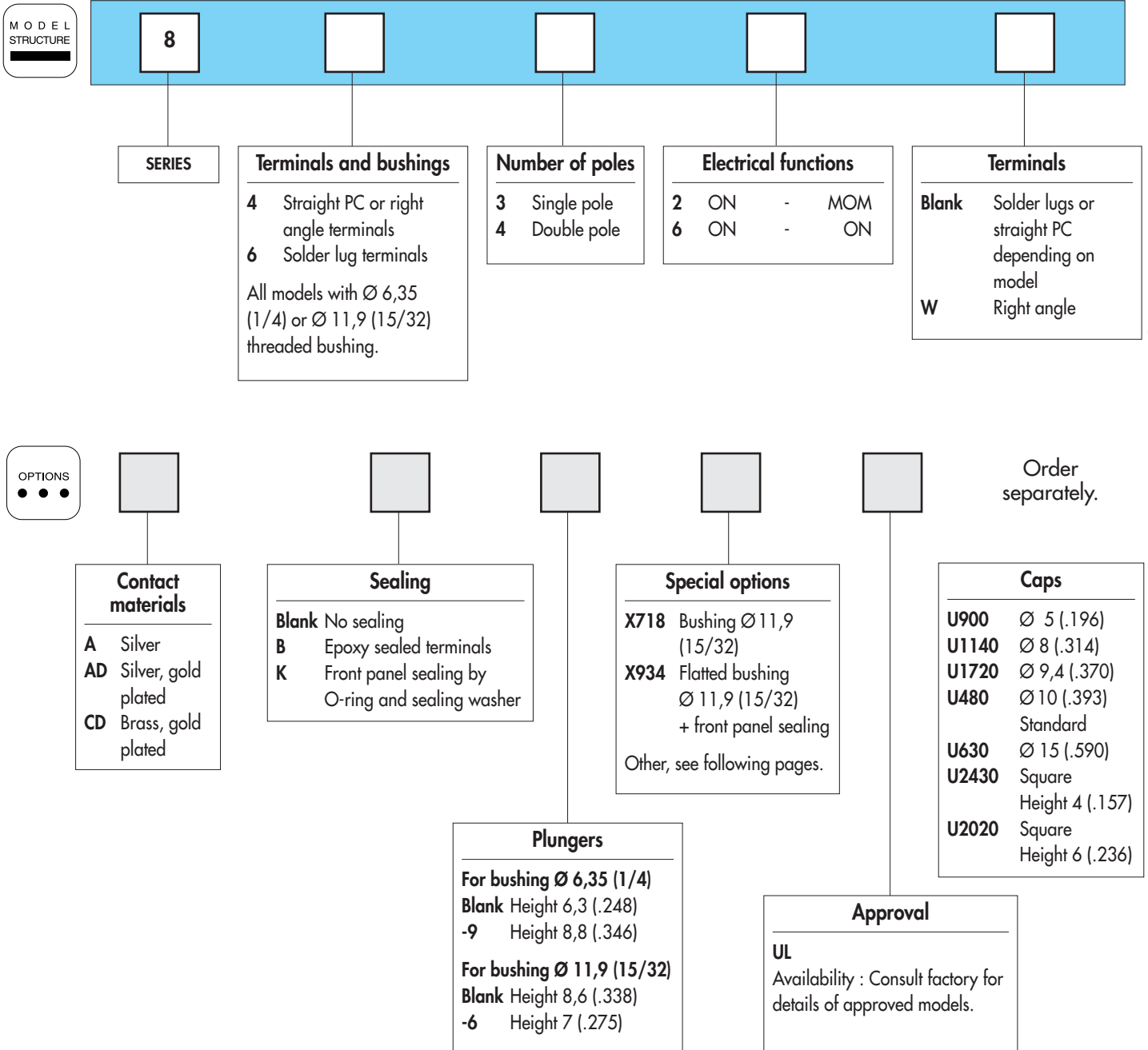
Availability : consult factory for details of approved models.

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

8000 series

Momentary or alternate action pushbutton switches

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 bracketed numbers.



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 mm (.314) across flats, 1 locking ring and 1 lockwasher.

Standard and special hardware available are presented in section I.

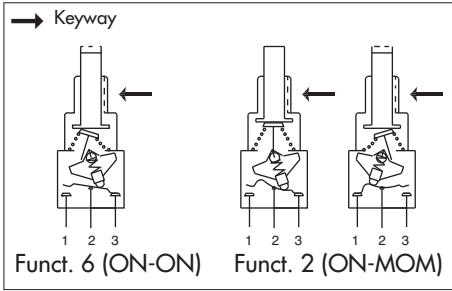


Packaging unit : 50 pieces, except 8000W (25 pieces).

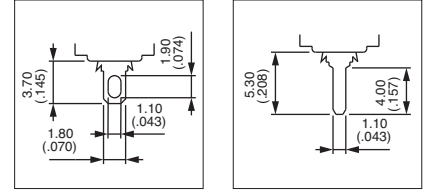
8000 series

Momentary or alternate action pushbutton switches

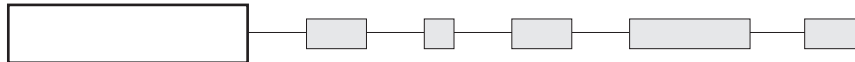
Threaded bushing $\varnothing 6,35 (1/4)$



- Solder lug, straight PC or right angle terminals
- 1 and 2 pole configurations
- Button returns in upper position after actuation.



MODEL STRUCTURE



Shown with standard plunger

B2

Solder lug terminals : 8600



Single pole
8632
8636

Double pole
8642
8646



ON

MOM

ON

ON

2-3

5-6

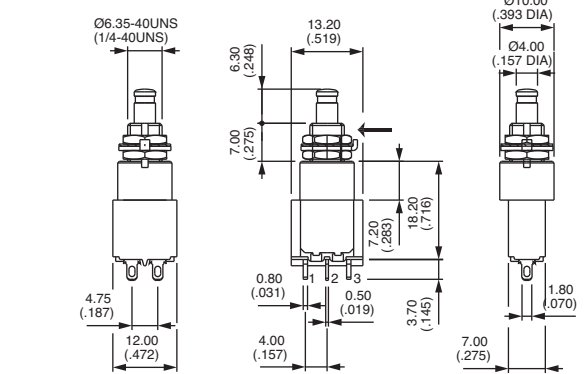
ON

MOM

ON

ON

→ Keyway



Straight PC terminals : 8400



Single pole
8432
8436

Double pole
8442
8446



ON

MOM

ON

ON

2-3

5-6

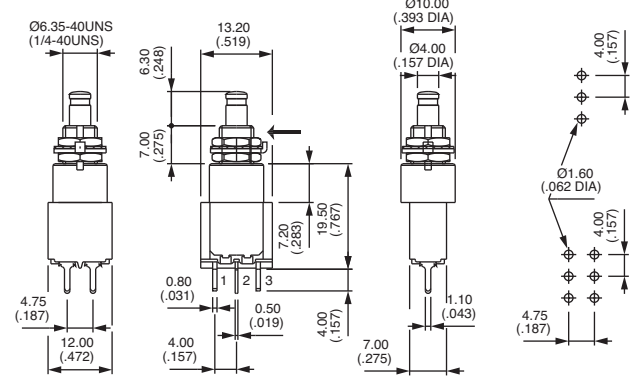
ON

MOM

ON

ON

→ Keyway



Right angle terminals - horizontal : 8400W



Single pole
8432W
8436W

Double pole
8442W
8446W



ON

MOM

ON

ON

2-3

5-6

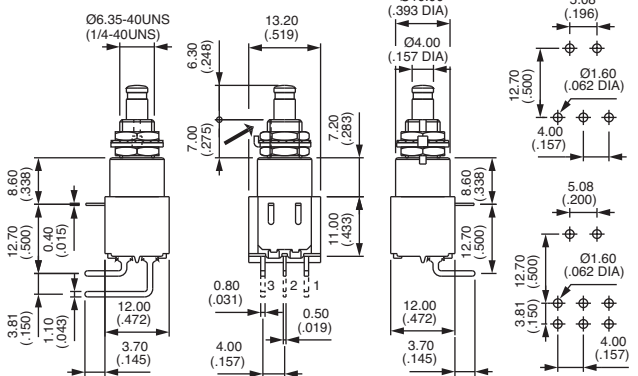
ON

MOM

ON

ON

→ Keyway

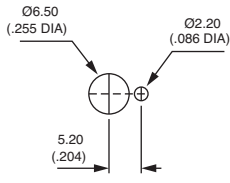




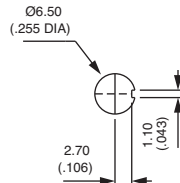
8000 series

Momentary or alternate action pushbutton switches

PANEL CUT-OUT



Standard



With K sealing option

CONTACT MATERIALS

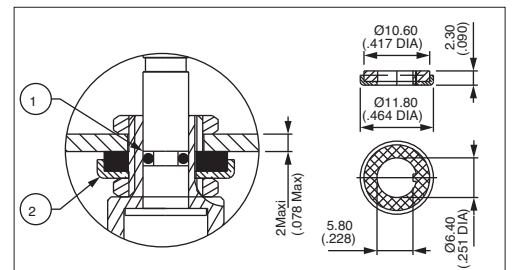


- A Silver
- AD Silver, gold plated
- CD Brass, gold plated

SEALING



- Blank** No sealing
 - B** Epoxy sealed terminals
 - K** Front panel sealing by one O-ring and sealing washer. Protects the switch against water and dust. Panel seal withstands 1 bar pressure.
 - KB** Combined sealings
- Sealing boot : see section H.



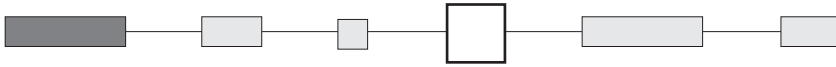
- ① O-ring
- ② Sealing washer

8000 series

Momentary or alternate action pushbutton switches

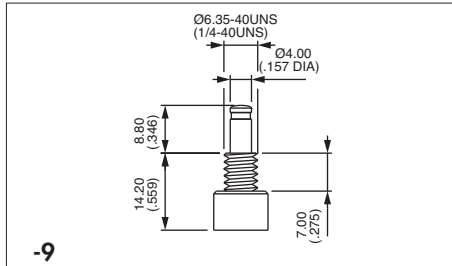
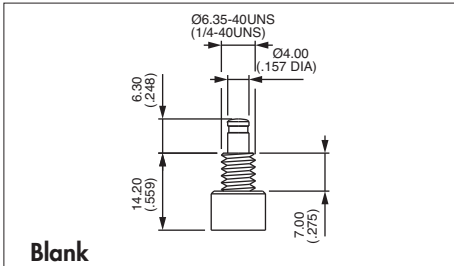


PLUNGERS



For $\varnothing 6,35$ (1/4) bushing

Dash compulsory before plunger code.

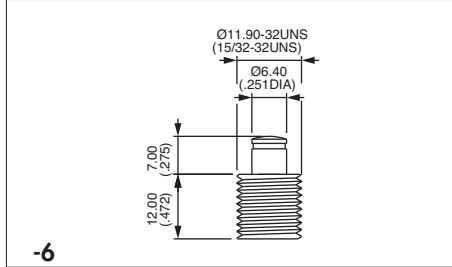
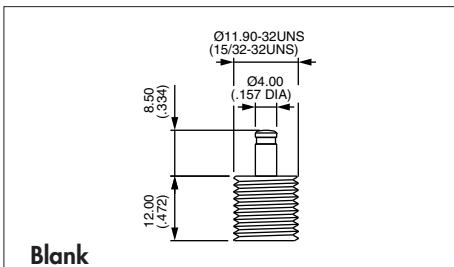


Blank

-9

Standard

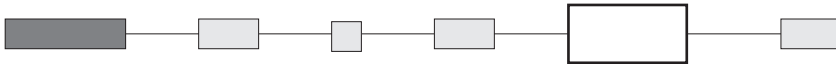
For $\varnothing 11,9$ (15/32) bushing (X718 models)



Blank

-6

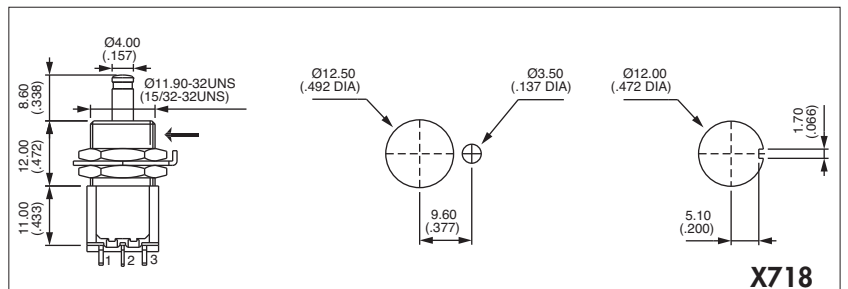
SPECIAL OPTIONS



X601 Silver plated brass contacts

Current/voltage rating for an electrical life of 20.000 cycles : 0,5A 30VDC.
Minimum quantity : 5.000 pieces per model and shipment.

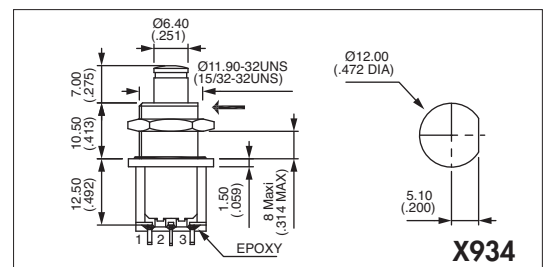
X718 Bushing $\varnothing 11,9$ (15/32)
For all basic models (solder lug straight PC or right angle terminals)
Available with plungers 13 and 6.
K sealing option available.



X718

X748 Snap-in mounting. Consult factory
Panel cut-out 15 x 12,5 (.59 x .492)

X934 Flatted bushing $\varnothing 11,9$ (15/32) + sealing by two O-rings (for plunger -6 only). Epoxy sealed terminals.



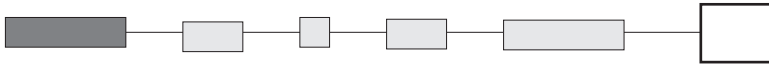
X934



8000 series

Momentary or alternate action pushbutton switches

APPROVAL



UL

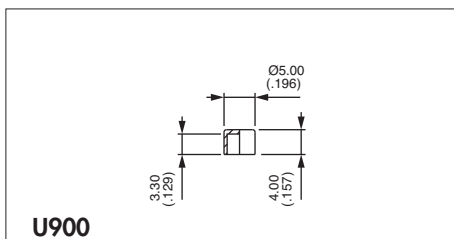
Availability : consult factory for details of approved models.

Marking : to order switches marked UL, complete above box with "UL".

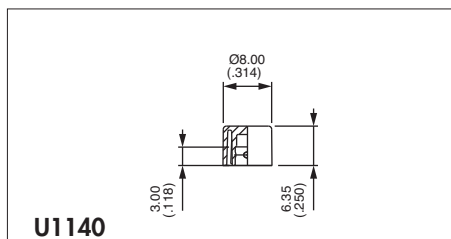
CAPS

Order separately.

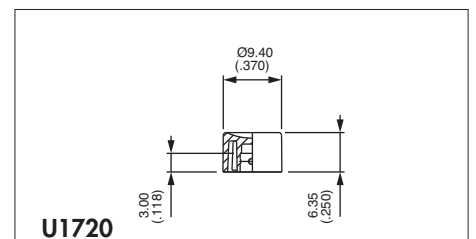
The caps below are for \varnothing 4 mm plungers (standard and -9), except U2600.



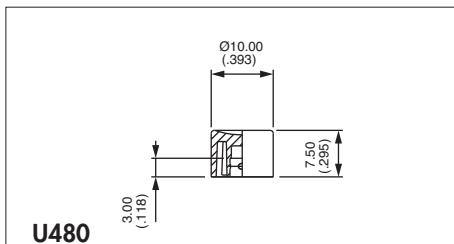
U900



U1140

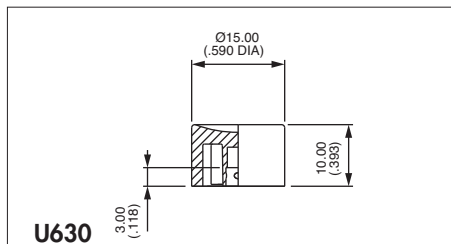


U1720



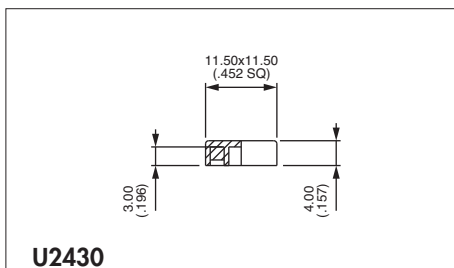
U480

Standard



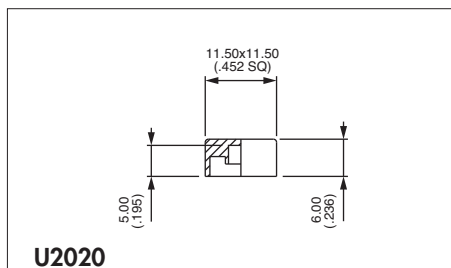
U630

Cap colours	
Replace last "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
6	red
7	ivory
7/1	white
9	orange



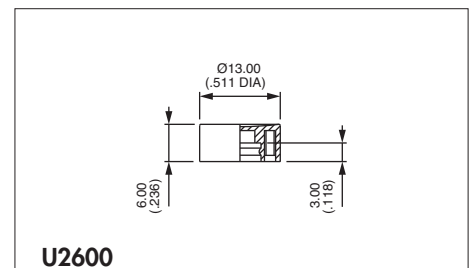
U2430

Square



U2020

Square

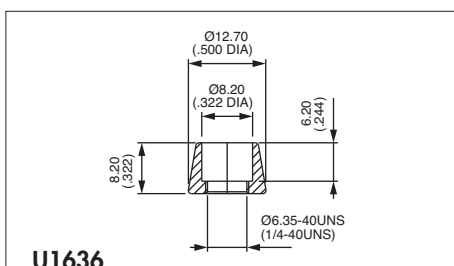


U2600

For large plunger -6 only.

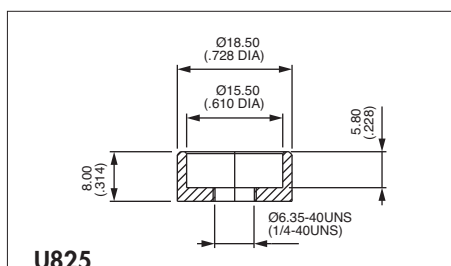
DRESS NUTS

Chrome plated. Order separately.



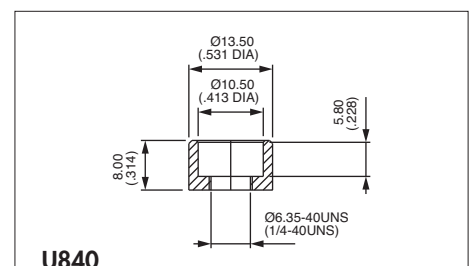
U1636

For cap U1140



U825

For cap U630



U840

For cap U480

9000 series

Momentary pushbutton switches

Distinctive features and specifications



- Two case lengths
- Three electrical functions
- Sealing options
- Model X1146 with $\varnothing 16$ (.630) bushing

B2

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contact (A) : 1A 30VDC
 - gold plated contacts (CD) : 100mA 30VDC
- Initial contact resistance : 50 m Ω max.
- Insulation resistance : 1.000 M Ω min. at 500VDC
- Dielectric strength :
 - 1.000 Vrms 50 Hz min. between terminals
 - 1.500 Vrms 50 Hz min. between terminals and frame
- Electrical life : 250.000 cycles

MATERIALS

- Case : thermoplastique UL94-V0
- Actuator : polyamide, glass filled
- Bushing : brass, nickel plated
- Contacts :
 - A : silver
 - CD : brass, gold plated
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

- Total travel :

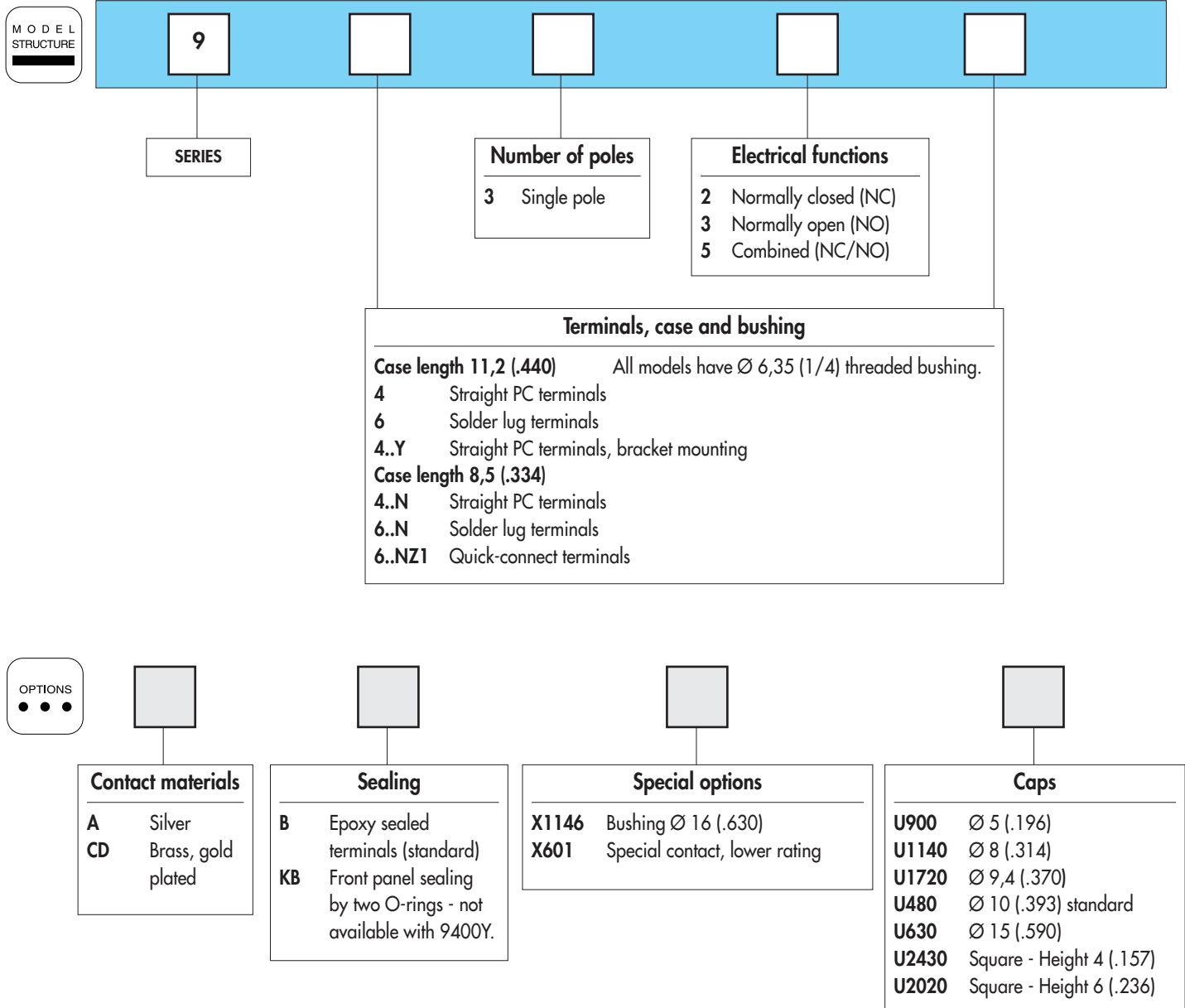
9600-9400-9400Y		9600N-9400N	
Functions 3 and 5	Function 2	Function 3	
1,3 mm	2 mm	0,9 mm	

- Torque : 1,25 Nm (.922 Ft.lb) max. applied to nut
- Operating temperature : -30°C to +65°C

9000 series

Momentary pushbutton switches

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :

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

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



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



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



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

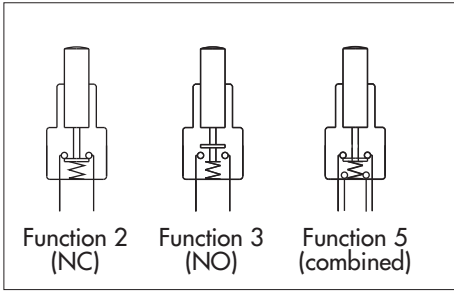


Packaging unit : 50 pieces, except for 9400Y (25 pieces)

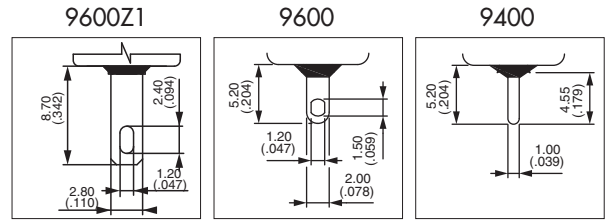
9000 series

Momentary pushbutton switches

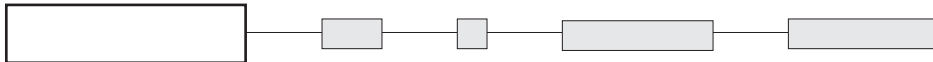
9600 - 9400 - 9400Y



- Single pole
- Solder lug or straight PC terminals
- Epoxy sealed terminals



MODEL STRUCTURE

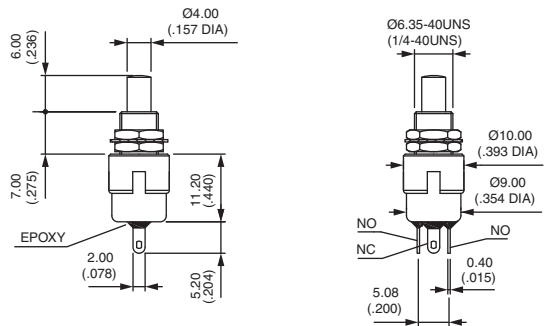


B2

Solder lug terminals - case length 11,2 (.440) : 9600



- | | | |
|--------------|--|-------------------|
| 9632B | | Normally Closed |
| 9635B | | Combined function |

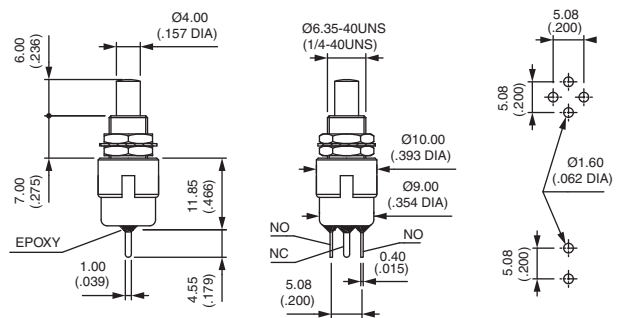


For Normally Open (function 3), see next page.

Straight PC terminals - case length 11,2 (.440) : 9400



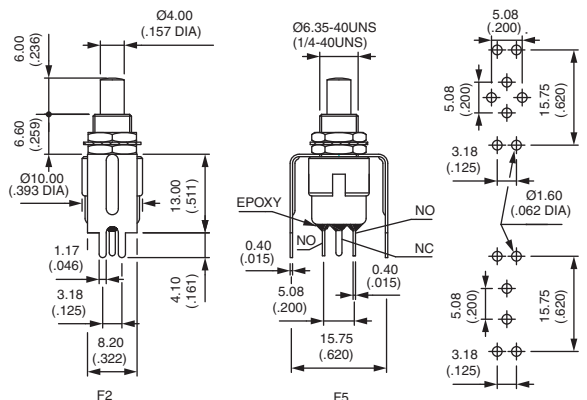
- | | | |
|--------------|--|-------------------|
| 9432B | | Normally Closed |
| 9433B | | Normally Open |
| 9435B | | Combined function |



Bracket mounting - case length 11,2 (.440) : 9400Y



- | | | |
|---------------|--|-------------------|
| 9432YB | | Normally Closed |
| 9433YB | | Normally Open |
| 9435YB | | Combined function |



The bracket is not fastened to the switch.



9000 series

Momentary pushbutton switches

9600N - 9400N

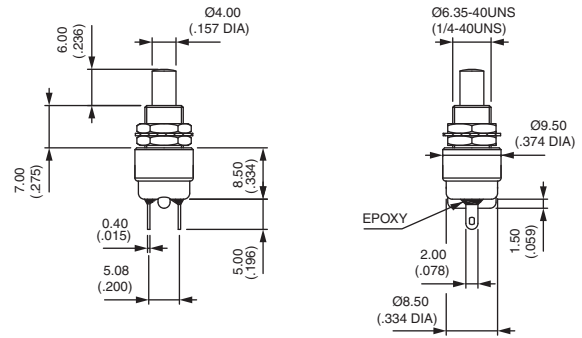
Solder lug terminals - case length 8,5 (.334) : 9600N



9633NB



Normally Open



Also available with quick-connect terminals 2,8 x 0,5 mm : 9633NZ1

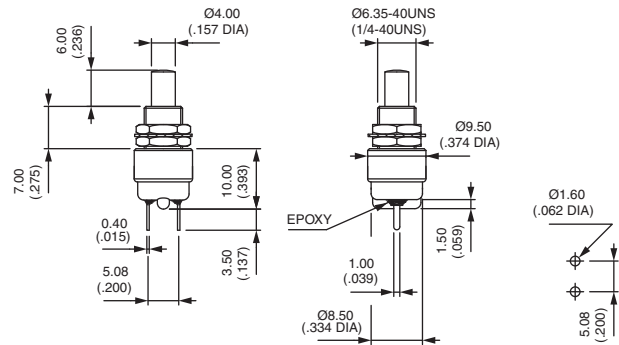
Straight PC terminals - case length 8,5 (.334) : 9400N



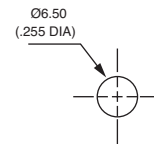
9433NB



Normally Open



PANEL CUT-OUT



Bushing Ø 16 (.630) - metal button : 9633•X1146



Silver contacts
9633AX1146

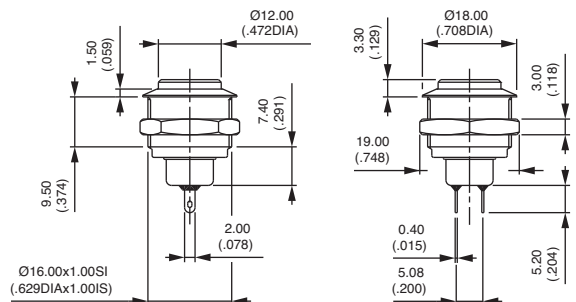


Normally open

Gold plated silver contacts
9633ADX1146



Normally open



Hex nut 19 (.748) across flats

Panel cut-out : Ø 16,2 (.637)

Max. current/voltage rating. : 1A 30VDC

Epoxy sealed terminals. Options of the following pages not applicable.

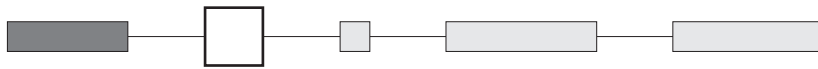
9000 series

Momentary pushbutton switches

OPTIONS



CONTACT MATERIALS



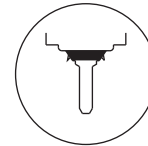
- A Silver
- CD Brass, gold plated

Special contact, lower rating : see X601 under "Special options".

SEALING



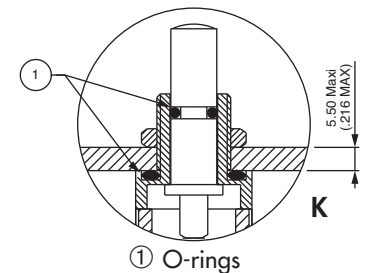
- B Epoxy sealed terminals (standard)



- KB Combined sealings
Epoxy sealed terminals + front panel sealing by two O-rings.
Protects the switch against water and dust.
Panel seal withstands 0,1 bar pressure.

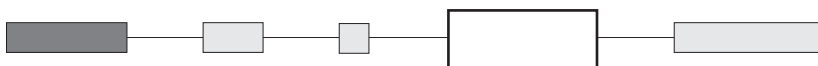


Option KB not available on 9400Y model.



Sealing boots : see section H.

SPECIAL OPTIONS



- X601 **Silver plated brass contacts**
Current/voltage rating for an electrical life of 20.000 cycles : 0,5A 30VDC.
Minimum quantity : 5.000 pieces per model and shipment.

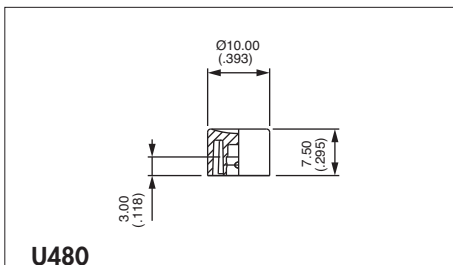
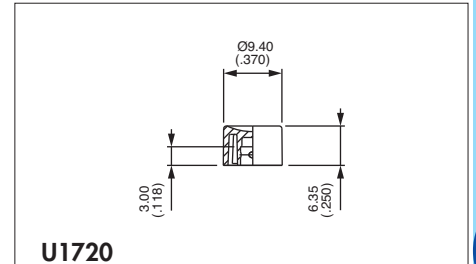
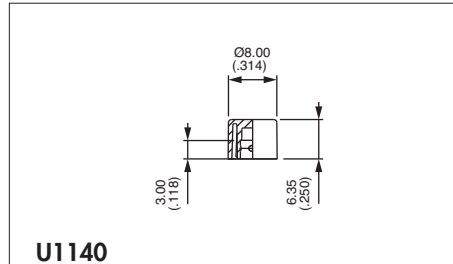
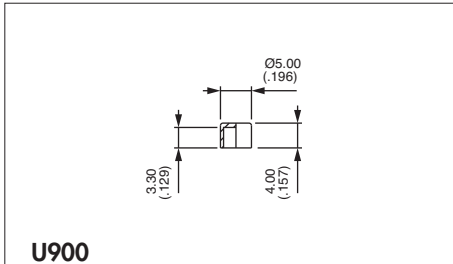
- X1146 **Model with dia. 16 (.630) bushing and metal plunger**
See previous page.



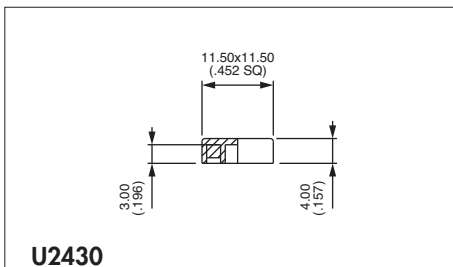
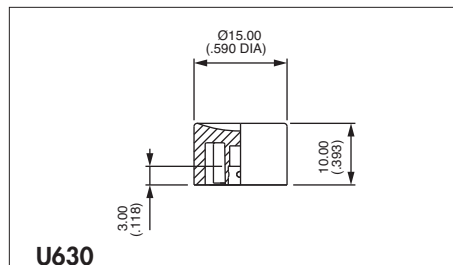
9000 series

Momentary pushbutton switches

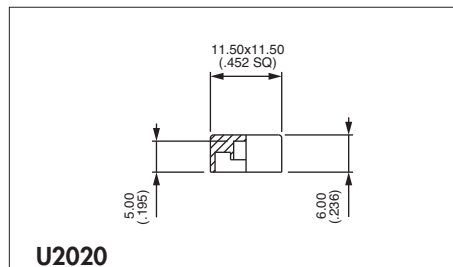
CAPS



Standard



Square

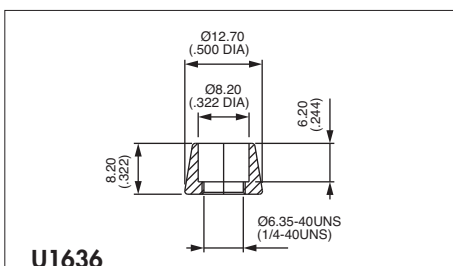


Square

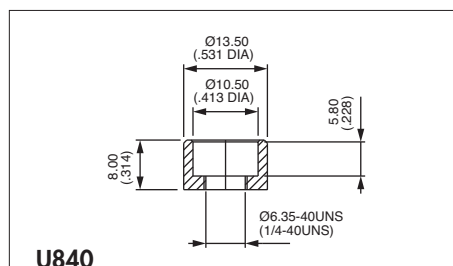
Cap colours	
Replace last "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
6	red
7	ivory
7/1	white
9	orange

DRESS NUTS

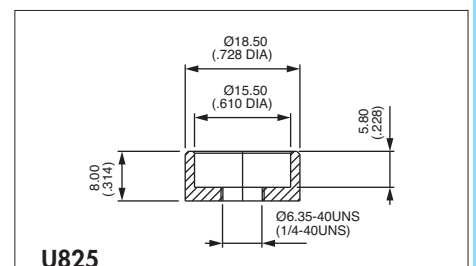
Chrome plated. Order separately.



For cap U1140



For cap U480



For cap U630

9000 series

Alternate action or momentary pushbutton switches

Distinctive features and specifications



❑ Bushing Ø 6,35 (1/4) and 11,9 (15/32)

❑ Two electrical functions

B2

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load and electrical life :
 - silver contacts (A) : 1A 28VDC - 250.000 cycles
 - 3A 28VDC - 10.000 cycles
 - gold plated contacts (CD) : 0,4VA 20V max. AC or DC
- Initial contact resistance : 10 mΩ max. at 0,1A 3VDC
- Insulation resistance : 10.000 MΩ min.
- Dielectric strength :
1.000 Vrms 50 Hz min.

MATERIALS

- Case : diallyphthalate
- Actuator : nylon
black for series 9630M
white for series 9631
- Bushing : brass, nickel plated
- Contacts :
 - A** : silver
 - CD** : brass, gold plated
- Terminal seal : epoxy

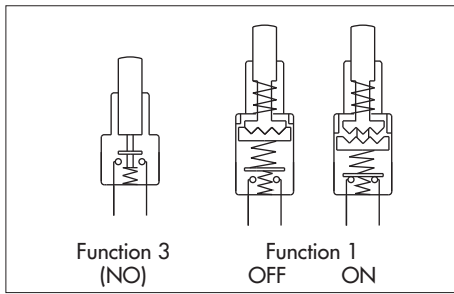
GENERAL SPECIFICATIONS

- Operating temperature : -30°C to +85°C
- Travels : see table below.

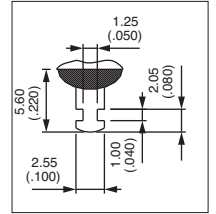
MODELS	9631	9633M
Total travel	3,48 (.137)	2,79 (.110)
Pre-travel	0,66 (.026)	-
Over travel	2,69 (.106)	0,51 (.020)

9000 series

Alternate action or momentary pushbutton switches



- Single pole
- Solder lug terminals
- Epoxy sealed terminals



B2

Bushing Ø 6,35 (1/4) - Alternate action - tactile feedback

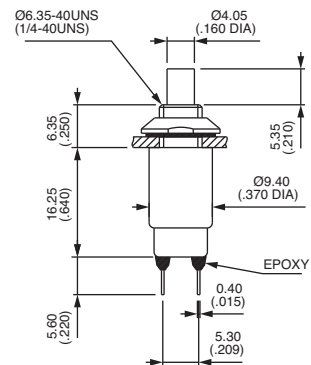


Gold plated contacts
9631CDB

ON - OFF

Silver contacts
9631AB

ON - OFF



Standard hardware : 1 conic nut and 1 lockwasher

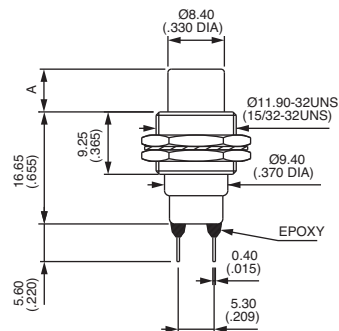
Bushing Ø 11,9 (15/32) - front or rear mounting - NO



9633MCDB



Normally open



MODEL	A
9633M	6.35 (.250)

Standard hardware : 2 hex nuts 14 mm (.551) across flats and 1 lockwasher

10400 series

Professional pushbutton switches - threaded bushing Ø 10 (.393)

Distinctive features and specifications



☐ CECC approved

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 3A 24VDC
- Minimum load : 100µA 10mV
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 1.000 Veff. 50 Hz min. between terminals of the same pole
 - 2.000 Veff. 50 Hz min. between terminals and frame
 - 2.000 Veff. 50 Hz min. between terminals of adjacent poles
- Electrical life : 50.000 cycles

MATERIALS

- Case : diallyphthalate (DAP)
- Actuator : brass, chrome plated
- Bushing : brass, nickel plated
- Housing : brass, nickel plated
- Contacts :
 - silver
 - gold plated silver
- Terminal seal : epoxy

APPROVAL



CECC 96401-001

Availability : consult factory for details of approved models.

Marking : to order switches marked CECC, add "CECC" to model number.

GENERAL SPECIFICATIONS

- Torque : 1,50 Nm (1.106 Ft.lb)
max. applied to nut
- Operating temperature :
-40°C to +85°C
- Max. panel thickness :
3,5 mm (.138)

ABOUT THIS SERIES

Complete part numbers are shown on the following page.

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



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



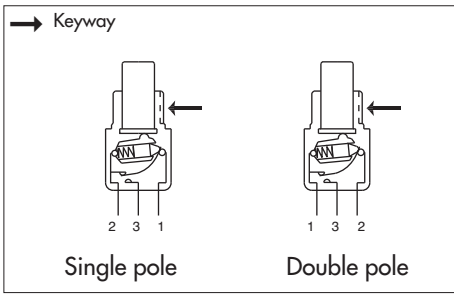
Mounting accessories : standard hardware supplied with all models : 1 knurled nut, 1 hex nut, 1 locking ring and 1 lockwasher. They are presented in section I.



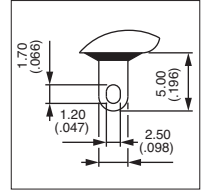
Packaging unit : 25 pieces.

10400 series

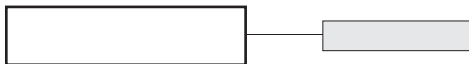
Professional pushbutton switches - threaded bushing $\varnothing 10$ (.393)



- Solder lug terminals
- 1 and 2 pole configurations
- Available with matt black finish : consult factory for model number



MODEL STRUCTURE



B2

Single pole

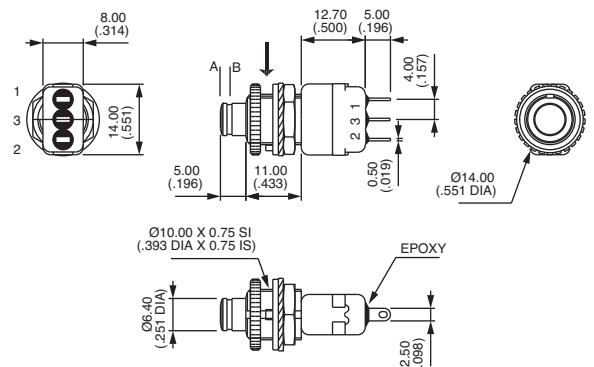


Silver contacts
104350003

Gold plated silver contacts
104350108

	A	B
	1-2	1-3
	ON	- MOM
	ON	- MOM

→ Keyway



Double pole

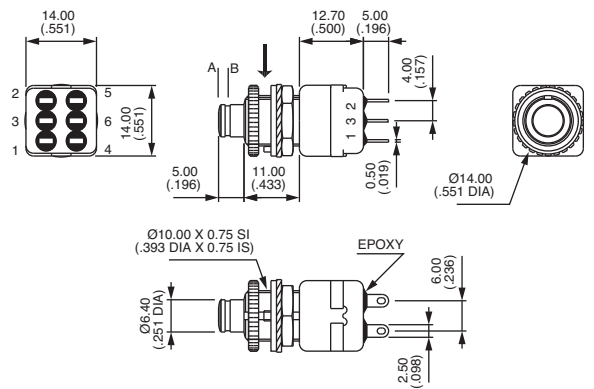


Silver contacts
104450003

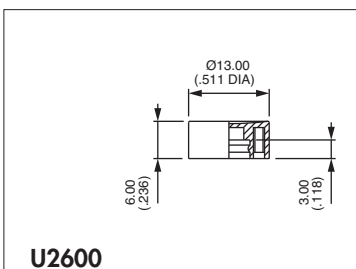
Gold plated silver contacts
104450108

	A	B
	2-1	2-3
	5-4	5-6
	ON	- MOM
	ON	- MOM

→ Keyway



CAP

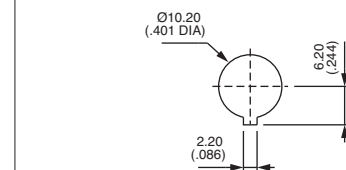


Cap colours

Replace last "0" by number

1	blue	5	yellow
1/4	dark blue	6	red
2	black	7	ivory
3	green	7/1	white
4	grey	9	orange

PANEL CUT-OUT



13000 series

Professional quick-break momentary pushbutton switches

Distinctive features and specifications



- PC and panel mount models
- Bushing \varnothing 6,35 (1/4) and 11,9 (15/32)
- UL and CECC approved

B2

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts (A-AD2) : 4A 30VDC
 - gold plated contacts (CD) : 100mA 30V
- Minimum load (AD2-CD 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 :

Contacts	Max. current/voltage rating	Number of cycles
A	4A 30VDC	50.000
AD2	4A 30VDC (gold plating : 100mA 30VDC max.)	20.000
CD	100mA 30VDC	50.000
	Low level or mechanical life	150.000

MATERIALS

- Case : diallylphthalate (DAP)
- Actuator : brass, nickel plated
- Bushing : brass, nickel plated
- Housing : brass, nickel plated
- Contacts : **A** : silver
AD2 : silver, gold plated
(2 micron gold)
CD : brass, gold plated
- Terminal seal : epoxy

Note : AD2 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 (.922 Ft.lb)
max. applied to nut
- Standard panel thickness : 2 mm
(.078) max.
- Total travel : 2 mm (.078)
- Operating temperature :
-40°C to +85°C

13000 series

Professional quick-break momentary pushbutton switches

Specifications

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



Designed to MIL specifications

Availability :

UL : all models with silver or gold plated silver contacts
CECC : consult factory for details of approved models.

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

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



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 mm (.314) across flats, 1 locking ring and 1 lockwasher.

Standard and special hardware available are presented in section I.

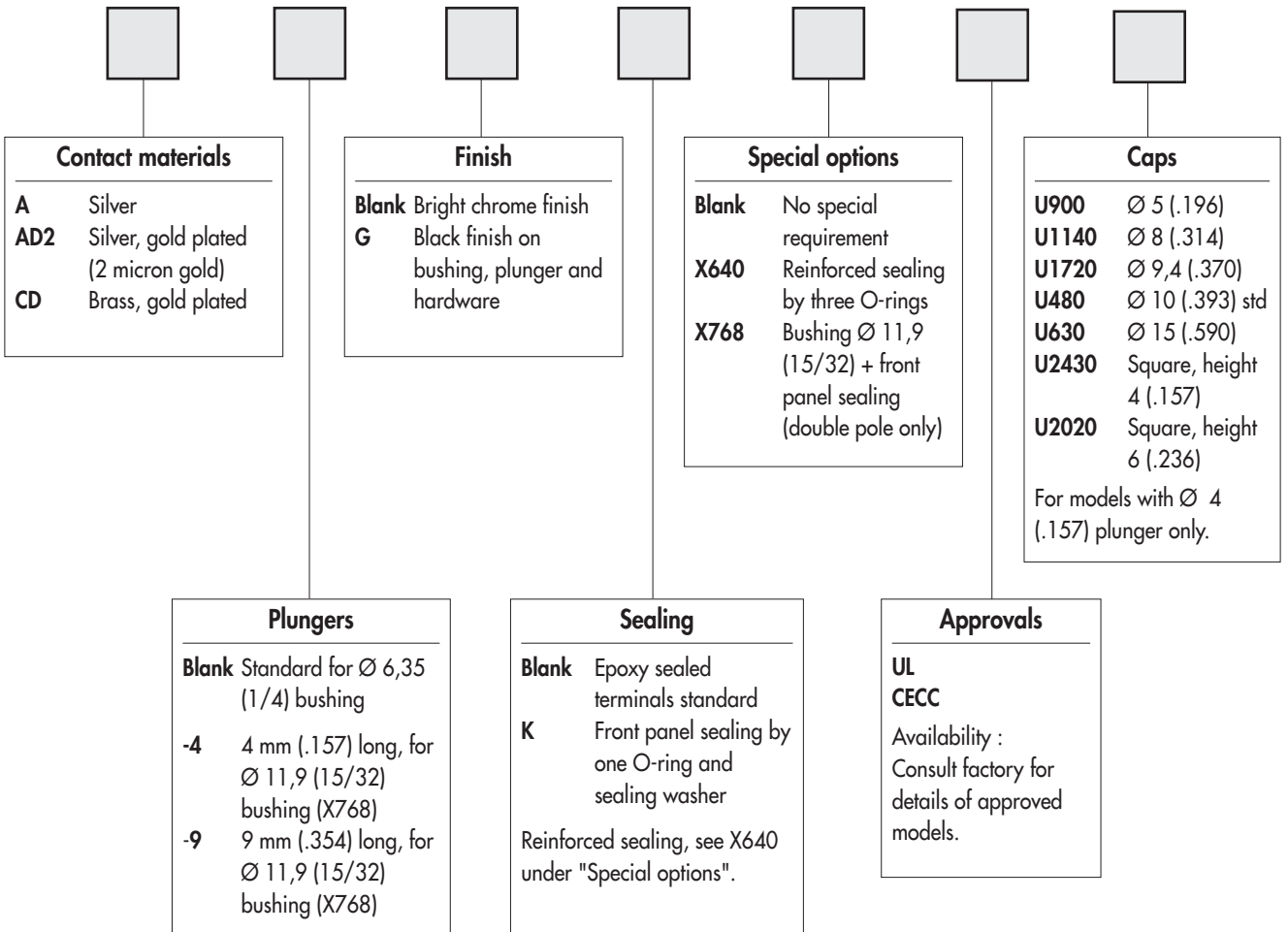
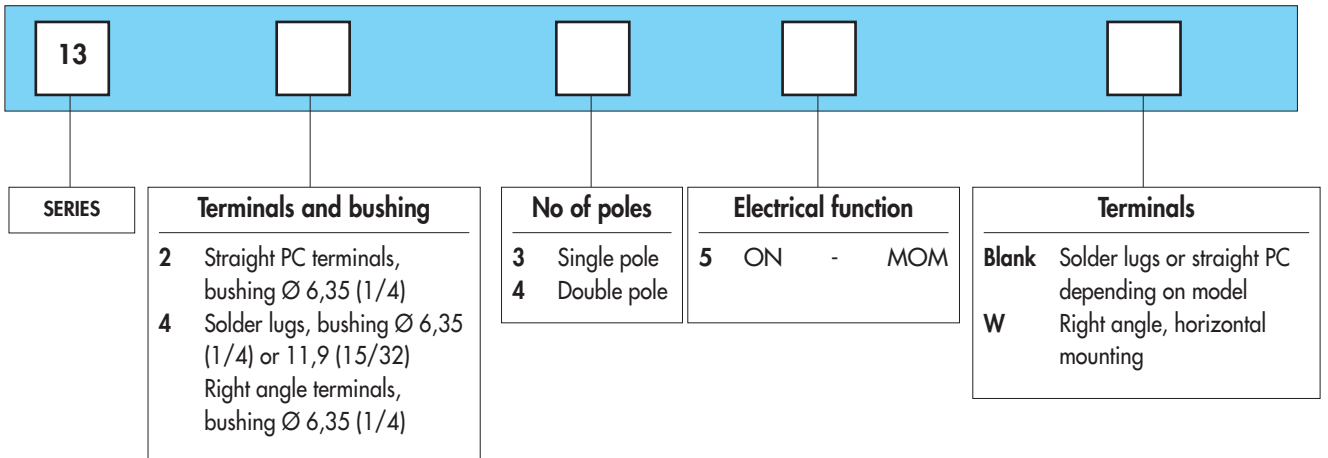


Packaging unit : 50 pieces.

13000 series

Professional quick-break momentary pushbutton switches

Overview



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

ABOUT THIS SERIES

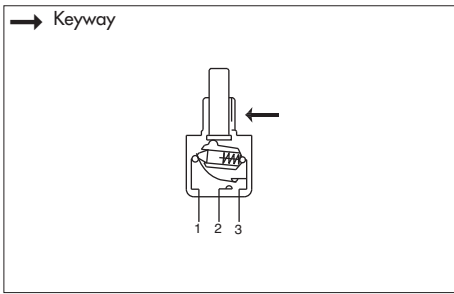
- On the following pages, you will find successively :
- model structure of switches
 - options in the same order as in above chart



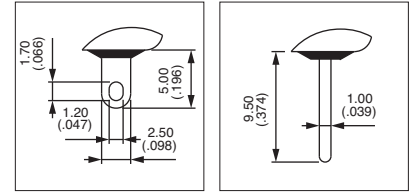
13000 series

Professional quick-break momentary pushbutton switches

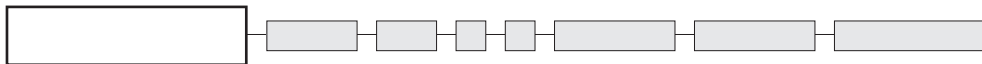
Solder lug terminals : 13400 - Straight PC terminals : 13200



- Threaded bushing $\varnothing 6,35$ mm (1/4)
- Epoxy sealed terminals standard



MODEL STRUCTURE



B2

Solder lug terminals : 13400

→ Keyway



Single pole
13435

Double pole
13445



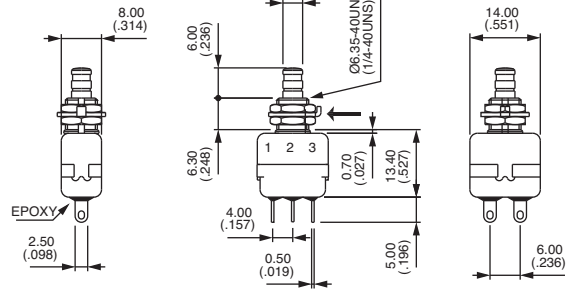
1-3

ON



1-2

MOM



Straight PC terminals : 13200

→ Keyway



Single pole
13235

Double pole
13245



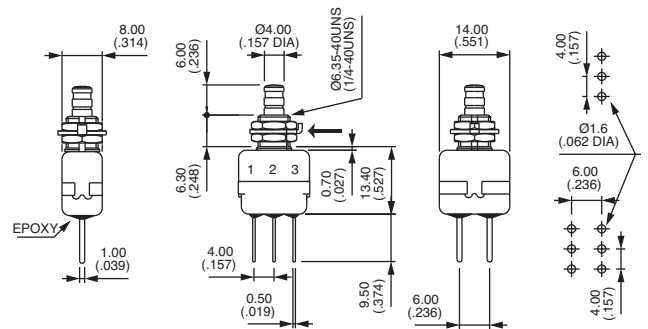
1-3

ON



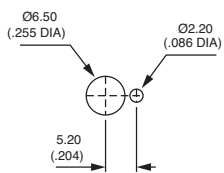
1-2

MOM

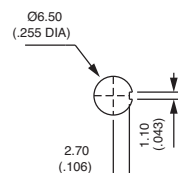


PANEL CUT-OUT

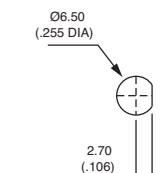
13400 - 13200



Standard



With K
sealing option



With X640
sealing option

13000 series

Professional quick-break momentary pushbutton switches

Right angle terminals : 13400W

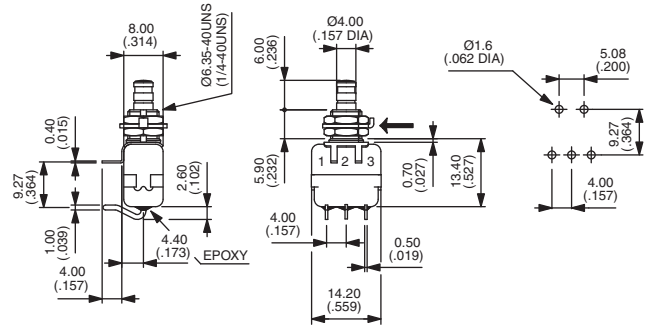
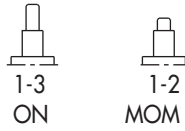


Right angle terminals - single pole

→ Keyway

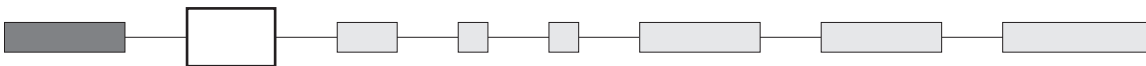


13435W



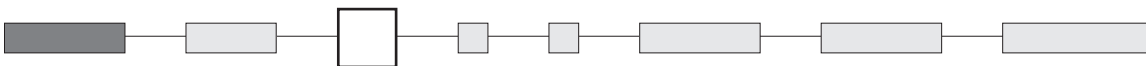
Panel cut-out, see previous page.

CONTACT MATERIALS



- A Silver
- AD2 Silver, gold plated (2 micron gold)
- CD Brass, gold plated

PLUNGER



Dash compulsory before plunger code.

- Blank Standard plunger for $\varnothing 6,35$ (1/4) bushing
- 4 4 mm (.157) long plunger for $\varnothing 11,9$ (15/32) bushing (X768 option)
- 9 9 mm (.354) long plunger for $\varnothing 11,9$ (15/32) bushing (X768 option)

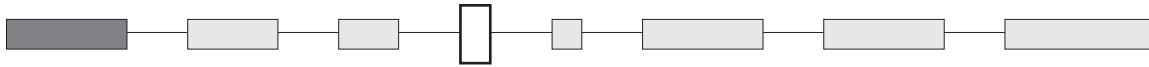
B2



13000 series

Professional quick-break momentary pushbutton switches

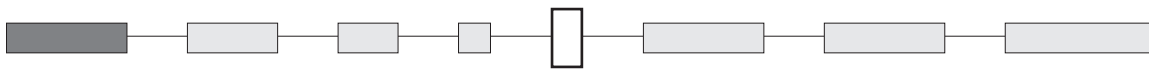
FINISH



Blank Bright chrome finish

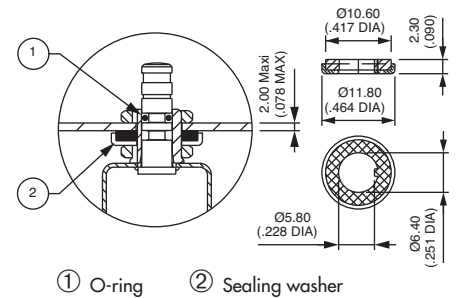
G Black finish on bushing, actuator and hardware

SEALING

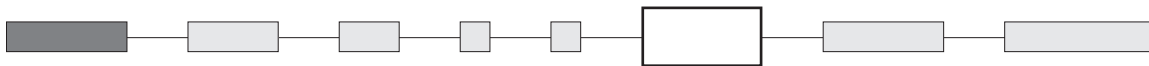


K Front panel sealing by one O-ring and sealing washer. Protects the switch against water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.

Reinforced sealing : see X640 under "Special options".



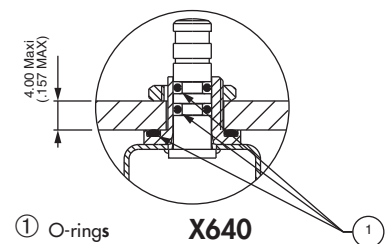
SPECIAL OPTIONS



X640 Front panel sealing by three O-rings. Flatted bush for precise orientation. Protects the switch against water and dust. Panel seal withstands 1 bar pressure and remains sealed even when switch is operated.

Available on models with Ø 6,35 (1/4) bushing only.

X935 C-ring on plunger for positive stop



13000 series

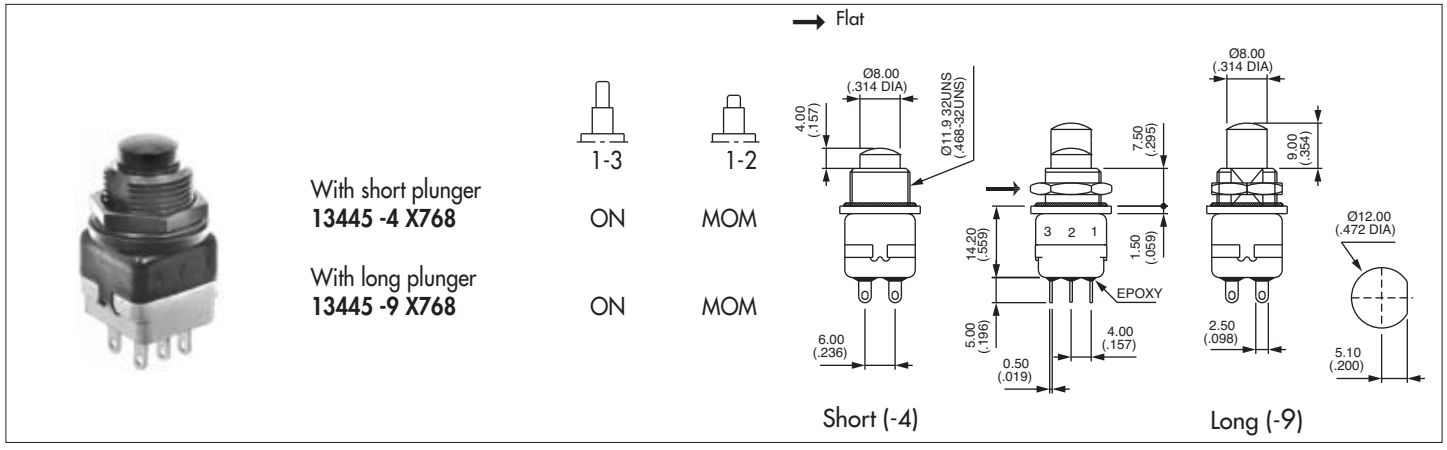
Professional quick-break momentary pushbutton switches



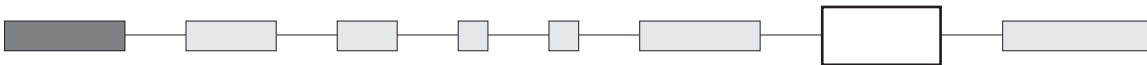
X768 Sealed switch with $\varnothing 11,9$ (15/32) flatted bushing. Chrome plated actuator. Solder lug terminals, double pole. Contact and finish options available.

Security cap for this model : see section I.

B2



AGENCY APPROVALS



UL

CECC CECC 96401-001

Availability :

UL : all models with silver or gold plated silver contacts

CECC : consult factory for details of approved models.

Marking : to order switches marked UL or CECC, please complete above box with desired approval.

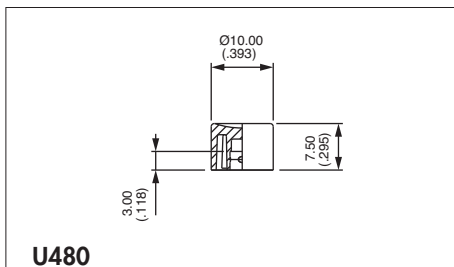
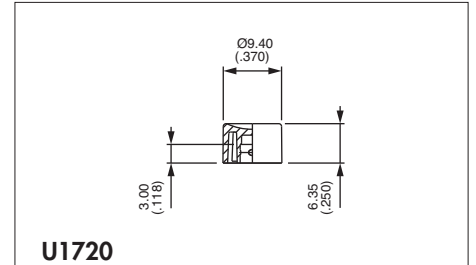
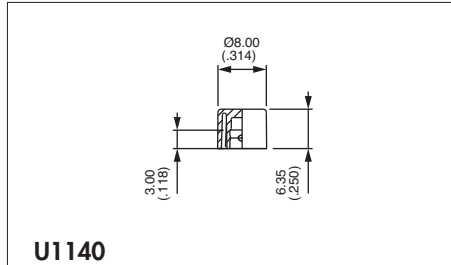
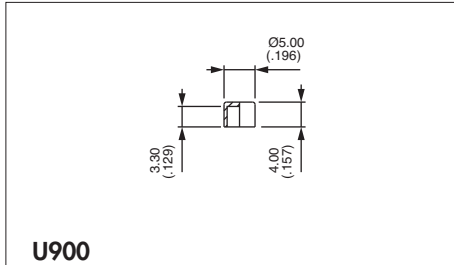
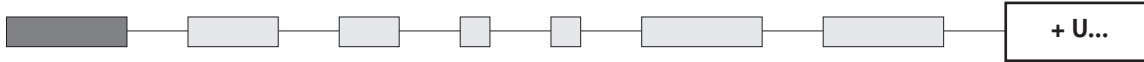
Blank : no agency approval required.



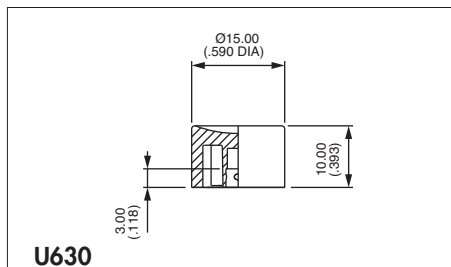
13000 series

Professional quick-break momentary pushbutton switches

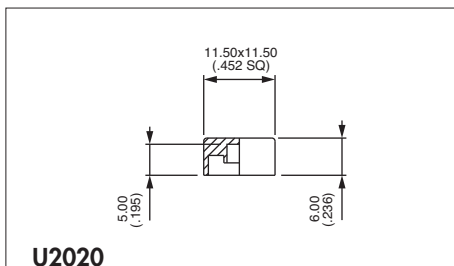
CAPS



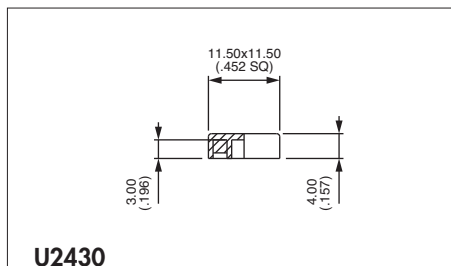
Standard



For models with Ø 6,35 (1/4) bushing only.



Square



Square

Cap colours

Replace last "0" by number

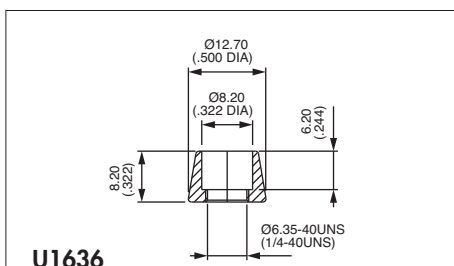
- 1 blue
- 1/4 dark blue
- 2 black
- 3 green
- 4 grey
- 5 yellow
- 6 red
- 7 ivory
- 7/1 white
- 9 orange

DRESS NUTS

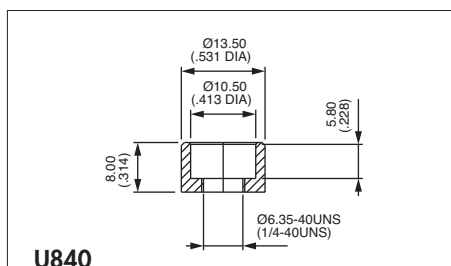
Chrome plated



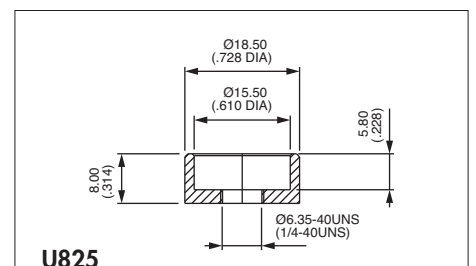
For models with Ø 6,35 (1/4) bushing only.



For cap U1140



For cap U480



For cap U630

Dress nuts are to be ordered separately.

13000X778 series

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

Distinctive features

New!



3-pole configurations now available !

Agency approvals



CECC 96401-001 (double pole only)

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

Contacts

Highly reliable contacts suitable for low level applications or power applications.

Double shell case

For high mechanical strength and high electrical insulation.

Compact size

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

Finish

Black finish on body, bushing, plunger and hardware.

Full sealing

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

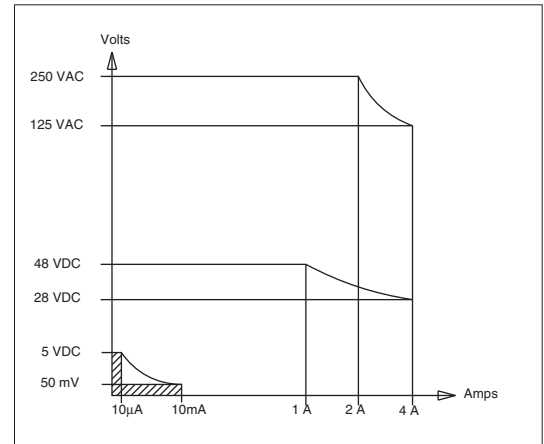
13000X778 series

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

Specifications

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 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 4A 28VDC : 10.000 cycles
 - At low level (50mV 10mA) : 150.000 cycles

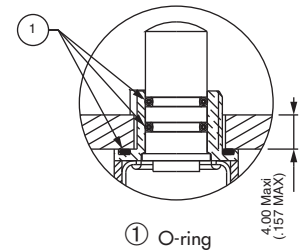


MATERIALS

- Case : diallylphthalate (DAP) with PBT external shell (epoxy sealed)
- Actuator : brass, black chrome plated
- Bushing : brass, black chrome plated
- Contacts : silver inlay - gold plated over nickel barrier

SEALING

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



GENERAL SPECIFICATIONS

- Total travel : 2 mm (.078)
- Torque : 1,50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness : 5 mm (.196) max.
- Shock test : 50g - 11 ms (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)

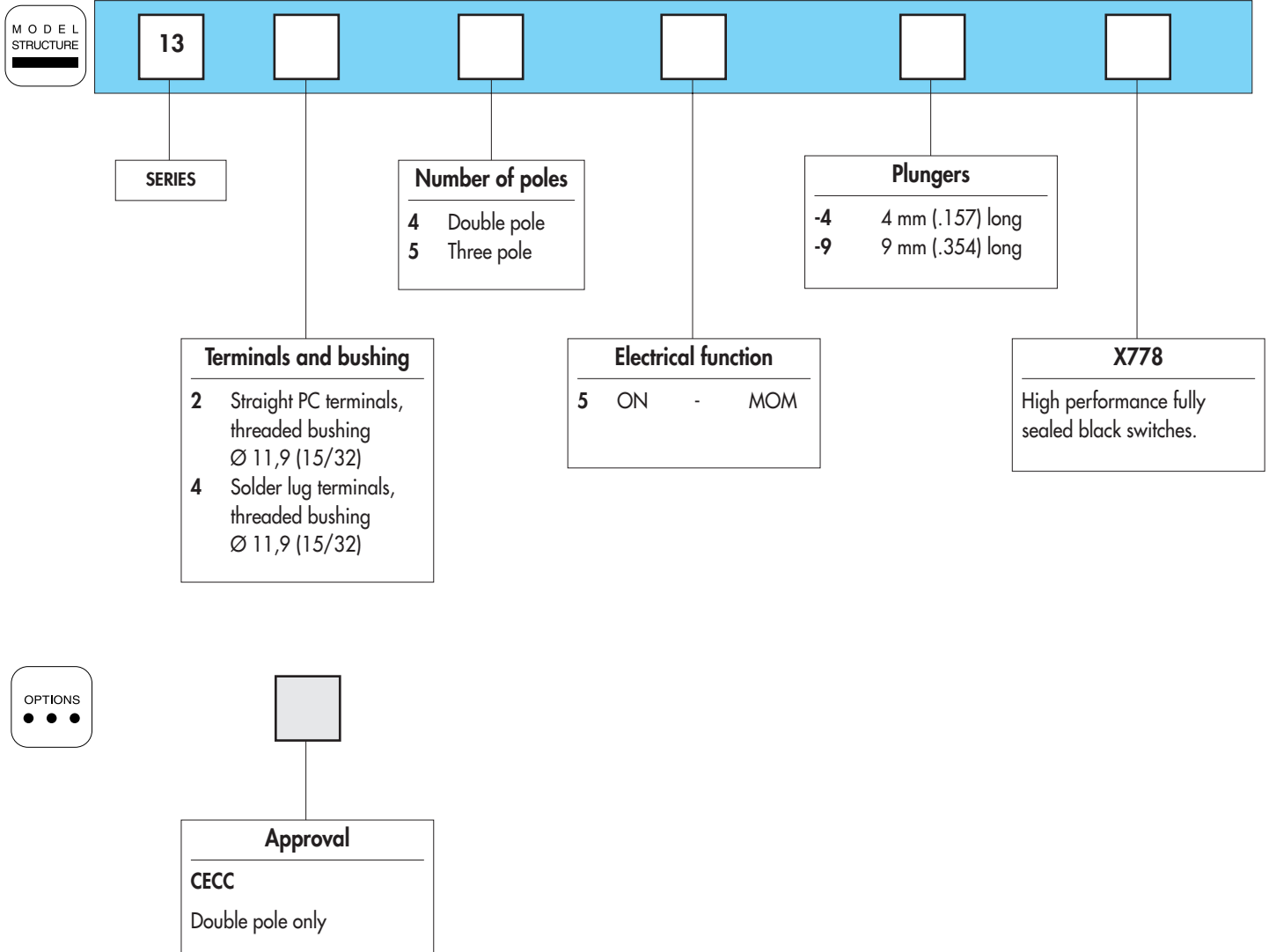
APPROVALS

Many double pole models have full CECC approval. Consult factory for details of approved models. To order switches marked CECC, complete appropriate box of ordering format.

13000X778 series

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

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 bracketed 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 (.551) across flats, part number U41. This nut is presented after model structure of switches.

Security cap available to prevent inadvertent plunger operation. See section I.

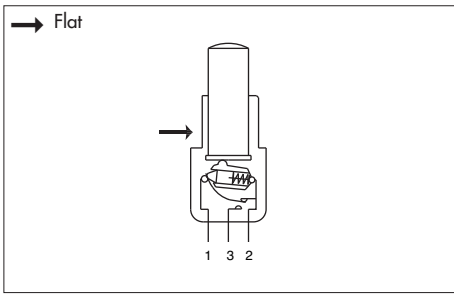


Packaging unit : 25 pieces

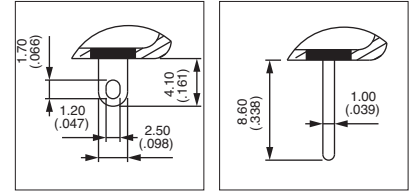
13000X778 series

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

Fully sealed - black



• Quick-break momentary pushbutton switches



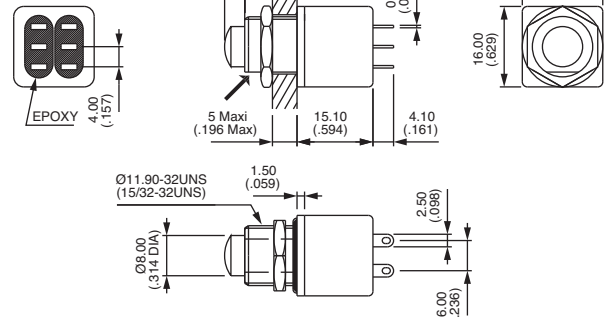
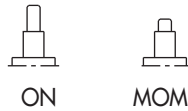
MODEL
STRUCTURE



Solder lug terminals - double pole - 4 mm (.157) plunger → Flat



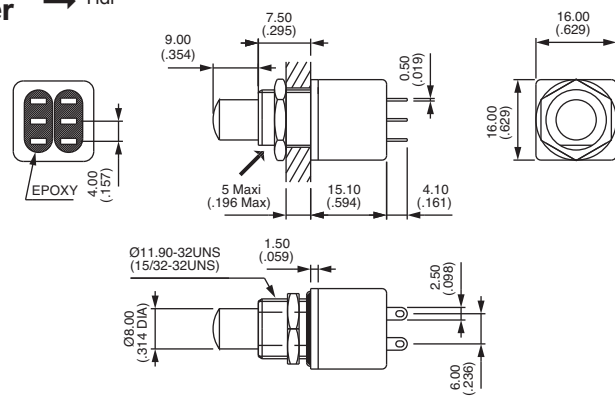
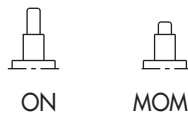
13445-4X778



Solder lug terminals - double pole - 9 mm (.354) plunger → Flat



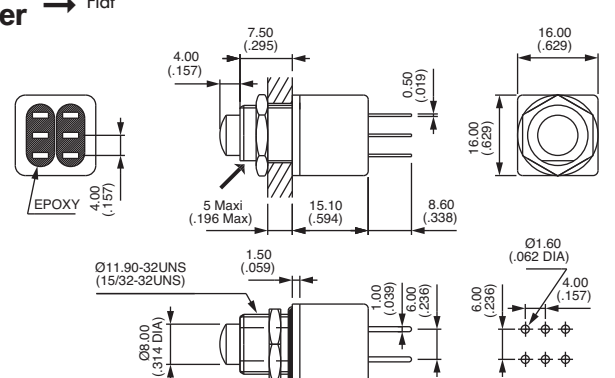
13445-9X778



Straight PC terminals - double pole - 4 mm (.157) plunger → Flat



13245-4X778



13000X778 series

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

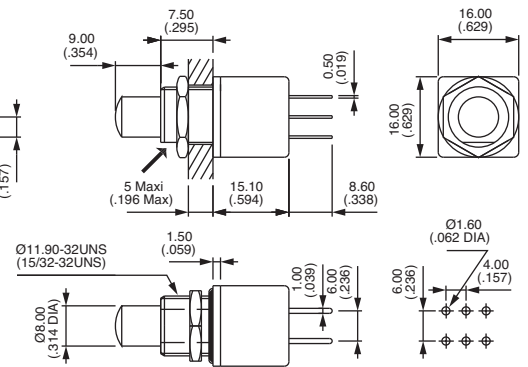
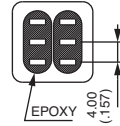
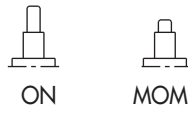
Fully sealed - black

B2

Straight PC terminals - double pole - 9 mm (.354) plunger → Flat



13245-9X778

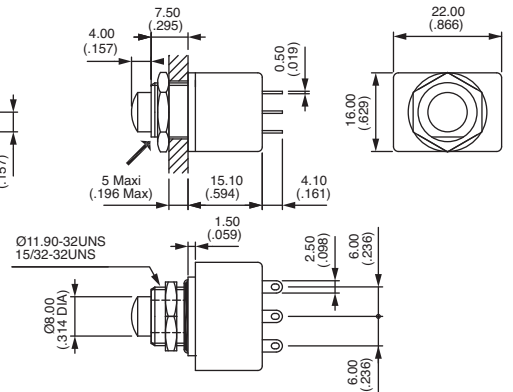
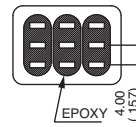
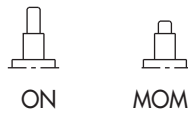


Solder lug terminals - three pole - 4 mm (.157) plunger → Flat



13455-4X778

New!

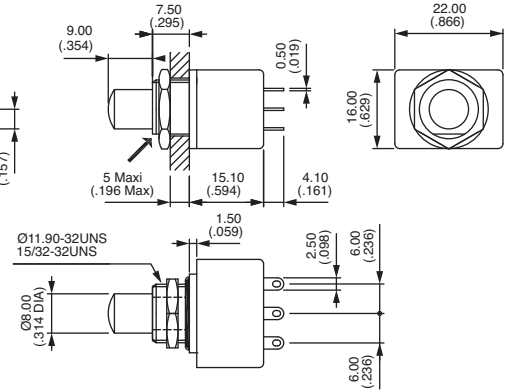
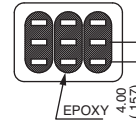


Solder lug terminals - three pole - 9 mm (.354) plunger → Flat



13455-9X778

New!

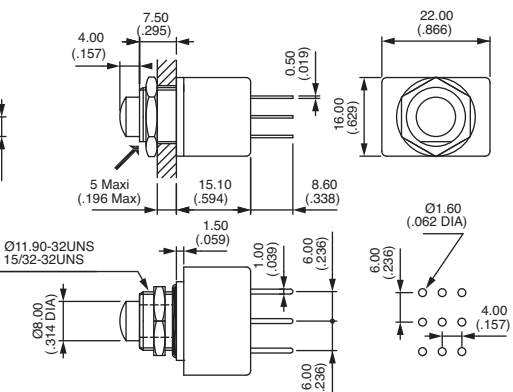
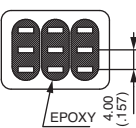


Straight PC terminals - three pole - 4 mm (.157) plunger → Flat



13255-4X778

New!



13000X778 series

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

Fully sealed - black

Straight PC terminals - three pole - 9 mm (.354) plunger → Flat



13255-9X778

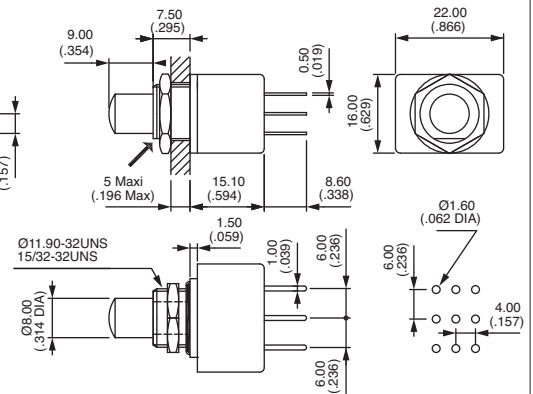
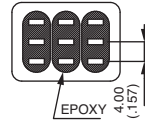
New!



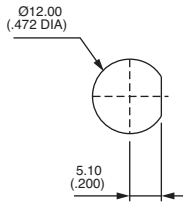
ON



MOM

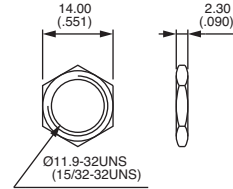


PANEL CUT-OUT



STANDARD HARDWARE

Hex nut

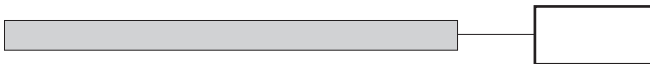


U41 (matt black)

POSITIONS AND CONNECTIONS

FUNCTION	BUTTON POSITION AND CONNECTIONS		TERMINAL IDENTIFICATION
	I	II	
DOUBLE POLE	ON	MOM	→ Flat
13245	A 1-2	A 1-3	
13445	B 1-2	B 1-3	
THREE POLE	A 1-2	A 1-3	
13255	B 1-2	B 1-3	
13455	C 1-2	C 1-3	

AGENCY APPROVAL



CECC CECC 96401-001 (double pole only)

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

13000X778 series **New!**

High performance pushbutton switches - threaded bushing $\varnothing 11,9$ (15/32) - alternate action

Distinctive features

Applications

These professional switches are suitable for use in military and other high specifications environments.

Alternate action

Now available as a bistable switch to have a maintained electrical contact.

Contacts

Highly reliable contacts suitable for low level applications or power applications.

Double shell case

For high mechanical strength and high electrical insulation.

Compact size

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

Finish

Black finish on body, bushing, plunger and hardware.

Full sealing

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



B2

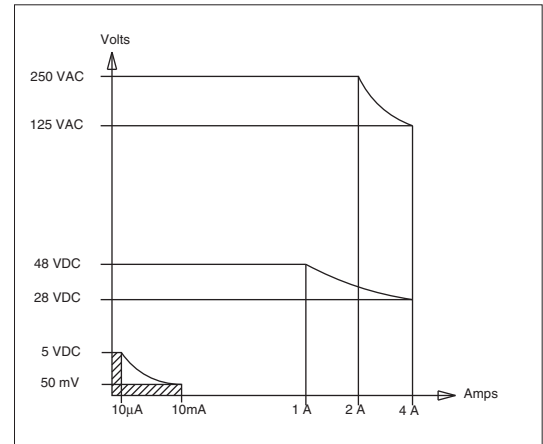
New! 13000X778 series

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

Specifications

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 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 4A 28VDC : 10.000 cycles
 - At low level (50mV 10mA) : 150.000 cycles

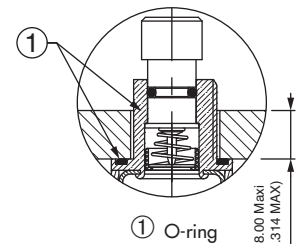


MATERIALS

- Case : diallylphthalate (DAP) with PBT external shell (epoxy sealed)
- Actuator : brass, black chrome plated
- Bushing : brass, black chrome plated
- Contacts : silver inlay - gold plated over nickel barrier

SEALING

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



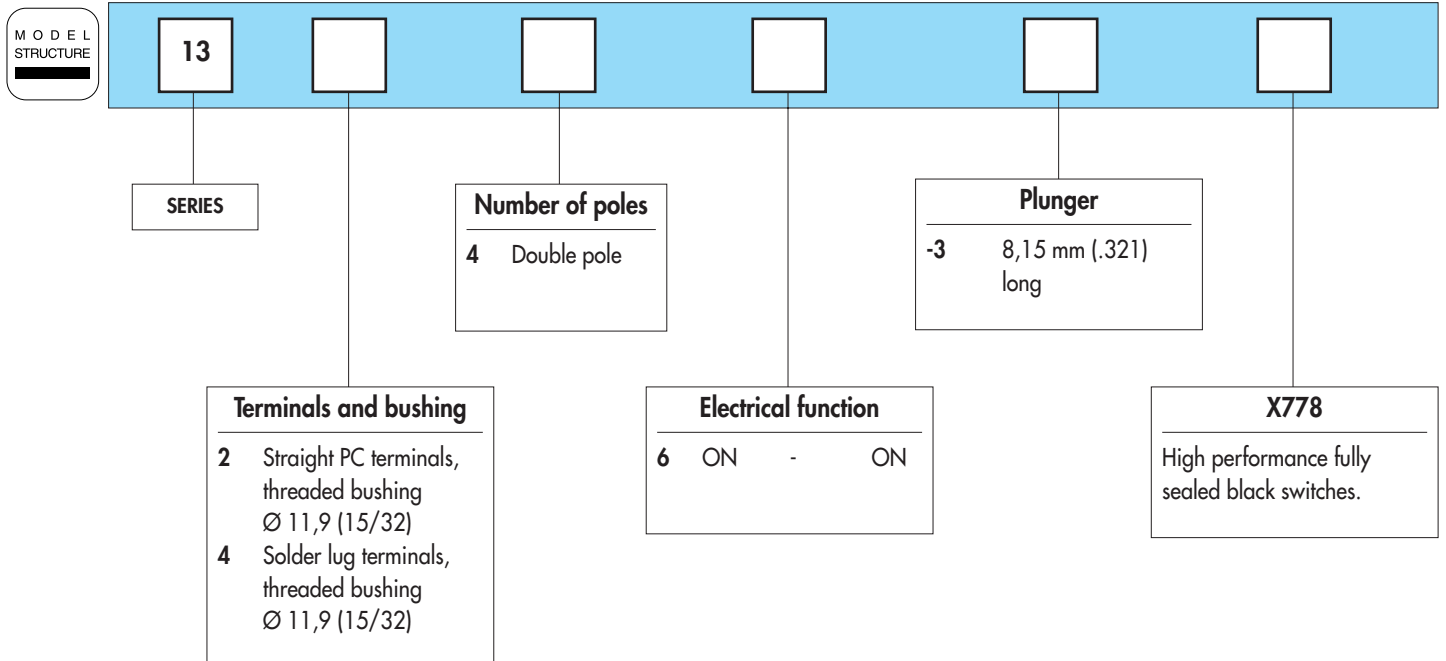
GENERAL SPECIFICATIONS

- Total travel : 2,5 mm (.098)
- Torque : 1,50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness : 8 mm (.315) max.
- Shock test : 50g - 11 ms (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)

13000X778 series **New!**

High performance pushbutton switches - threaded bushing Ø 11,9 (15/32) - alternate action

Overview



ABOUT THIS SERIES

Dimensions : first dimensions are in mm while inches are shown as bracketed 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 (.551) across flats, part number U41. This nut is presented after model structure of switches.

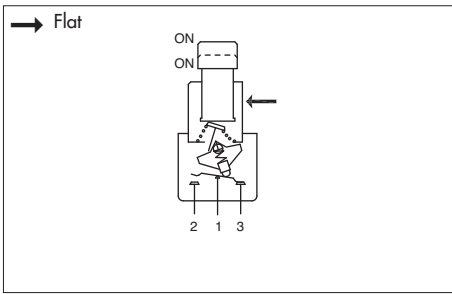


Packaging unit : 25 pieces

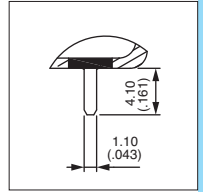
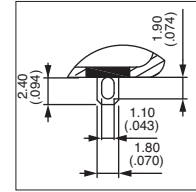
New! 13000X778 series

High performance pushbutton switches - threaded bushing $\varnothing 11,9$ (15/32) - alternate action

Fully sealed - black



- Alternate action pushbutton switches
- Button returns in upper position after actuation.



MODEL
STRUCTURE



Solder lug terminals - double pole

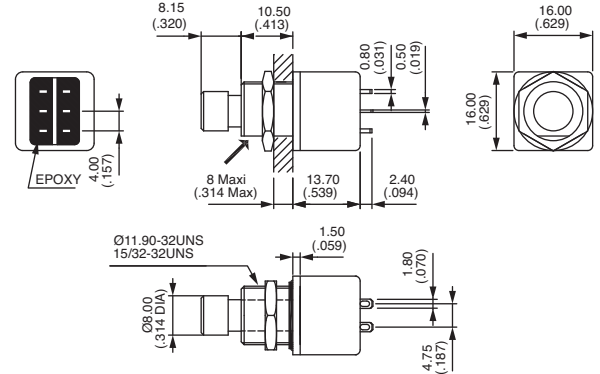


13446-3X778

ON

ON

→ Flat



Straight PC terminals - double pole

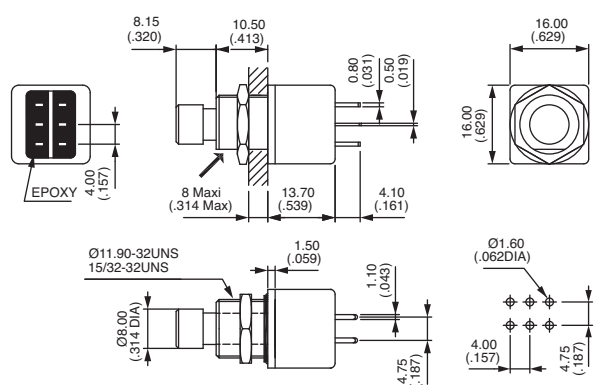


13246-3X778

ON

ON

→ Flat

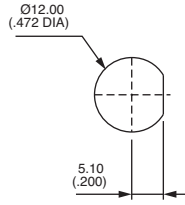


13000X778 series **New!**

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

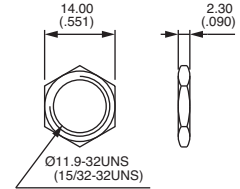
Fully sealed - black

PANEL CUT-OUT



STANDARD HARDWARE

Hex nut



U41 (matt black)

POSITIONS AND CONNECTIONS

FUNCTION	BUTTON POSITION AND CONNECTIONS		TERMINAL IDENTIFICATION
	I	II	
13246 13446	ON A 1-2 B 1-2	ON A 1-3 B 1-3	<p>→ Flat</p>



18000 series

Snap-action momentary pushbutton switches

Distinctive features and specifications



- Panel and PC mount models
- Snap-in panel mounting version
- Tactile feedback

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - gold plated brass contacts : 100mA - 30VDC
 - gold plated silver contacts : 1A 30VDC
- Initial contact resistance : 50 mΩ max.
- Insulation resistance : 1.000 MΩ min.
- Dielectric strength : 1.000 Vrms 50 Hz min.
- Electrical life : 60.000 cycles at full load

Models for high currents : see 18635A and 18645A at the end of the series.

MATERIALS

- Case : PBT
- Actuator : polyamide, glass filled
- Bushing : brass, nickel plated
- Housing : stainless steel
- Bracket : tin plated steel
- Contacts
 - AD** : silver, gold plated
 - CD** : brass, gold plated
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

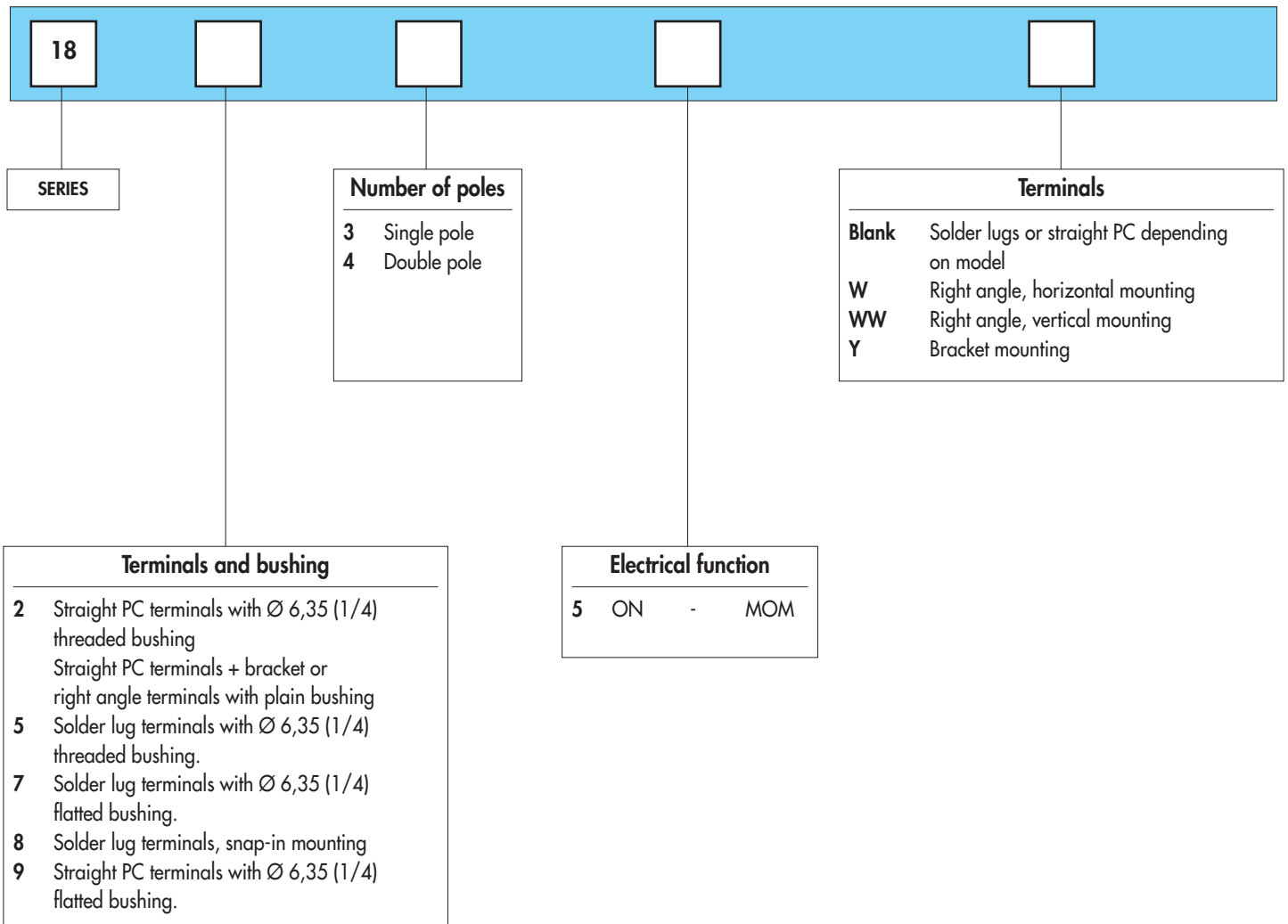
- Total travel : 0,5 mm (.019)
- Torque : 1,25 Nm (.922 Ft.lb) max. applied to nut
- Operating temperature : -30°C to +65°C
- Soldering : 300°C, 3 sec. max.

18000 series

Snap-action momentary pushbutton switches

Overview

MODEL
STRUCTURE



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 bracketed numbers.



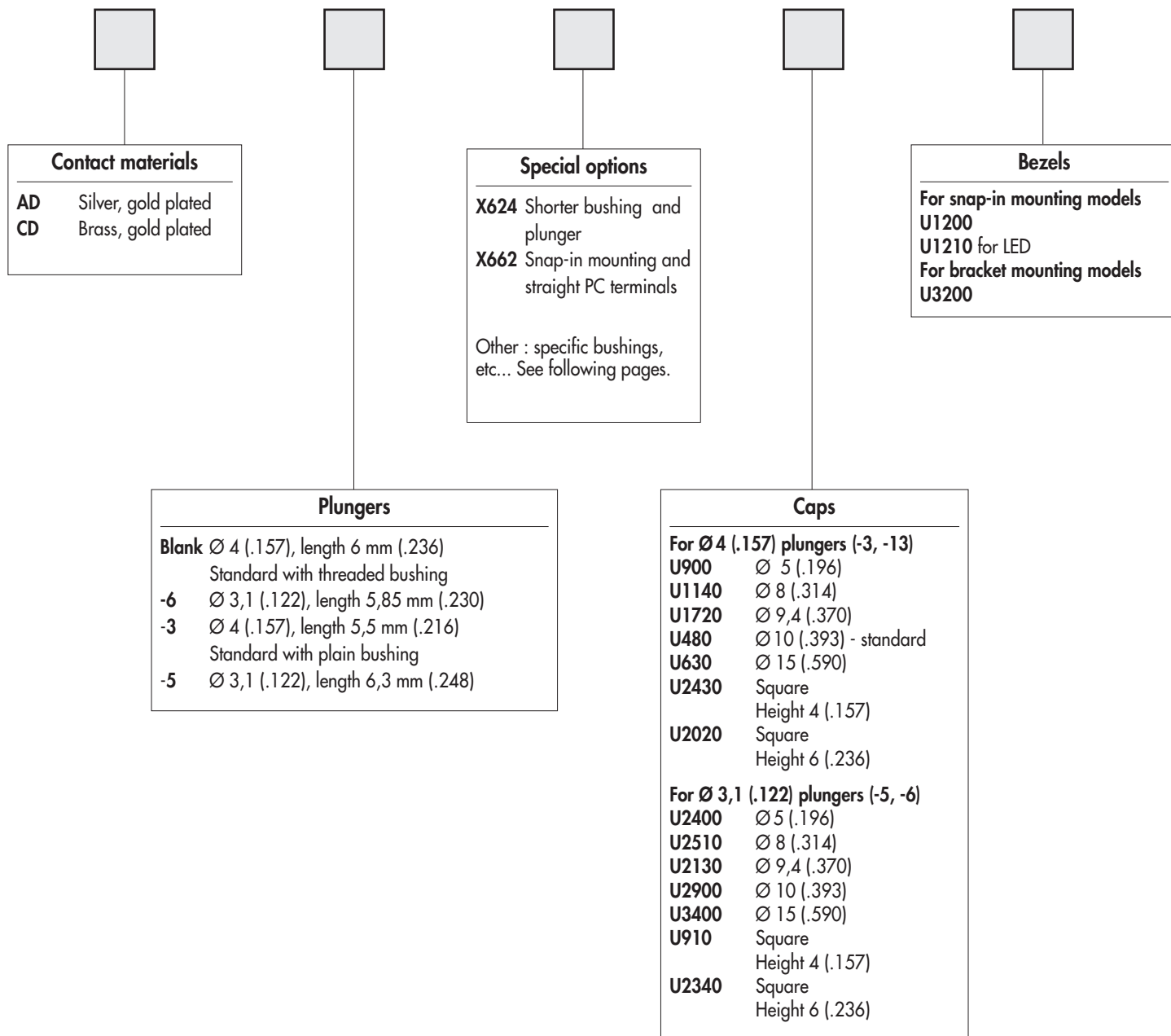
NOTICE : please note that not all combinations of above numbers are available. Refer to the following pages for further information.



18000 series

Snap-action momentary pushbutton switches

Overview



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 with Ø 6,35 (1/4) threaded bushing : 2 hex nuts 8 mm (.314) across flats, 1 locking ring and 1 lockwasher. Standard and special hardware available are presented in section I.

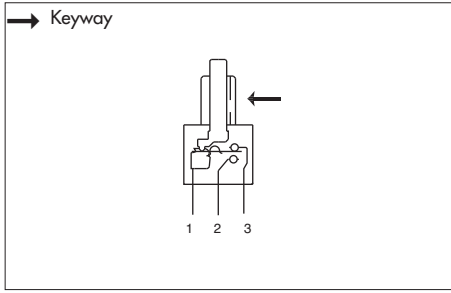


Packaging unit : 25 pieces for W, WW double pole and 18800 models
50 pieces for other models.

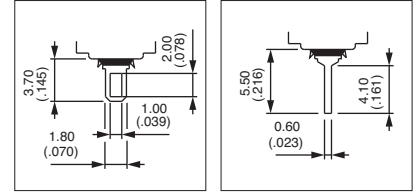
18000 series

Snap-action momentary pushbutton switches

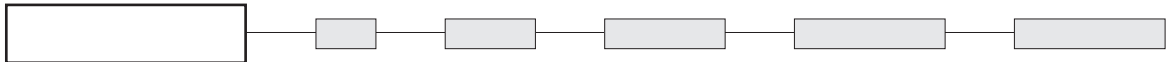
Threaded bushing $\varnothing 6,35$ (1/4) : 18500 - 18700 - 18200



- Solder lug or straight PC terminals
- Epoxy sealed terminals standard



MODEL STRUCTURE



Shown with standard plunger

B2

Solder lug terminals : 18500

→ Keyway



Single pole
18535

Double pole
18545



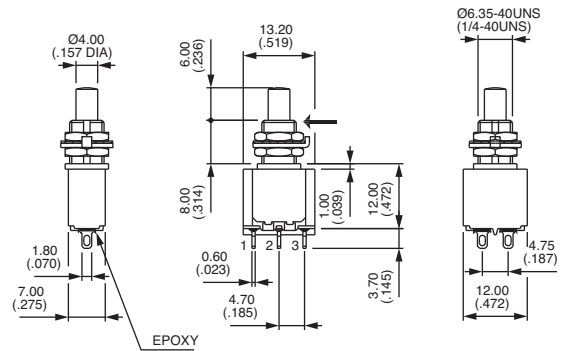
1-3

ON



1-2

MOM



Flatted bushing - solder lug terminals : 18700

→ Flat



Single pole
18735

Double pole
18745



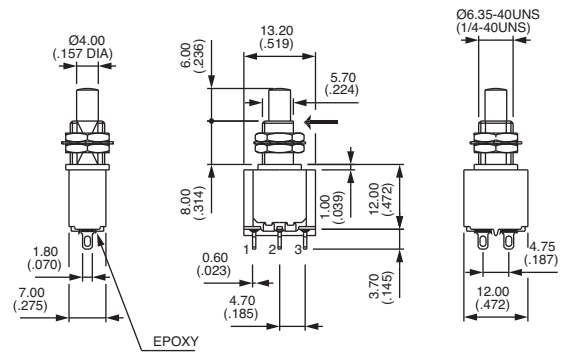
1-3

ON



1-2

MOM



Straight PC terminals : 18200

→ Keyway



Single pole
18235

Double pole
18245



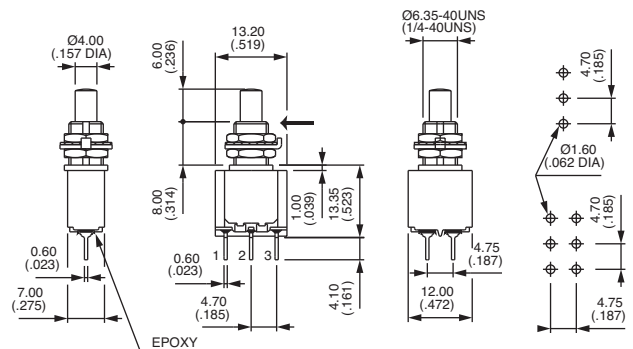
1-3

ON



1-2

MOM





18000 series

Snap-action momentary pushbutton switches

Threaded bushing $\varnothing 6,35$ (1/4) : 18900 - Snap-in mounting : 18800

Flatted bushing - straight PC terminals : 18900

→ Flat



Single pole
18935

Double pole
18945



1-3

ON

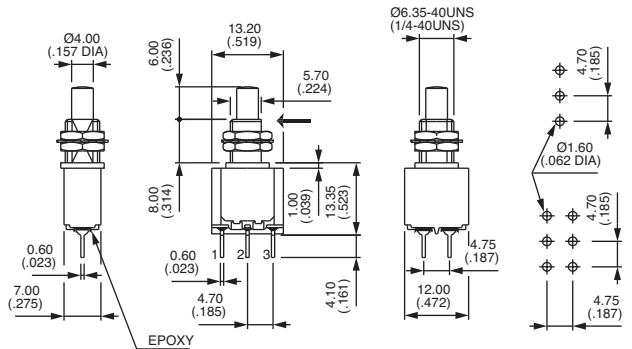


1-2

MOM

ON

MOM



Snap-in mounting - solder lug terminals : 18800

Shown with cap U910 + U1200



Single pole
18835

Double pole
18845



1-3

ON

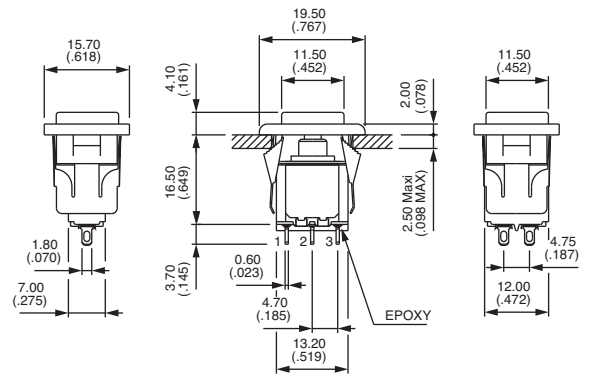


1-2

MOM

ON

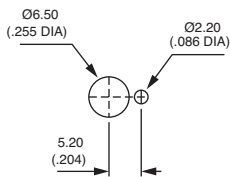
MOM



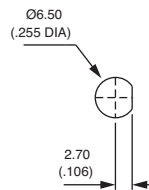
Available with straight PC terminals : see X662 under "Special options".

PANEL CUT-OUT

18500 - 18200

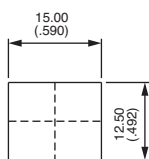


18700 - 18900

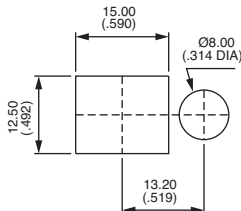


PANEL CUT-OUT

18800



With bezel **U1200**

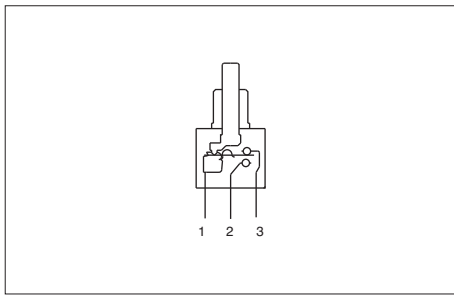


With bezel **U1210** for LED

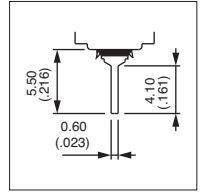
18000 series

Snap-action momentary pushbutton switches

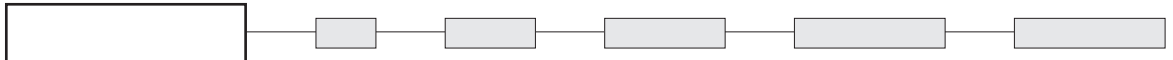
Plain bushing : 18200Y - 18200W - 18200WW



- Straight PC or right angle terminals
- Epoxy sealed terminals standard



MODEL
STRUCTURE



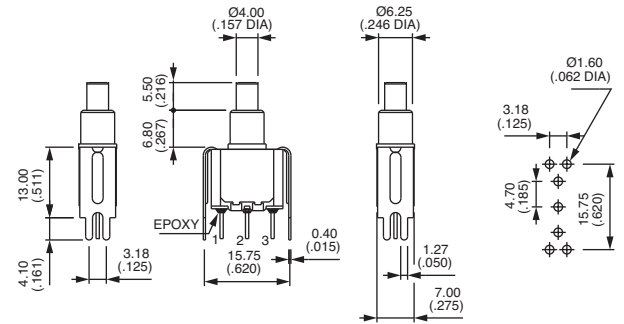
Shown with standard plunger (-3)

B2

Straight PC terminals - bracket mounting - single pole 18230Y



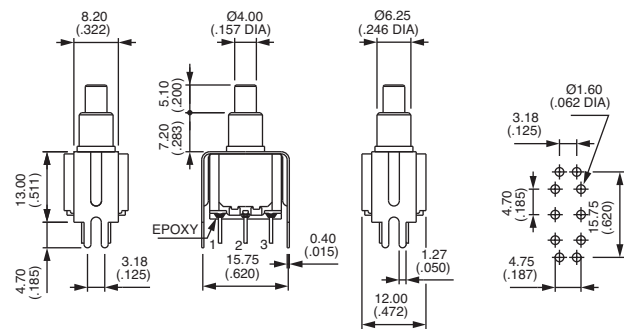
18235Y



Straight PC terminals - bracket mounting - double pole 18240Y



18245Y



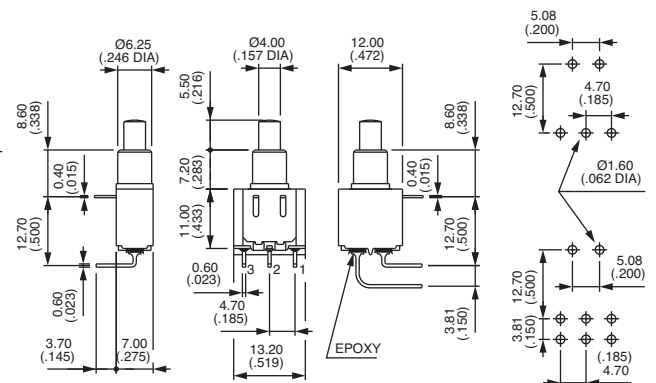
Right angle terminals - horizontal : 18200W



Single pole
18235W



Double pole
18245W





18000 series

Snap-action momentary pushbutton switches

Right angle terminals - vertical : 18200WW



Single pole
18235WW

Double pole
18245WW



1-3

ON

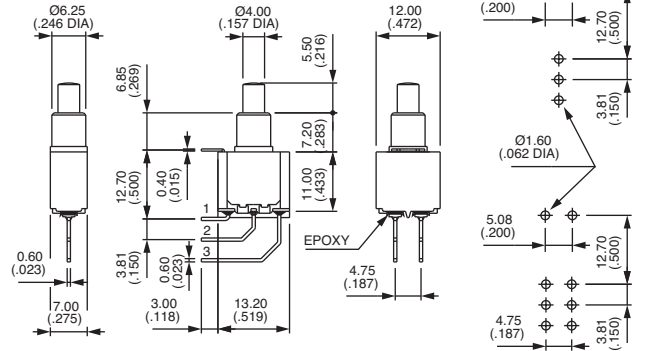


1-2

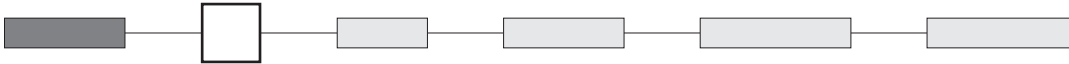
MOM

ON

MOM



CONTACT MATERIALS

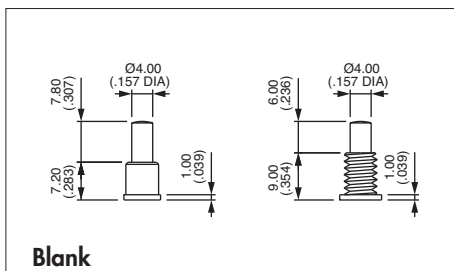


AD Silver, gold plated
CD Brass, gold plated

PLUNGERS

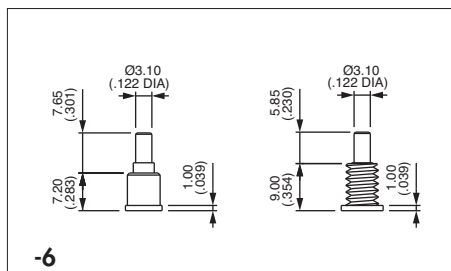


Dash compulsory before plunger code.



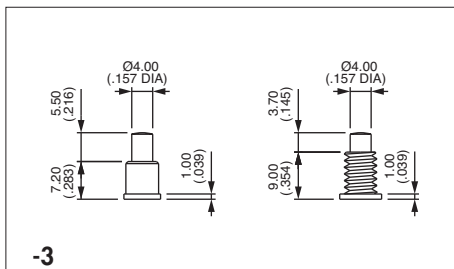
Blank

Ø 4 (.157) - standard with threaded bushing



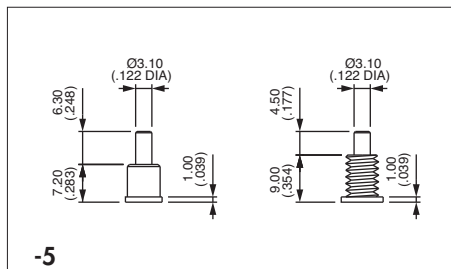
-6

Ø 3,1 (.122)



-3

Ø 4 (.157) - standard with plain bushing



-5

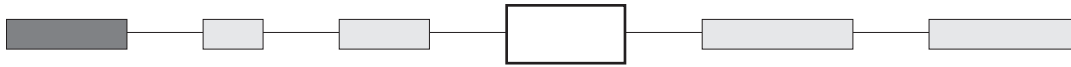
Ø 3,1 (.122)

18000 series

Snap-action momentary pushbutton switches



SPECIAL OPTIONS

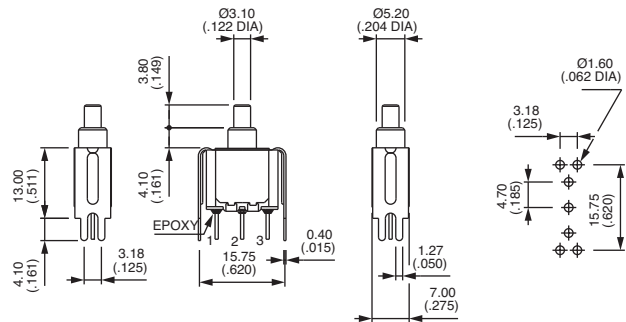


X624 Straight PC terminals - bracket mounting - with shorter bushing and plunger

B2

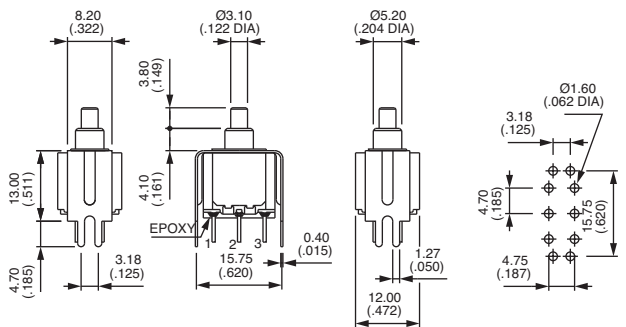
Single pole

18235Y -2X624



Double pole

18245Y -2X624



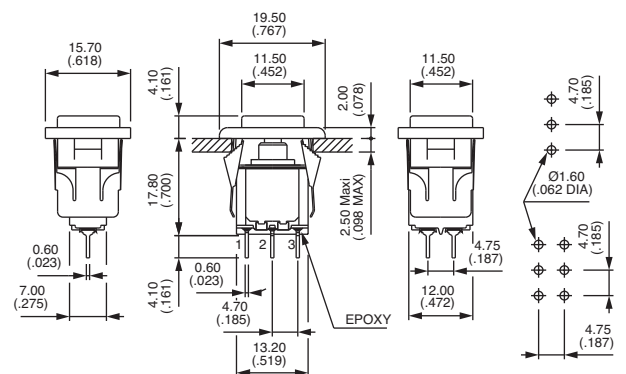
X662 Snap-in mounting - straight PC terminals



Single pole
18835 X662



Double pole
18845 X662





18000 series

Snap-action momentary pushbutton switches

SPECIAL OPTIONS (continued)

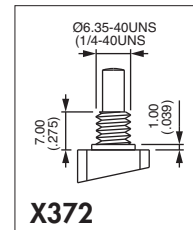


X371 Plain bushing \varnothing 6,25 mm (.246) (instead of standard threaded bushing).

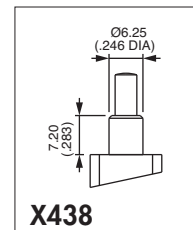
X372 Shorter threaded bushing \varnothing 6,35 (1/4). Height 7 mm (.274).

X386 Threaded bushing \varnothing 6,35 mm (1/4) to replace plain bushing on models W - WW and Y.

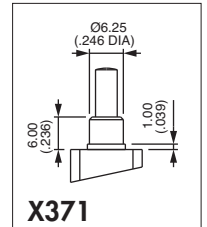
X438 Plain bushing \varnothing 6,25 mm (.246). Height 7,2 mm (.283) - without shoulder.



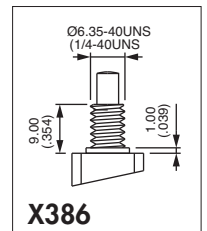
X372



X438

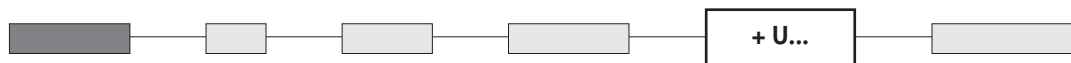


X371

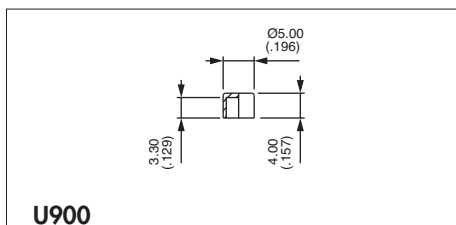


X386

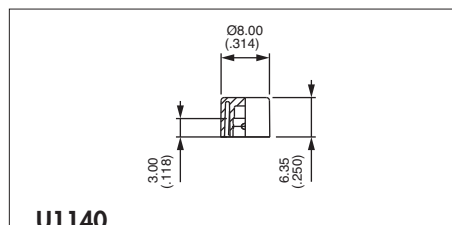
CAPS



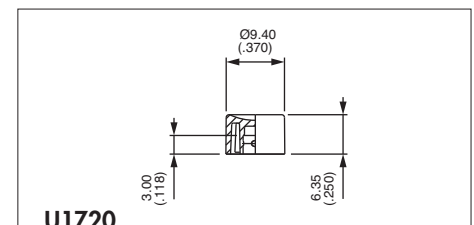
Caps for \varnothing 4 (.157) plungers (-13, -3)



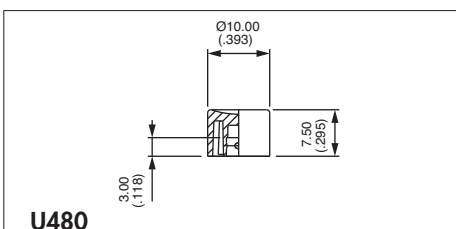
U900



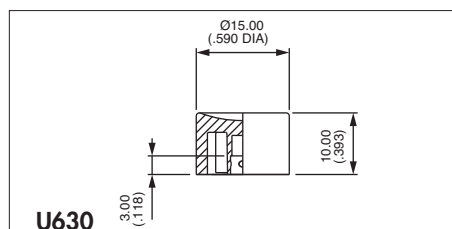
U1140



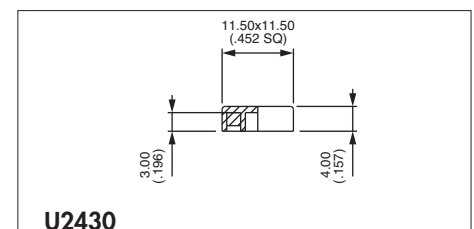
U1720



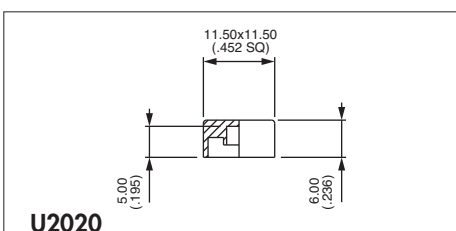
U480



U630



U2430



U2020

Square

Square

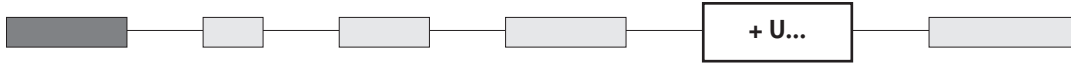
Cap colours			
Replace last "0" by number			
1	blue	5	yellow
1/4	dark blue	6	red
2	black	7	ivory
3	green	7/1	white
4	grey	9	orange

18000 series

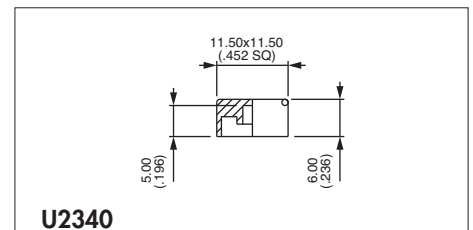
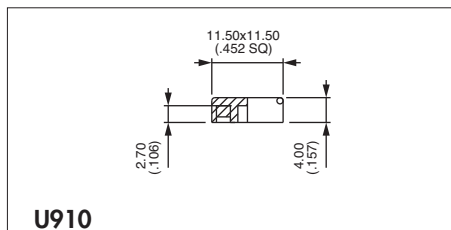
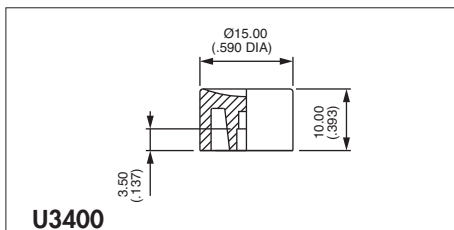
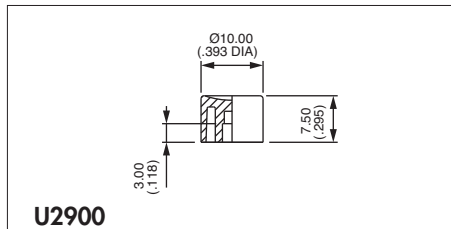
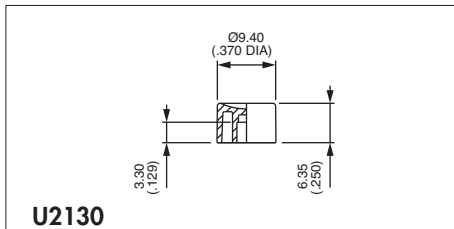
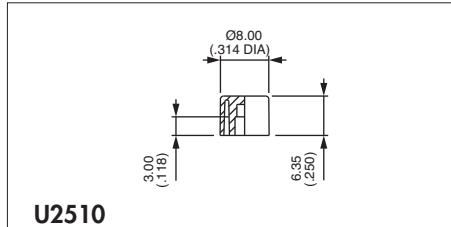
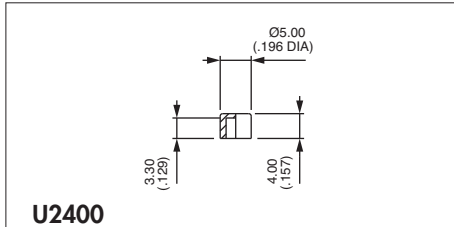
Snap-action momentary pushbutton switches



CAPS (continued)

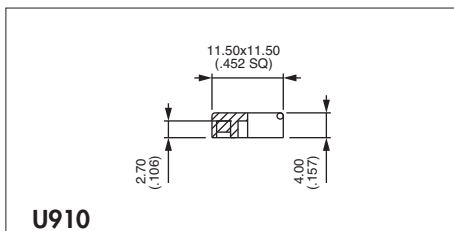


Caps for Ø 3,1 (.122) plungers (-5, -6)

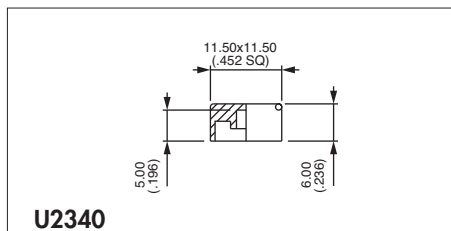


Cap colours	
Replace "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
6	red
7	ivory
7/1	white
9	orange

Caps for 18800 and 18800X662 models



Square



Square

B2



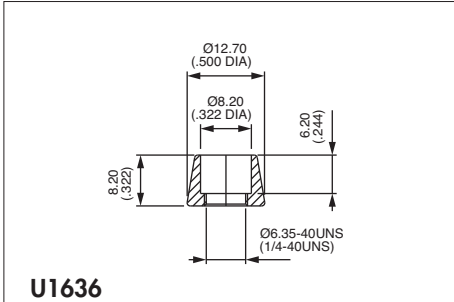
18000 series

Snap-action momentary pushbutton switches

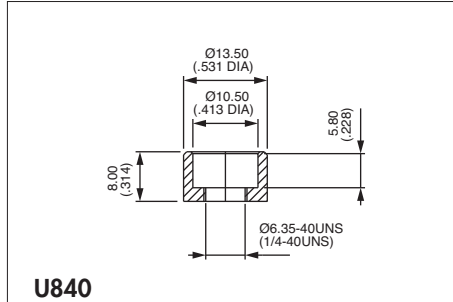
DRESS NUTS

For models with threaded bushing (18500 - 18700 - 18200 - 18900)

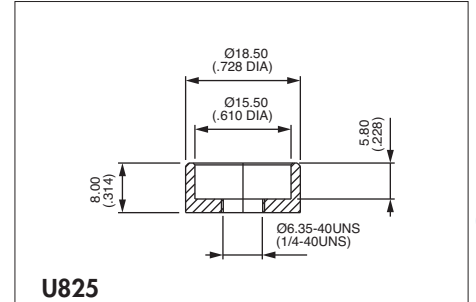
Chrome plated - Order separately.



For caps U1140 and U2510



For cap U480 and U2900

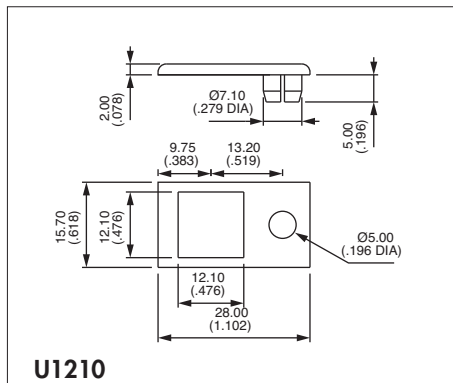
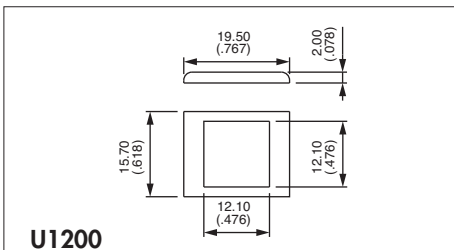


For caps U630 and U3400

BEZELS



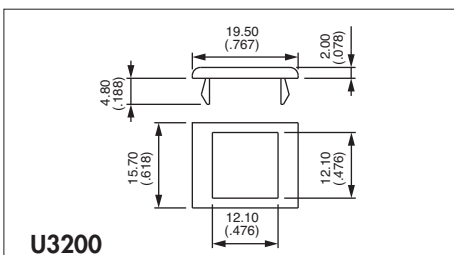
For snap-in models (18800 - 18800X662)



For LED Ø 5 - not supplied

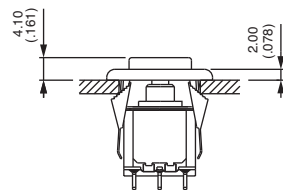
Bezel colours	
Replace last "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
6	red
7	ivory
7/1	white
9	orange

For bracket mounting models (18200Y & 18200YX624)

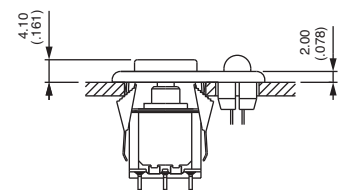


STANDARD PANEL MOUNTING

Panel thickness with bezel : 1 mm (.039) to 2,5 mm (.098)



18800 + U910 + U1200



18800 + U910 + U1210

18000 series

Snap-action momentary pushbutton switches



For high currents

Tactile feedback

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 7A 30VDC
- Initial contact resistance : 20 m Ω max. at 0,1A 3VDC
- Insulation resistance : 200.000 M Ω min. between terminals and frame
- Dielectric strength : 1.500 Vrms 50 Hz min.
- Electrical life : 60.000 cycles at full load

GENERAL SPECIFICATIONS

- Travel : 0,90 mm (.035) approx.
- Operating temperature : -30°C to +85°C

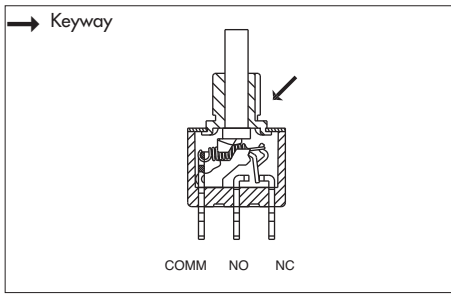
MATERIALS

- Case : diallyphthalate (DAP)
- Actuator : glass filled polyester
- Bushing : brass, nickel plated
- Housing : stainless steel
- Contacts : silver
- Terminal seal : epoxy

B2

18000 series

Snap-action momentary pushbutton switches



- Threaded bushing $\varnothing 6,35$ (1/4)
- Solder lug terminals
- Epoxy sealed terminals

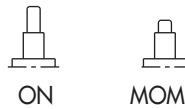
MODEL
STRUCTURE



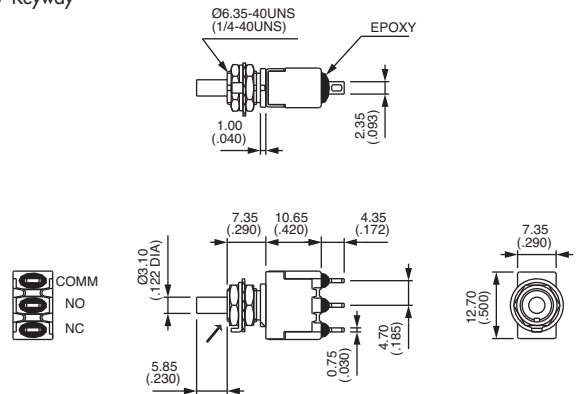
Single pole



18635A



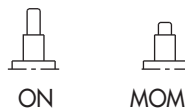
→ Keyway



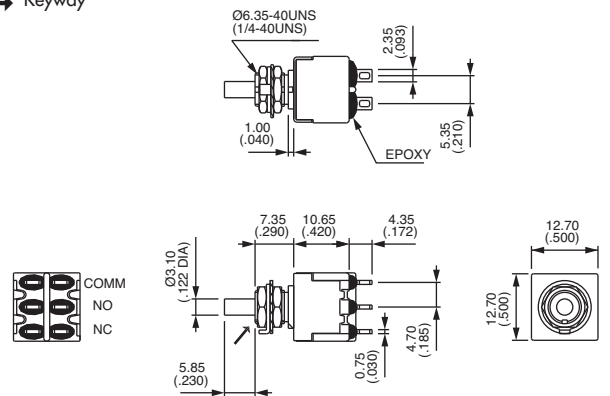
Double pole



18645A



→ Keyway

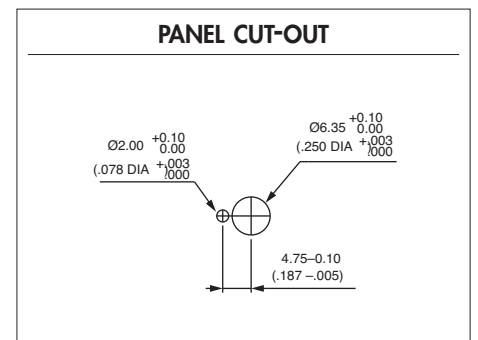


CAPS



Round	
U2400	$\varnothing 5$ (.196)
U2510	$\varnothing 8$ (.314)
U2130	$\varnothing 9,4$ (.370)
U2900	$\varnothing 10$ (.393)
U3400	$\varnothing 15$ (.590)

Square	
U910	Height 4 (.157)
U2340	Height 6 (.236)



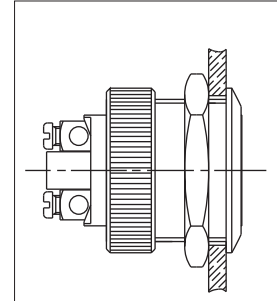
For cap dimensions, see "Caps for $\varnothing 3,1$ (.122) plungers" on the preceding pages.

AV series

Anti-vandal and security pushbutton switches

Distinctive features

- ❑ **Attractive, robust and durable**
 - Irremovable
 - **Anti-jamming construction** : reduced travel to prevent insertion of foreign parts
 - **Contact and mechanism protected against crushing**
 - **Fire resistant**
 - **Long life**
- ❑ **Different bushing sizes and actuator shapes**
- ❑ **Sealed versions**
- ❑ **Degree of protection of sealed versions (switches mounted on vertical panels) : IP65 to IP67 or IP69K depending on models**
- ❑ **UL/CSA approved models**



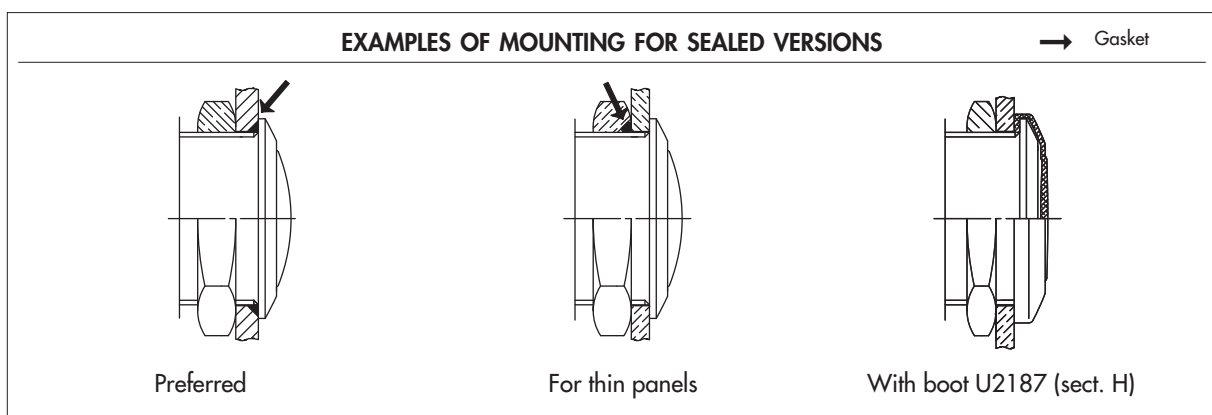
The AV series is a large range of very robust pushbutton switches, consisting of 2 families :

ANTI-VANDAL PUSHBUTTON SWITCHES (pages 77-79)

- Great robustness (impact resistance IK08 (Ø 19 mm) and IK10 (Ø 22 mm))
- Actuator and bushing : stainless steel
- Bushing Ø 19 mm (.748) or 22 mm (.866)

SECURITY PUSHBUTTON SWITCHES (pages 80-106)

- Large variety of models
- Actuator and bushing : nickel plated, chrome plated or polished varnished brass, stainless steel
- Bushing diameter 16 mm (.629), 19 mm (.748), 22 mm (.866) or 24 mm (.944)
- Marking, illumination, tactile feedback
- Numerous electrical functions (momentary or maintained)



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



Packaging unit : specified on the following pages.



Mounting accessories : Standard and special hardware are presented in section I.



Sealing boots are available for models with Ø 19 mm (.748) bushing. See Section H.

- Very robust**
Impact resistance IK08 for model Ø 19 mm (.748)
and IK10 for model Ø 22 mm (.866)

- Stainless steel actuator and bushing**

- UL-CSA approved (long case only)**

SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - A contacts : 4A 12VDC, 500.000 cycles
 - C contacts : 2A 48 VDC, 10.000 cycles
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.000 Vrms 50 Hz min. between terminals and frame
2.000 Vrms 50 Hz min. between terminals
- Torque : 5 Nm min.- 14 Nm max. applied to nut
- Panel thickness : 1 (.039) to 11 mm (.433) max.
- Operating temperature : -30°C to +70°C
- Low level or mechanical life : 1.000.000 cycles
- Hand soldering : 300°C, 3 sec. max.
- Packaging unit : 20 pieces (models Ø 22) or 40 pieces (models Ø 19)

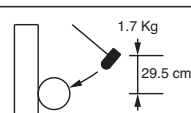
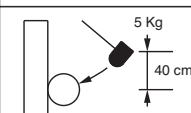
MATERIALS

- Case : PBT
- Contacts : silver (A)
or brass, silver plated (C)
- Bushing : stainless steel
- Actuator : stainless steel

CUT-OUT

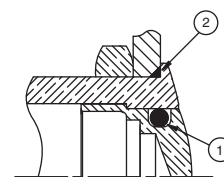
- Panel cut-out :
Ø 19,2 mm (.755)
or Ø 22,2 mm (.874)
- Min. pitch for matrix mounting :
30 mm x 30 mm (1.181x1.181)

ROBUSTNESS

	Model Ø 19 mm (.748)		Model Ø 22 mm (.866)	
Degree of protection according to EN 50102, June 95 (NFC 20-015)		IK08 Striking energy: 5 joules (5Nm)		IK10 Striking energy: 20 joules (20Nm)
	Hammer radius 25 mm		Hammer radius 50 mm	

Increased impact resistance provided by a nut or mechanical stop.

SEALING (OPTION T)



Front panel sealing (IP65)

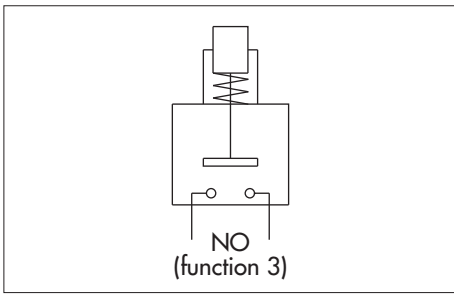
① internal gasket ② external gasket

Option N does not include ① nor ②.

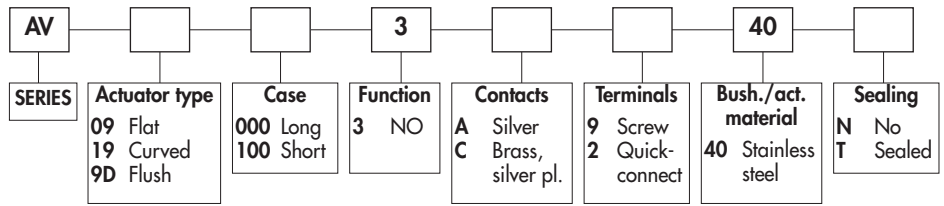
AV series

Anti-vandal pushbutton switches \varnothing 19 mm (.748)

Momentary (NO)



ORDER FORMAT



B2

In the following model numbers, replace • with elements selected in the above order format.

Flat actuator - short case - 48VDC - AV09100

Hex nut 22 (.866) across flats



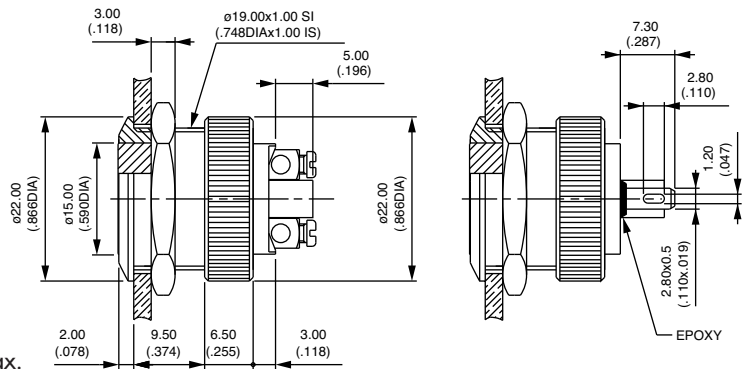
Screw terminals
AV091003•940•



Solder lug / quick-connect term.
AV091003•240•



Screw terminals for wires 1,5 mm² max.



Flat actuator - long case - 4A 250VAC/8A 125VAC - UL/CSA - AV09000

Hex nut 22 (.866) across flats

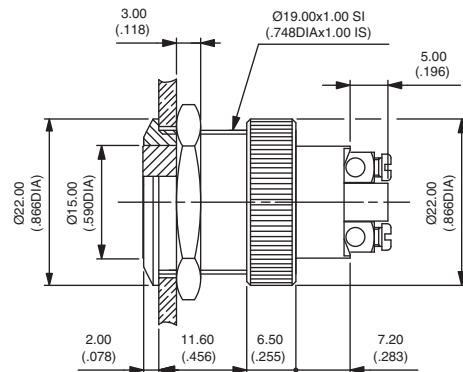


Screw terminals
AV090003A940•

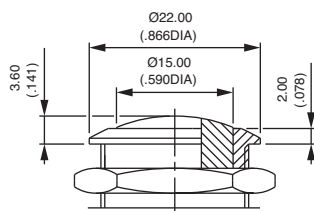


To order switches marked UL-CSA, add "UU" at the end of model number.

Screw terminals for wires 1,5 mm² max.



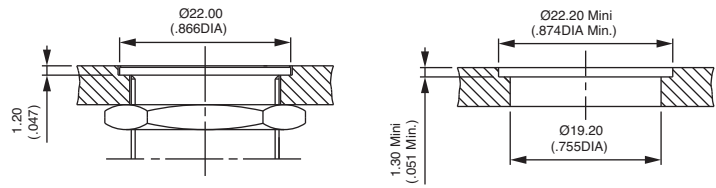
Curved actuator - AV19



Screw terminals
AV19•003•940•

Solder lug/quick-connect term. (short case)
AV191003•240•

Flush model - AV9D



Screw terminals
AV9D•003•940•

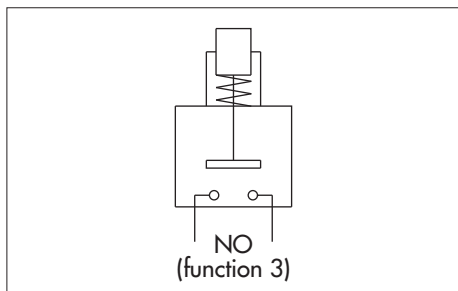
Solder lug / quick-connect terminals (short case only)
AV9D1003•240•

Panel cut-out

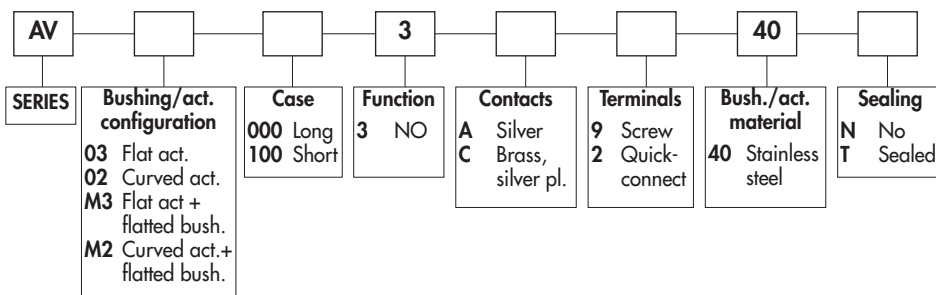
AV series

Anti-vandal pushbutton switches Ø 22 mm (.866)

Momentary (NO)



ORDER FORMAT



In the following model numbers, replace • with elements selected in the above order format.

Flat actuator - short case - 48VDC - AV03100

Hex nut 25 (.984) across flats



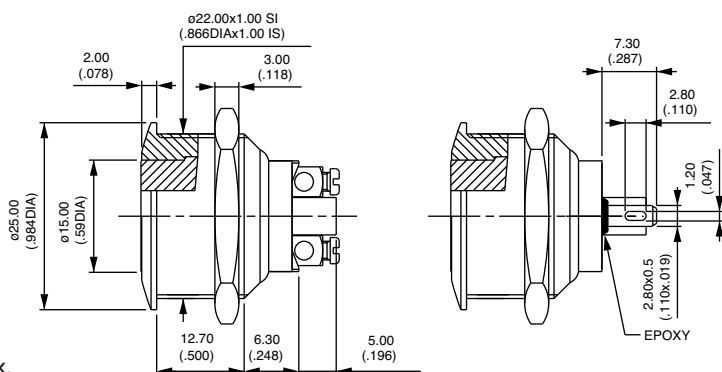
Screw terminals
AV031003•940•



Solder lug / quick-connect term.
AV031003•240•



Screw terminals for wires 1,5 mm² max.



Flat actuator - long case - 4A 250VAC/8A 125VAC - UL/CSA - AV03000

Hex nut 25 (.984) across flats

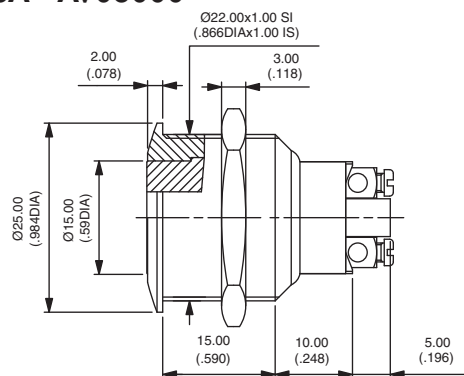


Screw terminals
AV030003A940•

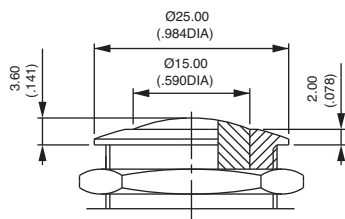


To order switches **marked UL-CSA**, add "UU" at the end of model number.

Screw terminals for wires 1,5 mm² max.

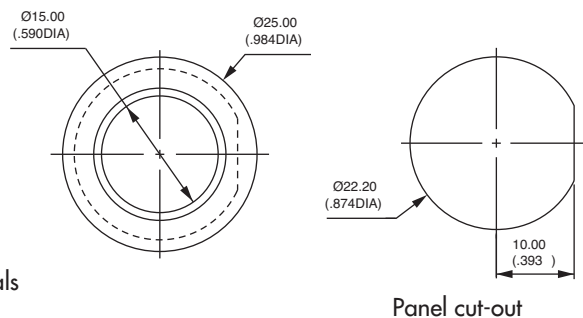


Curved actuator - AV02



Screw terminals
AV02•003•940•
Solder lug / quick-connect (short case)
AV021003•240•

Flatted bushing - AVM3 and AVM2



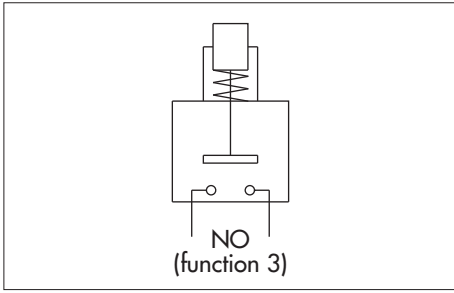
Flat actuator, screw terminals
AVM3•003•940•

Curved actuator, screw terminals
AVM2•003•940•

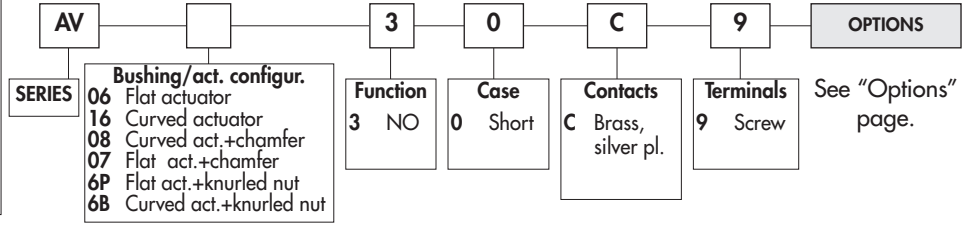
AV series

Snap action security pushbutton switches Ø 16 mm (.629)

Momentary (NO)



ORDER FORMAT



SPECIFICATIONS

- Travel : 1,60 mm (.063) ± 0,3 mm (.011)
- Max. current/voltage rating with resistive load : 200mA 48 VDC - 100mA 48VDC
- Initial contact resistance : 50 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.000 Vrms 50 Hz min. between terminals and frame
- Electrical life : 50.000 cycles at 200mA 48VDC
100.000 cycles at 100mA 48VDC
- Torque : 5 Nm min.- 14 Nm max. applied to nut
- Panel thickness : 1 (.039) to 6 mm (.236) max.
- Operating temperature : -30°C to +70°C
- Low level or mechanical life : 1.000.000 cycles
- Packaging unit : 60 pieces

MATERIALS

- Case : PBT
- Contacts : brass, silver plated (C)
- Bushing and actuator : see "Options" page

CUT-OUT

- Panel cut-out : Ø 16,2 mm (.637)
- Min. pitch for matrix mounting : 24 mm x 24 mm (.944 x .944) (AV6P & AV6B : 20 mm x 20 mm)

To order a product, select a basic model below and add the desired options.

BASIC MODEL

Flat or curved actuator - screw terminals

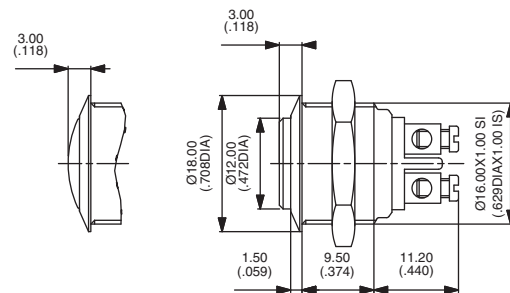
Hex nut 19 (.748) across flats



Flat actuator
AV0630C9

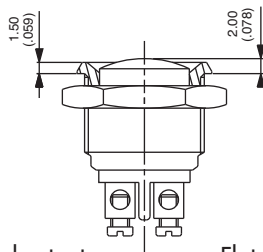


Curved actuator
AV1630C9



Screw terminals for wires 1,5 mm² max.

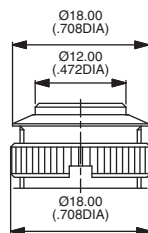
With chamfer



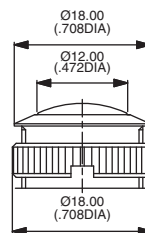
Curved actuator
AV0830C9

Flat actuator
AV0730C9

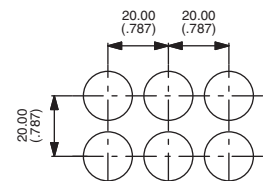
With knurled nut for matrix mounting 20 x 20 - AV6P and AV6B



Flat actuator
AV6P30C9



Curved actuator
AV6B30C9



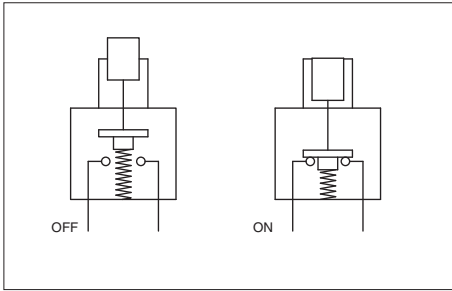
Wrench available under P/N U1990.



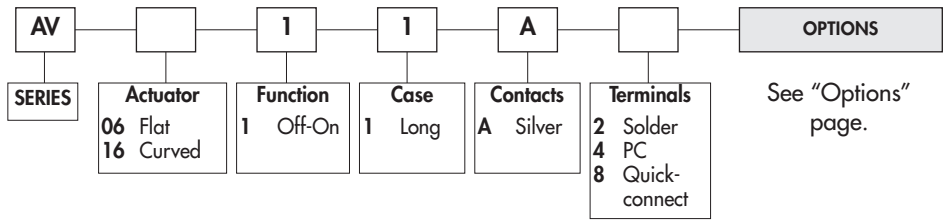
AV series

Security pushbutton switches Ø 16 mm (.629)

Latching action



ORDER FORMAT



SPECIFICATIONS

- Max. current/voltage rating with resistive load : 1 A 24VDC
- Initial contact resistance : 50mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.500 Vrms 50 Hz min. between terminals
1 000 Vrms 50 Hz between terminals and frame
- Electrical life : 100.000 cycles at 1,5A 250VAC
40.000 cycles at 1A 24VDC
- Torque : 5 Nm min. - 14 Nm max. applied to nut
- Panel thickness : 1 (.039) to 6 mm (.236) max.
- Operating temperature : -30°C to +70°C
- Low level or mechanical life : 200.000 cycles
- Hand soldering : 300°C, 5 sec. max.
- Packaging unit : 25 pieces

MATERIALS

- Case : PA-6T, UL94-V0
- Contacts : silver (A)
Gold plated silver (AD) on request
- Bushing and actuator : see "Options" page

CUT-OUT

- Panel cut-out : Ø 16,2 mm (.637)
- Min. pitch for matrix mounting : 24 mm x 24 mm (.944 x .944)

To order a product, select a basic model below and add the desired options.

BASIC MODEL

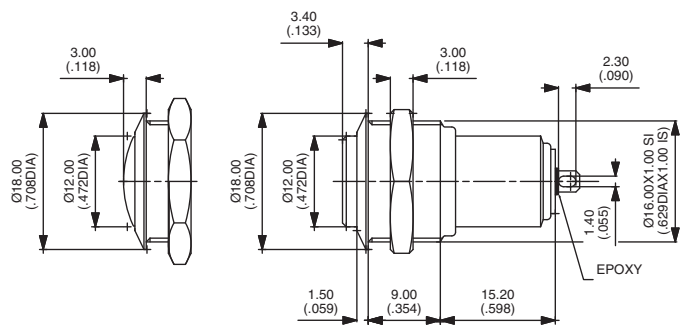
Flat or curved actuator - solder lug terminals

Hex nut 19 (.748) across flats

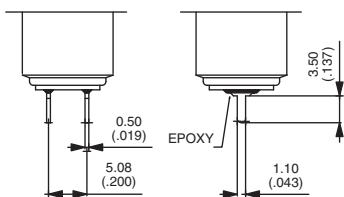


Flat actuator
AV0611A2 OFF - ON

Curved actuator
AV1611A2 OFF - ON



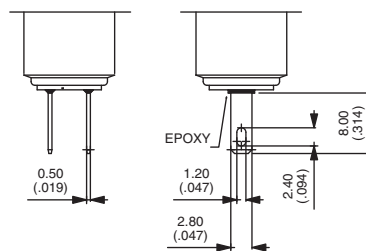
Straight PC terminals



Flat actuator
AV0611A4

Curved actuator
AV1611A4

Quick-connect terminals



Flat actuator
AV0611A8

Curved actuator
AV1611A8

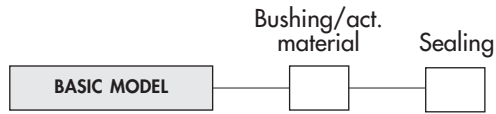
AV series

Security pushbutton switches Ø 16 mm (.629)



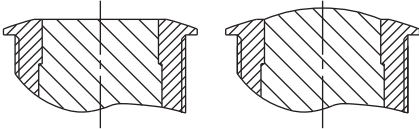
Options

After selecting basic model number, fill in last 2 boxes with desired options.



BUSHING/ACTUATOR MATERIALS

Flat or curved metal actuator



CODE	BUSHING	ACTUATOR
00 (standard)	Nickel plated brass	Nickel plated brass
10	Nickel plated brass	Stainless steel
40	Stainless steel	Stainless steel

SEALING

- Blank** No sealing
- K** Front panel sealing (IP65)

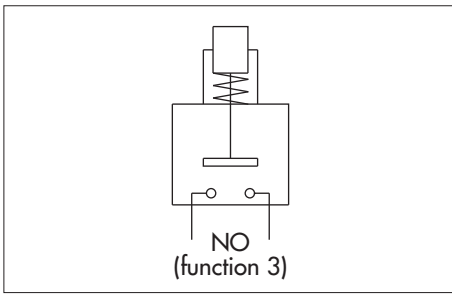
B2



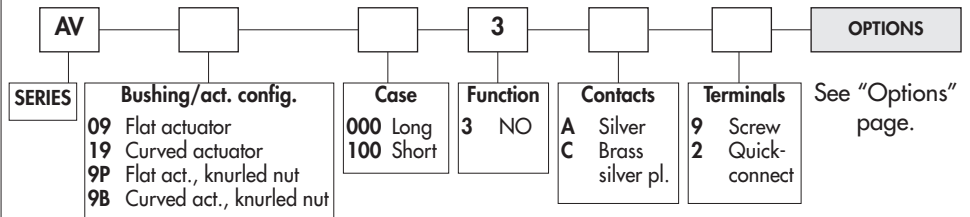
AV series

Security pushbutton switches Ø 19 mm (.748)

Momentary (NO)



ORDER FORMAT



SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - A contacts : 4A 12VDC, 500.000 cycles
 - C contacts : 2A 48 VDC, 10.000 cycles
- Approved ratings of models with long case and A contacts (AV.000) :
 - UL-CSA : 4A 250VAC - 8A 125VAC - 6.000 cycles
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.000 Vrms 50 Hz min. between terminals and frame
2.000 Vrms 50 Hz min. between terminals
- Torque : 5 Nm min.- 14 Nm max. applied to nut
- Panel thickness : 1 (.039) to 11 mm (.433) max.
- Operating temperature : -30°C to +70°C
- Low level or mechanical life : 1.000.000 cycles
- Hand soldering : 300°C, 3 sec. max.
- Packaging unit : 40 pieces

MATERIALS

- Case : PBT
- Contacts : silver (A) or brass, silver plated (C)
- Bushing and actuator : see "Options" page

CUT-OUT

- Panel cut-out : Ø 19,2 mm (.755)
- Min. pitch for matrix mounting : 30 mm x 30 mm (1.181x1.181) (AV9P & AV9B : 25 mm x 25 mm)

To order a product, select a basic model below and add the desired options.

BASIC MODEL

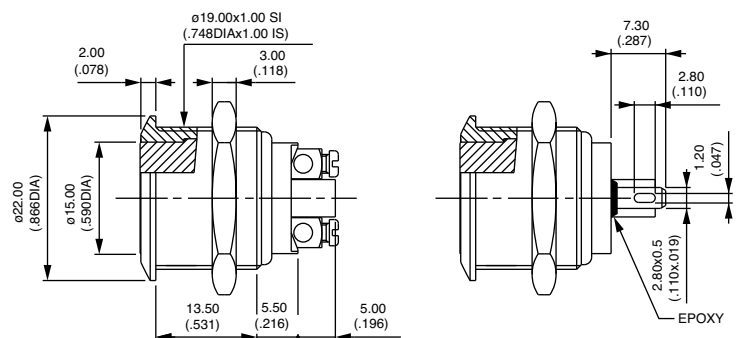
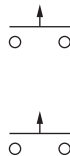
Flat actuator - short case - 48VDC - AV09100

Hex nut 22 (.866) across flats



Screw terminals
AV091003•9

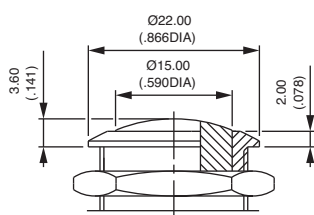
Solder lug / quick-connect term.
AV091003•2



Screw terminals for wires 1,5 mm² max.

Contacts : replace • with A (silver) or C (silver plated brass).

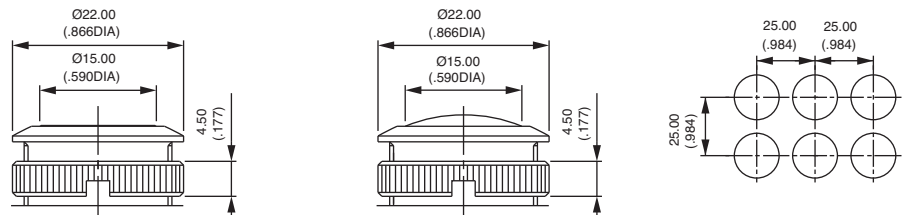
Curved actuator - short case



Screw terminals
AV191003•9

Solder lug / quick-connect terminals
AV191003•2

With knurled nut for matrix mounting 25 x 25 - AV9P and AV9B



Flat actuator, screw terminals
AV9P1003•9

Flat actuator, solder lug term.
AV9P1003•2

Curved actuator, screw terminals
AV9B1003•9

Curved actuator, solder lug term.
AV9B1003•2

Wrench available under P/N U1929

AV series

Security pushbutton switches Ø 19 mm (.748)

Momentary (NO)



Flat actuator - long case - 4A 250VAC/8A 125VAC - UL/CSA - AV09000

Hex nut 22 (.866) across flats

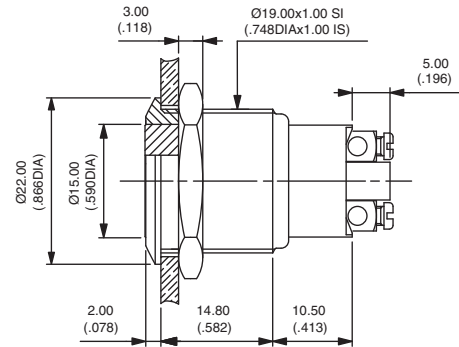


Screw terminals
AV090003A9



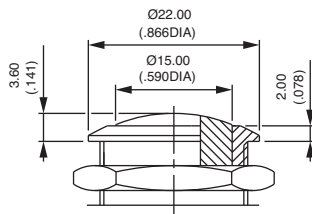
To order switches marked **UL-CSA**, add "UU" at the end of model number.

Screw terminals for wires 1,5 mm² max.



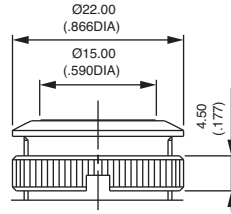
B2

Curved actuator - long case

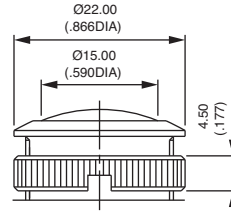


Screw terminals
AV190003A9

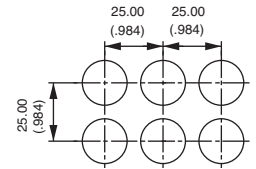
With knurled nut for matrix mounting 25 x 25 - AV9P and AV9B



Flat actuator, screw terminals
AV9P0003A9



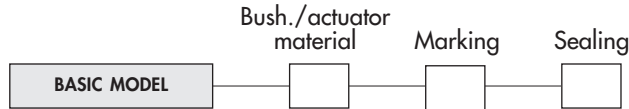
Curved actuator, screw terminals
AV9B0003A9



Wrench available under P/N U1929.

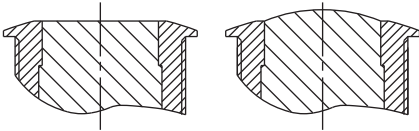


After selecting basic model number, fill in last 3 boxes with desired options.



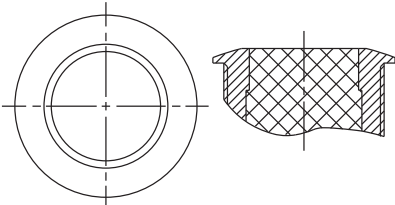
BUSHING/ACTUATOR MATERIALS

Flat or curved metal actuator



CODE	BUSHING	ACTUATOR
00 (standard)	Nickel plated brass	Nickel plated brass
10	Nickel plated brass	Stainless steel
12	Nickel plated brass	Chrome plated brass
20	Chrome plated brass	Chrome plated brass
30	Chrome plated brass	Stainless steel
40	Stainless steel	Stainless steel
80	Varnished polished brass	Varnished polished brass

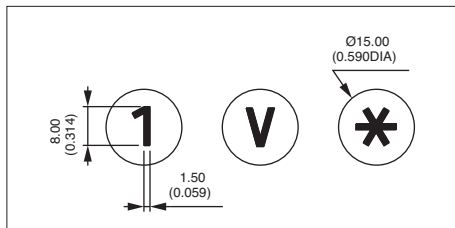
Flat thermoplastic actuator



CODE	BUSHING	ACTUATOR COLOUR
0• (standard)	Nickel plated brass	Replace • with one of the following codes.
2•	Chrome plated brass	1 : blue - 1/4 : dark blue - 2 : black - 3 : green
8•	Varnished polished brass	4 : grey - 5 : yellow - 6 : red - 7/1 : white
		9 : orange

MARKING

- By engraving on flat or curved brass actuator (stainless steel on request)
- by hot stamping on flat thermoplastic actuator



Select an option from each of the two tables below.

TYPE OF MARKING

CODE	TYPE
0 to 9	Numbers 0 to 9
X	Symbol *
Y	Symbol #
A to N	Letters A to N
P to W	Letters P to W
0	Letter O

Letter O : same code and same design as number 0.

For special symbols, consult factory.
Minimum order : 500 pieces

COLOUR OF MARKING

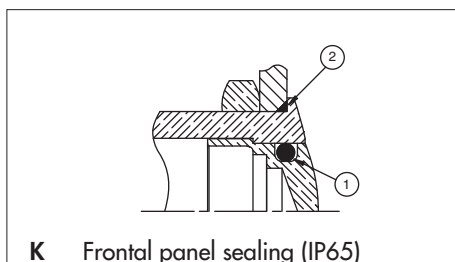
CODE	COLOUR
Brass actuator	
0 (standard)	Same as finish
2	Black

Note : a finished product supplied in version "0" cannot be modified to version "2".

CODE	COLOUR
Thermoplastic actuator	
2	Black
7	White

SEALING

Blank No sealing

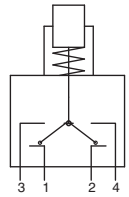


- ① internal gasket
- ② external gasket

AV series

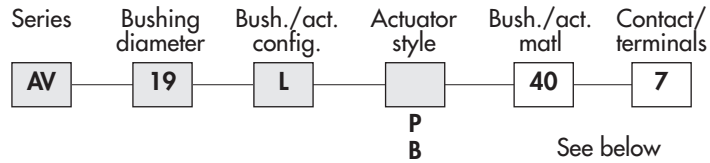
Security pushbutton switches Ø 19 mm (.748)

Momentary (NC/NO)



Combined NC/NO

ORDER FORMAT



SPECIFICATIONS

- Max. current/voltage rating with resistive load :
5A 250VAC - 5A 125VAC - 6.000 cycles
5A 15VDC - 3A 30VDC - 50.000 cycles
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.000 Vrms 50 Hz min. between term. and frame
- Torque : 5 Nm min.- 14 Nm max. applied to nut
- Panel thickness : 1 (.039) to 9 mm (.354) max.
- Operating temperature : -20°C to +85°C
- Low level or mechanical life : 1.000.000 cycles
- Front panel sealing : IP65 and IP69K
- Packaging unit : 20 pieces

MATERIALS

- Case : PA 6/6
- Contacts : silver
- Bushing : stainless steel (std)
- Actuator : stainless steel (std)

CUT-OUT

- Panel cut-out : Ø 19,2 mm (.755)
- Min. pitch for matrix mounting :
30 mm x 30 mm (1.181x1.181)

All model numbers below are for switches with standard bushing/actuator material.

BASIC MODEL

Solder lug terminals - AV19..407



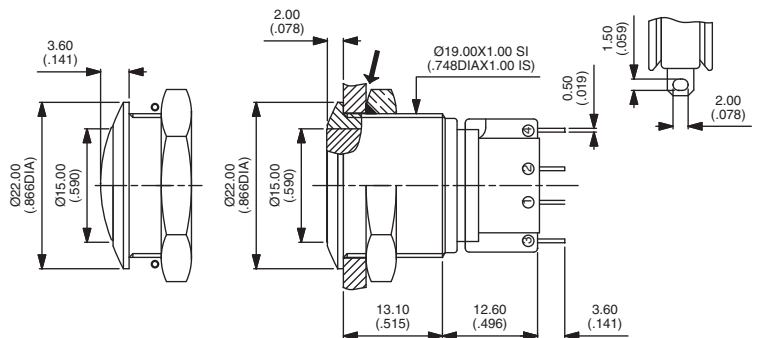
Flat actuator
AV19LP407

Curved actuator
AV19LB407



→ O-ring

Hex nut 22 (.866) across flats



BUSHING/ACTUATOR MATERIALS

For non-standard material, replace **40** with one of the following codes.

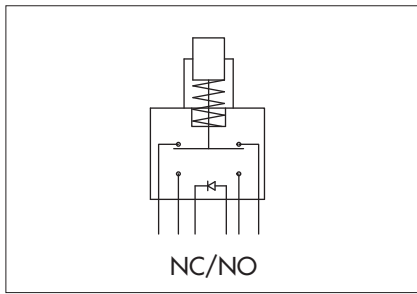
CODE	BUSHING	ACTUATOR
00	Nickel plated brass	Nickel plated brass
20	Chrome plated brass	Chrome plated brass



AV series

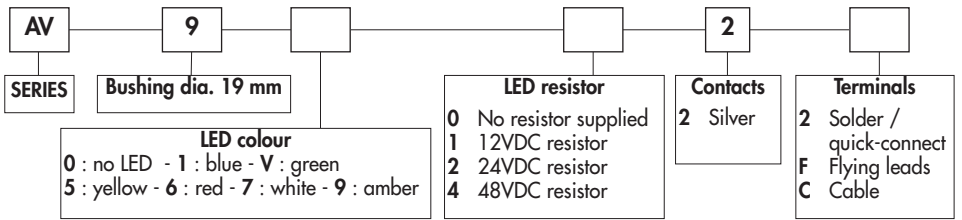
Security pushbutton switches Ø 19 mm (.748)

With illuminated ring - momentary (NC/NO)



ORDER FORMAT

Options : see next page.



SPECIFICATIONS

- Travel : 2 mm ± 0,3 mm (.003)
 - Max. current/voltage rating with resistive load : 1A 30VDC
 - LED voltage : 12VDC, 24VDC or 48VDC
(If not supplied by APEM, a resistor must be series-connected by the user)**
 - Initial contact resistance : 100 mΩ max.
 - Insulation resistance : 10 MΩ min. at 500VDC
 - Dielectric strength : 500 Vrms 50 Hz min. between terminals
1.000 Vrms 50 Hz min. between terminals and frame
 - Electrical life : 250.000 cycles at full load
 - Operating force : 5N ± 2N
 - Torque : 5 Nm min.- 14 Nm max. applied to nut
 - Panel thickness : 1 (.039) to 6 mm (.236) max.
 - Low level or mechanical life : 1.000.000 cycles
 - Operating temperature : -20°C to +55°C
 - Hand soldering : 350°C, 5 seconds max.
 - Packaging unit : flying lead/cable models : 1 piece - other models : 40 pieces
- ** Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

MATERIALS

- Case : polyamide, glass filled
- Contacts : silver
- Bushing : see next page
- Actuator : see next page
- Elastomeric membrane : silicone
- LED

CUT-OUT

- Panel cut-out : Ø 19,2 mm (.755)
- Min. pitch for matrix mounting : 30 mm x 30 mm (1.181x1.181)

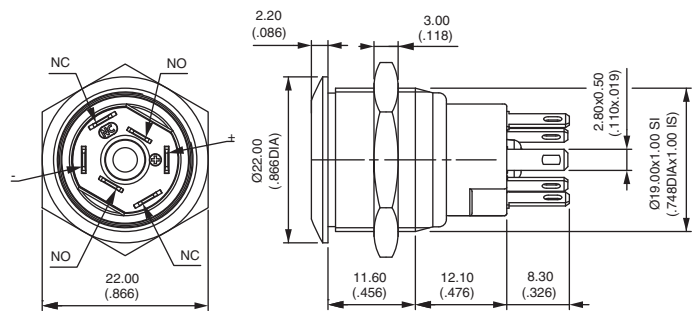
To order a product, select a basic model below and add the desired LED colour and voltage. Then select the desired options on next page.

Flat actuator - solder lug terminals

Hex nut 22 (.866) across flats



Illuminated (select LED colour above) *
AV9•022
Non-illuminated
AV90022



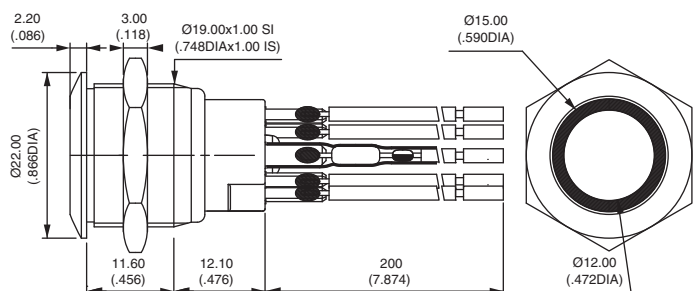
* No LED resistor supplied on this model.

Flat actuator - flying lead terminals

Hex nut 22 (.866) across flats



Illuminated (select LED colour & resistor above)
AV9••2F
Non-illuminated
AV9002F



Wire colours : black: NC, orange: NO, red: LED anode (+), blue : LED cathode (-)

AV series

Security pushbutton switches Ø 19 mm (.748)

With illuminated ring - momentary (NC/NO)

OPTIONS



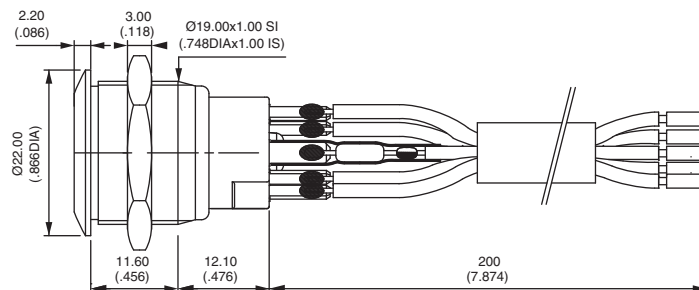
Flat actuator - cable terminals

Hex nut 22 (.866) across flats



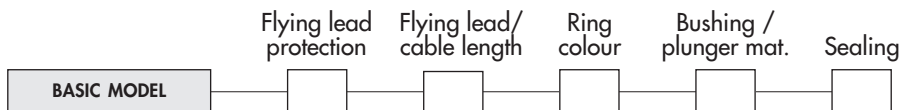
Illuminated (select colour & resistor)
AV9••2C

Non-illuminated
AV9002C



B2

After selecting basic model No., fill in last 5 boxes with desired options.



FLYING LEAD PROTECTION

- 0 No protection and/or no flying leads
- 1 Heat-shrink sleeves
- 2 Tube + epoxy

FLYING LEAD/CABLE LENGTH

- 000 No flying leads / no cable
- 020 Length 20 cm (standard)
- XXX Length in centimeters

RING COLOURS

CODE	COLOUR	CODE	COLOUR
1	Blue	6	Red
2	Black *	7	Opal white (std)
3	Green	8	Translucent
4	Grey *	9	Orange
5	Yellow		

* non-illuminated only

BUSHING/PLUNGER MATERIALS

CODE	BUSHING	ACTUATOR
00	Brass, nickel plated	Brass, nickel plated
40	Stainless steel 303	Stainless steel 303
4A	Stainless steel 304	Stainless steel 304
4B	Stainless steel 316	Stainless steel 316

Other : on request.

SEALING

Blank No sealing



K Front panel sealing (IP67)

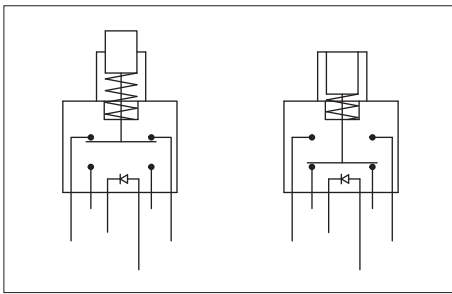
① internal membrane

② external gasket

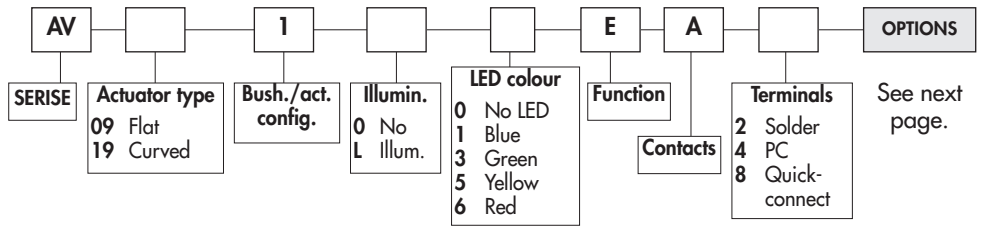
AV series

Security pushbutton switches Ø 19 mm (.748)

Illuminated and non-illuminated - latching



ORDER FORMAT



SPECIFICATIONS

- Max. current/voltage rating with resistive load : 2A 48 VDC
- LED voltage and consumption : blue 3,5V 10mA, green : 2V 10mA yellow & red : 2V 20mA (a resistor must be series-connected by the user)**
- Initial contact resistance : 50 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 1 000 Vrms 50 Hz min. between terminals 500 Vrms 50 Hz min. between terminals and frame
- Electrical life : 500.000 cycles at 2A 48VDC
- Torque : 5 Nm min.- 14 Nm max. applied to nut
- Panel thickness : 1 (.039) to 9 mm (.354) max.
- Operating temperature : -30°C to +70°C
- Low level or mechanical life : 1.000.000 cycles
- Hand soldering : 300°C, 4 seconds max.
- Packaging unit : 20 pieces

** Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

MATERIALS

- Case : PA6T UL94-V0
- Contacts : silver
- Bushing and actuator : see next page
- LED

CUT-OUT

- Panel cut-out : Ø 19,2 mm (.755)
- Min. pitch for matrix mounting : 30 mm x 30 mm (1.181 x 1.181)

To order a product, select a basic model below and add the desired options selected on next page.

Standard actuator position : the actuator is flush in the non-latched position and recessed in the latched position.

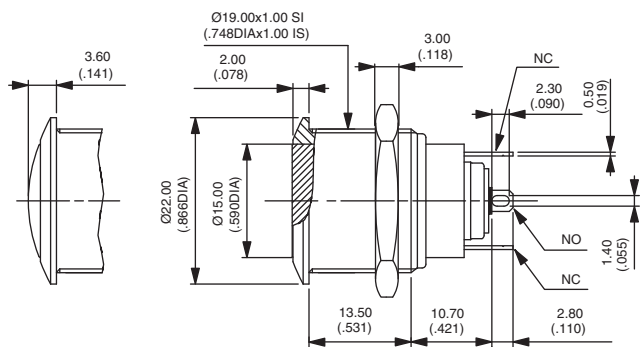
Non-illuminated - solder lug terminals

Hex nut 22 (.866) across flats



Flat actuator *
AV09100EA2 ON - ON

Curved actuator
AV19100EA2 ON - ON



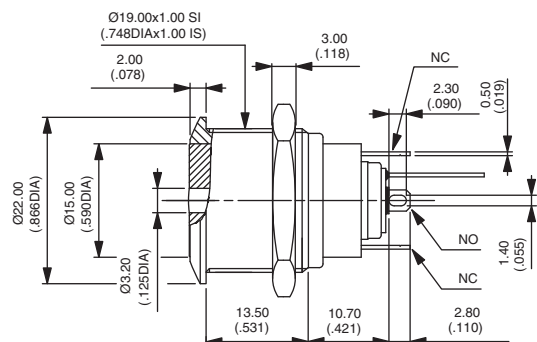
* Also available with prominent actuator in the non-latched position

Illuminated - solder lug terminals

Hex nut 22 (.866) across flats



Flat actuator
AV091L•EA2 ON - ON



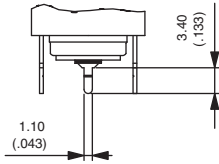
Replace • with desired LED colour.

AV series

Security pushbutton switches Ø 19 mm (.748)

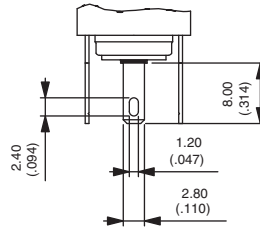
Latching - Options

Straight PC terminals



Replace 2 with 4 at the end of the model numbers shown on previous page.

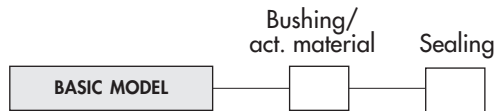
Quick-connect terminals



Replace 2 with 8 at the end of the model numbers shown on previous page.

B2

After selecting basic model number, fill in last 2 boxes with desired options.

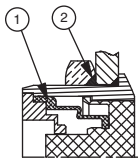


BUSHING/ACTUATOR MATERIALS

CODE	BUSHING	ACTUATOR
00 (std)	Nickel plated brass	Nickel plated brass
10	Nickel plated brass	Stainless steel
40	Stainless steel	Stainless steel
50	Stainless steel	Nickel plated brass

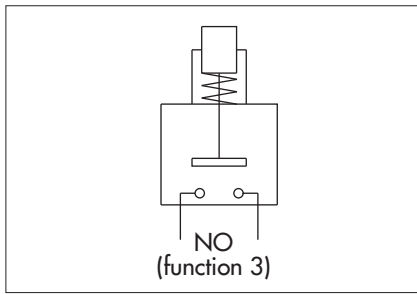
SEALING

Blank No sealing

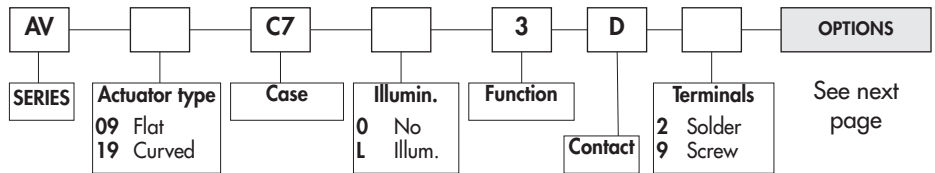


K Frontal panel sealing (IP65)

- ① elastomeric membrane
- ② external gasket



ORDER FORMAT



SPECIFICATIONS

- Travel : 0,7 mm (.027) ±0,1 mm (.003)
 - Max. current/voltage rating with resistive load : 50mA 24VDC
 - LED voltage and consumption : 2-colour LED : 2V (3V max.) 20mA
Other colours : 2V (3V max.) 10mA
A resistor must be series-connected by the user **
 - Initial contact resistance : 100 mΩ max.
 - Insulation resistance : 1.000 MΩ min. at 500VDC
 - Dielectric strength : 500 Vrms 50 Hz min. between terminals
2.000 Vrms 50 Hz min. between terminals and frame
 - Electrical life : 1.000.000 cycles at full load
 - Operating force : 7 N ±2N
 - Torque : 5 Nm min.- 14 Nm max. applied to nut
 - Panel thickness : 1 (.039) to 6 mm (.236) max.
 - Operating temperature : -30°C to +70°C
 - Hand soldering : 270°C, 3 seconds max.
 - Packaging unit : 40 pieces
- ** Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

MATERIALS

- Case : PBT UL94-V0
- Terminals : brass, gold plated
- Contacts : gold plated dome
- Bushing and actuator : see next page
- LED

CUT-OUT

- Panel cut-out : Ø 19,2 mm (.755)
- Min. pitch for matrix mounting : 30 mm x 30 mm (1.181x1.181)

To order a product, select a basic model below and add the desired options selected on next page.

Flat actuator - non-illuminated

Hex nut 22 (.866) across flats

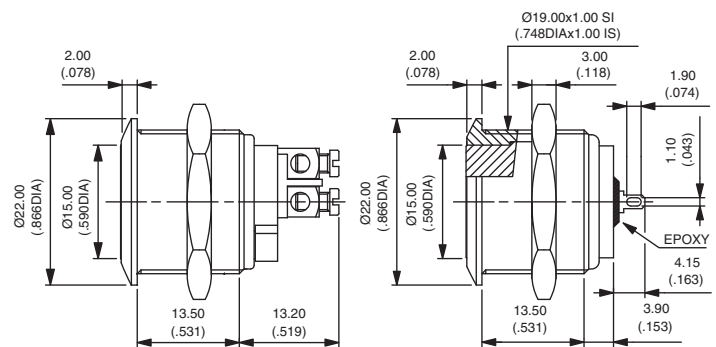


Solder lug terminals
AV09C703D2

Screw terminals
AV09C703D9



Also available with curved actuator :
AV19C703D2 or AV19C703D9



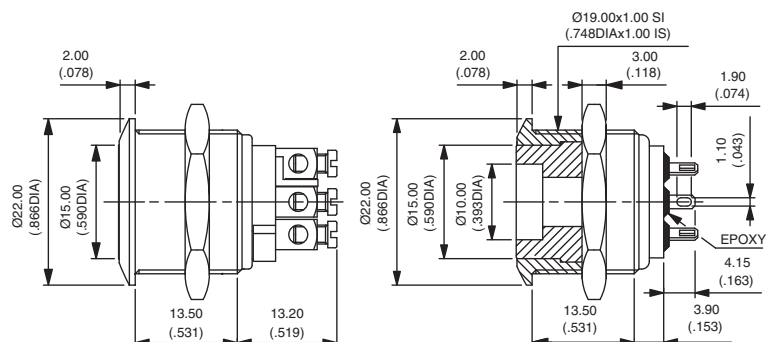
Flat actuator - illuminated

Hex nut 22 (.866) across flats



Solder lug terminals
AV09C713D2

Screw terminals
AV09C713D9



AV series

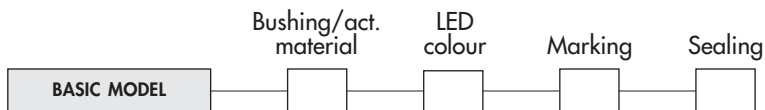
Snap-action security pushbutton switches Ø 19 mm (.748)

OPTIONS



Options

After selecting basic model no., fill in last 4 boxes with desired options.



BUSHING/ACTUATOR MATERIALS

Non-illuminated models

CODE	BUSHING	ACTUATOR
00 (std)	Nickel plated brass	Nickel plated brass
10	Nickel plated brass	Stainless steel
30	Chrome plated brass	Stainless steel
40	Stainless steel	Stainless steel
80	Varnished polished brass	Varnished polished brass

Illuminated models

CODE	BUSHING	ACTUATOR
00 (std)	Nickel plated brass	Nickel plated brass
20	Chrome plated brass	Chrome plated brass
40	Stainless steel	Stainless steel
50	Stainless steel	Nickel plated brass
80	Varnished polished brass	Varnished polished brass

LED COLOURS

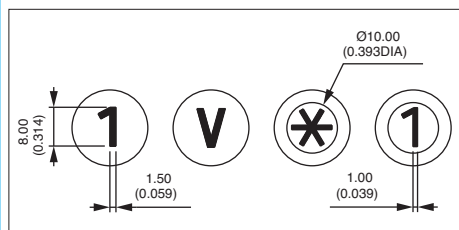
Blank No LED

1 : Blue - 3 : Green - 5 : Yellow - 6 : Red - 7 : White - 9 : Amber - 2 : Red/green

MARKING

For flat or curved actuator.

- by engraving on non-illuminated brass actuator (stainless steel on request).
- by hot stamping on thermoplastic insert (illuminated actuators)



Select an option from each of the two tables below.

TYPE OF MARKING

CODE	TYPE
0 to 9	Numbers 0 to 9
X	Symbol *
Y	Symbol #
A to N	Letters A to N
P to W	Letters P to W
0	Letter O

Letter O : same code and same design as number 0.

For special symbols, consult factory.
Minimum order : 500 pieces

COLOUR OF MARKING

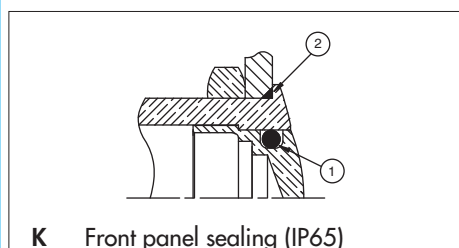
CODE	COLOUR
Non-illuminated actuators	
0 (standard)	Same as finish
2	Black

Note : a finished product supplied in version "0" cannot be modified to version "2".

CODE	COLOUR
Illuminated actuators	
2	Black (on white)

SEALING

Blank No sealing

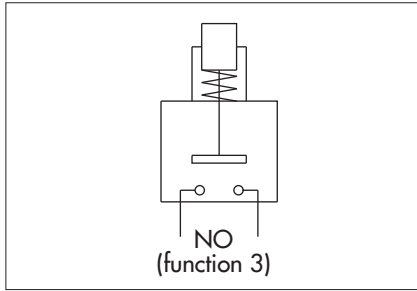


① internal gasket

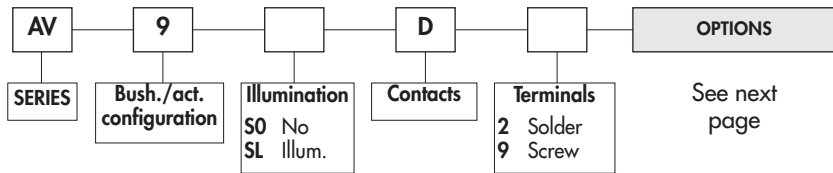
② external gasket

Snap-action security pushbuttons Ø 19 mm (.748) with overmolded actuator

Illuminated and non-illuminated - momentary (NO)



ORDER FORMAT



SPECIFICATIONS

- Travel : 0,7 mm (.027) ± 0,1 mm (.003)
- Max. current/voltage rating with resistive load : 50mA 24VDC
- LED voltage and consumption : 2-colour LED : 2V (3V max.) 20mA
Other colours : 2V (3V max.) 10mA
(a resistor must be series-connected by the user)**
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 500 Vrms 50 Hz min. between terminals
2.000 Vrms 50 Hz min. between terminals and frame
- Electrical life : 1.000.000 cycles at full load
- Operating force : 7 N ±2N
- Torque : 5 Nm min.- 14 Nm max. applied to nut
- Panel thickness : 1 (.039) to 6 mm (.236) max.
- Operating temperature : -30°C to +70°C
- Hand soldering : 270°C, 3 sec. max.
- Packaging unit : 16 pieces

** Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

MATERIALS

- Case : PBT UL94-V0
- Terminals : brass, gold plated
- Contacts : gold plated dome
- Bushing : see next page
- Actuator : stainless steel, with thermoplastic overmolding
- LED

CUT-OUT

- Panel cut-out : Ø 19,2 mm (.755)
- Min. pitch for matrix mounting : 30 mm x 30 mm (1.181x1.181)

To order a product, select a basic model below and add the desired options selected on next page.

Flat actuator - solder lug terminals

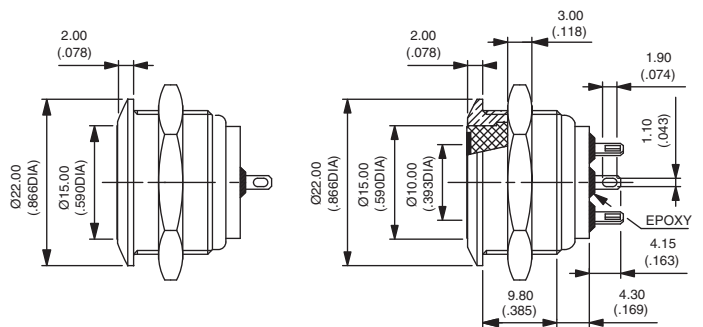
Hex nut 22 (.866) across flats



Illuminated
AV9SLD2



Non-illuminated
AV9SOD2



Also available with bushing Ø 22 (.866) : on request.

Flat actuator - screw terminals

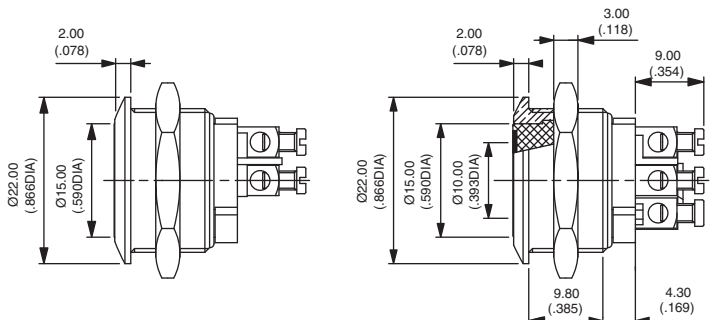
Hex nut 22 (.866) across flats



Illuminated
AV9SLD9



Non-illuminated
AV9SOD9



Also available with bushing Ø 22 (.866) : on request.

AV series

Snap-action security pushbuttons Ø 19 mm (.748) with overmolded actuator



Options

After selecting basic model no., fill in last 5 boxes with desired options.



BUSHING MATERIALS

CODE	MATERIAL
0 (std)	Nickel plated brass
2	Chrome plated brass
4	Stainless steel
5	Gold plated brass
6	Chrome plated brass, satin
7	Chrome pl. brass, matt black
8	Varnished polished brass
9	Polished brass

OVERMOLDING COLOURS

CODE	COLOUR	CODE	COLOUR
1	Blue	6	Red
2	Black *	7	White
3	Green	8	Translucent
4	Grey *	9	Orange
5	Yellow		

* non-illuminated only

LED COLOURS

CODE	COLOUR
Blank	No LED
1	Blue
2	Red/green
3 **	Green
V **	Green, high intensity
5	Yellow
6	Red
7	White
9	Amber

** To order a green LED for actuator style 002, always use code V. Other actuator styles can be ordered with LED code 3 or V.

ACTUATOR STYLES

The ring and symbols are obtained by photochemical engraving of a stainless steel insert. The insert is then overmolded in the desired colour.

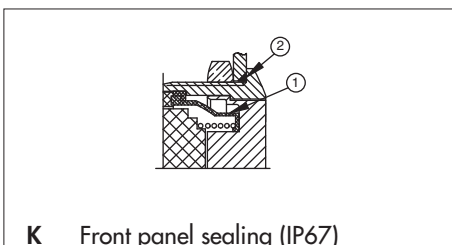
The following actuator styles are available. For other types, consult factory.

CODE	001	002	003	004	005
DESCRIPTION	Illuminated ring and disc	Illuminated ring	Arrow	Loudspeaker OFF	Opening
RING/SYMBOL					

CODE	006	008	009	010	011
DESCRIPTION	Validation	Closing	Standby	Cancel	Power
SYMBOL					

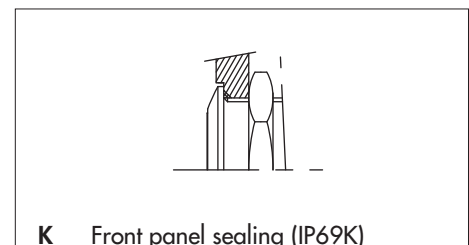
SEALING

Blank No sealing



- ① internal membrane
- ② external gasket

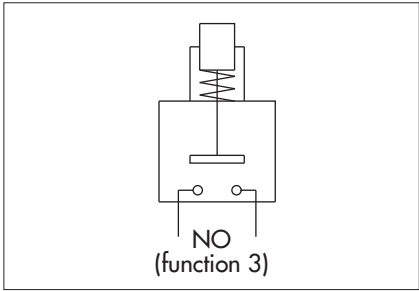
Recommended panel mounting for IP69K



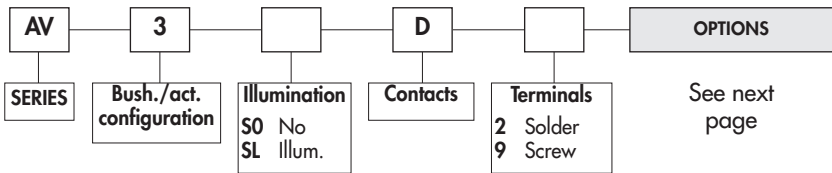
AV series

Snap-action security pushbuttons Ø 22 mm (.866) with overmolded actuator

Illuminated and non-illuminated - momentary (NO)



ORDER FORMAT



SPECIFICATIONS

- Travel : 0,7 mm (.027) ± 0,1 mm (.003)
- Max. current/voltage rating with resistive load : 50mA 24VDC
- LED voltage and consumption : 2-colour LED : 2V (3V max.) 20mA
Other colours : 2V (3V max.) 10mA
(a resistor must be series-connected by the user)**
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 500 Vrms 50 Hz min. between terminals
2.000 Vrms 50 Hz min. between terminals and frame
- Electrical life : 1.000.000 cycles at full load
- Operating force : 7 N ±2N
- Torque : 5 Nm min.- 14 Nm max. applied to nut
- Panel thickness : 1 (.039) to 6 mm (.236) max.
- Operating temperature : -30°C to +70°C
- Hand soldering : 270°C, 3 sec. max.
- Packaging unit : 16 pieces

** Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

MATERIALS

- Case : PBT UL94-V0
- Terminals : brass, gold plated
- Contacts : gold plated dome
- Bushing : see next page
- Actuator : stainless steel, with thermoplastic overmolding
- LED

CUT-OUT

- Panel cut-out : Ø 22,2 mm (.874)
- Min. pitch for matrix mounting : 30 mm x 30 mm (1.181x1.181)

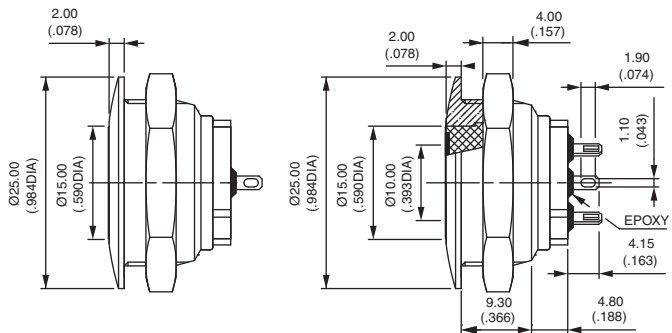
Flat actuator - solder lug terminals



Illuminated
AV3SLD2



Non-illuminated
AV3SOD2



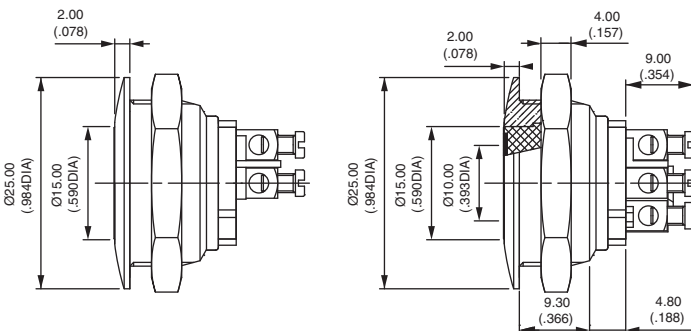
Flat actuator - screw terminals



Illuminated
AV3SLD9



Non-illuminated
AV3SOD9

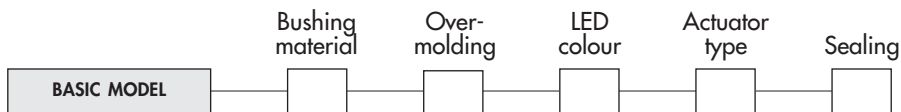


AV series

Snap-action security pushbuttons Ø 22 mm (.866) with overmolded actuator

Options

After selecting basic model no., fill in last 5 boxes with desired options.



BUSHING MATERIALS

CODE	MATERIAL
0 (std)	Nickel plated brass
2	Chrome plated brass
4	Stainless steel
5	Gold plated brass
6	Chrome plated brass, satin
7	Chrome pl. brass, matt black
8	Varnished polished brass
9	Polished brass

OVERMOLDING COLOURS

CODE	COLOUR	CODE	COLOUR
1	Blue	6	Red
2	Black *	7	White
3	Green	8	Translucent
4	Grey *	9	Orange
5	Yellow		

* non-illuminated only

LED COLOURS

CODE	COLOUR
Blank	No LED
1	Blue
2	Red/green
3 **	Green
V **	Green, high intensity
5	Yellow
6	Red
7	White
9	Amber

** To order a green LED for actuator style 002, always use code V. Other actuator styles can be ordered with LED code 3 or V.

ACTUATOR STYLES

The ring and symbols are obtained by photochemical engraving of a stainless steel insert. The insert is then overmolded in the desired colour.

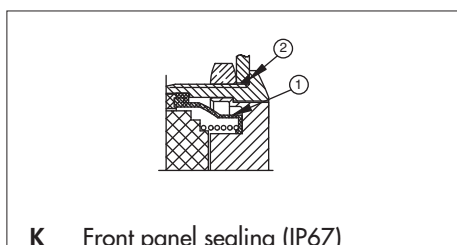
The following actuator styles are available. For other types, consult factory.

CODE	001	002	003	004	005
DESCRIPTION	Illuminated ring and disc	Illuminated ring	Arrow	Loudspeaker OFF	Opening
RING/SYMBOL					

CODE	006	008	009	010	011
DESCRIPTION	Validation	Closing	Standby	Cancel	Power
SYMBOL					

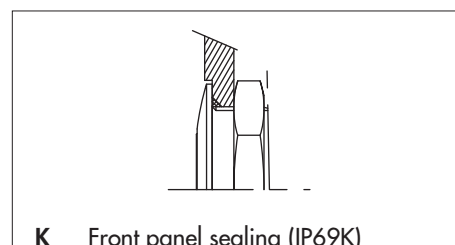
SEALING

Blank No sealing



① internal membrane
② external gasket

Recommended panel mounting for IP69K

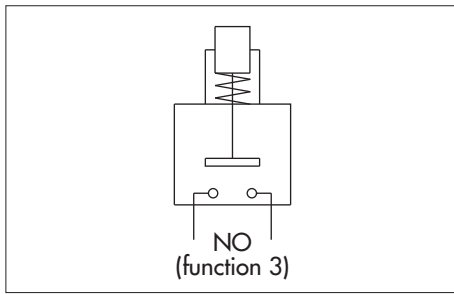




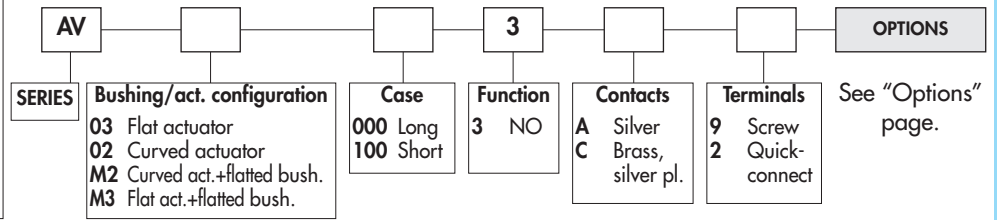
AV series

Security pushbutton switches Ø 22 mm (.866)

Momentary (NO)



ORDER FORMAT



SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - A contacts : 4A 12VDC, 500.000 cycles
 - C contacts : 2A 48 VDC, 10.000 cycles
- Approved ratings of models with long case and A contacts (AV.000) :
 - UL-CSA : 4A 250VAC - 8A 125VAC - 6.000 cycles
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.000 Vrms 50 Hz min. between terminals and frame
2.000 Vrms 50 Hz min. between terminals
- Torque : 5 Nm min.- 14 Nm max. applied to nut
- Panel thickness : 1 (.039) to 11 mm (.433) max.
- Operating temperature : -30°C to +70°C
- Low level or mechanical life : 1.000.000 cycles
- Hand soldering : 300°C, 3 sec. max.
- Packaging unit : 20 pieces

MATERIALS

- Case : PBT
- Contacts : silver (A) or brass, silver plated (C)
- Bushing and actuator : see "Options" page

CUT-OUTS

- Panel cut-out : Ø 22,2 mm (.874)
- Min. pitch for matrix mounting : 30 mm x 30 mm (1.181x1.181)

To order a product, select a basic model below or on next page and add the desired options.

BASIC MODEL

Flat actuator - short case - 48VDC - AV03100

Hex nut 25 (.984) across flats

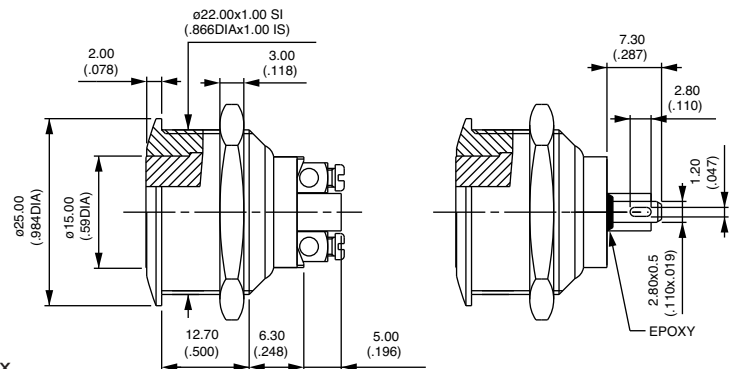


Screw terminals
AV031003•9

Solder lug / quick-connect term.
AV031003•2

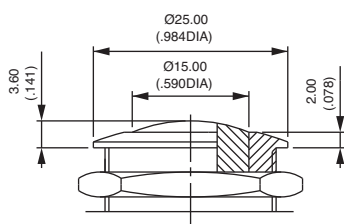


Screw terminals for wires 1,5 mm² max.



Contacts : replace • with A (silver) or C (silver plated brass).

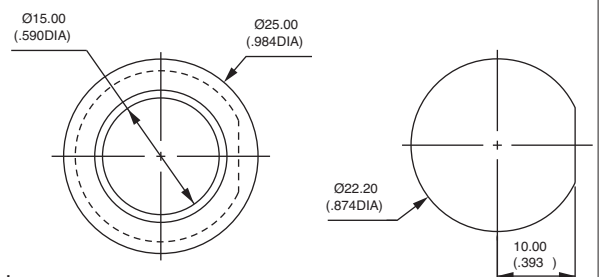
Curved actuator - short case



Screw terminals
AV021003•9

Solder lug / quick-connect terminals
AV021003•2

Flatted bushing - short case - AVM3 and AVM2



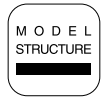
Flat actuator, screw terminals
AVM31003•9

Curved actuator, screw terminals
AVM21003•9

AV series

Security pushbutton switches Ø 22 mm (.866)

Momentary (NO) - momentary (NC) - alternate action



Flat actuator - long case - 4A 250VAC/8A 125VAC - UL/CSA - AV03000

Hex nut 25 (.984) across flats

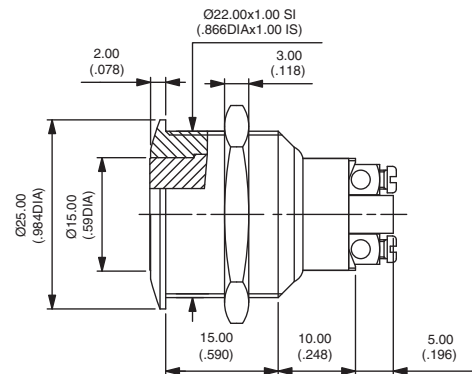


Screw terminals
AV030003A9

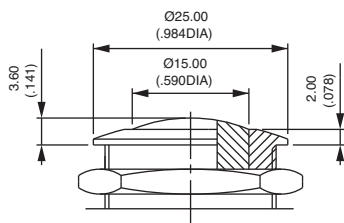


To order switches marked **UL-CSA**, add "UU" at the end of model number.

Screw terminals for wires 1,5 mm² max.

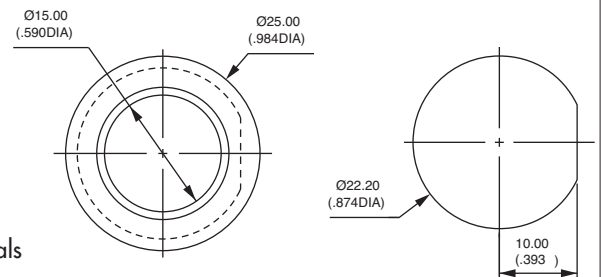


Curved actuator - long case



Screw terminals
AV020003A9

Flatted bushing - long case - AVM3 and AVM2



Flat actuator, screw terminals
AVM30003•9

Curved actuator, screw terminals
AVM20003•9

MOMENTARY NORMALLY CLOSED MODEL (NC)

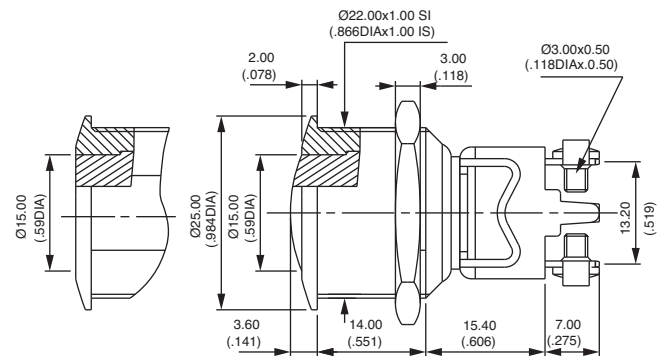
Bushing Ø 22 (.866) - AV..1200

Hex nut 25 (.984) across flats

- Single pole, screw terminals, without marking
- Silver plated copper contacts (C)
- Max. current/voltage rating with resistive load : 2A 250VAC - 3A 125VAC - 2,5A 24VDC
- Dielectric strength : 2.000 Vrms 50 Hz min. betw. term. and frame 2.000 Vrms. 50 Hz min. between terminals
- Electrical life : 100.000 cycles at 0,3A 24VAC or DC 10.000 cycles at full load
- Packaging unit : 20 pieces

Flat actuator
AV031202C900

Curved actuator
AV021202C900

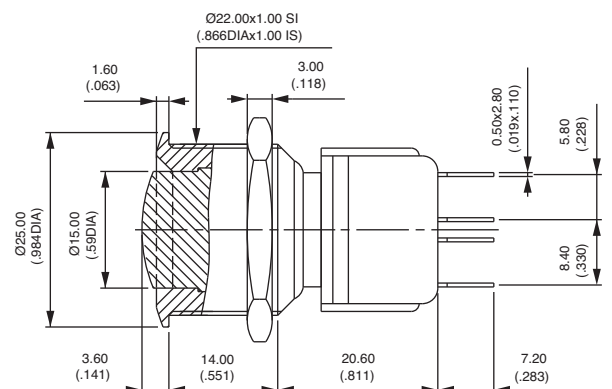


Bushing Ø 22 (.866) - alternate action - AV..4700

Hex nut 25 (.984) across flats

- Double pole, solder lug/quick-connect term., curved actuator
- Silver contacts
- Max. current/voltage rating with resistive load : 3(1,5)A 250VAC - 6A 125VAC - 3A 24VAC or DC
- Dielectric strength : 3.000 Vrms min. between terminals and frame
- Electrical life : 10.000 cycles at full load 50.000 cycles at 1A 24VAC or DC
- Mechanical life : 100.000 cycles
- Packaging unit : 10 pieces

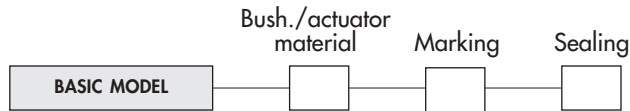
AV044746A200



Further specifications : see previous page. Bushing/actuator materials, marking and sealing : see "options" on next page.

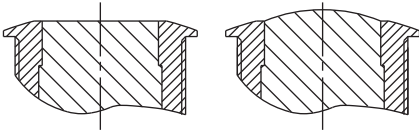


After selecting basic model number, fill in last 3 boxes with desired options.



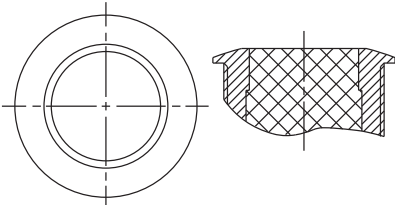
BUSHING/ACTUATOR MATERIALS

Flat or curved metal actuator



CODE	BUSHING	ACTUATOR
00 (standard)	Nickel plated brass	Nickel plated brass
10	Nickel plated brass	Stainless steel
12	Nickel plated brass	Chrome plated brass
20	Chrome plated brass	Chrome plated brass
30	Chrome plated brass	Stainless steel
40	Stainless steel	Stainless steel
80 **	Varnished polished brass	Varnished polished brass

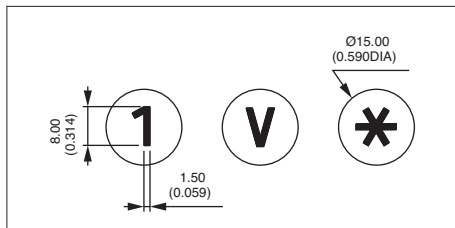
Flat thermoplastic actuator



CODE	BUSHING	ACTUATOR COLOUR
0• (standard)	Nickel plated brass	Replace • with one of the following codes.
2•	Chrome plated brass	1 : blue - 1/4 : dark blue - 2 : black - 3 : green
8•	Varnished polished brass	4 : grey - 5 : yellow - 6 : red - 7/1 : white
		9 : orange

MARKING

- By engraving on flat or curved brass actuator (stainless steel on request)
- by hot stamping on flat thermoplastic actuator



Select an option from each of the two tables below.

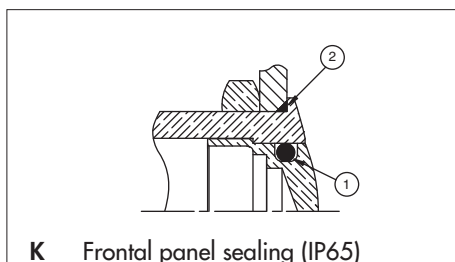
TYPE OF MARKING	
CODE	TYPE
0 to 9	Numbers 0 to 9
X	Symbol *
Y	Symbol #
A to N	Letters A to N
P to W	Letters P to W
0	Letter O

Letter O : same code and same design as number 0.
For special symbols, consult factory.
Minimum order : 500 pieces

COLOUR OF MARKING	
CODE	COLOUR
Brass actuator	
0 (standard)	Same as finish
2	Black
Note : a finished product supplied in version "0" cannot be modified to version "2".	
Thermoplastic actuator	
2	Black
7	White

SEALING

Blank No sealing

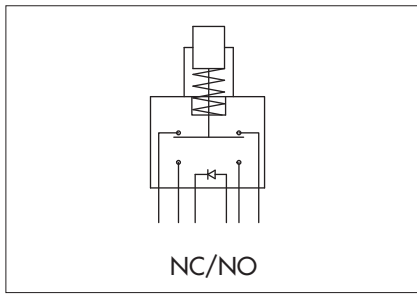


- ① internal gasket
- ② external gasket

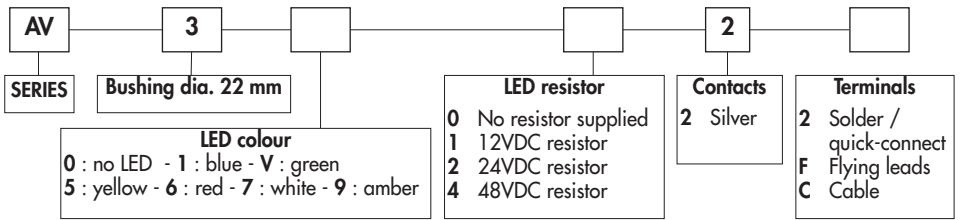
AV series

Security pushbutton switches Ø 22 mm (.866)

With illuminated ring - momentary (NC/NO)



ORDER FORMAT



SPECIFICATIONS

- Travel : 2 mm ± 0,3 mm (.003)
 - Max. current/voltage rating with resistive load : 1A 30VDC
 - LED voltage : 12VDC, 24VDC or 48VDC
(If not supplied by APEM, a resistor must be series-connected by the user)**
 - Initial contact resistance : 100 mΩ max.
 - Insulation resistance : 10 MΩ min. at 500VDC
 - Dielectric strength : 500 Vrms 50 Hz min. between terminals
1.000 Vrms 50 Hz min. between terminals and frame
 - Electrical life : 250.000 cycles at full load
 - Operating force : 5N ± 2N
 - Torque : 5 Nm min.- 14 Nm max. applied to nut
 - Panel thickness : 1 (.039) to 6 mm (.236) max.
 - Low level or mechanical life : 1.000.000 cycles
 - Operating temperature : -20°C to +55°C
 - Hand soldering : 350°C, 5 seconds max.
 - Packaging unit : flying lead/cable models : 1 piece - other models : 40 pieces
- ** Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

MATERIALS

- Case : polyamide, glass filled
- Contacts : silver
- Bushing : see next page
- Actuator : see next page
- Elastomeric membrane : silicone
- LED

CUT-OUT

- Panel cut-out : Ø 22,2 mm (.874)
- Min. pitch for matrix mounting : 30 mm x 30 mm (1.181x1.181)

To order a product, select a basic model below and add the desired LED colour and voltage. Then select the desired options on next page.

Flat actuator - solder lug terminals

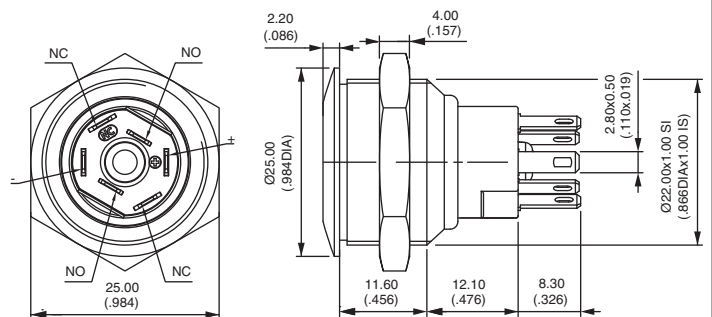
Hex nut 25 (.984) across flats



Illuminated (select LED colour above) *
AV3•022

Non-illuminated
AV30022

* No LED resistor supplied on this model.



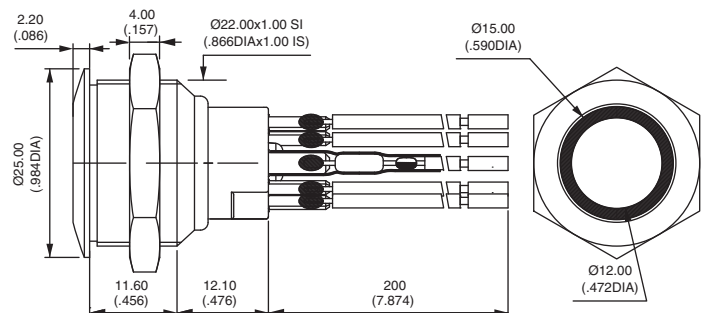
Flat actuator - flying lead terminals

Hex nut 25 (.984) across flats



Illuminated (select LED colour & resistor above)
AV3••2F

Non-illuminated
AV3002F



Wire colours : black: NC, orange: NO, red: LED anode (+), blue : LED cathode (-)



AV series

Security pushbutton switches Ø 22 mm (.866)

With illuminated ring - momentary changeover (NC/NO)

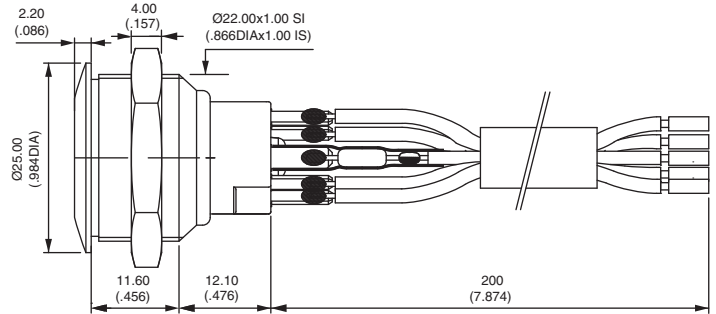
Flat actuator - cable terminals

Hex nut 25 (.984) across flats

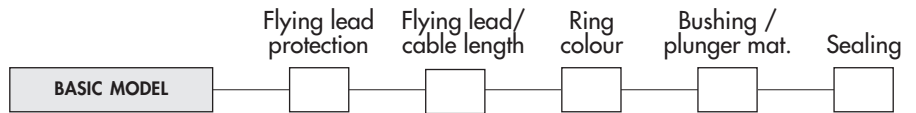


Illuminated (select colour & resistor)
AV3••2C

Non-illuminated
AV3002C



After selecting basic model No., fill in last 5 boxes with desired options.



FLYING LEAD PROTECTION

- 0 No protection and/or no flying leads
- 1 Heat-shrink sleeves
- 2 Tube + epoxy

WIRE/CABLE LENGTH

- 000 No flying leads / no cable
- 020 Length 20 cm (7.874) - standard
- XXX Length in centimeters

RING COLOURS

CODE	COLOUR	CODE	COLOUR
1	Blue	6	Red
2	Black *	7	Opal white (std)
3	Green	8	Translucent
4	Grey *	9	Orange
5	Yellow		

* non-illuminated only

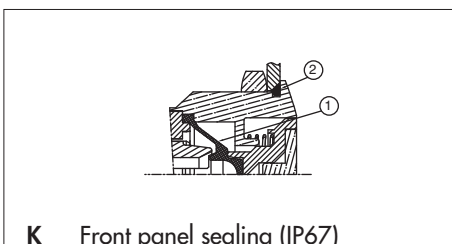
BUSHING/PLUNGER MATERIALS

CODE	BUSHING	ACTUATOR
00	Brass, nickel plated	Brass, nickel plated
40	Stainless steel 303	Stainless steel 303
4A	Stainless steel 304	Stainless steel 304
4B	Stainless steel 316	Stainless steel 316

Other : on request.

SEALING

Blank No sealing



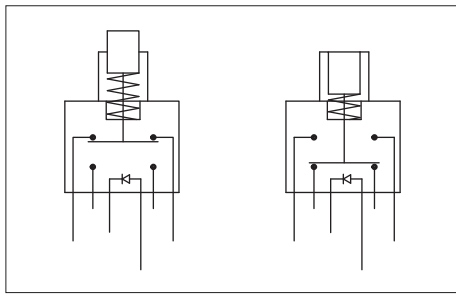
K Front panel sealing (IP67)

- ① internal membrane
- ② external gasket

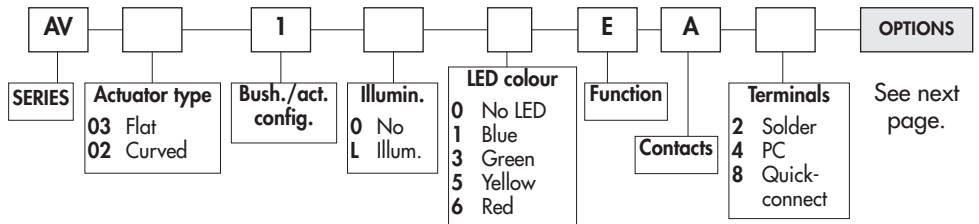
AV series

Security pushbutton switches Ø 22 mm (.866)

Illuminated and non-illuminated - latching



ORDER FORMAT



SPECIFICATIONS

- Max. current/voltage rating with resistive load : 2A 48 VDC
 - LED voltage and consumption : blue 3,5V 10mA, green : 2V 10mA yellow & red : 2V 20mA (a resistor must be series-connected by the user)**
 - Initial contact resistance : 50 mΩ max.
 - Insulation resistance : 1.000 MΩ min. at 500VDC
 - Dielectric strength : 1 000 Vrms 50 Hz min. between terminals 500 Vrms 50 Hz min. between terminals and frame
 - Electrical life : 500.000 cycles at 2A 48VDC
 - Torque : 5 Nm min.- 14 Nm max. applied to nut
 - Panel thickness : 1 (.039) to 9 mm (.354) max.
 - Operating temperature : -30°C to +70°C
 - Low level or mechanical life : 1.000.000 cycles
 - Hand soldering : 300°C, 4 seconds max.
 - Packaging unit : 20 pieces
- ** Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

MATERIALS

- Case : PA6T UL94-V0
- Contacts : silver
- Actuator and bushing : see next page
- LED

CUT-OUT

- Panel cut-out : Ø 22,2 mm (.874)
- Min. pitch for matrix mounting : 30 mm x 30 mm (1.181x1.181)

To order a product, select a basic model below and add the desired options selected on next page.

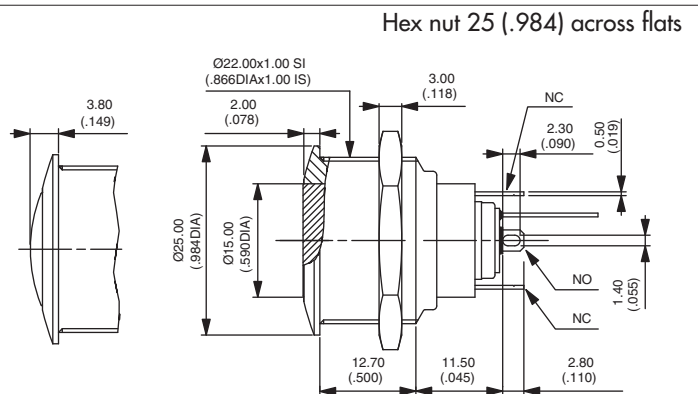
Standard actuator position : the actuator is flush in the non-latched position and recessed in the latched position.

Non-illuminated - solder lug terminals



Flat actuator *
AV03100EA2 ON - ON

Curved actuator
AV02100EA2 ON - ON

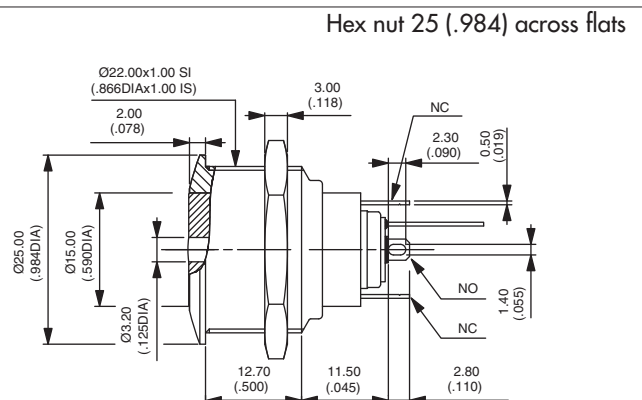


* Also available with prominent actuator in the non-latched position

Illuminated - solder lug terminals



Flat actuator
AV031L•EA2 ON - ON



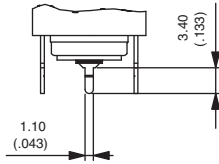
Replace • with desired LED colour.

AV series

Security pushbutton switches Ø 22 mm (.866)

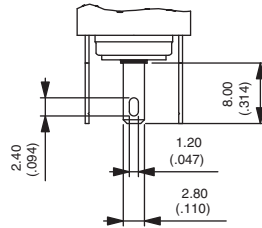
Illuminated and non-illuminated - latching

Straight PC terminals



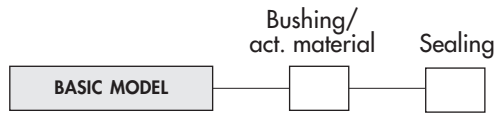
Replace 2 with 4 at the end of the model numbers shown on previous page.

Quick-connect terminals



Replace 2 with 8 at the end of the model numbers shown on previous page.

After selecting basic model number, fill in last 2 boxes with desired options.

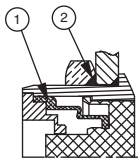


BUSHING/ACTUATOR MATERIALS

CODE	BUSHING	ACTUATOR
00 (std)	Nickel plated brass	Nickel plated brass
10	Nickel plated brass	Stainless steel
40	Stainless steel	Stainless steel
50	Stainless steel	Nickel plated brass

SEALING

Blank No sealing



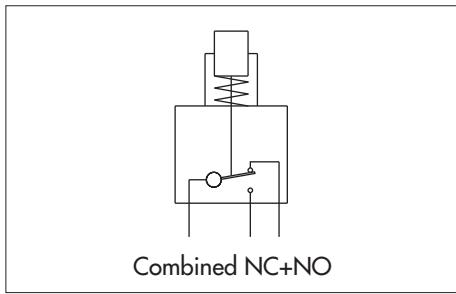
K Frontal panel sealing (IP65)

- ① elastomeric membrane
- ② external gasket

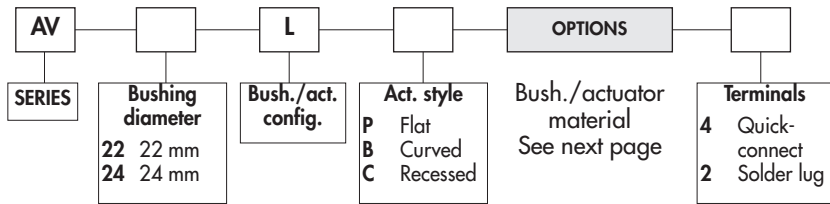
AV series

Security pushbutton switches Ø 22 mm (.866) or 24 mm (.944) with large actuator

Momentary (combined NC+NO)



ORDER FORMAT



SPECIFICATIONS

- Max. current/voltage rating with resistive load : 5A 250VAC
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.000 Vrms 50 Hz min. between terminals and frame
- Electrical life : 1.000.000 cycles at 1A 250VAC
100.000 cycles at full load
- Torque : 5 Nm min.- 14 Nm max. applied to nut
- Panel thickness : 1 (.039) to 6 mm (.236) max.
- Operating temperature : -20°C to +55°C
- Low level or mechanical life : 3.000.000 cycles
- Front panel sealing : IP65
- Hand soldering : 300°C, 5 sec. max.
- Packaging unit : 20 pieces (except black chrome plated : 16 pieces)

MATERIALS

- Case : polyester, glass filled
- Contacts : silver/nickel alloy
- Bushing and actuator : see next page.

CUT-OUT

- Panel cut-out : Ø 22,2 mm (.874) or Ø 24,2 mm (.952)
- Min. pitch for matrix mounting : 30 mm x 30 mm (1.181x1.181) or 33 mm x 33 mm (1.299x1.299)

To order a product, select a basic model below or on next page and add the desired bushing/actuator materials.

BASIC MODEL

Flat actuator - AV22LP



Quick-connect terminals
AV22LP••4

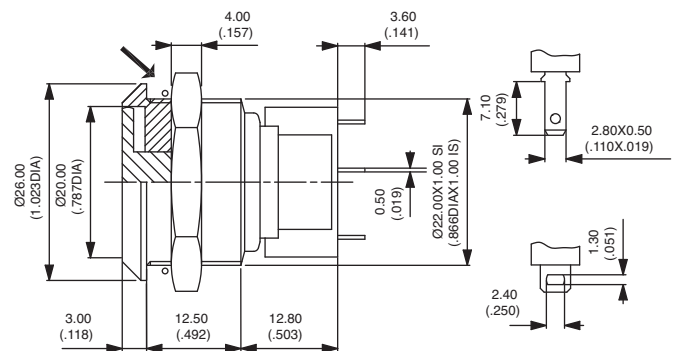


Solder lug terminals
AV22LP••2

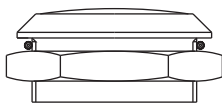


→ O-ring

Hex nut 25 (.984) across flats

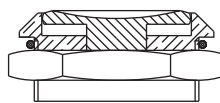


Curved actuator - AV22LB



Quick-connect terminals
AV22LB••4
Solder lug terminals
AV22LB••2

Recessed actuator - AV22LC



Quick-connect terminals
AV22LC••4
Solder lug terminals
AV22LC••2



AV series

Security pushbutton switches Ø 22 mm (.866) or 24 mm (.944) with large actuator

Momentary (combined NC+NO)

BASIC MODEL

Flat actuator - low profile - AV24LP



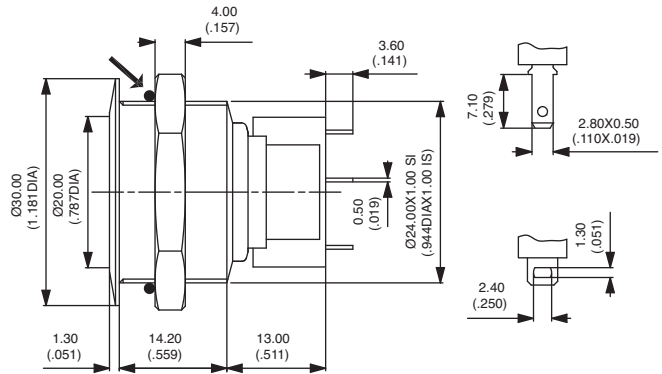
Quick-connect terminals
AV24LP••4

Solder lug terminals
AV24LP••2

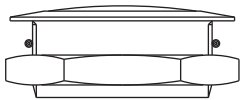


→ O-ring

Hex nut 27 (1.062) across flats

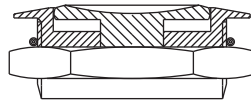


Curved actuator - AV24LB



Quick-connect terminals
AV24LB••4
Solder lug terminals
AV24LB••2

Recessed actuator - AV24LC



Quick-connect terminals
AV24LC••4
Solder lug terminals
AV24LC••2

BUSHING/ACTUATOR MATERIALS

Models with non-anodized actuator

CODE	BUSHING	ACTUATOR
40 (standard)	Stainless steel	Stainless steel
20	Chrome plated brass	Chrome plated brass

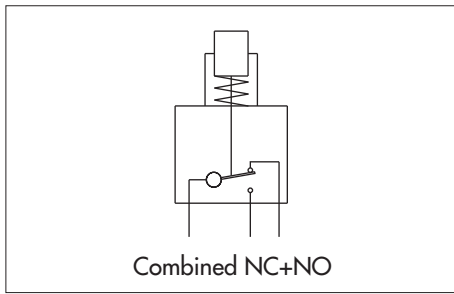
Models with anodized actuator

CODE	BUSHING	ACTUATOR COLOUR
1•	Black chrome plated brass	Replace • with one of the following codes :
2•	Chrome plated brass	1 : blue - 2 : black - 3 : pale green - 3F : dark green - 4 : natural - 5 : gold yellow
4•	Stainless steel	6 : red - 6B : maroon

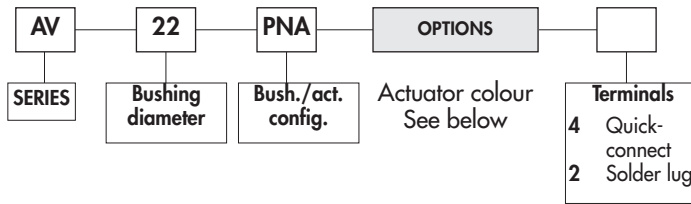
AV series

Mushroom head security pushbutton switches Ø 22 mm (.866)

Momentary (combined NC+NO)



ORDER FORMAT



SPECIFICATIONS

- Max. current/voltage rating with resistive load : 5A 250VAC
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.000 Vrms 50 Hz min. between terminals and frame
- Electrical life : 1.000.000 cycles at 1A 250VAC
50.000 cycles at full load
- Torque : 5 Nm min.- 14 Nm max. applied to nut
- Panel thickness : 1 (.039) to 6 mm (.236) max.
- Operating temperature : -20°C to +55°C
- Low level or mechanical life : 1.000.000 cycles
- Front panel sealing : IP65
- Hand soldering : 300°C, 5 sec. max.
- Packaging unit : 16 pieces

MATERIALS

- Case : polyester, glass filled
- Contacts : silver/nickel alloy
- Bushing : brass, nickel plated
- Actuator : aluminium, anodized

CUT-OUT

- Panel cut-out : Ø 22,2 mm (.874)
- Min. pitch for matrix mounting : 30 mm x 30 mm (1.181x1.181)

To order a product, select a basic model below and add the desired actuator colour.

BASIC MODEL

Mushroom head actuator - AV22PNA



Quick-connect terminals
AV22PNA•4

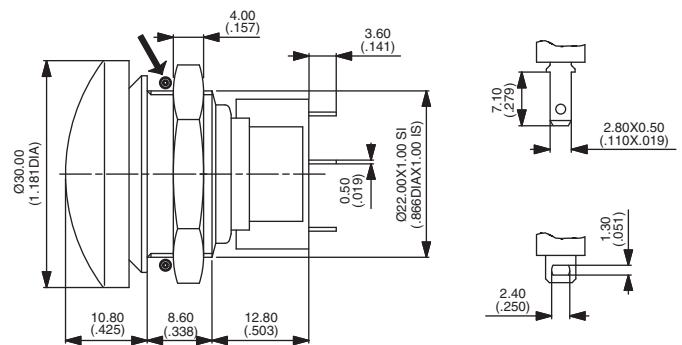


Solder lug terminals
AV22PNA•2



→ O-ring

Hex nut 25 (.984) across flats



ACTUATOR ANODIZATION COLOURS

1 : blue - 2 : black - 3 : pale green - 3F : dark green - 4 : natural - 5 : gold yellow - 6 : red - 6B : maroon

1200 series

Momentary pushbutton switches - round plunger

Distinctive features and specifications



- ❑ Butt action contacts, double break
- ❑ NF (EN 61058-1), UL and CSA approved

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts (A) : 4A 250VAC - 8A 125VAC - 4A 24VDC - 8A 12VDC
 - silver plated copper contacts. (C) : 2A 250VAC - 3A 125VAC
2A 24VDC - 3A 12VDC
- Initial contact resistance : 10 mΩ
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 2.000 Vrms 50 Hz min. between terminals
 - 3.000 Vrms 50 Hz min. between terminals and frame
- Electrical life : 10.000 cycles at full load

MATERIALS

- Case : polyamide
- Plunger : polyamide
- Bushing : brass, nickel plated
- Contacts :
 - A : silver
 - C : copper, silver plated

GENERAL SPECIFICATIONS

- Torque : 1,50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness : 5 mm (.196) max.
- Total travel :
 - NO : 4,5 (.177) +/- 0,3 (.011)
 - NC : 3,5 (.137) +/- 0,3 (.011)
- Operating temperature : -20°C to +55°C

AGENCY APPROVALS



2A 250VAC or 4A 250VAC, T55/125°C
All models



4A 250VAC - 8A 125VAC
All models function 3 (NO)

Models 1233X209 and 1233X209L are standard marked NF.
To order switches marked NF, UL or CSA, complete appropriate box of ordering format.

ABOUT THIS SERIES

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



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



Mounting accessories : standard hardware supplied :

- silver contact models : 1 hex nut U166 and 1 knurled nut U411
- copper contact models : 1 hex nut U42 and 1 knurled nut U411

Standard and special hardware are presented in section I.

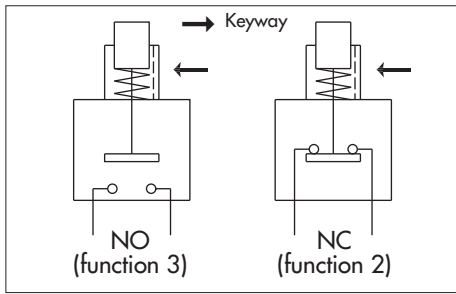


Packaging unit : 40 pieces, except model 1200.L (50 pieces).

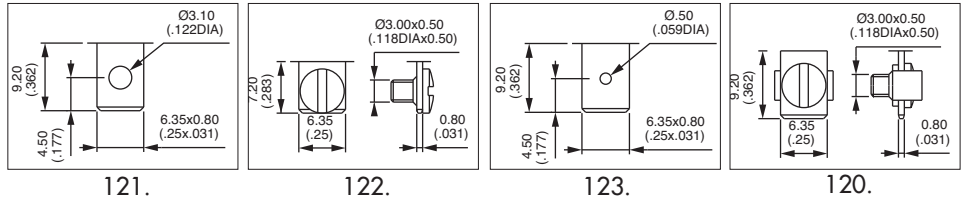
1200 series

Momentary pushbutton switches - round plunger

Solder lug/quick-connect terminals - screw terminals



- Single pole configurations
- Approved models : see following pages
- Panel cut-out : $\varnothing 12,2 (.480)$



MODEL STRUCTURE

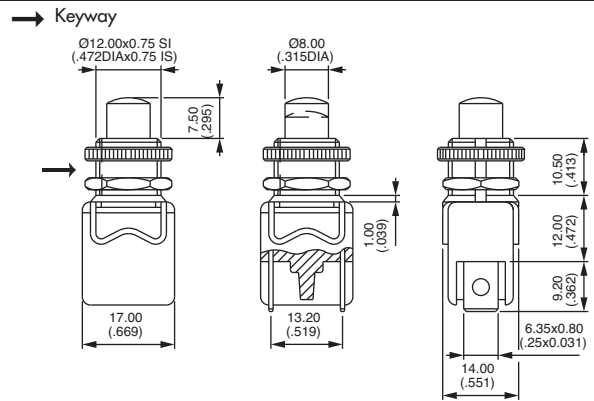


Plunger height : NO model : 7,50 mm, NC model : 5,80 mm

Solder lug/quick-connect terminals



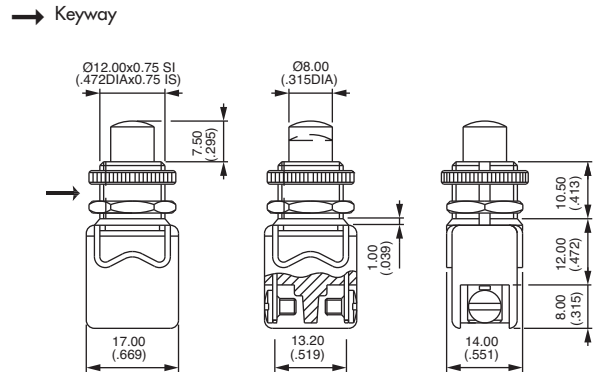
- | | | |
|------|--|-----------------|
| 1212 | | Normally Closed |
| 1213 | | Normally Open |



Screw terminals



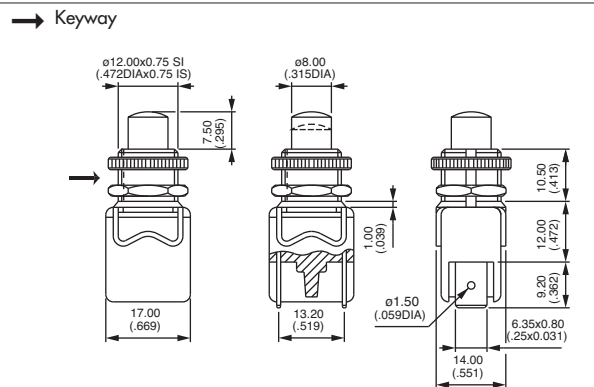
- | | | |
|------|--|-----------------|
| 1222 | | Normally Closed |
| 1223 | | Normally Open |



Normalized quick-connect terminals



- | | | |
|------|--|-----------------|
| 1232 | | Normally Closed |
| 1233 | | Normally Open |





1200 series

Momentary pushbutton switches - round plunger

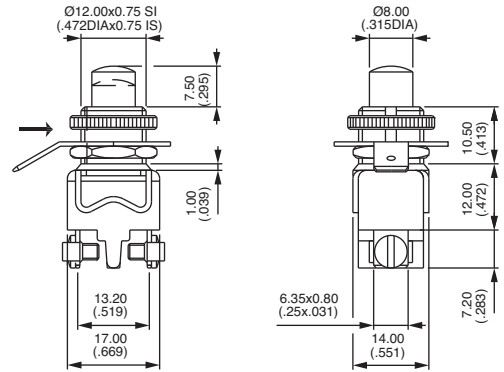
Plunger height : NO model : 7,50 mm, NC model : 5,80 mm

Straight screw terminals + clamp



1202		Normally Closed
1203		Normally Open

→ Keyway

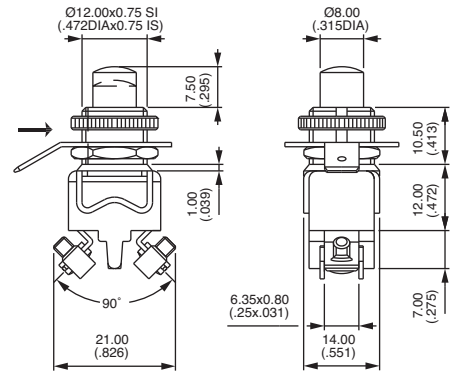


Right angle screw terminals + clamp

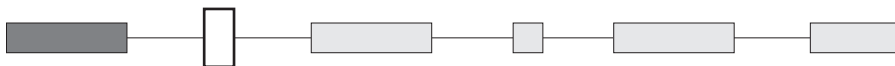


1203-7		Normally Open
--------	--	---------------

→ Keyway



CONTACT MATERIALS



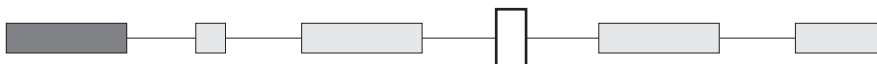
- A Silver
- C Copper, silver plated

FINISH



- LUXE Chrome plated cap nut U117 instead of knurled nut U411

PLUNGER COLOURS



- 2 : Black - 3 : Green - 6 : Red - 7/1 : White

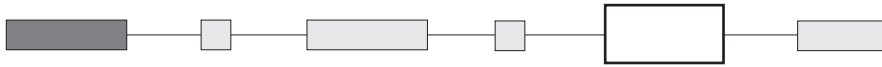
1200 series

Momentary pushbutton switches - round plunger

OPTIONS



SPECIAL MODELS



X209 NF standard marked - Silver contacts

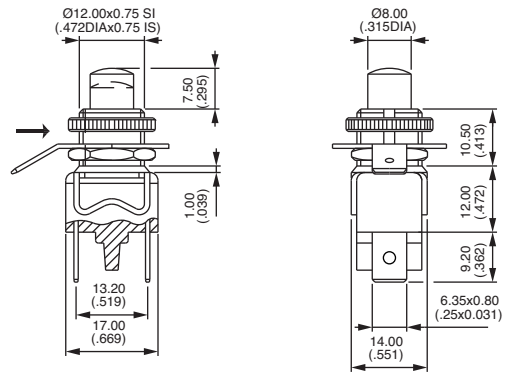


1233AX209



Normally open

→ Keyway



X209L NF standard marked - Silver contacts

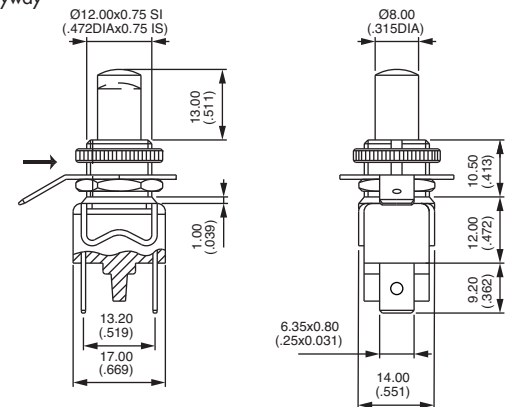


1233AX209L



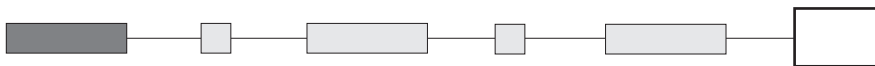
Normally open

→ Keyway



NOTE : Ground connector **U187** compulsory on models X209 and X209L if the panel is not metallic or not connected to ground. Order separately : see section I.

AGENCY APPROVALS



NF All models

UL-CSA All models function 3 (NO), including X209 and X209L

Marking : to order switches marked NF, UL or CSA, complete above box with desired approvals.

1200M/MR series

Robust momentary pushbutton switches - metal plunger

Distinctive features and specifications



Butt action contacts, double break

UL and CSA approved

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts (A) : 4A 250VAC - 8A 125VAC - 4A 24VDC - 8A 12VDC
 - silver plated copper contacts (C) : 2A 250VAC - 3A 125VAC - 2A 14VDC - 3A 12VDC
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 2.000 Vrms 50 Hz min. between terminals
 - 3.000 Vrms 50 Hz min. between terminals and frame
- Electrical life : 10.000 cycles at full load

MATERIALS

- Case : polyamide
- Plunger : top chrome plated brass on polyamide base
- Bushing : brass, nickel plated
- Cap nut : brass, chrome plated
- Contacts : **A** : silver
C : copper, silver plated

GENERAL SPECIFICATIONS

- Torque : 1,50 Nm (1.10 Ft.lb) max. applied to nut
- Panel thickness : 4,5 mm (.177) max.
- Total travel :
 - NO : 4,5 mm (.177) +/- 0,3 (.011)
 - NC : 3,5 mm (.137) +/- 0,3 (.011)
- Operating temperature : -20°C to +55°C

AGENCY APPROVALS



4A 250VAC - 8A 125VAC

Availability : approved models are 1213A and 1203A (M or MR)
(model 1223A is only UL approved).

Marking : to order switches marked UL or CSA, complete appropriate box of ordering format.

ABOUT THIS SERIES

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



Mounting accessories : standard hardware supplied with all models : 1 hex nut U166 and 1 conic cap nut U1866-6.
Special cap nut U1874 is presented on the following pages.

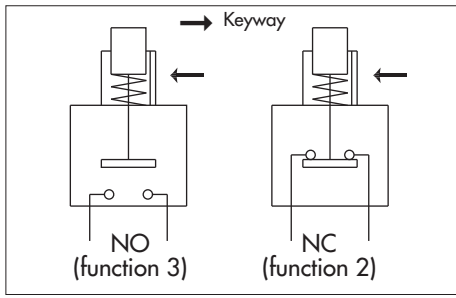


Packaging unit : 40 pieces

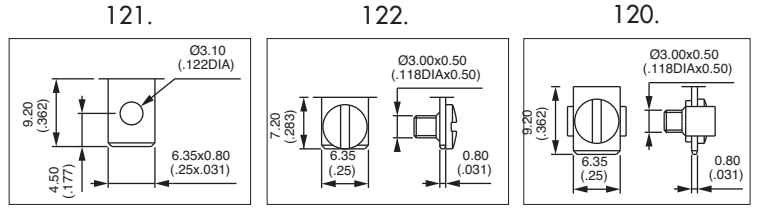
1200M/MR series

Robust momentary pushbutton switches - metal plunger

Solder lug/quick-connect terminals - screw terminals



- Flat or curved plunger
- Panel cut-out $\varnothing 12,2 (.480)$
- Single pole



MODEL STRUCTURE



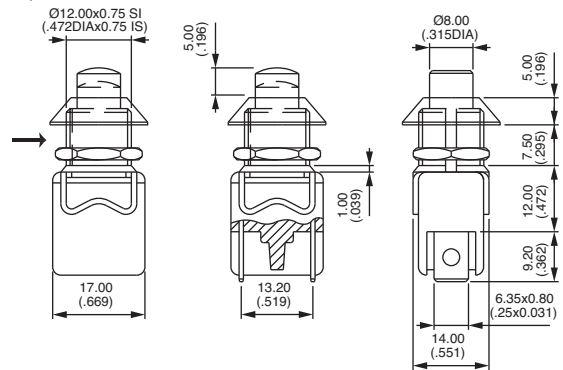
B2

Solder lug/quick-connect terminals 6,35 x 0,8 (.250 x .031) → Keyway



Curved plunger Flat plunger

1212MR	1212M		NC
1213MR	1213M		NO

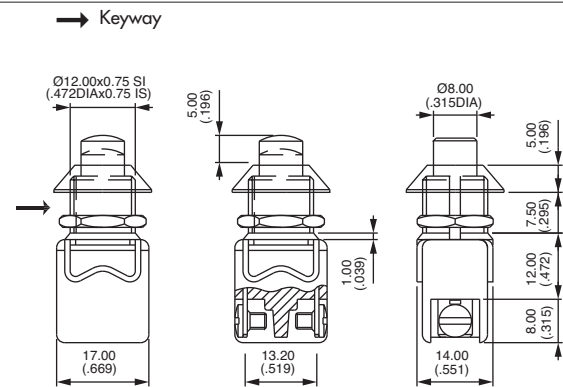


Screw terminals



Curved plunger Flat plunger

1222MR	1222M		NC
1223MR	1223M		NO

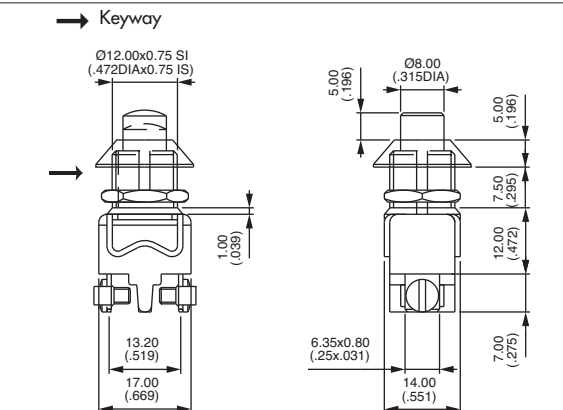


Screw terminals + clamp



Curved plunger Flat plunger

1202MR	1202M		NC
1203MR	1203M		NO

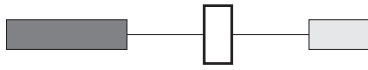




1200M/MR series

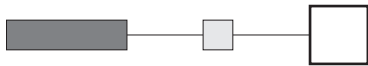
Robust momentary pushbutton switches - metal plunger

CONTACT MATERIALS



- A Silver
- C Copper, silver plated

AGENCY APPROVALS



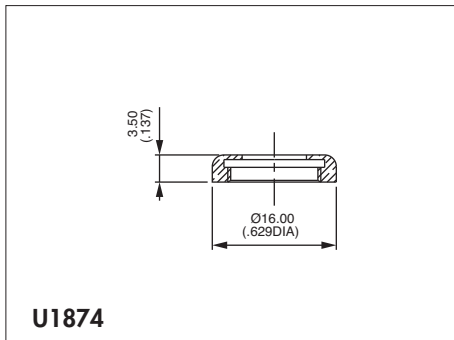
UL - CSA

Availability : approved models are 1213A and 1203A (M or MR) - model 1223A is only UL approved.

Marking : to order switches marked UL or CSA, complete above box with desired approvals.

SPECIAL CAP NUT

Chrome plated cap nut \varnothing 16 (.629), flat and plain.
Can be supplied instead of standard cap nut U1866-6.
Order separately.



1400N series

Momentary pushbutton switches - snap-in mounting - square plunger

Distinctive features and specifications



- Butt action contacts, double break
- Solder lug, straight PC and quick-connect terminals

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts (A) : 6A 12VDC
 - silver plated copper contacts (C) : 3A 12VDC
- Initial contact resistance : 10 mΩ
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 1.500 Vrms 50 Hz min. between terminals
 - 2.000 Vrms 50 Hz min. between terminals and metal panel
- Electrical life : 10.000 cycles at full load

MATERIALS

- Case : polyamide
- Plunger : polyamide
- Contacts :
 - A : silver
 - C : copper, silver plated

GENERAL SPECIFICATIONS

- Panel thickness : 2 mm (.078) max.
- Operating temperature : -20°C to +55°C

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



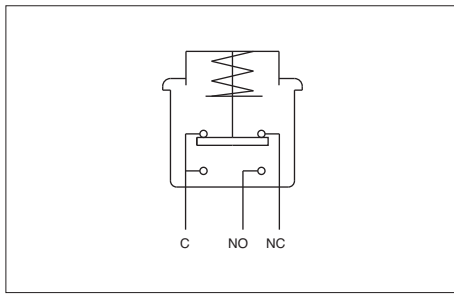
Packaging unit : 60 pieces.



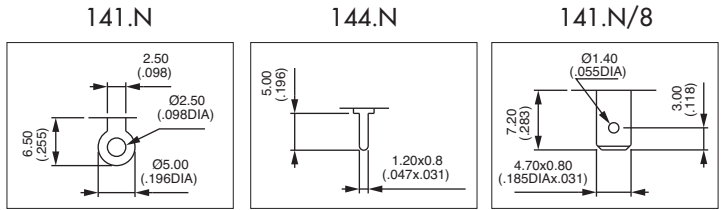
1400N series

Momentary pushbutton switches - snap-in mounting - square plunger

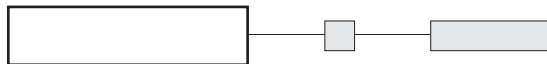
Solder lug, straight PC or quick-connect terminals



- Single pole configurations



MODEL STRUCTURE

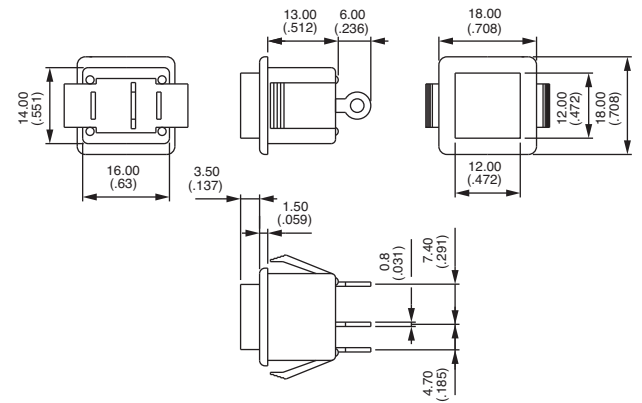


B2

Solder lug terminals



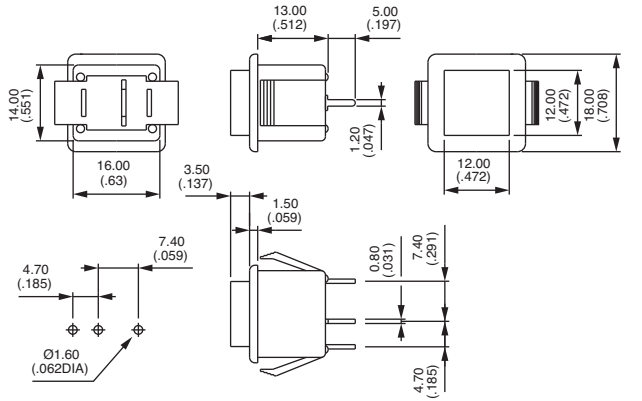
- | | | |
|-------|--|-----------------|
| 1412N | | Normally Closed |
| 1413N | | Normally Open |
| 1415N | | Changeover |



Straight PC terminals



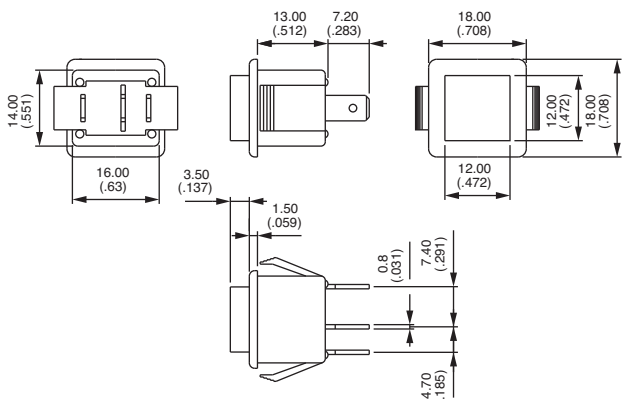
- | | | |
|-------|--|-----------------|
| 1442N | | Normally Closed |
| 1443N | | Normally Open |
| 1445N | | Changeover |



Quick-connect terminals 4,7 x 0,8 (.185 x .031)



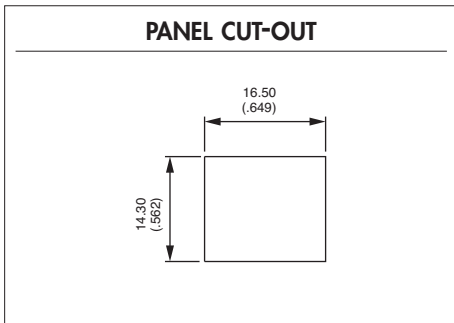
- | | | |
|---------|--|-----------------|
| 1412N/8 | | Normally Closed |
| 1413N/8 | | Normally Open |
| 1415N/8 | | Changeover |



1400N series

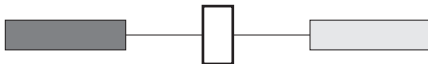
Momentary pushbutton switches - snap-in mounting - square plunger

OPTIONS
● ● ●



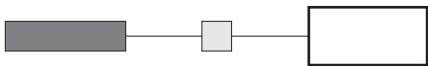
B2

CONTACT MATERIALS



- A Silver
- C Copper, silver plated

PLUNGER COLOURS



- 2 Black (standard)
- 3 Green
- 6 Red
- 7 Ivory



Switch frame supplied in black.

4700 and 4800 series

Momentary or alternate action pushbutton switches

Distinctive features and specifications



Butt action contacts

UL, CSA and VDE (EN 61058-1) approved

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts (A) : 3A 250VAC - 6A 125VAC
 - copper contacts (C) : 2A 250VAC - 4A 125VAC
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.000 Vrms 50 Hz min. between terminals
3.000 Vrms 50 Hz min. between terminals and frame
- Electrical life : 10.000 cycles at full load

MATERIALS

- Case : melamine-phenolic
- Plunger : polyamide
- Bushing : polyamide
- Contacts : **A** : silver
C : copper, silver plated

GENERAL SPECIFICATIONS

- Torque : 0,95 Nm (.70 Ft.lb) max. applied to nut
- Panel thickness : 5 mm (.196) max. between 2 nuts
- Total travel : 4,5 mm (.177) +/- 0,5 (.019)
- Operating temperature : -20°C to +65°C
- Hand soldering : 270°C max. for 10 seconds max. - Iron Ø 3 mm (.118)

APPROVALS



Models 4731A, 4736A, 4741A, 4746A are UL, CSA and VDE (EN 61058-1) approved.

Models 4831A, 4836A, 4841A, 4846A are VDE (EN 61058-1) approved.

Marking : to order switches marked UL/CSA, complete appropriate box of ordering format. VDE is standard marked.

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



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 : 1 hex nut U166 and 1 knurled nut U520 in the same colour as the plunger. They are presented in section I.

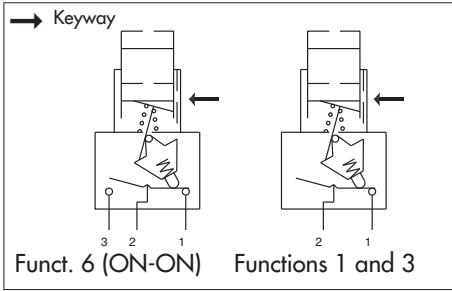


Packaging unit : single pole models : 40 pieces - Double pole models : 20 pieces.

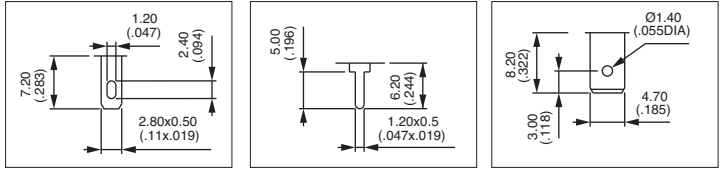
4700 and 4800 series

Momentary or alternate action pushbutton switches

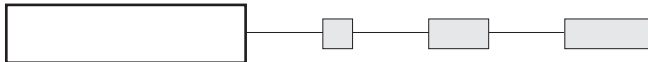
Solder lug/quick-connect or straight PC terminals



- 1 and 2 pole configurations
- Button returns in upper position after actuation.
- Panel cut-out :
 $\varnothing 12,2 (.480)$



MODEL STRUCTURE

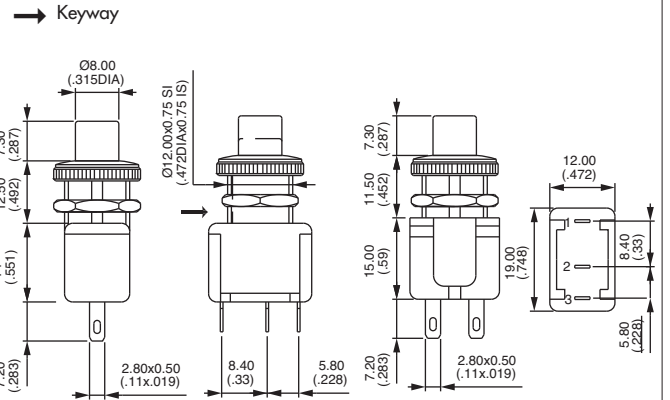


B2

Solder lug/quick-connect terminals



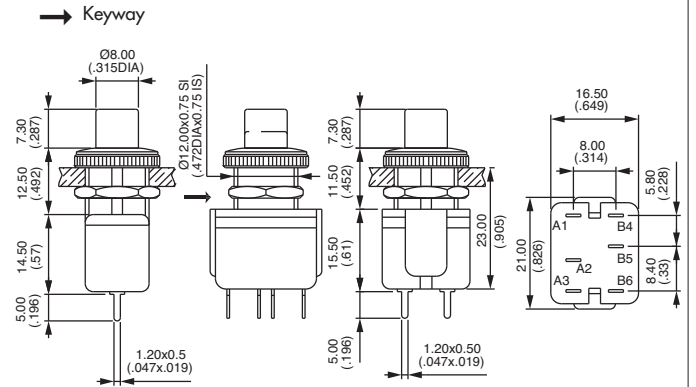
	Single pole	Double pole			
	4731	4741	ON	-	OFF
	4736	4746	ON	-	ON
	4733	4743	OFF	-	MOM



Straight PC terminals



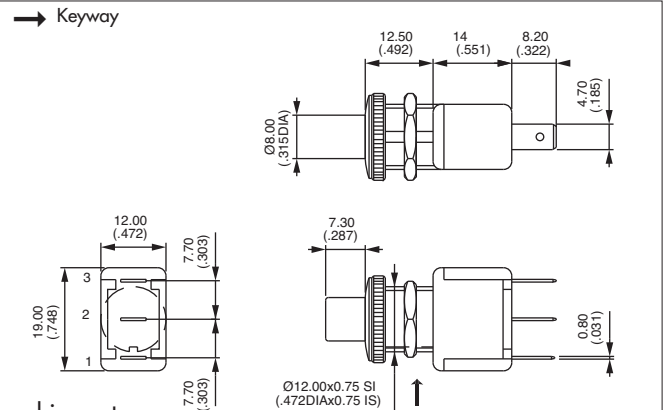
	Single pole	Double pole			
	4831	4841	ON	-	OFF
	4836	4846	ON	-	ON
	4833	4843	OFF	-	MOM



Quick-connect terminals 4,7 x 0,8 (.185 x .031)



	4731/8	ON	-	OFF
	4736/8	ON	-	ON
	4733/8	OFF	-	MOM



Available with silver contacts only.
 Minimum order : 1 000 pieces per type in one shipment.



4700 and 4800 series

Momentary or alternate action pushbutton switches

CONTACT MATERIALS



- A Silver
- C Copper, silver plated (not available on models with quick-connect terminals /8)

ACTUATOR COLOURS



- 01 Blue
- 02 Black
- 03 Green
- 05 Yellow
- 06 Red
- 07/1 White
- 09 Orange

APPROVALS



UU (UL-CSA)

Availability : see specifications for details or approved models.

Marking : to order switches marked UL-CSA, complete above box with "UU".
VDE approval is standard marked.

CG series

Capacitive switches for underlay applications

New!

Distinctive features

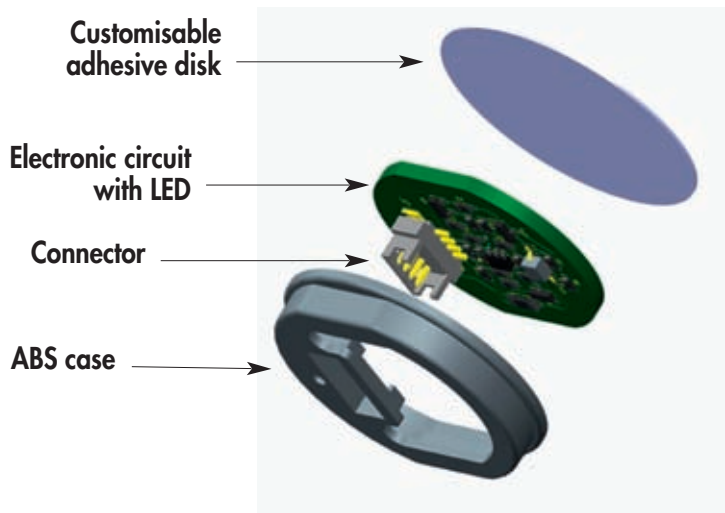
And your panel becomes active !

Like the CP series, CG series switches are activated by the touch of a finger. But they are designed for mounting under a non-conductive front face (glass or polycarbonate*) and are activated through the front face, transforming the inert fascia into an active interface. Low profile is an asset for this type of mounting.

- ❑ **50 million cycles**
No moving mechanical parts to wear out.
- ❑ **Advantages of under-panel mounting**
 - Robustness
 - Sealing
 - Easy to clean flat surface
 - Easy panel marking
- ❑ **Custom disk colours and marking**
Marking flexibility based on digital printing.



* For other non conductive materials, consult APEM.



Mounting of a CG switch



Note : the panel surface should be degreased prior to mounting.

New!



- Activated by the touch of a finger**
Even with surgeon gloves
- 50 million cycles**
- Auto-calibration function**
Ensures the sensor adapts to changing external environments
- Mounting under max. 6 mm glass or 4 mm polycarbonate panels**

ENVIRONMENTAL SPECIFICATIONS

- Triggered by flowing water
- Temperature range : -40°C to +70°C
- Adhesive and connector resistant to vibrations

MATERIALS

- Case : ABS
- Sealing : epoxy

ELECTRICAL AND GENERAL SPECIFICATIONS

- Supply voltage : 5 to 24VDC max.
- Supply current : 15mA max. (12V)
- Max. current/voltage rating : 200mA 24VDC
- Life expectancy : 50 million cycles
- Switch resistance ON : 1 Ohm max.
- Power consumption : 10mA max. mode OFF
- Output type : NPN

**Wiring for mating connector
Harwin M30-1100400**

- Pin 1 : output
- Pin 2 : GND
- Pin 3 : +LED
- Pin 4 : +VCC

Mating harness (connector + wires) available : see «Accessories» at the end of the series.

Wiring diagrams

	Non-illuminated	Illuminated 1 LED	
		Output indicator	Independent
OFF-ON OFF - MOM			



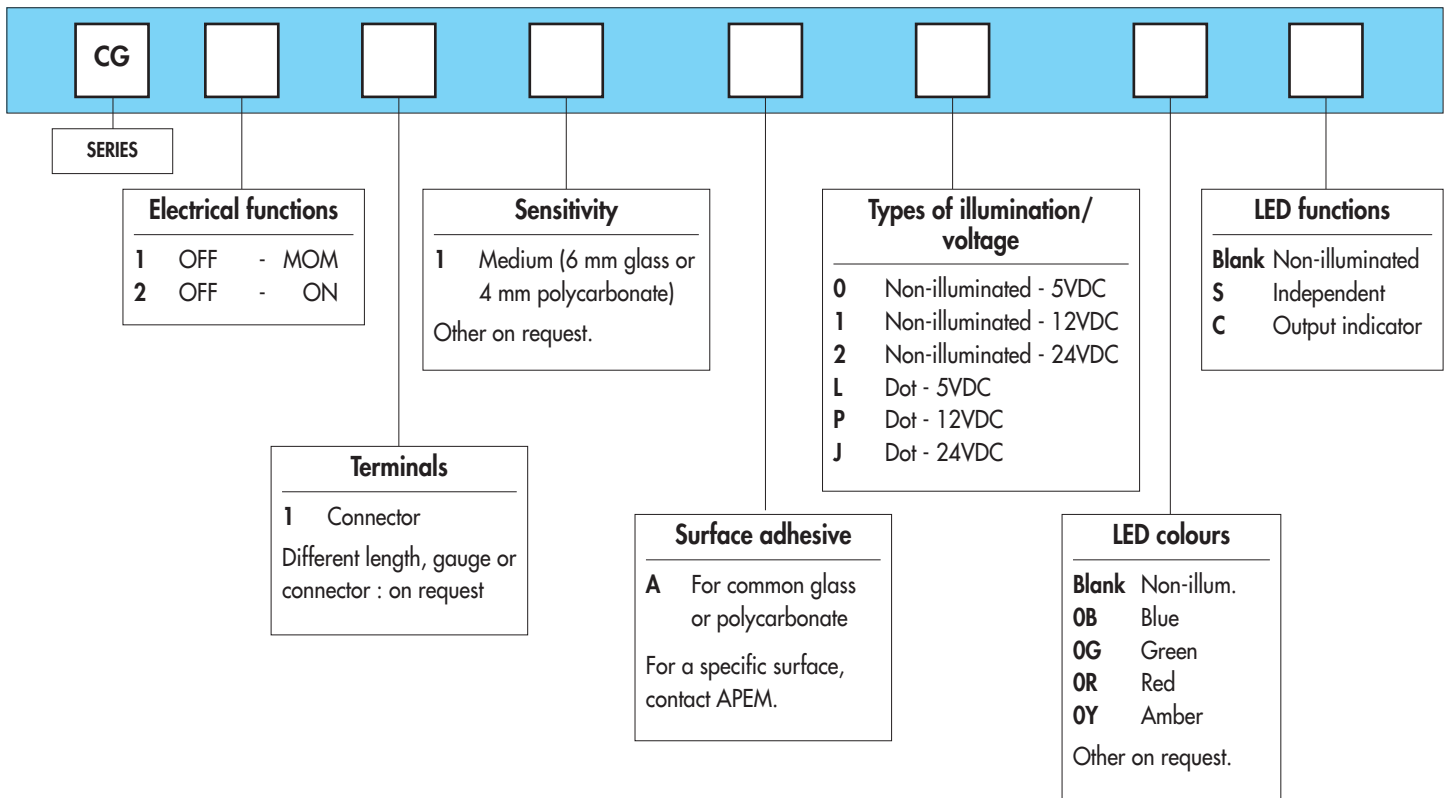
This switch should not be used in safety applications.

CG series

Capacitive switches for underlay applications

New!

Overview



B2

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

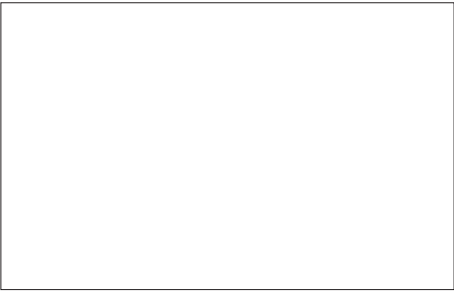


NOTICE : please note that not all combinations of above numbers are available. Refer to the following pages for further information.



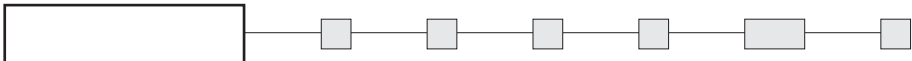
Packaging unit : 20 pieces

New!




- Momentary or latching

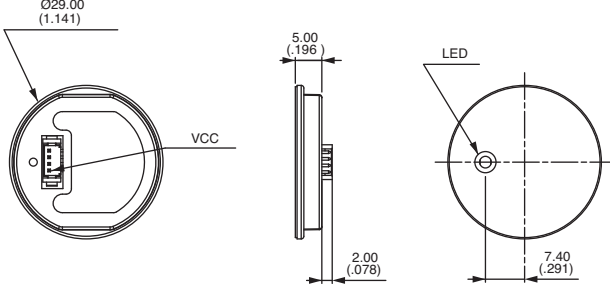
MODEL STRUCTURE



B2

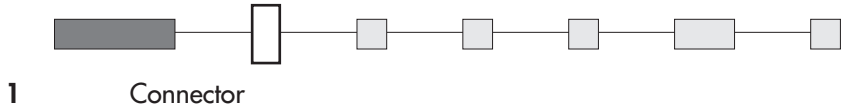


Momentary CG1	OFF - ON
Latching CG2	OFF - ON

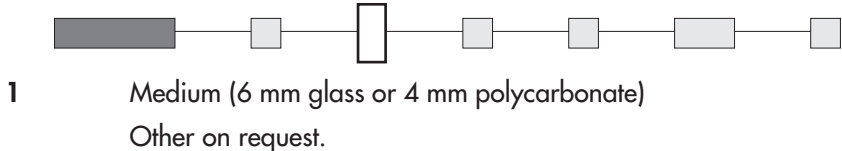


For connector wiring, see "Specifications" page.

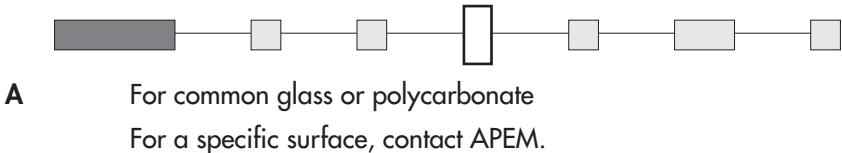
TERMINALS



SENSITIVITY



SURFACE ADHESIVE



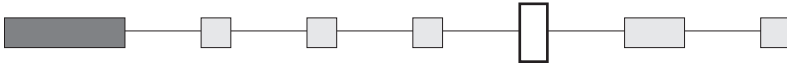
CG series

Capacitive switches for underlay applications

New!

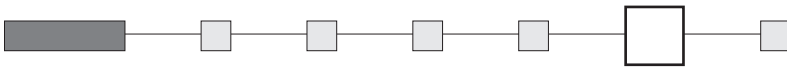
Options

TYPE OF ILLUMINATION



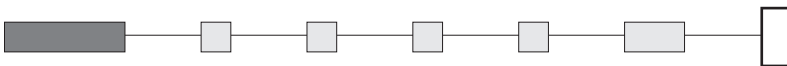
- 0** Non-illuminated - 5VDC
- 1** Non-illuminated - 12VDC
- 2** Non-illuminated - 24VDC
- L** Dot - 5VDC
- P** Dot - 12VDC
- J** Dot - 24VDC

LED COLOURS



- Blank** Non-illuminated
 - OB** Blue
 - OG** Green
 - OR** Red
 - OY** Amber
- Other on request.

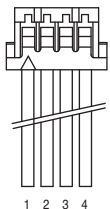
LED FUNCTION



- Blank** Non-illuminated
- S** Independent
- C** Output indicator

ACCESSORIES

Order separately.



U7120

Mating harness for independent LED
(version S)



U7040

Mating harness for all other versions

Connector : Harwin M30-1100400
Wires : AWG28, 150 mm

New!



- ❑ Activated by the touch of a finger
Even with surgeon gloves
- ❑ 50 million cycles
- ❑ Auto-calibration function
- ❑ Bushing diameter 16, 19 or 22 mm
- ❑ Momentary or latching

ENVIRONMENTAL SPECIFICATIONS

- Sealing : IP68 and IP69K according to IEC 60529
- Triggered by flowing water
- Impact resistance : IK10
- Operating temperature : -20°C to +65°C
- ESD : complies with EN61000-4-2 (extended) ± 8KV (20 contacts) and ± 15KV (20 air discharges)

MATERIALS

- Case : aluminium, anodized
- Multi-wire leads section 0,22 mm² length 300 mm
- Cable, length 300 mm, section depending on switch model
- Connector : HE14 6V compatible with AMP/TYCO281839-3

ELECTRICAL AND GENERAL SPECIFICATIONS

- Max. current/voltage rating : 200mA 24VDC
- Supply voltage : 5 to 24VDC
- Life expectancy : 50 million cycles
- Power consumption non-illuminated : 7mA
- Power consumption illuminated : 25mA
- Operating force : 0N
- LED state for output image option :
1 LED : the LED is ON when the output is closed.
2 LEDs : first colour is ON when the output is open. Second colour is ON when the output is closed.
- Output type : NPN

ADJUSTABLE SENSITIVITY

Connection to ground by means of the yellow wire increases sensitivity (momentary version only).



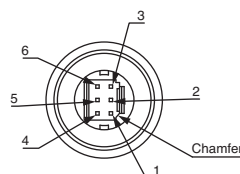
This switch should not be used in safety applications.

Wiring diagrams

	Non-illuminated	1 LED		2 LEDs		Legend
		Output indicator	Independent	Output indicator	Independent	
OFF-ON						R red +V Black black GND W white output Y yellow sensitivity G green -LED 1 Blue blue -LED2
OFF-MOM						Wire colours may vary. Always refer to the label on the switch.

Wiring for switch connector

- Pin 1 : GND
- Pin 2 : output
- Pin 3 : +V
- Pin 4 : LED 2
- Pin 5 : sensitivity
- Pin 6 : LED 1

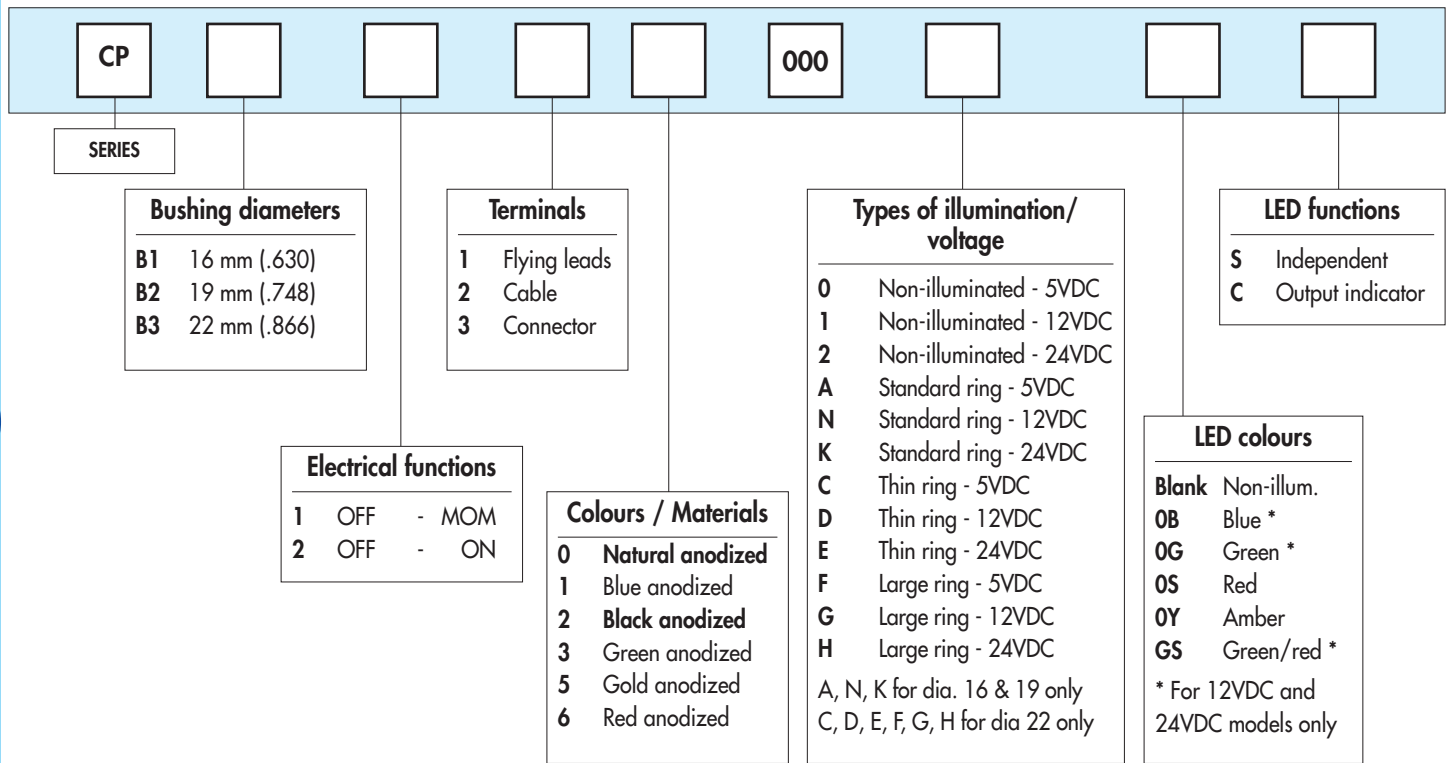


CP series

Capacitive switches

New!

Overview



On request

- Duration of activation 15 minutes for latching models (standard duration is infinite)
- Different lengths, gauges or colours for flying lead terminals
- Different cable lengths

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

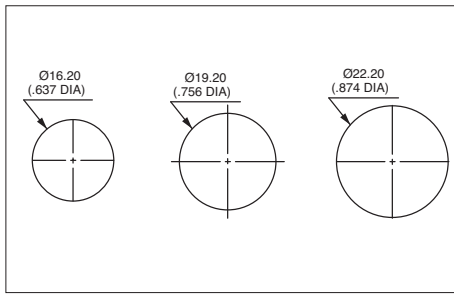


NOTICE : please note that not all combinations of above numbers are available. Refer to the following pages for further information.



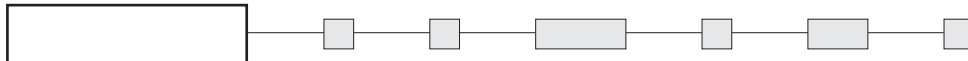
Packaging unit : 20 pieces

New!



Shown with flying lead terminals

MODEL STRUCTURE



B2

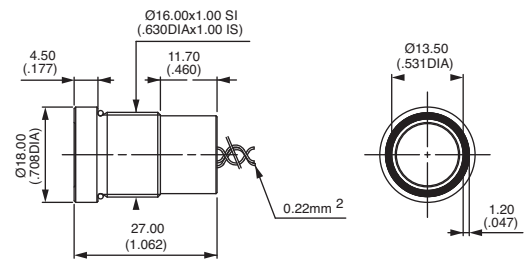
Bushing Ø 16 mm (.630) - standard ring



CPB1110000NGSC

Momentary
CPB11 OFF - MOM

Latching
CPB12 OFF - ON



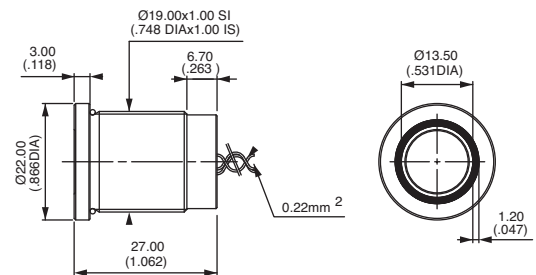
Bushing Ø 19 mm (.748) - standard ring



CPB2110000NGSC

Momentary
CPB21 OFF - MOM

Latching
CPB22 OFF - ON



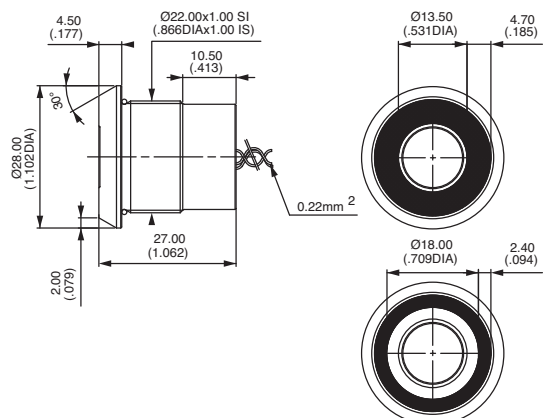
Bushing Ø 22 mm (.866) - large or thin ring



CPB3210000GGSC

Momentary
CPB31 OFF - MOM

Latching
CPB32 OFF - ON



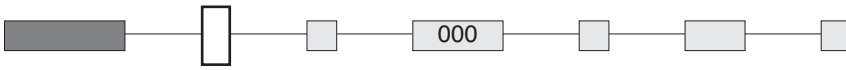
CP series

Capacitive switches

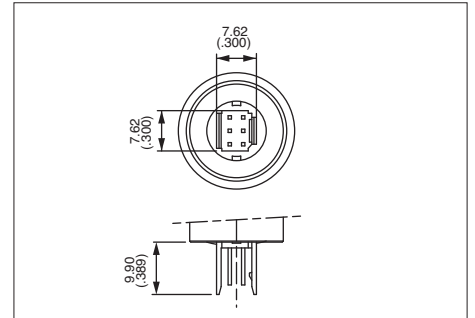
New!

Options

TERMINALS

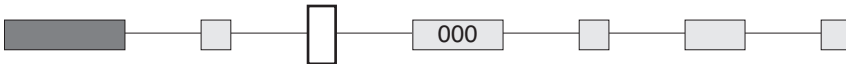


- 1 Flying leads
- 2 Cable
- 3 Connector HE14 6V (see opposite)



B2

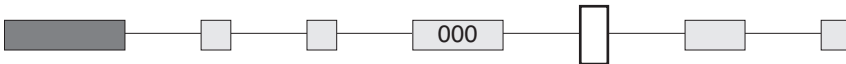
CASE COLOURS / MATERIALS



Code	Colour
0	Natural anodized aluminium
1	Blue anodized aluminium
2	Black anodised aluminium

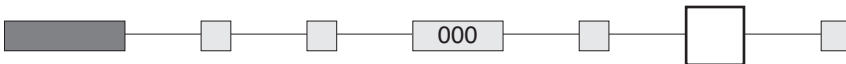
Code	Colour
3	Green anodized aluminium
5	Gold anodized aluminium
6	Red anodised aluminium

TYPES OF ILLUMINATION



	5VDC	12VDC	24VDC
Non-illuminated	0	1	2
Standard ring (Ø 16 & 19 only)	A	N	K
Thin ring (Ø 22 only)	C	D	E
Large ring (Ø 22 only)	F	G	H

LED COLOURS



Blank Non-illuminated

OB : blue - **OG** : green - **OS** : red - **OY** : amber - **GS** : green/red



Blue, green and green/red LEDs available on 12VDC and 24VDC models only.

LED FUNCTIONS



- S Independent
- C Output indicator



- Bushing diameter 16 mm, 19 mm or 22 mm
- Sealed to IP68 and IP69K (switches mounted on panel)
- Easy to clean metal surface
- Very long life expectancy
- Ring or dot illumination

ENVIRONMENTAL SPECIFICATIONS

- Sealing : IP68 per IEC 529, IP69K per DIN 40050-9 (switches mounted on panel)
- Vibration resistance : 10-500 Hz / 10 g per IEC 60068-2-6
- Operating temperature : -40°C to +75°C
- EMC compatibility according to EN 61058-1 for the whole range
- EMC compatibility according to EN 61000-4 & EN61000-6-2 for model 1A (code 002)

MATERIALS

- Case : aluminium, anodized or stainless steel 316L
- Multi-wire leads section 0,22 mm² length 300 mm, twisted by pair
- Cable, length 300 mm, section depending on switch model
- PC terminals : bronze, tin plated

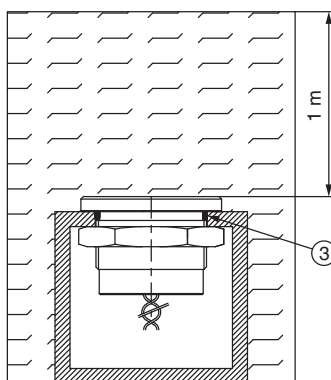
ELECTRICAL AND GENERAL SPECIFICATIONS

- Max. current/voltage rating :
 - Function A : standard 200mA 24VAC/DC - option 1A 24VAC/DC
 - Function B : standard 100mA 24VAC
- Switch resistance ON : 10Ω max.
- Switch resistance OFF : 5MΩ min.
- Operating force : 2 to 6N
- Life expectancy : 50 million cycles
- LED consumption : Illuminated dot 10mA - Illum. ring 20mA (functions A-B-C)
- Power consumption for function 1 : non-illum.10mA - illuminated 30mA

Note : to maintain the ESD performance, always add a ground washer when the panel is made of non-conductive material (PVC, polycarbonate).

For part numbers, see «Mounting accessories» on the following pages.

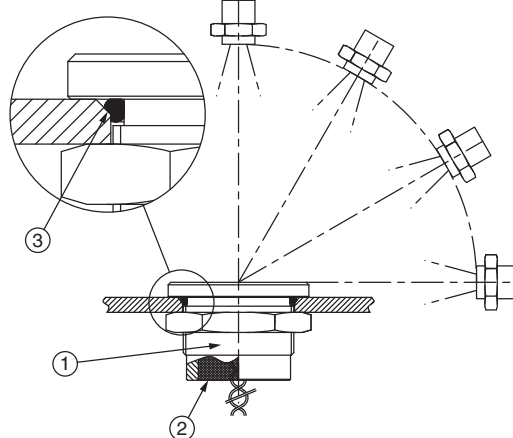
SEALING IP68



Continuous immersion in water IP68 test conditions

Continuous immersion in water
(1m, 24 hours)

SEALING IP69K



- ① One-piece bushing
- ② Epoxy sealed terminals
- ③ O-ring

High pressure, high temperature wash down IP69K test conditions

- Pressure : 80 - 120 bars
- Distance : 15 cm
- Temperature : 80°C ± 5°C
- Flow : 14 - 16 l/mn
- Duration : 30 seconds per position

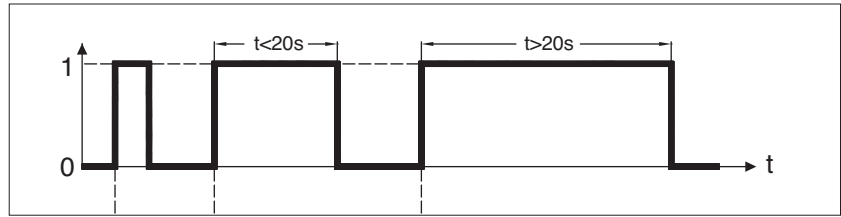
PBA series

Piezo switches

Electrical functions

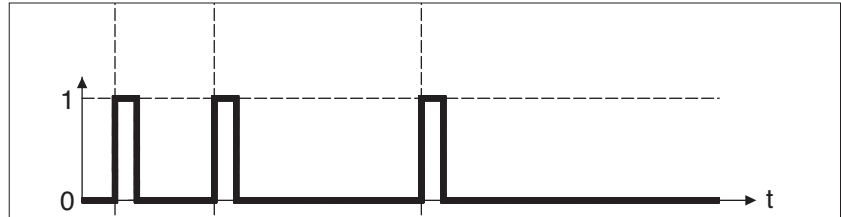
FINGER PRESSURE applied to switch

1 = pressure
0 = no pressure

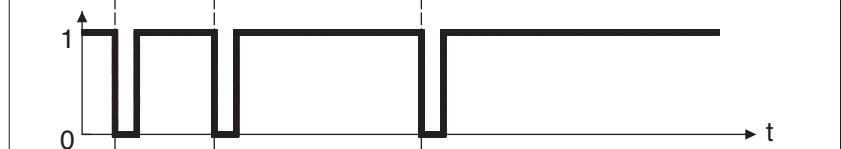


OUTPUT

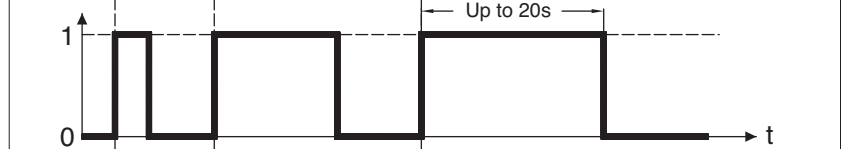
- Momentary NO (pulse)
No external power supply required



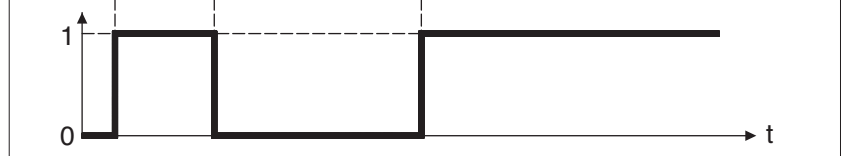
- Momentary NC (pulse)
No external power supply required



- Momentary NO prolonged pulse
No external power supply required



- Latching (ON - OFF)
Requires external power supply



1 = closed output 0 = open output

Wiring diagrams

	Non-illuminated	1 LED *	2 LEDs	3 LEDs
Momentary NO				
Momentary NC				
Momentary NO prolonged pulse				
Latching (ON - OFF)				

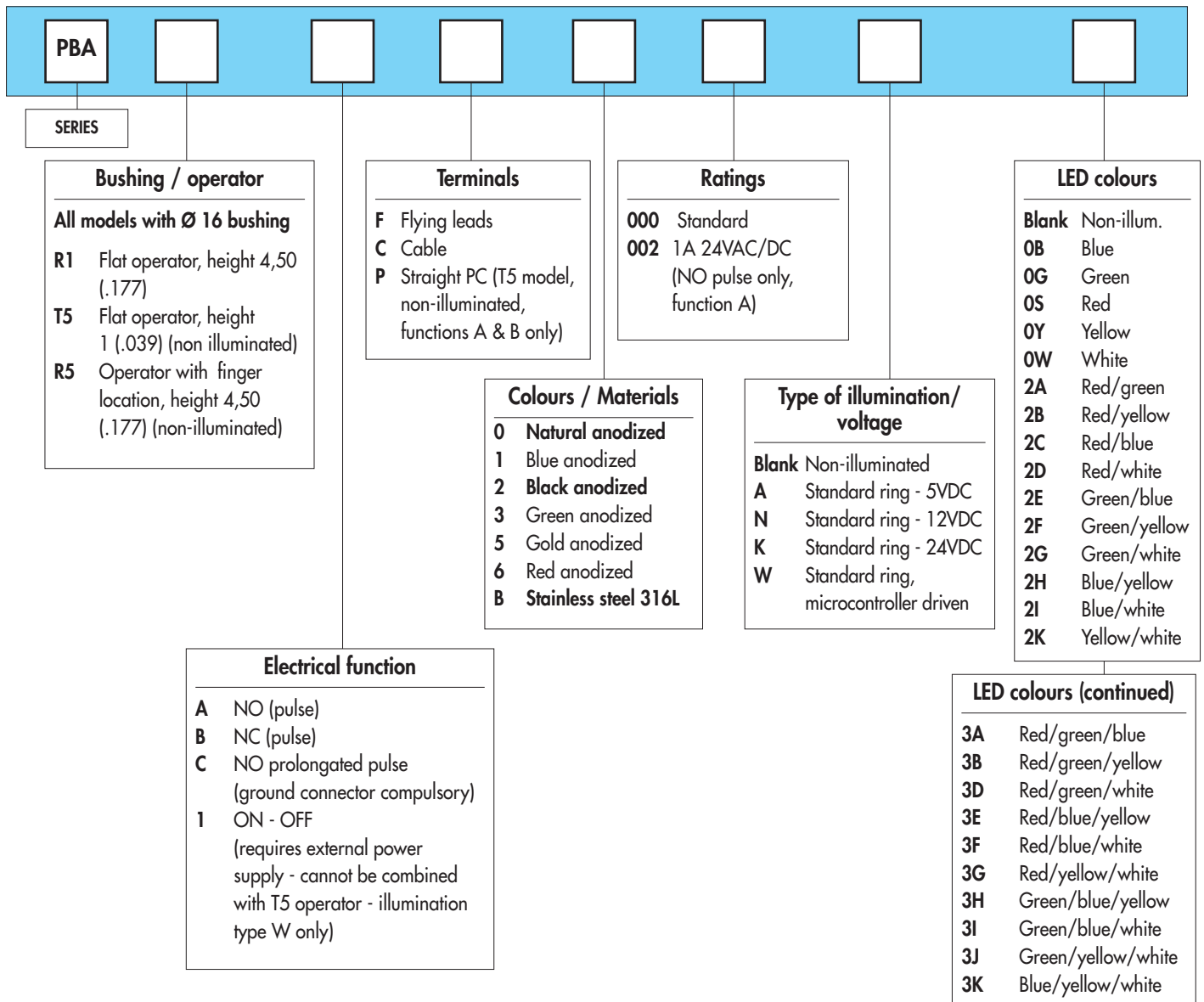
Legend : C = yellow, D = blue, B = black, A = same colour as LED

* LED colour is indicated by the bottom of the product.

PBA series

Piezo switches Ø 16 (.630)

Overview



B2

For options not listed above, please contact APEM.

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



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



Mounting accessories : standard hardware supplied :1 hex nut 10-621 (19 mm ac. flats) and 1 O-ring. Always add a ground washer U5735 when the panel is non-conductive (PVC, polycarbonate).

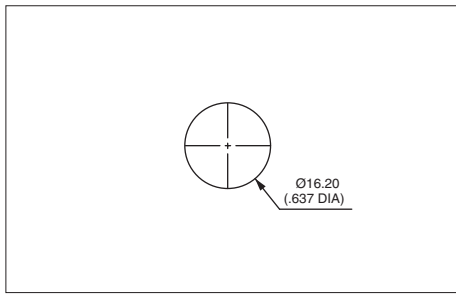


Packaging unit : 20 pieces (flying lead terminals) or 25 pieces (cable terminals)

PBA series

Piezo switches Ø 16 (.630)

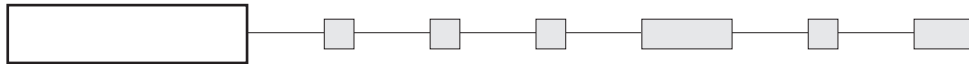
Illuminated or non-illuminated



- Operator Ø 18 mm (.708)

Shown with flying lead terminals.

MODEL
STRUCTURE



B2

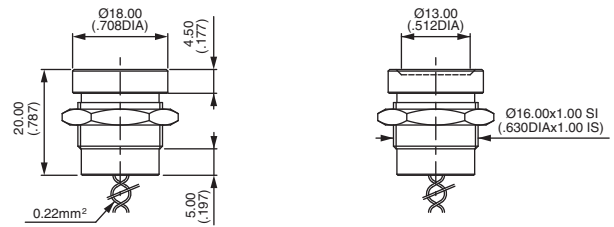
Non-illuminated, operator height 4,50 mm (.177)



PBAR1AF2000

Flat
PBAR1

With finger location
PBAR5



R1

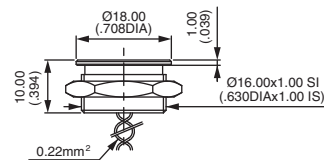
R5

Non-illuminated, operator height 1 mm (.039)



PBAT5AF0000

Flat
PBAT5

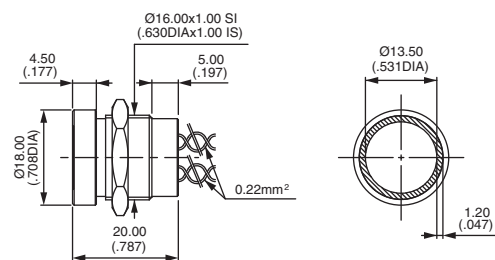


With standard illuminated ring



PBAR1AF000A0B

Flat operator, height 4,50 (.177)
PBAR1



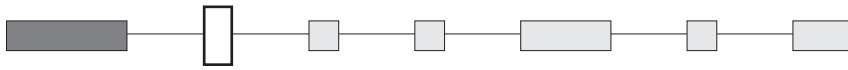
Wire colours : see "Electrical functions"

PBA series

Piezo switches Ø 16 (.630)

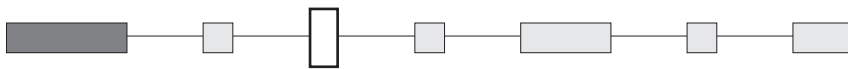
Options

ELECTRICAL FUNCTION

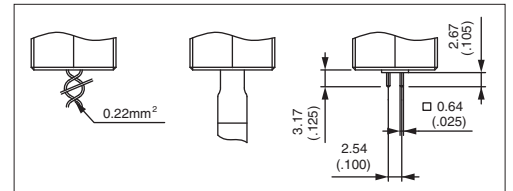


- A NO pulse
- B NC pulse
- C NO prolonged pulse - Ground connector U5735 compulsory, supplied with the switch.
- 1 ON - OFF - Requires external power supply - Cannot be combined with T5 operator.
Illumination type W only.

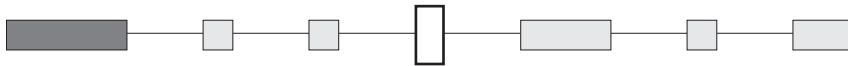
TERMINALS



- F Flying leads
- C Cable
- P Straight PC (T5 model, non-illuminated, functions A and B only)



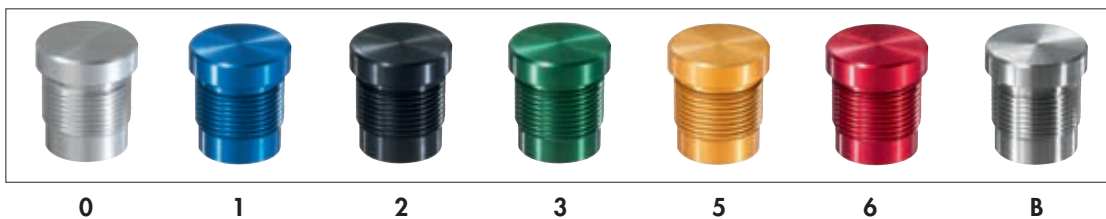
CASE COLOURS / MATERIALS



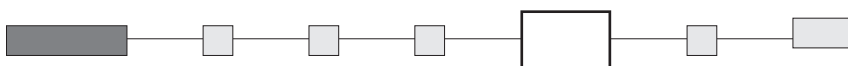
Code	Colour
0	Natural anodized aluminium
1	Blue anodized aluminium
2	Black anodised aluminium

Code	Colour
3	Green anodized aluminium
5	Gold anodized aluminium
6	Red anodised aluminium

Code	Colour
B	Stainless steel 316L



RATINGS



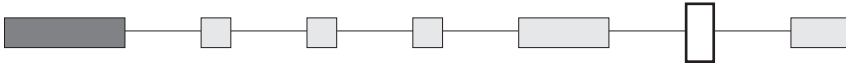
- 000 Standard
- 002 1A 24VAC or DC (NO pulse only, function A)

PBA series

Piezo switches Ø 16 (.630)

Options

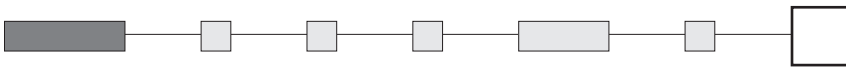
TYPE OF ILLUMINATION / VOLTAGE



Blank : non-illuminated

	5VDC	12VDC	24VDC	Microcontroller driven
○	A	N	K	W

LED COLOURS



Integrated LED resistor

Blank : non-illuminated



OB

OG

OS

OY

OW

Illuminated 1 LED *

OB : blue - OG : green - OS : red - OY : yellow - OW : white

Illuminated 2 LEDs

2A : red/green - 2B : red/yellow - 2C : red/blue - 2D : red/white - 2E : green/blue - 2F : green/yellow - 2G : green/white
2H : blue/yellow - 2I : blue/white - 2K : yellow/white

Illuminated 3 LEDs

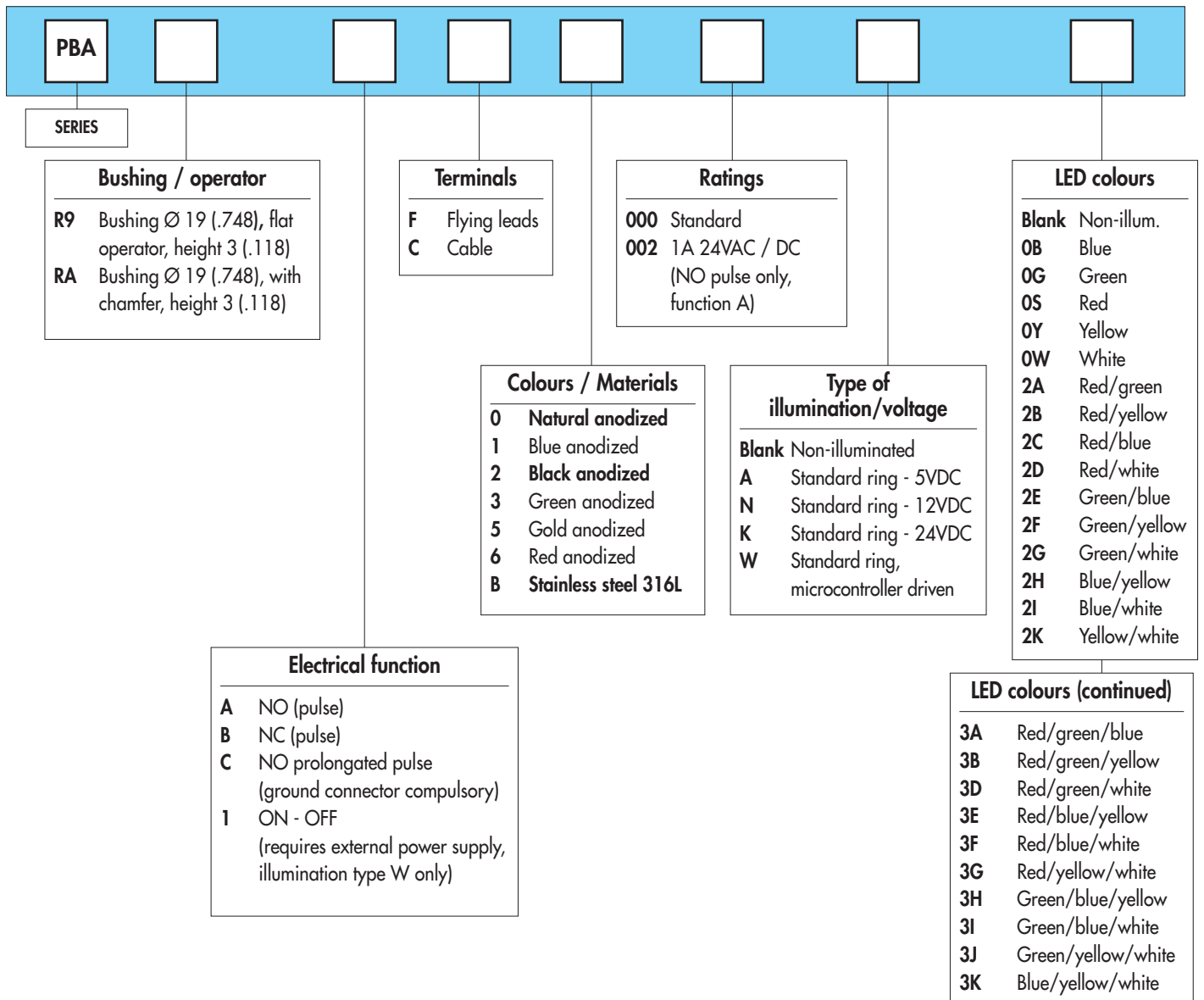
3A : red/green/blue - 3B : red/green/yellow - 3D : red/green/white - 3E : red/blue/yellow - 3F : red/blue/white
3G : red/yellow/white - 3H : green/blue/yellow - 3I : green/blue/white - 3J : green/yellow/white - 3K : blue/yellow/white

* LED colour is indicated by the bottom of the product.

PBA series

Piezo switches Ø 19 (.748)

Overview



B2

For options not listed above, please contact APEM.

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



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



Mounting accessories : standard hardware supplied : 1 hex nut 10-855-0 (22 mm ac. flats) and 1 O-ring Always add a ground washer U5736 when the panel is non-conductive (PVC, polycarbonate).

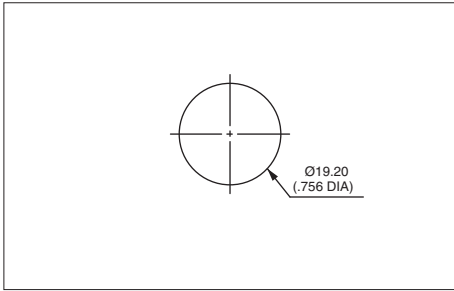


Packaging unit : 20 pieces (flying lead terminals) or 25 pieces (cable terminals)

PBA series

Piezo switches Ø 19 (.748)

Illuminated or non-illuminated



- Operator Ø 22 mm (.866)

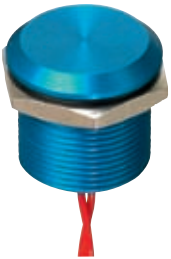
Shown with flying lead terminals.

MODEL STRUCTURE



B2

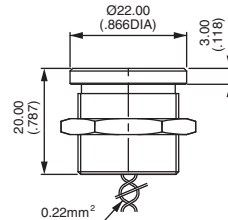
Non-illuminated - operator height 3 mm (.118)



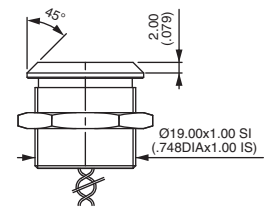
PBARAAF1000

Flat
PBAR9

With chamfer
PBARA



R9



RA

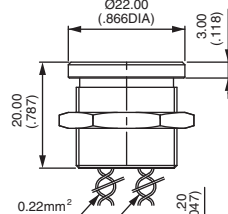
With standard illuminated ring - operator height 3 mm



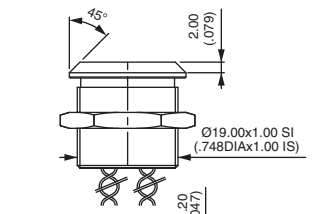
PBAR9AF0000A0S

Flat
PBAR9

With chamfer
PBARA



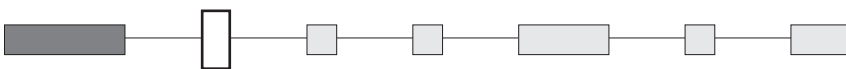
R9



RA

Wire colours : see "Electrical functions".

ELECTRICAL FUNCTIONS



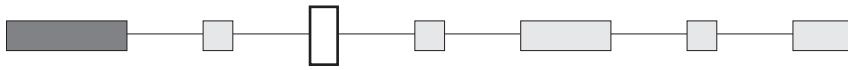
- A NO pulse
- B NC pulse
- C NO prolonged pulse - Ground connector U5736 compulsory, supplied with the switch.
- 1 ON - OFF - Requires external power supply - Illumination type W only.

PBA series

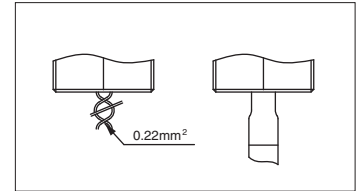
Piezo switches Ø 19 (.748)

Options

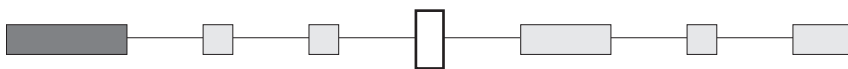
TERMINALS



F Flying leads
C Cable



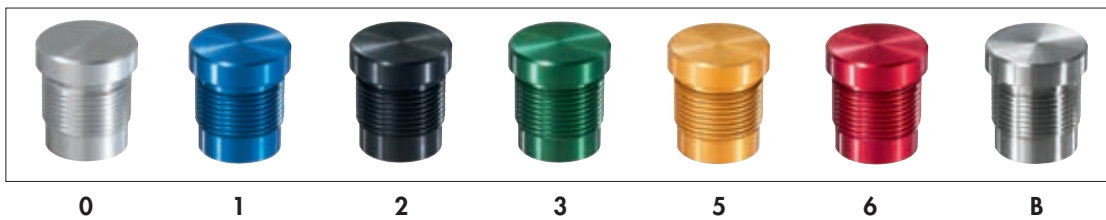
CASE COLOURS / MATERIALS



Code	Colour
0	Natural anodized aluminium
1	Blue anodized aluminium
2	Black anodised aluminium

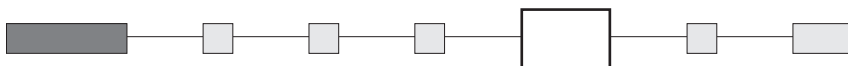
Code	Colour
3	Green anodized aluminium
5	Gold anodized aluminium
6	Red anodised aluminium

Code	Colour
B	Stainless steel 316L



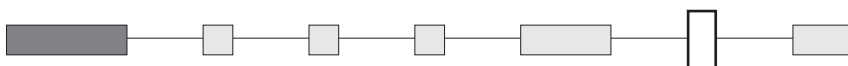
0 1 2 3 5 6 B

RATINGS



000 Standard
002 1A 24VAC or DC (NO pulse only, function A)

TYPE OF ILLUMINATION / VOLTAGE



	5VDC	12VDC	24VDC	Microcontroller driven
○	A	N	K	W

PBA series

Piezo switches Ø 19 (.748)

Options

LED COLOURS



Blank : non-illuminated



Illuminated 1 LED *

0B : blue - 0G : green - 0S : red - 0Y : yellow - 0W : white

Illuminated 2 LEDs

2A : red/green - 2B : red/yellow - 2C : red/blue - 2D : red/white - 2E : green/blue - 2F : green/yellow - 2G : green/white
2H : blue/yellow - 2I : blue/white - 2K : yellow/white

Illuminated 3 LEDs

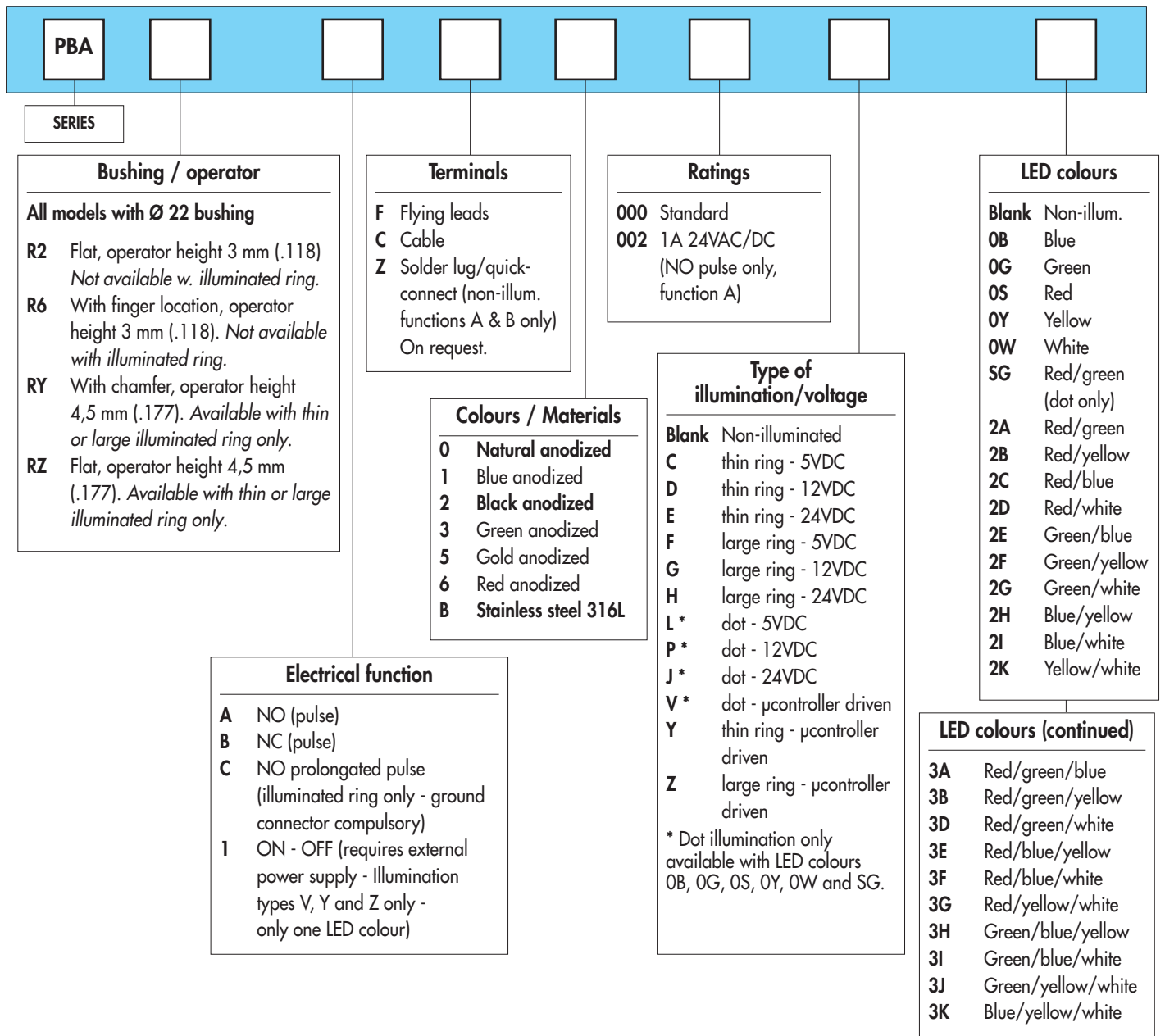
3A : red/green/blue - 3B : red/green/yellow - 3D : red/green/white - 3E : red/blue/yellow - 3F : red/blue/white
3G : red/yellow/white - 3H : green/blue/yellow - 3I : green/blue/white - 3J : green/yellow/white - 3K : blue/yellow/white

* LED colour is indicated by the bottom of the product.

PBA series

Piezo switches Ø 22 (.866)

Overview



For options not listed above, please contact APEM.



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



Mounting accessories : standard hardware supplied : 1 hex nut 10-856-0 (25 mm ac. flats) and 1 O-ring
Always add a ground washer U5737 when the panel is non-conductive (PVC, polycarbonate).

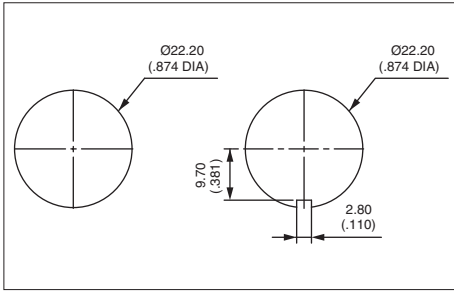


Packaging unit : 20 pieces (flying lead terminals) or 25 pieces (cable terminals)

PBA series

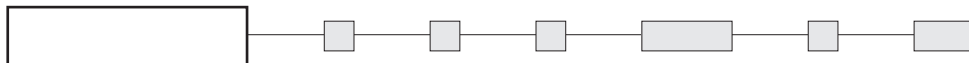
Piezo switches Ø 22 (.866)

Illuminated or non-illuminated



- Operator Ø 28 mm (1.102)

MODEL
STRUCTURE



Wire colours : see "Electrical functions".

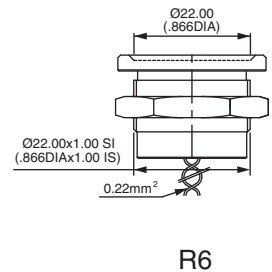
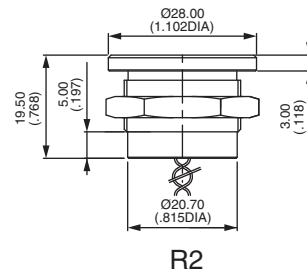
Non-illuminated - operator height 3 mm (.118)



Flat
PBAR2

With finger location
PBAR6

PBAR2AF6000



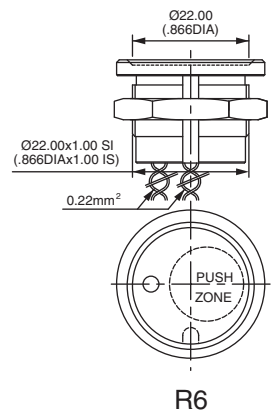
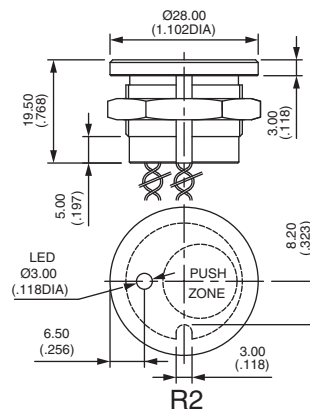
With illuminated dot - operator height 3 mm (.118)



Flat
PBAR2

With finger location
PBAR6

PBAR6AF6000LOG



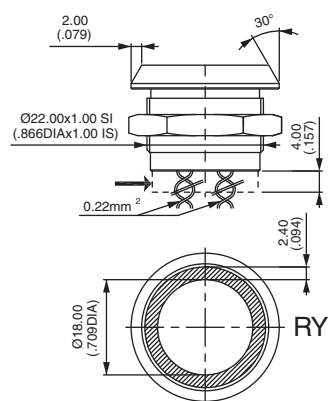
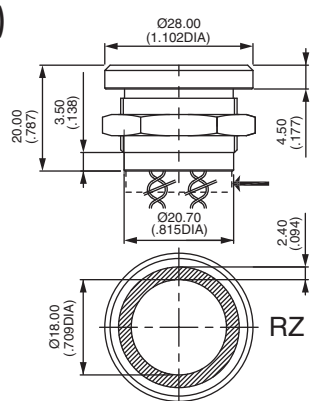
With thin illuminated ring - operator height 4,50 (.177)



Flat
PBARZ

With chamfer
PBAR Y

PBARYAF0000COB



→ Dimension of ON-OFF models

PBA series

Piezo switches Ø 22 (.866)

Illuminated or non-illuminated

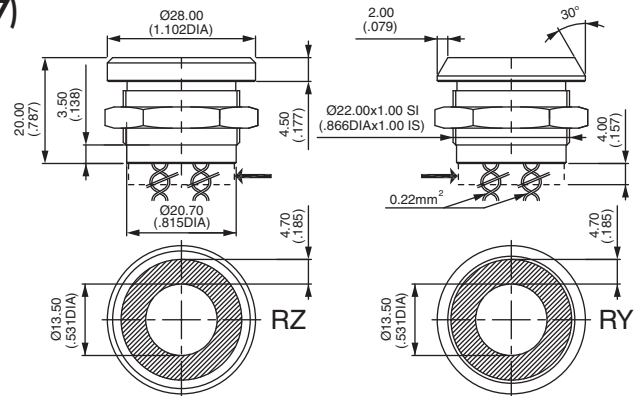
With large illuminated ring - operator height 4,50 (.177)



PBARYAF0000FOB

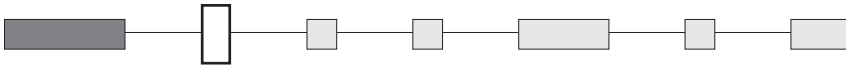
Flat
PBARZ

With chamfer
PBARY



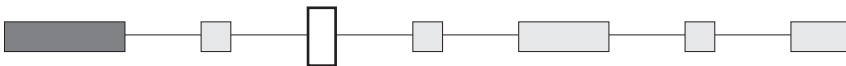
→ Dimension of ON-OFF models

ELECTRICAL FUNCTIONS

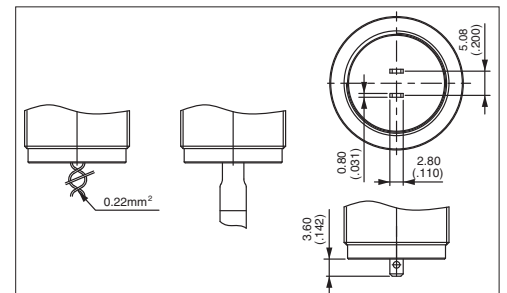


- A NO pulse
- B NC pulse
- C NO prolonged pulse (illuminated ring only) - Ground connector U5737 compulsory, supplied w. the switch.
- I ON - OFF - Requires external power supply - Illumination types V, Y and Z only - one LED colour only.

TERMINALS



- F Flying leads
- C Cable
- Z Solder lug / quick-connect (non-illuminated, functions A and B only)
On request.



CASE COLOURS / MATERIALS



Code	Colour
0	Natural anodized aluminium
1	Blue anodized aluminium
2	Black anodised aluminium

Code	Colour
3	Green anodized aluminium
5	Gold anodized aluminium
6	Red anodised aluminium

Code	Colour
B	Stainless steel 316L



0

1

2

3

5

6

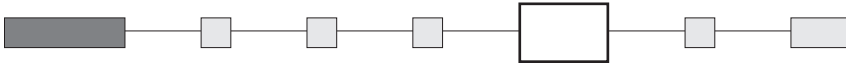
B

PBA series

Piezo switches Ø 22 (.866)

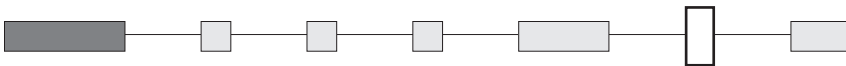
Options

RATINGS




000 Standard
002 1A 24VAC or DC (NO pulse only, function A)

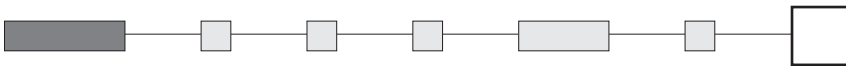
TYPE OF ILLUMINATION / VOLTAGE



	5V	12V	24V	Microcontroller driven
○	C	D	E	Y
◉	F	G	H	Z
•	L	P	J	V

 Dot illumination only available with LED colours OB, OG, OS, OY, OW and SG.

LED COLOURS



Integrated LED resistor

Blank : non-illuminated



OB

OG

OS

OY

OW

Illuminated 1 LED *

OB : blue - OG : green - OS : red - OY : yellow - OW : white
 SG : red/green (reversed polarity LED - for dot illumination only)

Illuminated 2 LEDs

2A : red/green - 2B : red/yellow - 2C : red/blue - 2D : red/white - 2E : green/blue - 2F : green/yellow - 2G : green/white
 2H : blue/yellow - 2I : blue/white - 2K : yellow/white

Illuminated 3 LEDs

3A : red/green/blue - 3B : red/green/yellow - 3D : red/green/white - 3E : red/blue/yellow - 3F : red/blue/white
 3G : red/yellow/white - 3H : green/blue/yellow - 3I : green/blue/white - 3J : green/yellow/white - 3K : blue/yellow/white

* LED colour is indicated by the bottom of the product.



PBA series

ATEX approved piezo switches

Distinctive features - Specifications - Overview

- Approved according to the ATEX 94/9/CE directive
- Sealed to IP66 (mounted on panel)
- Easy to clean metal surface
- Long life
- Illuminated models

ELECTRICAL SPECIFICATIONS

- Rated voltage : 5V to 24 VAC/DC max.
- Rated current : 200mA max. at 6VAC/DC
50mA max. at 24VAC/DC
(power limited to 1,2W for user group II)
- Contact resistance (ON) : 10Ω max.
- Insulation resistance (OFF) : 5MΩ min.
- Make impulse time : depending on actuating force and speed
- LED : 5VDC, 10mA to 20mA depending on model

MATERIALS

- Case : 316L stainless steel
- Terminals : multi-wire leads
0,22 mm², length 300 mm (11.81)

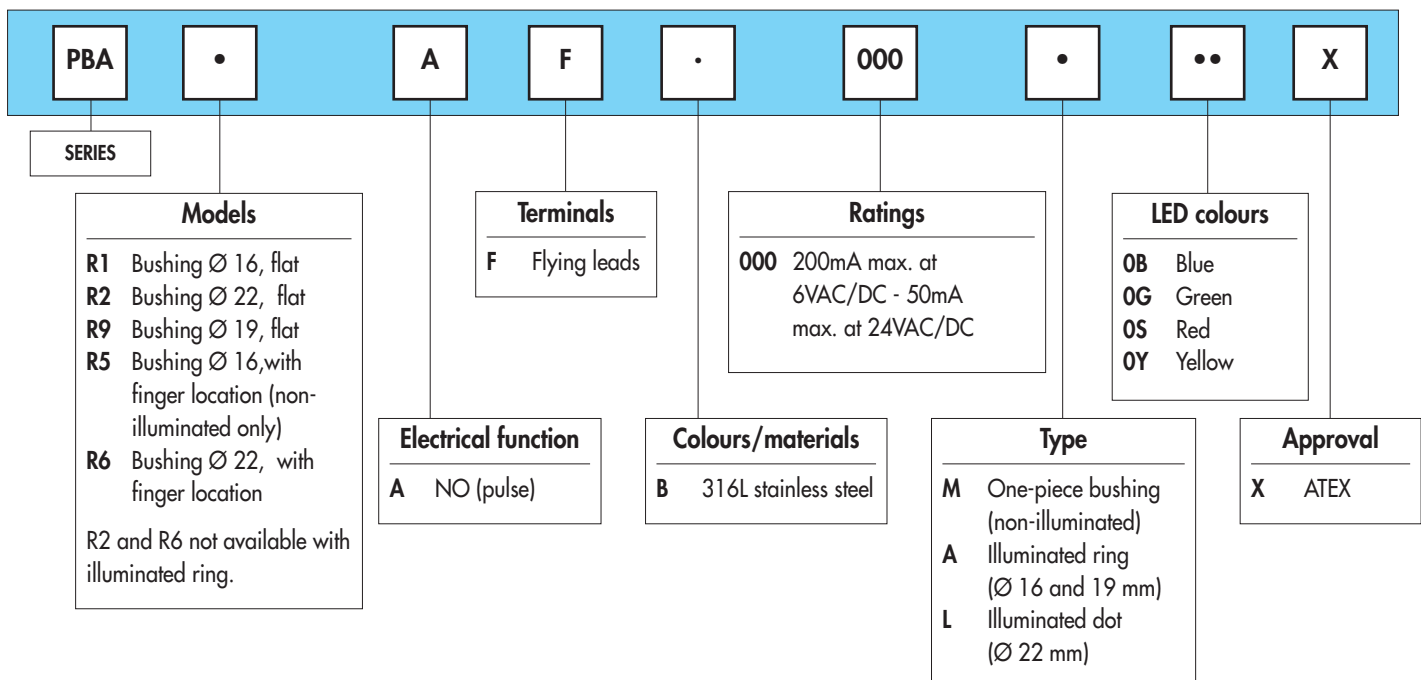
Standard hardware supplied: 1 hex nut 10-621 (19 mm ac. flats), 10-855-0 (22 mm ac. flats) or 10-856-0 (25 mm ac. flats), 1 O-Ring and 1 ground connector U5735, U5736 or U5737.

Packaging units : 20 pieces

Instructions for use :
see instruction notice NTPBA007.

GENERAL SPECIFICATIONS

- Operating force : 2 to 6N
- Torque : 2,5 Nm max.
- Life expectancy : 50 million cycles
- Operating temperature : -40°C to +55°C
- EMC compatibility according to EN 61058-1
- In accordance with EN 60079-0, EN 60079-11, EN 61241-0, EN 61241-11, EN 60079-26 and EN 50303
- Sealing : IP66 per IEC 60529 (switches mounted on panel)



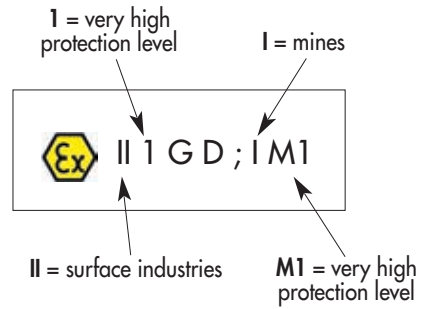
PBA series

ATEX approved piezo switches

Illuminated or non-illuminated



- Highest classifications
- Universal



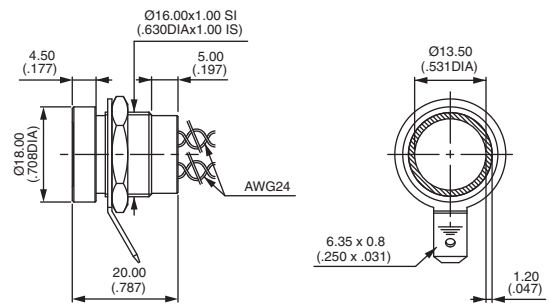
Usage : mines full of fire damp and potentially explosive atmospheres of groups IIC, IIB et IIA in T4 temperature class and/or in the presence of combustible dust (T1 35°C).

B2

Dia. 16 (.630) bushing - illuminated ring



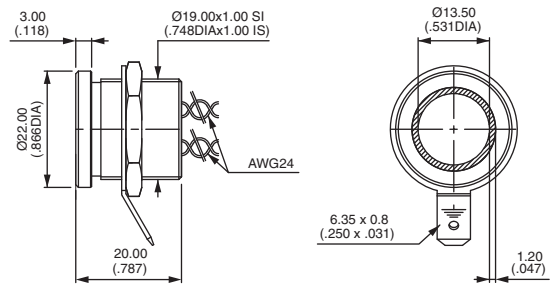
Stainless steel 316L, blue LED
PBAR1AFB000A0BX



Dia. 19 (.748) bushing - illuminated ring



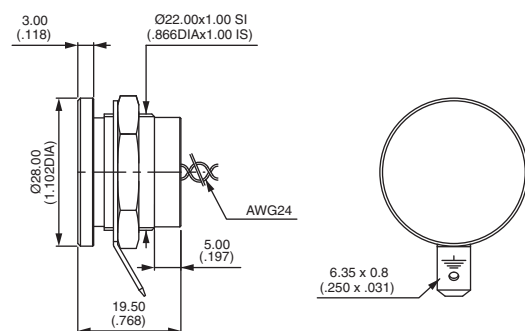
Stainless steel 316L, blue LED
PBAR9AFB000A0BX



Dia. 22 (.866) bushing - non-illuminated



Stainless steel 316L
PBAR2AFB000MX



New!

FP series

Fully illuminated pushbutton switches - bushing Ø 24 mm - momentary or latching

Distinctive features and specifications



- Suited for integrated designs
- Large but lightweight
- Pad printed or laser etched symbols
- Full actuator or symbol illumination, adaptable to design requirements

	Pad printing	Laser
Non-illuminated		
Illuminated		

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 200mA 12VDC
- Initial contact resistance : 50 mΩ max.
- Insulation resistance : 1 GΩ min. at 500VDC
- Dielectric strength : 1.000 Vrms 50 Hz min.
- Electrical life at full load :
 - Momentary models : 1 million cycles
 - Latching models : 200.000 cycles

MATERIALS

- Case : PA46
- Actuator : PA12
- Bushing/ bezel : PA66
- Contacts : silver, gold plated (code 4)
- Cable : length 30 mm, section depending on switch model
- Terminal seal : epoxy or overmolding

GENERAL SPECIFICATIONS

- Panel thickness : 1(.039) to 18 mm (.708) max.
- Total travel : 2,8 mm ± 0,5 mm
- Typical operating force : 8N ± 2N
- Low level or mechanical life :
 - Momentary models : 1 million cycles
 - Latching models : 200.000 cycles
- Torque : 3 Nm max. applied to nut
- Operating temperature : -40°C to +75°C

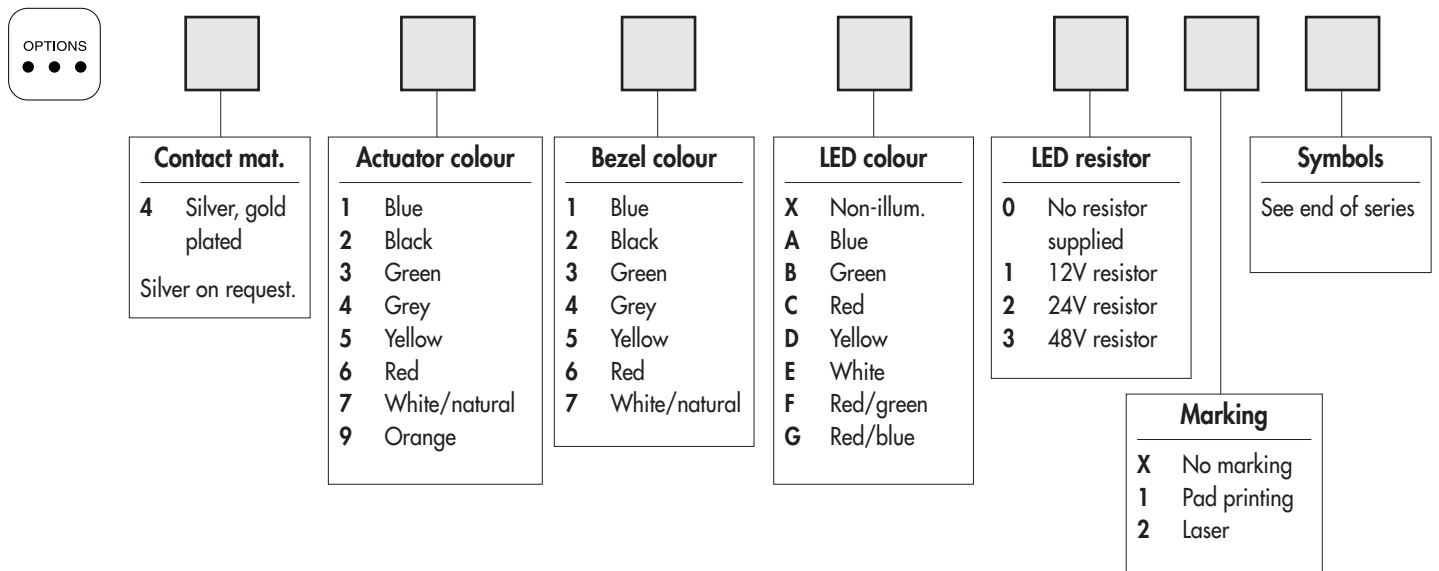
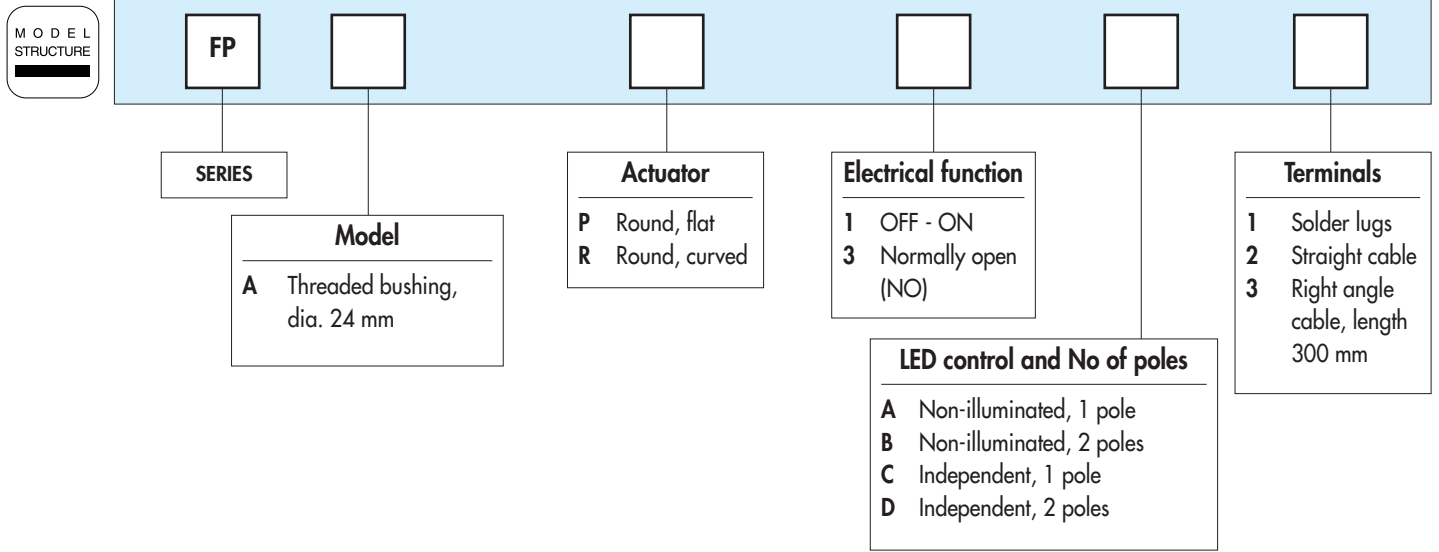
B2

FP series

New!

Fully illuminated pushbutton switches - bushing Ø 24 mm - momentary or latching

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
model structure of switches and options in the same order as in above chart

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



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



Mounting accessories : Standard hardware supplied : 1 hex nut and 1 O-Ring



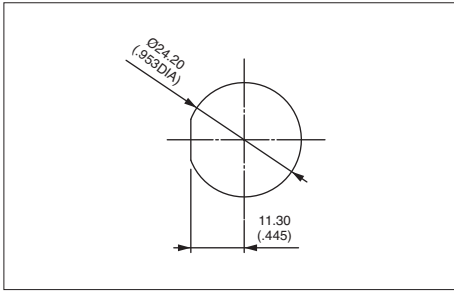
Packaging unit : solder lug versions : 20 pieces - cable versions : 1 piece



New!

FP series

Fully illuminated pushbutton switches - bushing Ø 24 mm - momentary or latching



- Three terminal types
- Curved or flat actuator

To order a product, replace • with one of the codes selected under "LED control and number of poles" on next page, then add the desired options.

MODEL STRUCTURE



B2

Solder lug terminals

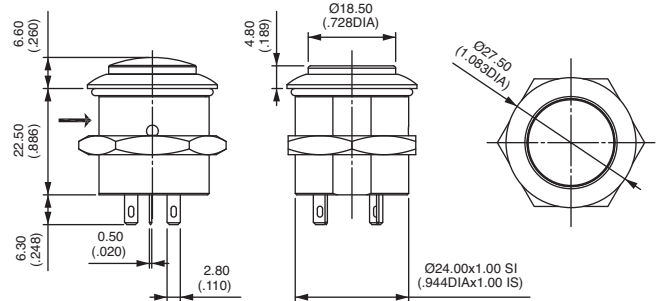


LATCHING
Curved actuator
FPAR1•1
Flat actuator
FPAP1•1

MOMENTARY (NO)
Curved actuator
FPAR3•1
Flat actuator
FPAP3•1

OFF - ON

OFF ON



Straight cable terminals

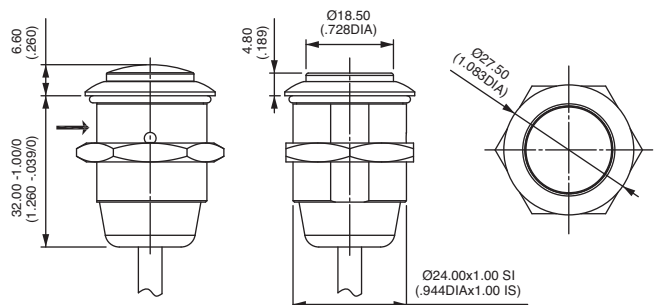


LATCHING
Curved actuator
FPAR1•2
Flat actuator
FPAP1•2

MOMENTARY (NO)
Curved actuator
FPAR3•2
Flat actuator
FPAP3•2

OFF - ON

OFF ON



Right angle cable terminals

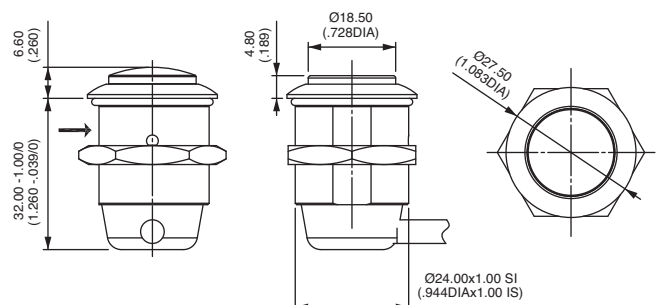


LATCHING
Curved actuator
FPAR1•3
Flat actuator
FPAP1•3

MOMENTARY (NO)
Curved actuator
FPAR3•3
Flat actuator
FPAP3•3

OFF - ON

OFF ON

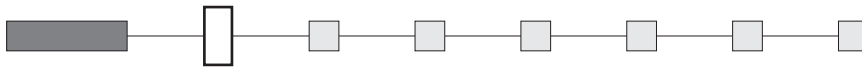


LED CONTROL AND NUMBER OF POLES

Complete the model numbers on previous pages with one of the following codes.

	Function 1 (latching)	Function 3 (momentary)		Function 1 (latching)	Function 3 (momentary)
Non-illuminated one pole A			Independent one pole C		
Non-illuminated two poles B			Independent two poles D		

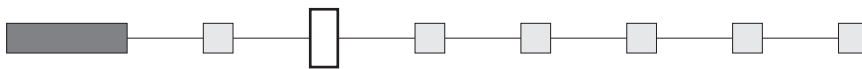
CONTACT MATERIALS



4 Silver, gold plated

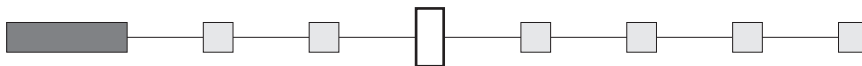
Silver : on request.

ACTUATOR COLOUR



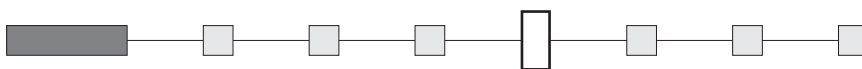
1 : blue - 2 : black - 3 : green - 4 : grey - 5 : yellow - 6 : red - 7 : white/natural
 9 : orange

BEZEL COLOUR



1 : blue - 2 : black - 3 : green - 4 : grey - 5 : yellow
 6 : red - 7 : white/natural - 8 : bright chrome

LED COLOUR



X : non-illuminated
 A : blue - B : green - C : red - D : yellow - E : white - F : red/green - G : red/blue



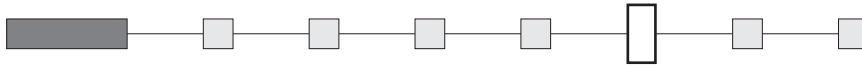
New!

FP series

Fully illuminated pushbutton switches - bushing Ø 24 mm - momentary or latching

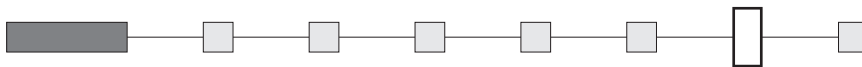
Options

LED RESISTOR



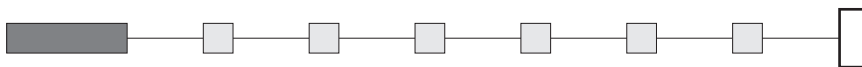
- 0 No resistor supplied
- 1 12V resistor
- 2 24V resistor
- 3 48V resistor

MARKING



- X No marking
- 1 Pad printing
- 2 Laser

SYMBOLS



- XX No symbol

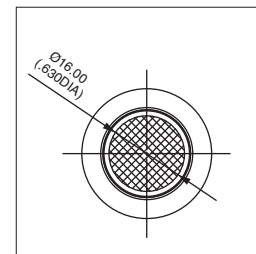
Available symbols
See end of K-range, section D.

Marking colour

White marking for illuminated actuators (laser etching) and non-illuminated black actuators (pad printing). Black marking for non-illuminated colour actuators (pad printing). Other : on request.

Marking area

The symbol will be included in the hatched area.



MP series

Two-step pushbutton switches

Distinctive features

New!

MP Series two-step momentary pushbutton switches with optical barrier contacts are designed for control of two-speed motors.

❑ **SIL2**

Safety Integrity Level (SIL2) is a safety level defined by the IEC 61508 standard, corresponding to a high protection level for the equipment, production and employees.

The electrical and mechanical redundancy of MP pushbuttons are ensured by :

- redundant optical contacts for each active position,
- two mechanical systems (a membrane and two springs).

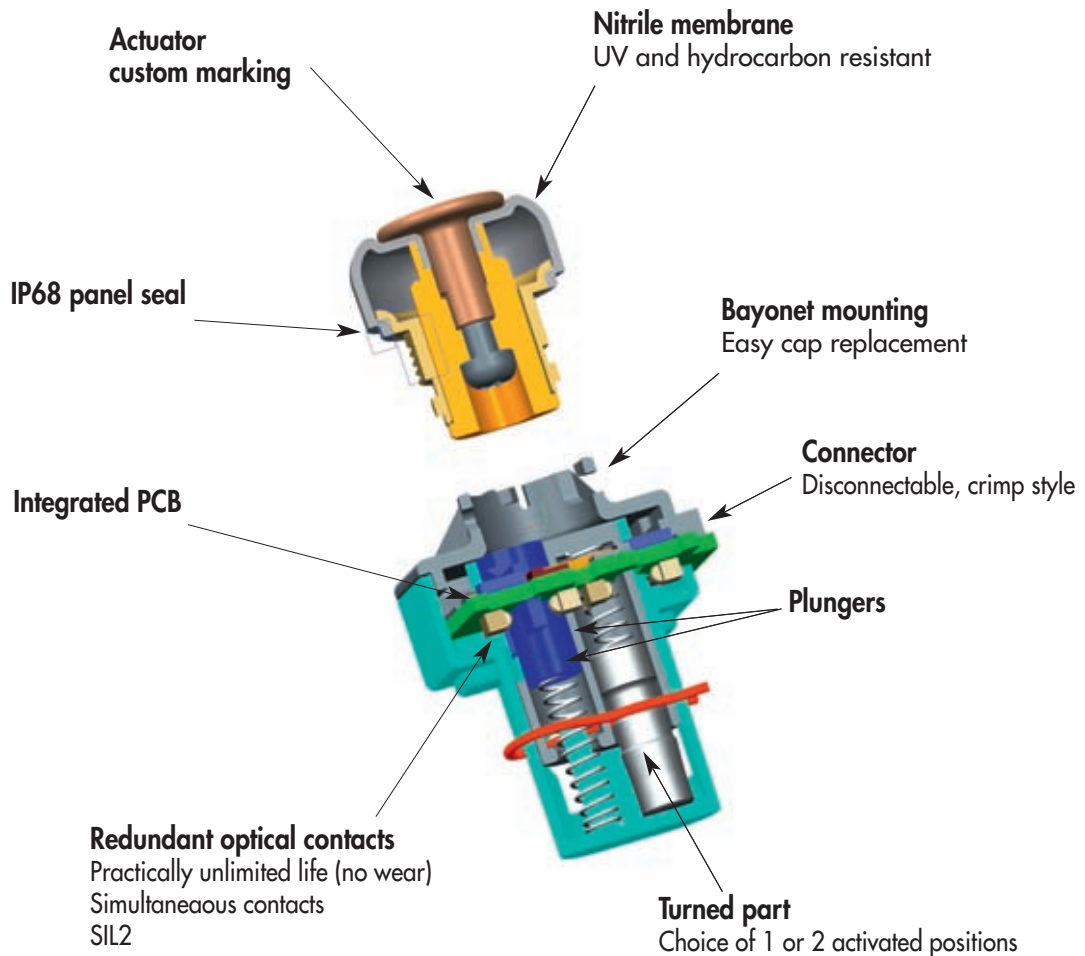
In case of mechanical or electrical failure, the pushbutton will provide a low logic signal if the equipment control system is programmed to verify output activation state.

❑ **Easy to integrate**

Disconnectable crimp style connector. The PCB is integrated in the switch.

❑ **Resistant to harsh environments**

IP68 front panel sealing and a bezel membrane resistant to UV and hydrocarbons make MP pushbuttons ideal for harsh environment applications.



New!



- SIL 2
- Easy to integrate
- Sealed to IP68
- UV and hydrocarbon resistant

ELECTRICAL AND GENERAL SPECIFICATIONS

- Current/voltage rating : 20mA 5VDC max. / 3,3VDC min.
- Idling current : 20 to 80mA 5VDC - 11 to 44mA 3,3VDC`
- NPN output signal : 20mA with 12VDC max. commutation voltage
- Operating force :
 - step 1 : 11,5N ± 1,5N
 - step 2 : 14,5N ± 1,5N
- Travel :
 - 1 step : 4 mm ± 0,4 mm
 - 2 steps : 6,65 mm ± 0,4 mm
- Mechanical life expectancy : 1 million cycles on each position

MATERIALS

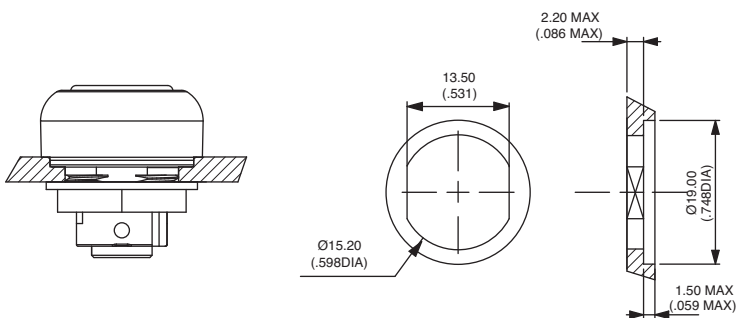
- Case + plungers : POM
- Bezel membrane : UV and hydrocarbon resistant nitrile
- Bushing + actuator : polyamide 6/6
- Connector : disconnectable crimp-style JST SM09B-SRSS-TB

Note : mating connector JST09SR-3S

ENVIRONMENTAL SPECIFICATIONS

- SIL 2 according to IEC 61508
- Sealing to IP68 according to IEC 529
- Operating temperature : -20°C to +70°C
- Static resistance : 10KV

PANEL CUT-OUT & RECOMMENDED MOUNTING



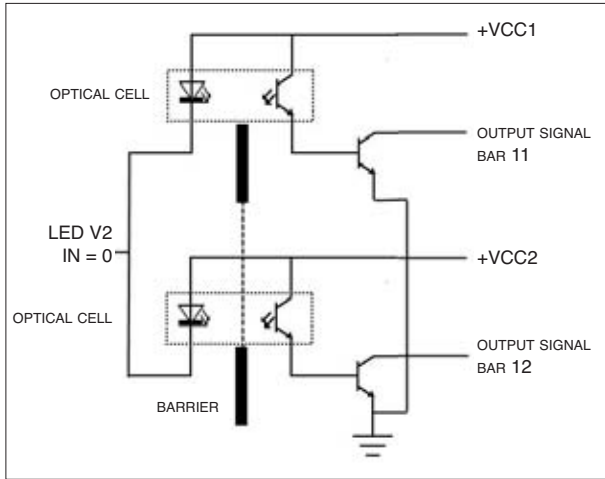
MP series

Two-step pushbutton switches

Electrical information

New!

Diagram of an optical barrier redundant in position 1



MP pushbutton switches feature two active positions.

Each position is activated by redundant optical contacts.

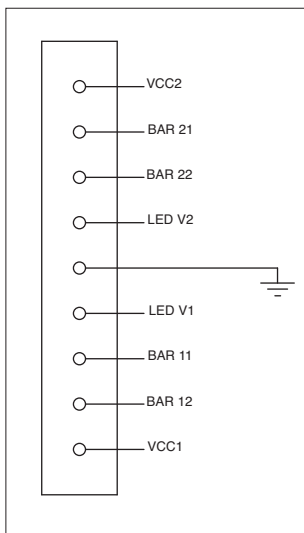
The redundant barriers have separate power supplies.

The output signal is equivalent to a NPN output signal.



The load should be connected between VCC and Output Signal Bar

Wiring diagram for connector JST SM09B-SRSS-TB

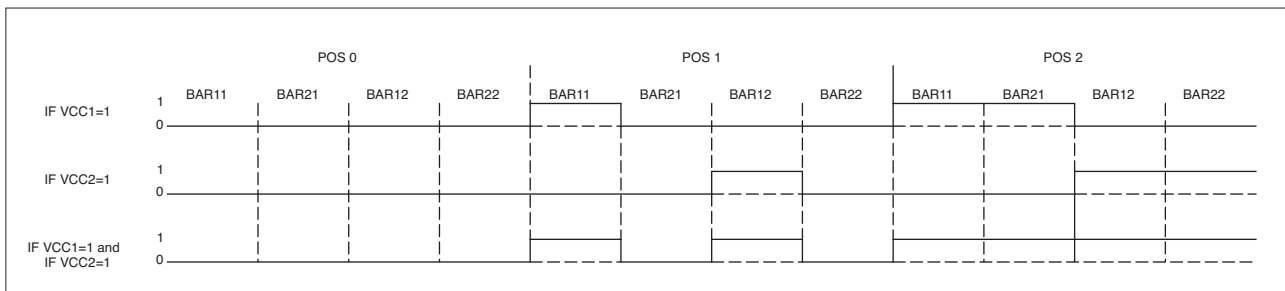


BAR 11 = output signal of step 1
 BAR 12 = output signal of step 1
 BAR 21 = output signal of step 2
 BAR 22 = output signal of step 2

VCC1 supplies the optical barriers with BAR 11 and BAR 21 outputs.
 VCC2 supplies the optical barriers with BAR 12 and BAR 22 outputs.

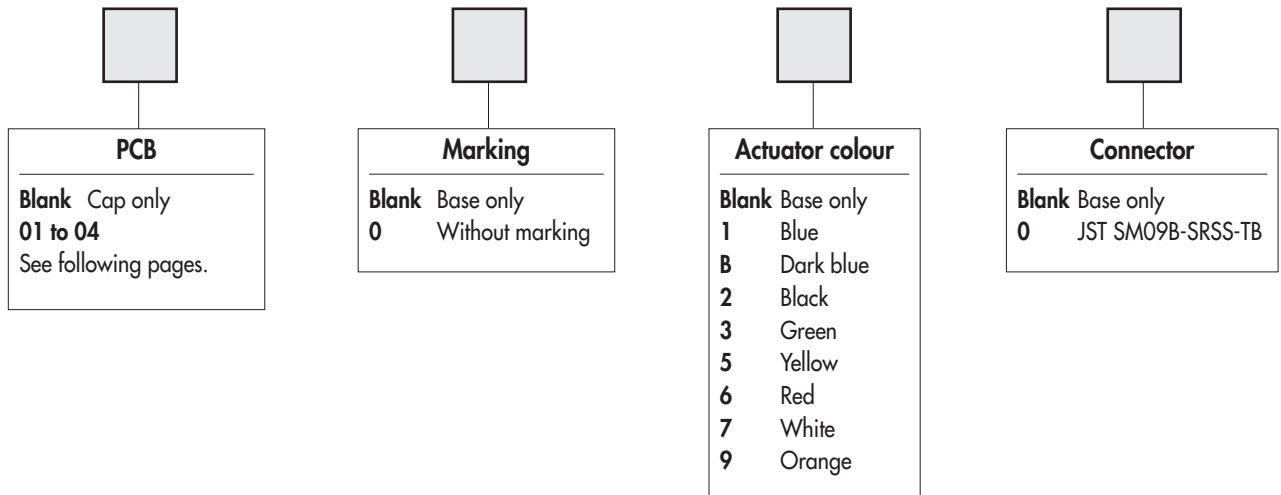
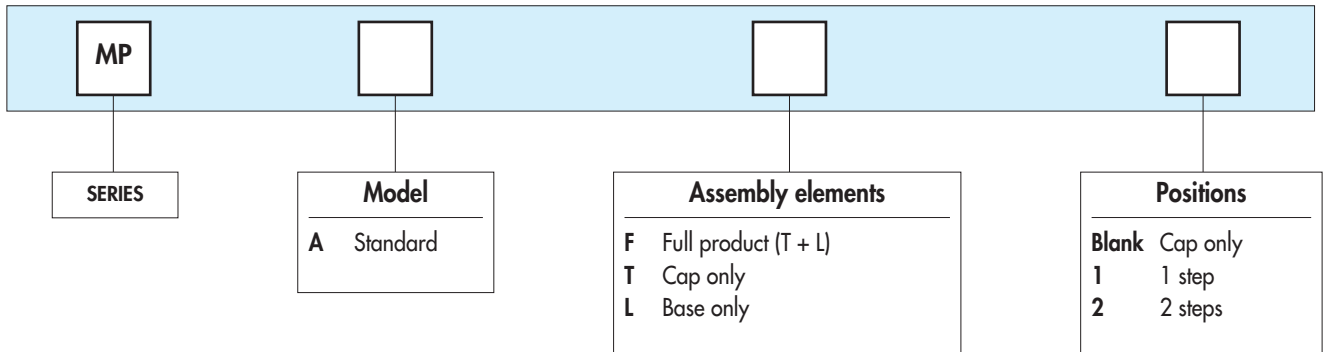
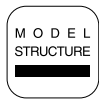
Optical cell inputs LED V2 and LED V1 are at zero.

Activation state of optical cells



Note : MP pushbutton switches can be used in low power mode. Please contact APEM.

New!



ABOUT THIS SERIES

On the following pages, you will find successively :
 model structure of switches and options in the same order as in above chart

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



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

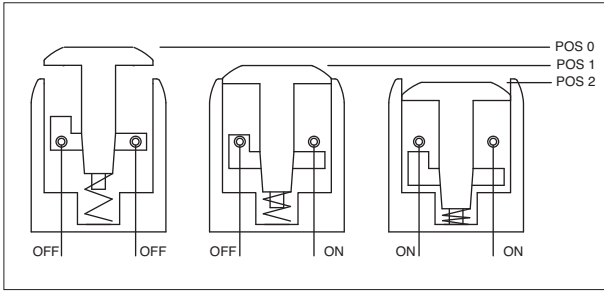


Packaging unit : 25 pieces

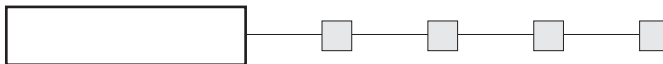
MP series

Two-step pushbutton switches

New!



MODEL
STRUCTURE



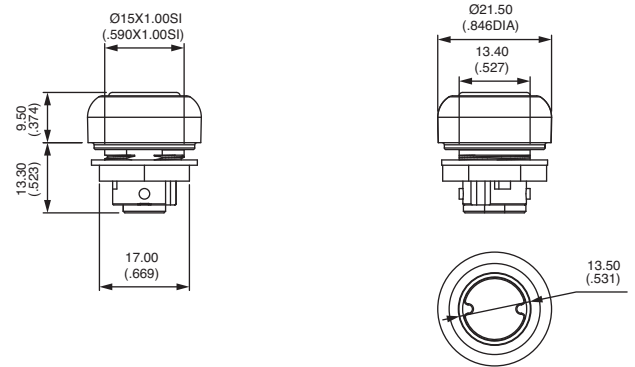
B2

Cap only



MPAT

Add desired actuator colour (see options).

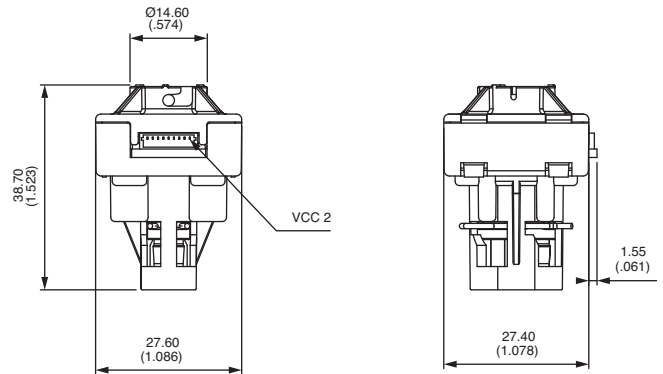


Switch base only



MPAL

Add desired PCB (see options).



Full product

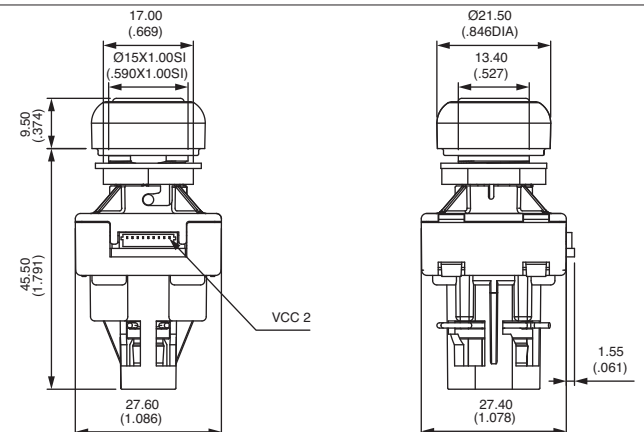


One-step switch
MPAF1

OFF MOM

Two-step switch
MPAF2

OFF MOM MOM





New!

MP series

Two-step pushbutton switches

Options

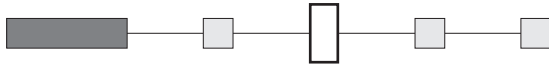
PCB



Blank Cap only

	No of barriers	No of steps	Contact Redundancy
01	4	2	yes
02	2	1	yes
03	2	2	no
04	1	1	no

MARKING



Blank Base only

0 Without marking

ACTUATOR COLOUR



Blank Base only

- 1** blue
- B** dark blue
- 2** black
- 3** green
- 5** yellow
- 6** red
- 7** white
- 9** orange

CONNECTOR



Blank Cap only

0 JST SM09B-SRSS-TB

B2

LPI series

Tactile pushbutton switches with large actuator

Distinctive features and applications



❑ Common features

- Large ergonomic actuator (Ø 35 mm)
- Tactile feedback
- Low behind-panel depth (21 mm max.)
- Stylish design
- Long life

This series has been developed on a modular base in order to fit the exact needs of technicians and end-users.

❑ Installation options

The LPI series has a number of features to ensure easy installation:

- Front or rear mounting
- With or without sealing
- 2 separate circuits for NO/NC 5A version
- Terminal block connector for 0,1A NO version
- 3 different LED voltages: 6V, 12V, 24V
- Integrated LED resistor

❑ Aesthetic options

- Ring or dot illumination
- Wide range of LED colours
- Wide range of bezel colours
- Many different actuator types and colours

❑ Applications

Because of its large actuator, this product is suited to all indoor applications where the pushbutton needs to be located quickly (access control, call information, museums, exhibitions). This product is also ideal for applications where the end-user uses gloves.

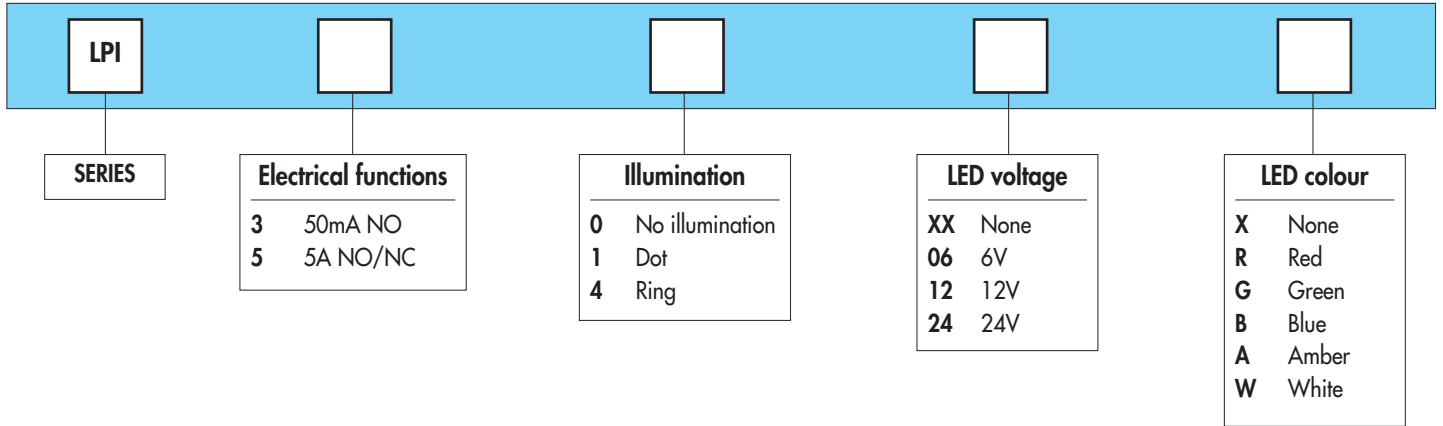
This product meets the requirements of EN81-70 and is ideal for use in all types of indoor lifts.

LPI series

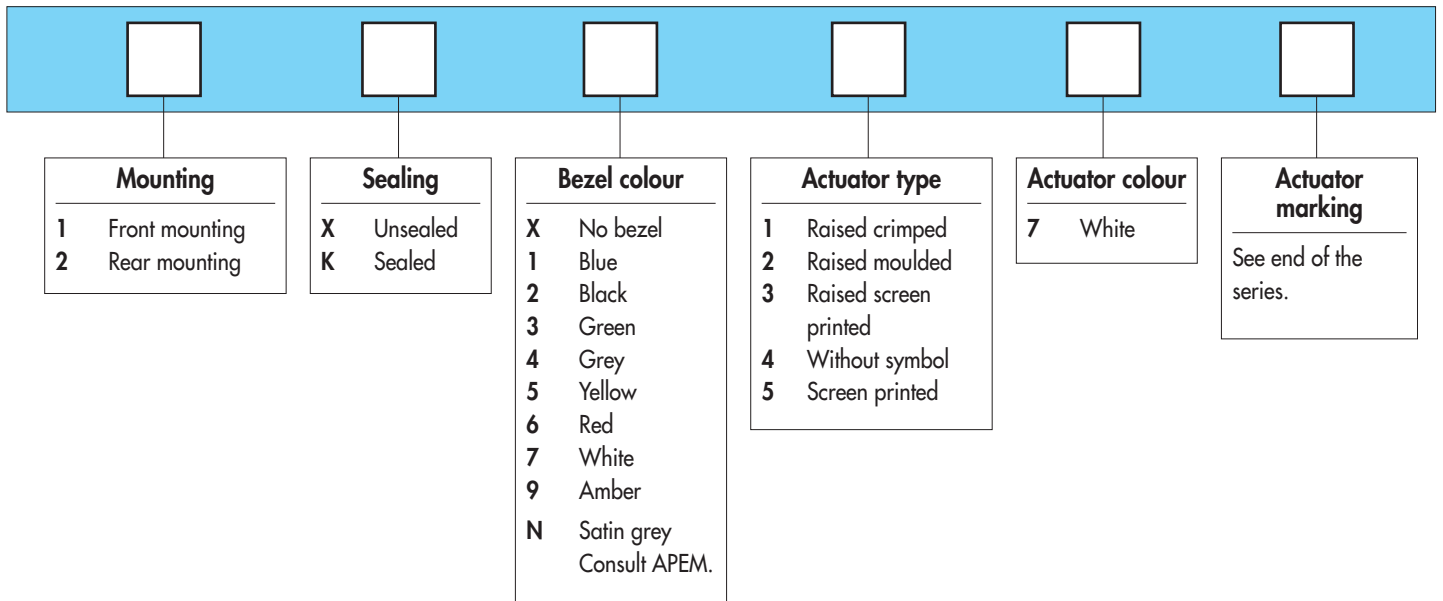
Tactile pushbutton switches with large actuator

Overview

SWITCH BLOCK



OPERATOR



ABOUT THIS SERIES

On the following pages, you will find successively switch block order numbers and operator order numbers.

Dimensions : first dimensions are in m while inches are shown as bracketed numbers.



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



Packaging unit : 15 pieces for front mounting versions - 20 pieces for rear mounting versions.

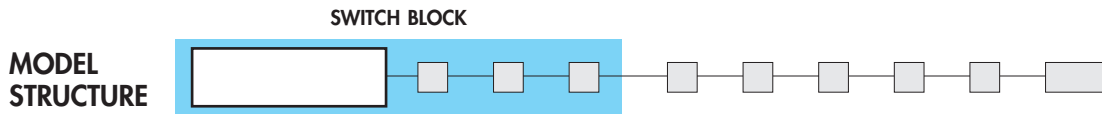


Sealing boot available to increase the sealing of LPI switches. See section H.

LPI series

Tactile pushbutton switches with large actuator

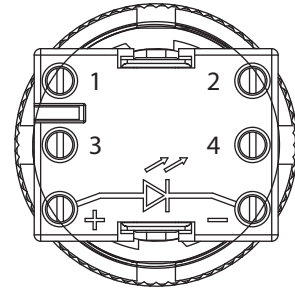
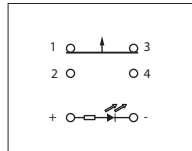
Switch block



5A momentary NC/NO combined



LPI5



Terminal block

Wire size : AWG20-15 - 0,5 to 1,5 mm²

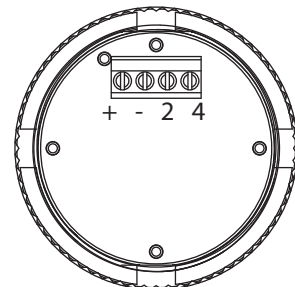
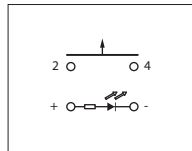
Rated torque : 0,5 Nm

Screw size : M3

50mA momentary NO



LPI3



Terminal block

Wire size : AWG28-16 - 0,5 to 1 mm²

Rated torque : 0,4 Nm

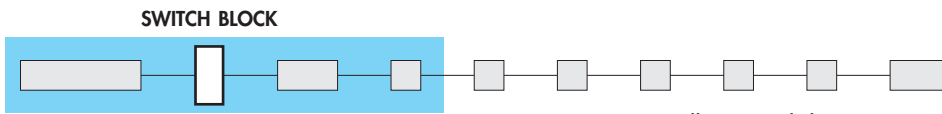
Screw size : M2

LPI series

Tactile pushbutton switches with large actuator

Switch block

ILLUMINATION



- 0 Non-illuminated
- 1 Illuminated dot (1 LED)
- 4 Illuminated ring (4 LEDs)

Option 4 available only in the case of screen-printed symbol

Illuminated dot



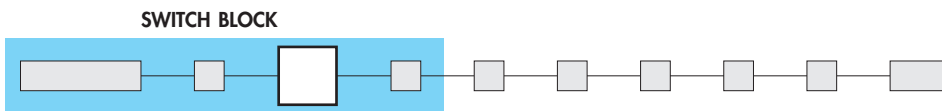
Option 1

Illuminated ring



Option 4

LED VOLTAGE



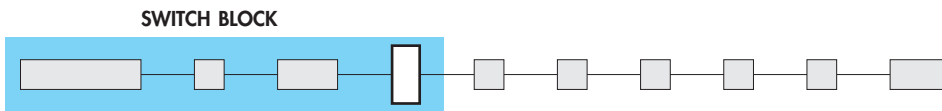
- XX Non-illuminated
- 06 6V
- 12 12V
- 24 24V



Combination with other options : see table below.

- Integrated resistors
- LED current : 20mA typical for dot or ring (30mA max.)
- LEDs protected from reverse polarity
- Stand-by consumption for illuminated product : 0,5VA max.

LED COLOUR

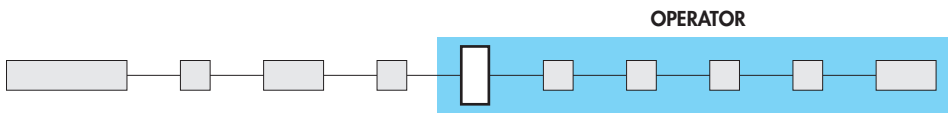


- X Non-illuminated
- R Red
- G Green
- A Amber
- B Blue
- W White

Colours available with illuminated ring (option 4)

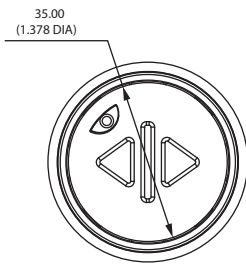
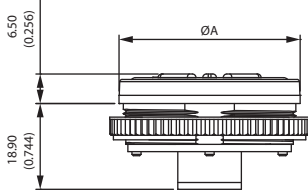
	Red	Green	Amber	Blue	White
LED voltage	Version 5A				
6V	No	No	No	No	No
12V	Yes	Yes	No	No	No
24V	Yes	Yes	Yes	Yes	Yes
LED voltage	Version 50mA				
6V	No	No	No	No	No
12V	Yes	No	Yes	No	No
24V	Yes	Yes	Yes	Yes	Yes@

MOUNTING

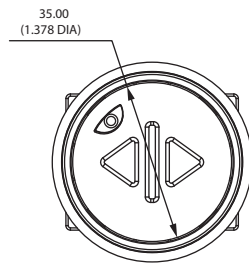
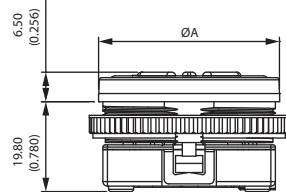


- 1 Front mounting
- 2 Rear mounting

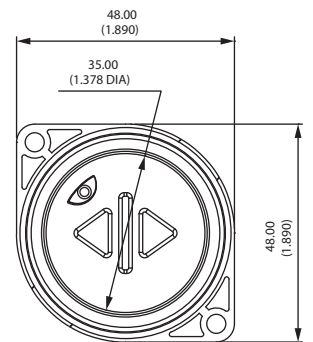
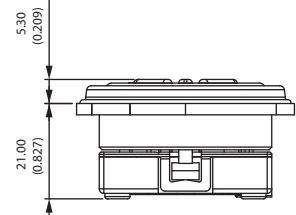
FRONT MOUNTING - 50mA version



FRONT MOUNTING - 5A version

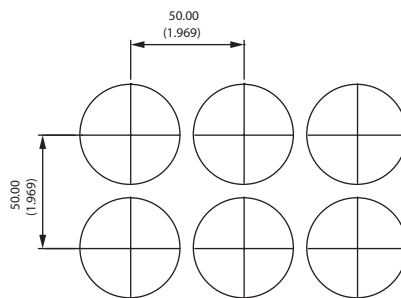


REAR MOUNTING - all versions



MATRIX MOUNTING

All versions

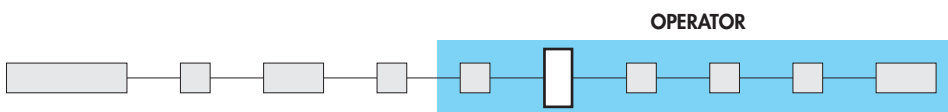


Dimension A

Sealed models : 44 mm (1.732)

Unsealed models : 39,9 mm (1.570)

SEALING



- X Unsealed
- K Sealed

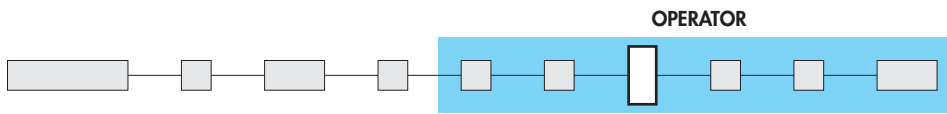
Note : bezel compulsory on sealed versions.

LPI series

Tactile pushbutton switches with large actuator

Operator

BEZEL COLOUR



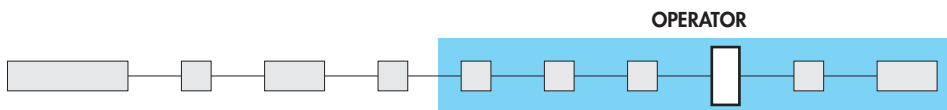
- X No bezel
- 1 Blue
- 2 Black
- 3 Green
- 4 Grey
- 5 Yellow
- 6 Red
- 7/1 White
- 9 Orange



Satin grey (option N) : consult APEM.

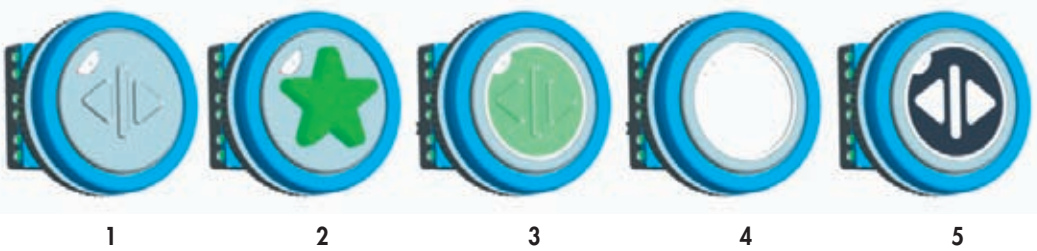
For sealed versions, the bezel is compulsory.

ACTUATOR TYPE

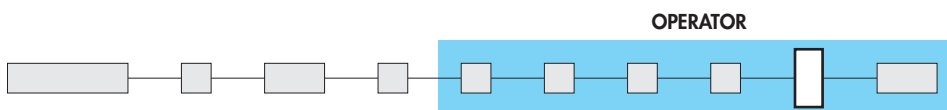


- 1 Stainless steel raised crimped symbol
- 2 Raised moulded symbol (star and bell)
- 3 Raised screen printed symbol
- 4 Without symbol
- 5 Screen printed symbol

Ring illumination available with options 3, 4 and 5 only.



ACTUATOR COLOR

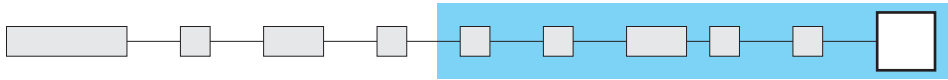


- 7 White



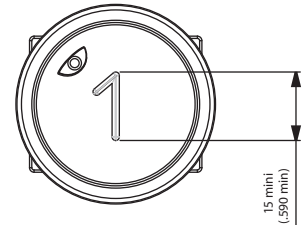
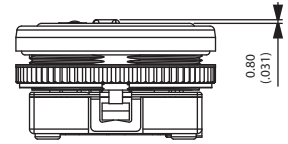
ACTUATOR MARKING

OPERATOR



CODE	SYMBOL	DESCRIPTION
XX	/	No symbol
00	0	
01	1	
02	2	
03	3	
04	4	
05	5•	With single tactile point
06	6	
07	7	
08	8	
09	9	
11	-1	
12	-2	
13	-3	

CODE	SYMBOL	DESCRIPTION
14	◀▶	Open
15	▶◀	Close
16	▲	Up
17	▼	Down
18	◀◀	Left
19	▶▶	Right
20	✻	Ventilation
21	🔔	Alarm (moulded, yellow)
22	★	Exit level (moulded, green)
23	☎	Phone



Actuator type 1

	Symbol height		
	Symbol 21	Symbol 22	Other symbol
Actuator type 1	x	x	0,8 mm
Actuator type 2	0,8 mm	5 mm	x
Actuator type 3	x	x	0,8 mm
Actuator type 4	x	x	x
Actuator type 5	x	x	0 mm

x = non available

Tact switches



Section C

D162 series

SMT tact switches

6 x 6 mm case

- ☐ Excellent coplanarity
- ☐ Right angle for pick and place

ELECTRICAL SPECIFICATIONS

- Normally open (NO)
- Current/voltage rating : 50mA 12VDC max.
- Contact resistance : 100 mΩ max.
- Insulation resistance (at 100VDC) : 1.000 MΩ min.
- Dielectric strength : 250 Vrms
- Electrical life : 40.000 cycles

MATERIALS

- Case : high temperature 4/6 nylon
- Actuator : high temperature 4/6 nylon
- Cover : steel, tin plated
- Contacts : stainless steel or copper alloy, min. 0,2 micron gold plated over nickel barrier
- Terminals : copper alloy, min. 0,2 micron gold plated over nickel barrier

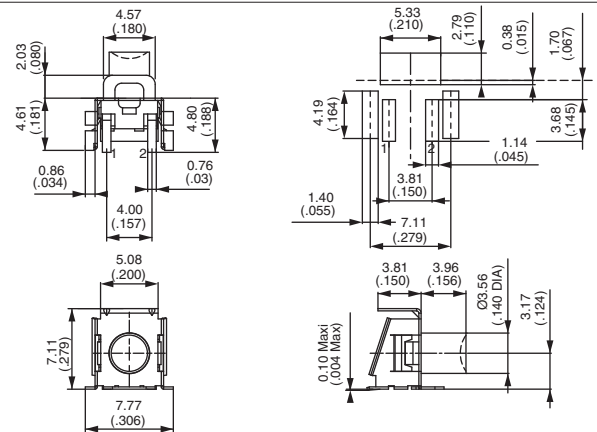
GENERAL SPECIFICATIONS

- Operating force : 1,6N ± 0,3N
- Travel : 0,2 mm ± 0,1 mm
- Shocks : 50 g according to IEC 512-4
- Moisture : 21 days according to IEC 512-6
- Temperature range : -40°C to +90°C
- Tape and reel packaging
- SMT soldering

Right angle mounting

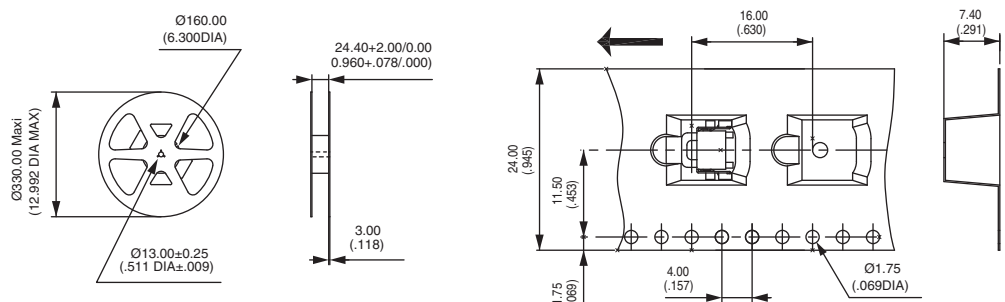


Model No
D162-02



PACKAGING

Quantity per reel : 600 pieces



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

PHAP33 series

Tact switches

Distinctive features and specifications



- Wide range of case formats
- SMT and through-hole models
- Normally closed models available

Models	PHAP3390 PHAP3391		PHAP3381 PHAP3382 PHAP3383 PHAP3384		PHAP3371 PHAP3372 PHAP3373 PHAP3374 PHAP3378		PHAP3355 PHAP3361 PHAP3362 PHAP3363 PHAP3365 PHAP3366		PHAP3301 PHAP3302 PHAP3303 PHAP3305 PHAP3306 PHAP3307 PHAP3308 PHAP3368		PHAP3350 PHAP3351 PHAP3352 PHAP3353		PHAP3320 PHAP3321	
Current/voltage rating	50mA 12VDC													
Contact resistance	100 mΩ max.													
Insulation resistance	100 MΩ min.													
Dielectric strength	250 VAC min. (1 minute)													
Electrical life (cycles)	70.000	70.000	75.000	30.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
Operating force	2,6N ± 0,5N	1,6N ± 0,5N	1,6N +0,5/-0,3N	1,8N ± 0,5N	1,6N ± 0,5N	2N ± 0,3N	1,6N ± 0,5N	2N ± 0,3N	1,6N ± 0,5N	2N ± 0,3N	1,6N ± 0,5N	2N ± 0,3N	1,6N ± 0,5N	1,6N ± 0,5N
Travel	0,20 mm	0,25 mm	0,25 mm	0,25 mm	0,25 mm	0,25 mm	0,25 mm	0,25 mm	0,25 mm	0,25 mm	0,50 mm	0,50 mm	0,30 mm	0,30 mm
Operating temperature	-20°C to +70°C													
Storage temperature	-30°C to +80°C													
Vibrations	10-500 Hz / 10 g													
IR reflow soldering	260°C for 40 seconds max.						-							
Wave soldering	255°C for 5 seconds max.													
Manual soldering	300°C for 3 seconds max.													

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



Packaging unit : 1.000 pieces and multiples, except for tape and reel packaging (see following pages).

PHAP33 series

SMT tact switches

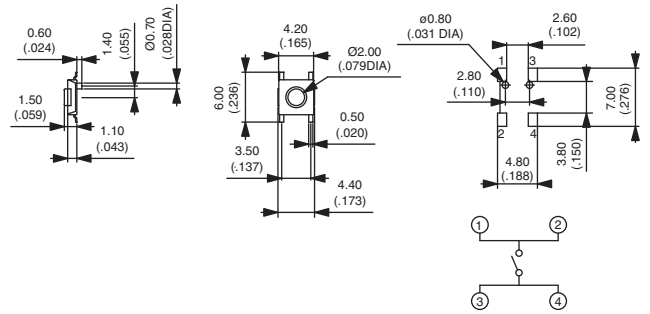
Microminiature and ultra-low profile - 4,2 x 4,2 mm case

- Ultra-compact size for board space saving : 4,2 x 4,2 mm case, 1,5 mm button height from PCB
- Reflow solderable
- With or without positioning pins
- For tape and reel packaging, add "R" at the end of model number.

With positioning pins



Model number
PHAP3390

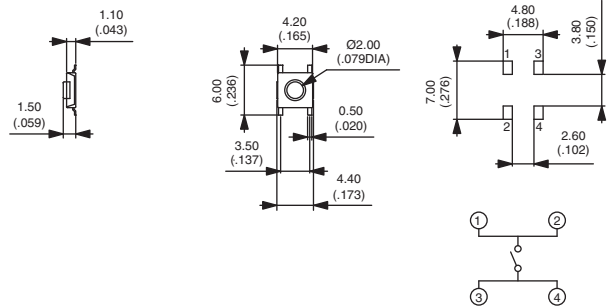


Operating force : 2,6N ± 0,5N - Travel : 0,20 mm

Without positioning pins



Model number
PHAP3391



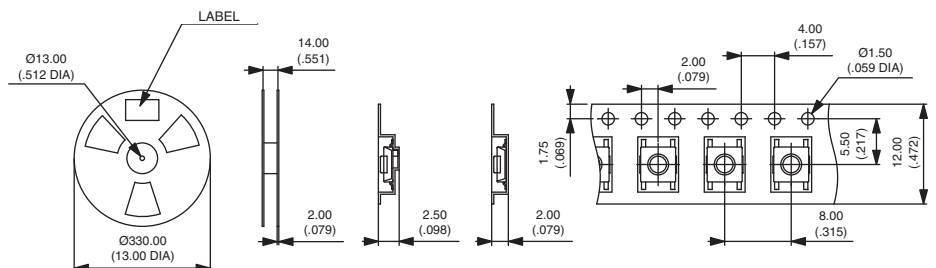
Operating force : 2,6N ± 0,5N - Travel : 0,20 mm

PACKAGING

To order a product with tape and reel packaging, add "R" at the end of its model number.

Example : PHAP3390R.

Quantity per reel : 3.400 pieces



PHAP33 series

SMT tact switches

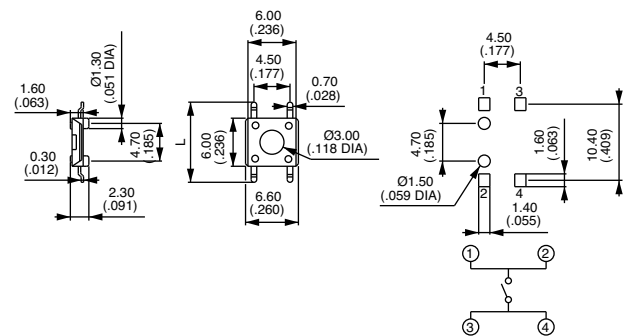
Ultra-low profile - 6 x 6 mm case

- Ultra-compact size for board space saving : 6 x 6 mm case, 1,6 mm button height from PCB
- Reflow solderable
- Types for iron soldering (L = 10 mm)
- With positioning pins
- With or without grounding tab for protection against electrostatic discharges
- For tape and reel packaging, add "R" at the end of model number.

Without grounding tab



Model No	Dim. «L»
PHAP3381	8 mm
PHAP3382	10 mm

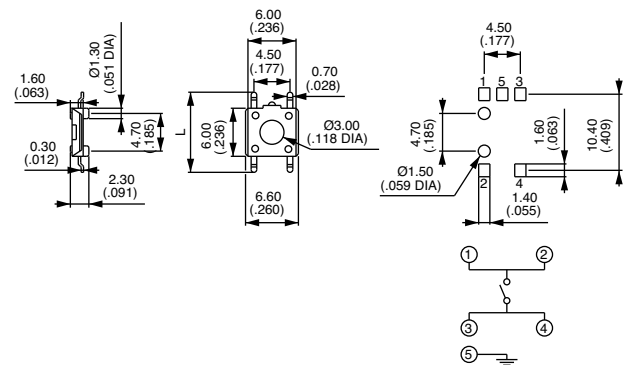


Operating force : 1,6N ± 0,5N - Travel : 0,25 mm

With grounding tab



Model No	Dim. «L»
PHAP3383	8 mm
PHAP3384	10 mm



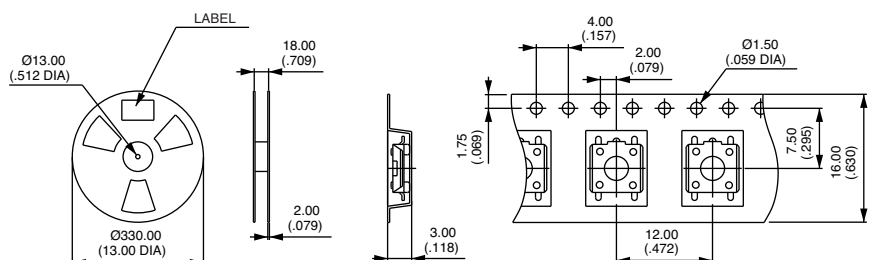
Operating force : 1,6N ± 0,5N - Travel : 0,25 mm

PACKAGING

To order a product with tape and reel packaging, add "R" at the end of its model number.

Example : PHAP3383R.

Quantity per reel : 2.200 pieces



PHAP33 series

SMT tact switches

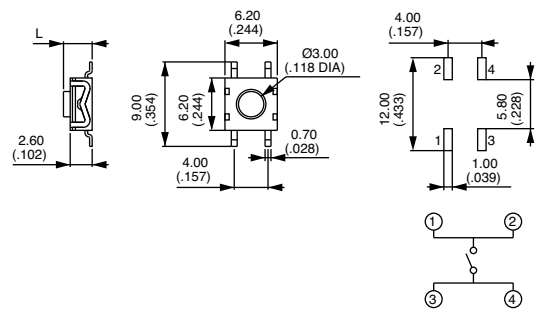
Low profile - 6,2 x 6,2 mm case

- Ultra-compact size for board space saving : 6,2 x 6,2 mm case, 2,6 to 3,4 mm button height from PCB
- Reflow solderable
- With or without grounding tab for protection against electrostatic discharges
- Models with external terminals type G or internal terminals type J
- For tape and reel packaging, add "R" at the end of model number.

External terminals type G (gullwing)



Model No	Dim. «L»
PHAP3371	2,6 mm
PHAP3371A	3,4 mm

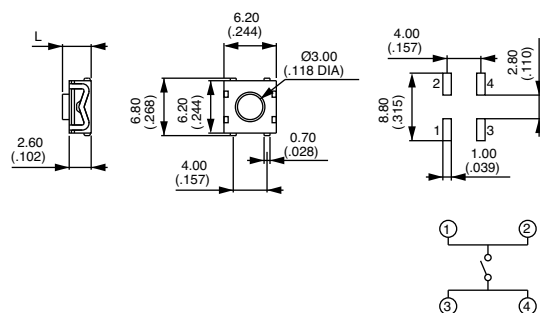


Operating force : 1,6N + 0,5N/-0,3N - Travel : 0,25 mm

Internal terminals type J - tape and reel packaging



Model No	Dim. «L»
PHAP3372R	2,6 mm
PHAP3372AR	3,4 mm



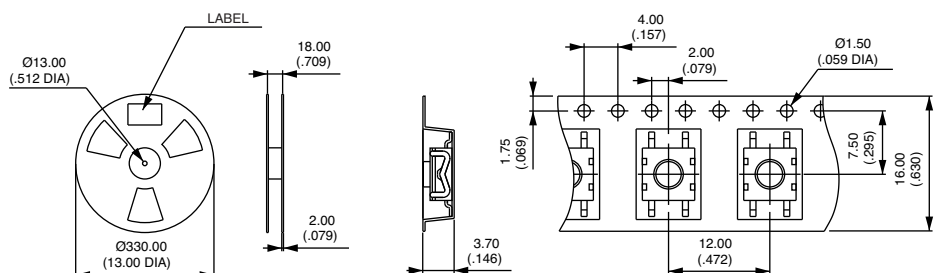
Operating force : 1,6N + 0,5N/-0,3N - Travel : 0,25 mm

PACKAGING

To order a product with tape and reel packaging, add "R" at the end of its model number.

Example : PHAP3371R.

Quantity per reel : 1.600 pieces



PHAP333 series

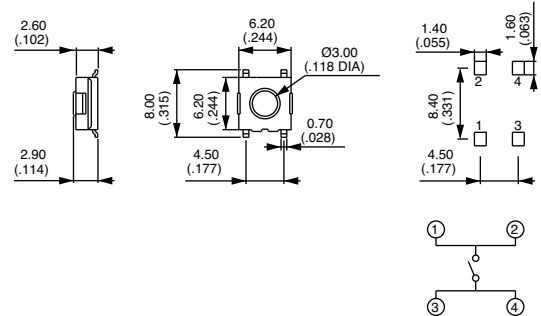
SMT tact switches

Low profile - 6,2 x 6,2 mm case

Button height from PCB : 2,9 mm



Model No
PHAP3373

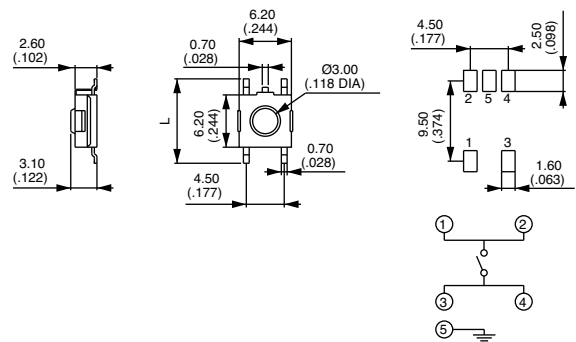


Operating force : 1,6N + 0,5N/-0,3N - Travel : 0,25 mm

Button height from PCB : 3,1 mm - with grounding tab



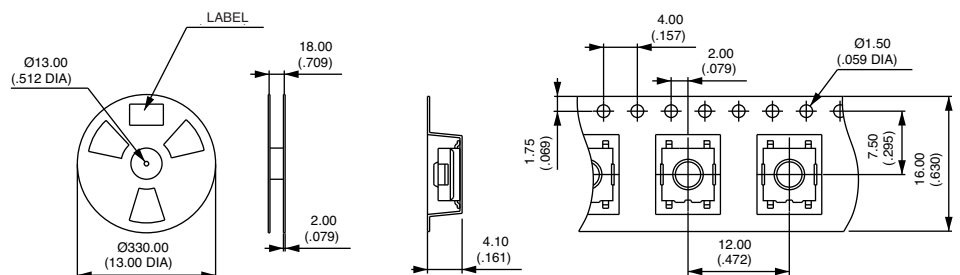
Model No	Dim. «L»
PHAP3374	8 mm



Operating force : 1,6N + 0,5N/-0,3N - Travel : 0,25 mm

PACKAGING

To order a product with tape and reel packaging, add "R" at the end of its model number.
Example : PHAP3373R.
Quantity per reel : 1.700 pieces



PHAP33 series

SMT tact switches

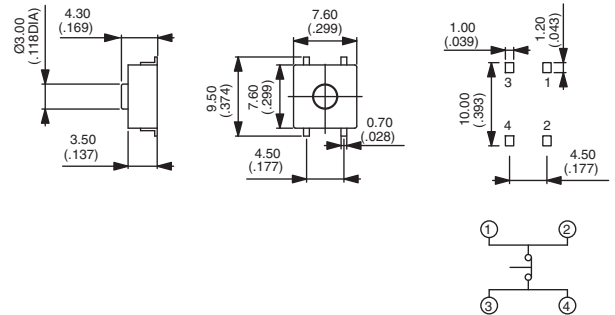
Normally closed - 7,6 x 7,6 mm case

- Compact size for board space saving : 7,6 x 7,6 mm case, 4,3 mm button height from PCB
- Reflow solderable
- Standard PCB layout

Normally closed



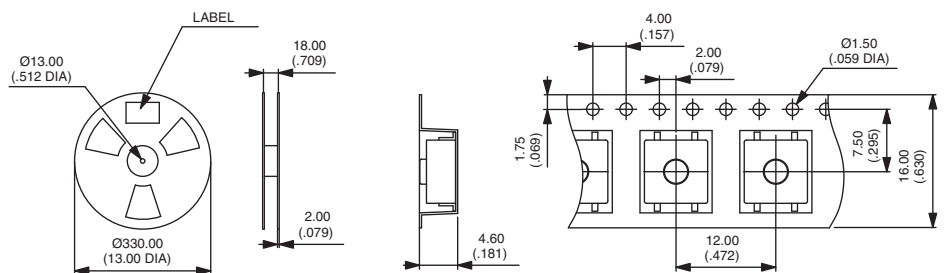
Model No
PHAP3378R



Operating force : 1,6N ± 0,5N - Travel : 0,25 mm

PACKAGING

Quantity per reel : 1.300 pieces



PHAP33 series

SMT tact switches

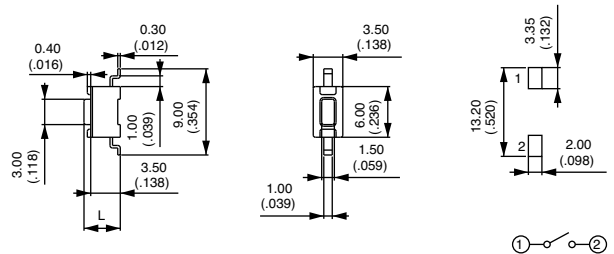
Microminiature - 6 x 3,5 mm case

- Ultra-compact size for board space saving : 6 x 3,5 mm case, 4,3 or 5 mm button height from PCB
- Right angle version available

Standard mounting



Model No	Dim. «L»
PHAP3361	4,3 mm
PHAP3361A	5,0 mm

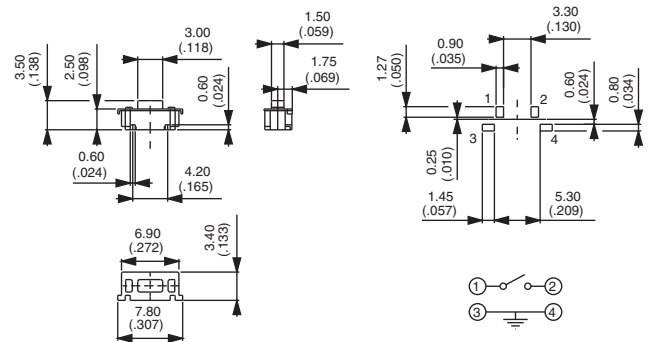


For tape and reel packaging, add "R" at the end of model number.
Operating force : 1,8N ± 0,5N - Travel : 0,25 mm

Right angle mounting



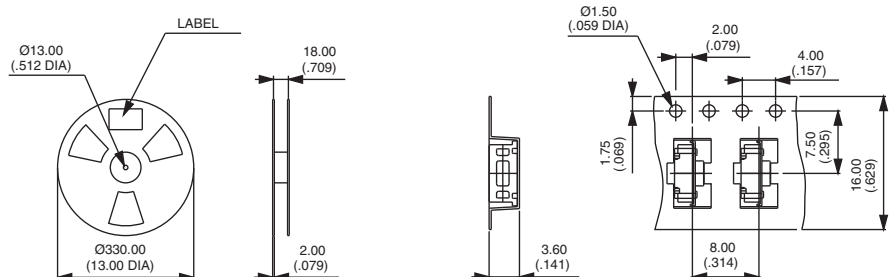
Model No
PHAP3355R



Operating force : 1,8N ± 0,5N - Travel : 0,25 mm

PACKAGING

Quantity per reel :
PHAP3361R : 1.800 pieces
PHAP3361AR : 1.800 pieces
PHAP3355R : 2.000 pieces



PHAP33 series

SMT tact switches

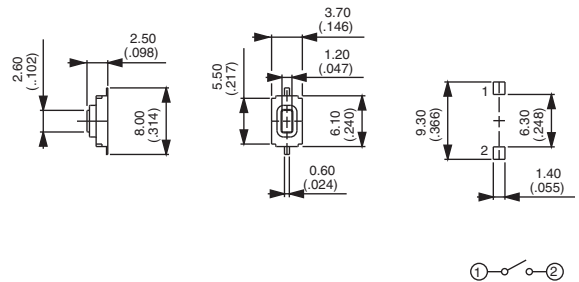
Microminiature - Low profile - 6,1 x 3,7 mm case

- Ultra-compact size for board space saving : 6,1 x 3,7 mm case, 2,5 mm button height from PCB
- Available with flat or bent terminals

Flat terminals



Model No
PHAP3365R

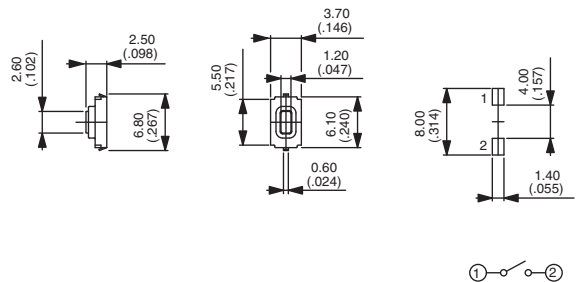


Operating force : 1,8N ± 0,5N - Travel : 0,25 mm

Bent terminals



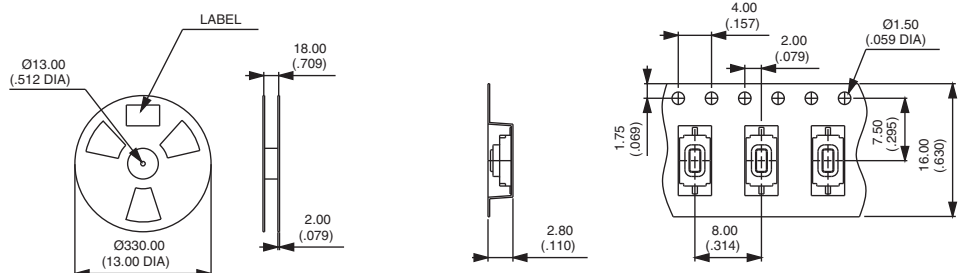
Model No
PHAP3366R



Operating force : 1,8N ± 0,5N - Travel : 0,25 mm

PACKAGING

Quantity per reel : 3.000 pieces

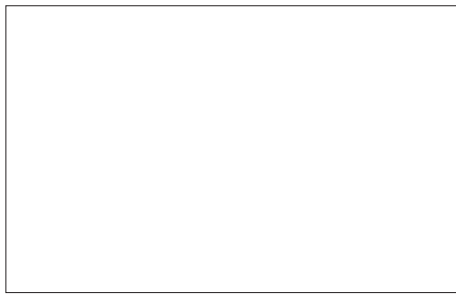


PHAP33 series

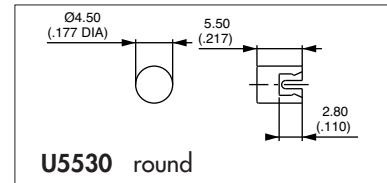
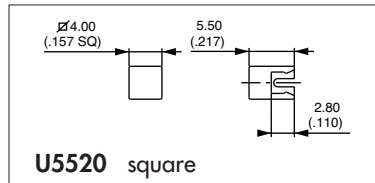
SMT tact switches

6 x 6 mm case

- 4,3 to 13 mm button height from PCB
- Excellent tactile feedback (snap dome)
- Standard PCB layout
- Caps for model with square actuator



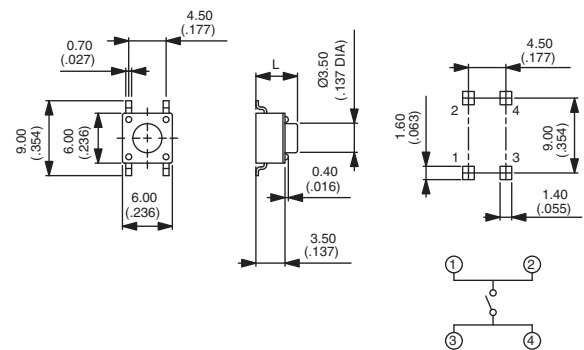
Cap colours : 1 : blue - 2 : black - 3 : green
5 : yellow - 6 : red - 7 : ivory



Round actuator



Model No	Dim. «L»	Actuator colour
PHAP3368	4,3 mm	black/white
PHAP3368A	5,0 mm	black/white
PHAP3368B	9,5 mm	black
PHAP3368C	8,0 mm	white
PHAP3368D	13,0 mm	black
PHAP3368E	7,3 mm	ivory
PHAP3368F	8,5 mm	grey

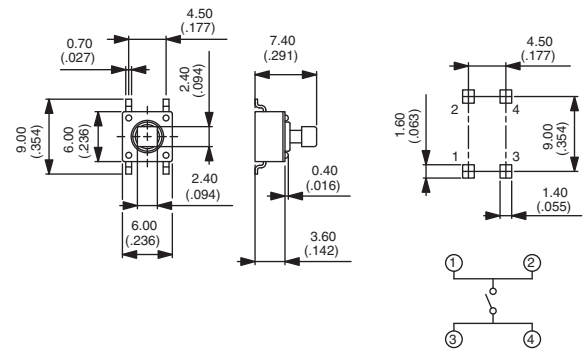


Operating force : 1,6N ± 0,5N - Travel : 0,25 mm

Square actuator



Model No
PHAP3368T

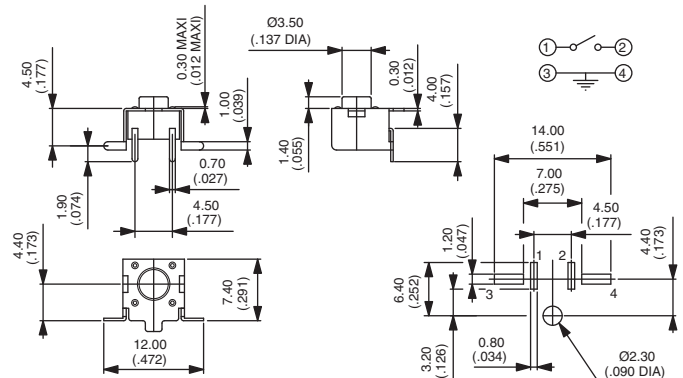


Operating force : 1,6N ± 0,5N - Travel : 0,25 mm

Edge of PCB mounting



Model No
PHAP3305ASR



Operating force : 1,6N ± 0,5N - Travel : 0,25 mm
Quantity per reel : 650 pieces

PHAP33 series

Through-hole tact switches

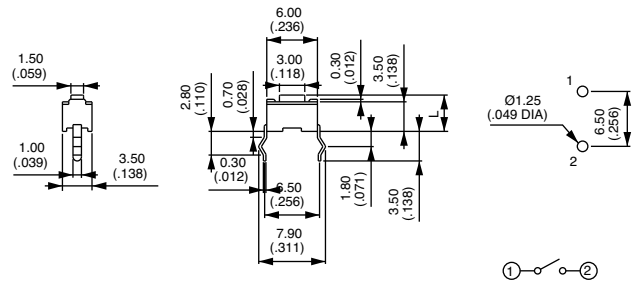
Microminiature - 6 x 3,5 mm case

- Ultra-compact size for board space saving : 6 x 3,5 mm case, 4,3 or 5 mm button height from PCB
- Crimped terminals for direct mounting onto PCB
- Moulded-in terminals for wave soldering

Standard mounting



Model No	Dim. «L»
PHAP3362	4,3 mm
PHAP3362A	5,0 mm

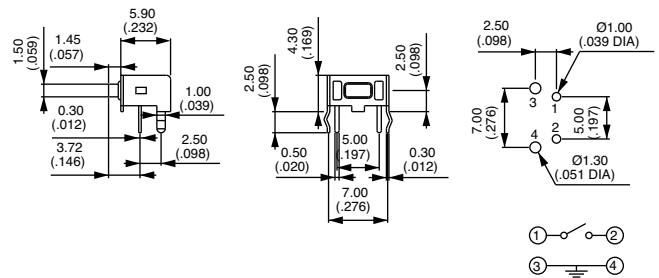


Operating force : 1,8N ± 0,5N - Travel : 0,25 mm

Right angle mounting



Model No
PHAP3363



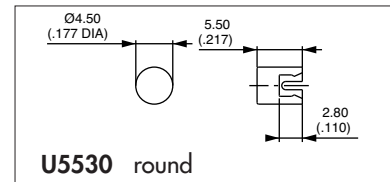
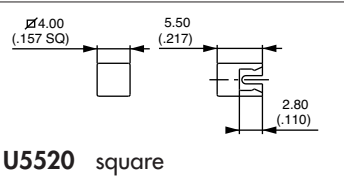
Operating force : 1,8N ± 0,5N - Travel : 0,25 mm

PHAP33 series

Through-hole tact switches

6 x 6 mm case

- 4,3 to 13 mm button height from PCB
- Excellent tactile feedback (snap dome)
- Crimped terminals for direct mounting onto PCB
- With or without grounding tab for protection ag. electrostatic discharges
- Moulded-in terminals for wave soldering
- Caps for model with square actuator (L = 2,4 mm) :

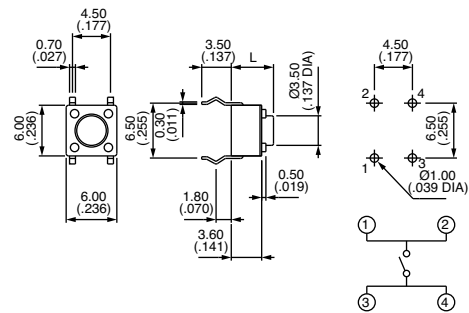


Cap colours : 1 : blue - 2 : black - 3 : green -
5 : yellow - 6 : red - 7 : ivory

Straight terminals



Model No	Dim. «L»	Actuator colour
PHAP3301	4,3 mm	black
PHAP3301A	5,0 mm	black
PHAP3301B	9,5 mm	black
PHAP3301C	8,0 mm	white
PHAP3301D	13,0 mm	black
PHAP3301E	7,3 mm	ivory
PHAP3301F	8,5 mm	grey

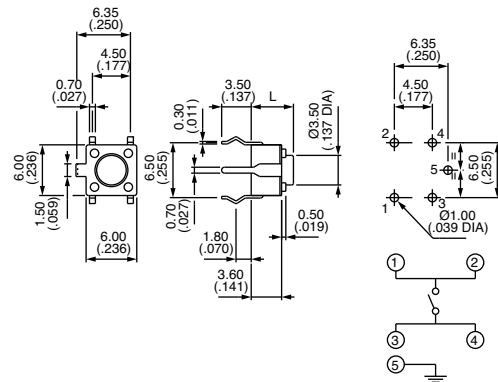


Operating force : 1,6N ± 0,5N - Travel : 0,25 mm

Straight terminals - with grounding tab



Model No	Dim. «L»	Actuator colour
PHAP3302	4,3 mm	black
PHAP3302A	5,0 mm	black
PHAP3302B	9,5 mm	black
PHAP3302C	8,0 mm	white
PHAP3302D	13,0 mm	black
PHAP3302E	7,3 mm	ivory

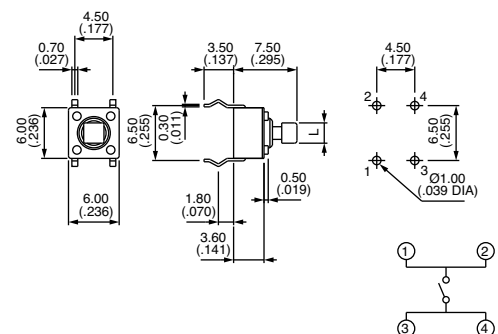


Operating force : 1,6N ± 0,5N - Travel : 0,25 mm

Straight terminals - square actuator



Model No	Dim. «L»	Actuator colour
PHAP3303	2,4mm	blue
PHAP3303A	2,8 mm	black



Operating force : 1,6N ± 0,5N - Travel : 0,25 mm

PHAP33 series

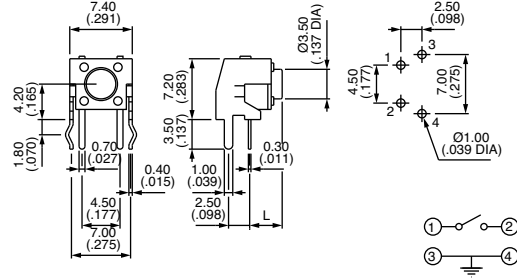
Through-hole tact switches

6 x 6 mm case

Right angle mounting



Model No	Dim. «L»	Actuator colour
PHAP3305	3,15 mm	black
PHAP3305A	3,85 mm	black
PHAP3305B	8,35 mm	black
PHAP3305C	6,85 mm	white
PHAP3305D	11,85 mm	black
PHAP3305E	6,15 mm	ivory
PHAP3305T	6,15 mm	blue 2.4 x 2.4

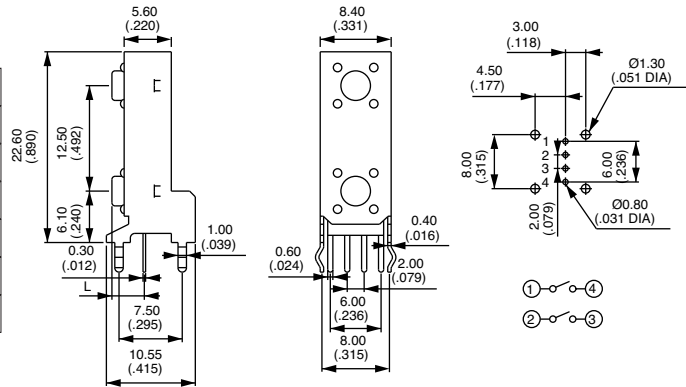


Operating force : 1,6N ± 0,5N - Travel : 0,25 mm

Right angle mounting of 2 tact switches



Model No	Dim. «L»	Actuator colour
PHAP3306	3,15 mm	black
PHAP3306A	3,85 mm	black
PHAP3306B	8,35 mm	black
PHAP3306C	6,85 mm	white
PHAP3306D	11,85 mm	black
PHAP3306E	6,15 mm	ivory

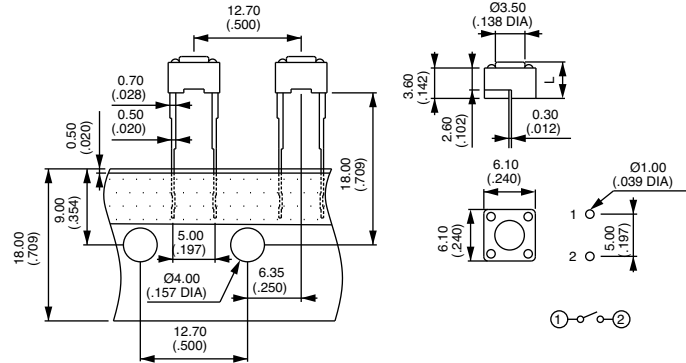


Operating force : 1,6N ± 0,5N - Travel : 0,25 mm

Long straight terminals + tape



Model No	Dim. «L»
PHAP3307	4,3 mm
PHAP3307A	5,0 mm
PHAP3307G	7,0 mm

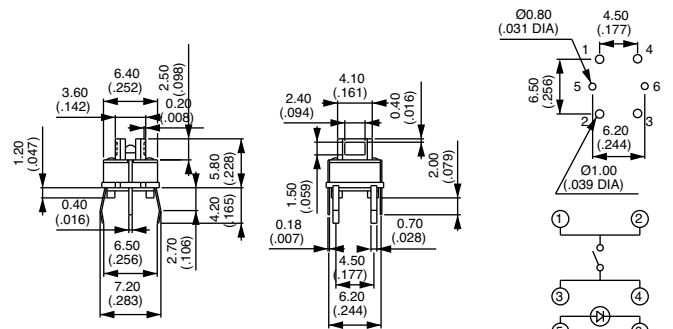


Operating force : 1,6N ± 0,5N - Travel : 0,25 mm
Quantity per tape : 1.000 pieces

Straight terminals + LED



Model No	LED colour	LED If	LED Vf
PHAP3308	-	-	-
PHAP3308R	red	15mA	2,1V
PHAP3308G	green	30mA	2,2V
PHAP3308Y	yellow	30mA	2V



Operating force : 1,6N ± 0,5N - Travel : 0,25 mm

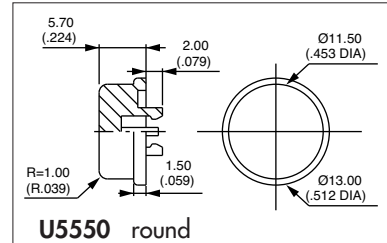
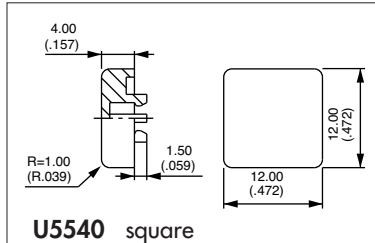
PHAP33 series

Through-hole tact switches

12 x 12 mm case

- 4,3 to 12 mm button height from PCB
- Excellent tactile feedback (snap-dome)
- Crimped terminals for direct mounting onto PCB
- Moulded-in terminals for wave soldering
- Caps for model PHAP3321 :

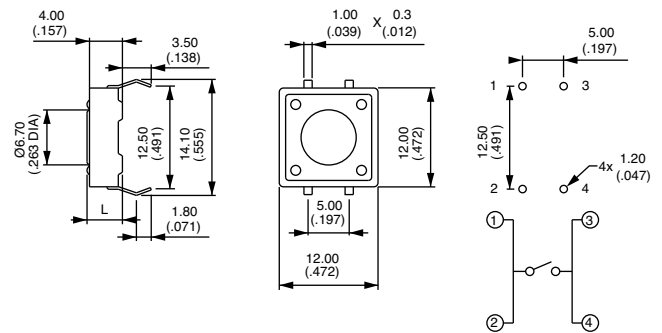
Cap colours : 1 : blue - 2 : black - 3 : green
5 : yellow - 6 : red - 7 : ivory



Straight terminals - short actuator



Model No	Dim. «L»
PHAP3320	4,3 mm
PHAP3320A	7,5 mm

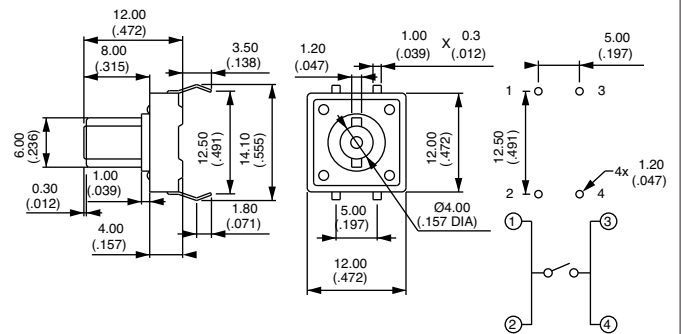


Operating force : 1,6N ± 0,5N - Travel : 0,30 mm

Straight terminals - long keyed actuator



Model No
PHAP3320B

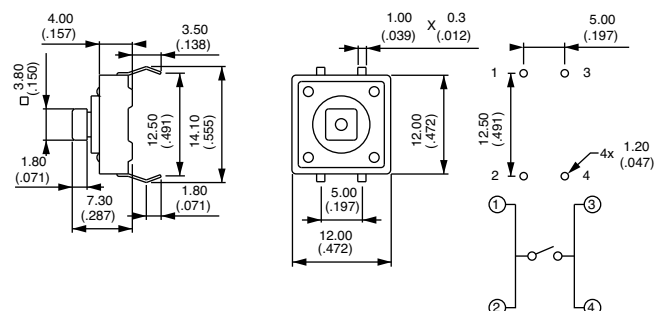


Operating force : 1,6N ± 0,5N - Travel : 0,30 mm

Straight terminals - square actuator



Model No
PHAP3321



Operating force : 1,6N ± 0,5N - Travel : 0,30 mm

Rocker and paddle switches



Section D

SMT TR series

Surface mount tiny washable rocker switches

Distinctive features and specifications



- Entirely designed for surface mount
- Tape and reel packaging
- Reflow solderable
 - High temperature plastic materials
 - Tin plated ground plate
 - Terminal coating : tin alloy over nickel plating
 - Terminals turned to the outside, preventing the shadow effect in infrared soldering and permitting visual inspection of solder joints
 - Distance between case and circuit : 0,55 mm (.021)
 - End stackable with 10,16 mm (.40) pitch
 - Available with positioning pins to ensure switch orientation during the reflow process and increasing switch mechanical resistance
- Protected against electrostatic discharges (ESD) up to 10 KV
- Washable
Construction withstands cleaning processes, including hot water under pressure

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 0,4VA 20V max. AC or DC
- Minimum load : 10mA 50mV or 10µA 5VDC
- Initial contact resistance : 20 mΩ max
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 1.000 Vrms. 50 Hz min. between terminals and frame 500 Vrms. 50 Hz min. between terminals
- Electrical life at full load :
 - 2 position switches : 60.000 cycles
 - 3 position switches : 30.000 cycles
- Static resistance : 10 KV (Schaffner equipment)

GENERAL SPECIFICATIONS

- Operating temperature : -40°C to +85°C
- Moisture resistance : 21 days per IEC 512-6 test 11 c
- Vibration resistance : 10-500 Hz / 10 g per IEC 512-4 test 6d
- Shock resistance : 50 g per IEC 512-4 test 6c

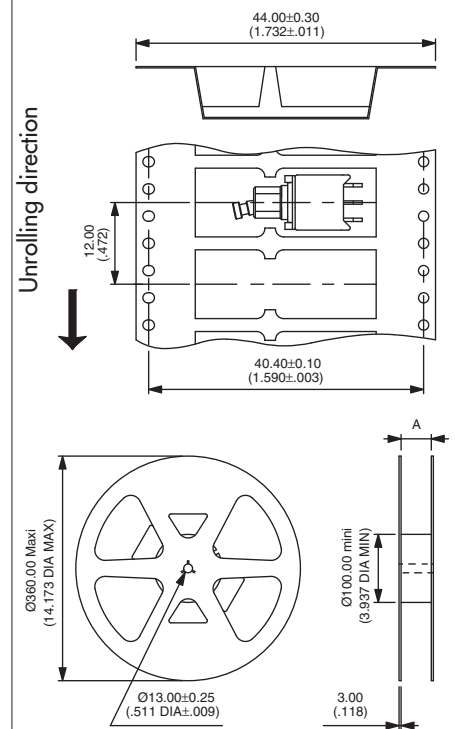
MATERIALS

- Case : high temperature plastic material UL94-V0
- Actuator : high temperature plastic rocker
- Ground plate and positioning pins : steel, tin plated
- Contacts : brass, gold plated
- Terminals : brass, with pure tin plating over nickel barrier

SOLDERING AND CLEANING

- Reflow soldering : infrared, vapor phase or infrared convection
- Washable per IEA-RS448-2 :
 - water + detergent - preferred
 - solvents
- Further information on reflow soldering : see end of catalogue.

PACKAGING



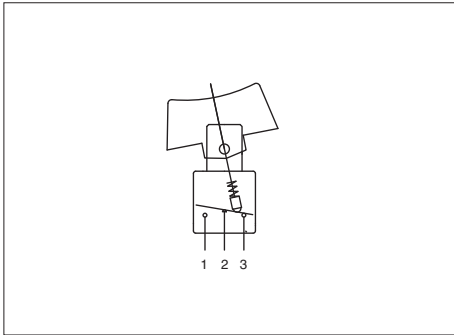
Tape width	24.00 (.944)	44.00 (1.732)
Reel (dimension A)	24.40+2.00/0.00 (.960+.078/.000)	44.40+2.00/0.00 (1.748+.078/.000)

Standard packaging unit : 700 pieces
Tape meeting international standard IEC - Publication 286-3 (EIA481A)
Start leader : 400 mm min.

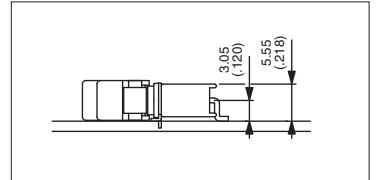
Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.

SMT TR series

Surface mount tiny washable rocker switches



- With or without positioning pins
- Single pole

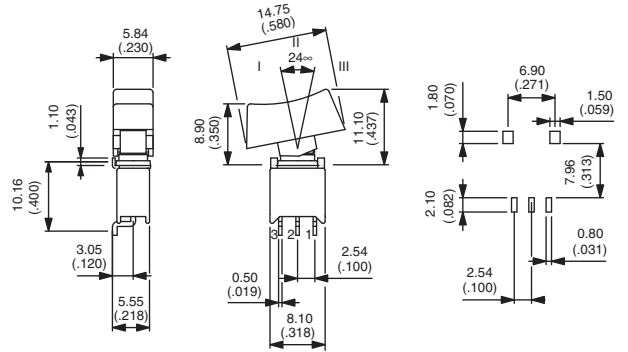


Without positioning pins



TR36WS80000
TR39WS80000
TR37WS80000
TR38WS80000
TR32WS80000

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



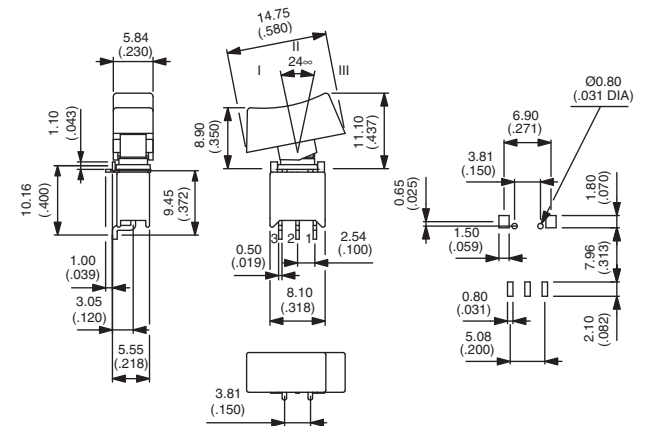
Supplied without rocker.

With positioning pins



TR36WS80065
TR39WS80065
TR37WS80065
TR38WS80065
TR32WS80065

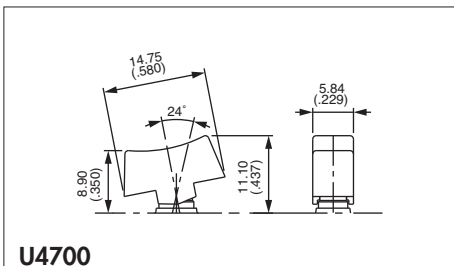
III	II	I
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM



Supplied without rocker.

ROCKERS

Order separately.



Rocker colours

Replace last "0" by number

1	blue	5	yellow
1/4	dark blue	6	red
2	black	7	ivory
3	green	7/1	white
4	grey	9	orange

TR series

Tiny washable rocker switches

Distinctive features and specifications



Sealed

- Single piece case
- O-ring seal between actuator and bushing
- Epoxy sealed terminals

Wide variety of contact materials

Same PCB layout as tiny toggle (TL), pushbutton (TP) and slide switches (TG)

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - gold plated contacts : 0,4VA 20V max. AC or DC
 - silver plated contacts : 0,5A 48V max. AC or DC
- Minimum load : 10mA 50mV - 10 μ A 5VDC
- Contact resistance : 20 m Ω max.
- Insulation resistance : 1.000 M Ω min. at 500VDC
- Dielectric strength :
 - 1.000 Vrms 50 Hz min. between terminals and frame
 - 500 Vrms 50 Hz min. between terminals
- Electrical life at full load :

Contacts	Number of cycles	
	2 positions	3 positions
Gold plated	60.000	30.000
Silver plated	20.000	10.000

MATERIALS

- Case : PBT
- Actuator : polyamide
- Contacts and terminals :
 - 0** : brass, gold plated
 - 1** : brass, silver plated
 - 3** : brass, gold plated (1,27 micron gold)
 - 8** : contact brass, gold plated + tin plated terminals
 - 9** : contact brass, gold plated (1,27 micron gold) + tin plated terminals
- Terminal seal : epoxy

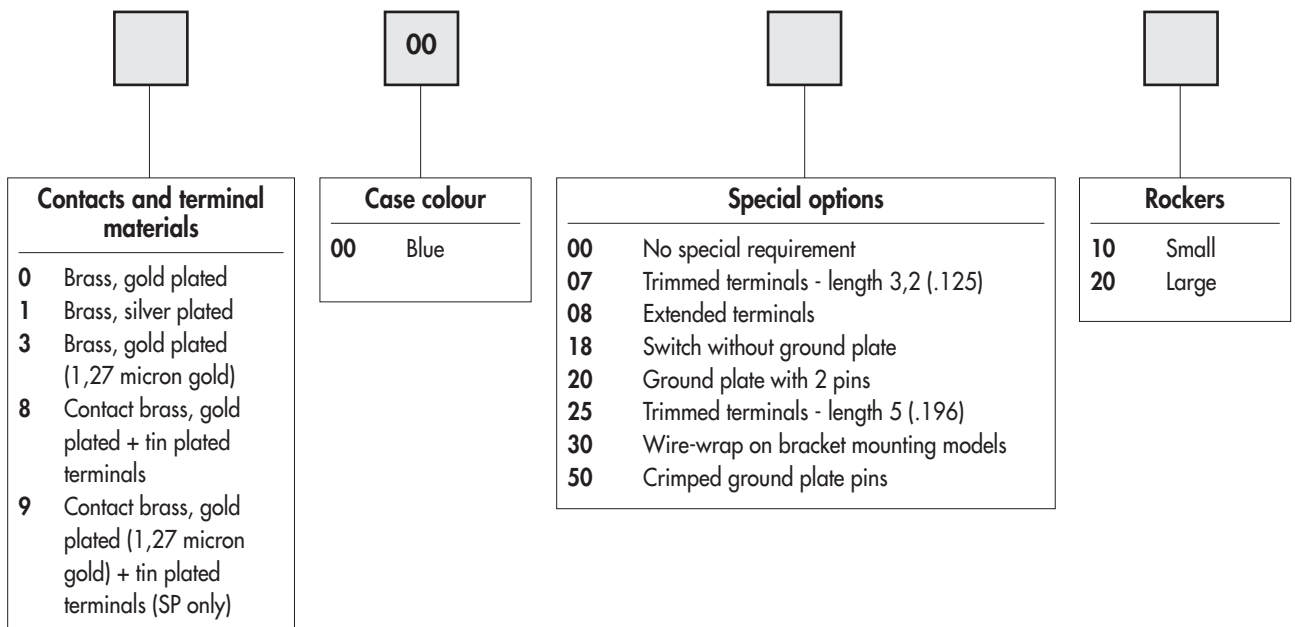
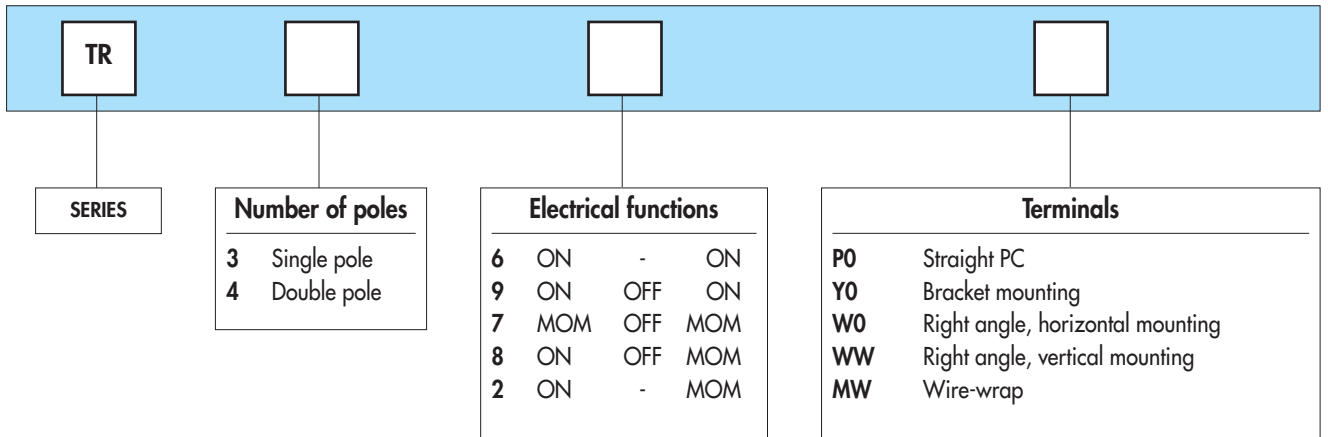
GENERAL SPECIFICATIONS

- Strength of terminals : pull-out force - 10N max.
- Operating temperature : -30°C to +85°C
- Moisture : 21 days 95 % (NFC 20-603 - IEC 68-2-3)
- Cleaning : solvents or water + detergent
- Wave soldering : 260°C - 5 sec.

TR series

Tiny washable rocker switches

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 bracketed numbers.



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

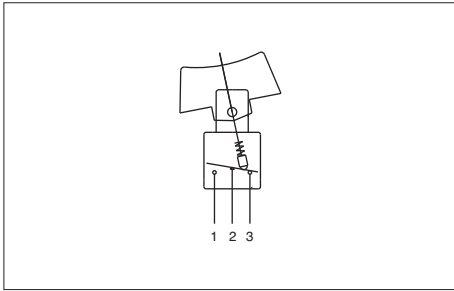


Packaging unit : 50 pieces.

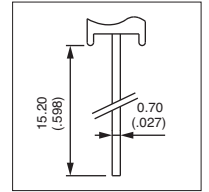
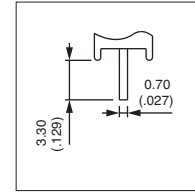
TR series

Tiny washable rocker switches

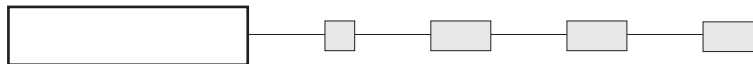
MODEL
STRUCTURE



- Straight PC, right angle or wire-wrap terminals
- 1 and 2 pole configurations



MODEL
STRUCTURE



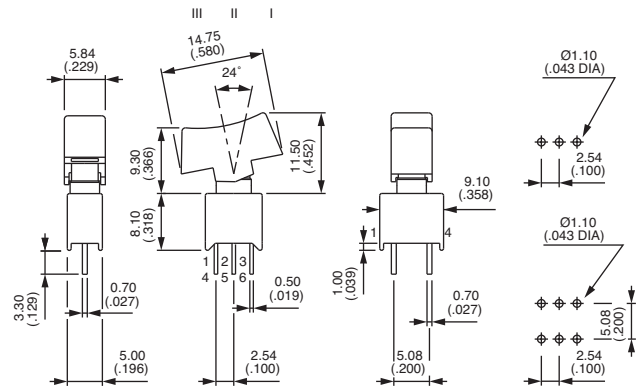
Shown with small rocker (code 10)

Straight PC terminals : TR..PO



Single pole	Double pole
TR36PO	TR46PO
TR39PO	TR49PO
TR37PO	TR47PO
TR38PO	TR48PO
TR32PO	TR42PO

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

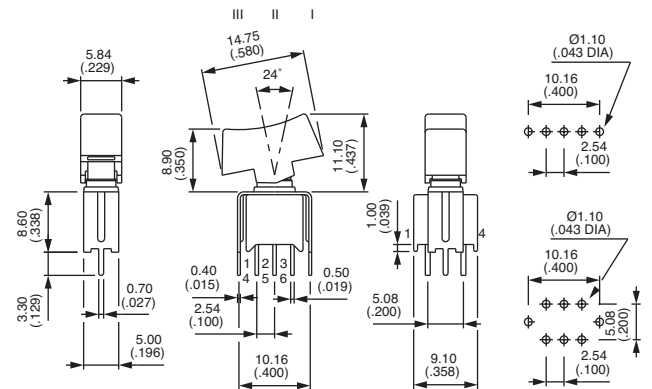


Straight terminals - bracket mounting : TR..YO



Single pole	Double pole
TR36YO	TR46YO
TR39YO	TR49YO
TR37YO	TR47YO
TR38YO	TR48YO
TR32YO	TR42YO

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

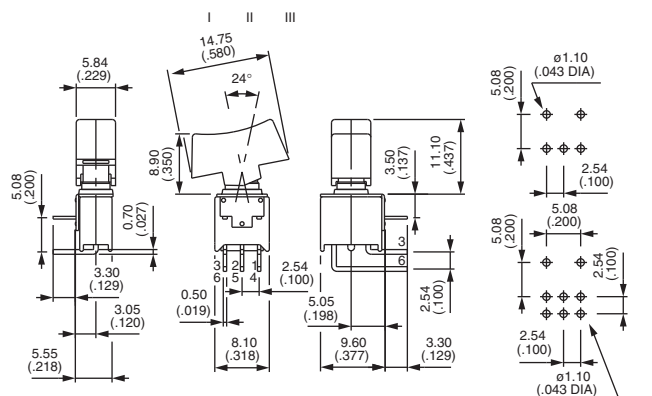


Right angle terminals - horizontal mounting : TR..WO



Single pole	Double pole
TR36WO	TR46WO
TR39WO	TR49WO
TR37WO	TR47WO
TR38WO	TR48WO
TR32WO	TR42WO

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





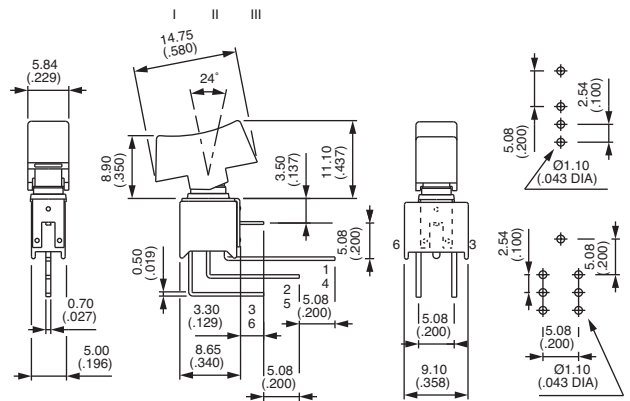
TR series

Tiny washable rocker switches

Right angle terminals - vertical mounting : TR..WW



	Single pole	Double pole	III	II	I
TR36WW	ON	-	ON		
TR39WW	ON	OFF	ON		
TR37WW	MOM	OFF	MOM		
TR38WW*	ON	OFF	MOM		
TR32WW*	ON	-	MOM		
TR46WW				ON	
TR49WW				ON	OFF
TR47WW				MOM	OFF
TR48WW*				ON	OFF
TR42WW*				ON	-

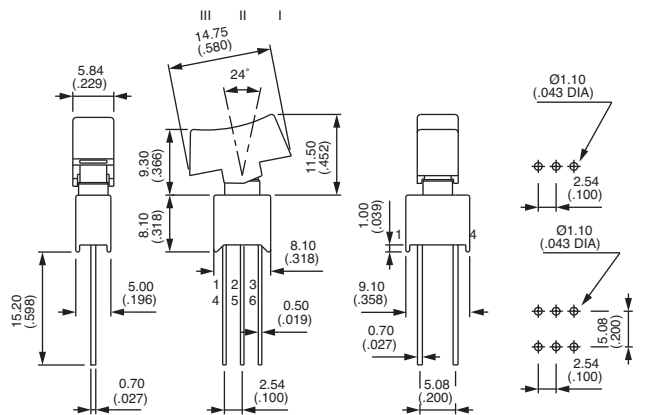


* Functions 2 and 8 : reversed connection available . Consult factory.

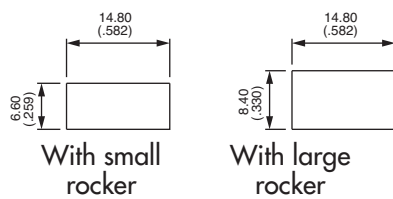
Wire-wrap terminals : TR..MW



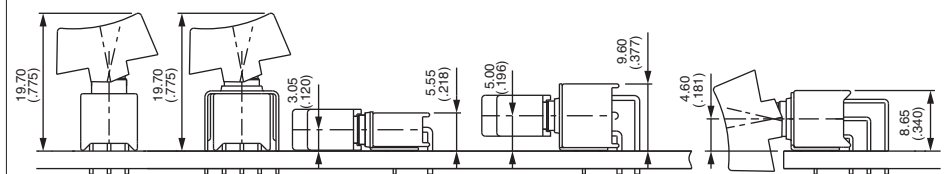
	Single pole	Double pole	III	II	I
TR36MW	ON	-	ON		
TR39MW	ON	OFF	ON		
TR37MW	MOM	OFF	MOM		
TR38MW	ON	OFF	MOM		
TR32MW	ON	-	MOM		
TR46MW				ON	
TR49MW				ON	OFF
TR47MW				MOM	OFF
TR48MW				ON	OFF
TR42MW				ON	-



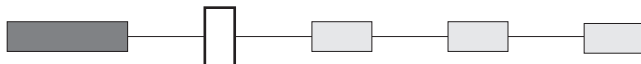
PANEL CUT-OUT



PCB MOUNTING

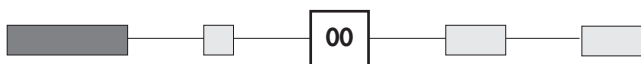


CONTACT AND TERMINAL MATERIALS



- 0 Brass, gold plated
- 1 Brass, silver plated
- 3 Brass, gold plated (1,27 micron gold)
- 8 Contact brass, gold plated + tin plated terminals
- 9 Contact brass, gold plated (1,27 micron gold) + tin plated terminals (single pole only)

CASE COLOUR



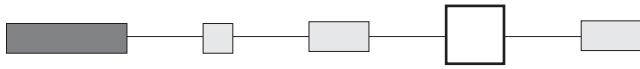
00 Blue

TR series

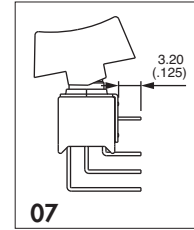
Tiny washable rocker switches



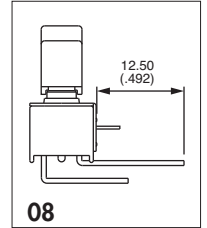
SPECIAL OPTIONS



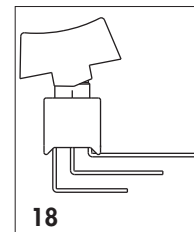
- 00 No special requirement
- 07 **Trimmed terminals** - length 3,2 mm (.125) for TR..WW models only
- 08 **Extended terminals** for TR..WO models only
- 18 Switch **without ground plate** for TR..WW models only
- 20 **Ground plate with 2 pins** for TR..WW models only
- 25 **Trimmed terminals** - length 5 mm (.196) for all models, except TR..WW
- 30 **Wire-wrap terminals** on models with mounting **bracket**
- 50 **Crimping of ground plate pins.**
Retains switch on PCB during handling and wave soldering.
For models TR..WO, TR..WW and TR..YO single and double pole.



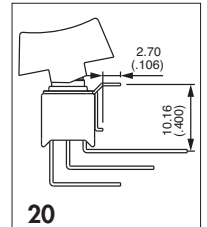
07



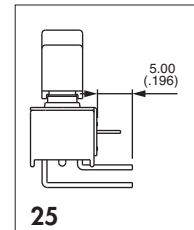
08



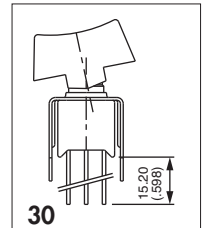
18



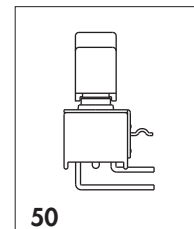
20



25



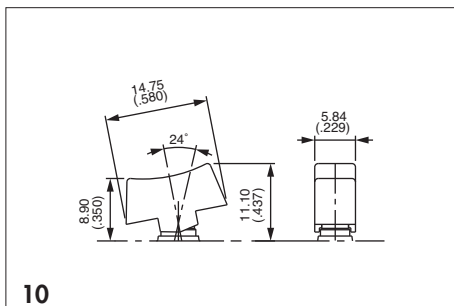
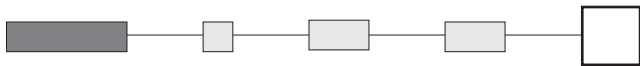
30



50

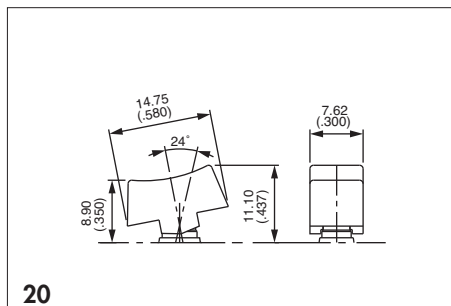
Marking on rocker : consult factory.

ROCKERS



10

Small



20

Large

Rocker colours	
Replace "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
6	red
7	ivory
7/1	white
9	orange

S and SR series

Washable rocker and paddle switches

Distinctive features and specifications



☐ Sealed

- Secure assembly of the two case parts
- Internally sealed bushing
- Epoxy sealed terminals

☐ Process compatible (S series)

- Wave solderable
- Washable

☐ Optional ESD protection

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts (A or 1) : 4A 30VDC
 - brass, gold plated contacts (CD or 0) : 0,4VA 20VAC or DC
 - silver, gold plated contacts (AD or 2) : 4A 30VDC (300mA 30VDC for gold plating)
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min.
- Dielectric strength : 1.000 Vrms 50 Hz min.
- Electrical life with nominal load :

Contacts	Number of cycles	
	2 positions	3 positions
A or 1	40.000	40.000
CD or 0	100.000	50.000
AD or 2	40.000	40.000

MATERIALS

- Case and cover : UL94-V0, polyamide, glass filled or PES
- Actuator : polyamide
- Contacts
 - CD or 0 : brass, gold plated
 - A or 1 : silver
 - AD or 2 : silver, gold plated
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

- Mechanical strength :
Terminals are strengthened by a bracket or a ground plate ensuring the rigidity of the switch on the board. Actuator strength is 10N max.
- Operating temperature : -20°C to +85°C
- Storage temperature : -40°C to +85°C
- Moisture :
The insulating materials employed and the complete seal permit the switches to withstand a 56 days moisture test (IEC 68-2-3).
- Soldering - thermal shock (S series only) :
The switches are especially designed for flow soldering at 260°C during 5 seconds owing to high temperature polymer parts.
- Iron soldering (SR series) : 300°C 5 sec. max.
- Solderability : The switches are tested at 235°C according to IEC 68-2-20 after accelerated aging.

AGENCY APPROVALS

 2A 250VAC
4A 125VAC

Availability : consult factory for details of approved models.

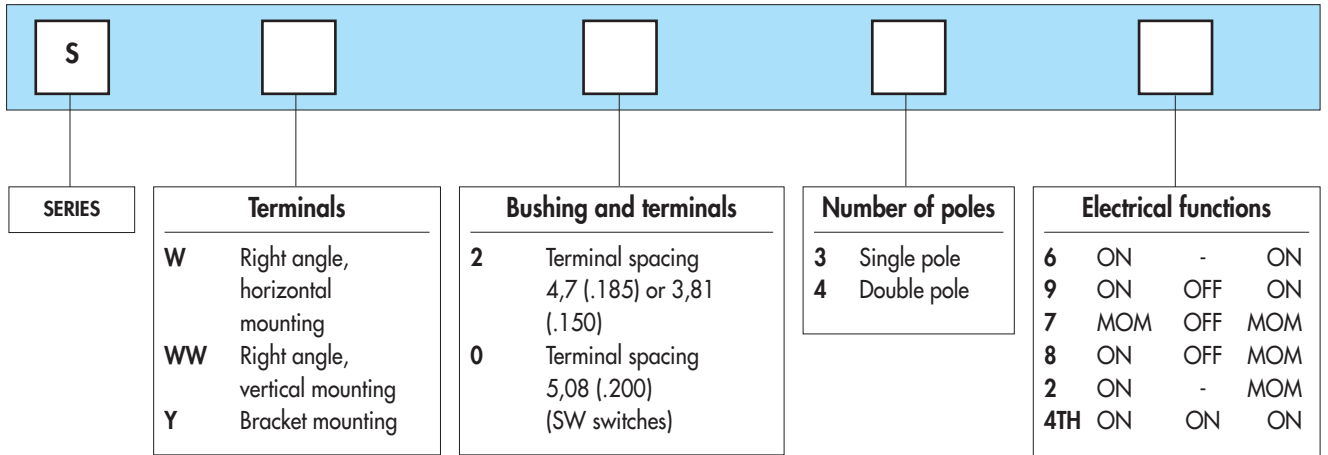
Marking : to order switches marked UL, complete appropriate box of ordering format.

S series

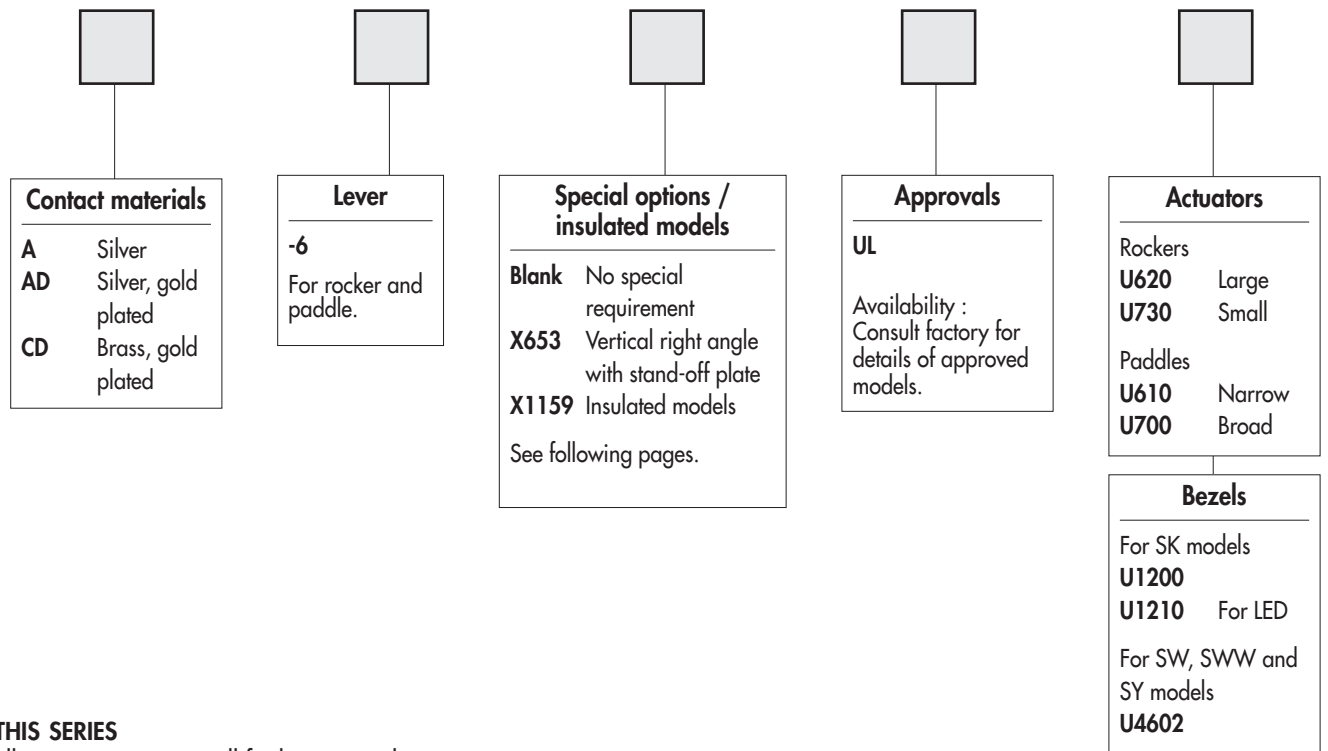
Washable rocker and paddle switches

Overview

MODEL
STRUCTURE



OPTIONS



ABOUT THIS SERIES

On the following pages, you will find successively :

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

Specifications are on previous page.

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



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

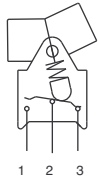


Packaging unit : 25 pieces to 50 pieces depending on models.

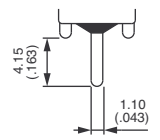
S series

Washable rocker and paddle switches

MODEL
STRUCTURE



- Straight PC or right angle terminals
- Models with snap-in mounting (SK)
- Terminal spacing 4,7 (.185) or 5,08 (.200) on SW switches
- 1 and 2 pole configurations



MODEL
STRUCTURE



Shown with rocker U620

Right angle terminals - horizontal - spacing 4,7 (.185)

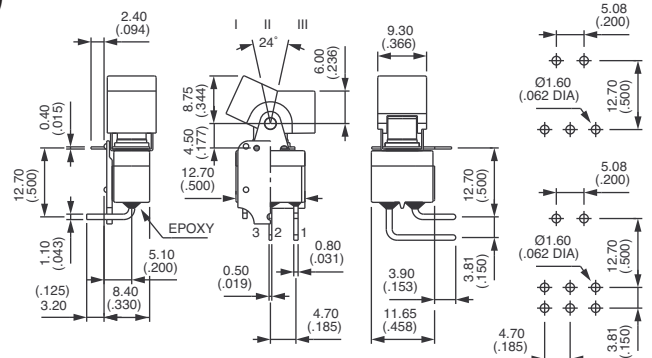


Single pole

Double pole

	III	II	I
SW236-6	ON	-	ON
SW239-6	ON	OFF	ON
SW237-6	MOM	OFF	MOM
SW238-6	ON	OFF	MOM
SW232-6	ON	-	MOM
	ON	ON	ON

Single pole with stand-off plate, double pole without.



Right angle terminals - vertical

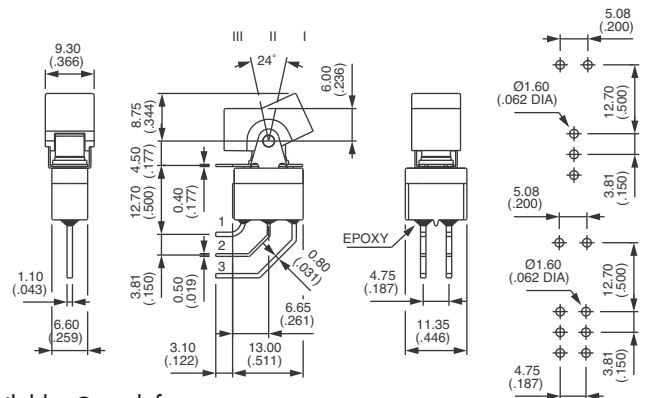


Single pole

Double pole

	III	II	I
SWW236-6	ON	-	ON
SWW239-6	ON	OFF	ON
SWW237-6	MOM	OFF	MOM
SWW238-6	ON	OFF	MOM
SWW232-6	ON	-	MOM
	ON	ON	ON

** Functions 2 and 8 : reversed connection available. Consult factory.



Bracket mounting

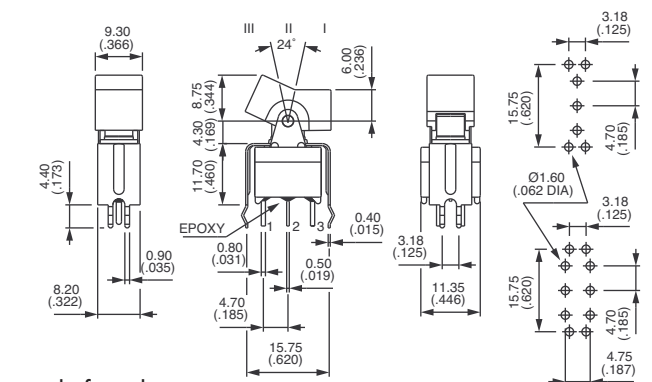


Single pole

Double pole

	III	II	I
SY236-6	ON	-	ON
SY239-6	ON	OFF	ON
SY237-6	MOM	OFF	MOM
SY238-6	ON	OFF	MOM
SY232-6	ON	-	MOM
	ON	ON	ON

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



S series

Washable rocker and paddle switches

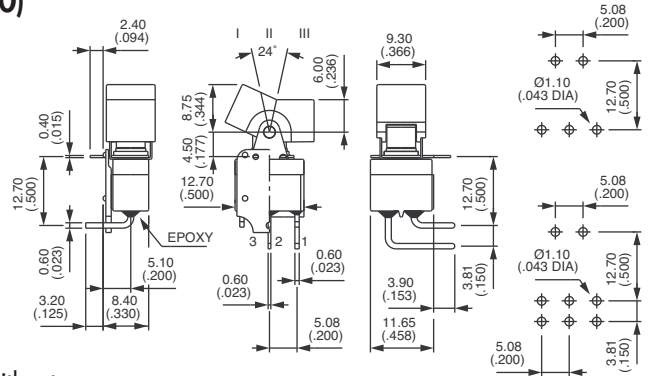
MODEL
STRUCTURE

Right angle terminals - horizontal - spacing 5,08 (.200)



Single pole Double pole

	III	II	I
SW036-6	ON	-	ON
SW039-6	ON	OFF	ON
SW037-6	MOM	OFF	MOM
SW038-6	ON	OFF	MOM
SW032-6	ON	-	MOM
SW044TH-6*	ON	ON	ON



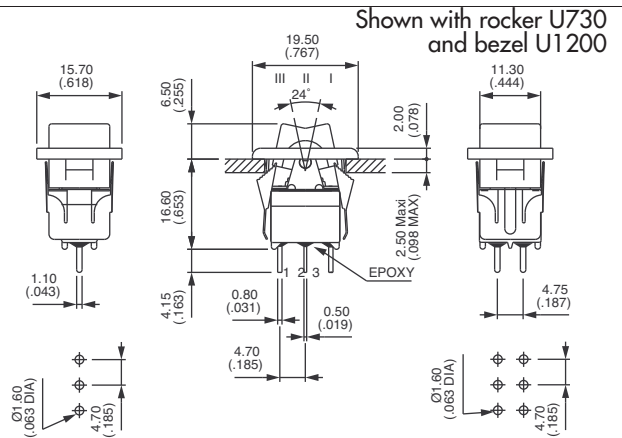
Single pole with stand-off plate, double pole without.

Straight PC terminals - snap-in mounting



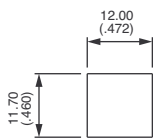
Single pole Double pole

	III	II	I
SK236-6	ON	-	ON
SK239-6	ON	OFF	ON
SK237-6	MOM	OFF	MOM
SK238-6	ON	OFF	MOM
SK232-6	ON	-	MOM
SK244TH-6*	ON	ON	ON



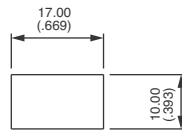
* Function 4 : SP in DP case - TH connection, see end of catalogue.

PANEL CUT-OUT



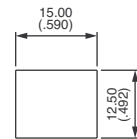
With rocker **U730**
or paddle **U700**

17.00



With rocker **U620**
or paddle **U610**

For SK only

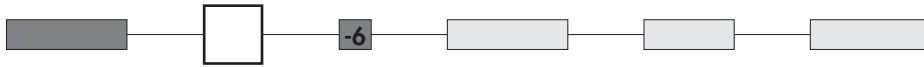




S series

Washable rocker and paddle switches

CONTACT MATERIALS



- A Silver
- AD Silver, gold plated
- CD Brass, gold plated

SPECIAL OPTIONS / INSULATED MODELS



X653 Vertical right angle with stand-off plate

Shown with rocker U620

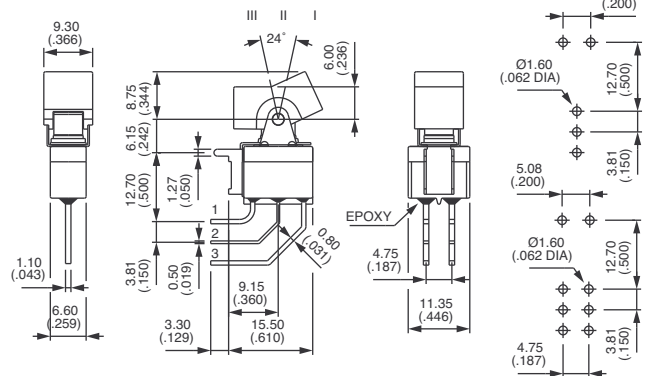


Single pole

	III	II	I
SWW236-6 X653	ON	-	ON
SWW239-6 X653	ON	OFF	ON
SWW237-6 X653	MOM	OFF	MOM
SWW238-6 X653	ON	OFF	MOM
SWW232-6 X653	ON	-	MOM

Double pole

SWW246-6 X653	ON	-	ON
SWW249-6 X653	ON	OFF	ON
SWW247-6 X653	MOM	OFF	MOM
SWW248-6 X653**	ON	OFF	MOM
SWW242-6 X653**	ON	-	MOM
SWW244TH-6 X653*	ON	ON	ON



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

** Functions 2 and 8 : reversed connection available. Consult factory.

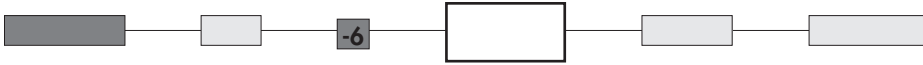
- X601** Silver plated brass contacts
Current/voltage rating for an electrical life of 20.000 cycles : 0,5A 30VDC
Minimum quantity : 5.000 per type and shipment.

S series


Washable rocker and paddle switches



SPECIAL OPTIONS / INSULATED MODELS (continued)

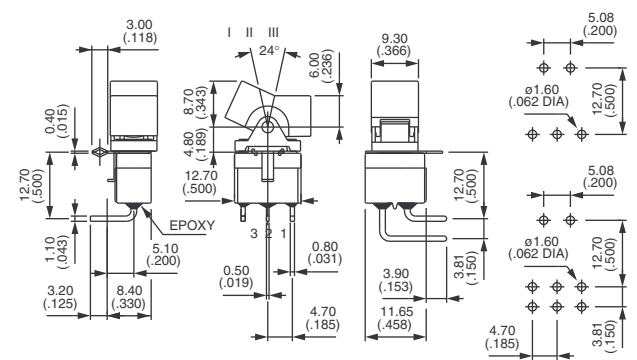


X1159 Insulated model protected against E.S.D. up to 12 KV - Horizontal right angle




	III	II	I
Single pole			
SW236-6 X1159	ON	-	ON
SW239-6 X1159	ON	OFF	ON
SW237-6 X1159	MOM	OFF	MOM
SW238-6 X1159	ON	OFF	MOM
SW232-6 X1159	ON	-	MOM
Double pole			
SW246-6 X1159	ON	-	ON
SW249-6 X1159	ON	OFF	ON
SW247-6 X1159	MOM	OFF	MOM
SW248-6 X1159	ON	OFF	MOM
SW242-6 X1159	ON	-	MOM
SW244TH-6 X1159*	ON	ON	ON

Shown with rocker U620

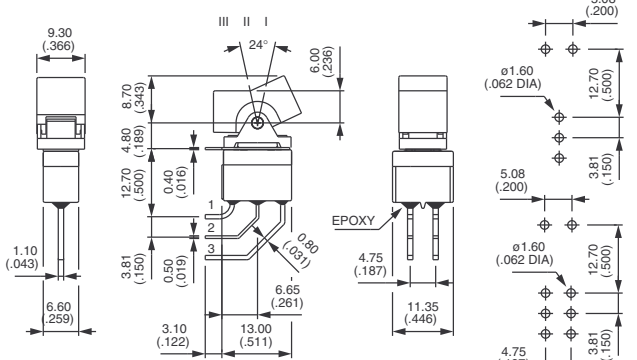


X1159 Insulated model protected against E.S.D. up to 12 KV - Vertical right angle




	III	II	I
Single pole			
SWW236-6 X1159	ON	-	ON
SWW239-6 X1159	ON	OFF	ON
SWW237-6 X1159	MOM	OFF	MOM
SWW238-6 X1159	ON	OFF	MOM
SWW232-6 X1159	ON	-	MOM
Double pole			
SWW246-6 X1159	ON	-	ON
SWW249-6 X1159	ON	OFF	ON
SWW247-6 X1159	MOM	OFF	MOM
SWW248-6 X1159**	ON	OFF	MOM
SWW242-6 X1159**	ON	-	MOM
SWW244TH-6 X1159*	ON	ON	ON

Shown with rocker U620

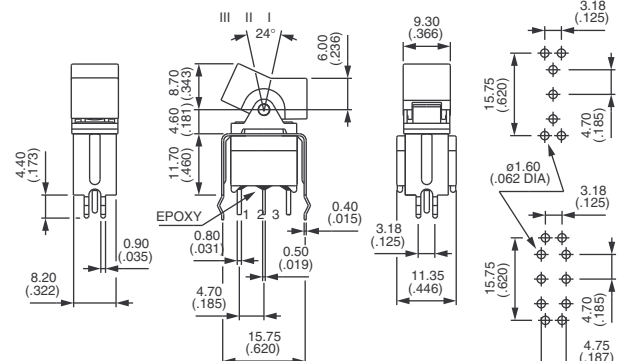


X1159 Insulated model protected against E.S.D. up to 12 KV - Straight PC terminals - bracket mounting



	III	II	I
Single pole			
SY236-6 X1159	ON	-	ON
SY239-6 X1159	ON	OFF	ON
SY237-6 X1159	MOM	OFF	MOM
SY238-6 X1159	ON	OFF	MOM
SY232-6 X1159	ON	-	MOM
Double pole			
SY246-6 X1159	ON	-	ON
SY249-6 X1159	ON	OFF	ON
SY247-6 X1159	MOM	OFF	MOM
SY248-6 X1159**	ON	OFF	MOM
SY242-6 X1159**	ON	-	MOM
SY244TH-6 X1159*	ON	ON	ON

Shown with rocker U620



* Function 4 : SP in DP case - TH connection, see end of catalogue. ** Functions 2 and 8 : reversed connection available. Consult factory.

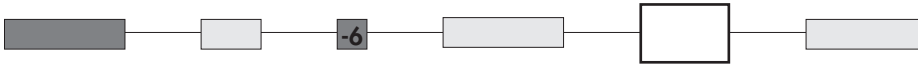
Above models available with all actuators shown on next page.



S series

Washable rocker and paddle switches

AGENCY APPROVAL

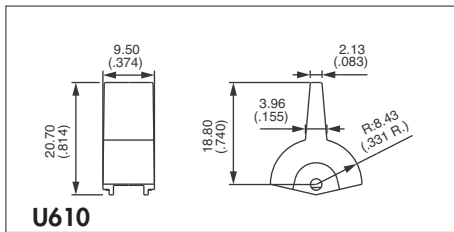
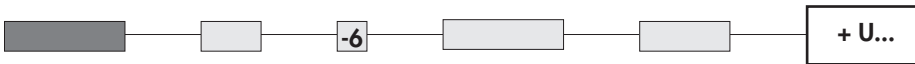


UL

Availability : consult factory for details of approved models.

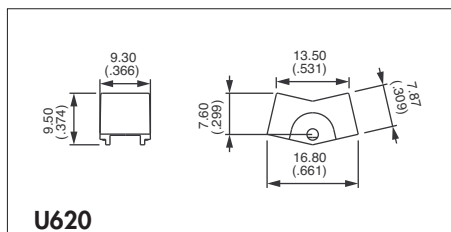
Marking : to order switches marked with the UL symbol, complete above box with "UL".
Blank : no agency approval required.

ACTUATORS



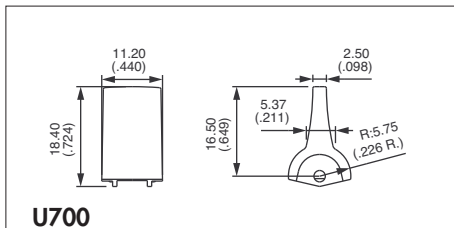
U610

Narrow paddle



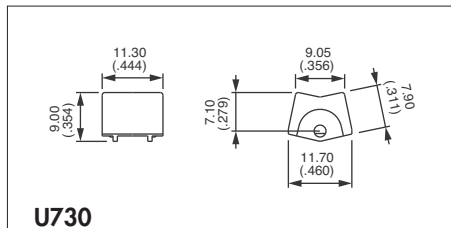
U620

Large rocker



U700

Broad paddle



U730

Small rocker

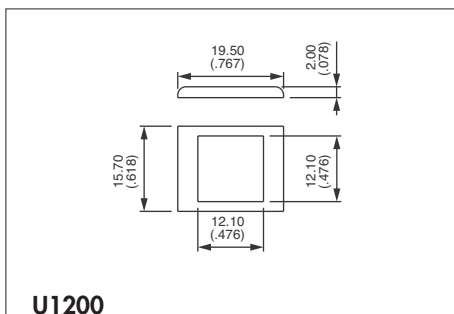
Actuator colours	
Replace last "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
6	red
7	ivory
7/1	white
9	orange



U610 and U620 not available on SK models

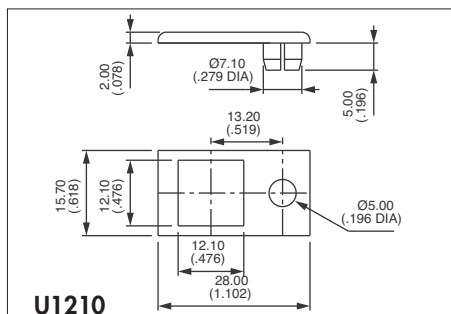
Bezels for SK model (snap-in)

Add bezel part number to actuator part number.



U1200

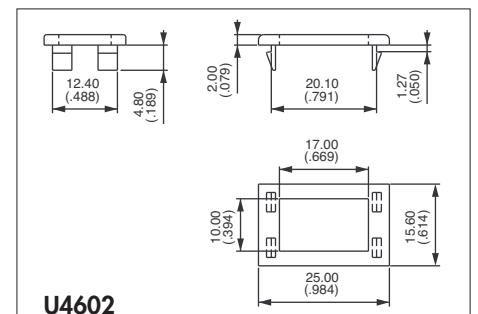
Bezel



U1210

Bezel for LED Ø 5 (.196) - not supplied

Bezel for SW - SWW and SY models



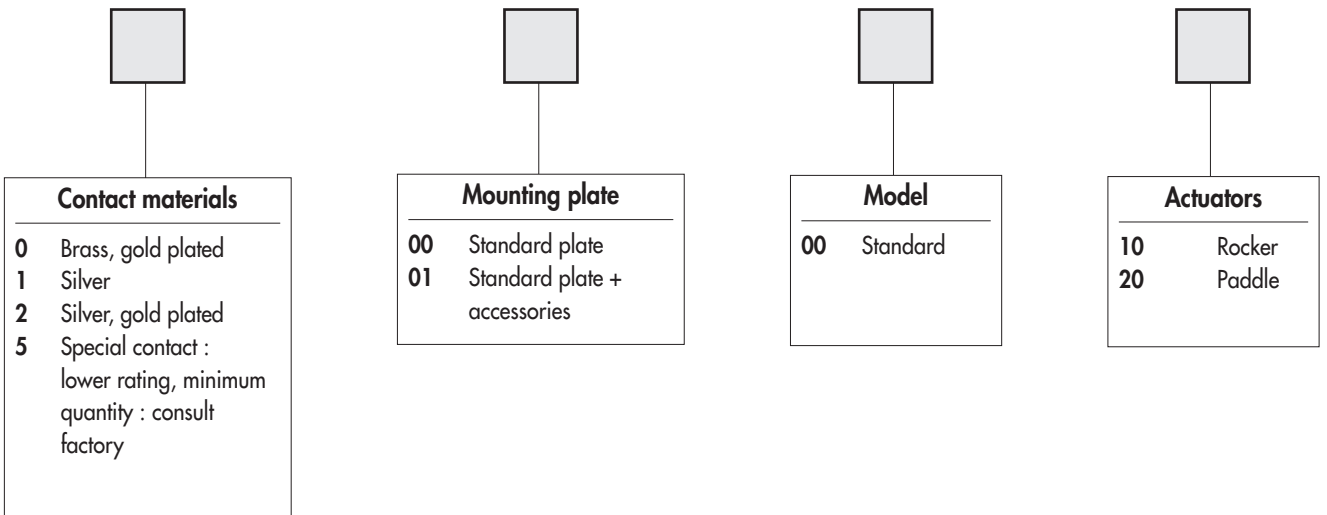
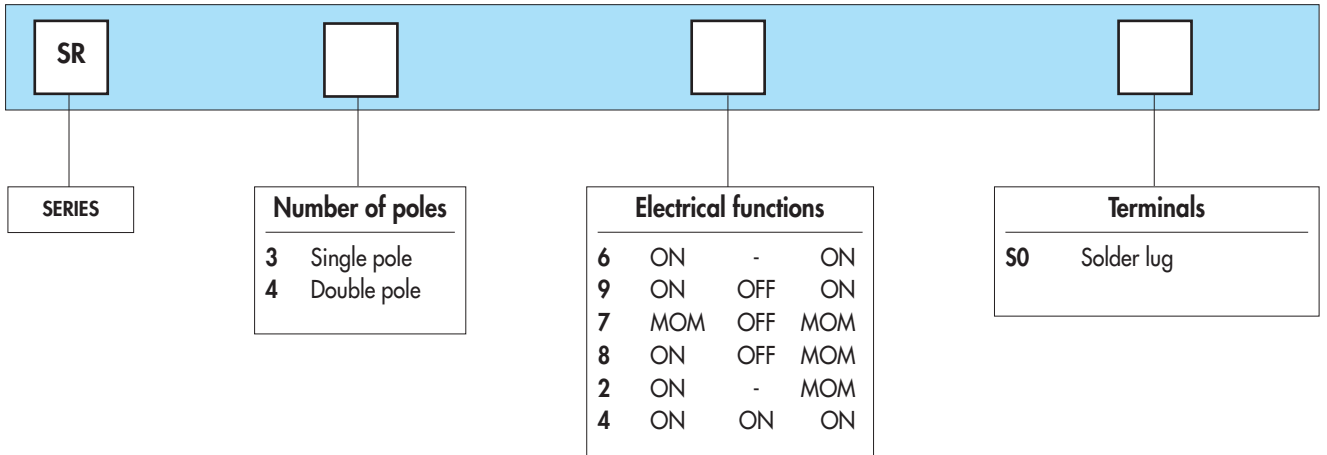
U4602

Black bezel - for rocker U620 only

SR series

Washable rocker and paddle switches

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :

- model structure of switches

- options in the same order as above

Specifications are at the beginning of this section (S and SR series).

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



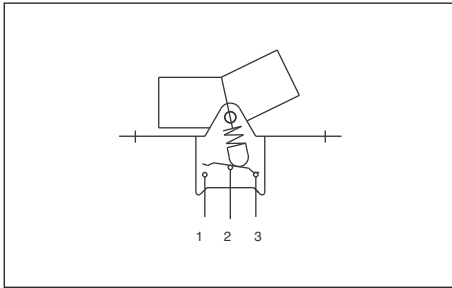
Packaging unit : 20 pieces.



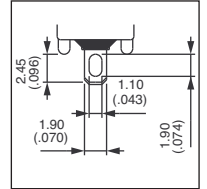
SR series

Washable rocker and paddle switches

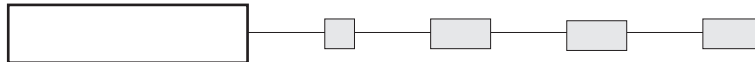
Solder lug terminals



- 1 and 2 pole configurations
- Iron soldering 300°C max. 5 seconds max.



MODEL
STRUCTURE



Shown with standard mounting plate (code 00)

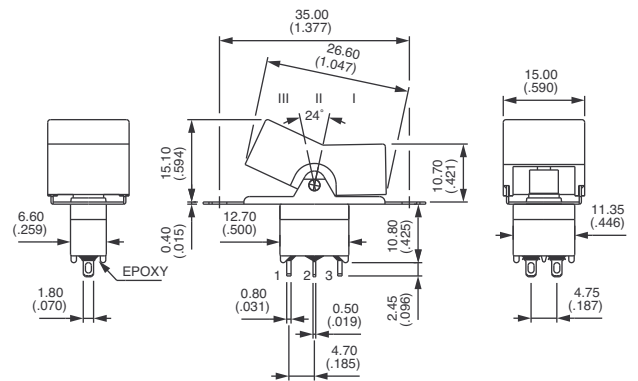
Solder lug terminals



Single pole Double pole

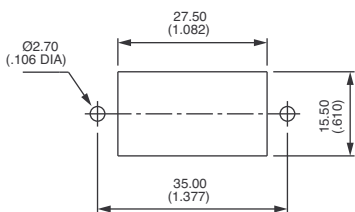
SR36S0	SR46S0
SR39S0	SR49S0
SR37S0	SR47S0
SR38S0	SR48S0
SR32S0	SR42S0
	SR44S0*

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



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

PANEL CUT-OUT

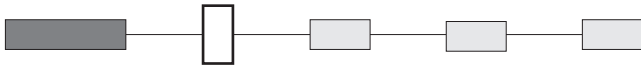


SR series

Washable rocker and paddle switches

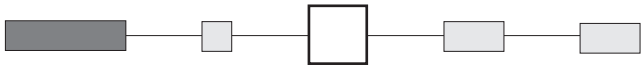


CONTACT MATERIALS

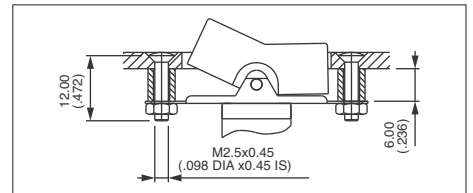


- 0 Brass, gold plated
- 1 Silver
- 2 Silver, gold plated
- 5 Special contact, lower rating, minimum quantity : consult factory.

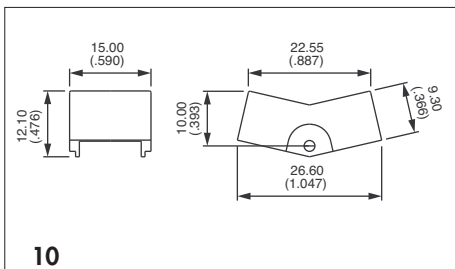
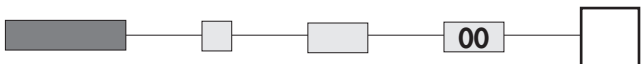
MOUNTING PLATE



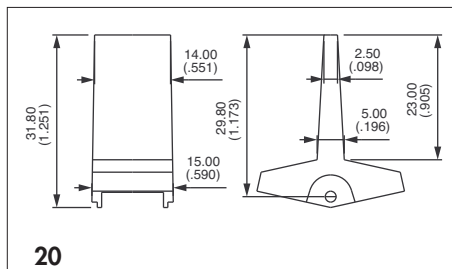
- 00 Standard mounting plate
- 01 Standard mounting plate + mounting accessories (spacers, screws and nuts)



ACTUATORS



10
Rocker



20
Paddle

Actuator colours	
Replace "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
6	red
7	ivory
7/1	white
9	orange

AS series

Snap-in rocker switches

Distinctive features and specifications



- Double insulation
- Epoxy sealed terminals
- UL and CSA approved

ELECTRICAL AND GENERAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts (code 1) and gold plated silver contacts (code 2) : 4A 30VDC
 - gold plated brass contacts (code 0) : 0,4VA 20V AC or DC
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 10.000 MΩ min.
- Dielectric strength :
 - 1.000 Vrms 50 Hz min. between terminals
 - 4.000 Vrms 50 Hz min. between terminals and metal panel
- Electrical life : 50.000 cycles
- Panel thickness : 1 (.039) to 3 mm (.118) max.
- Operating temperature : -40°C to +85°C

MATERIALS

- Case : PES
- Actuator : polyamide
- Contacts
 - 0 : brass, gold plated
 - 1 : silver
 - 2 : silver, gold plated
 - 5 : special contact, lower rating
- Minimum quantity : consult factory.
- Terminal seal : epoxy

APPROVALS



2A 250VAC
4A 125VAC

Availability : consult factory for details or approved models.

Marking : to order switches marked with above approvals, complete last box of ordering format.

ABOUT THIS SERIES

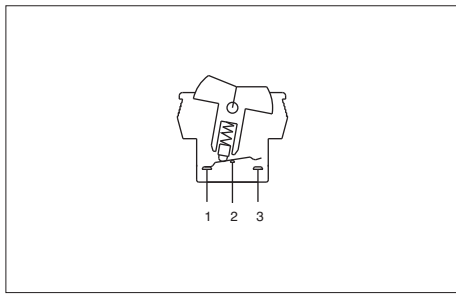
Dimensions : first dimensions are in mm while inches are shown as bracketed numbers.



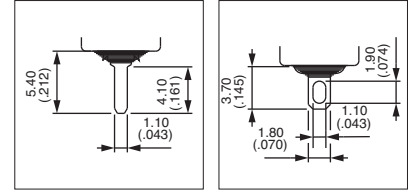
Packaging unit : 50 pieces.

AS series

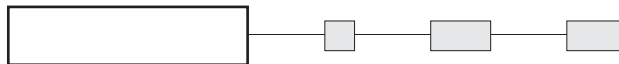
Snap-in rocker switches



- Black body
- Single pole configuration



MODEL
STRUCTURE

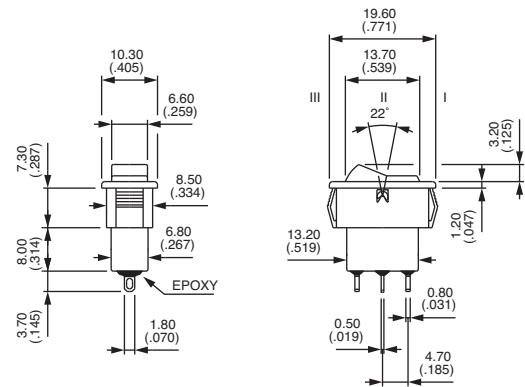


Solder lug terminals



AS36S0
AS39S0
AS37S0
AS38S0
AS32S0

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

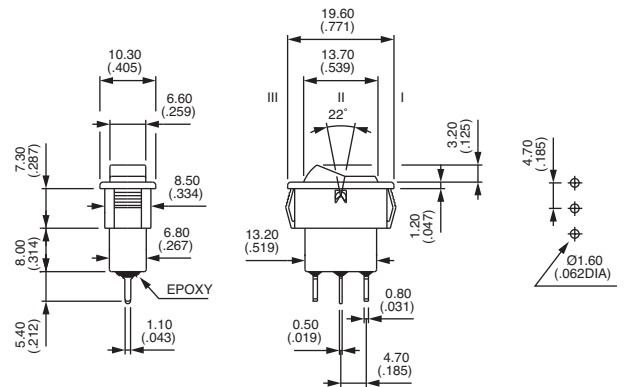


Straight PC terminals

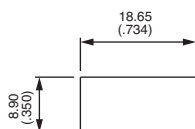


AS36P0
AS39P0
AS37P0
AS38P0
AS32P0

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



PANEL CUT-OUT

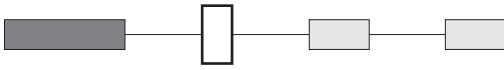




AS series

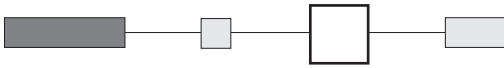
Snap-in rocker switches

CONTACT MATERIALS



- 0 Brass, gold plated
- 1 Silver
- 2 Silver, gold plated
- 5 Special contact, lower rating
Minimum quantity. Consult factory

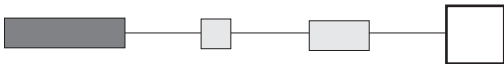
ACTUATORS



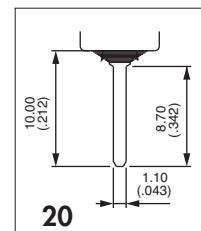
- 00 Black
- 01 Red
- 02 Grey
- 03 Blue
- 04 Ivory
- 07 White
- 09 Dark blue

For marking on actuator, consult factory.

OTHER OPTIONS



- 10 With **UL-CSA** marking
- 20 10 mm (.393) long straight PC terminals



MT series

Sealed selector switches

Distinctive features - Specifications

New!



- Environmentally sealed selector switch
- Multiple single functions available
- Various contact materials that allow usage from dry circuit applications up to 4A

ELECTRICAL AND GENERAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - Silver contacts (A) : 4A 30VDC
 - Gold plated silver contacts (AD) : 4A 30VDC (gold plating withstands up to 100mA 30VDC)
 - Gold plated brass contacts (CD) : 0,4VA 20VAC or DC
- Minimal load :
 - A contacts : 50mA 10VDC
 - AD and CD contacts : 10mA 50mV - 10 μ A 5V
- Initial contact resistance : 10m Ω max.
- Insulation resistance : 1.000 M Ω min. at 500VDC
- Dielectric strength : 1.000 Vrms 50Hz min. between terminals
1.500 Vrms 50Hz min. between terminals and frame
- Contact bounce : 2ms max.
- Electrical life at full load : 50.000 cycles
- Low level or mechanical life : 1.000.000 cycles
- Panel thickness : 11,5 mm (.452) max.
- Operating temperature : -40°C to +85°C

MATERIALS

- Actuator : 6/6 nylon
- Bushing : brass, nickel plated
- Contacts :
 - A : silver
 - AD : silver, gold plated
 - CD : brass, gold plated
- Terminal seal : epoxy

Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.

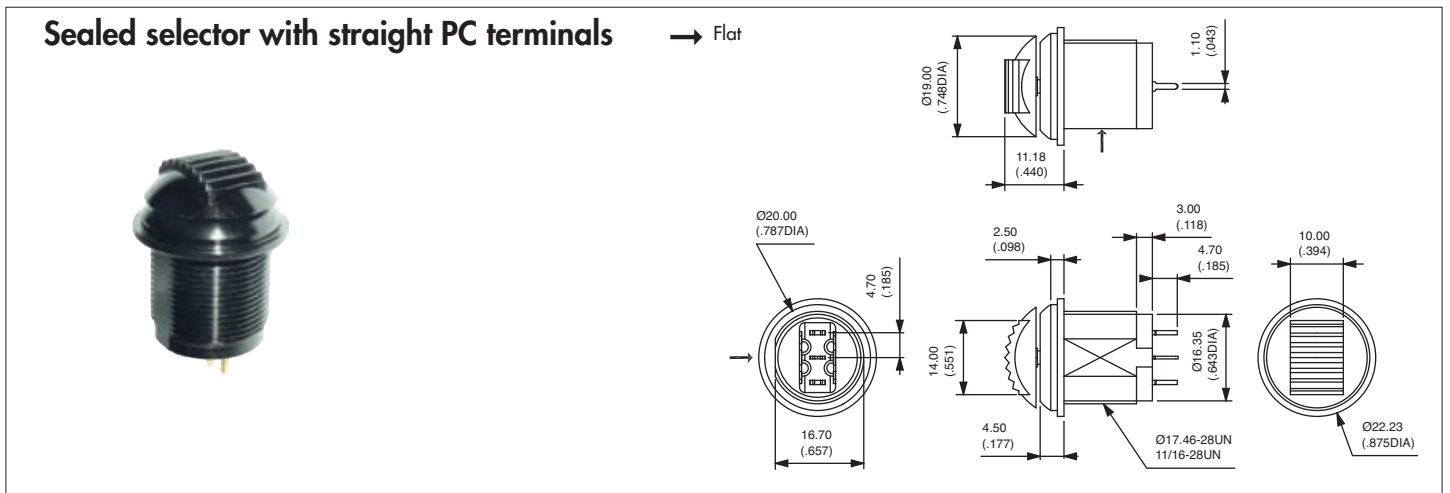
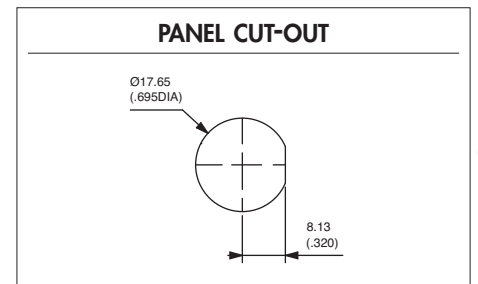
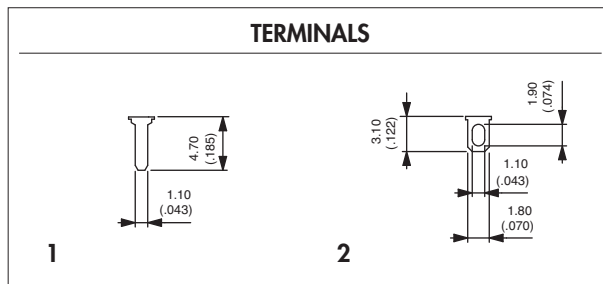
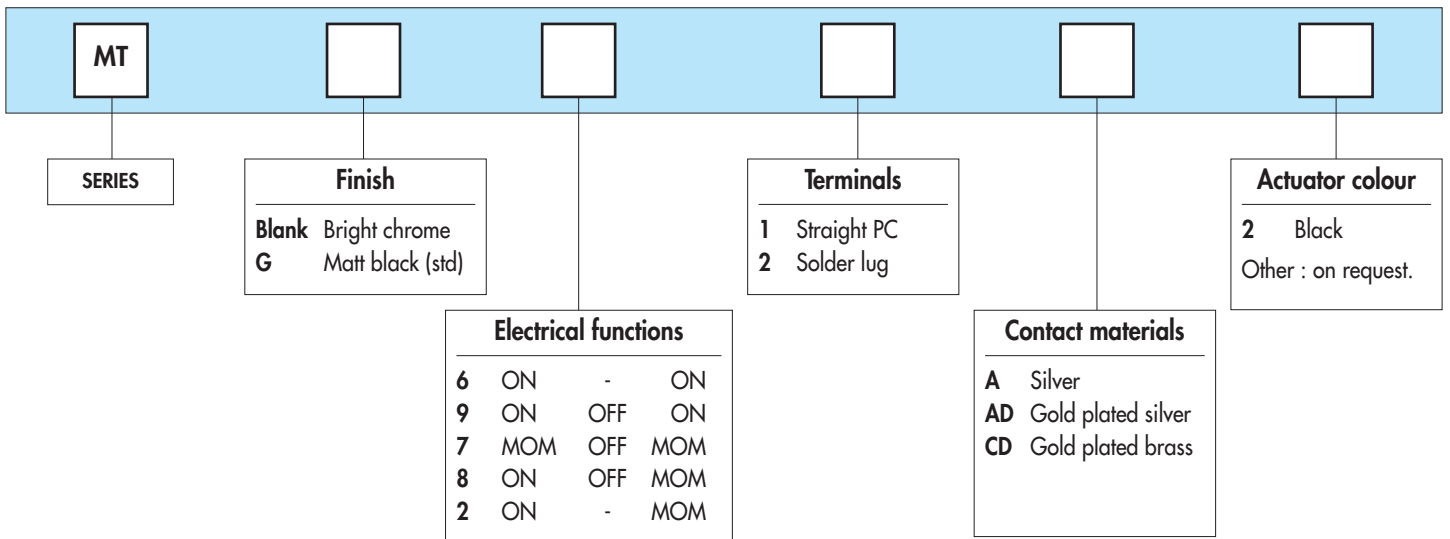


Mounting accessories : Standard hardware supplied : 1 hex nut 20.64 mm (.813) across flats and 1 sealing gasket.



Packaging unit : 25 pieces or 50 pieces depending on model

New!

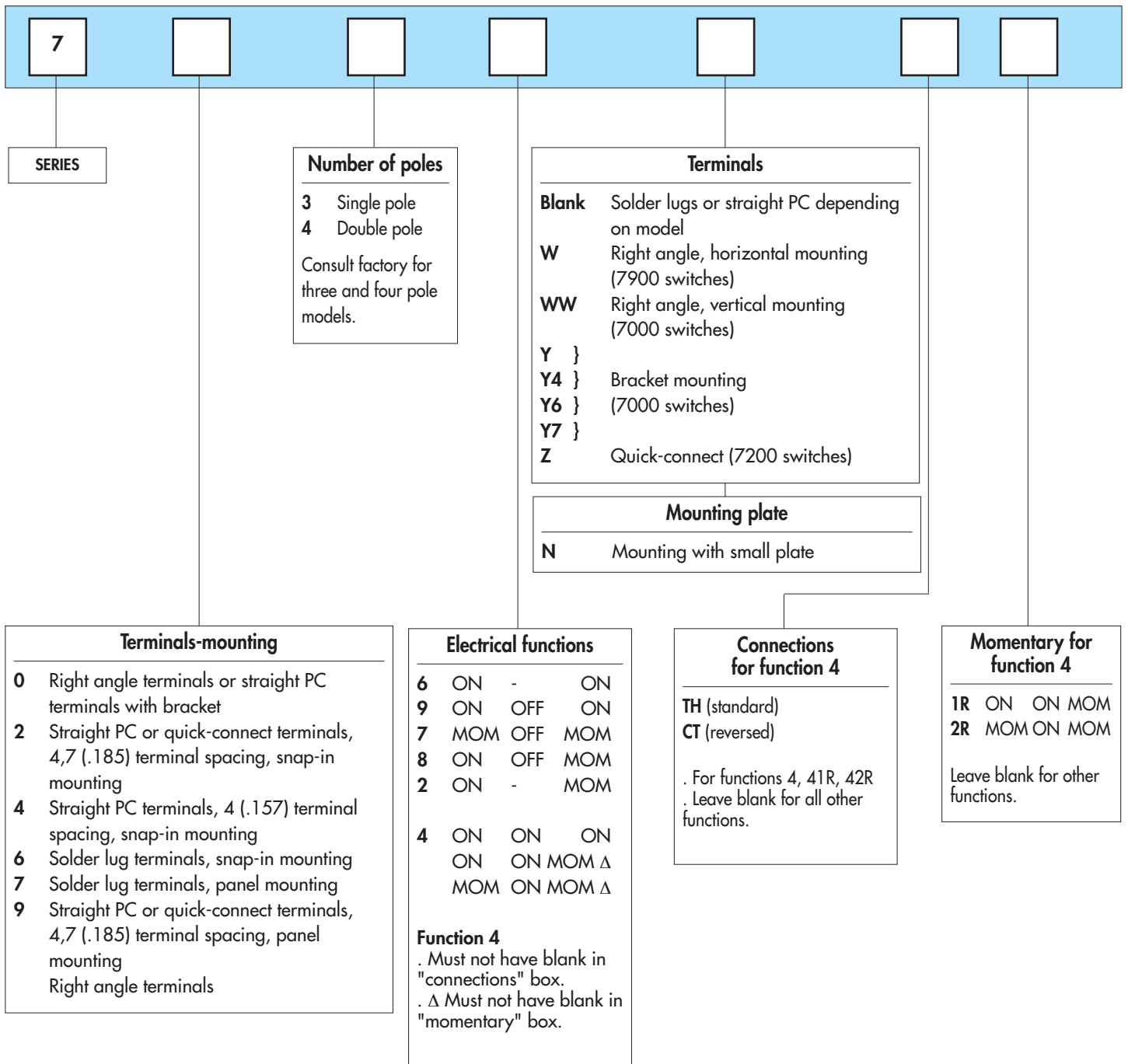


To order a product, select the desired codes in the above overview.

7000 series

Rocker and paddle switches

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 bracketed numbers.



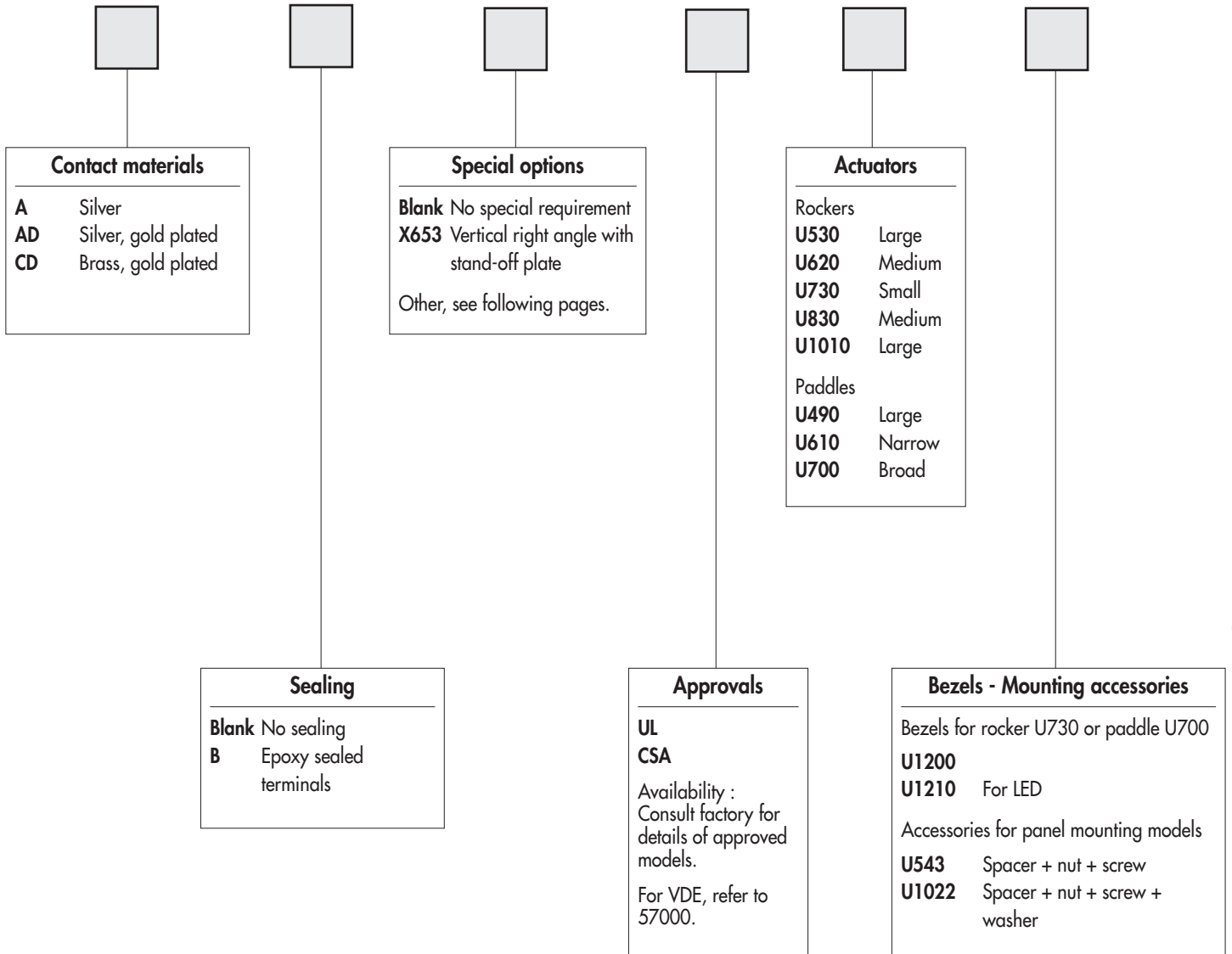
NOTICE : please note that not all combinations of above numbers are available. Refer to the following pages for further information.



7000 series

Rocker and paddle switches

Overview



Packaging unit : 25 pieces.

7000 series

Rocker and paddle switches

Distinctive features and specifications



- ❑ Wide variety of actuators
- ❑ Many mounting styles for panel or PCB
- ❑ UL and CSA approved

ELECTRICAL SPECIFICATIONS

- Current/voltage rating with resistive load :

Contact	Maximum	Minimum	Level *
Silver A	4A 30VDC	50mA 10VDC	III and IV
Silver, gold plated AD	4A 30VDC Gold plating withstands up to 100mA 30VDC.	10mA 50mV 10µA 5V	I to IV
Brass, gold plated CD	0,4 VA at 20VAC or DC	10mA 50mV 10µA 5V	I and II

- For inductive, lamp or capacitive loads, consult factory. * For details, see technical information, end of catalogue.
- Initial contact resistance : 10 mΩ
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength :
 - 1.000 Vrms 50 Hz min. between terminals
 - 1.500 Vrms 50 Hz min. between poles
 - 1.500 Vrms 50 Hz min. between terminals and frame
- Contact bounce : 2 ms max.
- Electrical life : 50.000 cycles at full load

MATERIALS

- Case : diallyphthalate (DAP) or high temperature plastic material (UL94-V0)
- Actuator : polyamide
- Housing : stainless steel or steel tin plated
- Bracket : steel, tin plated
- Contacts
 - A : silver
 - AD : silver, gold plated
 - CD : brass, gold plated
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

- Low level or mechanical life : 100.000 cycles
- Panel thickness : 1 (.039) to 2,5 mm(.098)
- Operating temperature : -40°C to +85°C

AGENCY APPROVALS



3A 250VAC
6A 125VAC

For VDE, refer to 57000 series.

Availability : consult factory for details of approved models.

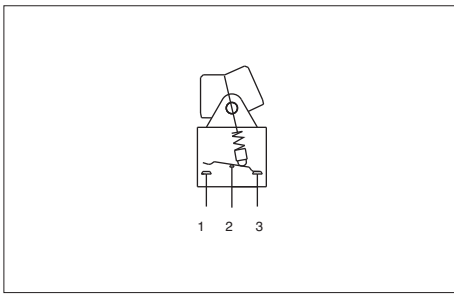
Marking : to order switches marked UL or CSA, complete appropriate box of ordering format.



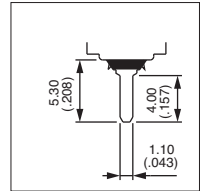
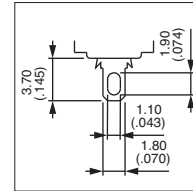
7000 series

Rocker and paddle switches

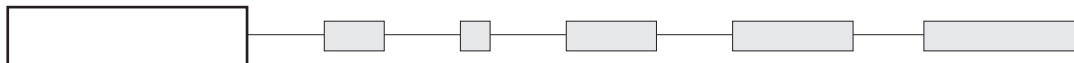
Snap-in mounting : 7600 - 7200 - 7400



- Solder lug or straight PC terminals
- Epoxy sealing standard on models with straight PC terminals



MODEL STRUCTURE



Shown with rocker U730 and bezel U1200

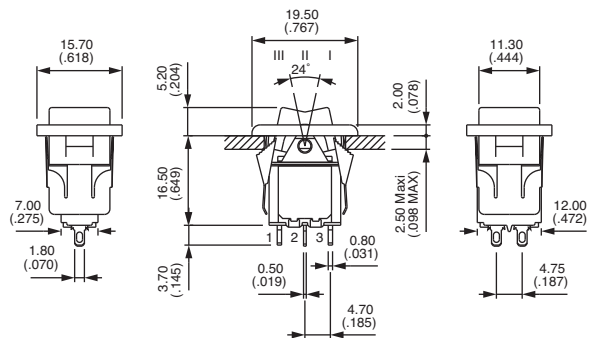
Solder lug terminals : 7600



Single pole Double pole

7636	7646
7639	7649
7637	7647
7638	7648
7632	7642
	7644*
	7644 1R*
	7644 2R*

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM



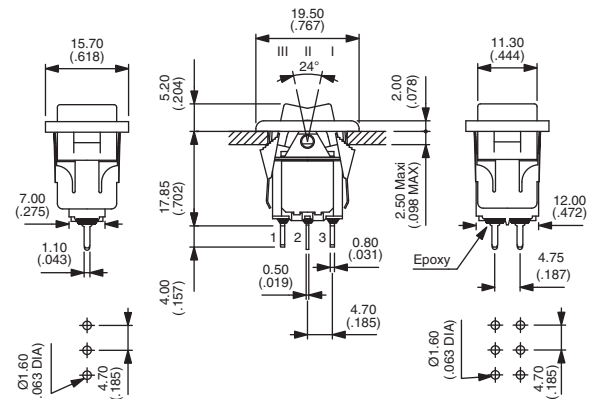
Straight PC terminals - spacing 4,7 (.185) : 7200



Single pole Double pole

7236 B	7246 B
7239 B	7249 B
7237 B	7247 B
7238 B	7248 B
7232 B	7242 B
	7244 B*
	7244 1R B*
	7244 2R B*

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM



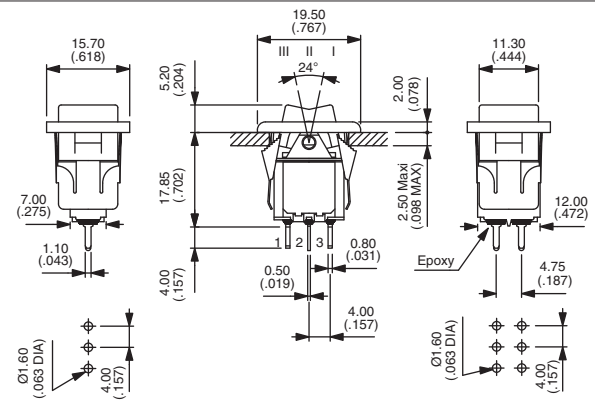
Straight PC terminals - spacing 4 (.157) : 7400



Single pole Double pole

7436 B	7446 B
7439 B	7449 B
7437 B	7447 B
7438 B	7448 B
7432 B	7442 B
	7444 B*
	7444 1R B*
	7444 2R B*

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM

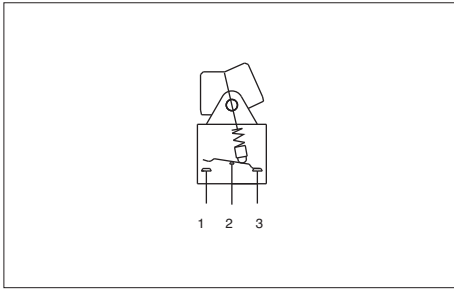


* Function 4 : SP in DP case - specify CT or TH connections, see end of catalogue.

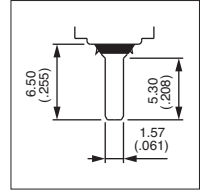
7000 series

Rocker and paddle switches

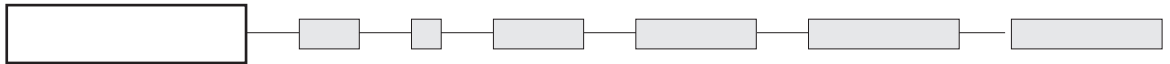
Snap-in mounting : 7200Z



- Quick-connect terminals



MODEL
STRUCTURE



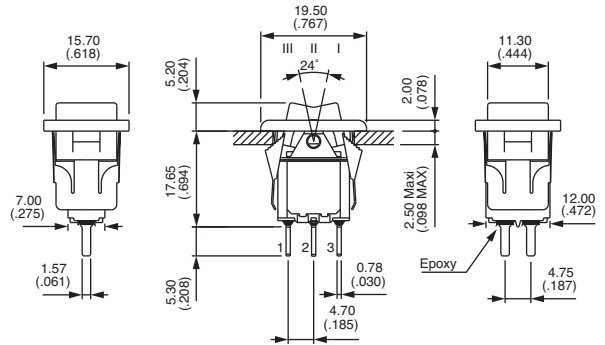
Shown with rocker U730 and bezel U1200

Quick-connect terminals : 7200Z



Single pole	Double pole
7236Z	7246Z
7239Z	7249Z
7237Z	7247Z
7238Z	7248Z
7232Z	7242Z
	7244Z*
	7244Z 1R*
	7244Z 2R*

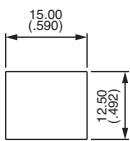
III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM



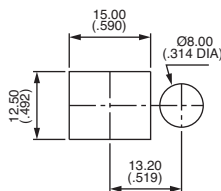
* Function 4 : SP in DP case - specify CT or TH connections, see end of catalogue.

PANEL CUT-OUT

7600 - 7200 - 7400 - 7200Z



With or without bezel U1200



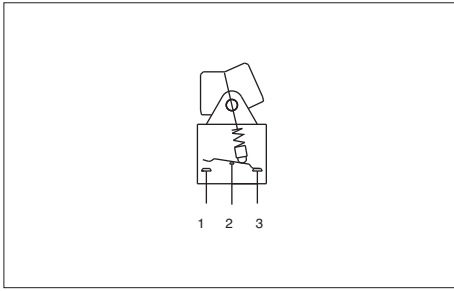
With bezel U1210



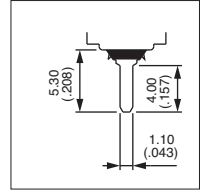
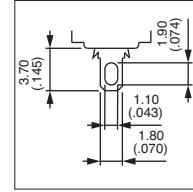
7000 series

Rocker and paddle switches

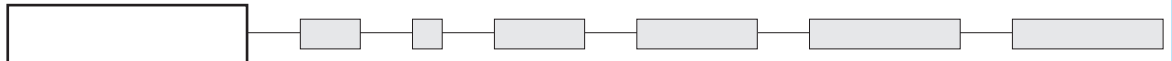
Panel mounting : 7700 - 7900



- Large rocker or paddle
- Solder lug or straight PC terminals
- Quick-connect terminals : on request
- Epoxy sealing standard on models with straight PC terminals



MODEL STRUCTURE



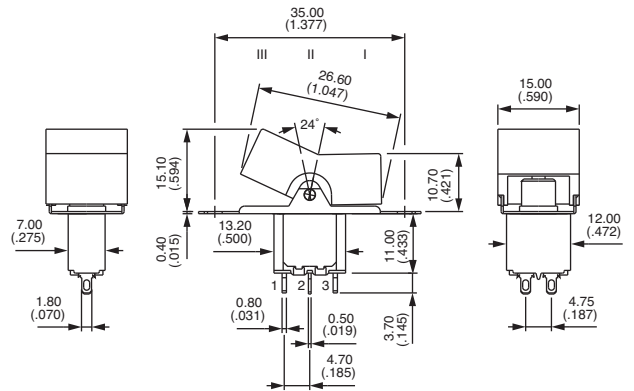
Shown with rocker U530

Solder lug terminals : 7700



Single pole	Double pole
7736	7746
7739	7749
7737	7747
7738	7748
7732	7742
	7744*
	7744 1R*
	7744 2R*

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM

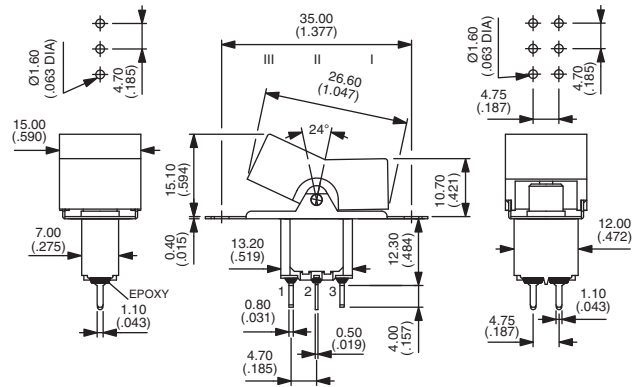


Straight PC terminals : 7900



Single pole	Double pole
7936 B	7946 B
7939 B	7949 B
7937 B	7947 B
7938 B	7948 B
7932 B	7942 B
	7944 B*
	7944 1R B*
	7944 2R B*

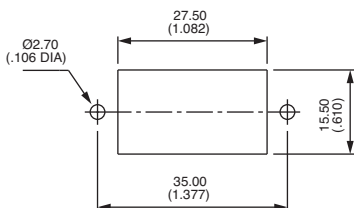
III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM



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

PANEL CUT-OUT

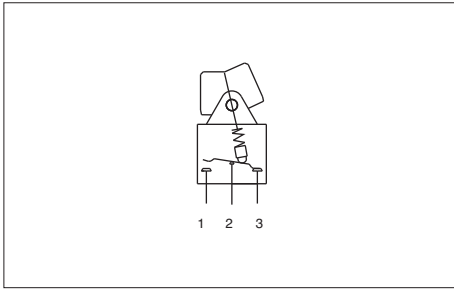
7700 - 7900



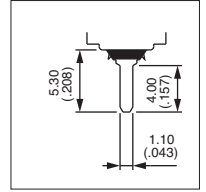
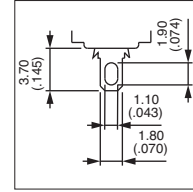
7000 series

Rocker and paddle switches

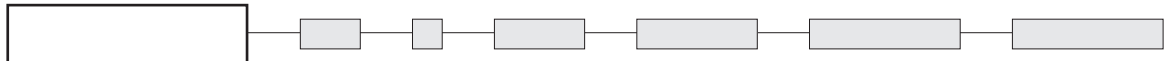
Panel mounting : 7700N - 7900N



- Small or medium rocker or paddle
- Solder lug or straight PC terminals
- Quick-connect terminals : on request
- Epoxy sealing standard on models with straight PC terminals



MODEL STRUCTURE



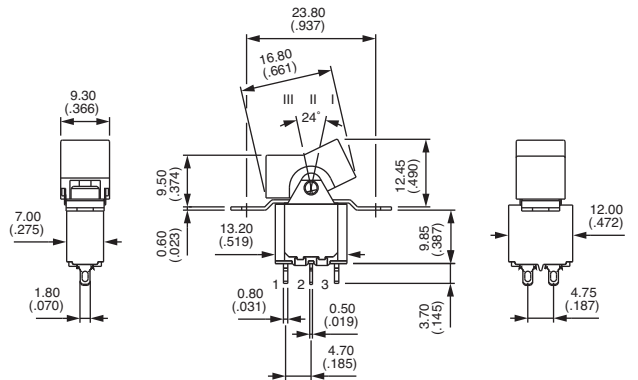
Shown with rocker U620

Solder lug terminals : 7700N



Single pole	Double pole
7736N	7746N
7739N	7749N
7737N	7747N
7738N	7748N
7732N	7742N
	7744N*
	7744N 1R*
	7744N 2R*

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM

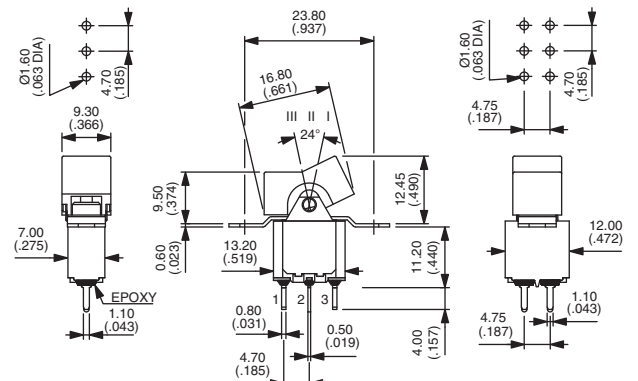


Straight PC terminals : 7900N



Single pole	Double pole
7936N B	7946N B
7939N B	7949N B
7937N B	7947N B
7938N B	7948N B
7932N B	7942N B
	7944N B*
	7944N 1R B*
	7944N 2R B*

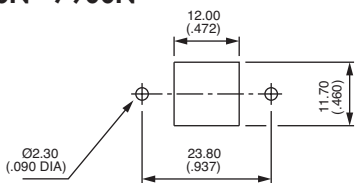
III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM



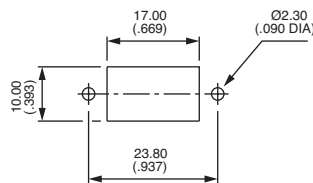
* Function 4 : SP in DP case - specify CT or TH connections, see end of catalogue.

PANEL CUT-OUT

7700N - 7900N



With small rocker **U730**
or small paddle **U700**



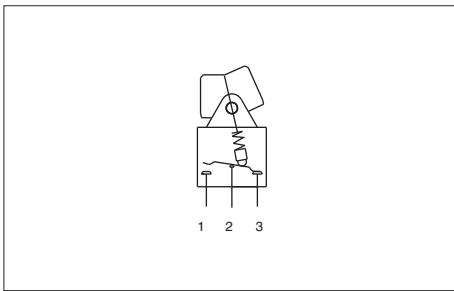
With medium rocker **U620**
or medium paddle **U610**



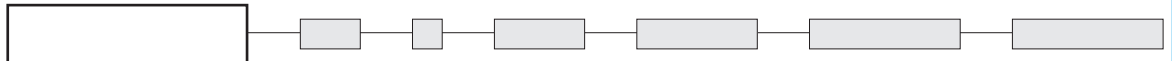
7000 series

Rocker and paddle switches

Right angle terminals - horizontal : 7900W



MODEL
STRUCTURE



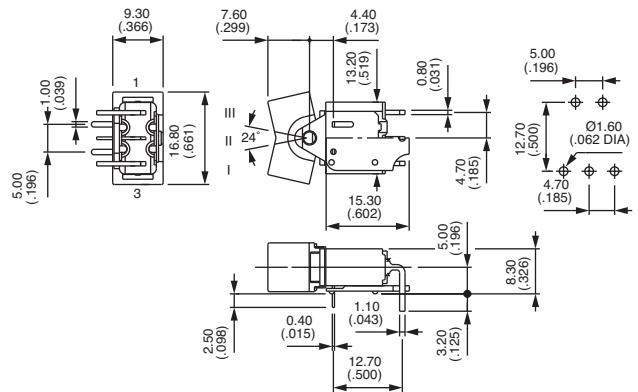
Shown with rocker U620

Single pole



7936W
7939W
7937W
7938W**
7932W**

III	II	I
2-3		1-2
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

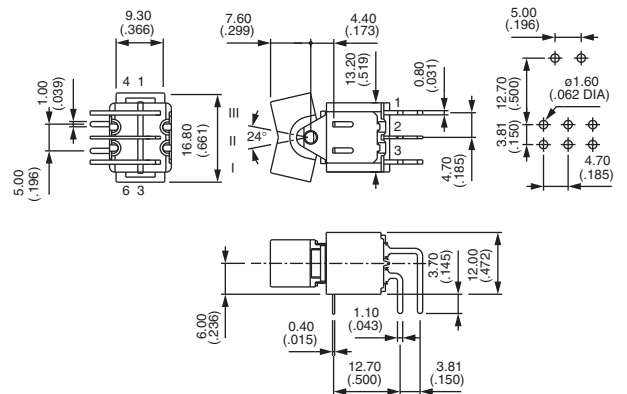


Double pole



7946W
7949W
7947W
7948W**
7942W**
7944W*
7944W 1R*
7944W 2R*

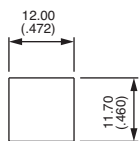
III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM



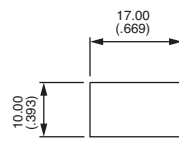
* Function 4 : SP in DP case - specify CT or TH connections, see end of catalogue.

** Functions 2 and 8 : standard connection (CT) shown on drawing - reversed connection available. Consult factory.

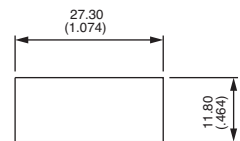
PANEL CUT-OUT



With small rocker **U730**
or small paddle **U700**



With medium rocker **U620**
or medium paddle **U610**



With large rocker **U1010**

7000 series

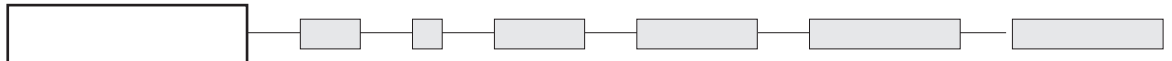
Rocker and paddle switches

Right angle terminals - vertical : 7000WW

MODEL
STRUCTURE



MODEL
STRUCTURE



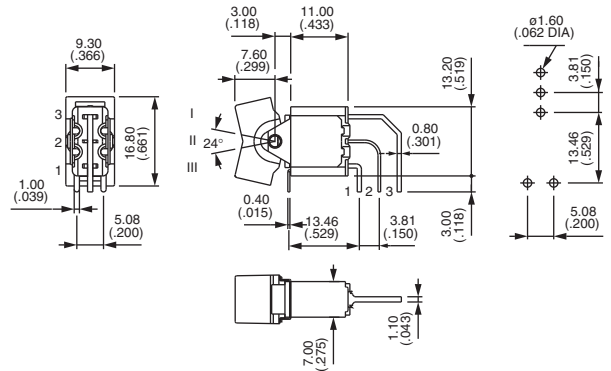
Shown with rocker U830

Single pole



7036WW
7039WW
7037WW
7038WW**
7032WW**

III	II	I
2-3		1-2
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

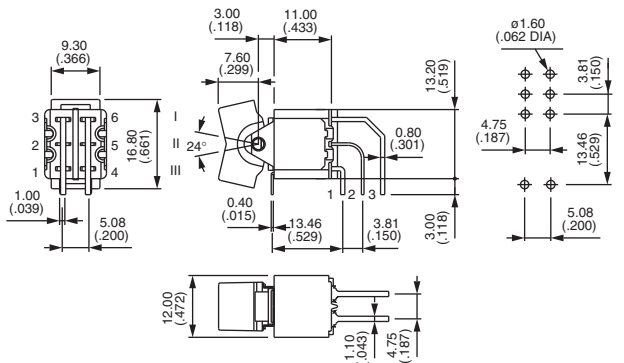


Double pole



7046WW
7049WW
7047WW
7048WW**
7042WW**
7044WW*
7044WW 1R*
7044WW 2R*

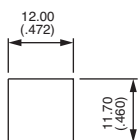
III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM



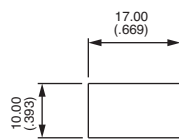
* Function 4 :SP in DP case - specify CT or TH connections, see end of catalogue.

** Functions 2 and 8 : standard connection (CT) shown on drawing - reversed connection available. Consult factory.

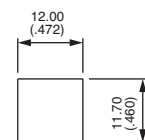
PANEL CUT-OUT



With small rocker **U730**



With medium rocker **U830**



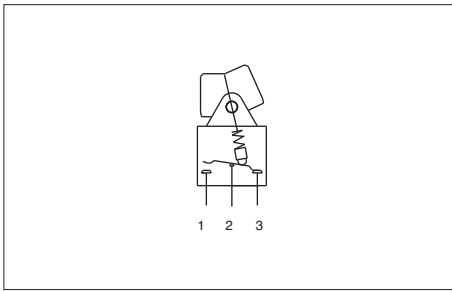
With broad paddle **U700**



7000 series

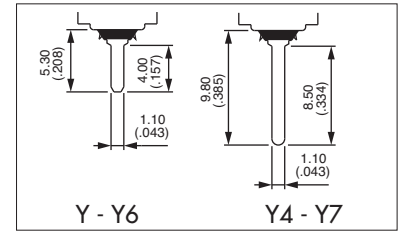
Rocker and paddle switches

Straight PC terminals - bracket mounting : 7000Y

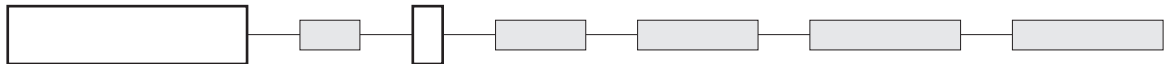


Brackets reduce mechanical stress on solder joints and increase the resistance to vibrations.

- Epoxy sealed terminals standard (B included in model structure)



MODEL STRUCTURE



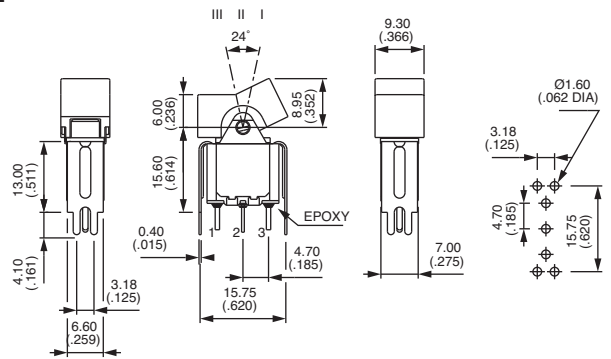
Shown with rocker U620

Short bracket - width 15,75 (.620) - single pole : 7030Y



7036Y B
7039Y B
7037Y B
7038Y B
7032Y B

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM

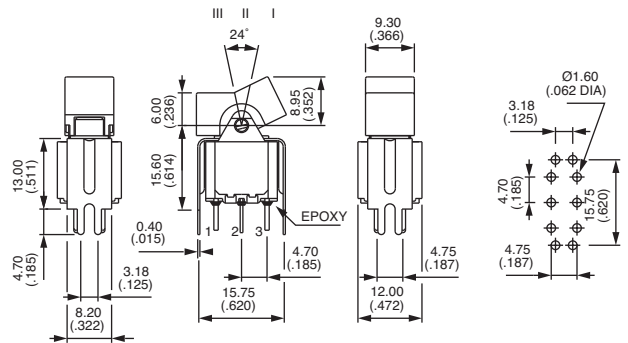


Short bracket - width 15,75 (.620) - double pole : 7040Y



7046Y B
7049Y B
7047Y B
7048Y B
7042Y B
7044Y* B
7044Y 1R* B
7044Y 2R* B

III	II	I
2-3		1-2
5-6		4-5
ON	-	ON
ON	OFF	ON
MOM	OFF	MOM
ON	OFF	MOM
ON	-	MOM
ON	ON	ON
ON	ON	MOM
MOM	ON	MOM



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

7000 series

Rocker and paddle switches

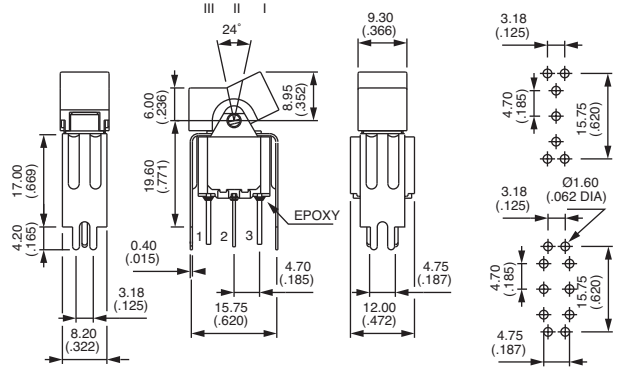
Straight PC terminals - bracket mounting : 7000Y4 - Y6 - Y7



Tall bracket - width 15,75 (.620) : 7000Y4



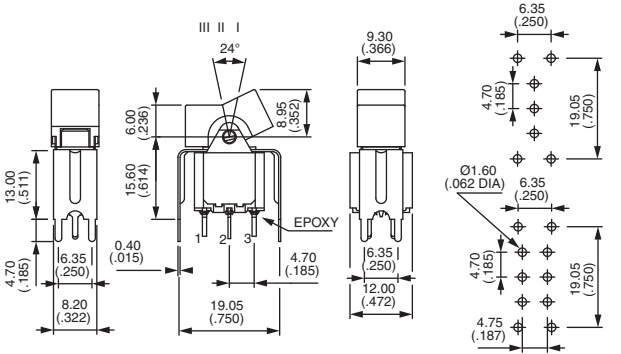
	III	II	I
Single pole	2-3		1-2
Double pole	5-6		4-5
7036Y4 B	ON	-	ON
7039Y4 B	ON	OFF	ON
7037Y4 B	MOM	OFF	MOM
7038Y4 B	ON	OFF	MOM
7032Y4 B	ON	-	MOM
7044Y4* B	ON	ON	ON
7044Y4 1R* B	ON	ON	MOM
7044Y4 2R* B	MOM	ON	MOM



Short bracket - width 19,05 (.750) : 7000Y6



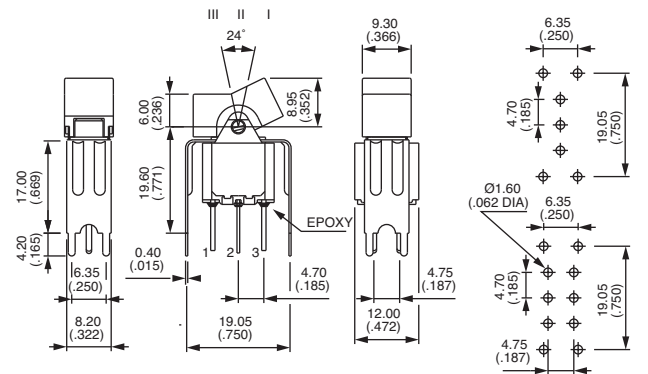
	III	II	I
Single pole	2-3		1-2
Double pole	5-6		4-5
7036Y6 B	ON	-	ON
7039Y6 B	ON	OFF	ON
7037Y6 B	MOM	OFF	MOM
7038Y6 B	ON	OFF	MOM
7032Y6 B	ON	-	MOM
7044Y6* B	ON	ON	ON
7044Y6 1R* B	ON	ON	MOM
7044Y6 2R* B	MOM	ON	MOM



Tall bracket - width 19,05 (.750) : 7000Y7



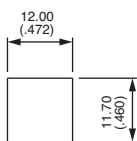
	III	II	I
Single pole	2-3		1-2
Double pole	5-6		4-5
7036Y7 B	ON	-	ON
7039Y7 B	ON	OFF	ON
7037Y7 B	MOM	OFF	MOM
7038Y7 B	ON	OFF	MOM
7032Y7 B	ON	-	MOM
7044Y7* B	ON	ON	ON
7044Y7 1R* B	ON	ON	MOM
7044Y7 2R* B	MOM	ON	MOM



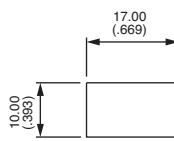
* Function 4 :SP in DP case - specify CT or TH connections, see end of catalogue.

PANEL CUT-OUT

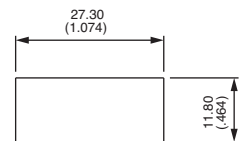
7000Y - Y4 - Y6 - Y7



With small rocker **U730**
or small paddle **U700**



With medium rocker **U620**
or medium paddle **U610**



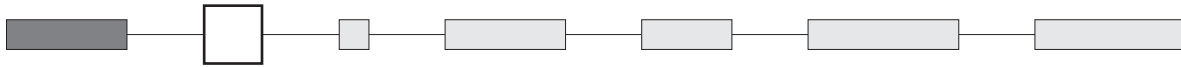
With large rocker **U1010**



7000 series

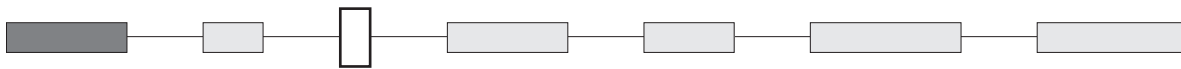
Rocker and paddle switches

CONTACT MATERIALS

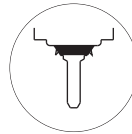


- A Silver
- AD Silver, gold plated
- CD Brass, gold plated

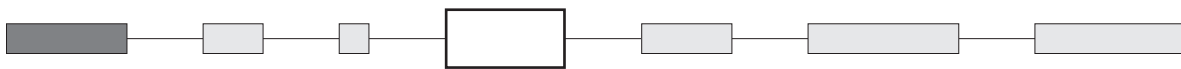
SEALING



- Blank No sealing
- B Epoxy sealed terminals



SPECIAL OPTIONS



- Blank No special requirement
- X653 Vertical right angle with stand-off plate

Shown with rocker U620

		III	II	I	
		2-3		1-2	
		5-6		4-5	
	Single pole	7036WW X653	7046WW X653	ON - ON	
		7039WW X653	7049WW X653	ON OFF ON	
		7037WW X653	7047WW X653	MOM OFF MOM	
	7038WW X653	7048WW X653**	ON OFF MOM		
	7032WW X653	7042WW X653**	ON - MOM		
		7044WW X653*	ON ON ON		
		7044 1RWW X653*	ON ON MOM		
		7044 2RWW X653*	MOM ON MOM		

* Function 4 : SP in DP case - specify CT or TH connections, see end of catalogue.
 ** Functions 2 and 8 : reversed connection available. Consult factory.

Actuators for X653 : small rocker U730 and medium rocker U620, broad paddle U700 and narrow paddle U610.

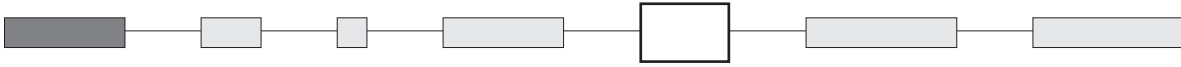
- X601 Silver plated brass contacts
 Current voltage rating for an electrical life of 20.000 cycles : 0,5A 30VDC
 Minimum quantity : 5.000 pieces per model and shipment.

7000 series

Rocker and paddle switches

OPTIONS

AGENCY APPROVALS



UL
CSA

All standard models

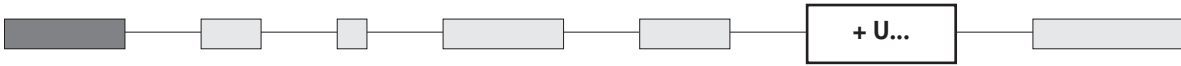
Availability : consult factory for details of approved combinations or options.

Marking : to order switches marked UL or CSA, complete above box with desired approvals in this order, without space (ex. ULCSA). Blank : no agency approval required.

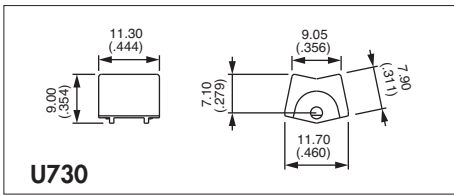
VDE (with UL & CSA)

Refer to **57000** series on the following pages.

ACTUATORS

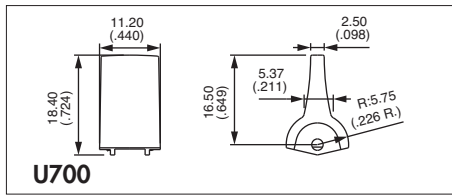


For snap-in mounting models : 7600 - 7200 - 7400 - 7200Z



U730

Small rocker

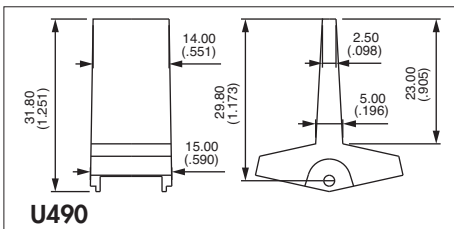


U700

Broad paddle

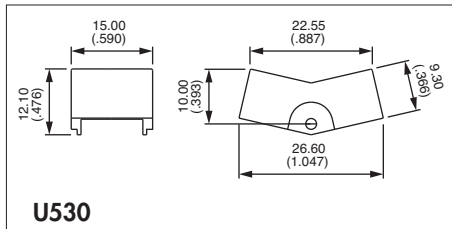
Actuator colours	
Replace last "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
6	red
7	ivory
7/1	white
9	orange

For 7700 and 7900 models



U490

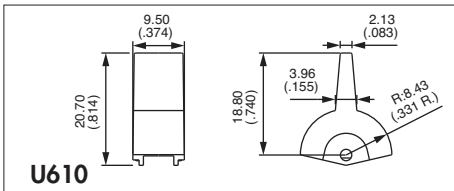
Large paddle



U530

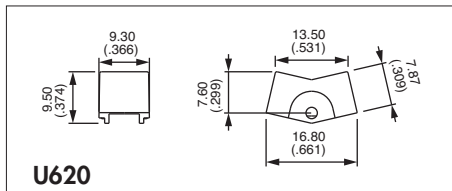
Large rocker

For 7700N - 7900N - 7900W - 7000WWX653 and 7000Y models



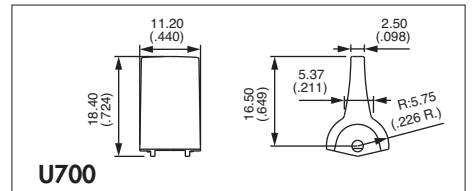
U610

Narrow paddle



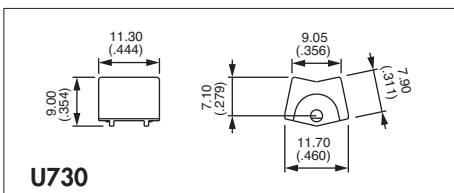
U620

Medium rocker



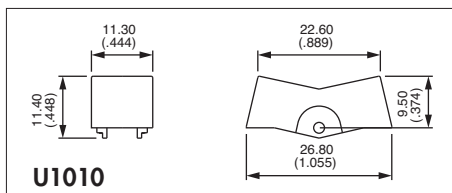
U700

Broad paddle



U730

Small rocker



U1010

Large rocker
For 7900W, available on DP only.

D

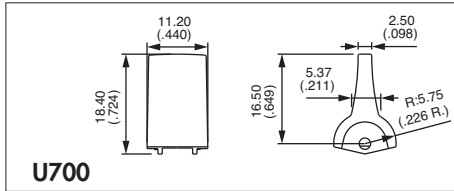


7000 series

Rocker and paddle switches

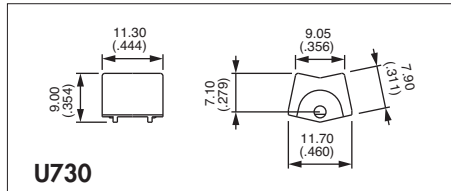
ACTUATORS (continued)

For 7000WW models



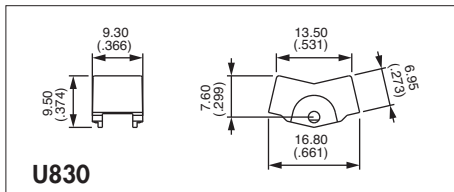
U700

Broad paddle



U730

Small rocker



U830

Medium rocker

Actuator colours

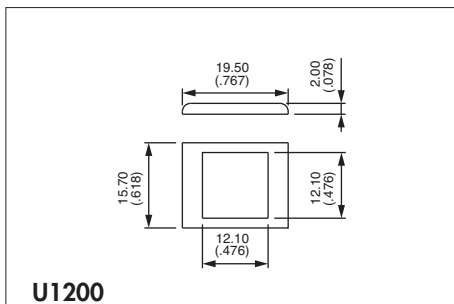
Replace last "0" by number

- 1 blue
- 1/4 dark blue
- 2 black
- 3 green
- 4 grey
- 5 yellow
- 6 red
- 7 ivory
- 7/1 white
- 9 orange

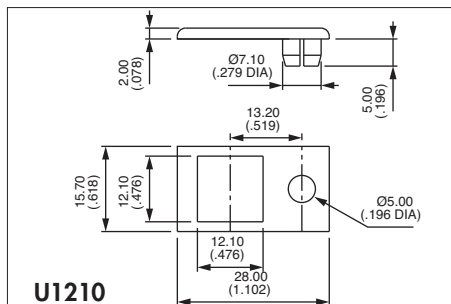
BEZELS - MOUNTING ACCESSORIES



Bezels for paddle U700 and rocker U730



U1200



U1210

For LED Ø 5 (.196) - not supplied

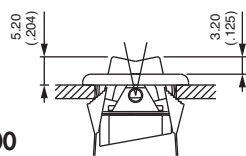
Bezel colours

Replace last "0" by number

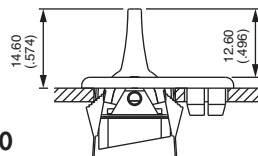
- 1 blue
- 1/4 dark blue
- 2 black
- 3 green
- 4 grey
- 5 yellow
- 6 red
- 7 ivory
- 7/1 white
- 9 orange

STANDARD PANEL MOUNTING

Panel thickness with bezel 1 to 2,5 mm (.039 to .098)

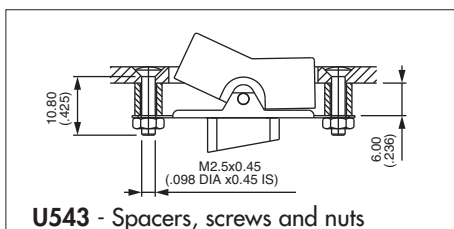


U730 + U1200



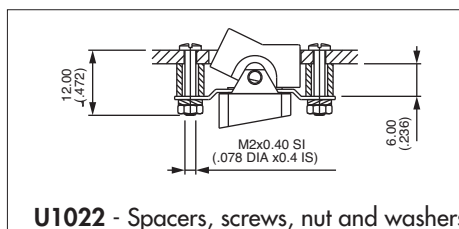
U700 + U1210

Mounting accessories



U543 - Spacers, screws and nuts

For rocker U530 or paddle U490



U1022 - Spacers, screws, nut and washers

For rockers U620 or U730
For paddles U610 or U700

57000 series

VDE approved rocker and paddle switches



EN 61058-1



- The switches described below are standard marked VDE.
- UL and CSA agency approvals are also available. To order a switch marked UL or CSA, please complete "Other agency approvals" box.

ELECTRICAL SPECIFICATIONS

- Class I (normal insulation)
- Small contact opening : μ (< 3 mm (.118))
- Current/voltage rating with resistive load : 3A 250VAC - 6A 125 VAC
- Dielectric strength :
2.000 Vrms 50 Hz min. between poles and between terminals and frame
1.000 Vrms 50 Hz min. between terminals
- Special body for increased creepage distance and air gap : 3 mm (.118)

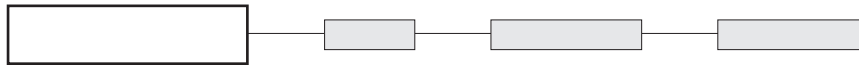
Further specifications, see 7000 series.

MATERIALS

- Contacts : silver
- Case : diallylphthalate (DAP)
- Actuators : polyamide
- Housing : stainless steel or steel tin plated
- Terminal seal : epoxy

D

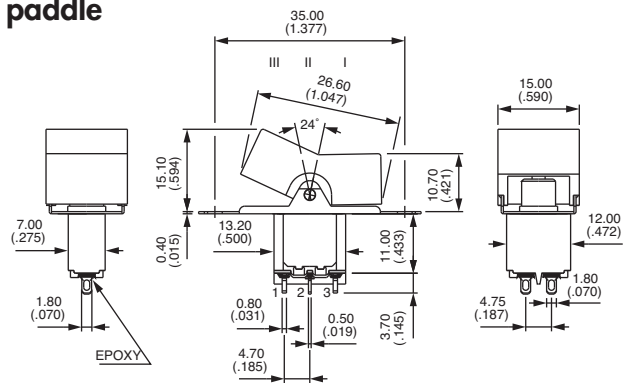
MODEL STRUCTURE



Shown with rocker U530

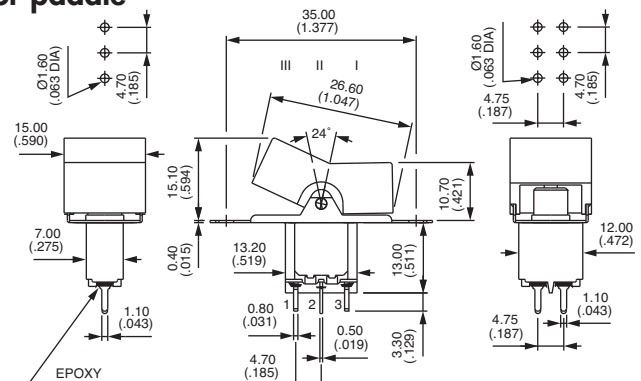
Panel mounting - solder lug terminals - large rocker or paddle

	III	II	I
	2-3		1-2
	5-6		4-5
Single pole			
57736A	ON	-	ON
57739A	ON	OFF	ON
Double pole			
57746A			
57749A			



Panel mounting - straight PC terminals - large rocker or paddle

	III	II	I
	2-3		1-2
	5-6		4-5
Single pole			
57936A	ON	-	ON
57939A	ON	OFF	ON
Double pole			
57946A			
57949A			





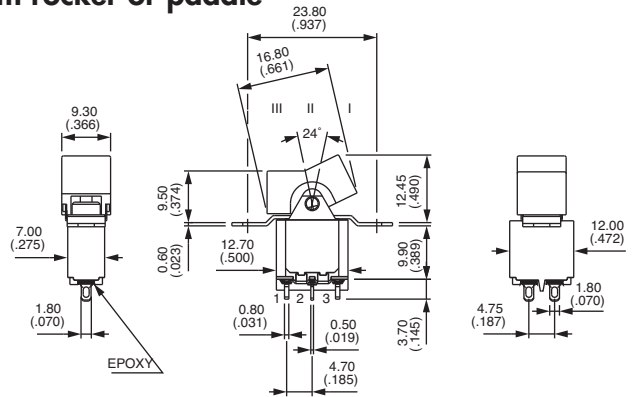
57000 series

VDE approved rocker and paddle switches

Shown with rocker U620

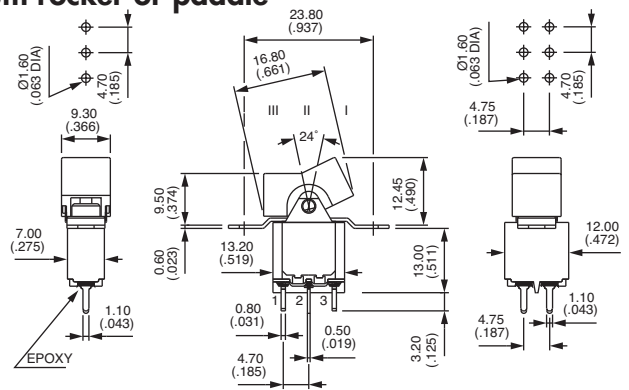
Panel mounting - solder lug terminals - small or medium rocker or paddle

		III	II	I
		2-3		1-2
		5-6		4-5
Single pole	Double pole	ON	-	ON
57736NA	57746NA	ON	OFF	ON
57739NA	57749NA	ON	OFF	ON



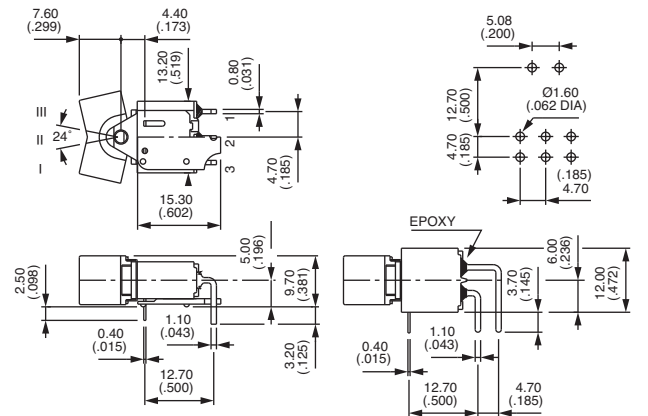
Panel mounting - straight PC terminals - small or medium rocker or paddle

		III	II	I
		2-3		1-2
		5-6		4-5
Single pole	Double pole	ON	-	ON
57936NA	57946NA	ON	OFF	ON
57939NA	57949NA	ON	OFF	ON



Right angle terminals - horizontal

		III	II	I
		2-3		1-2
		5-6		4-5
Single pole	Double pole *	ON	-	ON
57936WA	57946WAX433	ON	OFF	ON
57939WA	57949WAX433	ON	OFF	ON



Also available for VERTICAL mounting (on request).

PANEL CUT-OUT : Refer to 7000 series

* In double pole W models, spacing between poles on PCB is different from standard : 4,70 mm (.185) instead of 3,81 mm (.150). Part number X433.

57000 series

VDE approved rocker and paddle switches



OTHER AGENCY APPROVALS



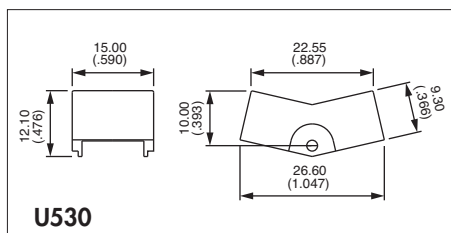
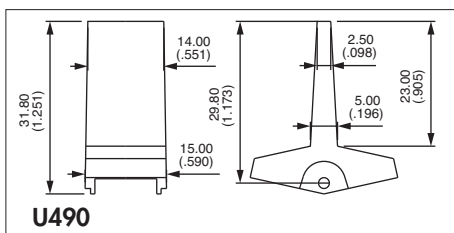
UL
CSA

To order a switch additionally marked UL and/or CSA, complete above box with desired approvals (ex. ULCSA).

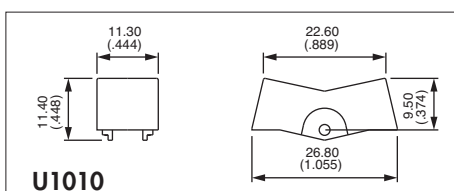
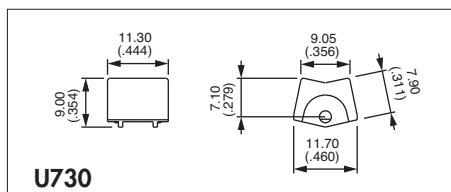
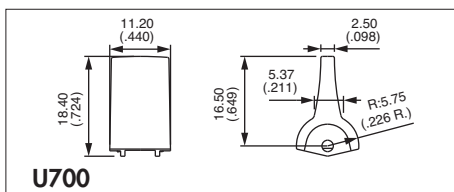
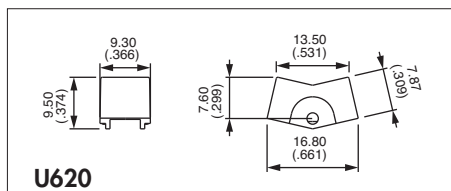
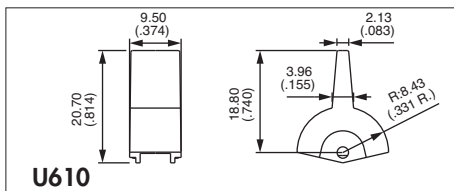
ACTUATORS



For 57000A models



For 57000NA and 57000WA models



For 57000WA, available on double pole only

Actuator colours	
Replace last "0" by number	
1	blue
1/4	dark blue
2	black
3	green
4	grey
5	yellow
7	ivory
7/1	white
9	orange

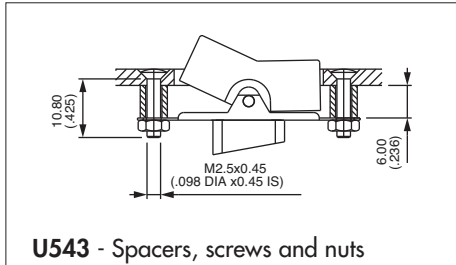
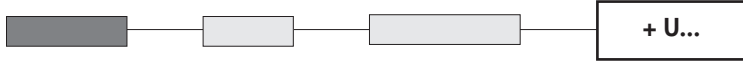
D



57000 series

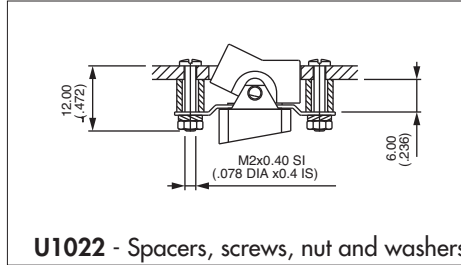
VDE approved rocker and paddle switches

MOUNTING ACCESSORIES



U543 - Spacers, screws and nuts

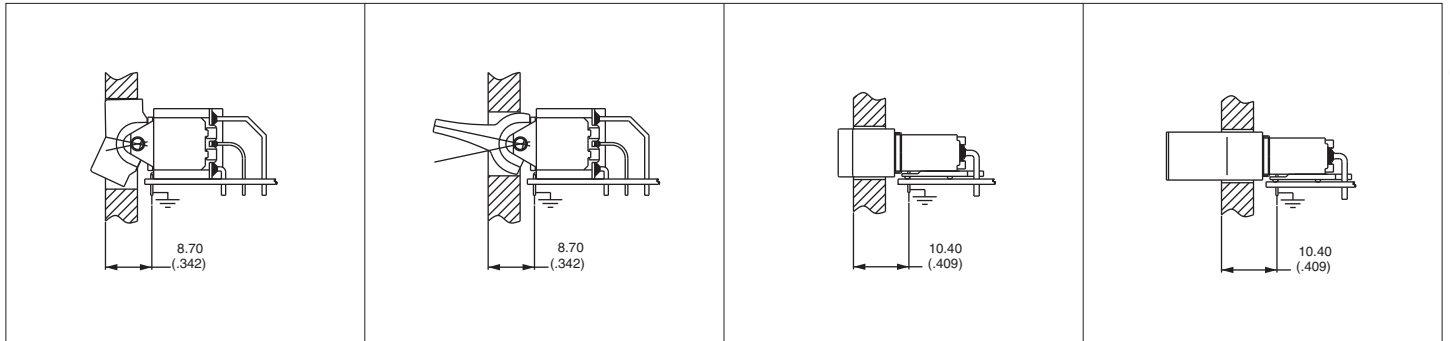
For rocker U530 or paddle U490



U1022 - Spacers, screws, nut and washers

For rockers U620 or U730
For paddles U610 or U700

MOUNTING RECOMMENDATIONS



D

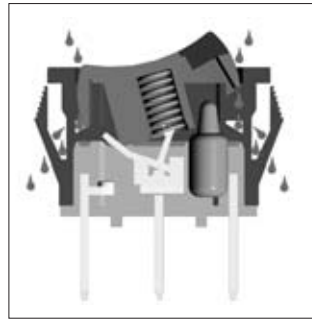
FM series

Snap-in rocker switches - panel cut-out 19 x 13 (.750 x .508)

Distinctive features and specifications

- Illuminated and non-illuminated
- For class II appliances
- VDE and UL approved
- Protection against moisture by double-shell case

When the switch is submitted to moisture (drops, condensation), the double-shell case conducts the liquid outside, thus protecting the contact area and terminals. The light dripping inside the equipment resulting from this should be evacuated by adequate arrangement on back of panel.



- Protection by boot

In case of sand or splashing water, the best protection consists of insulating the rocker from these aggressive elements. This can be achieved with transparent PVC boot **U5720**. Order separately, see section H.

AGENCY APPROVALS



EN 61058-1



Availability : functions 1 and 6

Marking : approved models are standard marked.

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



Packaging unit : 150 pieces.

FM series

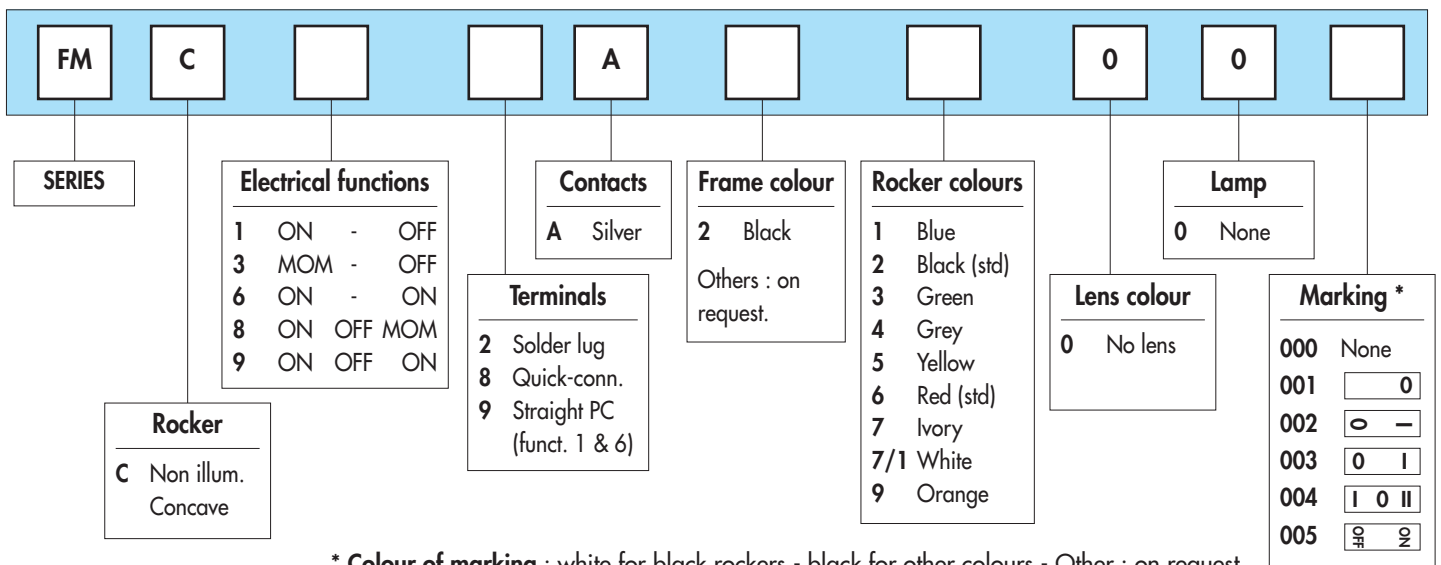
Snap-in rocker switches - panel cut-out 19 x 13 (.750 x .508)

Single pole - non-illuminated

- Approved ratings (functions 1 and 6) :
VDE : 10(4)A 250VAC T85°C - UL : 6A 250VAC & 125VAC T65°C
- Max. contact rating :
- functions 1 and 6 : see above.
- function 3 : 4A 250VAC
- functions 8 and 9 : 6A 250VAC
- Initial contact resistance : 20mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : - functions 1 and 6 : 2.500 Vrms between terminals
- functions 3, 8 and 9 : 1.500 Vrms between terminals
- Electrical life at full load : 10 000 cycles

- Operating temperature :
-20°C to +85°C
- Case, frame, rocker : PA6/6
- Contacts : silver
- Terminals : silver plated
- Panel cut-out :

Panel thickness	Dim. Y	Dim. Z
0,75 to 1,25 mm	19,2 +0/-0,1	12,9 +0,15/-0
1,25 to 2 mm	19,4 +0/-0,1	12,9 +0,15/-0
2 to 3 mm	19,8 +0/-0,1	12,9 +0,15/-0



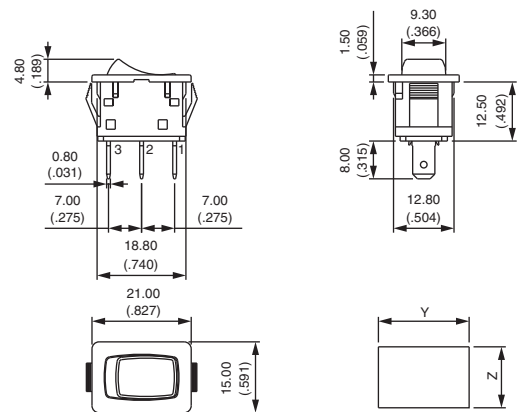
* Colour of marking : white for black rockers - black for other colours - Other : on request.

Single throw and double throw switch



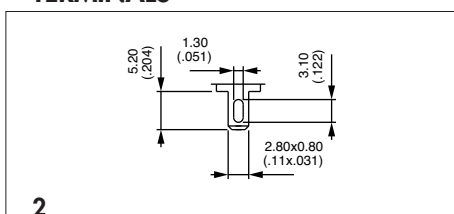
FMC1
FMC3
FMC6
FMC8
FMC9

1-2	ON	-	OFF
2-3	MOM	-	OFF
	ON	-	ON
	ON	OFF	MOM
	ON	OFF	ON



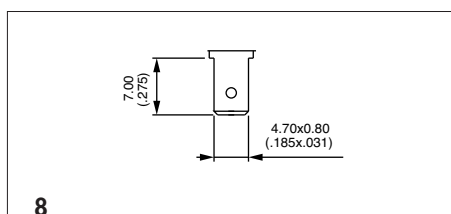
Shown with quick-connect terminals

TERMINALS



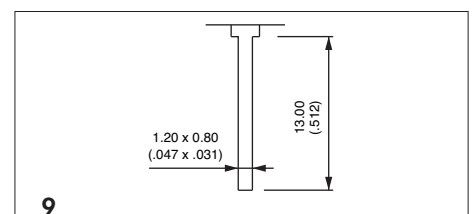
2

Solder lug



8

Quick-connect



9

Straight PC (functions 1 and 6 only)

FM series

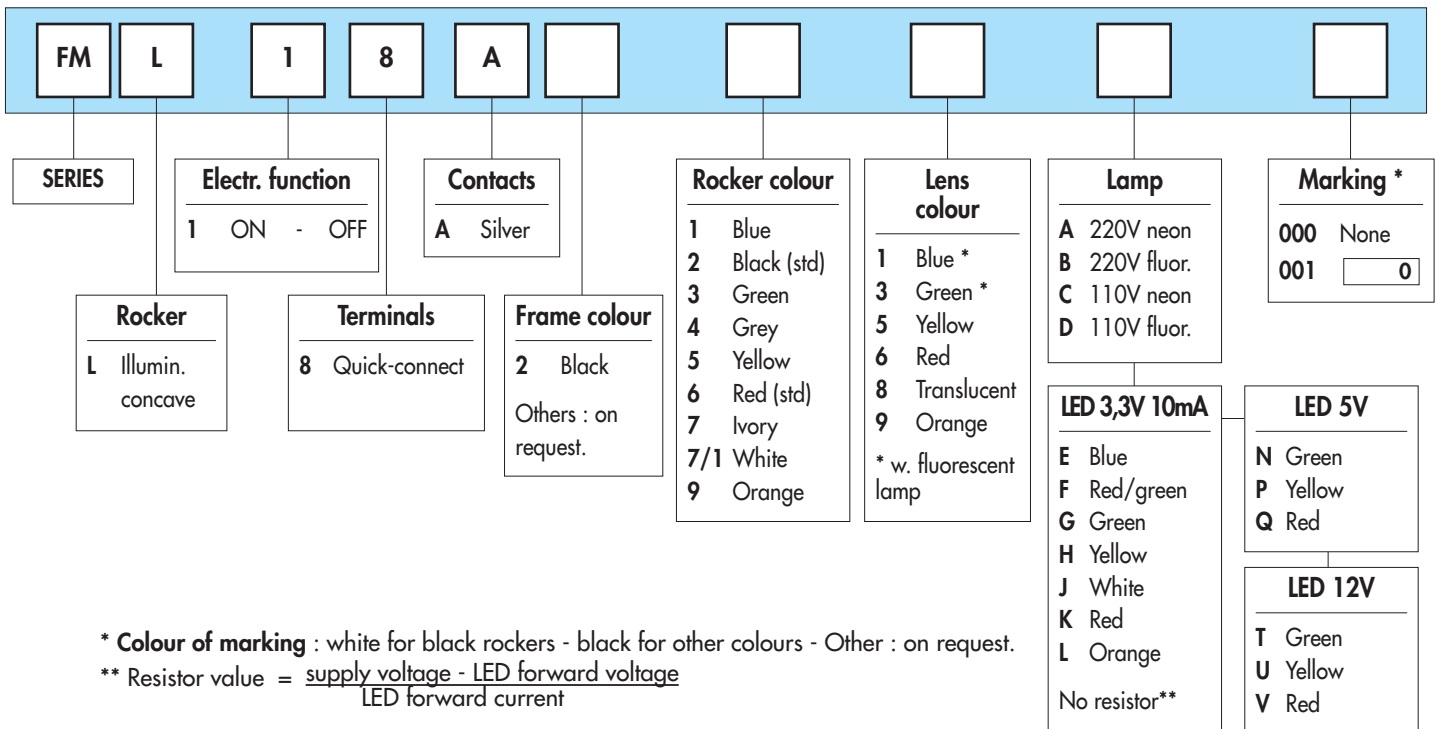
Snap-in rocker switches - panel cut-out 19 x 13 (.750 x .508)

Single pole - illuminated

- Approved ratings :
VDE : 10(4)A 250VAC T85°C - **UL** : 6A 250VAC & 125VAC T65°C
- LED types available :
 3,3V (4V max.) 10mA LED (resistor to be series connected by the user)
 5V or 12V LED with integrated resistor
- Initial contact resistance : 20mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.500 Vrms between terminals
- Electrical life at full load : 10 000 cycles
- Operating temperature: - 20°C to + 85°C
- Case, frame and rocker : PA6/6

- Lens : PC
- Contacts : silver
- Terminals : silver plated
- Lamp terminal : no plating
- Fluorescent lamp for blue or green lens, neon lamp for other colours
- Panel cut-out :

Panel thickness	Dim. Y	Dim. Z
0,75 to 1,25 mm	19,2 +0/-0,1	12,9 +0,15/-0
1,25 to 2 mm	19,4 +0/-0,1	12,9 +0,15/-0
2 to 3 mm	19,8 +0/-0,1	12,9 +0,15/-0



* **Colour of marking** : white for black rockers - black for other colours - Other : on request.

** Resistor value = $\frac{\text{supply voltage} - \text{LED forward voltage}}{\text{LED forward current}}$

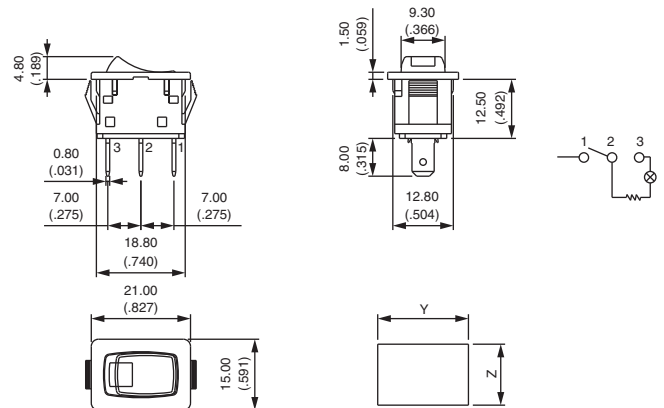
Illuminated switches - quick-connect terminals



FML1

ON - OFF

For LED models, terminal 2 = cathode (-), terminal 3 = anode (+)



2600 series

Power rocker switches

Distinctive features and specifications



- Three rocker shapes : plain, V-shaped or concave
- Various rocker colours
- Frame with protection guard on 2600LP models
- Illuminated or non-illuminated
- UL, CSA, VDE and NF (EN 61058-1) approved

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load and approved ratings : see table below.
- Initial contact resistance : 10mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.500 Vrms 50 Hz min. between terminals
3.000 Vrms 50 Hz min. between terminals and metal panel
- Electrical life : 10.000 cycles at full load

FUNCTIONS	APPROVED RATINGS				DIRECT CURRENT	
	CSA (double pole)	UL (double pole)	VDE	NF	24 VDC	12 VDC
	CSA 22-2	UL 1054	EN 61058-1	EN 61058-1		
ON - OFF ON - ON	1/6 HP 125VAC 16A 125VAC 16A 250VAC 1/3 HP 250VAC	1/6 HP 125VAC 16A 125VAC 16A 250VAC 1/3 HP 250VAC	10(4)A 250VAC T 85/55	-	10A	15A
ON - OFF - ON	10A 125VAC 10A 250VAC 1/6 HP 125/250VAC	10A 125VAC 10A 250VAC 1/6 HP 125/250VAC	L1 option 10(4)A 250VAC	L1 option 10(4)A 250VAC	8A	10A
ON - ON - ON	-	-	-	-	5A	8A
OTHERS	10A 125VAC 10A 250VAC 1/6 HP 250VAC	-	L1 option 10(4)A 250VAC	L1 option 10(4)A 250VAC	8A	10A

MATERIALS

- Case : melamine/polyester
- Frame : polyamide
- Actuator : polyamide
- Contacts :
- A : silver
- C : copper, silver plated

GENERAL SPECIFICATIONS

- Panel thickness : 0,8 mm to 4 mm (.031 to .157)
- Operating temperature :
 - silver contacts (A) : -20°C to +85°C
 - silver plated contacts (C) : -10°C to +55°C

AGENCY APPROVALS



EN 61058-1 EN 61058-1

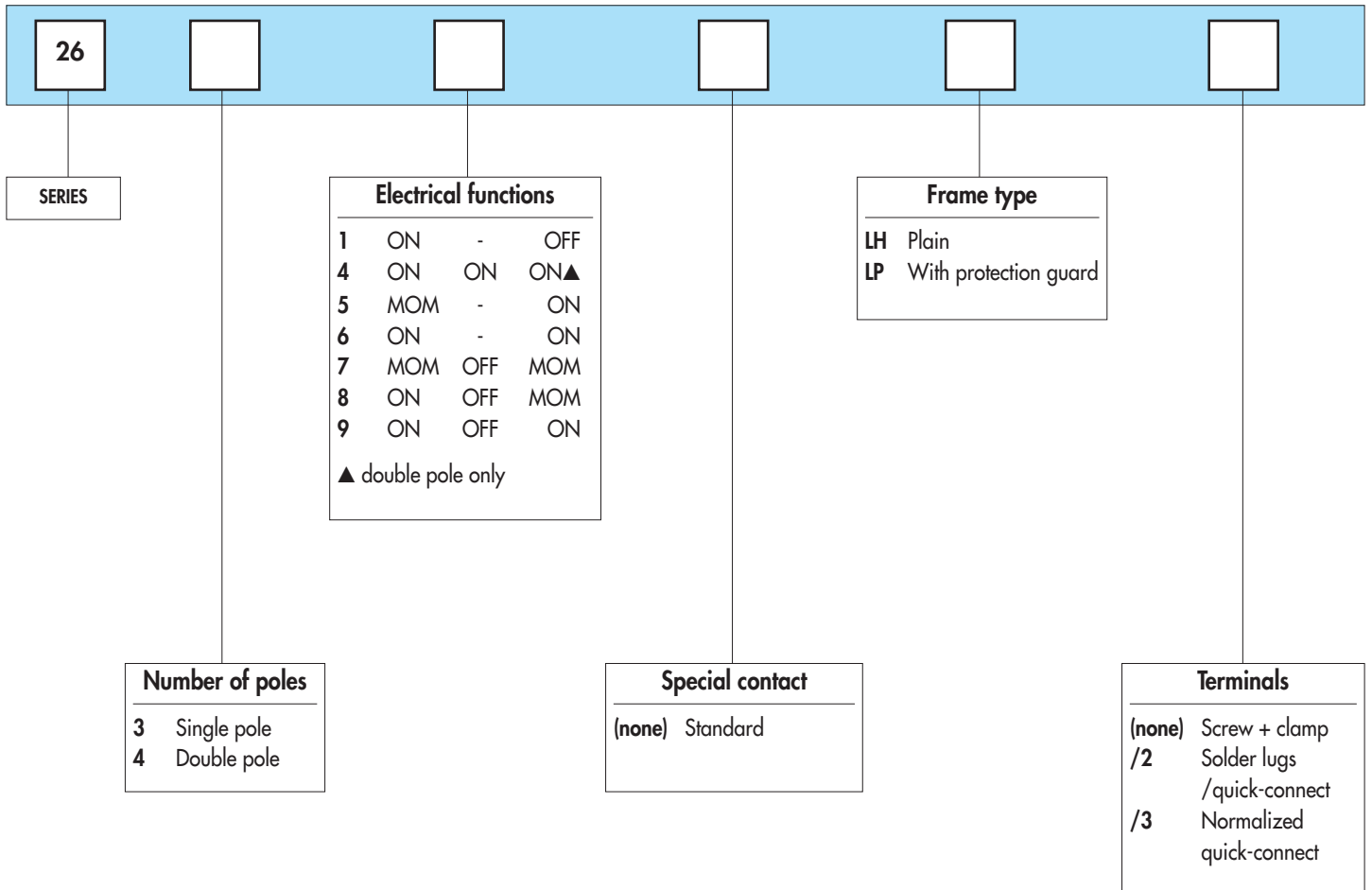
Availability : consult factory for details of approved models.

Marking : approved models are standard marked.

2600 series

Power rocker switches

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 bracketed numbers.



Sealing boot U21 50 available to protect the switches against dust and water. See section H.



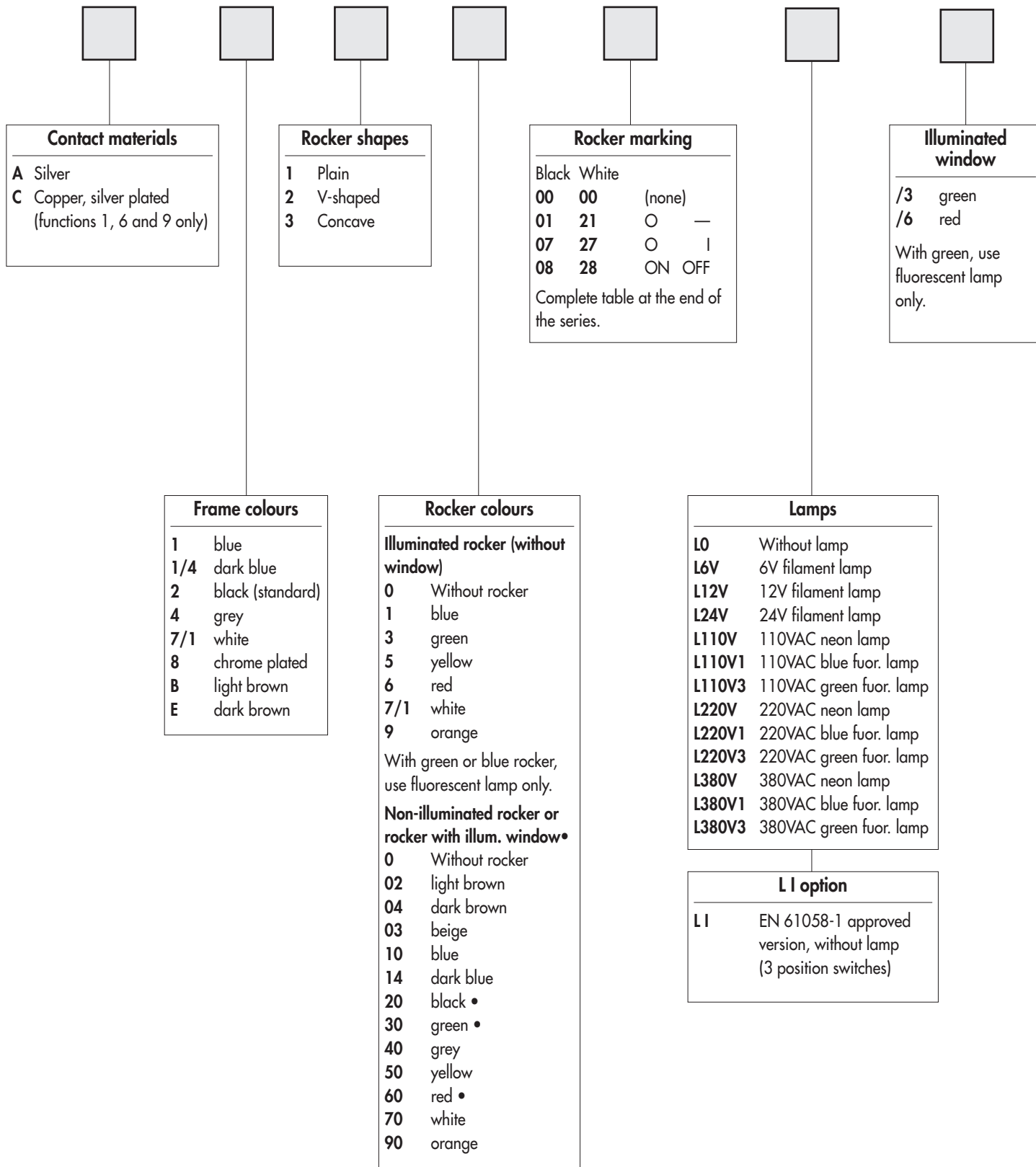
NOTICE : please note that not all combinations of above numbers are available. Refer to the following pages for further information.



2600 series

Power rocker switches

Overview



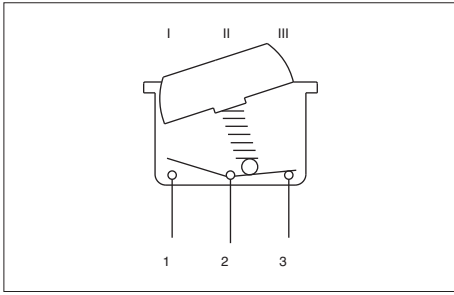
D



Packaging unit : 20 pieces per type and colour.

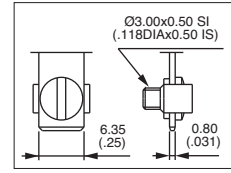
2600 series

Power rocker switches

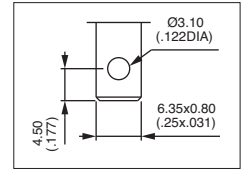


- Model 2600LP with protection guard
- 1 and 2 pole configurations

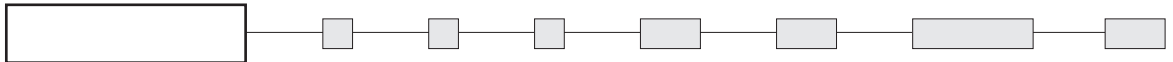
2640LH



2640LH/2



MODEL STRUCTURE

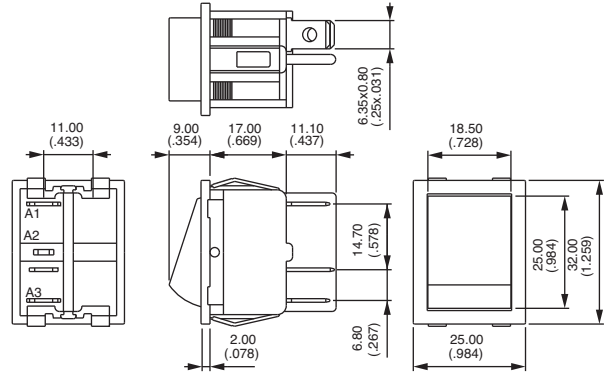


2600LH - single pole



Screw term. + clamp Solder lug/ quick-connect

	III A2-A1	II A2-A3	I
2631LH	2631LH/2	ON	OFF
2645LH	2645LH/2	MOM	ON
2636LH	2636LH/2	ON	ON
2637LH	2647LH/2	MOM	OFF MOM
2638LH	2638LH/2	ON	OFF MOM
2639LH	2639LH/2	ON	OFF ON



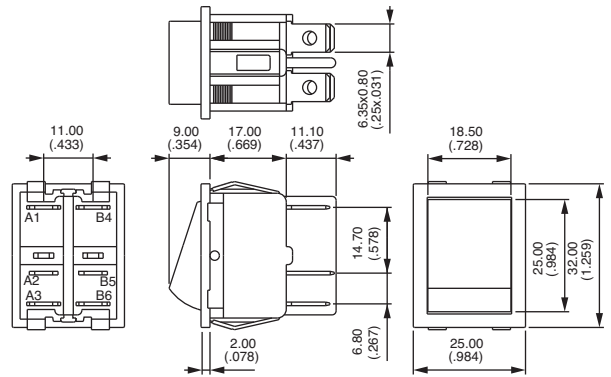
2600LH - double pole



Screw term. + clamp Solder lug/ quick-connect

	III A2-A1	II A2-A3	I
2641LH	2641LH/2	ON	OFF
2644LH*	2644LH/2*	ON	ON ON
2645LH	2645LH/2	MOM	ON
2646LH	2646LH/2	ON	ON
2647LH	2647LH/2	MOM	OFF MOM
2648LH	2648LH/2	ON	OFF MOM
2649LH	2649LH/2	ON	OFF ON

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

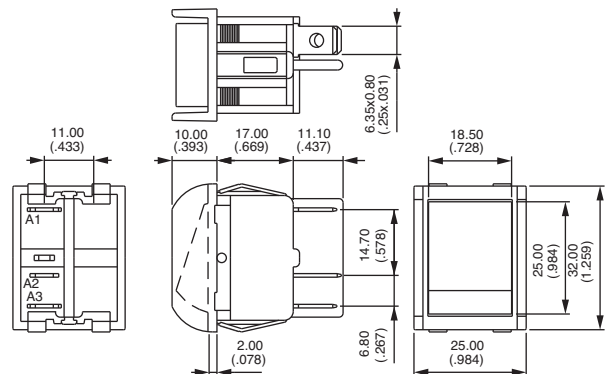


2600LP - with protection guard - single pole



Screw term. + clamp Solder lug/ quick-connect

	III A2-A1	II A2-A3	I
2631LP	2631LP/2	ON	OFF
2635LP	2635LP/2	MOM	ON
2636LP	2636LP/2	ON	ON
2637LP	2637LP/2	MOM	OFF MOM
2638LP	2638LP/2	ON	OFF MOM
2639LP	2639LP/2	ON	OFF ON





2600 series

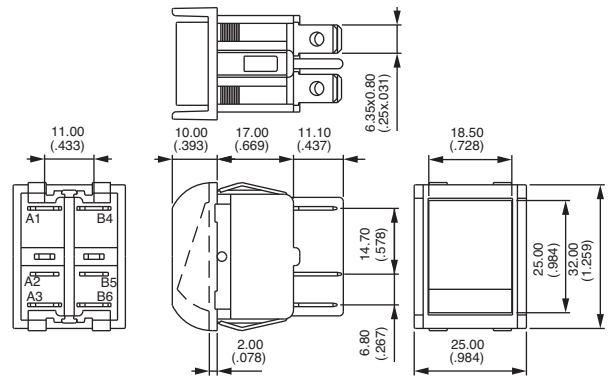
Power rocker switches

2600LP - with protection guard - double pole

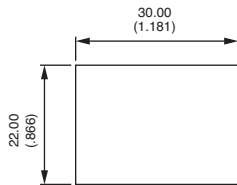


	III	II	I
	A2-A1	A2-A3	
	B5-B4	B5-B6	
Screw term. + clamp			
Solder lug/ quick-connect			
2641LP	2641LP/2	ON - OFF	
2644LP*	2644LP/2*	ON ON ON	
2645LP	2645LP/2	MOM - ON	
2646LP	2646LP/2	ON - ON	
2647LP	2647LP/2	MOM OFF MOM	
2648LP	2648LP/2	ON OFF MOM	
2649LP	2649LP/2	ON OFF ON	

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



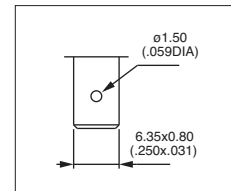
PANEL CUT-OUT



TERMINAL OPTION

Specify after LH or LP.

/3 Normalized quick-connect terminals 6,35 x 0,8 (.250 x .031)

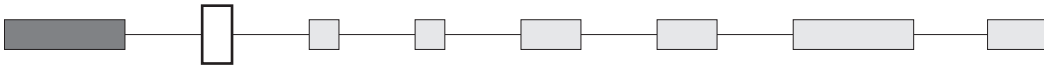


2600 series

Power rocker switches

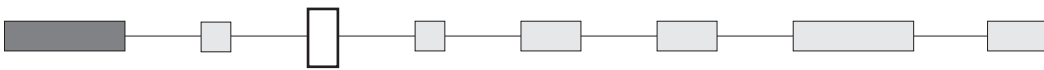


CONTACT MATERIALS



- A Silver
- C Copper, silver plated (available with functions 1, 6 and 9 only)

FRAME COLOURS

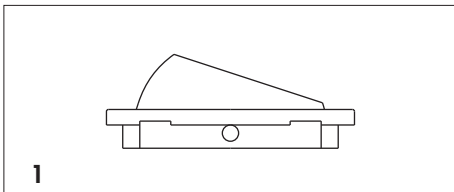
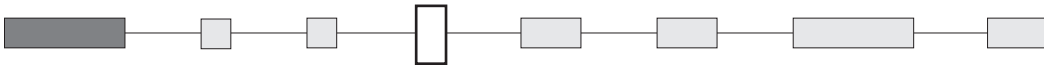


- 1 Blue
- 1/4 Dark blue
- 2 Black (standard)
- 4 Grey
- 7/1 White
- 8 Chrome plated
- B Light brown
- E Dark brown

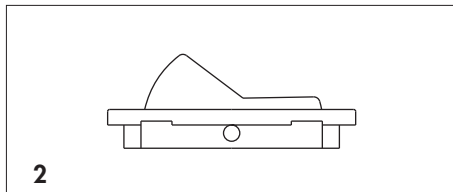


This option has UL approval only.

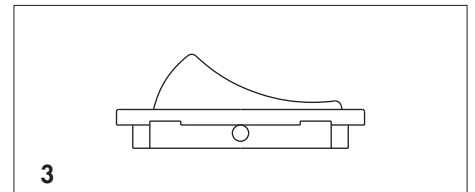
ROCKER SHAPES



1 Plain



2 V-shaped



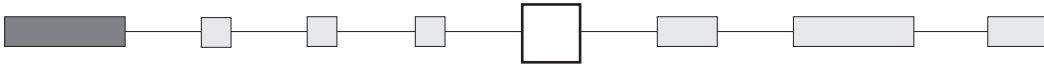
3 Concave



2600 series

Power rocker switches

ROCKER COLOURS



For illuminated switches

	Without rocker	Blue*	Green*	Yellow	Red	White	Orange
Plain rocker P/N	-	U881	U883	U885	U886	U887	U889
V-shaped rocker P/N	-	U861	U863	U865	U866	U867	U869
Concave rocker P/N	-	U871	U873	U875	U876	U877	U879
Colour code	0	1	3	5	6	7/1	9

* With green or blue rocker, use fluorescent lamp only.

For non-illuminated switches or switches with illuminated window (•)

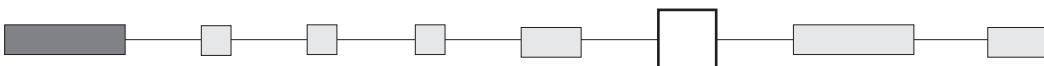
	Without rocker	Light brown	Dark brown	Beige	Blue	Dark blue	Black	Green	Grey	Yellow	Red	White	Orange
Plain rocker P/N	-	U1250B	U1250BF	U1250	U1251	U1251/4	U1252	U1253	U1254	U1255	U1256	U1257	U1259
V-shaped rocker P/N	-	U1270B	U1270BF	U1270	U1271	U1271/4	U1272	U1273	U1274	U1275	U1276	U1277	U1279
Concave rocker P/N	-	U1260B	U1260BF	U1260	U1261	U1261/4	U1262	U1263	U1264	U1265	U1266	U1267	U1269
Colour code	0	02	04	03	10	14	20•	30•	40	50	60•	70	90

Complete box with one of above colour codes.

To order rockers separately, use their P/N (U....) and complete box with code 0.

Rockers with illuminated windows (codes 20, 30, 60) : part numbers on request.

ROCKER MARKING



MARKING \ COLOUR	-	01	02	06	07	08	03	04	05*	40	43*	46
Black	00	01	02	06	07	08	03	04	05*	40	43*	46
Red	00	11	12	16	17	18	13	14	15*	41	44*	47
White	00	21	22	26	27	28	23	24	25*	42	45*	48

* Not available on V-shaped rockers

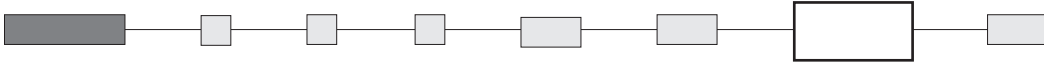
Special markings and marking on rockers with illuminated window : consult factory.

2600 series

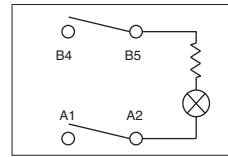
Power rocker switches

OPTIONS
● ● ●

LAMP



L0	Non-illuminated switch
L6V	Filament lamp 6V
L12V	Filament lamp 12V
L24V	Filament lamp 24V
L110V	Neon lamp 110VAC
L110V1	BLUE fluorescent lamp 110VAC
L110V3	Green fluorescent lamp 110VAC
L220V	Neon lamp 220VAC
L220V1	BLUE fluorescent lamp 220VAC
L220V3	Green fluorescent lamp 220VAC
L380V	Neon lamp 380VAC
L380V1	BLUE fluorescent lamp 380VAC
L380V3	Green fluorescent lamp 380VAC
LI	EN61058-1 approved version without lamp (3 position switches)

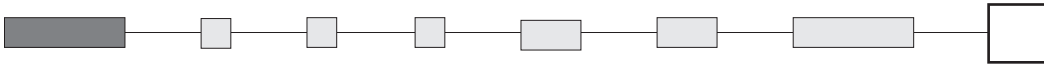


For illuminated models, the lamp is always connected between center terminals 2 and 5.



Lamps L380V, L380V1 and L380V3 are not UL/CSA approved.

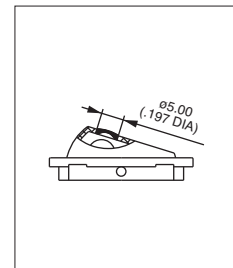
ILLUMINATED WINDOW



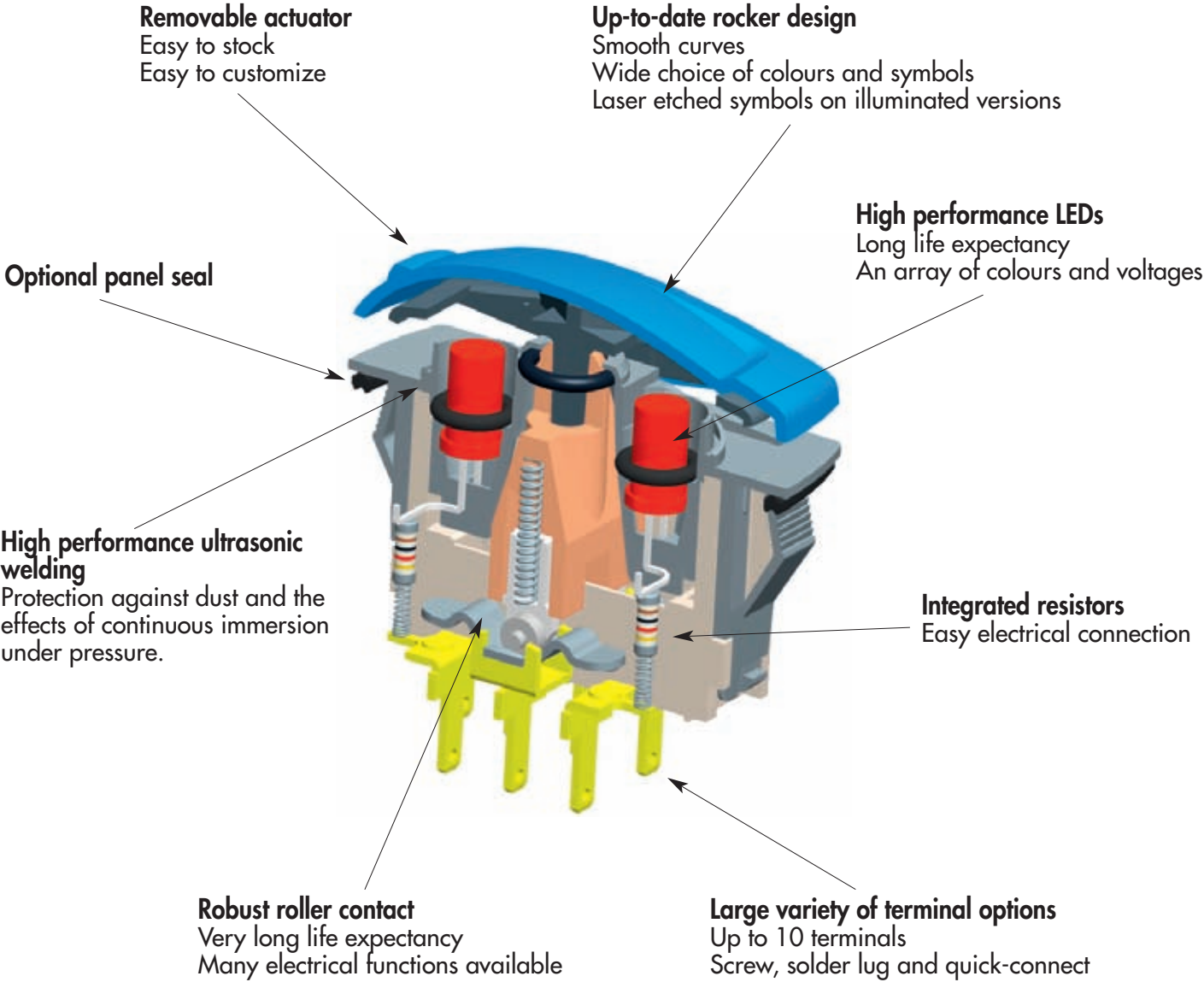
For black, green and red rockers only

/3 Green
/6 Red

With green, use fluorescent lamp only.
No marking available on illuminated windows.



Attractive rugged rocker switch



APEM will be happy to develop custom product solutions. Please contact us with your requirements.

HOW TO ORDER

- To order a complete product, fill in all the boxes of the following order guide.
- To order case only (without actuator), finish your order number with the LED wiring code.
- To order actuator only (without case), begin the order number with code KRR, then follow the order format from "actuator type" until the end of the options.

CASE + LEADS

KR							Side A	Side B		
SERIES	Electrical functions						Contacts	Sealing	LEDS	Wiring
Poles	<p>1 ON - OFF</p> <p>4 ON ON ON</p> <p>4-1R ON ON MOM</p> <p>5 MOM - ON</p> <p>6 ON - ON</p> <p>7 MOM OFF MOM</p> <p>8 ON OFF MOM</p> <p>9 ON OFF ON</p> <p>Function 1 only for 6-terminal versions.</p> <p>Functions 5 and 6 cannot be combined with "H" wiring.</p>						A Silver D Gold plated	X No K Yes	X None A LED 6V red B LED 6V green C LED 6V yellow M LED 6V blue R LED 6V white D LED 12V red E LED 12V green F LED 12V yellow N LED 12V blue S LED 12V white J LED 24V red K LED 24V green L LED 24V yellow P LED 24V blue T LED 24V white ...	See following pages.
3 Single pole 4 Double pole							Terminals	Terminals (continued)		
							Screw 0 6 terminals with barrier Solder lug/quick-connect 2 6 terminals with barrier 4 6 terminals w/o barrier A 10 term. with barrier B 10 term. w/o barrier C 10 terminals for use with connector U2292 Quick-connect 6,35x0,8 3 6 terminals with barrier	Quick-connect 6,35x0,8 5 6 terminals w/o barrier D 10 term. with barrier E 10 term. w/o barrier F 10 term. for use with connector U2292 Quick-connect 2,8x0,8 G 10 term. with barrier H 10 term. w/o barrier J 10 terminals for use with connector U2282		

ACTUATOR

Type	Colour
1 For non-illuminated application 2 For illuminated application	1 Blue 1/4 Dark blue 2 Black 3 Green 4 Grey 5 Yellow 6 Red 7 Ivory 9 Orange A Aluminium bright

ACTUATOR MARKING

	Area A	Area M	Area B
Orientation	Symbols		
<p>N </p> <p>O </p> <p>S </p> <p>E </p>			

Symbols & Accessories : see end of section D.



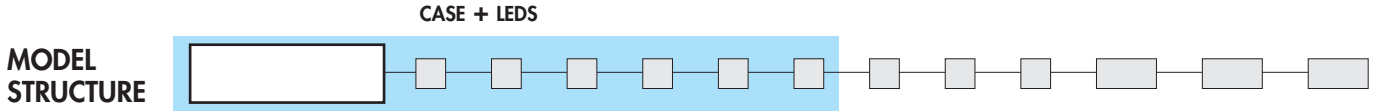
NOTICE : please note that not all combinations of above numbers are available. Refer to the following pages for further information.


KR series

Power rocker switches

Case

- To order case only (without rocker), finish your order number with the LED wiring code.



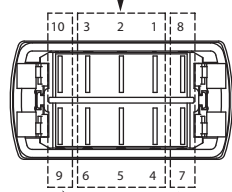


		2-3 5-6	1-2 4-5	
Single pole	Double pole			
KR31	KR41	ON - OFF		
	KR44*	ON ON ON		
	KR44-1R*	ON ON MOM		
KR35	KR45	MOM - ON		
KR36	KR46	ON - ON		
KR37	KR47	MOM OFF MOM		
KR38	KR48	ON OFF MOM		
KR39	KR49	ON OFF ON		

* Function 4 : single pole in double pole case

Bottom view

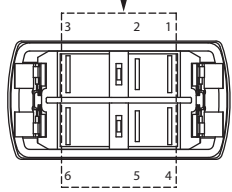
Contact area



LED area

10 terminal version

Contact & LED area



6 terminal version

D

ELECTRICAL FUNCTIONS AND CONNECTIONS

In the tables below, terminal connections as viewed from bottom of switch. Only the contact area is represented. For single pole models, only terminals 1, 2 and 3 are to be considered (not terminals 6, 5, 4).

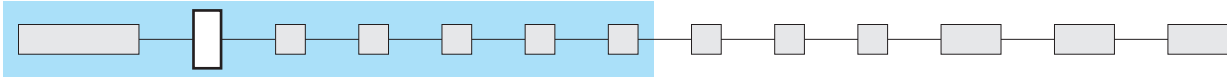
x = w/o terminal
o = with terminal
▲ = momentary

	Positions				Positions		
Function 1 * KR31-KR41				Function 8 KR38-KR48			
Function 5 KR35-KR45				Function 9 KR39-KR49			
Function 6 KR36-KR46				Function 4 KR44			
Function 7 KR37-KR47				Function 4-1R KR44-1R			

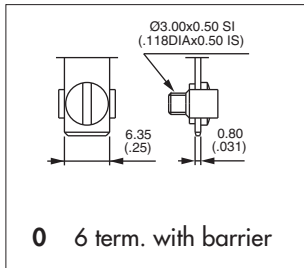
* Function 1 only available for 6 terminal versions.

TERMINALS

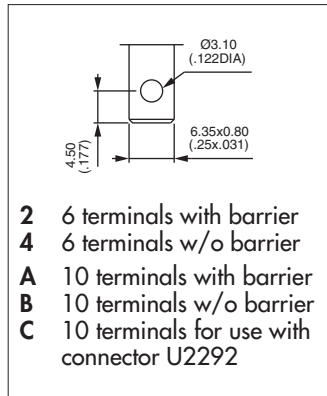
CASE + LEDS



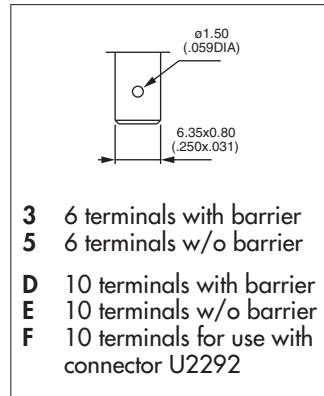
Screw



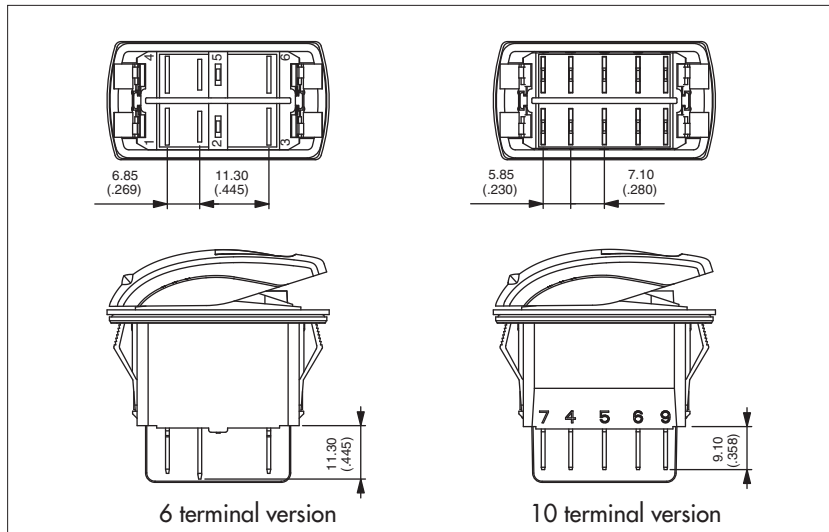
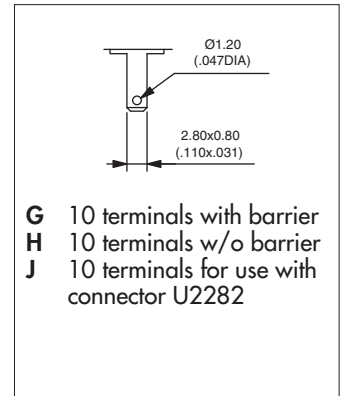
Solder lug / quick-connect



Normalized quick-connect 6,35x0,8



Normalized quick-connect 2,8x0,8

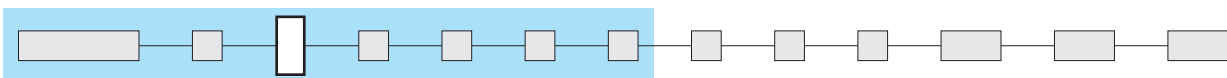


Terminals are marked on the case.

The drawings show the maximum possible number of terminals.

CONTACT MATERIALS

CASE + LEDS



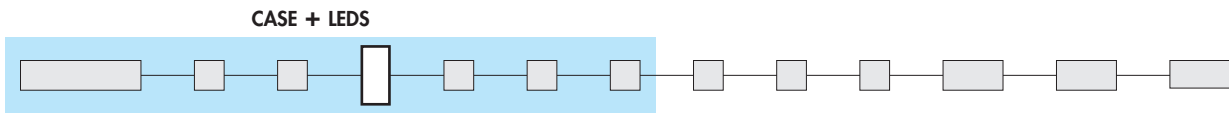
- A** Silver
- D** Silver, gold plated

KR series

Power rocker switches

Case - LEDs

SEALING

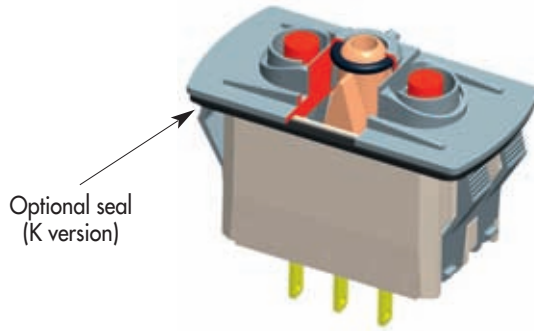


X No sealing

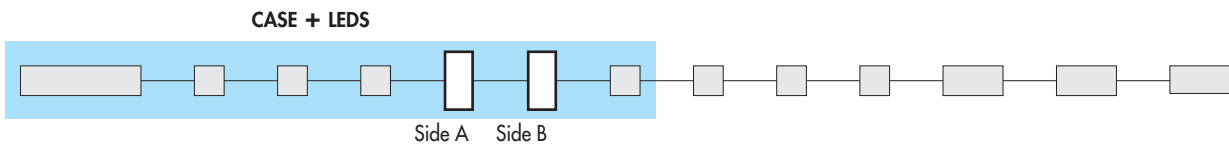
K IP68 (switch assembled on panel)

Ultrasonic welding of frame to case is standard on all versions.
The ultrasonic welding and the optional panel seal prevent water and dust from introducing into the switch housing.

*The product shall be installed professionally.
Test conditions available on request.*



LEDS

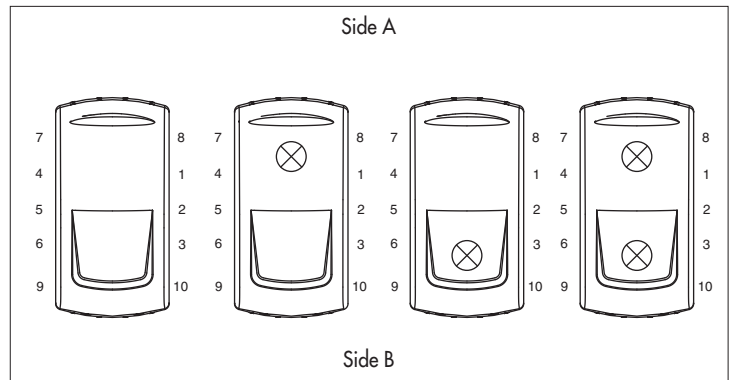


Complete each enlarged box with one of the codes listed below.

X Without LED

	Red	Green	Yellow	Blue	White	Red/green
6VDC	A	B	C	M	R	1
12VDC	D	E	F	N	S	2
24VDC	J	K	L	P	T	3
No resistor	U	V	W	Y	Z	-

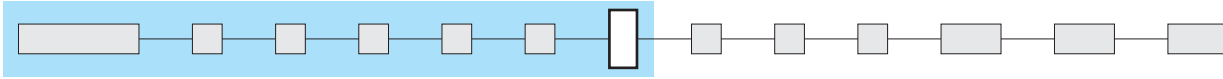
LED consumption : 20mA @ nominal voltage (25°C)
Other illumination solutions : on request.



WIRING

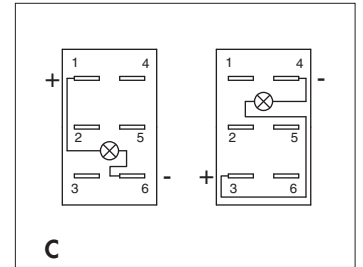
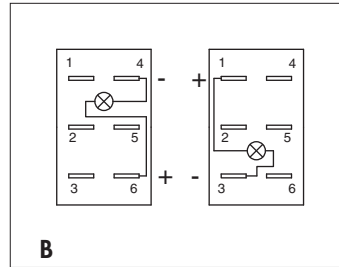
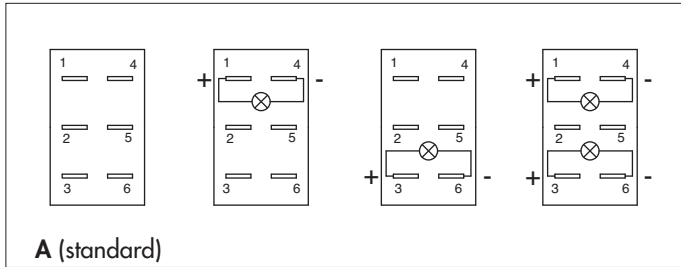
The LED wiring diagram is shown on the case.

CASE + LEDs

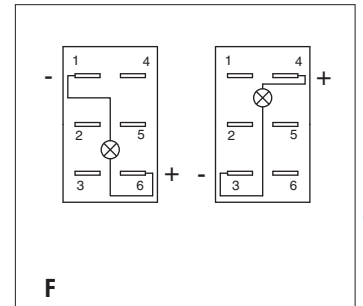
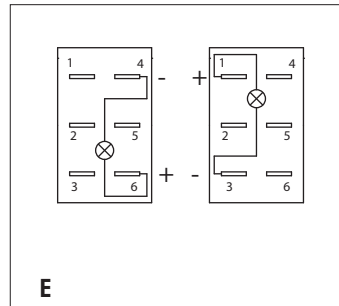
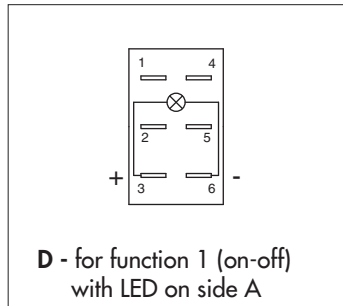


• For 6 terminal versions

LED connected to the load

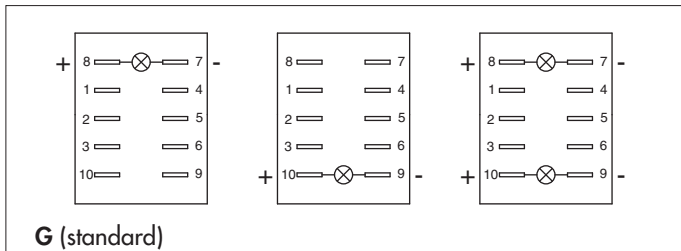


Note : If not available, terminals are added to connect the LED.

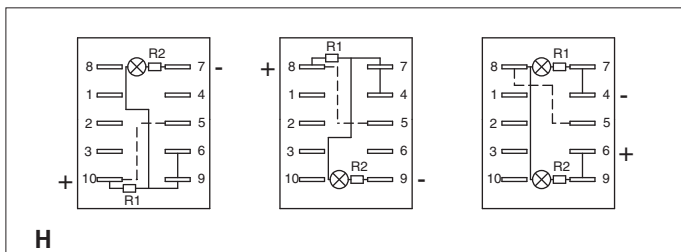


• For 10 terminal versions

Independent LED or integrated functions



To have independent LEDs.



To obtain 2 symbol illumination levels (night illumination when OFF and higher illumination when ON).

H wiring with LED on side A available with functions 6, 8, 9 and 44.

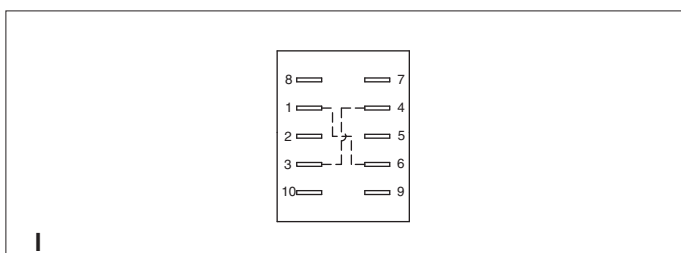
H wiring with LED on side B available with functions 5, 6 and 9.

H wiring with 2 LEDs available with functions 8 and 9.

More information (H wiring schematics) : on request.

Dotted line = external wiring, continuous line = internal wiring

Available in Single Pole only, with H and J quick-connect terminals.



To have a polarity inversion (typical application : fan motor).

Dotted line = external wiring

Power supply between 2 and 5 - Load between 1 and 4 or 3 and 6. Available with H and J quick-connect terminals.

Please contact us for other wiring solutions.

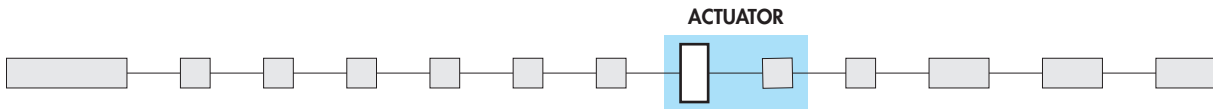
KR series

Power rocker switches

Actuator - Marking

To order actuator only (without case), begin the order number with code KRR, then follow the order format from "actuator type" until the end of the options.

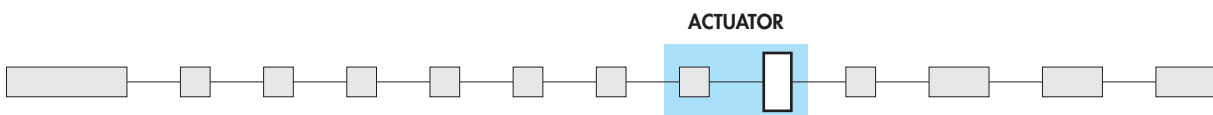
ACTUATOR TYPE



- 1 For non-illuminated application
- 2 For illuminated application

Other rocker design : on request.

ACTUATOR COLOUR



Code	Colour
1	Blue
1/4	Dark blue
2	Black
3	Green

Code	Colour
4	Grey
5	Yellow
6	Red
7	Ivory

Code	Colour
7/1	White
9	Orange
A	Aluminium bright

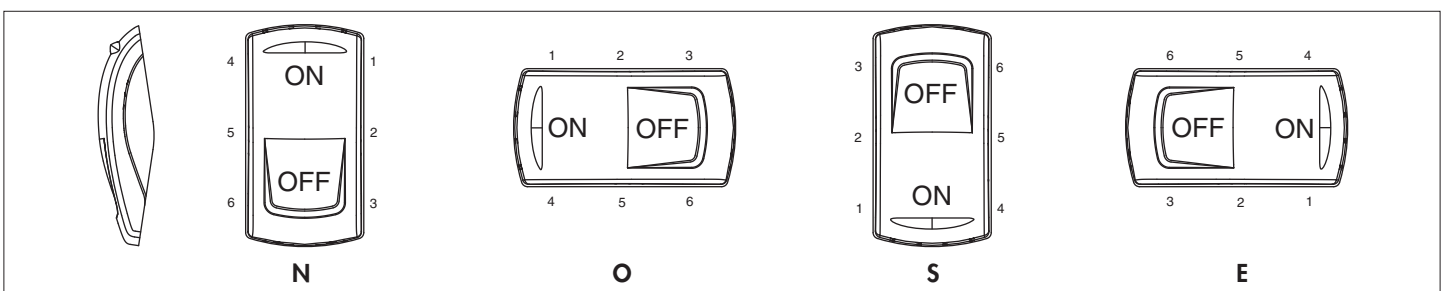
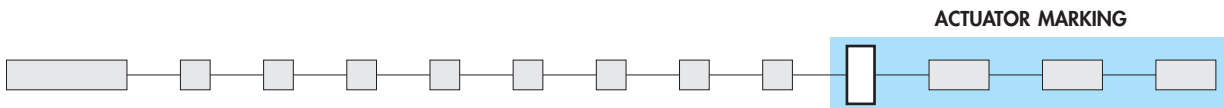
Note : colours 7 and 7/1 not available on illuminated versions.

A **soft-touch varnish** can be added. Consult us.



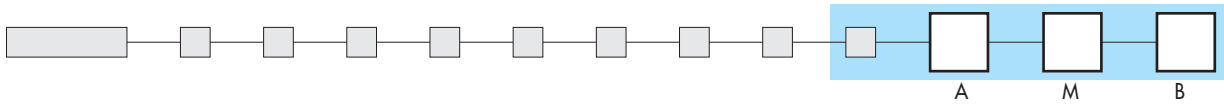
MARKING ORIENTATION

If no marking required, leave box blank.



Other orientations : on request

SYMBOLS



XX No symbol

Available symbols : see end of section D.

Marking colour

White marking for illuminated rockers (laser etching) and non-illuminated black rockers (pad printing). Black marking for non-illuminated colour rockers (pad printing). Other : on request.

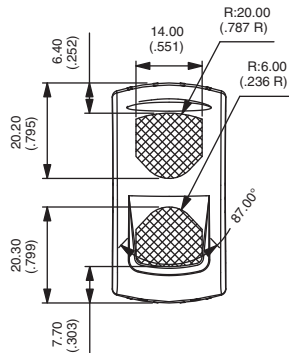
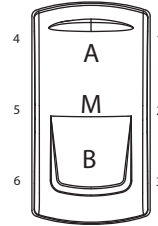
Laser etching resistance

- Water and petrol resistant according to EN61058-1
- Tear resistant (cross-cut test) according to NF ISO 2409 : class 0
- UV resistant according to ISO 4892-2

Marking area

For illuminated versions. The symbol will be included in the hatched area.

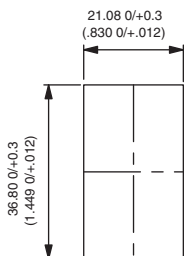
Marking in M area : on request.



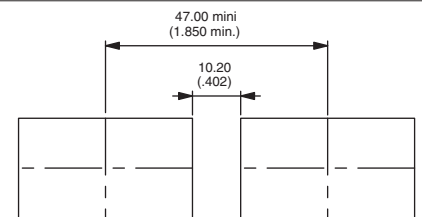
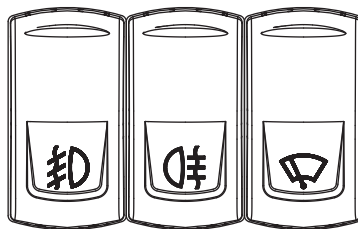
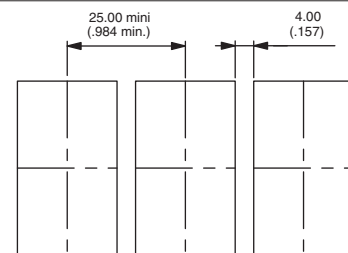
SWITCH PANEL CUT-OUT

Panel thickness : 0,8 mm to 4,6 mm

Recommended panel thickness :
between 2 mm and 3,5 mm



MATRIX MOUNTING



KL series

Locking power rocker switches

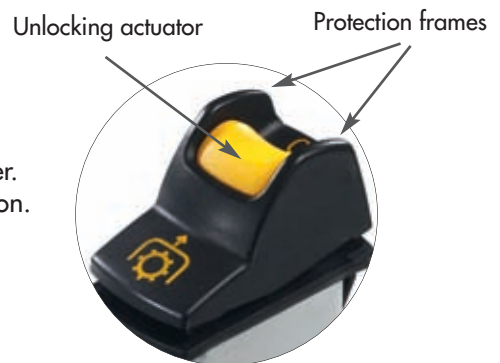
Distinctive features

Unlocking actuator

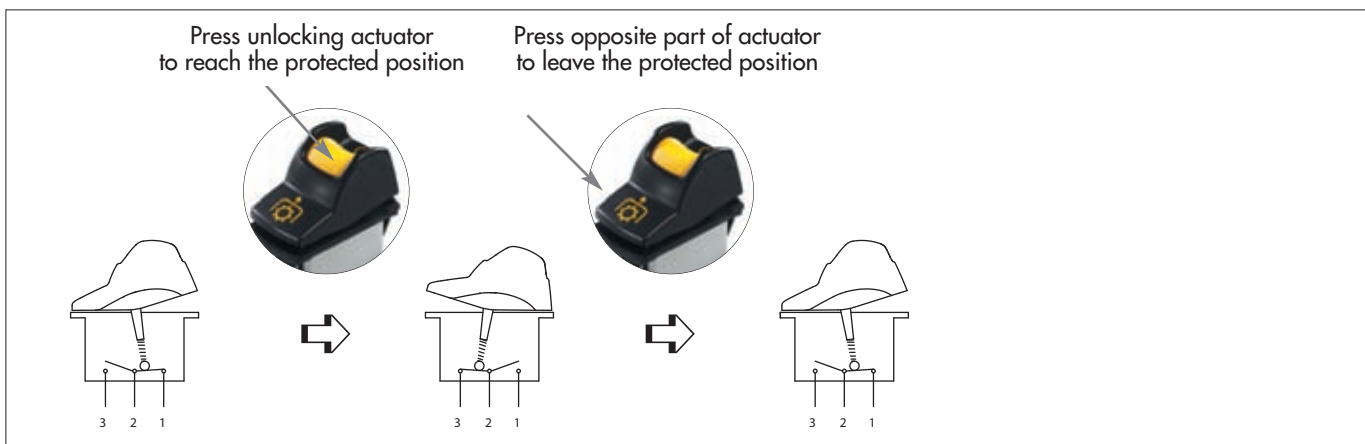
Each KL rocker switch includes an unlocking actuator.

This actuator must be pressed to activate the protected function of the rocker. Moreover, two frames protect the unlocking actuator from untimely activation.

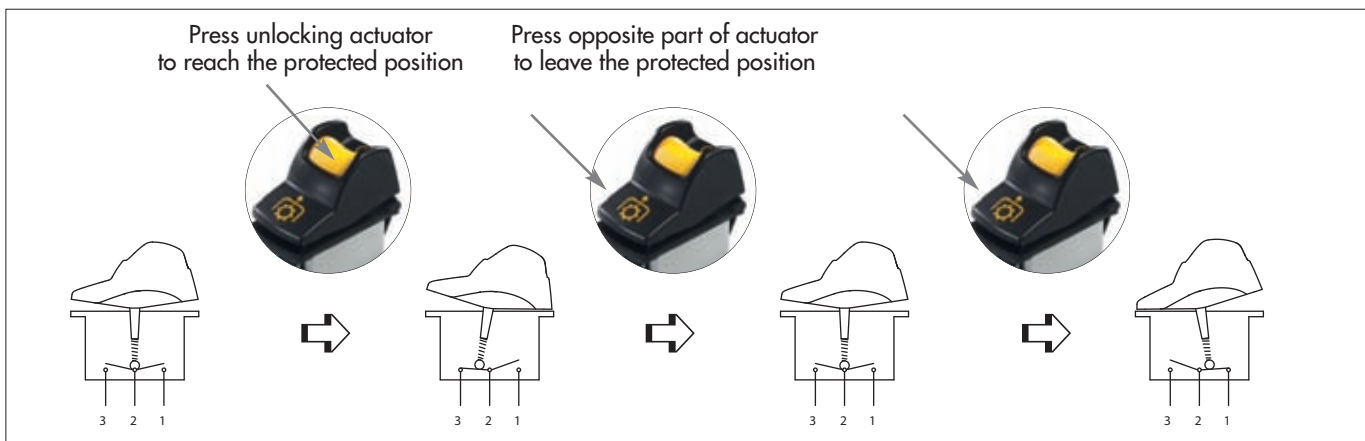
This intuitive and secured ergonomics is patented by APEM.



2 position versions (electrical functions 1, 5 and 6)



3 position versions (electrical functions 7, 8, 9 4, 4-1R)





- One protected position
- Patented intuitive ergonomics
- Wide choice of colours
- Laser etched symbols
- Illuminated or non-illuminated
- Optionally sealed to IP68

ELECTRICAL SPECIFICATIONS

- Current/voltage rating with resistive load :
 - Silver contacts (A) : 5A 24VDC, 100.000 cycles
10A 24VDC, 10.000 cycles (terminals 6.35 x 0.8 only)
 - Gold plated contacts (D) : 20mA 12V, 150.000 cycles
- Initial contact resistance : 10 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.000 Vrms 50 Hz min. between terminals
- Mechanical life : 150.000 cycles min.

MATERIALS

- Case : PA 6-6
- Actuator and unlocking actuator : ABS
- Bezel : PA 6-6
- Terminals : brass, silver plated
- Contacts : silver (A)
or silver, gold plated (D)
- Contact roller : brass, nickel plated

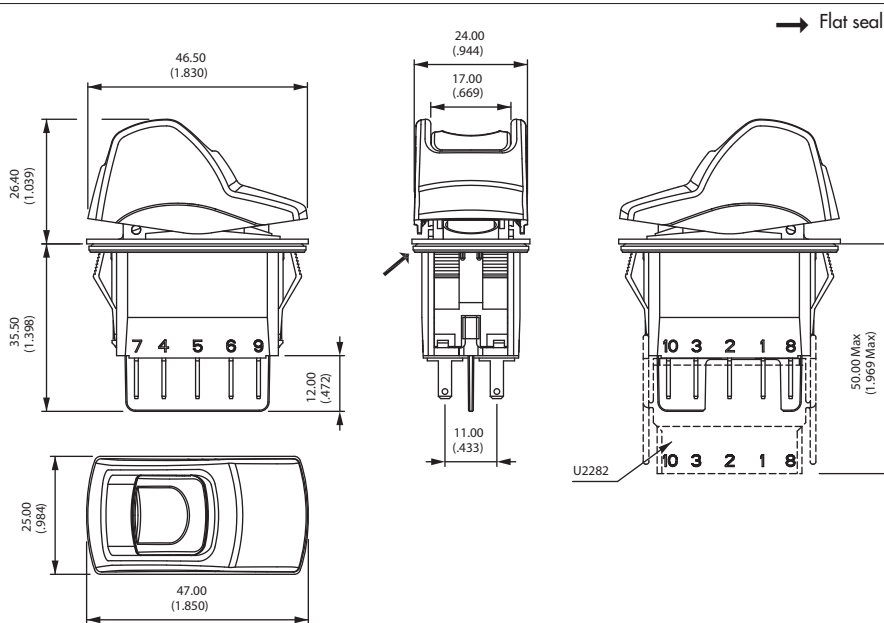
ENVIRONMENTAL SPECIFICATIONS

- Degree of protection of sealed versions : frontal sealing to IP68 according to IEC 60529 (submersion under 1 meter of water for more than 30 minutes)
- Salt spray resistance : 96 hours according to IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C

SEALING

Sealing is optional.
To order a sealed product, complete the appropriate box of ordering format on the following pages.

DIMENSIONS



Packaging unit : 40 pieces

Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.

KL series

Locking power rocker switches

Selection guide

• To order a complete product, fill in all the boxes of the following order guide.

CASE + LEDS

KL							Side B																																																																									
SERIES	Electrical functions			Contacts	Sealing	LEDS		Wiring																																																																								
Poles 3 Single pole 4 Double pole	<table border="1"> <tr><td>1</td><td>ON</td><td>-</td><td>OFF</td></tr> <tr><td>4</td><td>ON</td><td>ON</td><td>ON</td></tr> <tr><td>4-1R</td><td>ON</td><td>ON</td><td>MOM</td></tr> <tr><td>5</td><td>MOM</td><td>-</td><td>ON</td></tr> <tr><td>6</td><td>ON</td><td>-</td><td>ON</td></tr> <tr><td>7</td><td>MOM</td><td>OFF</td><td>MOM</td></tr> <tr><td>8</td><td>ON</td><td>OFF</td><td>MOM</td></tr> <tr><td>9</td><td>ON</td><td>OFF</td><td>ON</td></tr> </table> <p>Function 1 only for 6-terminal versions. Functions 5 and 6 cannot be combined with "H" wiring.</p>			1	ON	-	OFF	4	ON	ON	ON	4-1R	ON	ON	MOM	5	MOM	-	ON	6	ON	-	ON	7	MOM	OFF	MOM	8	ON	OFF	MOM	9	ON	OFF	ON	<table border="1"> <tr><td>A</td><td>Silver</td></tr> <tr><td>D</td><td>Gold plated</td></tr> </table>	A	Silver	D	Gold plated	<table border="1"> <tr><td>X</td><td>No</td></tr> <tr><td>K</td><td>Yes</td></tr> </table>	X	No	K	Yes	<table border="1"> <tr><td>X</td><td>None</td></tr> <tr><td>A</td><td>LED 6V red</td></tr> <tr><td>B</td><td>LED 6V green</td></tr> <tr><td>C</td><td>LED 6V yellow</td></tr> <tr><td>M</td><td>LED 6V blue</td></tr> <tr><td>R</td><td>LED 6V white</td></tr> <tr><td>D</td><td>LED 12V red</td></tr> <tr><td>E</td><td>LED 12V green</td></tr> <tr><td>F</td><td>LED 12V yellow</td></tr> <tr><td>N</td><td>LED 12V blue</td></tr> <tr><td>S</td><td>LED 12V white</td></tr> <tr><td>J</td><td>LED 24V red</td></tr> <tr><td>K</td><td>LED 24V green</td></tr> <tr><td>L</td><td>LED 24V yellow</td></tr> <tr><td>P</td><td>LED 24V blue</td></tr> <tr><td>T</td><td>LED 24V white</td></tr> </table>		X	None	A	LED 6V red	B	LED 6V green	C	LED 6V yellow	M	LED 6V blue	R	LED 6V white	D	LED 12V red	E	LED 12V green	F	LED 12V yellow	N	LED 12V blue	S	LED 12V white	J	LED 24V red	K	LED 24V green	L	LED 24V yellow	P	LED 24V blue	T	LED 24V white	See following pages.
1	ON	-	OFF																																																																													
4	ON	ON	ON																																																																													
4-1R	ON	ON	MOM																																																																													
5	MOM	-	ON																																																																													
6	ON	-	ON																																																																													
7	MOM	OFF	MOM																																																																													
8	ON	OFF	MOM																																																																													
9	ON	OFF	ON																																																																													
A	Silver																																																																															
D	Gold plated																																																																															
X	No																																																																															
K	Yes																																																																															
X	None																																																																															
A	LED 6V red																																																																															
B	LED 6V green																																																																															
C	LED 6V yellow																																																																															
M	LED 6V blue																																																																															
R	LED 6V white																																																																															
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J	LED 24V red																																																																															
K	LED 24V green																																																																															
L	LED 24V yellow																																																																															
P	LED 24V blue																																																																															
T	LED 24V white																																																																															
	Terminals			Terminals (continued)																																																																												
	Screw 0 6 terminals with barrier Solder lug/quick-connect 2 6 terminals with barrier 4 6 terminals w/o barrier A 10 term. with barrier B 10 term. w/o barrier C 10 terminals for use with connector U2292 Quick-connect 6,35x0,8 3 6 terminals with barrier			Quick-connect 6,35x0,8 5 6 terminals w/o barrier D 10 term. with barrier E 10 term. w/o barrier F 10 term. for use with connector U2292 Quick-connect 2,8x0,8 G 10 term. with barrier H 10 term. w/o barrier J 10 terminals for use with connector U2282																																																																												

ACTUATOR

Type	Rocker colour	Unlocking actuator colour
1 For non-illum. application 2 For illuminated application	1 Blue 1/4 Dark blue 2 Black 3 Green 4 Grey 5 Yellow 6 Red 7 Ivory 9 Orange	1 Blue 1/4 Dark blue 2 Black 3 Green 4 Grey 5 Yellow 6 Red 7 Ivory 9 Orange

ACTUATOR MARKING

	Area A	Area B	
Orientation	Symbols		Marking colour
			Illuminated models Blank White Non-illuminated 1 Blue 2 Black 3 Green 4 Grey 5 Yellow 6 Red 7 White 9 Orange

Symbols & Accessories : see end of section D.

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

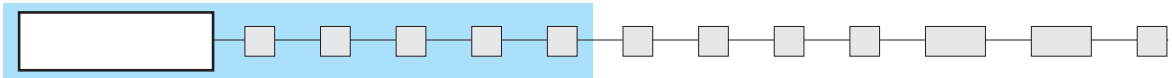
KL series

Locking power rocker switches

Case

MODEL
STRUCTURE

CASE + LEDS



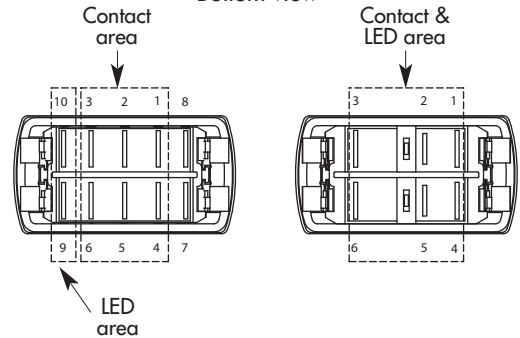
Single pole
KL31

Double pole
KL41
KL44*
KL44-1R*
KL35
KL36
KL37
KL38
KL39

2-3 1-2
5-6 4-5

ON - OFF
ON ON ON
ON ON MOM
MOM - ON
ON - ON
MOM OFF MOM
ON OFF MOM
ON OFF ON

Bottom view



10 terminal version

6 terminal version

* Function 4 : single pole in double pole case

ELECTRICAL FUNCTIONS AND CONNECTIONS

In the tables below, terminal connections as viewed from bottom of switch. Only the contact area is represented. For single pole models, only terminals 1, 2 and 3 are to be considered (not 6, 5, 4).

x = w/o terminal
o = with terminal
▲ = momentary

	2 positions	
	Press unlocking actuator to unlock.	
Function 1 * KL31-KL41		
Function 5 KL35 - KL45		
Function 6 KL36-KL46		

	3 positions		
Function 7 KL37-KL47			
Function 8 KL38-KL48			
Function 9 KL39-KL49			
Function 4 KL44			
Function 4-1R KL44-1R			

*** Function 1**

- Only available for 6 terminal versions.
- Illuminated versions only available with "A" wiring.

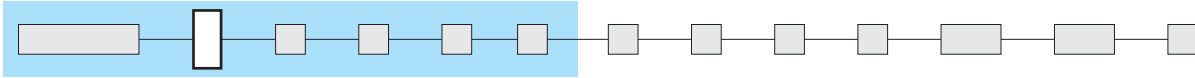
KL series

Locking power rocker switches

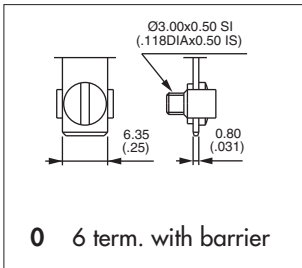
Case

TERMINALS

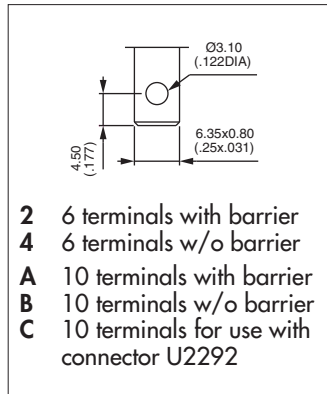
CASE + LEDS



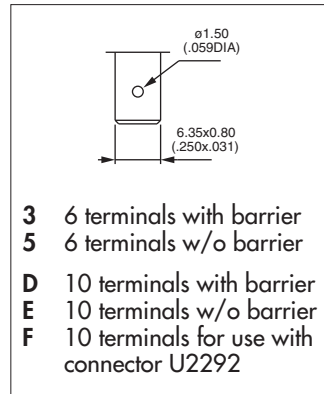
Screw



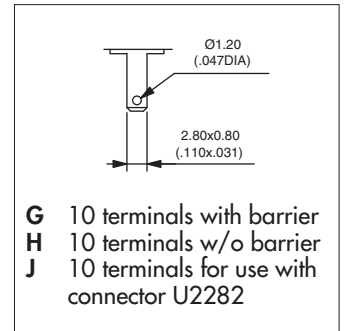
Solder lug / quick-connect



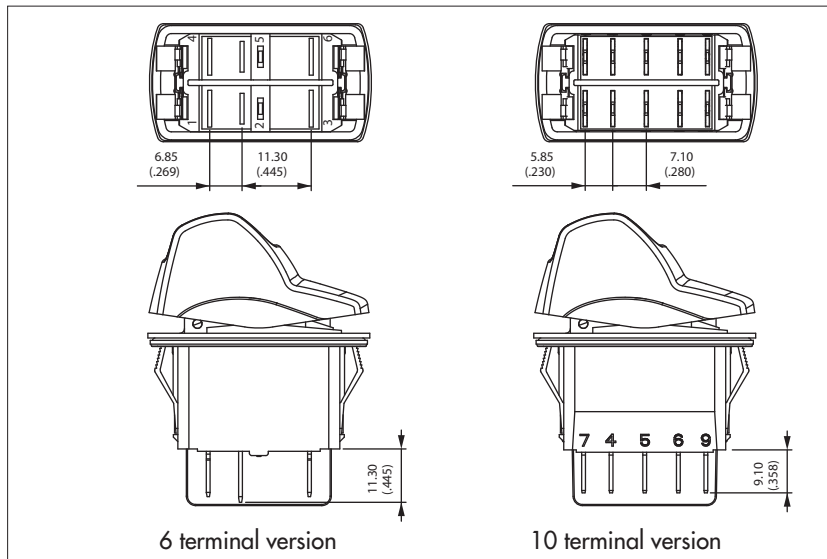
Normalized quick-connect 6,35x0,8



Normalized quick-connect 2,8x0,8



D

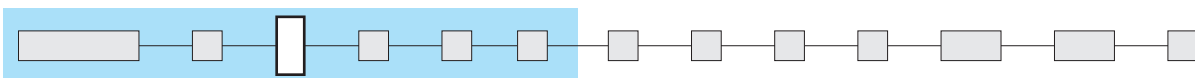


Terminals are marked on the case.

The drawings show the maximum possible number of terminals.

CONTACT MATERIALS

CASE + LEDS



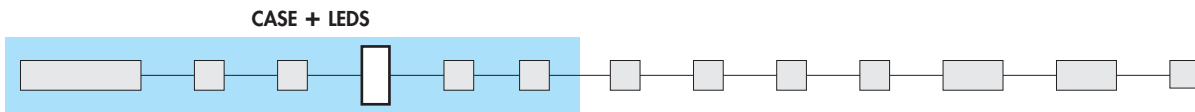
- A** Silver
- D** Silver, gold plated

KL series

Locking power rocker switches

Case - LEDs

SEALING

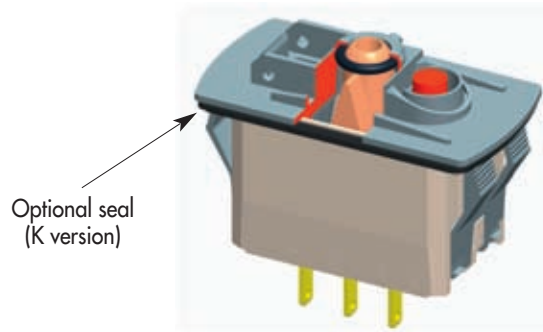


X No sealing

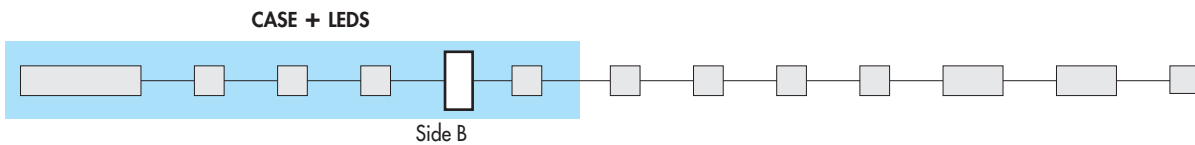
K IP68 (switch assembled on panel)

Ultrasonic welding of frame to case is standard on all versions.
The ultrasonic welding and the optional panel seal prevent water and dust from introducing into the switch housing.

*The product shall be installed professionally.
Test conditions available on request.*



LEDS

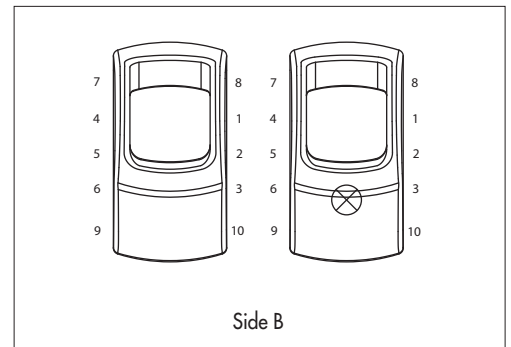


Complete enlarged box with one of the codes listed below.

X Without LED

	Red	Green	Yellow	Blue	White	Red/green
6VDC	A	B	C	M	R	1
12VDC	D	E	F	N	S	2
24VDC	J	K	L	P	T	3
No resistor	U	V	W	Y	Z	-

LED consumption : 20mA @ nominal voltage (25°C)
Other illumination solutions : on request.



D

KL series

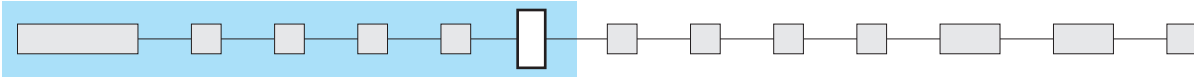
Locking power rocker switches

Case - LED

WIRING

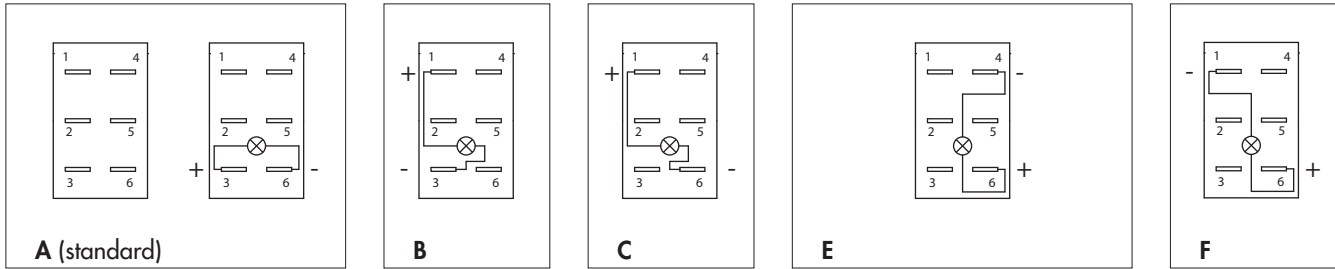
The LED wiring diagram is shown on the case.

CASE + LED



• For 6 terminal versions

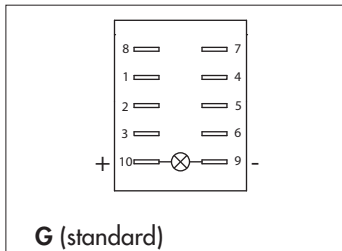
LED connected to the load



Note : If not available, terminals are added to connect the LED.

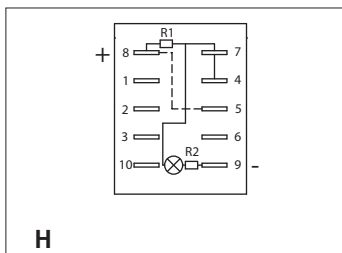
• For 10 terminal versions

Independent LED or integrated functions



G (standard)

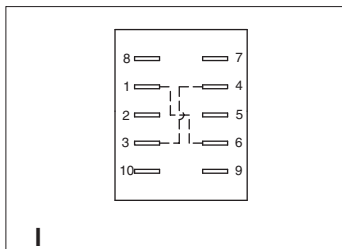
To have independent LED.



H

To obtain 2 symbol illumination levels (night illumination when OFF and higher illumination when ON).
Dotted line = external wiring, continuous line = internal wiring

Available in Single Pole only, with H and J quick-connect terminals.



I

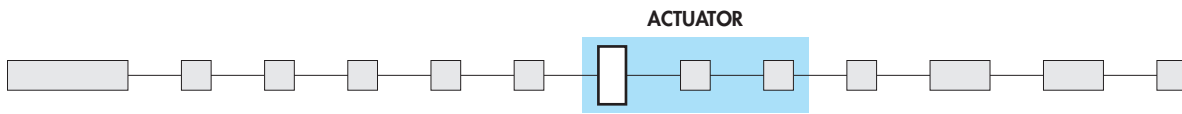
To have a polarity inversion (typical application : fan motor).
Dotted line = external wiring

Power supply between 2 and 5 - Load between 1 and 4 or 3 and 6.
Available with H and J quick-connect terminals.

Please contact us for other wiring solutions.

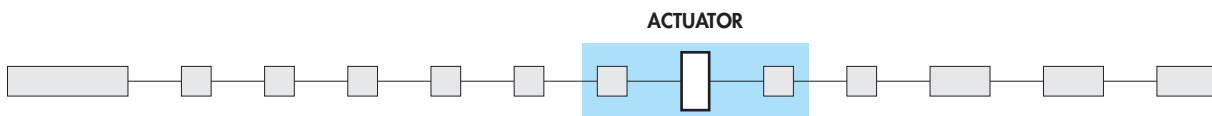
D

ACTUATOR TYPE



- 1 For non-illuminated application
- 2 For illuminated application

ROCKER COLOUR



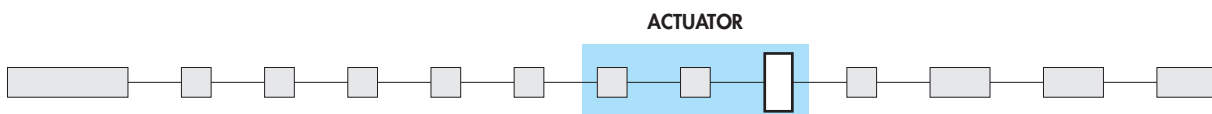
Code	Colour
1	Blue
1/4	Dark blue
2	Black

Code	Colour
3	Green
4	Grey
5	Yellow

Code	Colour
6	Red
7	Ivory
9	Orange

Note : colour 7 not available on illuminated versions

UNLOCKING ACTUATOR COLOUR



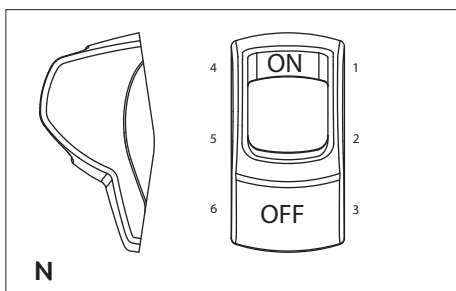
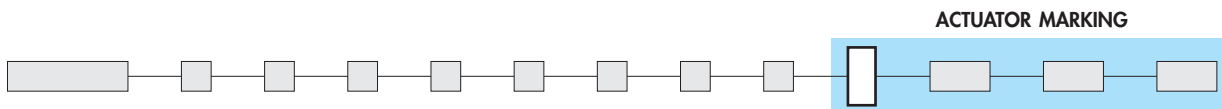
Code	Colour
1	Blue
1/4	Dark blue
2	Black

Code	Colour
3	Green
4	Grey
5	Yellow

Code	Colour
6	Red
7	Ivory
9	Orange

MARKING ORIENTATION

If no marking required, leave box blank.



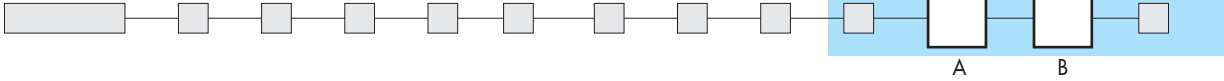
Other orientations : on request

KL series

Locking power rocker switches

Marking - Mounting

SYMBOLS



XX No symbol

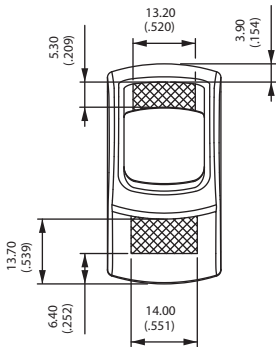
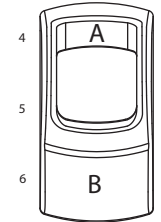
Available symbols : see end of section D.

Laser etching resistance

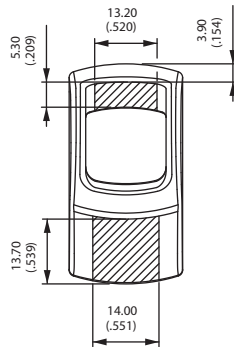
- Water and petrol resistant according to EN61058-1
- Tear resistant (cross-cut test) according to NF ISO 2409 : class 0
- UV resistant according to ISO 4892-2

Marking area - The symbol will be included in the hatched area.

ACTUATOR MARKING

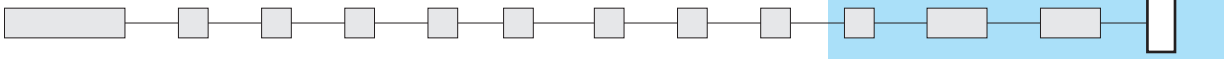


For illuminated versions



For non-illuminated versions

MARKING COLOUR



ACTUATOR MARKING

Illuminated models (laser etching)

Blank White

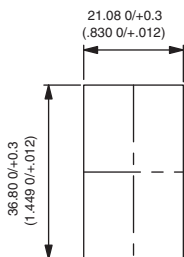
Non-illuminated models (pad printing)

1 : Blue - **2** : Black - **3** : Green - **4** : Grey - **5** : Yellow - **6** : Red - **7** : White - **9** : Orange

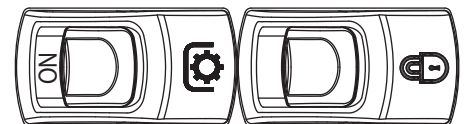
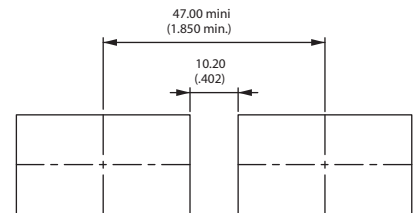
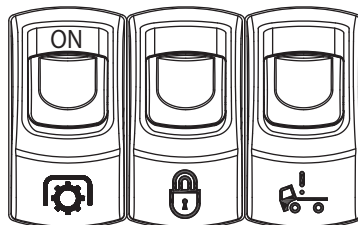
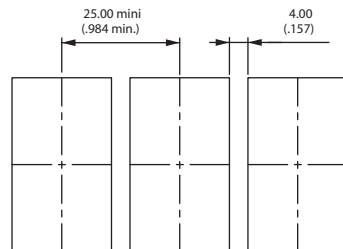
SWITCH PANEL CUT-OUT

Panel thickness : 0,8 mm to 4,6 mm

Recommended panel thickness :
between 2 mm and 3,5 mm



MATRIX MOUNTING





- Wide choice of bezel colours
- Wide choice of LEDs
- Laser etched symbols
- Long life expectancy
- Optionally sealed to IP68

ELECTRICAL SPECIFICATIONS

- Operating voltage : 6VDC, 12VDC or 24VDC
- Nominal current : 20mA per LED

ENVIRONMENTAL SPECIFICATIONS

- Degree of protection of sealed versions : frontal sealing to IP68 according to IEC 60529 (submersion under 1 meter of water for more than 30 minutes)
- Salt spray resistance : 96 hours according to IEC 512-6, test 11f
- Operating temperature : -40°C to +85°C

MATERIALS

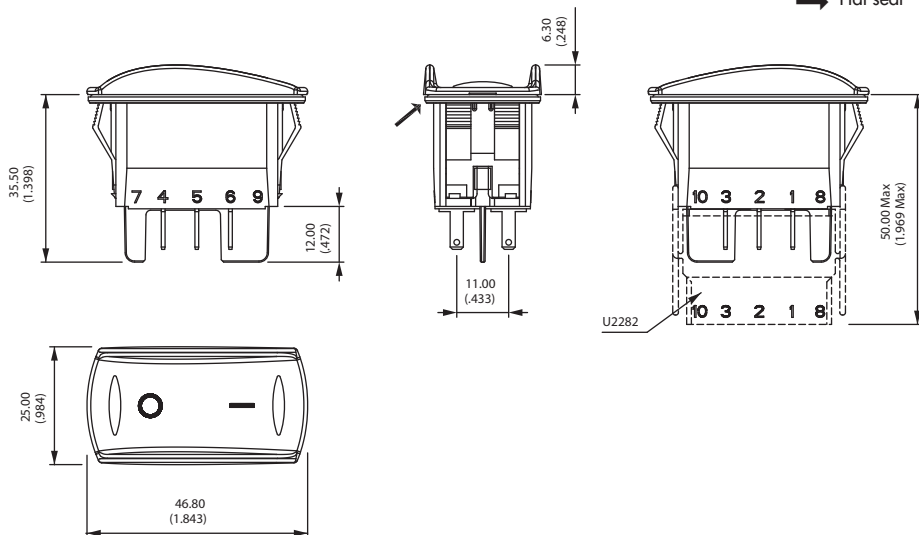
- Case : ABS
- Bezel : ABS
- Terminals : brass, silver plated

SEALING

Sealing is optional.
To order a sealed product, complete the appropriate box of ordering format on the following pages.

DIMENSIONS

→ Flat seal



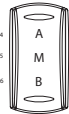
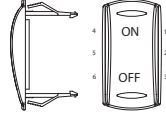

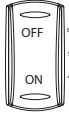
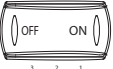
Packaging unit : 40 pieces

Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.

KI series

LED indicators

Selection guide

Side A	Side M	Side B			Side A	Side M	Side B		
KI									
SERIES	Colours	LEDS	Type of illumination		Symbols			Sealing	
1 Blue 1/4 Dark blue 2 Black 3 Green 4 Grey 5 Yellow 6 Red 9 Orange	X None A LED 6V red B LED 6V green C LED 6V yellow M LED 6V blue R LED 6V white D LED 12V red E LED 12V green F LED 12V yellow N LED 12V blue S LED 12V white J LED 24V red K LED 24V green L LED 24V yellow P LED 24V blue T LED 24V white	X Standard S Super bright			X No K Yes				
		DC voltage standard	Marking orientation		Terminals with barrier				
			N 		C Solder lug / quick-connect F Quick-connect 6,35 J Quick-connect 2,8				
			O 						
			S 						
			E 						

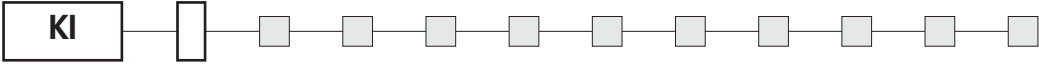
On request : 48VDC voltage - AC voltage - new design

Symbols & Accessories : see end of section D.



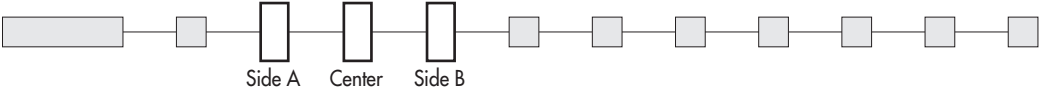
NOTICE : please note that not all combinations of above numbers are available. Refer to the following pages for further information.

BEZEL COLOUR



Code	Colour	Code	Colour
1	Blue	4	Grey
1/4	Dark blue	5	Yellow
2	Black	6	Red
3	Green	9	Orange

LEDS

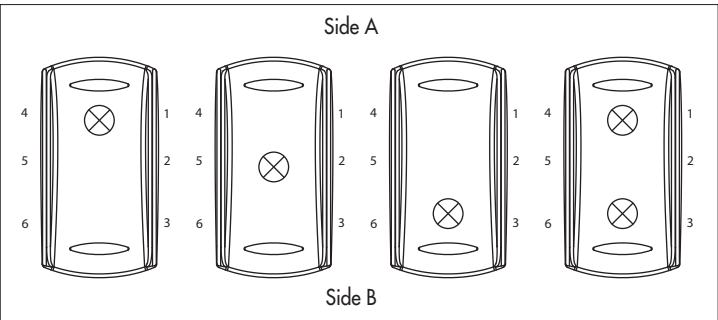


Complete each enlarged box with one of the codes listed below.

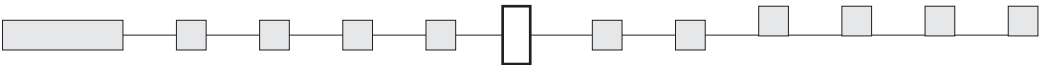
X Without LED

	Red	Green	Yellow	Blue	White	Red/green
6VDC	A	B	C	M	R	1
12VDC	D	E	F	N	S	2
24VDC	J	K	L	P	T	3
No resistor	U	V	W	Y	Z	-

LED consumption : 20mA @ nominal voltage (25°C)
 Other illumination solutions : on request.



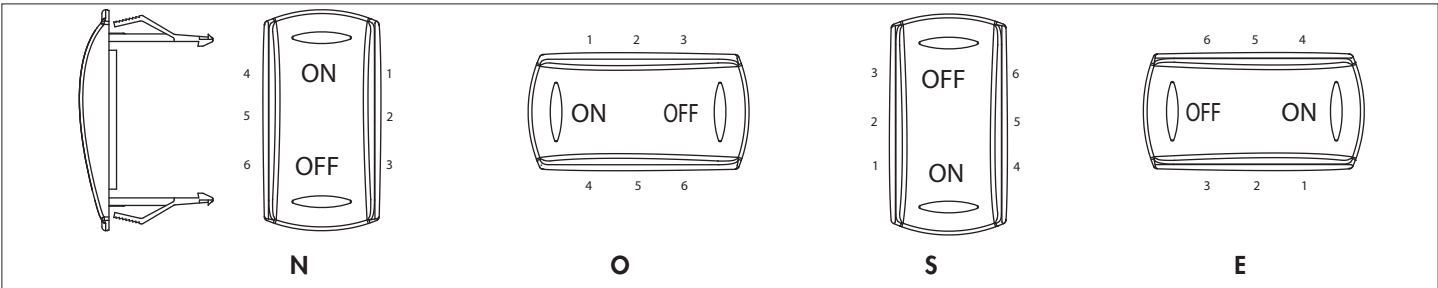
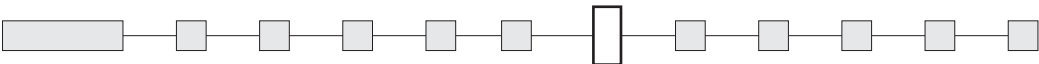
TYPE OF ILLUMINATION



X Standard
S Super bright

MARKING ORIENTATION

If no marking required, leave box blank. Other orientations : on request

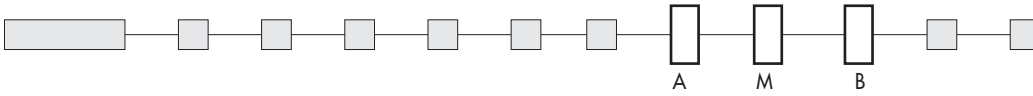


KI series

LED indicators

Marking - Terminals

SYMBOLS



XX No symbol

Available symbols : see end of section D.

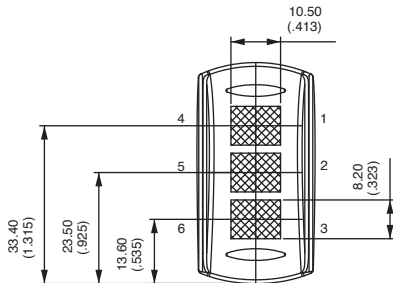
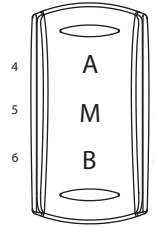
Marking colour

White (laser etching)

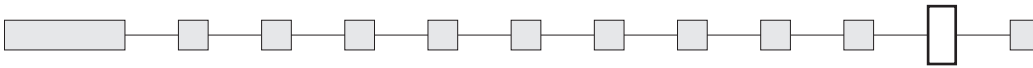
Laser etching resistance

- Water and petrol resistant according to EN61058-1
- Tear resistant (cross-cut test) according to NF ISO 2409 : class 0
- UV resistant according to ISO 4892-2

Marking area - The symbol will be included in the hatched area.



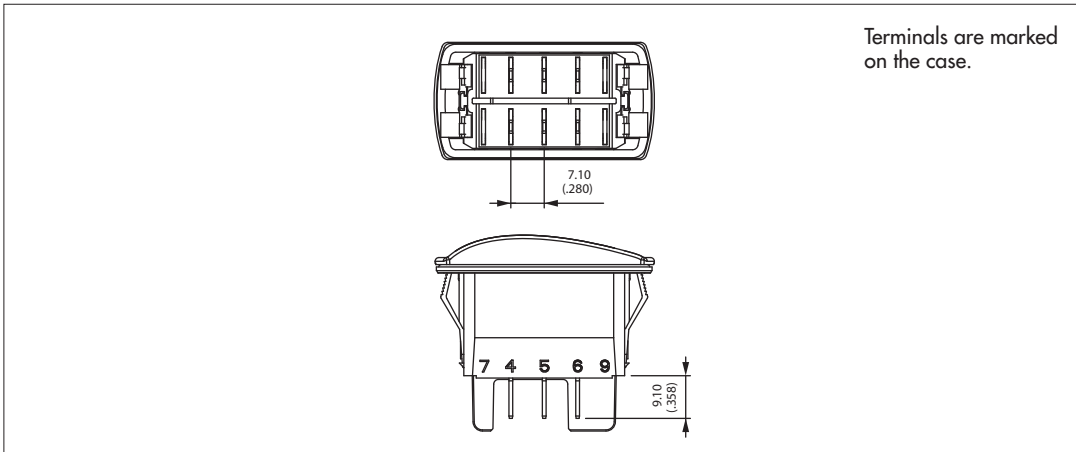
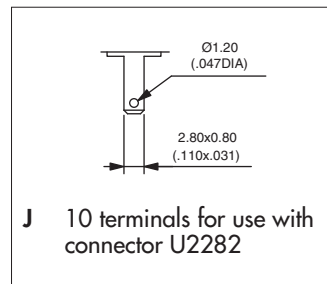
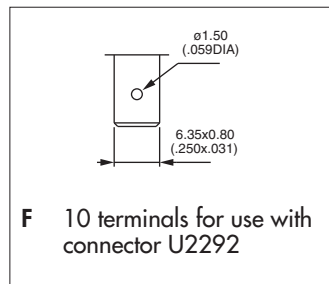
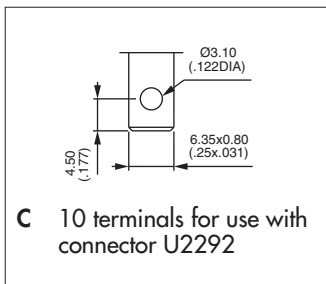
TERMINALS (WITH BARRIER)



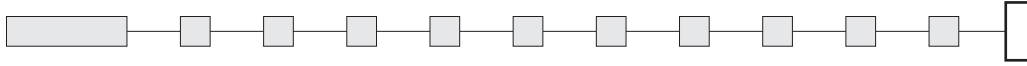
Solder lug / quick-connect

Normalized quick-connect 6,35x0,8

Normalized quick-connect 2,8x0,8



SEALING



- X No sealing
- K IP68 (switch assembled on panel)

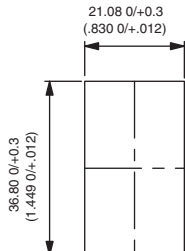
Ultrasonic welding of frame to case is standard on all versions.
The ultrasonic welding and the optional panel seal prevent water and dust from introducing into the switch housing.

*The product shall be installed professionally.
Test conditions available on request.*

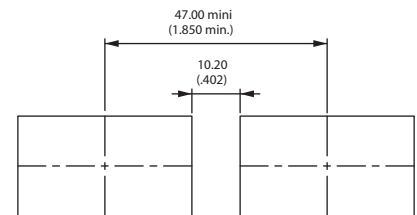
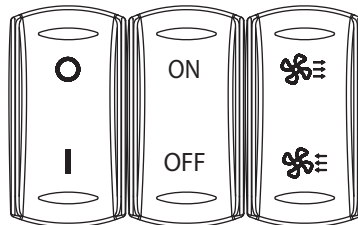
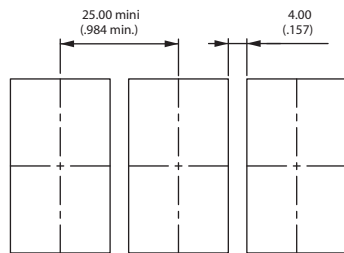


SWITCH PANEL CUT-OUT

Panel thickness : 0,8 mm to 4,6 mm
Recommended panel thickness :
between 2 mm and 3,5 mm



MATRIX MOUNTING



KG series

Power rocker switches

Distinctive features and specifications



- Protected rocker
- Illuminated or non-illuminated
- VDE (EN 61058-1) approved
- Sealed to IP65

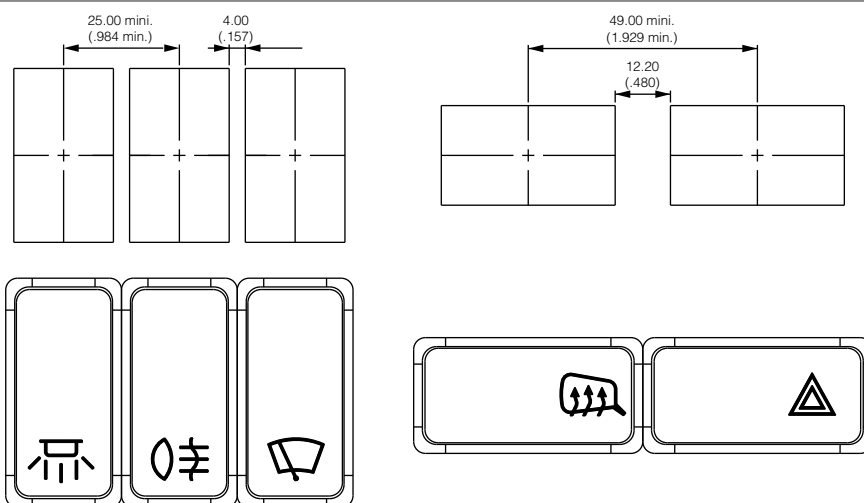
ELECTRICAL SPECIFICATIONS

- Current/voltage rating :
 - functions 1 (ON-OFF) and 6 (ON-ON) : 15A 12VDC, 10A 24VDC max., 10mA 14VDC min.
 - functions 4 (ON ON ON) and 4-1R (ON ON MOM) : 8A 12VDC, 5A 24VDC max.
 - other functions : 10A 12VDC, 8A 24VDC max.
- Initial contact resistance : 10 mΩ max. at 1A 2VDC
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 2.000 Vrms 50 Hz min. between terminals
- Electrical life : 10.000 cycles min.
- Mechanical life : 2 position models : 100.000 cycles min.
3 position models : 30.000 cycles min.

ENVIRONMENTAL SPECIFICATIONS

- Degree of protection : IP65 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500 Hz - 10 g according to IEC 512-4, test 6d
- Salt spray resistance : 96 hours according to IEC 512-6, test 11f
- Operating temperature : 2 position models : -40°C to + 85°C
3 position models : -10°C to + 65°C

MATRIX MOUNTING



MATERIALS

- Case : thermoplastic UL94-V0
- Terminals : brass, silver plated
- Contacts : silver grain
- Contact roller : brass, nickel plated

AGENCY APPROVAL



12(4)A 250VAC
T85/55°C

Availability : double pole models, functions ON-OFF and ON-ON.

Marking : to order switches marked VDE, add "VDE" at the end of model number.



Packaging unit : 40 pieces



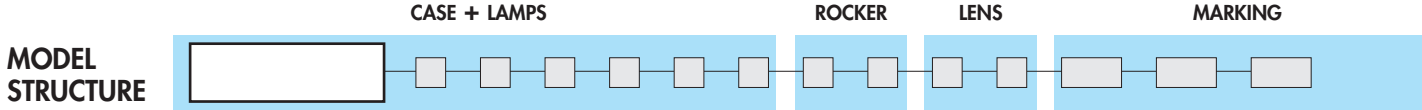
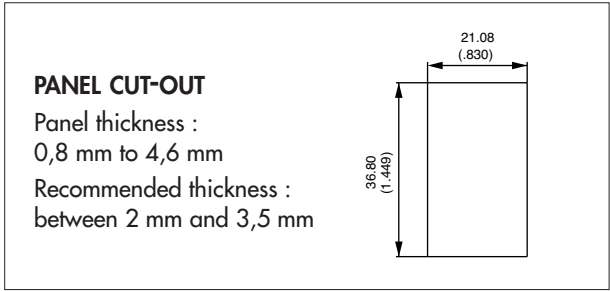
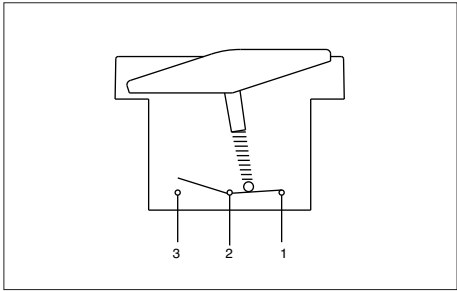
Sealing boots are available to protect the switches against dust and water. They are presented in section H.

Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.

KG series

Power rocker switches

Case

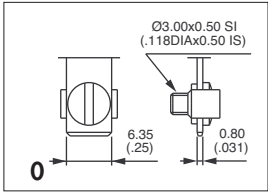
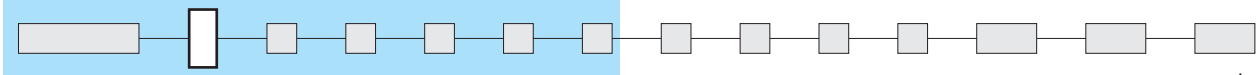


	2-3	1-2	
	5-6	4-5	
Single pole	ON	ON	OFF
KG31	ON	ON	ON
Double pole	ON	ON	MOM
KG41*	ON	ON	MOM
KG44-1R*	MOM	-	ON
KG35	ON	-	ON
KG36	ON	-	ON
KG37	MOM	OFF	MOM
KG38	ON	OFF	MOM
KG39	ON	OFF	ON
KG45			
KG46			
KG47			
KG48			
KG49			

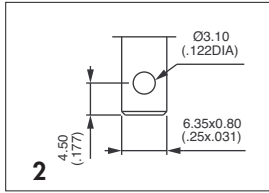
* Function 4 : single pole in double pole case

→ Flat seal

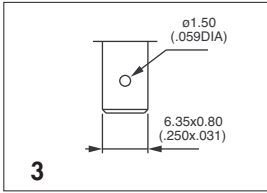
TERMINALS



Screw



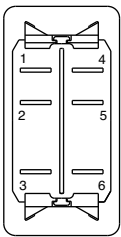
Solder lug / quick-connect



Quick-connect

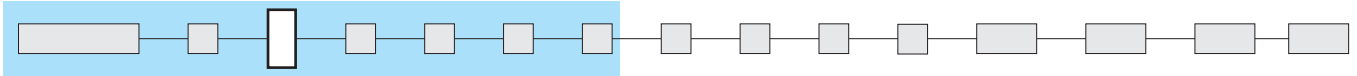
Terminals 1 to 6 are marked on the case.

Side A : terminals 1 and 4
Side B : terminals 3 and 6



Side B

CONTACT MATERIALS



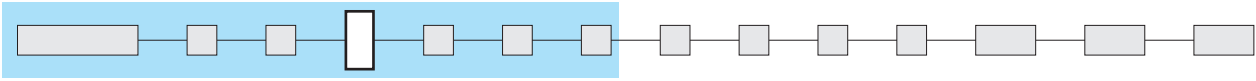
A Silver grain

KG series

Power rocker switches

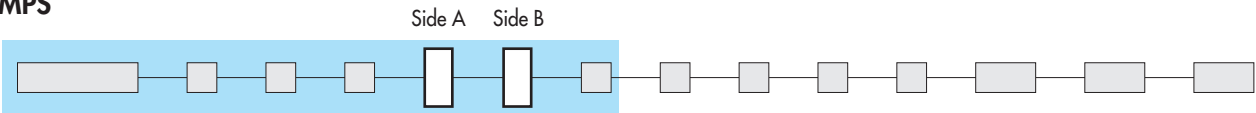
Lamps

BEZEL



2 Black, sealed to IP65

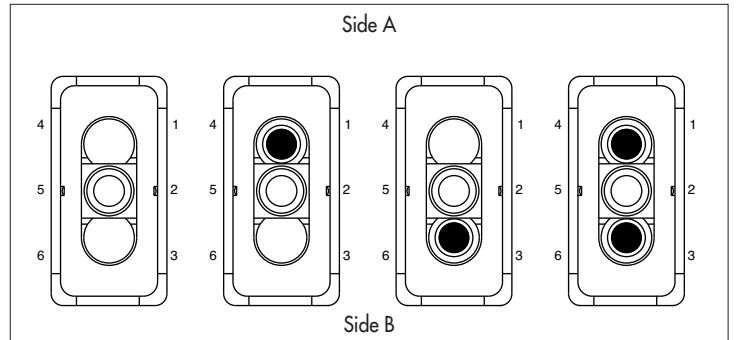
LAMPS



Complete each enlarged box with one of the codes listed below.

X	Without lamp
A	6V LED red
B	6V LED green
C	6V LED yellow
D	12V LED red
E	12V LED green
F	12V LED yellow
G	18V LED red
H	18V LED green
I	18V LED yellow

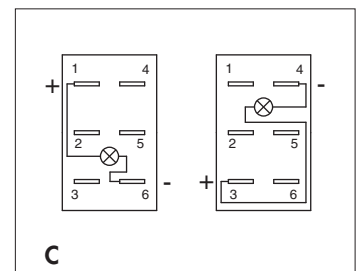
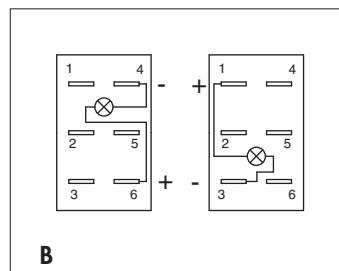
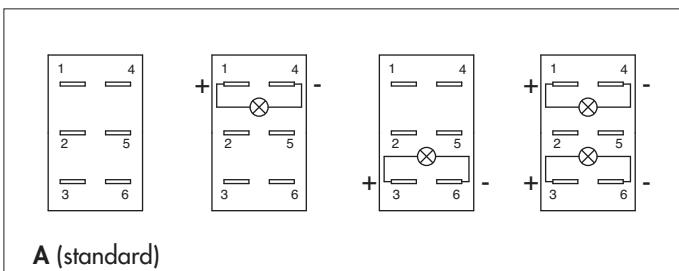
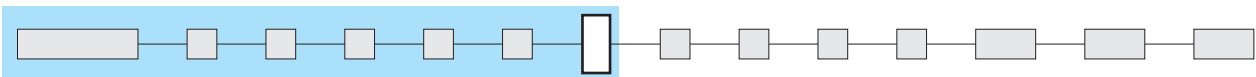
J	24V LED red
K	24V LED green
L	24V LED yellow
M	Neon 125V
N	Neon 250V
O	Filament 6V
P	Filament 12V
R	Filament 24V
S	Fluorescent 220V
T	Fluorescent 110V



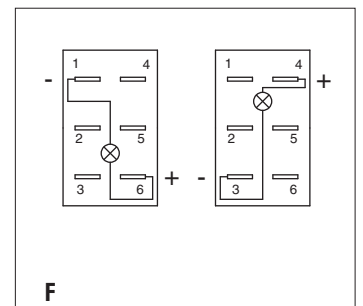
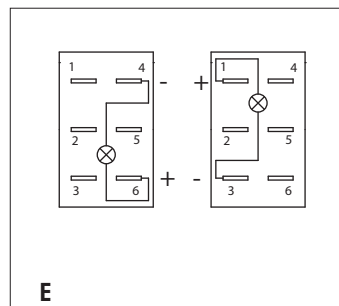
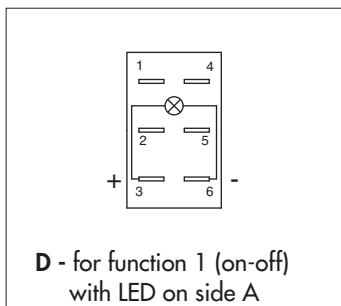
White and blue LEDs : on request.

LAMP WIRING

The lamp wiring diagram is shown on the case.



Note : If not available, terminals are added to connect the LED.



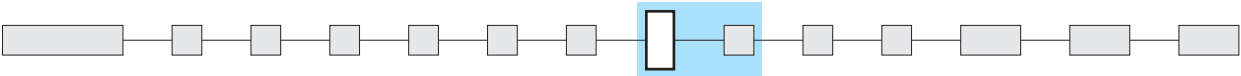
To order case only (without rocker), finish your order number with the lamp wiring code.

KG series

Power rocker switches

Rocker - Lenses

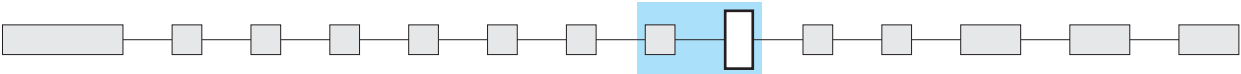
ROCKER COLOUR



1	Blue
1/4	Dark blue
2	Black
3	Green
4	Grey

5	Yellow
6	Red
7	Ivory
9	Orange

ROCKER SHAPE



1 Full rocker



4 Opening on side A



6 Opening on side B

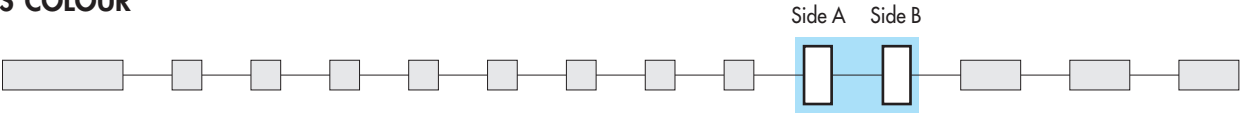


8 Opening on sides A and B

Other rocker shapes on customer specifications : on request.

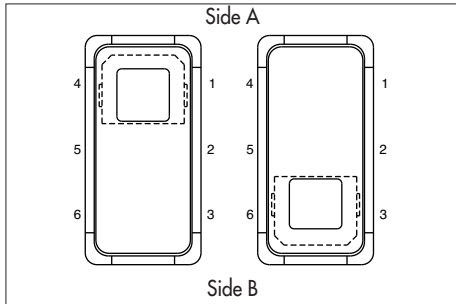
To order rocker only (without case), begin the order number with code KGR, then follow the order format from "rocker colour" until the end of the options.

LENS COLOUR



Complete each enlarged box with one of the codes listed below.

X	No lens
1	Blue *
3	Green *
6	Red
9	Orange
B	White
T	Translucent



* Blue or green lens recommended with fluorescent lamp.

To order lenses only, begin the order number with the codes :
 KGLA for lens A and KGLB for lens B,
 then follow the order format from "lens colour" until the end of the options.

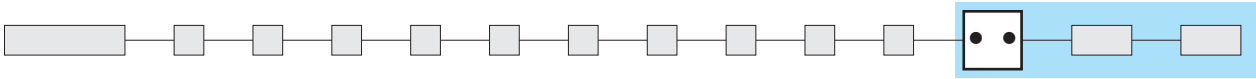
KG series

Power rocker switches

Marking

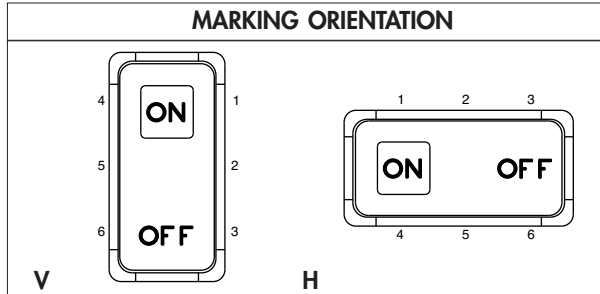
MARKING

If no marking required, leave all boxes blank.



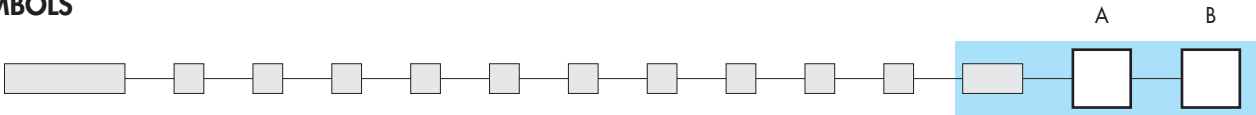
Select one option from each of the tables below.

MARKING METHOD	
C	Hot stamping



Other orientations :
on request

SYMBOLS



XX No symbol

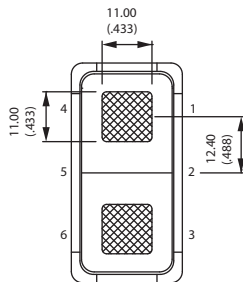
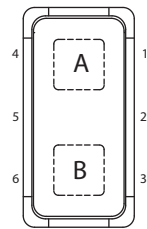
Available symbols : see end of section D.

Marking colour

White marking for black rockers - Black marking for colour rockers
Other : on request.

Marking area

For illuminated versions. The symbol will be included in the hatched area.



Most symbols meet the ISO 7000 standard “graphical symbols for use on equipments” (code given in bracket in the description). Contact us for symbols not featured in the following tables.

Legend scale :

KR series : 1:1

KL, KG and KI series : depending on space available on the product (see “Symbols” section at the end of each series).

CODE	SYMBOL	DESCRIPTION	CODE	SYMBOL	DESCRIPTION	CODE	SYMBOL	DESCRIPTION
XX	None	-	16		Revolving light	32		Emergency first aid vehicle (2565)
01	ON	-	17		Rear ventilator	33		Load tipping (1557)
02	OFF	-	18		Heating (0637)	34		Loading light (2457)
03	○	-	19		Door opening	35		Tractor, rear-ward (1667)
04	I	-	20		Windshield demister/defroster (0635)	36		Combine, direction of movement (1678)
05	II	-	21		Windshield wiper (0086)	37		Use no forks (2406)
06	STOP	-	22		Windshield washer (0088)	38		Transmission (1166)
07	A	Stop	23		Ventilator fan (0089)	39		Working spot light (1145)
08	M	Motion	24		Side mirror defroster	40		Engine (0640)
09		Up motion	25		Restarting pump	41		Horn (0244)
10		Down motion	26		Front fog lights (0633)	42		Lock (1656)
11		Hot	27		Rear fog lights (0634)	43		Taxi sign light (2551)
12		Cold	28		Propulsion system trim	44		Working light (1204)
13		Hazard warning (0085)	29		Beacon (1141)	45		Working light symmetric (1204)
14		Traveller lighting	30		Anchor	46		-
15		Driver lighting (1421)	31		Electric motor (0011)	47	ASM	-

K range

Power rocker switches and indicators









































Symbols

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Legend scale :

KR series : 1:1

KL, KG and KI series : depending on space available on the product (see "Symbols" section at the end of each series).






































CODE	SYMBOL	DESCRIPTION	CODE	SYMBOL	DESCRIPTION	CODE	SYMBOL	DESCRIPTION
48		All wheel drive	64		Indicator	80		Front windshield heating
49		Differential lock (1662)	65		Brake release	81	AUS	Aus
50		-	66		Baggage room left door	82		Radiator fan
51		-	67		Baggage room right door	83		Remove retarder
52		-	68		Power blinds	84		Restricted speed
53	N	-	69		Engine idle control	85		Preheater
54		Rear window wiper (0097)	70	CRUISE RES/SET	Cruise res/set	86		ABS detection
55		Rear window washer (0099)	71		Driver windows up/down	87		ECAS detection
56		Lower load (2223)	72		Middle door opening	88		Engine stop
57		Cab lock (1560)	73		Front door opening	89	CRUISE RES/CAN	Cruise res/cancel
58		Extraction	74		Lighting in baggage room	90		ECAS reset
59		Pumping in	75	CRUISE ON/OFF	Cruise on/off	91		Driver windows heating
60		Rear PTO (1572)	76	TV	TV	92	CRUISE SET+/SET-	Cruise set
61		Front PTO	77		Pump	93		Air bag up/down
62		Rockshaft down	78	WC	Toilet	94		Read lighting
63		Rockshaft up	79		Toilet decontamination	95		Lighting main switch

Most symbols meet the ISO 7000 standard "graphical symbols for use on equipments" (code given in bracket in the description). Contact us for symbols not featured in the following tables.

Legend scale :

KR series : 1:1

KL, KG and KI series : depending on space available on the product (see "Symbols" section at the end of each series).

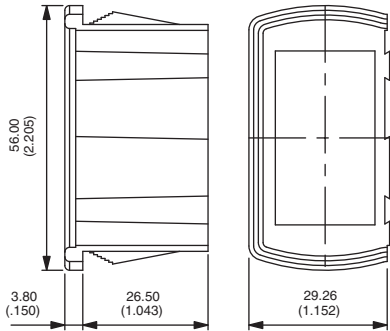
CODE	SYMBOL	DESCRIPTION	CODE	SYMBOL	DESCRIPTION	CODE	SYMBOL	DESCRIPTION
96		Heating using water	AD		-	AV		-
97		Low beam	AE		-	AW		-
98		Position lights	AF		-	AY		-
99		Diesel acceleration	AG		Battery charging condition (0247)	AZ		-
A1		Manual mode	AH		Turn signals (0084)	B1	HIGH	-
A2		Clockwise cabin rotation	AJ		High beam (0082)	B2	LOW	-
A3		Anticlockwise cabin rotation	AK		Differential lock, bogie (2600)	B3		-
A4		-	AL		Brushing with a rotating brush (0070)			
A5		-	AM		Differential lock, transfer case 4x4 (2475)			
A6		Parking brake	AN		Loader bucket, float (1441)			
A7		-	AP		Loader bucket (1437)			
A8		-	AQ		Rear window washer & wiper (0098)			
A9		-	AR		Header Header drive (1579)			
AA		-	AS		Excavator/backhoe boom side shift (2091)			
AB		-	AT		Chemical water treatment (1851)			
AC		-	AU		Grapple skidder, single funct° boom (1762)			

K range

Power rocker switches and indicators

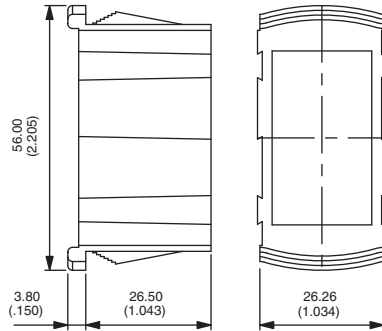
Accessories for KR, KL and KI series

MOUNTING PANEL END



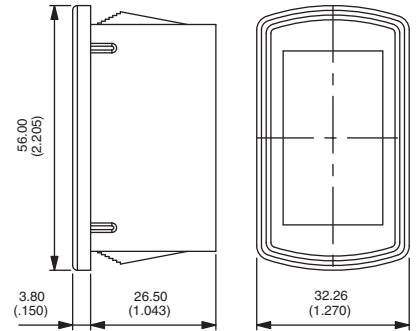
U2261

MOUNTING PANEL MIDDLE



U2262

SINGLE MOUNTING PANEL



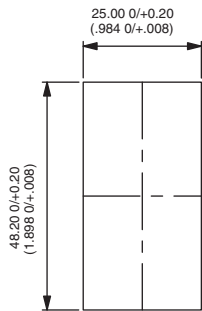
U2267

Recommended panel thickness : 1,10 mm - 1,80 mm - 2,60 mm - 3,40 mm - 4,20 mm - 5 mm - 5,80 mm

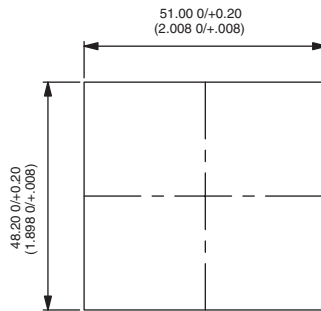
MOUNTING PANEL CUT-OUT

For additional elements, add 26,40 mm (1.039)

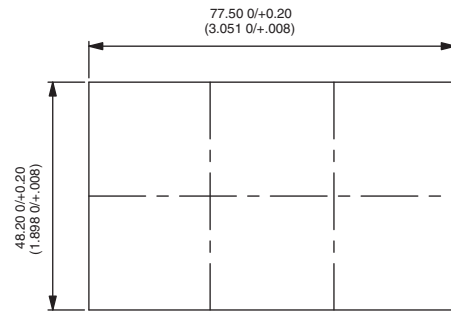
For 1 element U2267



For 2 elements U2261

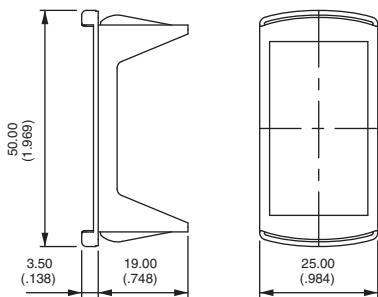


For 3 elements (2xU2261 + 1x U2262)



22 x 44 ADAPTER

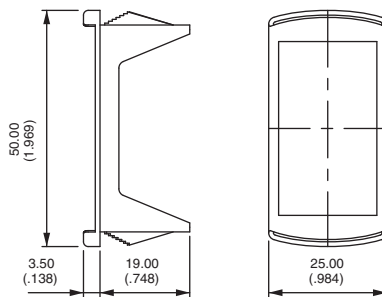
Front panel dismounting



U3060

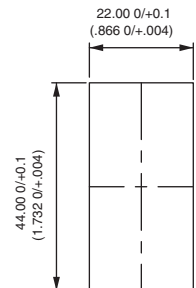
22 x 44 ADAPTER

Rear panel dismounting



U3070

PANEL CUT-OUT



Adapter colours (replace 0 with code)
 1/4 : dark blue - 2 : black - 4 : grey
 5 : yellow - 6 : red - 7/1 : white

Recommended panel thickness : 0,60 mm to 1,50 mm

Recommended panel thickness : 1,60 mm -0,1/0 to 5,60 mm -0,1/0 in stages of 0,40 mm

ACTUATOR REMOVING TOOL



U3052

2 tools are supplied

EXTRACT ACTUATOR (KR ONLY)

Allows the extraction of the rocker / rocker support assembly.
Place the 2 claws under the support and push as indicated by the arrow.

EXTRACT ROCKER (KR ONLY)

Allows to separate the rocker from its support.

Insert the tool between rocker and support as indicated by the arrow. Pull out the tool in the opposite direction.

EXTRACT SWITCH (KR, KL AND KI)

Allows to extract switch from panel mounting units. 2 tools are necessary.

Insert the tools between switch and panel mounting units from the rear to compress the snap-in device. Pull off switch manually.

CONNECTORS

Standard colour : black. Other colours : on request.

Connectors cannot be combined with wiring types H and I.



U2260

6 terminal version

For use with terminals type 2, 3, 4 or 5.
6,35 (1/4) tabs to be fitted by the user
(example : AMP/Tyco 0-0141013-2).
Can be used for the KG series.



U2282

10 terminal version

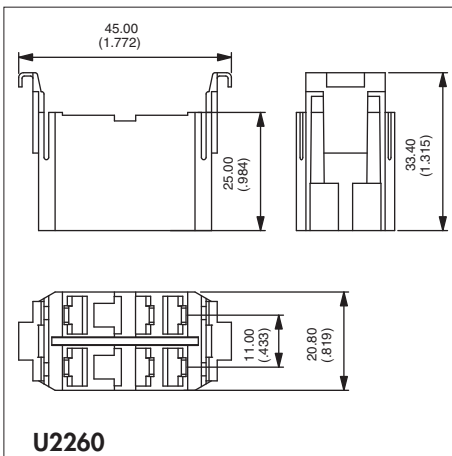
For use with terminals type H or J.
2,8 (.110) tabs to be fitted by the user
(example : AMP/Tyco 0-927779-3).



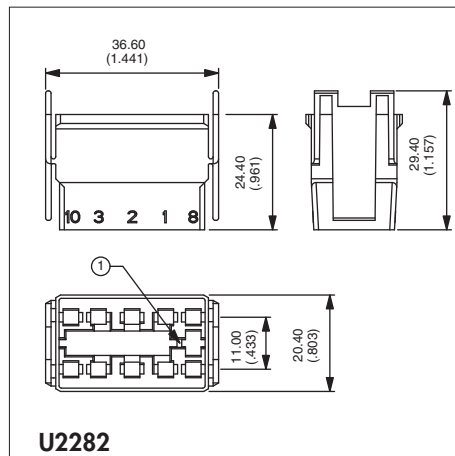
U2292

10 terminal version

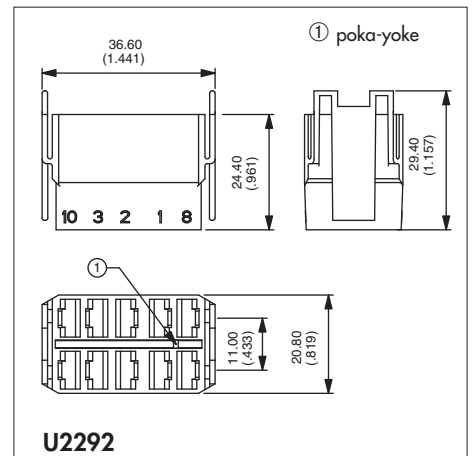
For use with terminals type B, C, E or F.
6,35 (1/4) tabs to be fitted by the user
(example : AMP/Tyco 0-0141013-2).



U2260



U2282



U2292

K range

Power rocker switches and indicators

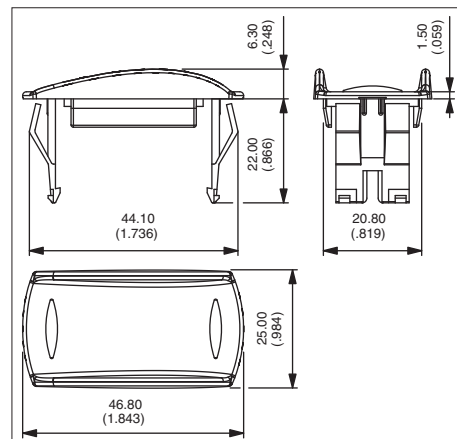
Accessories for KR, KL and KI series

HOLE PLUGS

Usefull for future extensions.

Code	Colour	Code	Colour
U2271	Blue	U2274	Grey
U2271/4	Dark blue	U2275	Yellow
U2272	Black	U2276	Red
U2273	Green	U2277	Ivory
		U2279	Orange

Recommended panel thickness :
1,50 mm to 6 mm



Connectors can be hanged on specific hole plugs. Contact APEM.

D

Slide switches



Section E

NK series

Subminiature slide switches

☐ The smallest changeover

☐ Flush and raised actuators

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 0,5A 12V
- Minimum load : 1mA 10mV
- Initial contact resistance : 20 mΩ max.
- Insulation resistance : 10.000 MΩ min. at 500VDC
- Dielectric strength : 250 Vrms. 50 Hz min. between terminals
- 2.000 Vrms 50 Hz min. between adjacent poles of switches placed side by side
- Electrical life with nominal load : 2.000 cycles
- Capacitance : < 1,5 pF

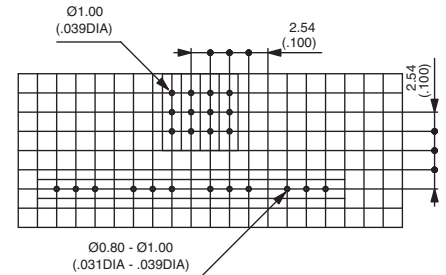
MATERIALS

- Case : PA6/6, glass filled, UL94-V0
- Actuator : PA6/6, glass filled, UL94-V0
- Contacts : gold over nickel

GENERAL SPECIFICATIONS

- Wave solderable : flux sealed
- End stackable, 2,54 (.100) terminal to terminal pitch - 4 switches max., hole dia. 1 mm (.039)
- Travel : 1,6 mm (.062)
- Operating temperature : -40°C to +85°C
- Soldering temperature : 250°C for 5 sec. max.
- Moisture test : 21 days at 95 % RH (IEC 68-2-3)

EXAMPLES OF LAYOUT

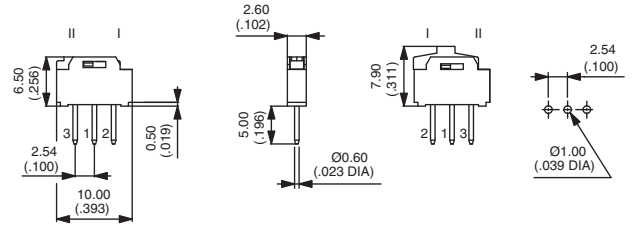
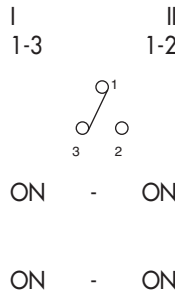


Straight PC terminals



Flush actuator
NK236

Raised actuator
NK236H

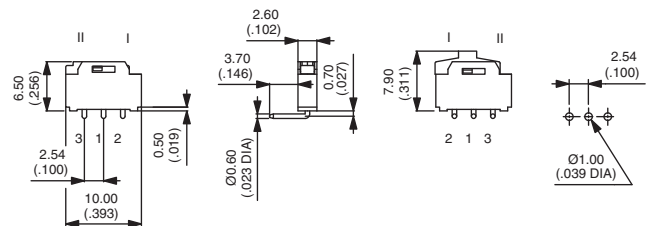
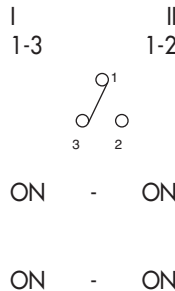


Right angle terminals



Flush actuator
NK236W

Raised actuator
NK236WH



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



Packaging unit : 100 pieces.

SMT TG series

Surface mount tiny washable slide switches

Distinctive features and specifications



❑ Entirely designed for surface mount

❑ Tape and reel packaging

❑ Reflow solderable

- High temperature plastic materials
- Tin plated ground plate
- Terminal coating : tin-lead alloy over nickel plating
- Terminals turned to the outside, preventing the shadow effect in infrared soldering and permitting visual inspection of solder joints
- Distance between case and circuit : 0,55 mm (.021)
- End stackable with 10,16 mm (.40) pitch
- Available with positioning pins to ensure switch orientation during the reflow process and increasing switch mechanical resistance

❑ Washable

Construction withstands cleaning processes, including hot water under pressure

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load : 0,4VA 20V max. AC or DC
- Minimum load : 10mA 50mV or 10µA 5VDC
- Initial contact resistance : 20 mΩ max
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 1.000 Vrms. 50 Hz min. between terminals and frame 500 Vrms. 50 Hz min. between terminals
- Electrical life at full load :
 - 2 position switches : 60.000 cycles
 - 3 position switches : 30.000 cycles

GENERAL SPECIFICATIONS

- Actuator travel : 2,60 mm (.102)
- Operating temperature : -40°C to +85°C
- Moisture resistance : 21 days per IEC 512-6 test 11c
- Vibration resistance : 10-500 Hz / 10 g per IEC 512-4 test 6d
- Shock resistance : 50 g per IEC 512-4 test 6c

MATERIALS

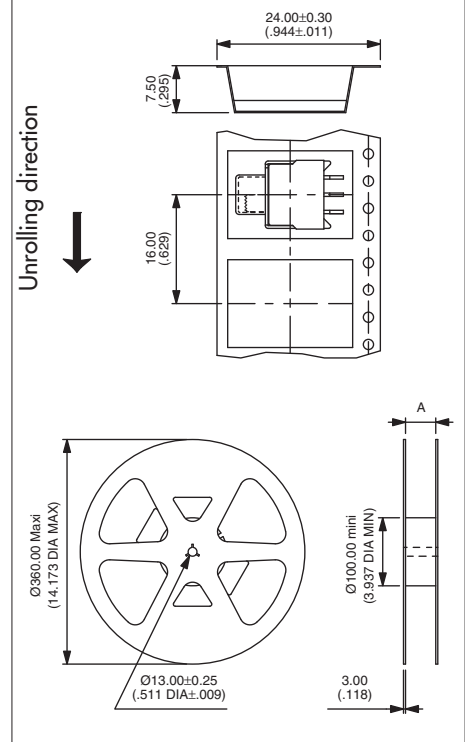
- Case : high temperature plastic material UL94-V0
- Actuator : high temperature plastic material UL94-V0
- Ground plate and positioning pins : steel, tin plated
- Contacts : brass, gold plated
- Terminals : brass, with pure tin plating over nickel barrier
- Rubber seal : silicone, transparent

SOLDERING AND CLEANING

- Reflow soldering : infrared, vapor phase or infrared convection
- Washable per IEA-RS448-2 :
 - water + detergent - preferred
 - solvents
- Further information on reflow soldering : see end of catalogue.

Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.

PACKAGING

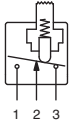


Tape width	24.00 (.944)	44.00 (1.732)
Reel (dimension A)	24.40+2.00/0.00 (.960+.078/.000)	44.40+2.00/0.00 (1.748+.078/.000)

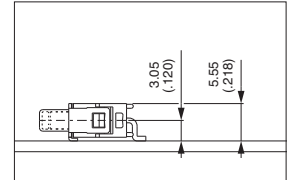
Standard packaging unit : 500 pieces
Tape meeting international standard IEC - Publication 286-3 (EIA481A)
Start leader : 400 mm min.

SMT TG series

Surface mount tiny washable slide switches



- With or without positioning pins
- Rubber seal removable after cleaning
- Single pole

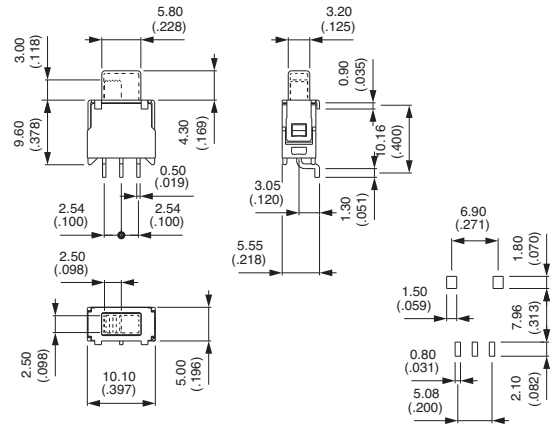


Slide switches



TG36WS80050
TG39WS80050

ON - ON
ON OFF ON

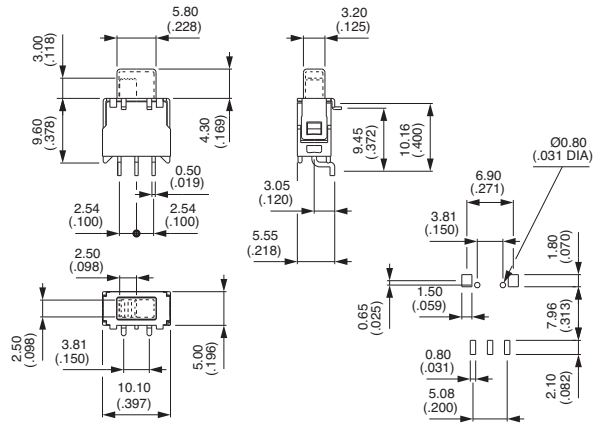


Slide switches - with positioning pins



TG36WS80065
TG39WS80065

ON - ON
ON OFF ON



Slide switches with flush actuator

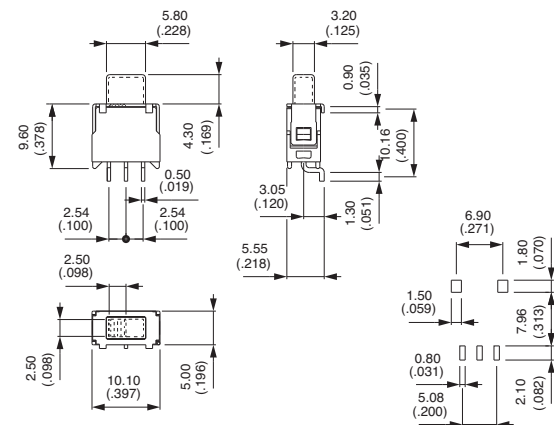


Without positioning pins
TG36WS81050
TG39WS81050

ON - ON
ON OFF ON

With positioning pins
TG36WS81065
TG39WS81065

ON - ON
ON OFF ON



Shown without positioning pins
(positioning pins same as above)

E

TG series

Tiny slide switches

Overview and specifications



- Sealed**
 - Single piece case
 - Epoxy sealed terminals
- Wide variety of contact materials**
- Same PCB layout as TL, TP and TR tiny series**

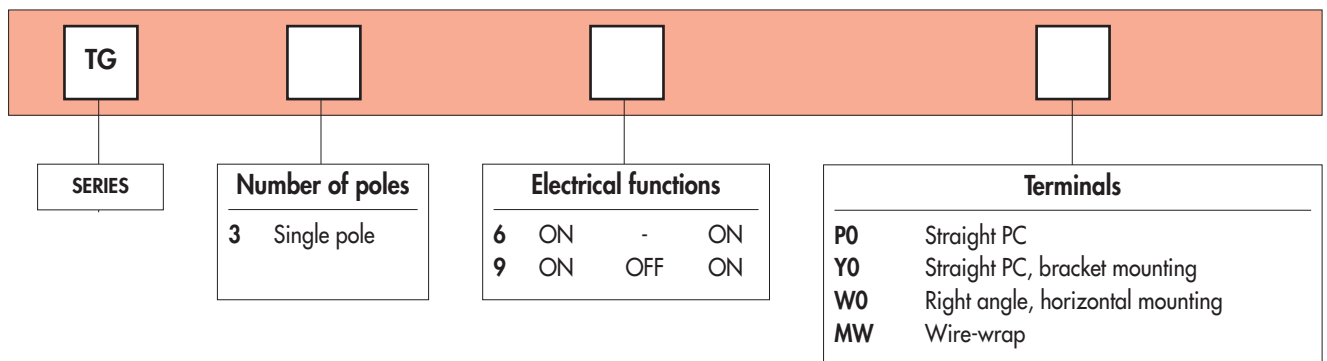
SPECIFICATIONS

- Current/voltage rating with resistive load :
 - Gold plated contacts : 0,4VA 20V max. AC or DC.
 - Silver plated contacts : 0,5A 48V max. AC or DC
- Contact resistance : 20 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 1.000 Vrms 50 Hz min. between terminals and frame
500 Vrms 50 Hz min. between terminals
- Electrical life at full load : 2 position switches : 60.000 cycles
3 position switches : 30.000 cycles
- Travel : 2,60 mm (.102)
- Operating temperature : -30°C to +85°C
- Cleaning : solvents or water + detergent
- Wave soldering : 260°C - 5 sec. max.

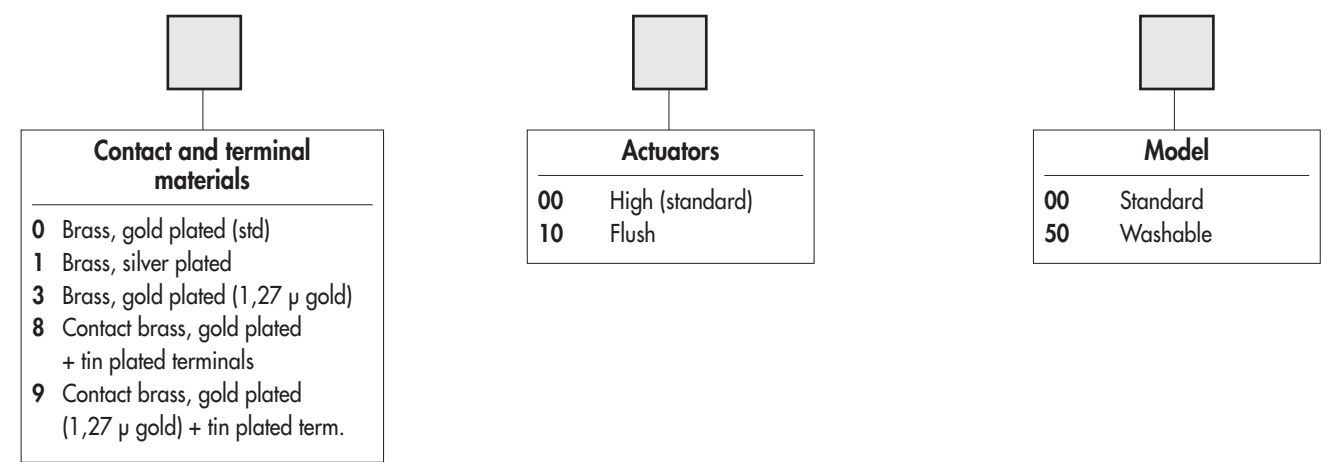
MATERIALS

- Case : flame retardant thermoplastic
- Actuator : thermoplastic
- Ground plate and bracket : brass, tin plated
- Contacts and terminals : see above
- Rubber seal : silicone, transparent
- Terminal seal : epoxy

MODEL STRUCTURE



OPTIONS



Dimensions : First dimensions are in mm while inches are shown as bracketed numbers.

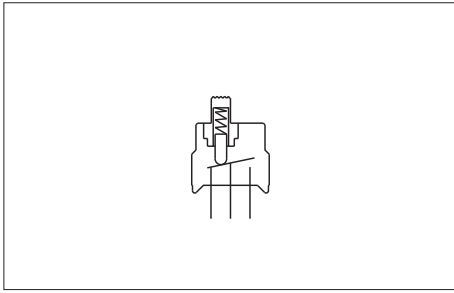


Packaging unit : 100 pieces, except for models with right angle terminals (50 pieces)

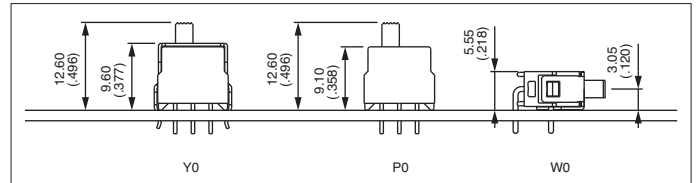
TG series

Tiny slide switches

Standard or washable



- Straight PC, right angle or wire-wrap terminals
- Single pole
- The silicone rubber seal can be removed after cleaning.



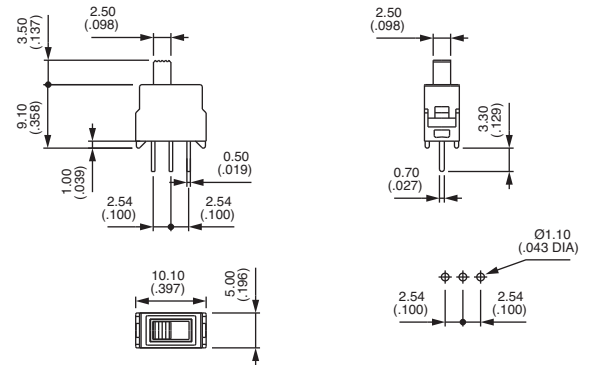
To complete the following part numbers, refer to "Overview" and replace the • symbol with one of the options proposed under "Contact and terminal materials".

Straight PC terminals - standard model



TG36P0•0000
TG39P0•0000

ON - ON
ON OFF ON

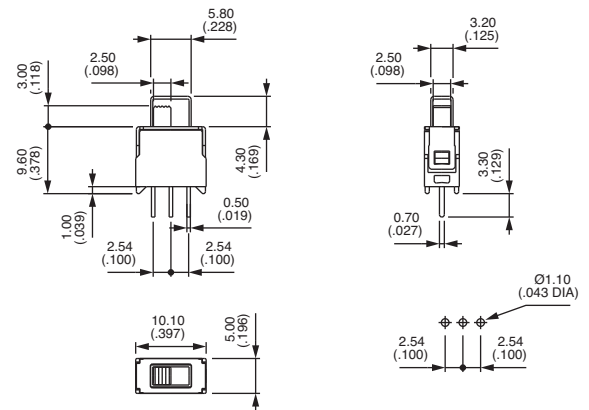


Straight PC terminals - washable model



TG36P0•0050
TG39P0•0050

ON - ON
ON OFF ON

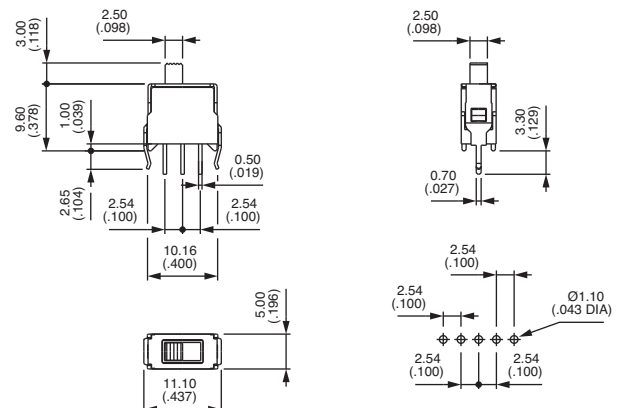


Straight terminals - bracket mounting - standard model



TG36Y0•0000
TG39Y0•0000

ON - ON
ON OFF ON



E

TG series

Tiny slide switches

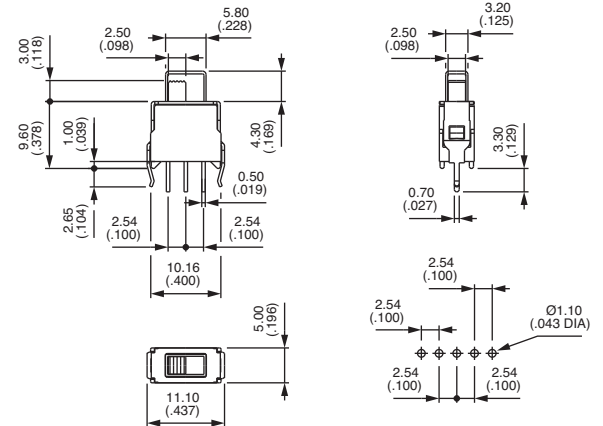
Standard or washable

Straight terminals - bracket mounting - washable model



TG36Y0•0050
TG39Y0•0050

ON - ON
ON OFF ON

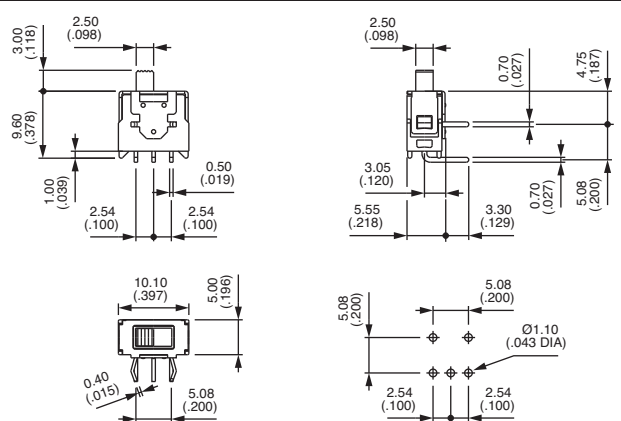


Right angle terminals - horizontal mounting - standard model



TG36W0•0000
TG39W0•0000

ON - ON
ON OFF ON

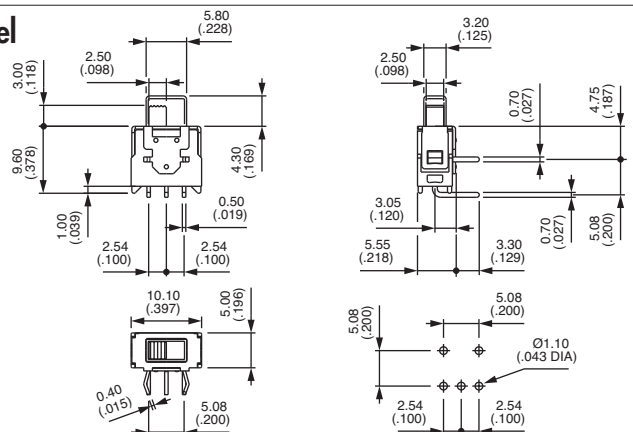


Right angle terminals - horizontal mounting - washable model



TG36W0•0050
TG39W0•0050

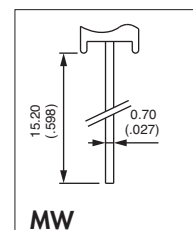
ON - ON
ON OFF ON



OTHER CONFIGURATIONS

MW Wire-wrap terminals

10 Flush actuator



G series

Slide switches - telecom grade

Distinctive features and specifications



- Panel and PC mount models
- 6 actuator lengths
- Wide variety of contact materials

ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts (codes 1 or 2) : 3A 30VDC
 - gold plated brass contacts (code 0) : 0,4VA 20VAC or DC max.
- Initial contact resistance : 10 m Ω
- Insulation resistance : 1.000 M Ω min.
- Dielectric strength : 1.000 Vrms 50 Hz min.
- Electrical life with resistive load :
 - silver contacts (codes 1 or 2) : 2 positions : 40.000 cycles
 - 3 positions : 20.000 cycles
 - gold plated brass contacts (code 0) : 60.000 cycles (0,4VA max.)

MATERIALS

- Case : PES
- Actuator : polyamide, glass filled
- Cover : stainless steel
- Contacts
 - 0 : brass, gold plated
 - 1 : silver
 - 2 : silver, gold plated
 - 5 : special contact, lower rating, minimum quantity : consult factory
- Terminal seal : epoxy

GENERAL SPECIFICATIONS

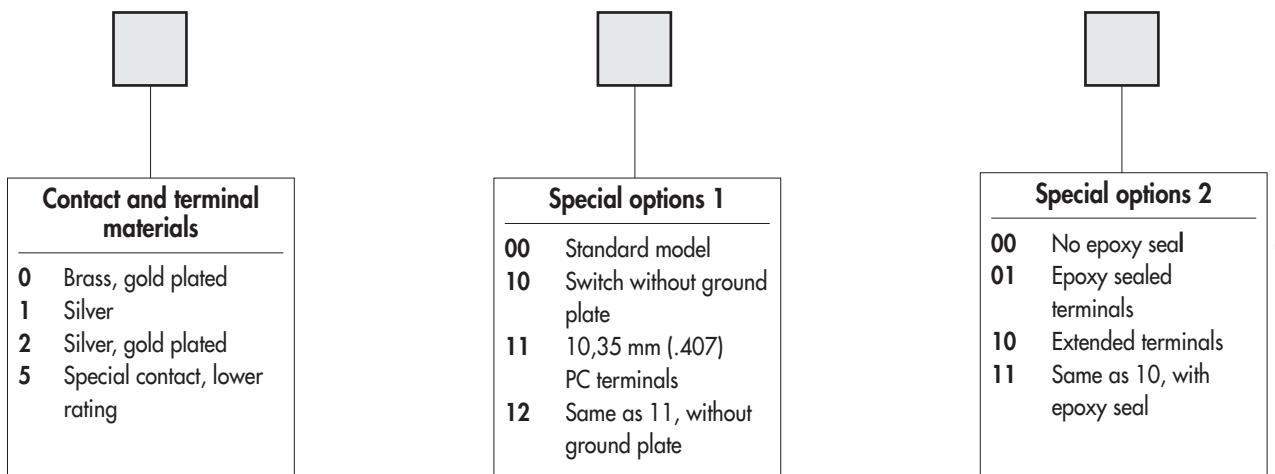
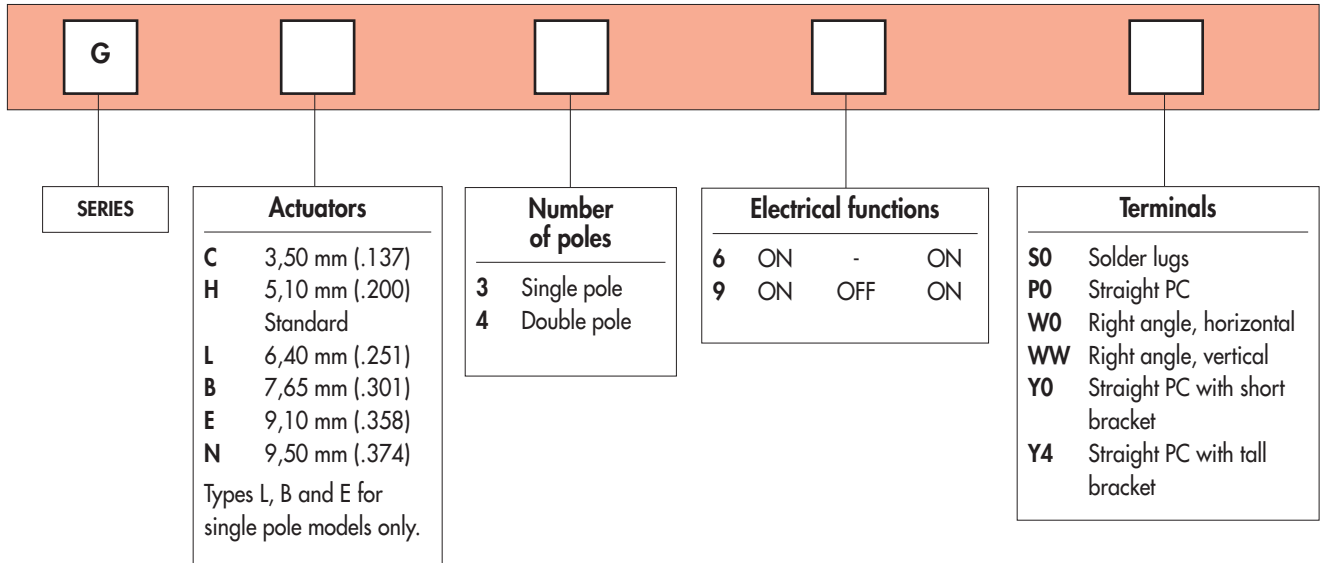
- Travel : 2,20 mm (.086), except actuator N on SP model : 2,60 mm (.102)
- Operating temperature : -30°C to +85°C
- Recommended soldering : 300°C 5 sec. max.

E

G series

Slide switches - telecom grade

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.



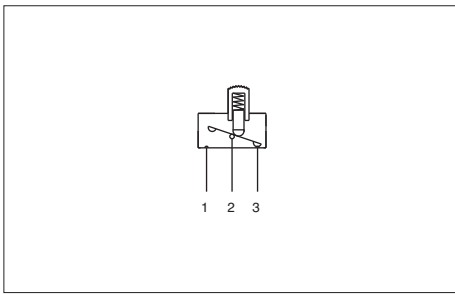
NOTICE : please note that not all combinations of above numbers are available. Refer to the following pages for further information.



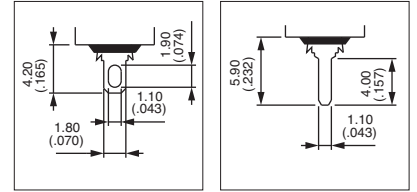
Packaging unit : 100 pieces for SP solder lug (S0) and straight terminal (P0) models. 50 pieces for other models.

G series

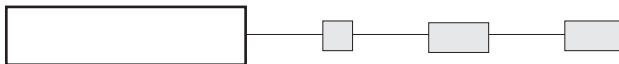
Slide switches - telecom grade



- Solder lug, straight PC or right angle terminals
- Single and double pole configurations



MODEL STRUCTURE

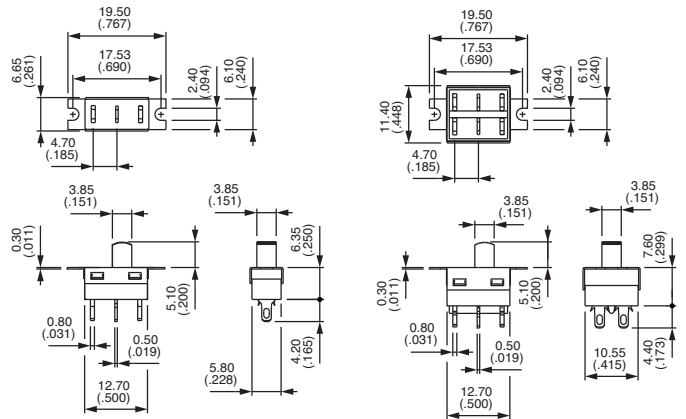


Shown with standard actuator (type H)

Solder lug terminals



Single pole	Double pole	ON	-	ON
GH36S0	GH46S0	ON	-	ON
GH39S0	GH49S0	ON	OFF	ON

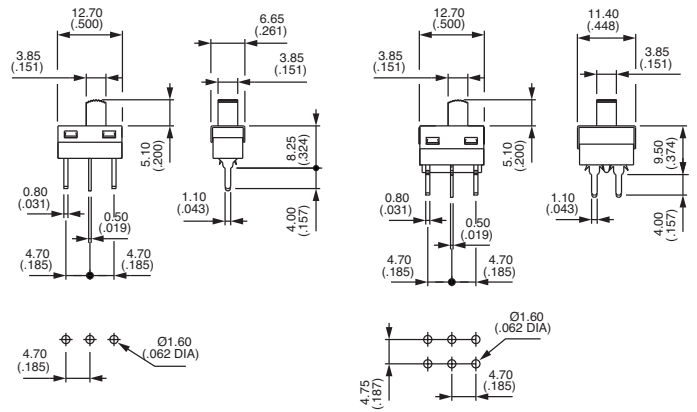


Order with epoxy sealed terminals (option 01).

Straight PC terminals



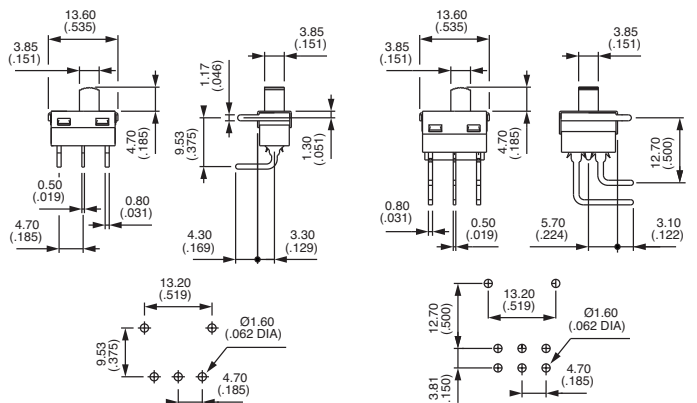
Single pole	Double pole	ON	-	ON
GH36P0	GH46P0	ON	-	ON
GH39P0	GH49P0	ON	OFF	ON



Right angle terminals - horizontal



Single pole	Double pole	ON	-	ON
GH36W0	GH46W0	ON	-	ON
GH39W0	GH49W0	ON	OFF	ON





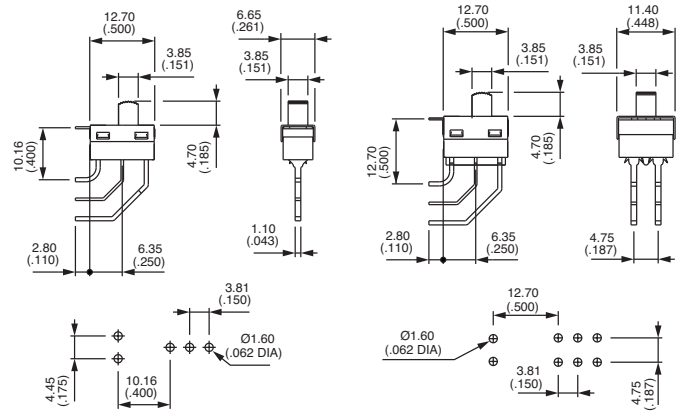
G series

Slide switches - telecom grade

Right angle terminals - vertical



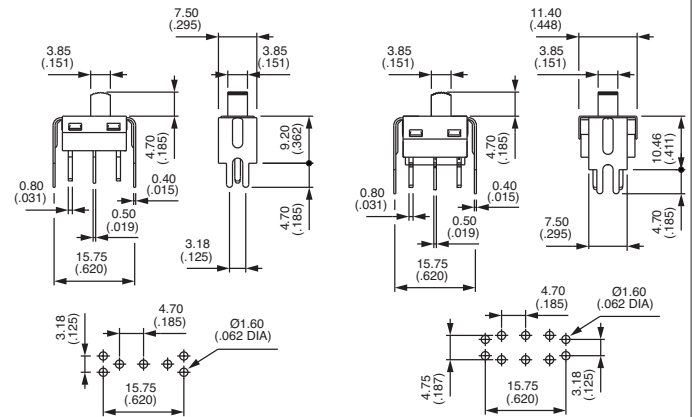
Single pole	Double pole	ON	-	ON
GH36WW	GH46WW	ON	-	ON
GH39WW	GH49WW	ON	OFF	ON



Straight PC terminals - short bracket : Y0



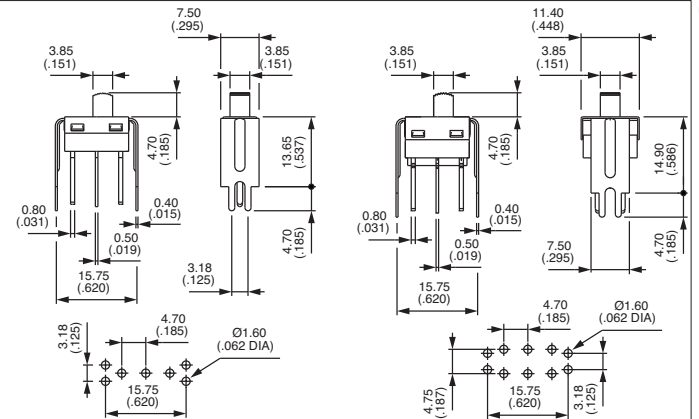
Single pole	Double pole	ON	-	ON
GH36Y0	GH46Y0	ON	-	ON
GH39Y0	GH49Y0	ON	OFF	ON



Straight PC terminals - tall bracket : Y4

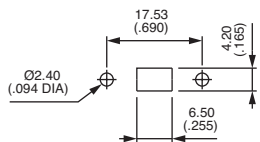


Single pole	Double pole	ON	-	ON
GH36Y4	GH46Y4	ON	-	ON
GH39Y4	GH49Y4	ON	OFF	ON

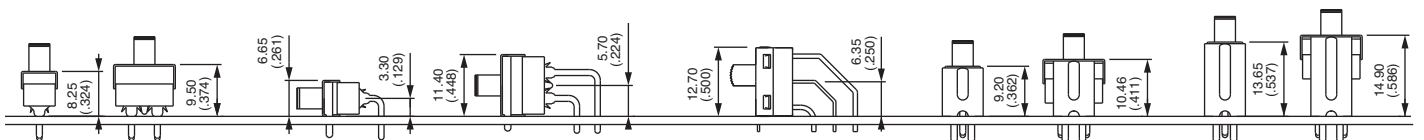


PANEL CUT-OUT

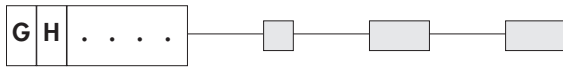
Solder lug model



PCB MOUNTING



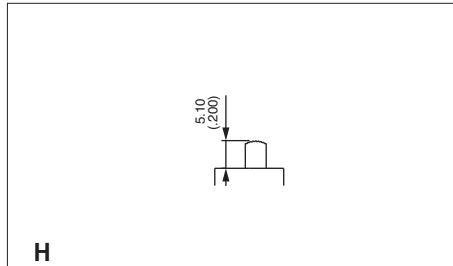
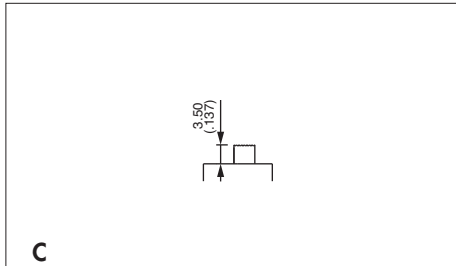
ACTUATORS



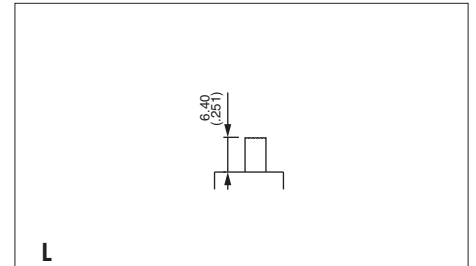
Replace second digit (H) of basic model number with one of the codes below.



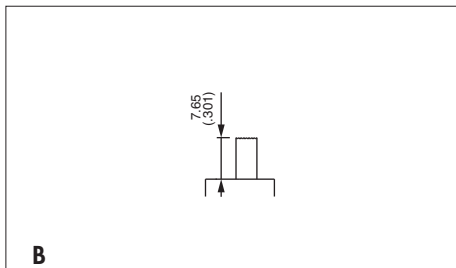
Dimensions below are for solder lug (SO) and straight terminals (PO) models.
For other models (WO - WW - Y0 - Y4), height is less 0,4 mm (.015).



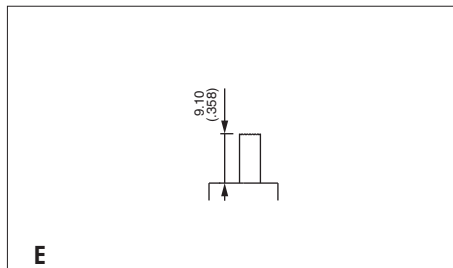
Standard



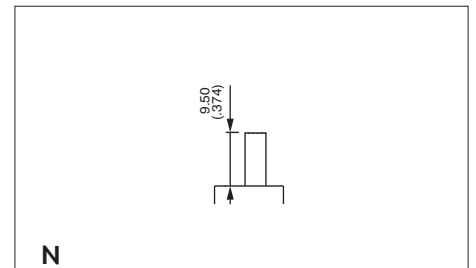
For single pole only



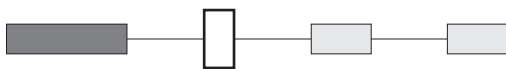
For single pole only



For single pole only



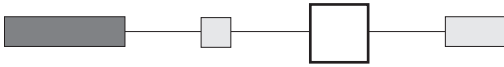
CONTACT AND TERMINAL MATERIALS



- 0** Brass, gold plated
- 1** Silver
- 2** Silver, gold plated
- 5** Special contact, lower rating, minimum quantity : consult factory



SPECIAL OPTIONS 1

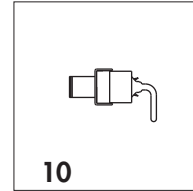


00 Standard switch as presented under "Model Structure"

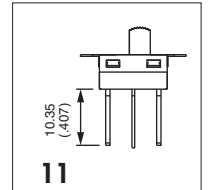
10 Switch **without ground plate**
For right angle only (W0 and WW models)

11 **10,35 mm (.407) long PC terminals**

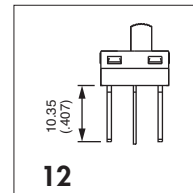
12 **10,35 mm (.407) long PC terminals without ground plate**



10

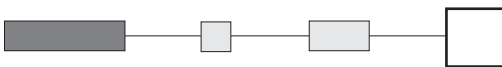


11



12

SPECIAL OPTIONS 2

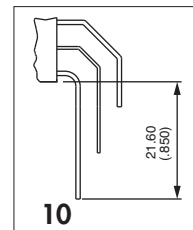


00 No epoxy seal

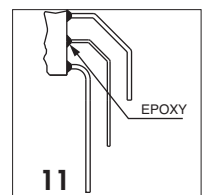
01 **Epoxy sealed terminals**
(compulsory on solder lug models)

10 **Extended terminals**
For vertical right angle (WW models)

11 **Extended terminals as above, with epoxy seal**



10



11

25000N series

Professional slide switches

Distinctive features and specifications



- Professional grade slide switches for PC boards
- Approved according to UL 1054
- Wave solderable
Not washable in aqueous process
- Available with flush, high and side actuator
- Various actuator lengths

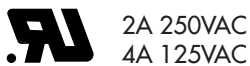
ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load :
 - silver contacts (A) : 1A 30VDC
 - gold plated brass contacts (LD) : 100mA 30VDC
- Minimum load :
 - silver contacts (A) : 100mA 10V
 - gold plated brass contacts (LD) : 10 μ A 5VDC - 10mA 50mV
- Initial contact resistance :
 - silver contacts (A) : 10m Ω max.
 - gold plated brass contacts (LD) : 50m 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
- Electrical life : 10.000 cycles at full load
- Low level or mechanical life : 20.000 cycles

MATERIALS

- Case : PBT
- Actuator : polyamide, glass filled
- Cover : polyamide, glass filled
- Contacts
 - A** : silver
 - LD** : brass, gold plated
- Terminal seal : epoxy

APPROVALS



2A 250VAC
4A 125VAC

Availability : consult factory for details of approved models.

Marking : To order switches marked UL, complete the "Options and Approvals" box of ordering format.

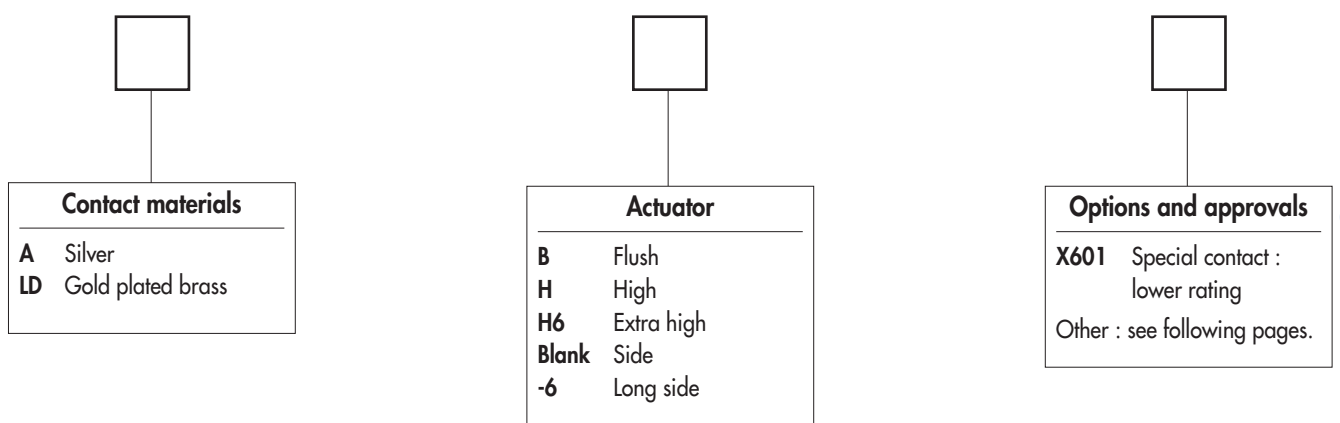
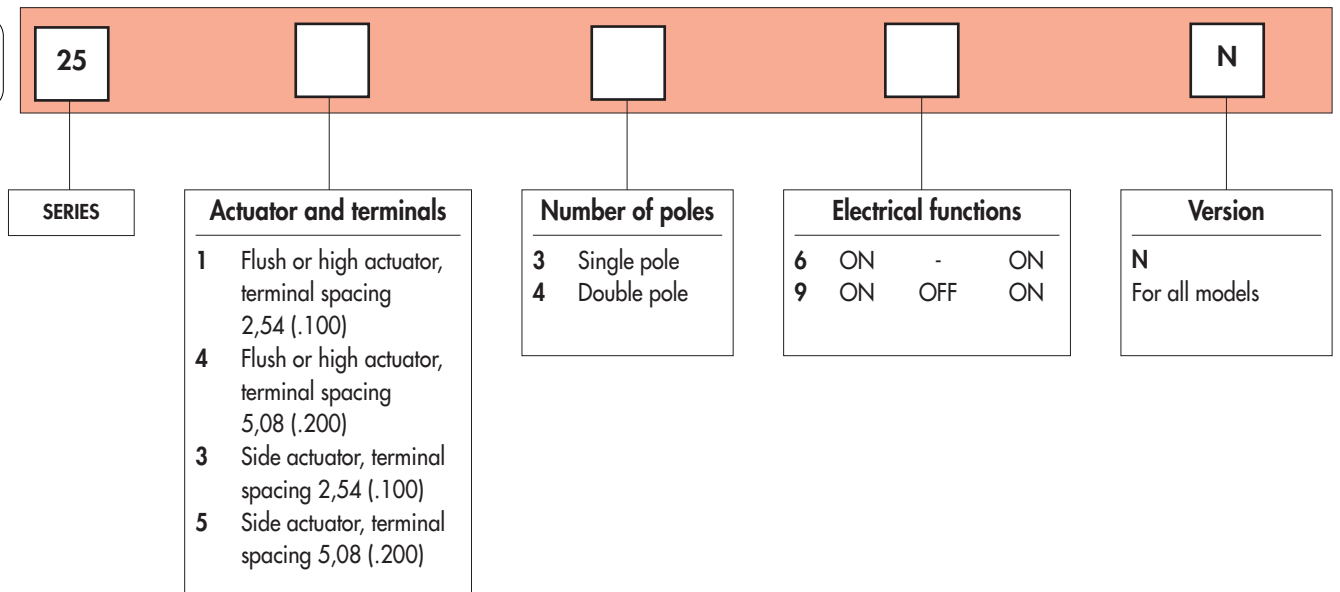
GENERAL SPECIFICATIONS

- Operating temperature :
 - 40°C to +85°C
- Overall length : 14 mm (.551)
- Actuator height (outside case) :
 - high : 2,80 mm (.110)
 - extra high : 6 mm (.236)
 - side : 2,3 mm (.090)
 - long side : 6 mm (.236)
- Travel : 4 mm (.157)

25000N series

Professional slide switches

Overview



ABOUT THIS SERIES

On the following pages, you will find successively :
 - model structure of switches (including actuator options)
 - contact options

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



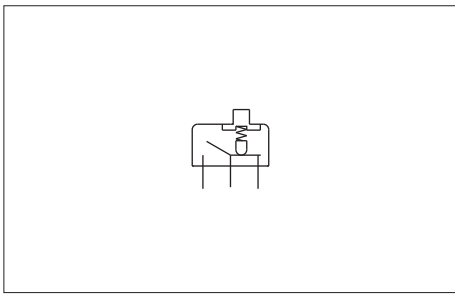
NOTICE : please note that not all combinations of above numbers are available. Refer to the following pages for further information.



Packaging unit : single pole : 100 pieces - double pole : 50 pieces

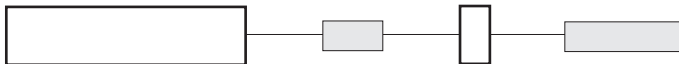
25000N series

Professional slide switches



- Epoxy sealed terminals standard
- 1 and 2 pole configurations
- **UL approved models** : see next page.

MODEL
STRUCTURE



Flush actuator : 25000NB

Shown with 2,54 mm terminal spacing



Terminal spacing
2,54 (.100)

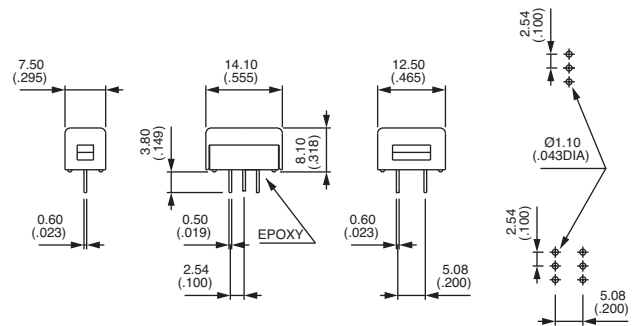
Single pole
25136N B
25139N B

Double pole
25146N B
25149N B

Terminal spacing
5,08 (.200)

Single pole
25436N B
25439N B

Double pole
25446N B
25449N B



High actuator : 25000NH

Shown with 5,08 mm terminal spacing



Terminal spacing
2,54 (.100)

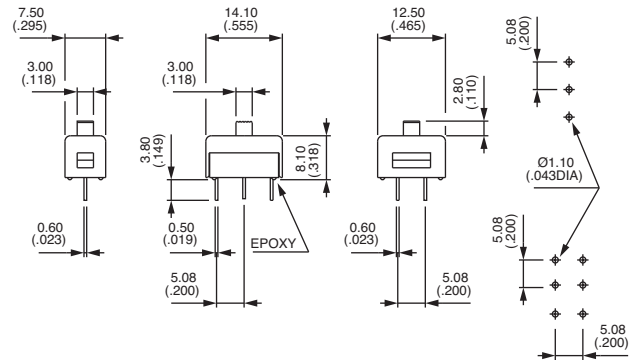
Single pole
25136N H
25139N H

Double pole
25146N H
25149N H

Terminal spacing
5,08 (.200)

Single pole
25436N H
25439N H

Double pole
25446N H
25449N H



Extra high actuator : 25000NH6

Shown with 5,08 mm terminal spacing



Terminal spacing
2,54 (.100)

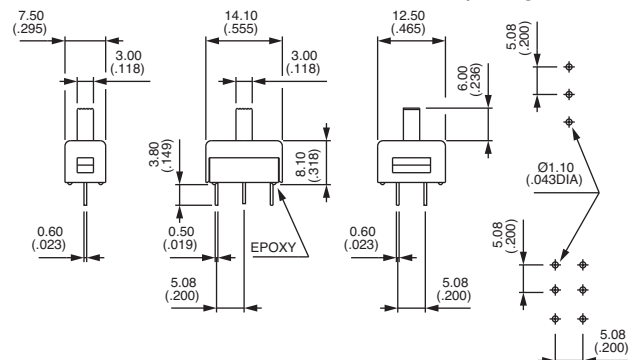
Single pole
25136N H6
25139N H6

Double pole
25146N H6
25149N H6

Terminal spacing
5,08 (.200)

Single pole
25436N H6
25439N H6

Double pole
25446N H6
25449N H6





25000N series

Professional slide switches

Side actuator : 25000N



Terminal spacing
2,54 (.100)

Single pole
25336N
25339N

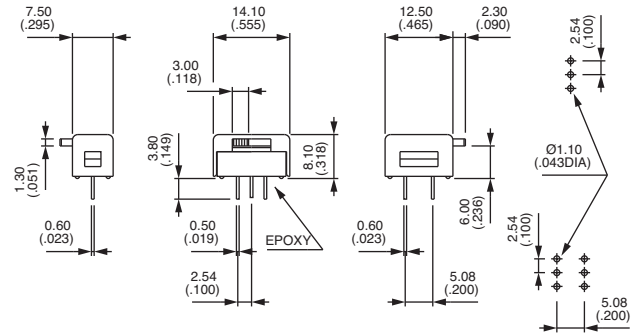
Double pole
25346N
25349N

Terminal spacing
5,08 (.200)

Single pole
25536N
25539N

Double pole
25546N
25549N

Shown with 2,54 mm terminal spacing



Long side actuator : 25000N-6



Terminal spacing
2,54 (.100)

Single pole
25336N -6
25339N -6

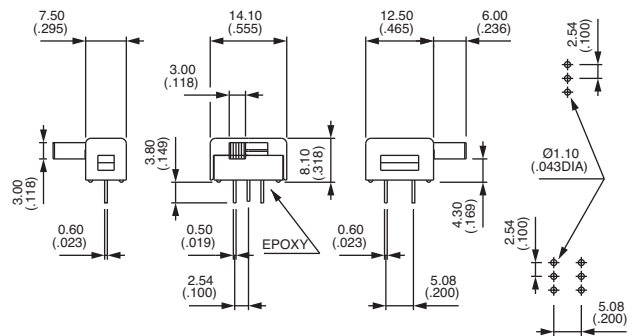
Double pole
25346N -6
25349N -6

Terminal spacing
5,08 (.200)

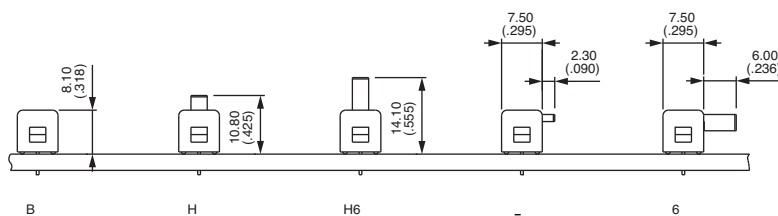
Single pole
25536N -6
25539N -6

Double pole
25546N -6
25549N -6

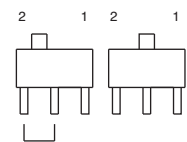
Shown with 2,54 mm terminal spacing



PCB MOUNTING



POSITIONS AND CONNECTIONS



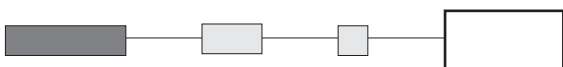
Function 6	ON	-	ON
Function 9	ON	OFF	ON

CONTACT MATERIALS



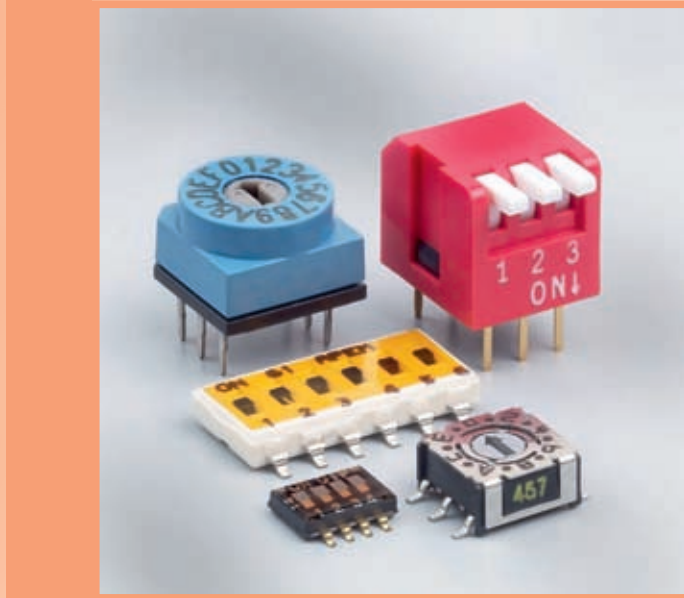
A Silver
LD Brass, gold plated

OPTIONS AND APPROVALS



X601 Silver plated brass contacts - Lower rating 3VA 30VDC. Min quantity : 5.000 pieces per model and shipment.
X693 Flame retardant plastic materials
X693UL Switches approved and marked UL (silver contacts only)

Dip and coded rotary switches



Section F

P36 series

Low profile rotary code switches

Surface mount or through-hole

Outside the US and the UK, this series is sold as the CR36 series.



- 3 actuator types
- Save board space
- Highly reliable
- Solder and flux sealed, washable

P36				
SERIES	Mounting	Actuators	Codes	Terminals
	(none) Through-hole S Surface mount	1 Screwdriver 3 Spindle 8 Slotted spindle	01 BCD 02 BCD complement 03 Hexadecimal 06 Hexadec. complement	(none) Straight or SMT V Crimped L254 Right angle, spacing 2,54 (.100)

ELECTRICAL SPECIFICATIONS
<ul style="list-style-type: none"> • Operating voltage : 24 VDC max. • Contact load, static : 400mA max. • Contact load, dynamic : 100mA max. • Initial contact resistance : 100 mΩ max. • Insulation resistance : 100 MΩ min.

MECHANICAL AND THERMAL SPECS
<ul style="list-style-type: none"> • Torque : 0,7 Ncm min. • Expected life : 10.000 cycles min. • Operating temperature : -30°C to +90°C

MATERIALS
<ul style="list-style-type: none"> • Base : UL94-V0, high temperature thermoplastic • Cover : stainless steel • Actuator : PA 4.6 nylon • Contacts : gold over nickel plated phosphor bronze • Terminals : tin plated

SOLDER RECOMMENDATIONS
(DIN CEI 68-2-20)
<ul style="list-style-type: none"> • Manual soldering : 340°C max. for 2 seconds max. • Wave soldering : 280°C max. for 5 seconds max. • Reflow soldering : 260°C max. for 10 seconds max.

PACKAGING

P36S1..
1300 pieces per reel
(dim.A = 22,4 mm
dim B = 16,4 mm)

P36S3..
P36S8..
600 pieces per reel
(dim.A = 30,4 mm
dim B = 24,4 mm)

- Reels : see above. To order a SMT product with tape & reel packaging, add "TR" at the end of its part number.
- Tubes : 50 pieces (through-hole or SMT) per tube.

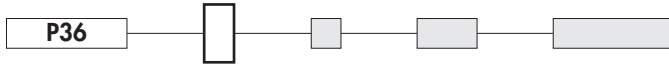
Dimensions : first dimensions are in mm while inches are shown as bracketed numbers.

P36 series

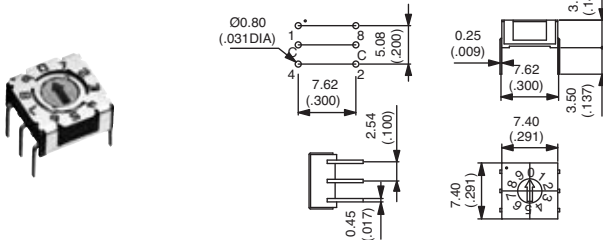
Low profile rotary code switches

Surface mount or through-hole

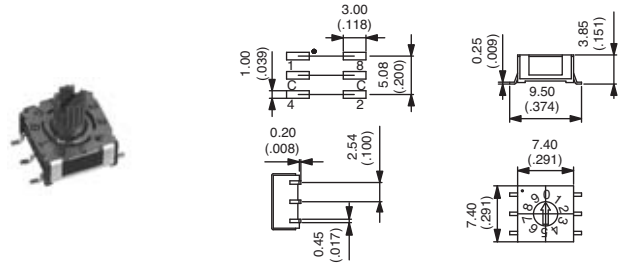
MOUNTING



(none) Through-hole



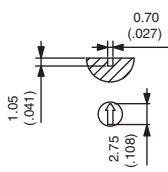
S Surface mount



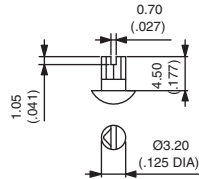
ACTUATORS



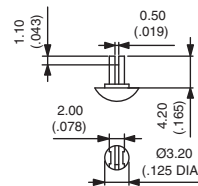
1 Screwdriver



3 Spindle



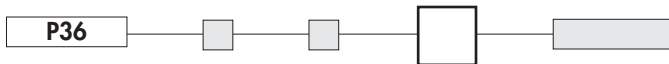
8 Slotted spindle



Actuator colour depending on codes

BCD red
 BCD compl. orange
 Hexadecimal grey
 Hexadec. compl. white

CODES / TRUTH TABLES



01 BCD	
	C 1 2 4 8
0	●
1	● ●
2	● ● ●
3	● ● ● ●
4	● ● ● ● ●
5	● ● ● ● ● ●
6	● ● ● ● ● ● ●
7	● ● ● ● ● ● ● ●
8	● ● ● ● ● ● ● ● ●
9	● ● ● ● ● ● ● ● ● ●

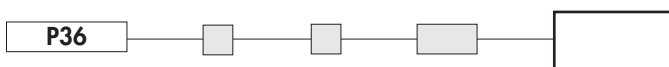
▲ Position ▲ Marking

02 BCD complement	
	C 1 2 4 8
0	● ● ● ● ●
1	● ● ● ● ● ●
2	● ● ● ● ● ● ●
3	● ● ● ● ● ● ● ●
4	● ● ● ● ● ● ● ● ●
5	● ● ● ● ● ● ● ● ● ●
6	● ● ● ● ● ● ● ● ● ● ●
7	● ● ● ● ● ● ● ● ● ● ● ●
8	● ● ● ● ● ● ● ● ● ● ● ● ●
9	● ● ● ● ● ● ● ● ● ● ● ● ● ●

03 Hexadecimal	
	C 1 2 4 8
0	●
1	● ●
2	● ● ●
3	● ● ● ●
4	● ● ● ● ●
5	● ● ● ● ● ●
6	● ● ● ● ● ● ●
7	● ● ● ● ● ● ● ●
8	● ● ● ● ● ● ● ● ●
9	● ● ● ● ● ● ● ● ● ●
10	● ● ● ● ● ● ● ● ● ● ●
11	● ● ● ● ● ● ● ● ● ● ● ●
12	● ● ● ● ● ● ● ● ● ● ● ● ●
13	● ● ● ● ● ● ● ● ● ● ● ● ● ●
14	● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
15	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●

06 Hexadecimal complement	
	C 1 2 4 8
0	● ● ● ● ● ●
1	● ● ● ● ● ● ●
2	● ● ● ● ● ● ● ●
3	● ● ● ● ● ● ● ● ●
4	● ● ● ● ● ● ● ● ● ●
5	● ● ● ● ● ● ● ● ● ● ●
6	● ● ● ● ● ● ● ● ● ● ● ●
7	● ● ● ● ● ● ● ● ● ● ● ● ●
8	● ● ● ● ● ● ● ● ● ● ● ● ● ●
9	● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
10	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
11	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
12	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
13	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
14	● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●
15	● ●

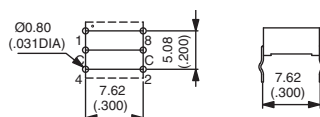
TERMINALS



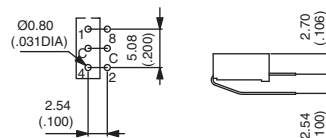
(none) Straight or SMT



V Crimped



L254 Right angle, spacing 2,54 (.100)



PT65 series

Rotary code switches

Through-hole

Outside the US and the UK, this series is sold as the CR65 series with a blue case.



- 4 actuator types
- Save board space
- Highly reliable
- Solder and flux sealed, washable

PT65			
SERIES	Actuators	Codes	Terminals
	<ul style="list-style-type: none"> 1 Screwdriver 3 Spindle 5 Segment wheel 7 Accessories 	<ul style="list-style-type: none"> 01 BCD 02 BCD complement 03 Hexadecimal 06 Hexadecimal complement 	<ul style="list-style-type: none"> (none) Straight L254 Right angle, spacing 2,54 (.100) L508 Right angle, spacing 5,08 (.200)

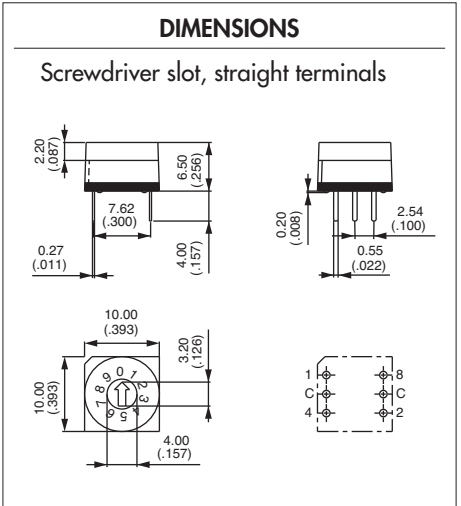
ELECTRICAL SPECIFICATIONS
<ul style="list-style-type: none"> • Operating voltage : 24 VDC max. • Contact load, static : 400mA max. • Contact load, dynamic : 150mA max. • Initial contact resistance : 80 mΩ max. • Insulation resistance : 100 MΩ min.

MECHANICAL AND THERMAL SPECS
<ul style="list-style-type: none"> • Torque : 0,7 Ncm min. • Expected life : 10.000 cycles min. • Operating temperature : -20°C to +70°C

MATERIALS
<ul style="list-style-type: none"> • Base : UL94-V0, high temperature thermoplastic • Cover : UL94-V0, high temperature thermoplastic, grey • Actuator : PA 4.6 nylon • Contacts : gold over nickel plated phosphor bronze • Terminals : tin plated

SOLDER RECOMMENDATIONS
(DIN CEI 68-2-20)
<ul style="list-style-type: none"> • Manual soldering : 340°C max. for 2 seconds max. • Wave soldering : 260°C max. for 10 seconds max.

PACKAGING
<ul style="list-style-type: none"> • Switches for screwdriver slot or accessory actuation (PT651 and PT657) : tubes of 50 pieces • Switches with spindle (PT653) or segment wheel (PT655) : candy trays of 50 pieces • Accessories : bags of 50 pieces



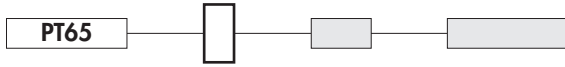
Dimensions : first dimensions are in mm while inches are shown as bracketed numbers.

PT65 series

Rotary code switches

Through-hole

ACTUATORS



1 Screwdriver

3 Spindle (grey)

5 Segment wheel (grey)

7 Accessories

See next page

CODES / TRUTH TABLES



01 BCD

	C	1	2	4	8	
0	●					0
1	●	●				1
2	●		●			2
3	●	●	●			3
4	●			●		4
5	●	●		●		5
6	●		●	●		6
7	●	●	●	●		7
8	●				●	8
9	●	●			●	9

▲ Position ▲ Marking

02 BCD complement

	C	1	2	4	8	
0	●	●	●	●	●	0
1	●	●	●	●	●	1
2	●	●	●	●	●	2
3	●	●	●	●	●	3
4	●	●	●	●	●	4
5	●	●	●	●	●	5
6	●	●	●	●	●	6
7	●	●	●	●	●	7
8	●	●	●	●	●	8
9	●	●	●	●	●	9

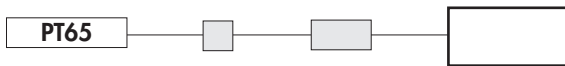
03 Hexadecimal

	C	1	2	4	8	
0	●					0
1	●	●				1
2	●		●			2
3	●	●	●			3
4	●			●		4
5	●	●		●		5
6	●		●	●		6
7	●	●	●	●		7
8	●				●	8
9	●	●			●	9
10	●		●		●	A
11	●	●			●	B
12	●		●		●	C
13	●	●		●	●	D
14	●		●	●	●	E
15	●	●	●	●	●	F

06 Hexadecimal complement

	C	1	2	4	8	
0	●	●	●	●	●	0
1	●	●	●	●	●	1
2	●	●	●	●	●	2
3	●	●	●	●	●	3
4	●	●	●	●	●	4
5	●	●	●	●	●	5
6	●	●	●	●	●	6
7	●	●	●	●	●	7
8	●	●	●	●	●	8
9	●	●	●	●	●	9
10	●	●	●	●	●	A
11	●	●	●	●	●	B
12	●	●	●	●	●	C
13	●	●	●	●	●	D
14	●	●	●	●	●	E
15	●	●	●	●	●	F

TERMINALS



(none) Straight

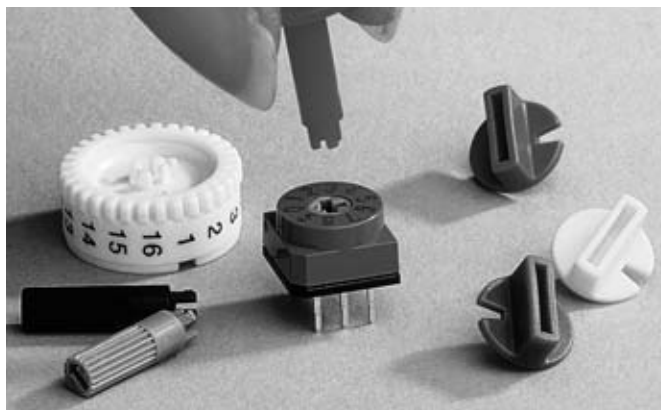
L254 Right angle spacing 2,54 (.100)

L508 Right angle spacing 5,08 (.200)

PT65 series

Rotary code switches

Through-hole



ACCESSORIES ADAPTED TO YOUR APPLICATIONS

Basic model PT65 7 has been designed to accept different actuators with snap-in connection.

According to your application, you can choose between spindles or plastic knobs in two different lengths and a Ø 17 mm (.669) knurled wheel for lateral marking.

Standard colours are shown below. Special colours are also available on request.

<p>SPINDLES Length 11,6 mm (standard) Length 13,3 mm</p>	<p>P/N U4822 U4824 U4832</p>	<p>COLOURS black grey black</p>	
<p>PLASTIC KNOBS Length 5,3 mm (standard) Length 15,7 mm Length 4,4 mm</p>	<p>P/N U4906 U4916 U4941 U4943 U4944 U4945 U4946</p>	<p>COLOURS red red blue green grey yellow red</p>	
<p>KNURLED WHEEL (unmarked - marking on request)</p>	<p>P/N U4847/1</p>	<p>COLOUR white/black</p>	<p>→ Panel</p>

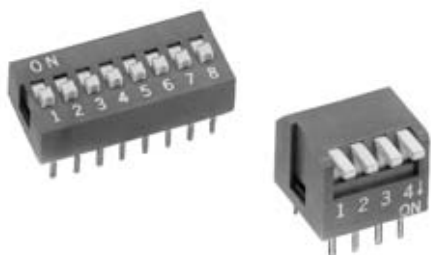
STANDARD PRODUCTS

MODELS CODES	FOR SCREWDRIVER		WITH SPINDLE	WITH SEGMENT WHEEL		FOR ACCESS.
	Upper actuation	Side actuation	Upper actuation	Upper actuation	Side actuation	Upper actuation
BCD	PT65101	PT65101L254	PT65301	PT65501	-	PT65701
		PT65101L508			-	
BCD complement	PT65102	-	-	PT65502	-	-
Hexadecimal	PT65103	PT65103L254	PT65303	PT65503	PT65303L254	-
		PT65103L508				-
Hexadecimal complem.	PT65106	-	-	-	-	-

DS-DP-DA series

DIP switches

Distinctive features and specifications



- Standard, piano and right angle models
- 2 to 12 positions
- Top tape sealing option

ELECTRICAL SPECIFICATIONS

- Current/voltage rating :
 - non-switching : 100mA 50VDC
 - switching : 50mA 24VDC
- Contact resistance (at 100mA) :
 - 50mΩ max. at initial
 - 100mΩ after life test
- Insulation resistance (at 100VDC +/-15V) :
 - 100 MΩ min. between adjacent terminals
- Dielectric strength : 500VDC for one minute
- Capacitance : 5 pF between adjacent terminals
- Circuit : single pole, single throw
- Electrical life : 2.000 cycles min. per switch

MATERIALS

- Case, UL94-V0, glass fiber filled PBT, black
- Cover : UL94-V0, glass fiber filled PBT, red
- Actuator : UL94-V0, glass fiber filled PBT, white
- Terminals/contacts : gold over nickel plated phosphor bronze
- Terminal seal : epoxy
- Tape seal : polyester film

GENERAL SPECIFICATIONS

- Operating force : DP models : 4N - DS/DA models : 8N
- Travel : 2 mm (.078)
- Mechanical life : 5.000 cycles min. per switch
- Vibration test : MIL-STD-202F method 201A
- Shock test : MIL-STD-202F method 213B, condition A
- Operating temperature : -20°C to +70°C

RECOMMENDED SOLDERING AND CLEANING PROCESSES

- Hand soldering : 320°C max. for 2 seconds max. (30 watt iron max.)
- Wave soldering : 260°C max. for 5 seconds max.
- Force rinse, high agitation or triple bath cleaning method (**with tape seal, option T**) : freon TF or TE. When vapor methods are used, do not subject switch to solvents above 51°C.

Note : keep switches in "OFF" position during soldering and cleaning for best results.

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

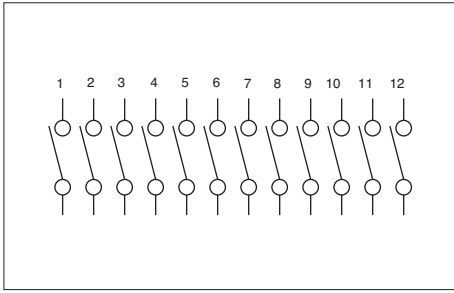


Packaging unit : standard IC tubes - Quantities depending on model. See table below.

DS/DSR	Quantity	DS-T/DSR-T	Quantity	DA	Quantity	DA-T	Quantity	DP/DPL	Quantity	DP-T/DPL-T	Quantity
DS(R)-02	72	DS(R)-02T	72	DA-02	73	DA-02T	70	DP(L)-02	70	DP(L)-02T	65
DS(R)-03	51	DS(R)-03T	51	DA-03	52	DA-03T	50	DP(L)-03	50	DP(L)-03T	49
DS(R)-04	40	DS(R)-04T	40	DA-04	40	DA-04T	39	DP(L)-04	39	DP(L)-04T	39
DS(R)-05	32	DS(R)-05T	32	DA-05	33	DA-05T	32	DP(L)-05	32	DP(L)-05T	32
DS(R)-06	27	DS(R)-06T	27	DA-06	28	DA-06T	28	DP(L)-06	27	DP(L)-06T	27
DS(R)-07	24	DS(R)-07T	24	DA-07	24	DA-07T	24	DP(L)-08	21	DP(L)-08T	21
DS(R)-08	21	DS(R)-08T	21	DA-08	21	DA-08T	21	DP(L)-10	17	DP(L)-10T	17
DS(R)-09	19	DS(R)-09T	19	DA-09	19	DA-09T	19	DP(L)-12	14	DP(L)-12T	14
DS(R)-10	17	DS(R)-10T	17	DA-10	17	DA-10T	17				
DS(R)-12	14	DS(R)-12T	14	DA-12	14	DA-12T	14				

DS/DSR series

Standard DIP switches



- Raised or recessed actuator
- 2 to 12 positions

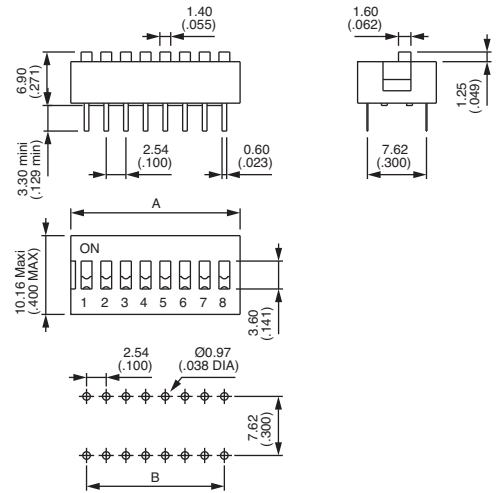
MODEL
STRUCTURE



Raised actuator : DS



Model No	No. pos.	Dim "A"	Dim. "B"
DS-02	2	6,60 (.259)	2,54 (.100)
DS-03	3	9,14 (.359)	5,08 (.200)
DS-04	4	11,68 (.459)	7,62 (.300)
DS-05	5	14,22 (.559)	10,16 (.400)
DS-06	6	16,76 (.659)	12,70 (.500)
DS-07	7	19,30 (.759)	15,24 (.600)
DS-08	8	21,84 (.859)	17,78 (.700)
DS-09	9	24,38 (.959)	20,32 (.800)
DS-10	10	26,92 (1.059)	22,86 (.900)
DS-12	12	32,00 (1.259)	27,94 (1.100)

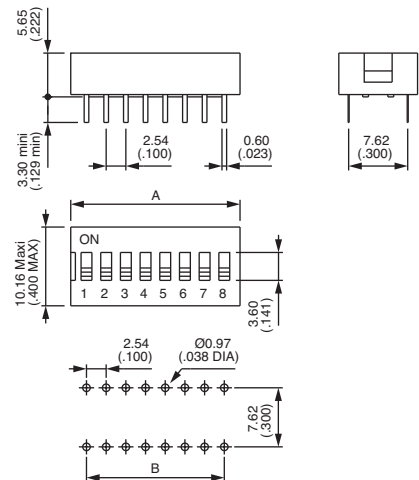


Top tape sealed : add "T" after model number.

Recessed actuator : DSR



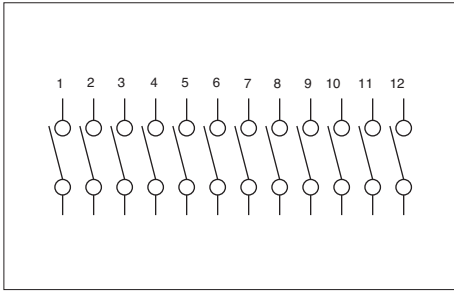
Model No	No. pos.	Dim "A"	Dim. "B"
DSR-02	2	6,60 (.259)	2,54 (.100)
DSR-03	3	9,14 (.359)	5,08 (.200)
DSR-04	4	11,68 (.459)	7,62 (.300)
DSR-05	5	14,22 (.559)	10,16 (.400)
DSR-06	6	16,76 (.659)	12,70 (.500)
DSR-07	7	19,30 (.759)	15,24 (.600)
DSR-08	8	21,84 (.859)	17,78 (.700)
DSR-09	9	24,38 (.959)	20,32 (.800)
DSR-10	10	26,92 (1.059)	22,86 (.900)
DSR-12	12	32,00 (1.259)	27,94 (1.100)



Top tape sealed : add "T" after model number.

DP/DPL series

Piano DIP switches



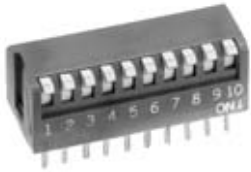
- Short or long actuator
- 2 to 12 positions

Note : Push down for "ON" is our standard type.
Push down for "OFF" is also available on special order,
consult factory.

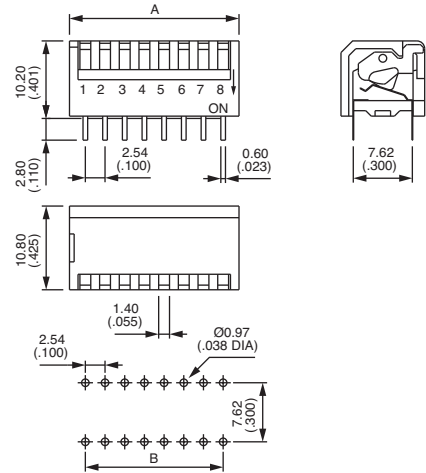
MODEL STRUCTURE



Short actuator : DP



Model No	No. pos.	Dim "A"	Dim. "B"
DP-02	2	6,63 (.261)	2,54 (.100)
DP-03	3	9,17 (.361)	5,08 (.200)
DP-04	4	11,71 (.461)	7,62 (.300)
DP-05	5	14,25 (.561)	10,16 (.400)
DP-06	6	16,8 (.661)	12,70 (.500)
DP-08	8	21,87 (.861)	17,78 (.700)
DP-10	10	26,95 (1.061)	22,86 (.900)
DP-12	12	32,03 (1.261)	27,94 (1.100)

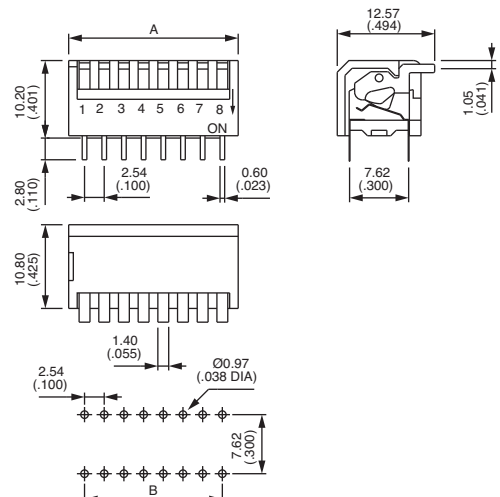


Top tape sealed : add "T" after model number.

Long actuator : DPL



Model No	No. pos.	Dim "A"	Dim. "B"
DPL-02	2	6,63 (.261)	2,54 (.100)
DPL-03	3	9,17 (.361)	5,08 (.200)
DPL-04	4	11,71 (.461)	7,62 (.300)
DPL-05	5	14,25 (.561)	10,16 (.400)
DPL-06	6	16,8 (.661)	12,70 (.500)
DPL-08	8	21,87 (.861)	17,78 (.700)
DPL-10	10	26,95 (1.061)	22,86 (.900)
DPL-12	12	32,03 (1.261)	27,94 (1.100)

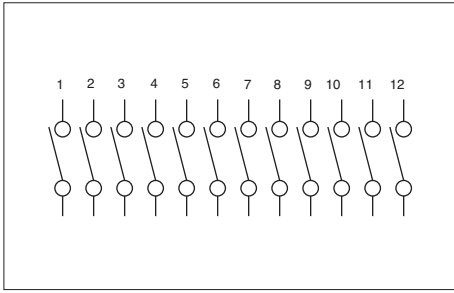


Top tape sealed : add "T" after model number.

DA series

Right angle DIP switches

- 2 to 12 positions



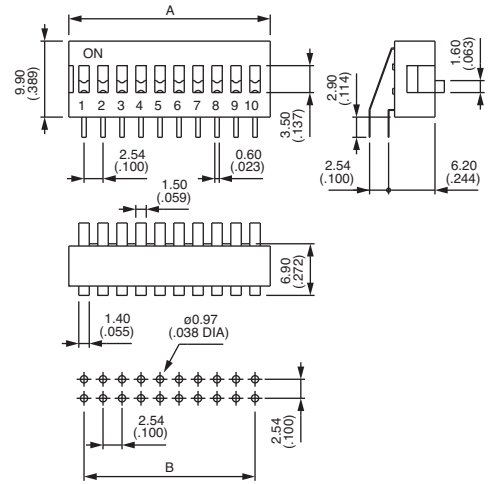
MODEL
STRUCTURE



Raised actuator : DA



Model No	No. pos.	Dim "A"	Dim. "B"
DA-02	2	6,60 (.259)	2,54 (.100)
DA-03	3	9,14 (.359)	5,08 (.200)
DA-04	4	11,68 (.459)	7,62 (.300)
DA-05	5	14,22 (.559)	10,16 (.400)
DA-06	6	16,76 (.659)	12,70 (.500)
DA-07	7	19,30 (.759)	15,24 (.600)
DA-08	8	21,84 (.859)	17,78 (.700)
DA-09	9	24,38 (.959)	20,32 (.800)
DA-10	10	26,92 (1.059)	22,86 (.900)
DA-12	12	32,00 (1.259)	27,94 (1.100)



Top tape sealed : add "T" after model number.

Distinctive features

Low profile

- The lowest case available in 2, 4, 6 and 8 pole versions
- Reduction of the shadow effect in IR soldering
- 30 % reduction of component volume

Two versions

Surface mount models

- Designed for reflow soldering
- UL 94-V0 high temperature materials
- Tin plated terminals

Through-hole models

- Same thermal specifications as SMT models, allowing mixed soldering process



Washable by construction

- Moulded-in terminals
- Ultrasonic-welded case
- Two slots on case corners allowing removal of protection tape

Reliable contacts

- Anti-crush system on moving contact
- Bifurcated self-cleaning sliding contacts
- Positive detent actuation
- Recessed slide actuators preventing accidental actuation
- Good visibility of actuators : black slide on clear background

Two types of packaging

Surface mount models

- Tape and reel (1.000 pieces per reel) - IC tubes

Through-hole models

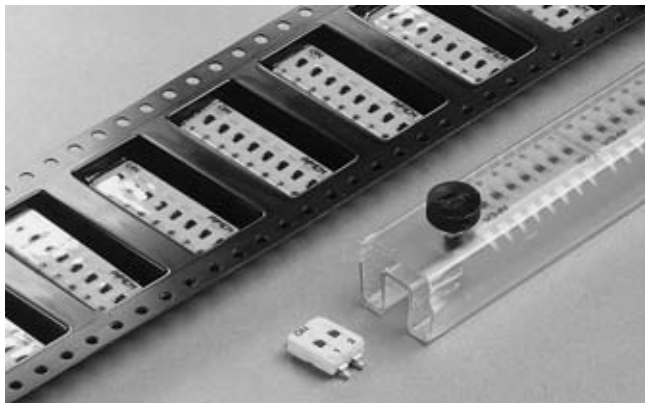
- IC tubes

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

IKN series

Surface mount DIP switches

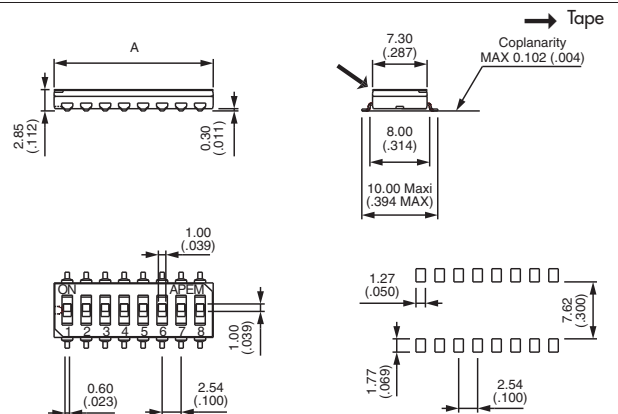
Low profile



- Overall height from PCB : 2,85 mm (.112)
- Self-cleaning wiping contacts
- Recessed actuator with positive detent
- Tin plated terminals
- Process compatible - withstand IR reflow soldering (see Technical Information, Surface Mount, end of catalogue)
- Washable

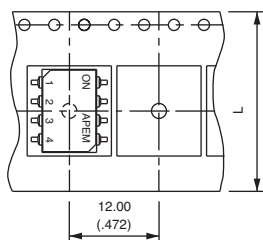
Tape & reel	IC tubes	No pos.	Dimension "A"
IKN0204000	IKN0203000	2	6 (.236)
IKN0404000	IKN0403000	4	11,10 (.437)
IKN0604000	IKN0603000	6	16,20 (.637)
IKN0804000	IKN0803000	8	21,30 (.838)

Supplied with all poles in "ON" position.
Other models (3, 5 and 7 positions) : on request

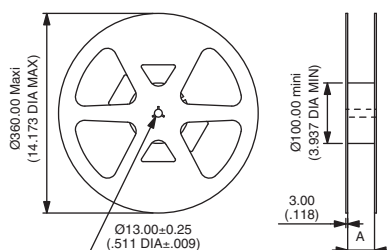


PACKAGING

Unrolling direction →



Pos.	Tape dim. "L"	Reel dim. "A"
2	16 (.629)	16,40 (.646)
4	24 (.944)	24,40 (.960)
6	24 (.944)	24,40 (.960)
8	32 (1.259)	32,40 (1.275)



SPECIFICATIONS

- Max. current/voltage rating :
 - switching : 100mA 24VDC
 - non-switching : 100mA 48VDC
- Contact resistance :
 - initial : 30 mΩ max.
 - after 2.000 cycles : 100 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 500 VAC min.
- Electrical life : 2.000 cycles
- Travel : 0,67 mm (.026)
- Operating temperature : -40°C to +100°C
- Storage temperature : -40°C to +125°C

MATERIALS

- Case and actuator : UL 94-V0 thermoplastic
- Stationary contact : bronze, gold plated over nickel barrier
- Moving contact : beryllium copper, gold plated
- Terminals : tin plated over nickel barrier
- Protection tape : polyimide

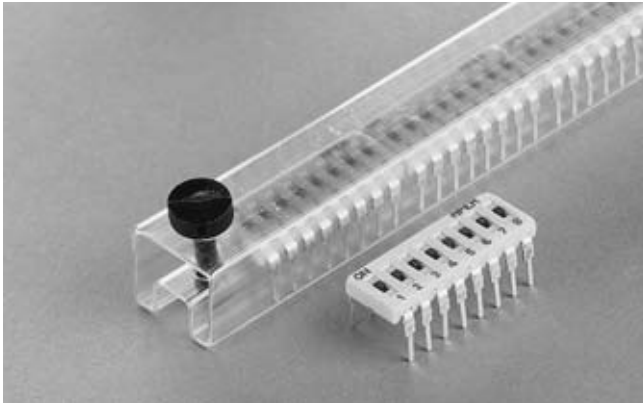
Antistatic packaging - Standard packaging units :

- Reels of 1.000 pieces
- Tape meeting international standard IEC - Publication 286-3 (EIA481A)
- Start leader : 400 mm min. - End leader : 160 mm
- IC tubes : see next page.

IKN series

Through-hole DIP switches

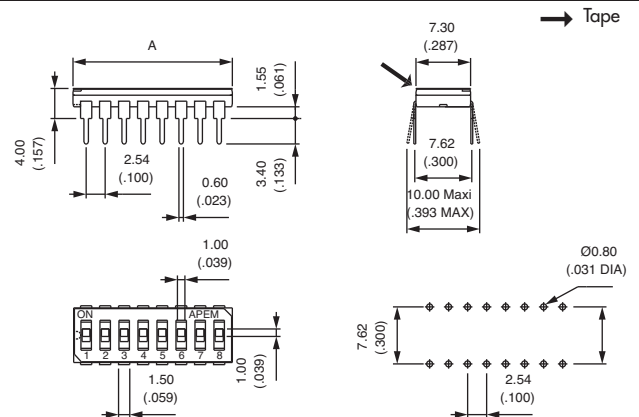
Low profile



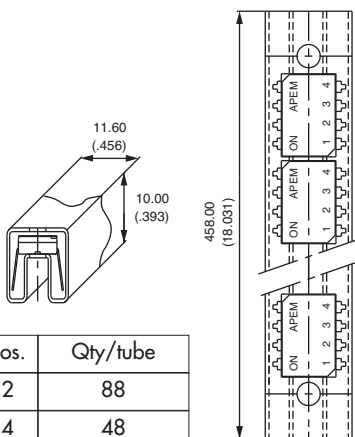
- Overall height from PCB : 4 mm (.156)
- Self-cleaning wiping contacts
- Recessed actuator with positive detent
- Tin plated terminals
- Wave solderable
- Washable

Model No	No pos.	Dimension "A"
IKN0200000	2	6 (.236)
IKN0400000	4	11,10 (.437)
IKN0600000	6	16,20 (.637)
IKN0800000	8	21,30 (.838)

Supplied with all poles in "ON" position.
Other models (3, 5 and 7 positions) : on request



PACKAGING



Pos.	Qty/tube
2	88
4	48
6	33
8	25

IC TUBES

SPECIFICATIONS

- Max. current/voltage rating :
 - switching : 100mA 24VDC
 - non-switching : 100mA 48VDC
- Contact resistance :
 - initial: 30 mΩ max.
 - after 2.000 cycles : 100 mΩ max.
- Insulation resistance : 1.000 MΩ min. at 500VDC
- Dielectric strength : 500 VAC min.
- Electrical life : 2.000 cycles
- Travel : 0,67 mm (.026)
- Operating temperature : -40°C to +100°C
- Storage temperature : -55°C to +125°C

MATERIALS

- Case and actuator : UL 94-V0 thermoplastic
- Stationary contact : bronze, gold plated over nickel barrier
- Moving contact : beryllium copper, gold plated
- Terminals : tin plated over nickel barrier
- Protection tape : polyimide

IKE series

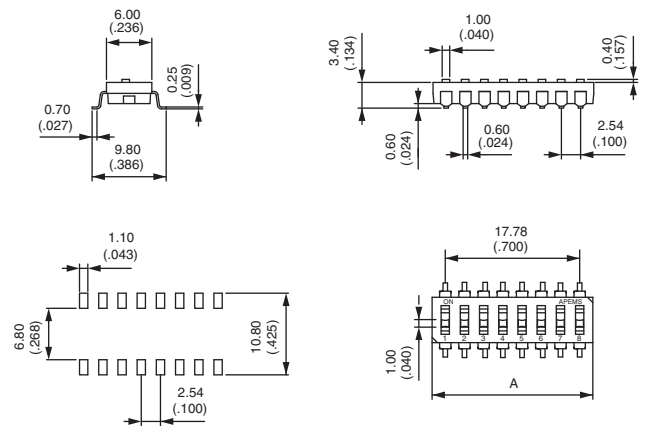
Surface mount DIP switches



- Overall height from PCB : 3,80 mm (.149)
- End stackable
- Raised actuator
- Even and odd pole numbers
- Self-cleaning wiping contacts
- Gold plated terminals
- Process compatible - withstand IR reflow soldering
(see Technical Information, Surface Mount, end of catalogue)

Models with recessed actuator and tape available on request.

Tape & reel	IC tubes	No pos.	Dimension "A"	Qty/tube
IKE0104101	IKE0103101	1	2,44 (.096)	194
IKE0204101	IKE0203101	2	4,98 (.196)	95
IKE0304101	IKE0303101	3	7,52 (.296)	63
IKE0404101	IKE0403101	4	10,06 (.316)	47
IKE0504101	IKE0503101	5	12,60 (.496)	38
IKE0604101	IKE0603101	6	15,14 (.596)	31
IKE0704101	IKE0703101	7	17,68 (.696)	27
IKE0804101	IKE0803101	8	20,22 (.796)	23
IKE0904101	IKE0903101	9	22,76 (.896)	21
IKE1004101	IKE1003101	10	25,30 (.996)	18
IKE1204101	IKE1203101	12	30,38 (1,196)	12



Supplied with all poles in "OFF" position.

SPECIFICATIONS

- Max. current/voltage rating : 25mA 24VDC
- Initial contact resistance : 50 mΩ max.
- Insulation resistance : 100 MΩ min. at 500VDC
- Dielectric strength : 500 VAC min.
- Electrical life : 2.000 cycles
- Travel : 1 mm (.039)
- Operating temperature : -20°C to +85°C
- Storage temperature : -40°C to +85°C

MATERIALS

- Case and actuator : UL94-V0 thermoplastic
- Moving contact : copper, gold plated
- Terminals : gold plated

Antistatic packaging - standard packaging units

- Reels of 900 pieces
Tape meeting international standard IEC, publication 286-3 (EIA481A).
- IC tubes : see above chart for quantities.

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

IKE series

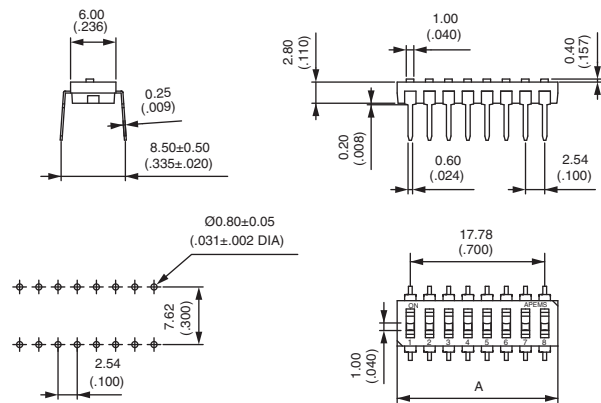
Through-hole DIP switches



- Overall height from PCB : 3,40 mm (.133)
- End stackable
- Raised actuator
- Even and odd pole numbers
- Self-cleaning wiping contacts
- Gold plated terminals
- Wave solderable

Models with recessed actuator and tape available on request.

Model No	No pos.	Dimension "A"	Qty/tube
IKE0100101	1	2,44 (.096)	194
IKE0200101	2	4,98 (.196)	95
IKE0300101	3	7,52 (.296)	63
IKE0400101	4	10,06 (.316)	47
IKE0500101	5	12,60 (.496)	38
IKE0600101	6	15,14 (.596)	31
IKE0700101	7	17,68 (.696)	27
IKE0800101	8	20,22 (.796)	23
IKE0900101	9	22,76 (.896)	21
IKE1000101	10	25,30 (.996)	18
IKE1200101	12	30,38 (1,196)	12



Supplied with all poles in "OFF" position.

SPECIFICATIONS

- Max. current/voltage rating : 25mA 24VDC
- Initial contact resistance : 50 mΩ max.
- Insulation resistance : 100 MΩ min. at 500VDC
- Dielectric strength : 500 VAC min.
- Electrical life : 2.000 cycles
- Travel : 1 mm (.039)
- Operating temperature : -20°C to +85°C
- Storage temperature : -40°C to +85°C

MATERIALS

- Case and actuator : UL94-V0 thermoplastic
- Moving contact : copper, gold plated
- Terminals : gold plated

Antistatic packaging - standard packaging units

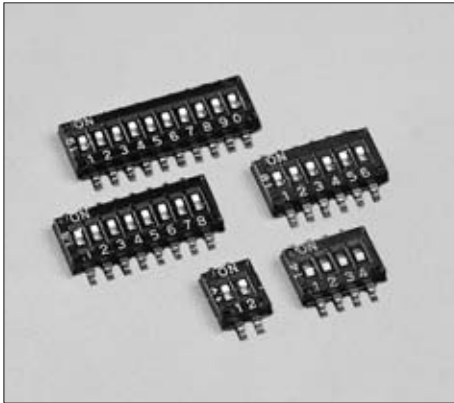
- IC tubes : see above chart for quantities.

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

IKH series

Surface mount half pitch DIP switches

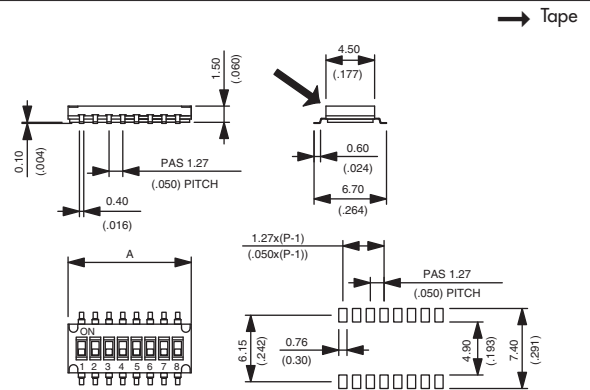
Very low profile



- 1,27 mm (.050) terminal to terminal pitch
- Overall height from PCB : 1,6 mm (.063) only
- Very small PCB space requirement
- Process compatible - withstand IR reflow soldering (see Technical Information, Surface Mount, end of catalogue)
- Washable (tape seal standard)

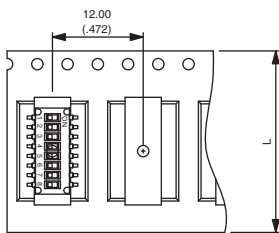
Tape & reel	IC tubes (Qty)	No pos.	Dimension "A"
IKH0204000	IKH0203000 (125)	2	3,77 (.148)
IKH0404000	IKH0403000 (75)	4	6,31 (.248)
IKH0604000	IKH0603000 (54)	6	8,85 (.348)
IKH0804000	IKH0803000 (40)	8	11,39 (.448)
IKH1004000	IKH1003000 (33)	10	13,93 (.548)

Supplied with all poles in "ON" position.
Switches without tape seal : on request.

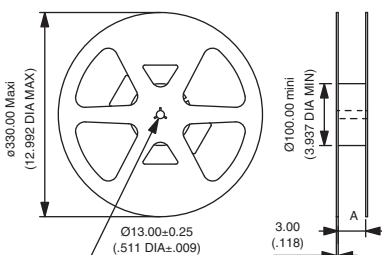


TAPE AND REEL PACKAGING

Unrolling direction →



Pos.	Tape dim. "L"	Reel dim. "A"
2	12,00 (.472)	12,40 (.488)
4	16,00 (.629)	16,40 (.646)
6	16,00 (.629)	16,40 (.646)
8	24,00 (.944)	24,40 (.960)
10	24,00 (.944)	24,40 (.960)



SPECIFICATIONS

- Max. current/voltage rating :
 - switching : 25mA 24VDC
 - non switching : 100mA 50VDC
- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 100 MΩ min. at 500VDC
- Dielectric strength : 300 Vca min.
- Electrical life : 1.000 cycles
- Travel : 0,60 mm (.024)
- Operating temperature : -20°C to +70°C
- Storage temperature : -40°C to +85°C

MATERIALS

- Case and cover : high temperature thermoplastic UL 94-V0, black
- Actuator : high temperature thermoplastic UL 94-V0, white
- Contacts : phosphor bronze, gold plated, over nickel barrier
- Terminals : tin plated
- Tape seal : polyimide

Antistatic packaging - standard packaging units

- Reels of 4.000 pieces
Tape meeting international standard IEC - Publication 286-3 (EIA481A)
- IC tubes : see above.

Dimensions in mm and inches.

Industrial controls



Section G

A1-A01-A02-A03 series

Industrial controls

Distinctive features

The A01 and A02 series offer ranges of :

- pushbutton switches, illuminated or not
- indicators
- 2 or 3 position keylock switches
- 2 or 3 position rotary lever switches
- emergency stop switches

with rectangular, square or round operators.

- Environmental protection : IP65
- Modular construction
- Electrical life : 50.000 cycles min.
- Screen engraving or insertable legends on request
- Approvals (for switch blocks only)



UL 1054



BS RIA 20 Shock & Vibration



EN 61058-1
pending



Each sub-assembly has to be ordered separately.

A01 - A1 - A03 series

- Panel cut-out :
Ø 16 mm (.630), except :
 - flush mount round : Ø 22 mm (.866)
 - flush mount rectangular : 20.60 x 26.70 mm
 - flush mount square : 20.60 x 20.60 mm
 - A1 series : Ø 22 mm (.866)
 - A03 series : round or square Ø 22 (.866)
flush mount : Ø 30 mm (1.378)
- 1, 2, 3 and 4 poles
- Solder lug/quick-connect terminals
- Contacts : silver, gold plated
- Current/voltage rating :
6A 250VAC max. - 10mA 5VAC min.
These values are applicable for all components, accessories and lamps, unless otherwise specified in the following pages.
- Lamp : filament, neon or LED

A02 series

- Panel cut-out :
 - round or square : Ø 22 mm (.866)
 - rectangular : 29,5 x 21,5 mm (1.160x.846)
 - flush mount : Ø 30 mm (1.378)
 - 1 and 2 poles
 - Screw terminals (optional : quick-connect term.)
 - Contacts : silver
 - Current/voltage rating : 12A 380VAC
16A 250VAC max. - 25mA 5VAC min.
These values are applicable for all components, accessories and lamps, unless otherwise specified in the following pages.
 - Lamp : filament, neon, LED
or special multi-LED array
- Option : end cap terminal guard. Order separately (see end of A02 series).

Packaging unit :

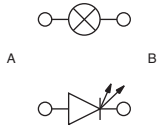
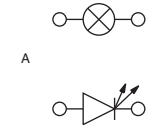
A1 : 25 pieces - A01 : 20 pieces (except pushbuttons: 25 pieces) - A02 : 25 pieces - A03 : 10 pieces.

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

A1-A01-A02-A03 series

Industrial controls

Specifications for pushbutton, keylock and rotary switches

ELECTRICAL SPECIFICATIONS		
	A01 - A1 - A03	A02
• Function :	Momentary or maintained action	Momentary or maintained action
• Current/voltage rating :	10mA 5VAC min. 6A 250VAC max. - 6A 12VDC max.	25mA 5VAC min. 12A 380VAC - 16A 250VAC max. 12A 12VDC max.
• Contact gap	> 1 mm (.039)	Double break 2 x 1,5 mm (.059)
• Initial contact resistance :	10mΩ max. at 1A 4VDC	10mΩ max. at 1A 4VDC
• Insulation resistance :	50 MΩ min.	50 MΩ min.
• Dielectric strength :	750V between open contacts 5KV live to accessible	2KV between open contacts 4KV live to accessible
• Electrical life (resistive load) :	50.000 cycles	50.000 cycles
• Insulation :	Class 2	Class 2
• Lamp life :	LED : 60.000 h min. to 75% relative luminosity - Filament : approx. 5.000 h Neon : approx. 10.000 h	LED : 60.000 h min. to 75 % relative luminosity - Filament : approx. 5.000 h Neon : approx. 10.000 h
• Lamp circuit diagrams		

GENERAL SPECIFICATIONS		
	A01 - A1 - A03	A02
• Min. mechanical life :	Pushb. momentary : 1 million cycles Pushb. maintained : 100.000 cycles Keylock and rotary : 100.000 cycles	Pushb. momentary: 1 million cycles Pushb. maintained : 100.000 cycles Keylock and rotary : 100.000 cycles
• Panel thickness	8 mm (.315) max.	8 mm (.315) max.
• Operating temperature :	-20°C to +55°C	-20°C to +85°C
• Solder heat resistance : (IEC 68-2-20Tb, method 2)	350°C, 5 sec.	350°C, 5 sec.
• Degree of environmental protection (IEC 529)	IP 65 front of panel IP 40 back of panel	IP 65 front of panel IP 40 back of panel
• Lamps :	Midget Grooved T1 _{3/4} , filament, LED or neon	Midget Grooved T1 _{3/4} , filament, LED or neon Special multi-LED array
• Switch terminals :	Solder/quick-connect 2,8 mm (.110)	M3 screws - wire 2 x 0,75 mm ² max.
• Lamp terminals :	Solder/quick-connect 2,8 mm (.110)	M3 screws Flexible wire 2 x 2,5 mm ² max. Rigid wire 4 mm ² max.

Specifications for emergency stop switches : see pages 9 and 21.

For screen engraving or film legends, contact APEM.

A1 series

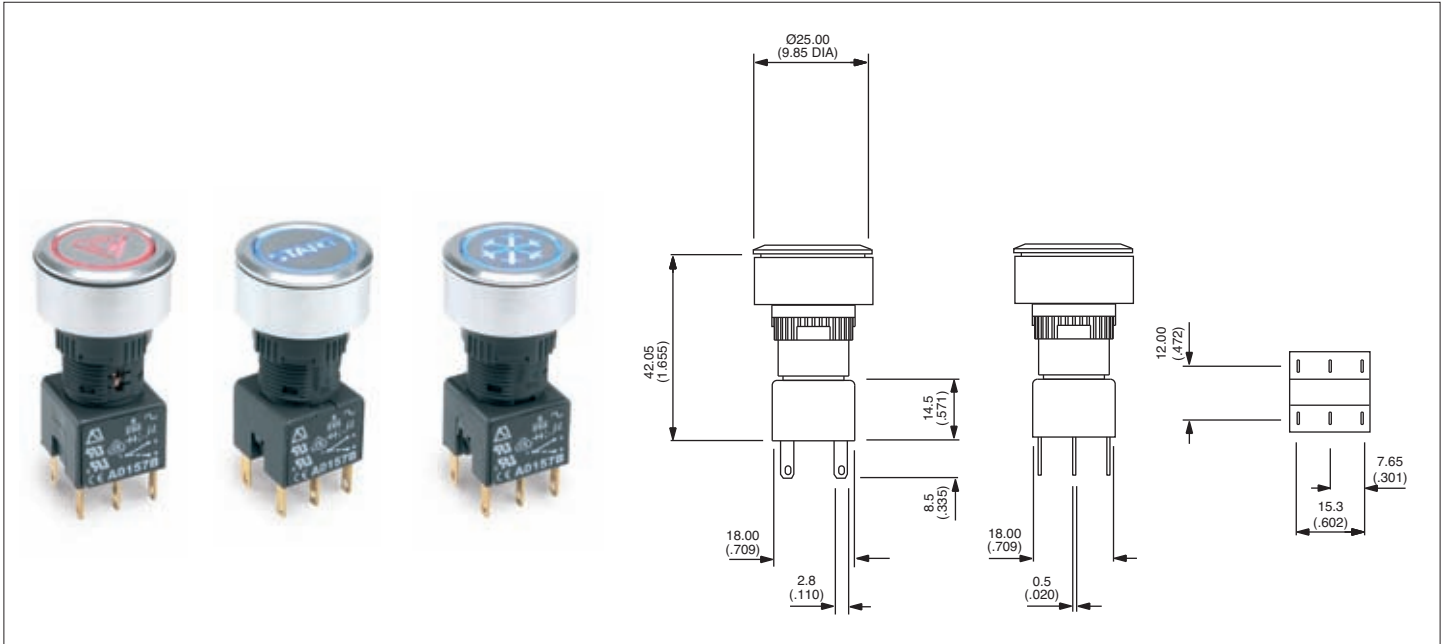
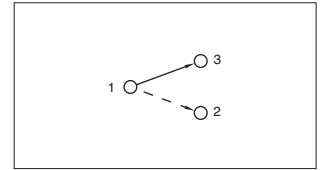
Engraved aluminium flush mounting pushbuttons and indicators

Panel cut-out Ø 22 (.866)

A pushbutton assembly requires :

engraved screen + lamp (if illuminated) + operator + switch block + flush mount bezel.
To order these elements, select desired model numbers from the table below.

Example : pushbutton, round, illuminated, sealed to IP65, latching, single pole with "start" engraving, 24V blue LED and flush mounting bezel = A1PCA1X103K403.



A1									
Switch Type P - pushbutton I - indicator	Bezel C - round	Illumination A - illuminated B - non-illum.	Sealing 0 - unsealed 1 - sealed IP65	Function 0 - indicator X - latching Y - momentary	Switch block 0 - indicator 1 - single pole 2 - double pole 5 - three pole 3 - four pole	Accessories 03 - flushmount			
Bulb									

Engraved Screen Options	
01 - Front Fog Lights	11 - 'Lock'
02 - Rear Fog Lights	12 - 'Unlock'
03 - 'Start'	13 - Rear Window Heating
04 - Interior Light	14 - Cooling
05 - Boot Release	15 - Wipers
06 - Hazard Warning	16 - Washers
07 - Lights	17 - Fan
08 - Heating & Ventilation	18 - Horn
09 - Map Lights	19 - Air recirculation
10 - Side Lights	20 - Blank

A1 - filament 6.3V
B1 - filament 14V
C1 - filament 28V
D1 - filament 36V
E1 - filament 48V
F1 - filament 60V
G1 - Neon 110V
H1 - Neon 220V
I1 - Led 6V red
I2 - Led 6V green
I3 - Led 6V amber
J1 - Led 12V red
J2 - Led 12V green
J3 - Led 12V amber
J4 - Led 12V blue
J5 - Led 12V white
K1 - Led 24V red
K2 - Led 24V green
K3 - Led 24V amber
K4 - Led 24V blue
K5 - Led 24V white
L1 - Led 48V red
L2 - Led 48V green
L3 - Led 48V amber

OTHER SCREEN ENGRAVING OPTIONS :
contact APEM.

A01 series

Illuminated or non-illuminated pushbutton switches

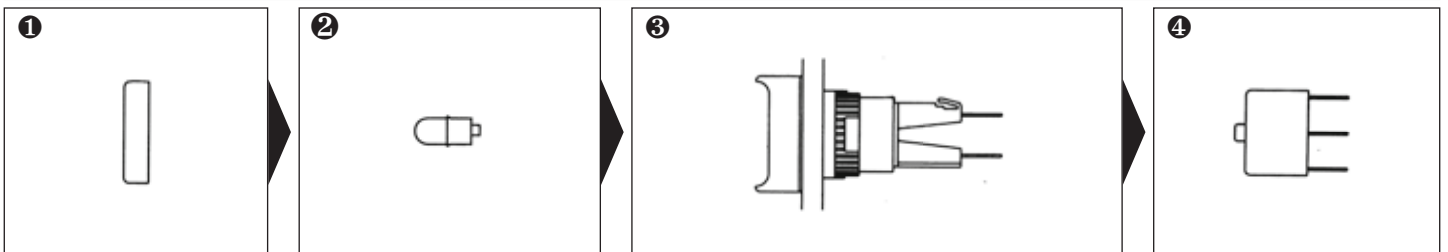
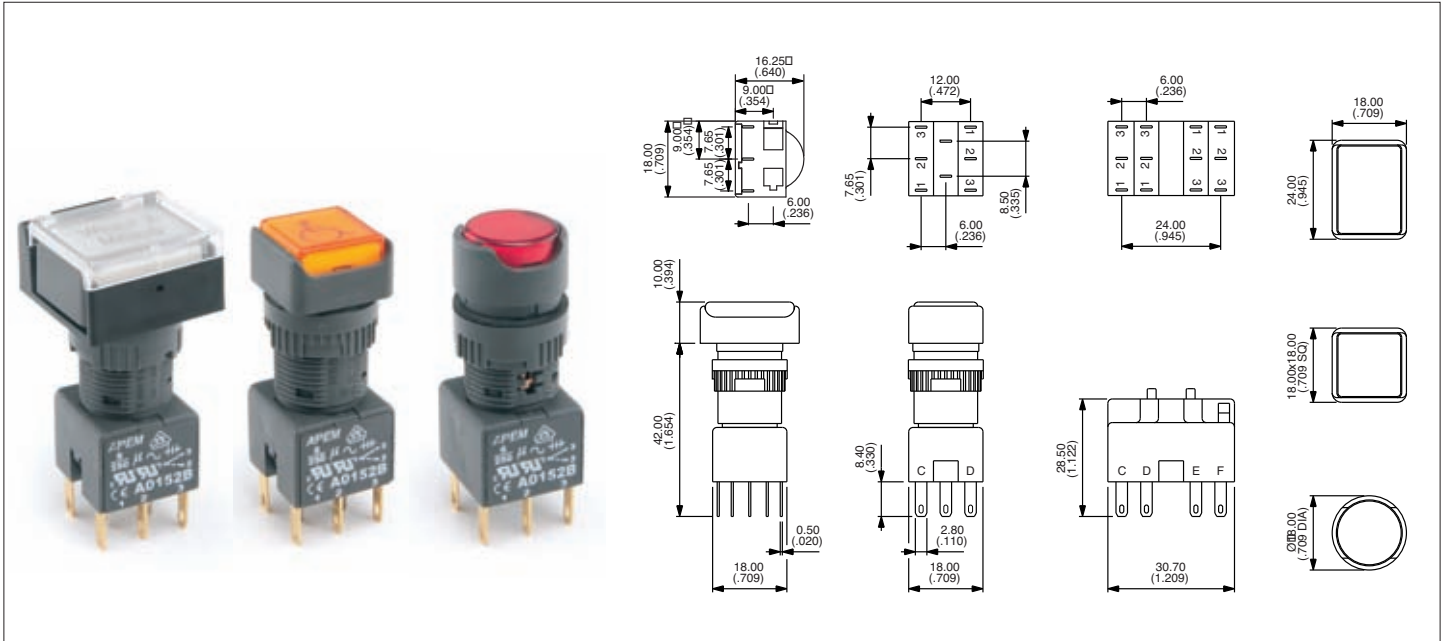
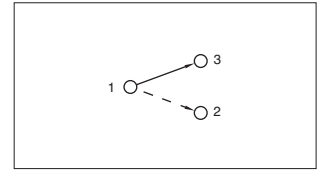
Panel cut-out Ø 16 (.630)

A pushbutton assembly requires :

screen + lamp (if illuminated) + operator + switch block.

To order these elements, select desired model numbers from tables below.

Example : IP65 rectangular pushbutton, single pole, maintained, red screen and 12V red LED = A0161B, A0142M1, A0101X and A0151BUL.



Screen

Bezel	Colour	Part No
□	black	A0161A
□	red	A0161B
□	amber	A0161C
□	yellow	A0161D
□	green	A0161E
□	blue	A0161F
□	clear	A0161G
□	white	A0161J
□	black	A0162A
□	red	A0162B
□	amber	A0162C
□	yellow	A0162D
□	green	A0162E
□	blue	A0162F
□	clear	A0162G
□	white	A0162J
○	black	A0163A
○	red	A0163B
○	amber	A0163C
○	yellow	A0163D
○	green	A0163E
○	blue	A0163F
○	clear	A0163G
○	white	A0163J

Lamp

Lamp	Voltage	Part No
Filament	6.3V	A0141A
Filament	14V	A0141B
Filament	28V	A0141C
Filament	36V	A0141D
Filament	48V	A0141E
Filament	60V	A0141F
Neon	110V	A0143G
Neon	220V	A0143H
LED	6V red	A0142L1
LED	6V green	A0142L2
LED	6V amber	A0142L3
LED	12V red	A0142M1
LED	12V green	A0142M2
LED	12V amber	A0142M3
LED	12V blue	A0142M4
LED	12V white	A0142M5
LED	24V red	A0142N1
LED	24V green	A0142N2
LED	24V amber	A0142N3
LED	24V blue	A0142N4
LED	24V white	A0142N5
LED	48V red	A0142P1
LED	48V green	A0142P2
LED	48V amber	A0142P3

Operator

Pole	Bezel	Description	Part No
1 or 2	□	illum, momentary	A0101Y
1 or 2	□	illum, maintained	A0101X
1 or 2	□	Non-illum, momentary	A0102Y
1 or 2	□	Non-illum, maintained	A0102X
3 or 4	□	illum, momentary	A0103Y
3 or 4	□	illum, maintained	A0103X
3 or 4	□	Non-illum, momentary	A0104Y
3 or 4	□	Non-illum, maintained	A0104X
1 or 2	□	illum, momentary	A0105Y
1 or 2	□	illum, maintained	A0105X
1 or 2	□	Non-illum, momentary	A0106Y
1 or 2	□	Non-illum, maintained	A0106X
3 or 4	□	illum, momentary	A0107Y
3 or 4	□	illum, maintained	A0107X
3 or 4	□	Non-illum, momentary	A0108Y
3 or 4	□	Non-illum, maintained	A0108X
1 or 2	○	illum, momentary	A0109Y
1 or 2	○	illum, maintained	A0109X
1 or 2	○	Non-illum, momentary	A0110Y
1 or 2	○	Non-illum, maintained	A0110X
3 or 4	○	illum, momentary	A0111Y
3 or 4	○	illum, maintained	A0111X
3 or 4	○	Non-illum, momentary	A0112Y
3 or 4	○	Non-illum, maintained	A0112X

Switch block

No of poles	Part No
Single pole	A0151BUL
Double pole	A0152BUL
Three pole	A0155BUL
Four pole	A0153BUL

UNSEALED SWITCHES (IP40) : add "01" to end of operator model number.

BI-COLOUR LED's optional.

SCREEN ENGRAVING/INSERTABLE LEGENDS : contact APEM

Bezel: □ rectangular, □ square, ○ round, 'illum' - illuminated, 'Non-illum' - non illuminated

A01 series

Indicators

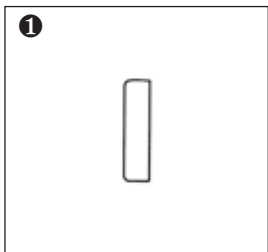
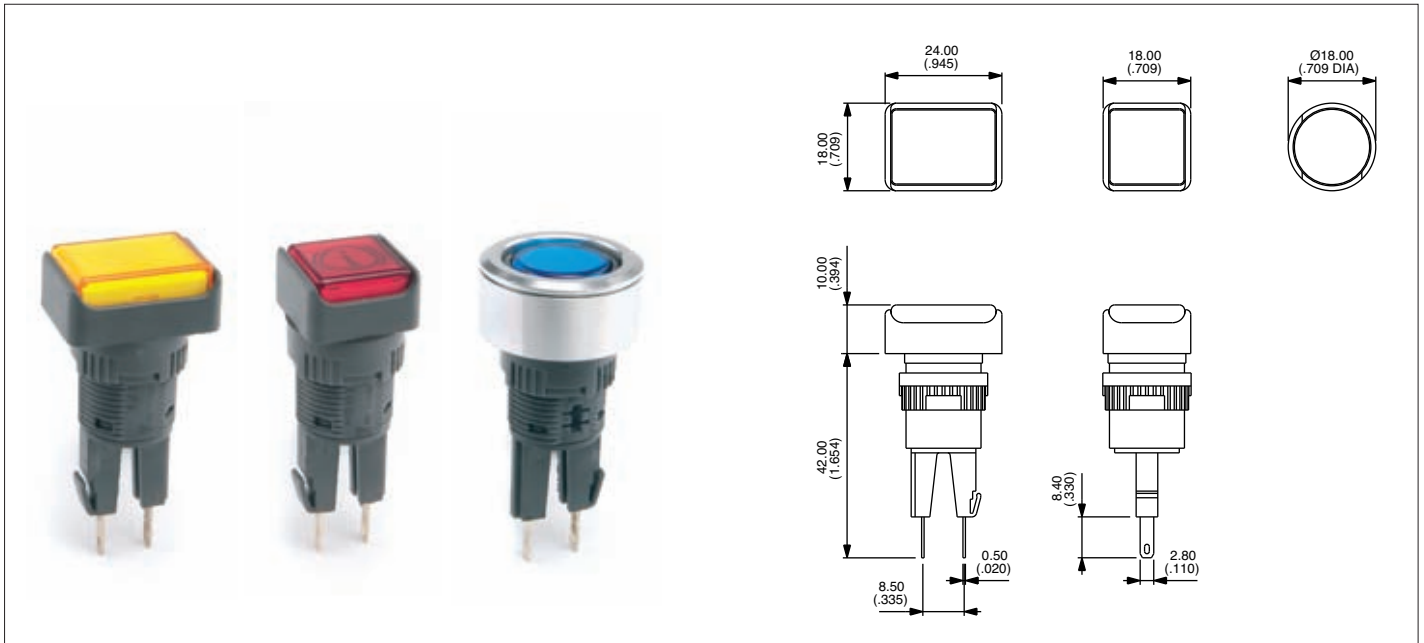
Panel cut-out Ø 16 (.630)

An indicator assembly requires :

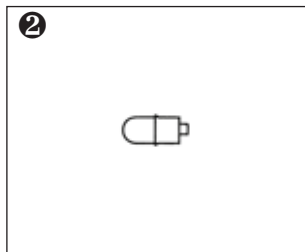
screen + lamp + operator.

To order these elements, select desired model numbers from tables below.

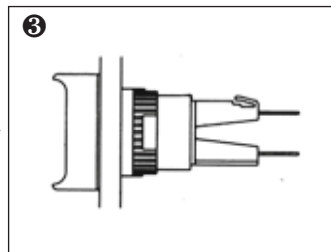
Example : IP65 rectangular indicator with red screen and 12V red LED = A0161B, A0142M1 and A0171.



Screen



Lamp



Operator

Bezel	Colour	Part No
□	black	A0161A
□	red	A0161B
□	amber	A0161C
□	yellow	A0161D
□	green	A0161E
□	blue	A0161F
□	clear	A0161G
□	white	A0161J
□	black	A0162A
□	red	A0162B
□	amber	A0162C
□	yellow	A0162D
□	green	A0162E
□	blue	A0162F
□	clear	A0162G
□	white	A0162J
○	black	A0163A
○	red	A0163B
○	amber	A0163C
○	yellow	A0163D
○	green	A0163E
○	blue	A0163F
○	clear	A0163G
○	white	A0163J

Lamp	Voltage	Part No
Filament	6.3V	A0141A
Filament	14V	A0141B
Filament	28V	A0141C
Filament	36V	A0141D
Filament	48V	A0141E
Filament	60V	A0141F
Neon	110V	A0143G
Neon	220V	A0143H
LED	6V red	A0142L1
LED	6V green	A0142L2
LED	6V amber	A0142L3
LED	12V red	A0142M1
LED	12V green	A0142M2
LED	12V amber	A0142M3
LED	12V blue	A0142M4
LED	12V white	A0142M5
LED	24V red	A0142N1
LED	24V green	A0142N2
LED	24V amber	A0142N3
LED	24V blue	A0142N4
LED	24V white	A0142N5
LED	48V red	A0142P1
LED	48V green	A0142P2
LED	48V amber	A0142P3

Bezel	Description	Part No
□	Indicator	A0171
□	Indicator	A0172
○	Indicator	A0173

UNSEALED INDICATORS (IP40) :
add "01" to end of operator model number.

SCREEN ENGRAVING / INSERTABLE LEGENDS : contact APEM

Bezel: □ rectangular, □ square, ○ round

A01 series

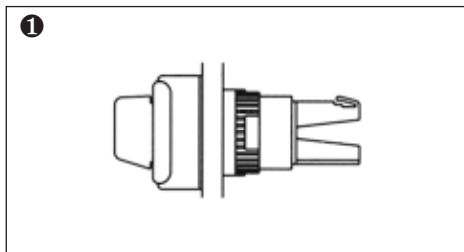
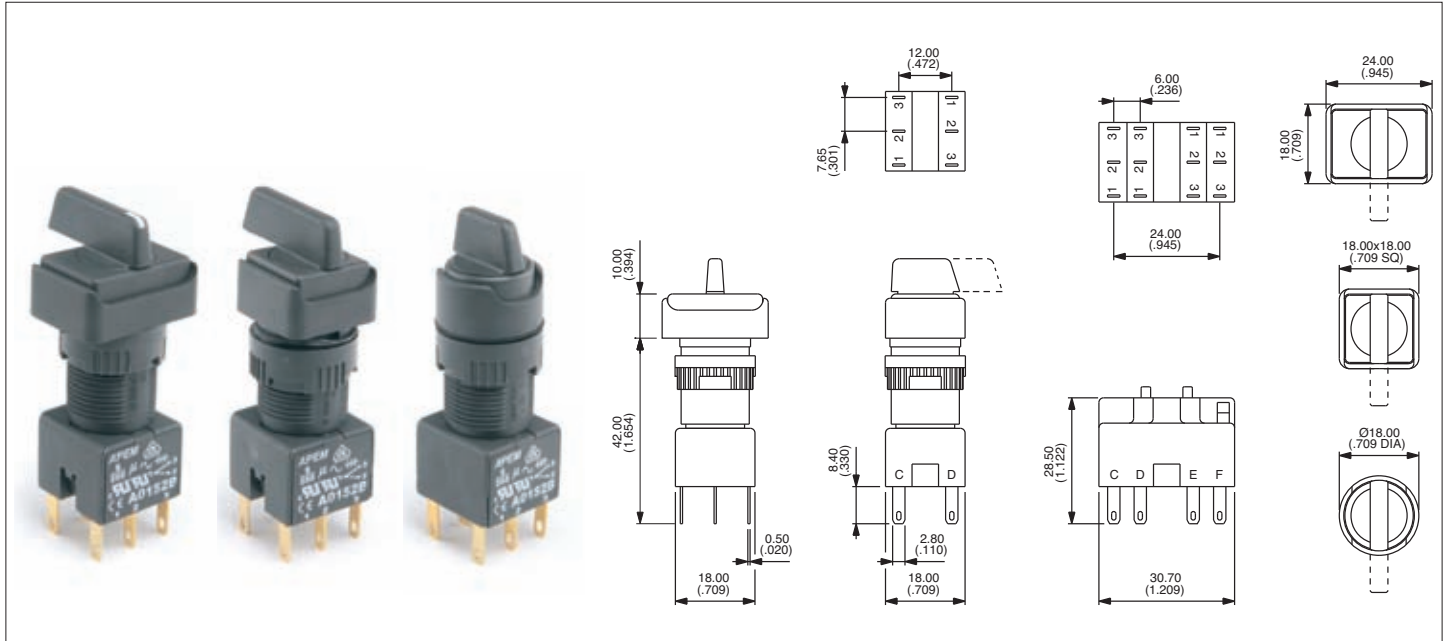
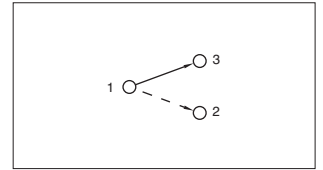
Rotary lever switches

Panel cut-out Ø 16 (.630)

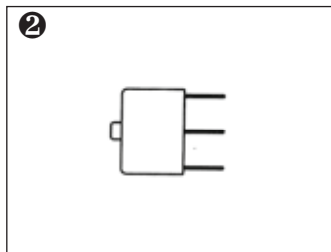
A rotary lever switch assembly requires :
operator + switch block.

To order these elements, select desired model numbers from tables below.

Example : IP65 rectangular rotary switch with long lever, clockwise rotation, single pole, 2 positions, maintained = A019109 and A0151BUL.

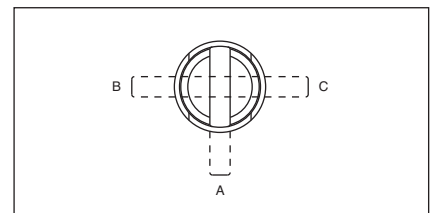


Operator



Switch block

Lever Positions



• Lever Rotation - 2 position switches

The model numbers shown are for switches with clockwise lever rotation.

For anticlockwise rotation, replace :

09	with	01
10	with	02
11	with	03
12	with	04

at the end of the model number.

Optional Engraving on Lever end

See above photo left.

To order, add "WL" to the end of the operator part No.

Example : A019609WL..

Pole	Bezel	Description	Short lever	Long lever	No of poles	Part No
1 or 2	□	2 pos. maintained	A019209	A019109•	Single pole	A0151BUL
1 or 2	□	2 pos. momentary	A019210	A019110•	Double pole	A0152BUL
3 or 4	□	2 pos. maintained	A019211	A019111•	Three pole	A0155BUL
3 or 4	□	2 pos. momentary	A019212	A019112•	Four pole	A0153BUL
1 or 2	□	3 pos. maintained	A019205	A019105		
1 or 2	□	3 pos. momentary	A019206	A019106		
1 or 2	□	3 pos. mainL, momR	A019207	A019107		
1 or 2	□	3 pos. momL, mainR	A019208	A019108		
1 or 2	□	2 pos. maintained	A019409	A019309•		
1 or 2	□	2 pos. momentary	A019410	A019310•		
3 or 4	□	2 pos. maintained	A019411	A019311•		
3 or 4	□	2 pos. momentary	A019412	A019312•		
1 or 2	□	3 pos. maintained	A019405	A019305		
1 or 2	□	3 pos. momentary	A019406	A019306		
1 or 2	□	3 pos. mainL, momR	A019407	A019307		
1 or 2	□	3 pos. momL, mainR	A019408	A019308		
1 or 2	○	2 pos. maintained	A019609	A019509•		
1 or 2	○	2 pos. momentary	A019610	A019510•		
3 or 4	○	2 pos. maintained	A019611	A019511•		
3 or 4	○	2 pos. momentary	A019612	A019512•		
1 or 2	○	3 pos. maintained	A019605	A019505		
1 or 2	○	3 pos. momentary	A019606	A019506		
1 or 2	○	3 pos. mainL, momR	A019607	A019507		
1 or 2	○	3 pos. momL, mainR	A019608	A019508		

Bezel: □ rectangular, □ square, ○ round, 'pos' - position, 'mainL' - maintained left, 'momR' - momentary right, etc

A01 series

Keylock switches

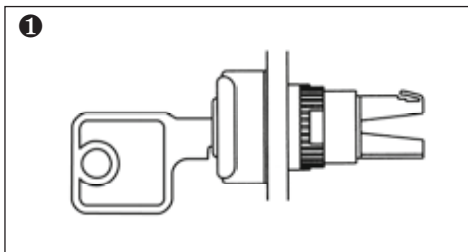
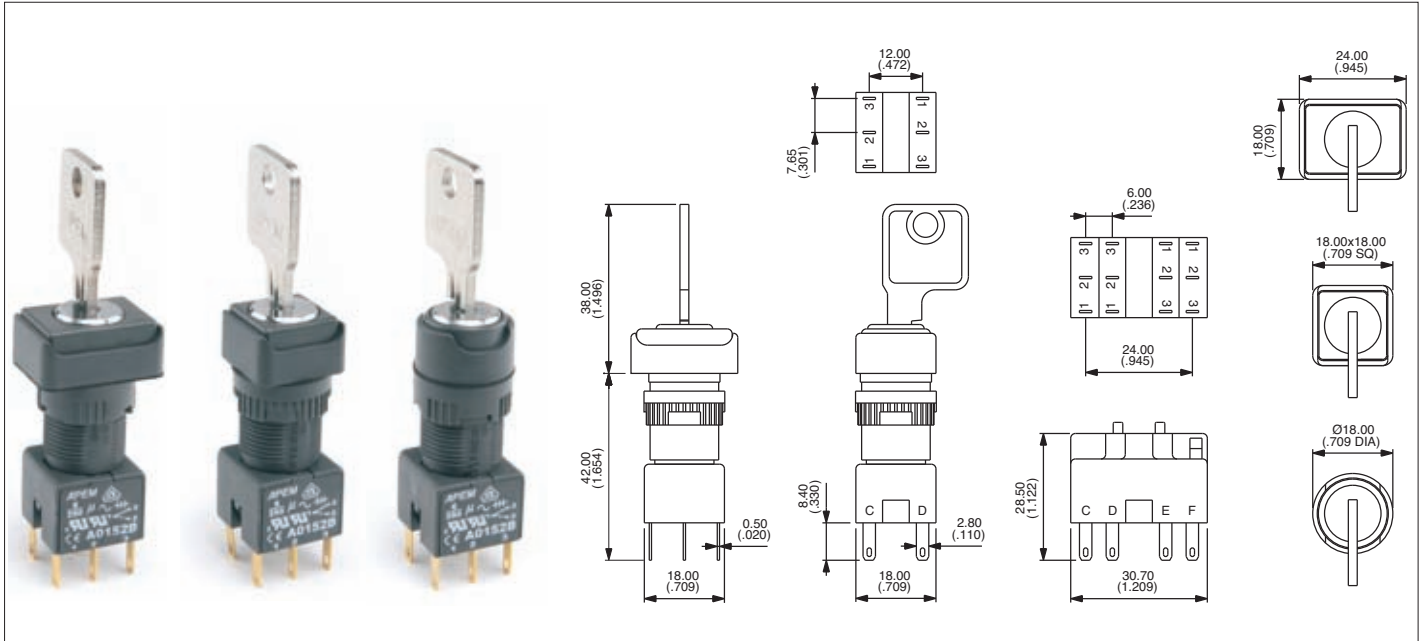
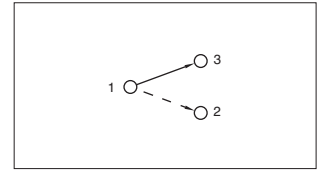
Panel cut-out Ø 16 (.630)

A keylock switch assembly requires :

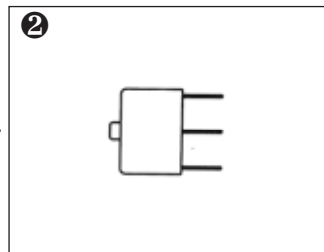
operator + switch block.

To order these elements, select desired model numbers from tables below.

Example : IP65 rectangular keyswitch, clockwise rotation, single pole, 2 positions, maintained = A018125 and A0151BUL.

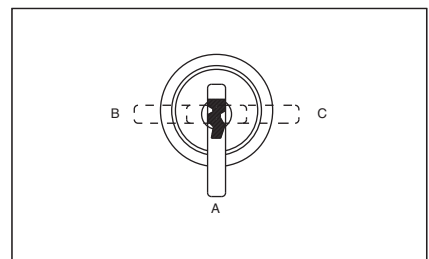


Operator



Switch block

Key Positions



• Key Rotation - 2 position switches

The model numbers shown are for switches with clockwise key rotation.

For anticlockwise rotation, replace :

25	with	01
24	with	02
27	with	03
28	with	04

at the end of the model number.

2 standard keys are supplied.
20 key barrel types available from stock.

Pole	Bezel	Description	Part No	Key removable	No of poles	Part No
1 or 2	□	2 pos. maintained	A018123	A	Single pole	A0151BUL
1 or 2	□	2 pos. maintained	A018125	A-B	Double pole	A0152BUL
1 or 2	□	2 pos. momentary	A018124	A	Three pole	A0155BUL
3 or 4	□	2 pos. maintained	A018127	A-B	Four pole	A0153BUL
3 or 4	□	2 pos. momentary	A018128	A		
1 or 2	□	3 pos. maintained	A018105	A-B-C		
1 or 2	□	3 pos. momentary	A018106	A		
1 or 2	□	3 pos. mainL, momR	A018107	A-B		
1 or 2	□	3 pos. momL, mainR	A018108	A-C		
1 or 2	□	2 pos. maintained	A018223	A		
1 or 2	□	2 pos. maintained	A018225	A-B		
1 or 2	□	2 pos. momentary	A018224	A		
3 or 4	□	2 pos. maintained	A018227	A-B		
3 or 4	□	2 pos. momentary	A018228	A		
1 or 2	□	3 pos. maintained	A018205	A-B-C		
1 or 2	□	3 pos. momentary	A018206	A		
1 or 2	□	3 pos. mainL, momR	A018207	A-B		
1 or 2	□	3 pos. momL, mainR	A018208	A-C		
1 or 2	○	2 pos. maintained	A018323	A		
1 or 2	○	2 pos. maintained	A018325	A-B		
1 or 2	○	2 pos. momentary	A018324	A		
3 or 4	○	2 pos. maintained	A018327	A-B		
3 or 4	○	2 pos. momentary	A018328	A		
1 or 2	○	3 pos. maintained	A018305	A-B-C		
1 or 2	○	3 pos. momentary	A018306	A		
1 or 2	○	3 pos. mainL, momR	A018307	A-B		
1 or 2	○	3 pos. momL, mainR	A018308	A-C		

NON-REMOVABLE KEY POSITIONS / ON-ON-ON FUNCTION : contact APEM.

Bezel: □ rectangular, □ square, ○ round, 'pos' - position, 'mainL' - maintained left, 'momR' - momentary right, etc

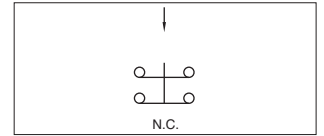
A01 series

Emergency stop switches

Panel cut-out Ø 16 (.630)

- Prominent 24 mm (.944) dia. or optional 40 mm (1.575) dia. red mushroom actuator
- Highly reliable positive break switch
- Push to shut off switch, twist to reset to ON
- Approved to UL 1054 / EN 60947-5-1

An emergency stop switch assembly requires : operator + switch block.
To order, specify with single pole or double pole positive break switch block.

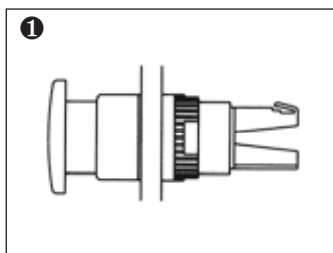
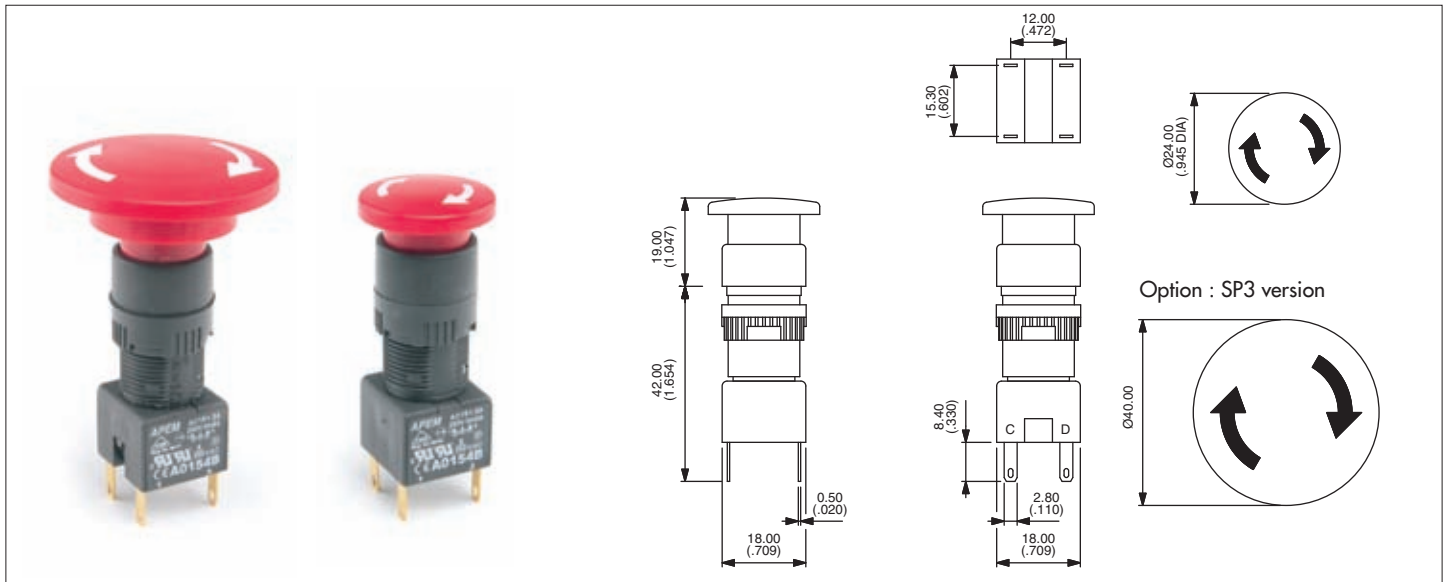


General specifications

- Min. mechanical life : 6.050 cycles (6 cycles per minute)
- Operating force / torque : 16 N / 0,1 Nm
- Operating temperature : -20°C to +55°C
- Solder heat resistance : 350°C, 5 secs (IEC 68-2-2-20Tb, method 2)
- Degree of environmental protection (IEC 529) : IP65 front of panel, IP40 back of panel
- Switch terminals : solder/quick-connect 2,8 mm (.110) (IEC 68-2-20)

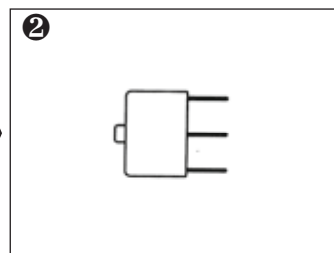
Electrical specifications

- Current/voltage rating : 1,5A 250VAC AC-15
- Contact gap : > 3 mm (.118)
- Dielectric strength : 2.900V
- Electrical life : 6.050 cycles



Operator

Description	Part No
24 mm Ø Emergency stop	A01ES
40 mm Ø Emergency stop	A01ES SP3



Switch block

No of poles	Part No
Single pole	A0150BUL
Double pole	A0154BUL

Accessory



60 mm Ø Self Adhesive Label

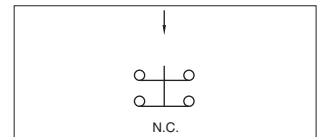
Description	Part No
Yellow label with text	A01YL1
Yellow label	A01YL2

A01 series

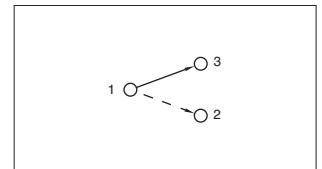
Emergency stop switches/mushroom head pushbutton switches

Fitted in enclosures

- Prominent 40 mm (1.575) dia. mushroom actuator, twist to release
- Highly reliable positive break switching on E-Stop
- Sealed to IP65
- Robust polycarbonate enclosures
- Knockouts for popular conduit sizes
- Double pole changeover switch blocks available for momentary/maintained mushroom head pushbuttons.



Emergency stop



Momentary & maintained

Technical specifications

- Contact rating : Pushbutton switch : 6A 250VAC - E-Stop : 1,5A 250VAC
- Dimensions : 65 x 65 x 57 mm
- Electrical life : Pushbutton switch : 50 000 cycles - E-Stop : 6 050 cycles
- Operating temperature : -20°C to +55°C



Description	Part No
Emergency stop	A01ESSP354B + PEA01
Black momentary	A01MMASP352B + PEA01
Red momentary	A01MMBSP352B + PEA01
Yellow momentary	A01MMDSP352B + PEA01
Green momentary	A01MMESP352B + PEA01
Blue momentary	A01MMFSP352B + PEA01
Black maintained	A01MXASP352B + PEA01
Red maintained	A01MXBSP352B + PEA01
Yellow maintained	A01MXDSP352B + PEA01
Green maintained	A01MXESP352B + PEA01
Blue maintained	A01MXFSP352B + PEA01

OPTIONS

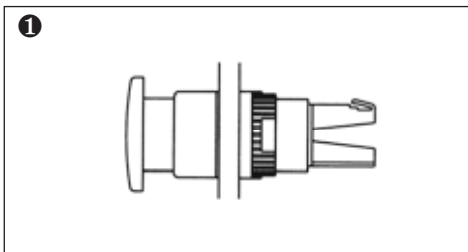
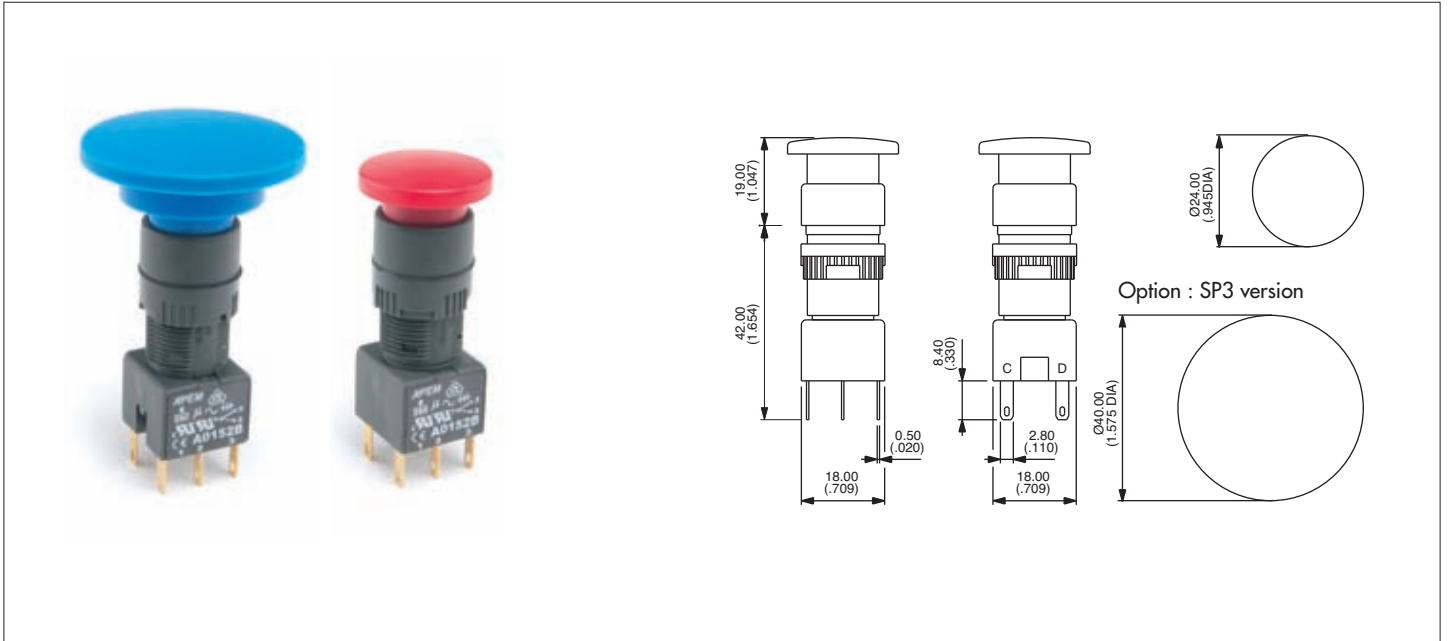
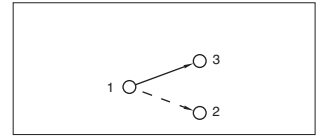
12A 250V versions or custom printing on mushroom head actuators : contact APEM.

A01 series

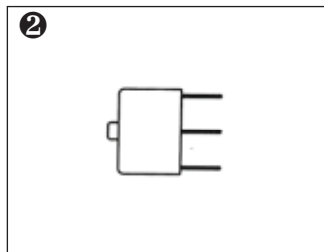
Mushroom head pushbutton switches

Panel cut-out Ø 16 (.630)

- Prominent 24 mm (.944) dia. or optional 40 mm (1.575) dia. mushroom actuators
- Momentary and maintained functions
Momentary function versions are unmarked.
Maintained function versions are twist release (arrows indicate direction of twist)
- Various coloured mushroom actuators are available.



Operator



Switch block

Actuator	Description	Part No	No of poles	Part No
24mmØ	Black momentary	A01MMA	Single pole	A0151BUL
24mmØ	Red momentary	A01MMB	Double pole	A0152BUL
24mmØ	Yellow momentary	A01MMD	Three pole	A0155BUL
24mmØ	Green momentary	A01MME	Four pole	A0153BUL
24mmØ	Blue momentary	A01MMF		
24mmØ	Black maintained	A01MXA		
24mmØ	Red maintained	A01MXB		
24mmØ	Yellow maintained	A01MXD		
24mmØ	Green maintained	A01MXE		
24mmØ	Blue maintained	A01MXF		
40mmØ	Black momentary	A01MMA SP3		
40mmØ	Red momentary	A01MMB SP3		
40mmØ	Yellow momentary	A01MMD SP3		
40mmØ	Green momentary	A01MME SP3		
40mmØ	Blue momentary	A01MMF SP3		
40mmØ	Black maintained	A01MXA SP3		
40mmØ	Red maintained	A01MXB SP3		
40mmØ	Yellow maintained	A01MXD SP3		
40mmØ	Green maintained	A01MXE SP3		
40mmØ	Blue maintained	A01MXF SP3		

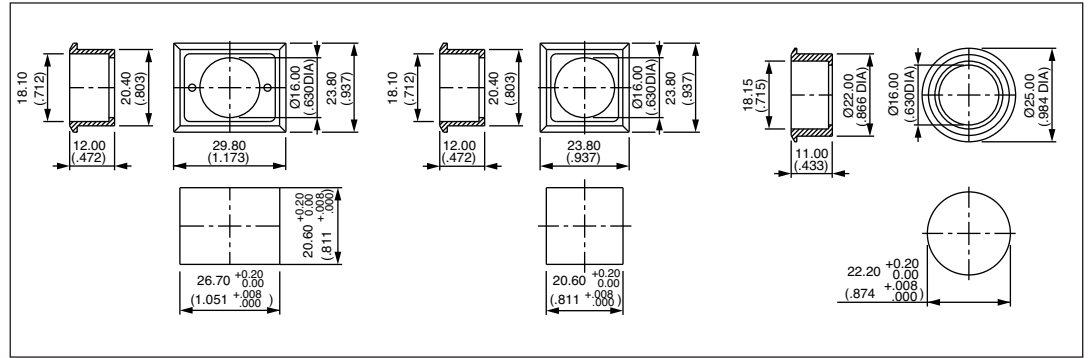
A1-A01 series

Industrial controls

Accessories

FLUSH MOUNTING BEZELS

Dark grey plastic material - supplied with sealing washer



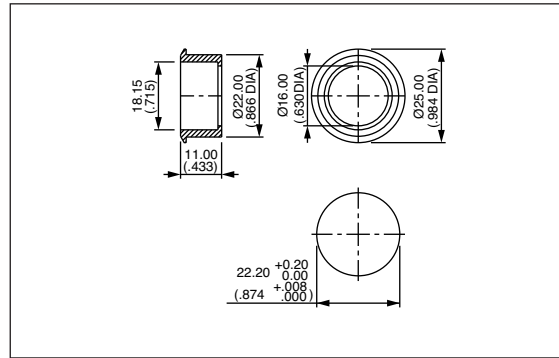
Rectangular **A01FM1**

Square **A01FM**

Round **A01FM2**

FLUSH MOUNTING BEZELS

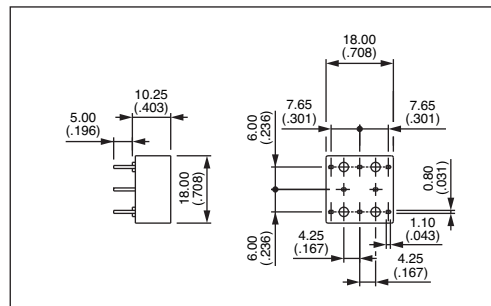
Metal versions



Round, anodised aluminium **A01FMM**

Round, matt black **A01FMMG**

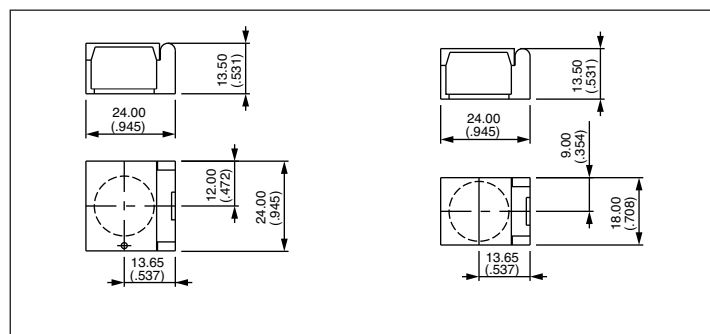
PCB SOCKET



Single pole, non illuminated **A01PC1**
 Double pole, non illuminated **A01PC2**
 Single pole, illuminated **A01PC3**
 Double pole, illuminated **A01PC4**
 Indicator **A01PC5**
 Single pole, E-stop **A01PC6**
 Double pole, E-stop **A01PC7**

A01PC1
A01PC2
A01PC3
A01PC4
A01PC5
A01PC6
A01PC7

FLAPGUARDS



Rectangular **A01FG1**

Square/round **A01FG2**

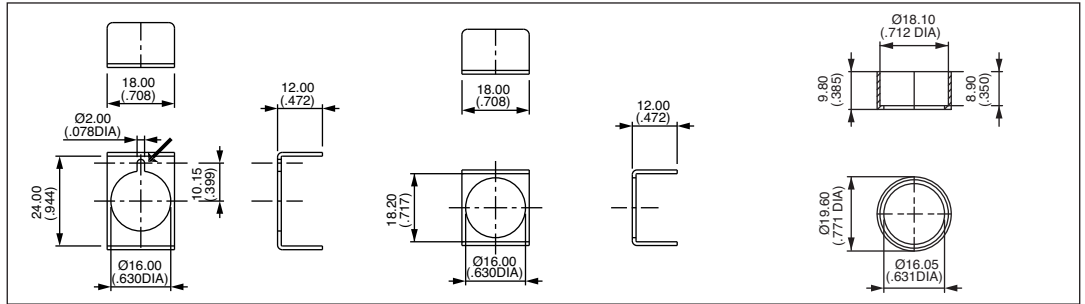
A1-A01 series

Industrial controls

Accessories

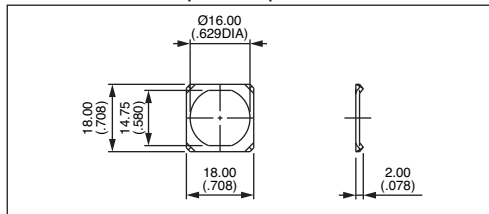
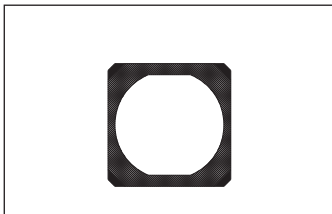
METAL GUARDS

→ Slot as alternative to Ø 2 mm hole - Material : 1 mm thick aluminium.

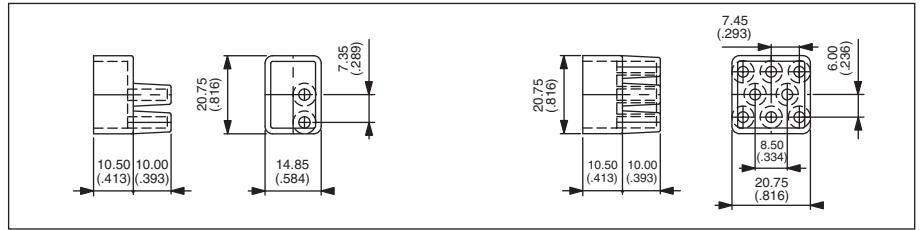


ANTI ROTATION RING

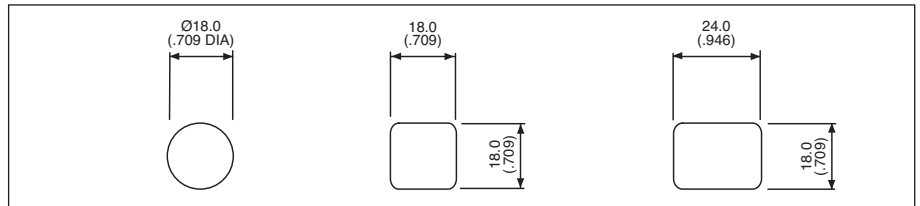
Recommended to prevent product rotation



SWITCHBLOCK TERMINAL GUARDS

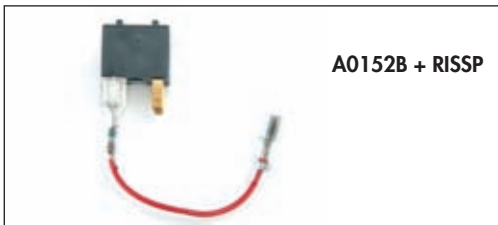


BLANKING PLUGS



RESISTOR ASSEMBLY

Resistor assembly - 2 stage illumination

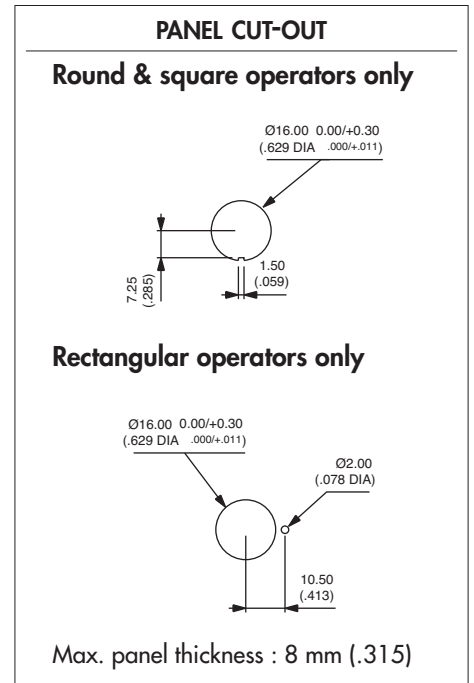
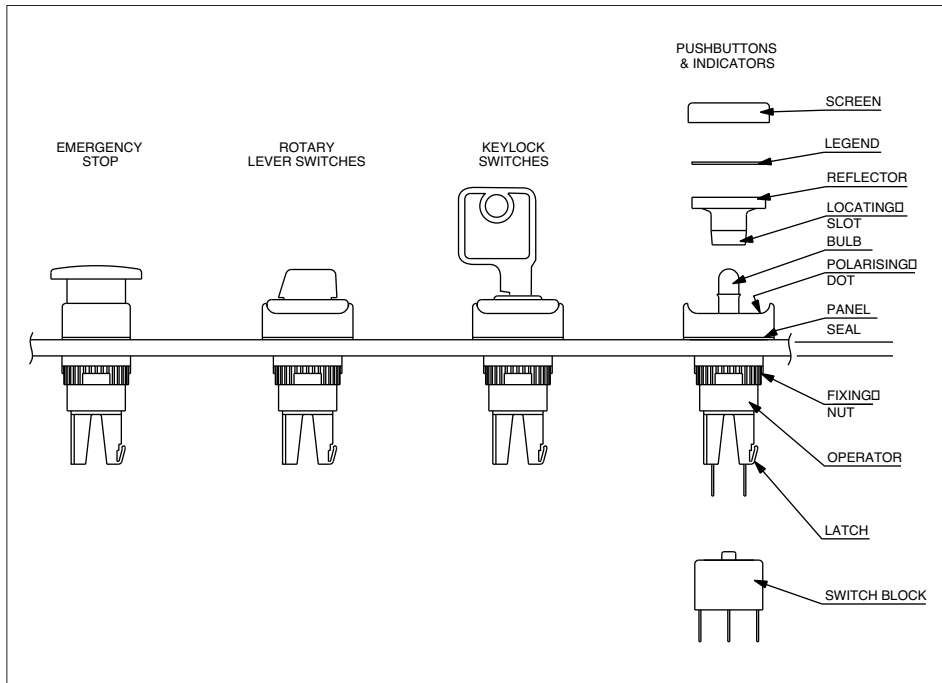


A1-A01 series

Industrial controls

Installation - tools

Modular construction / panel mounting



PANEL MOUNTING ASSEMBLY

- Drill/punch hole shaped as above.
- Assemble front operator through hole, fit fixing nut and tighten to a maximum torque of 0,8Nm using tool No 30-0001.
- Wire chosen switch block as required and slide onto operator until latch engages.
- Fit bulb if required using tool No 30-0002.
- Snap screen onto reflector assembly with legend in between if required and snap onto front operator TAKING CARE TO LINE UP THE LOCATING SLOT WITH THE POLARISING DOT, and not to damage the seal.

TO REMOVE BULB

Remove reflector/screen assembly. Use the bulb extractor 30-0002 to remove the bulb.

SWITCH BLOCK

To assemble switch block to front operator, TAKE CARE TO LINE UP SWITCH BLOCK WITH FRONT OPERATOR. Once in position, slide on to front operator. NB. : Ensure latch is fully engaged correctly onto the switch block.

To remove switch block, depress the latch and slide the switch block off the operator.

FIXING NUT KEY



30-0001

BULB REMOVER



30-0002

A02 series

Illuminated or non-illuminated pushbutton switches

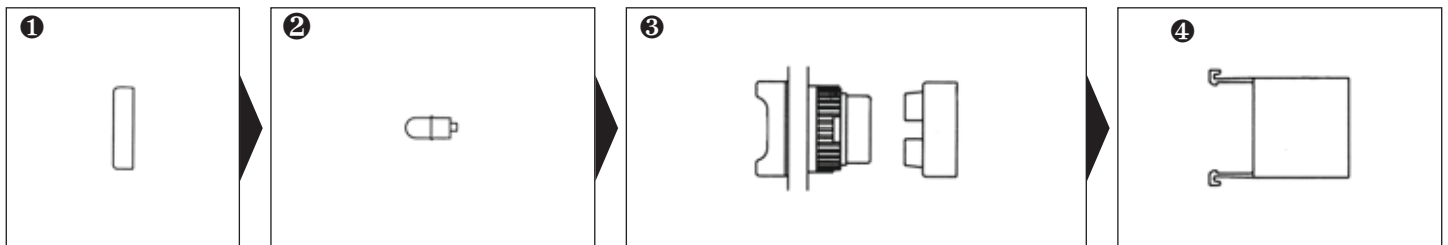
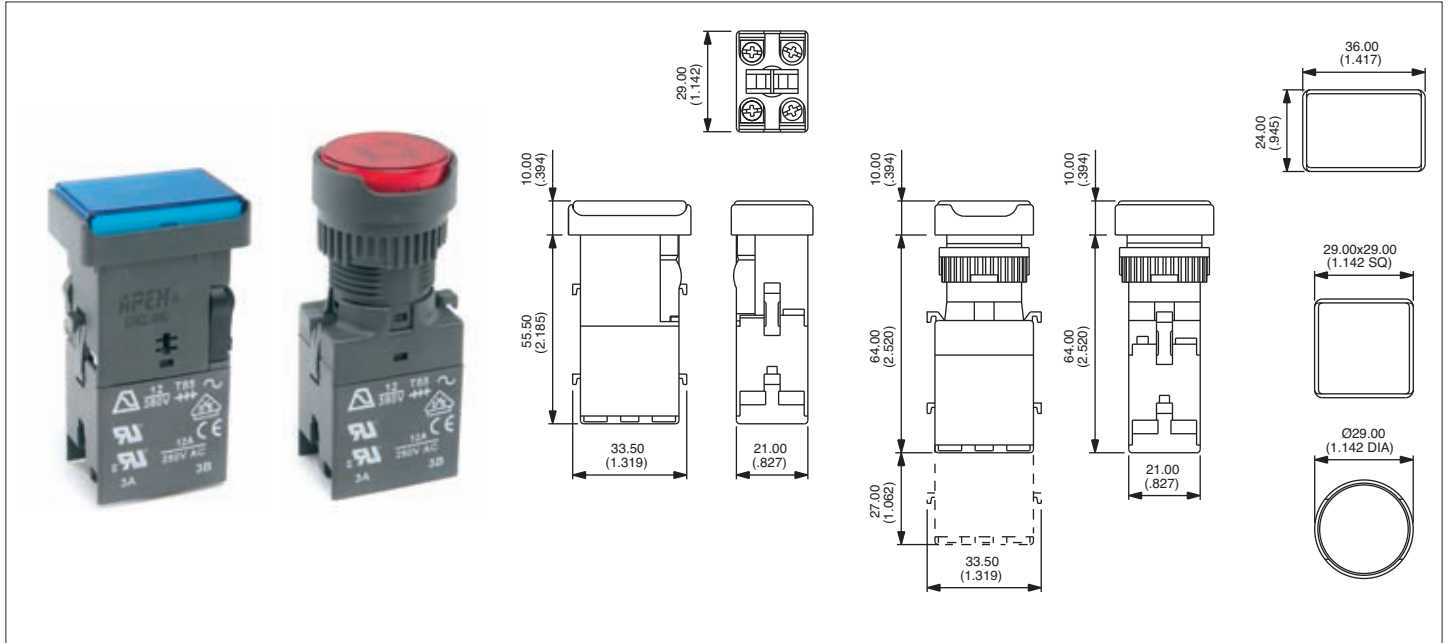
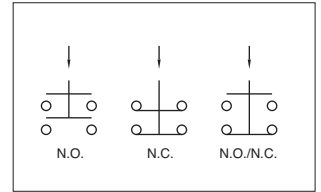
Panel cut-out Ø 22 (.866) or 29,5 x 21,5 (1.160x.846)

A pushbutton assembly requires :

screen + lamp (if illuminated) + operator + one or two switch blocks.

To order these elements, select desired model numbers from tables below.

Example : IP65 illuminated rectangular maintained pushbutton, switch block with 2 N.O. contacts, red screen and 12V red LED assembly = A0261B, A0242J1, A0201X and A02503UL.



Screen

Lamp

Operator

Switch block

Bezel	Colour	Part No	Lamp	Voltage	Part No
	black	A0261A	Filament	6.3V	A0141A
	red	A0261B	Filament	14V	A0141B
	amber	A0261C	Filament	28V	A0141C
	yellow	A0261D	Filament	36V	A0141D
	green	A0261E	Filament	48V	A0141E
	blue	A0261F	Filament	60V	A0141F
	clear	A0261G	Neon	110V	A0143G
	white	A0261J	Neon	220V	A0143H
	black	A0262A	LED	model numbers: see A01 pages G6-G7.	A0242H*
	red	A0262B	LED assy		
	amber	A0262C	LED assy	6V	A0242K*
	yellow	A0262D	LED assy	12V	A0243H*
	green	A0262E	LED assy	24V	A0243J*
	blue	A0262F	LED assy	6V	A0243K*
	clear	A0262G	LED assy	12V	A0244H*
	white	A0262J	LED assy	24V	A0244J*
	black	A0263A	LED assy	6V	A0244K*
	red	A0263B	LED assy	12V	A0244L*
	amber	A0263C	LED assy	24V	A0244M*
	yellow	A0263D			
	green	A0263E			
	blue	A0263F			
	clear	A0263G			
	white	A0263J			

Bezel	Description	Lamp type	Part No
	illum, momentary	Lamp/LED	A0201Y
	illum, maintained	Lamp/LED	A0201X
	illum, momentary	LED assy	A0202Y
	illum, maintained	LED assy	A0202X
	Non-illum, maintained		A0203X
	Non-illum, momentary		A0203Y
	illum, momentary	Lamp/LED	A0204Y
	illum, maintained	Lamp/LED	A0204X
	illum, momentary	LED assy	A0205Y
	illum, maintained	LED assy	A0205X
	Non-illum, momentary		A0206Y
	Non-illum, maintained		A0206X
	illum, momentary	Lamp/LED	A0207Y
	illum, maintained	Lamp/LED	A0207X
	illum, momentary	LED assy	A0208Y
	illum, maintained	LED assy	A0208X
	Non-illum, momentary		A0209Y
	Non-illum, maintained		A0209X

Contacts	Part No
1 N.O.	A02501UL
1 N.C.	A02502UL
2 N.O.	A02503UL
2 N.C.	A02504UL
1 N.O./1 N.C.	A02505UL

Second switch block

Contacts	Part No
1 N.O.	A02506UL
1 N.C.	A02507UL
2 N.O.	A02508UL
2 N.C.	A02509UL
1 N.O./1 N.C.	A02510UL

To achieve 3 or 4 pole switching, add second switch block, from above table.

White or blue LED assembly : contact APEM.

UNSEALED SWITCHES (IP40) :

add "01" to end of operator model number.

SCREEN ENGRAVING / INSERTABLE LEGENDS : contact APEM.

Bezel: rectangular, square, round, 'illum' - illuminated, 'Non-illum' - non illuminated

A02 series

Metal bezel pushbutton switches and indicators

Panel cut-out Ø 22 (.866)

A pushbutton assembly requires :

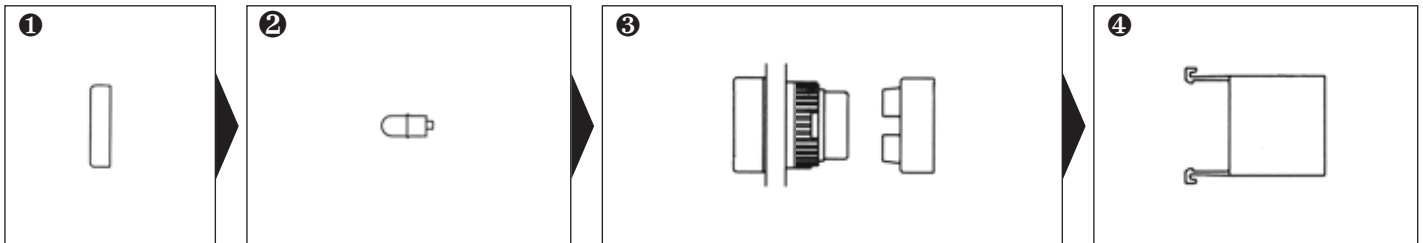
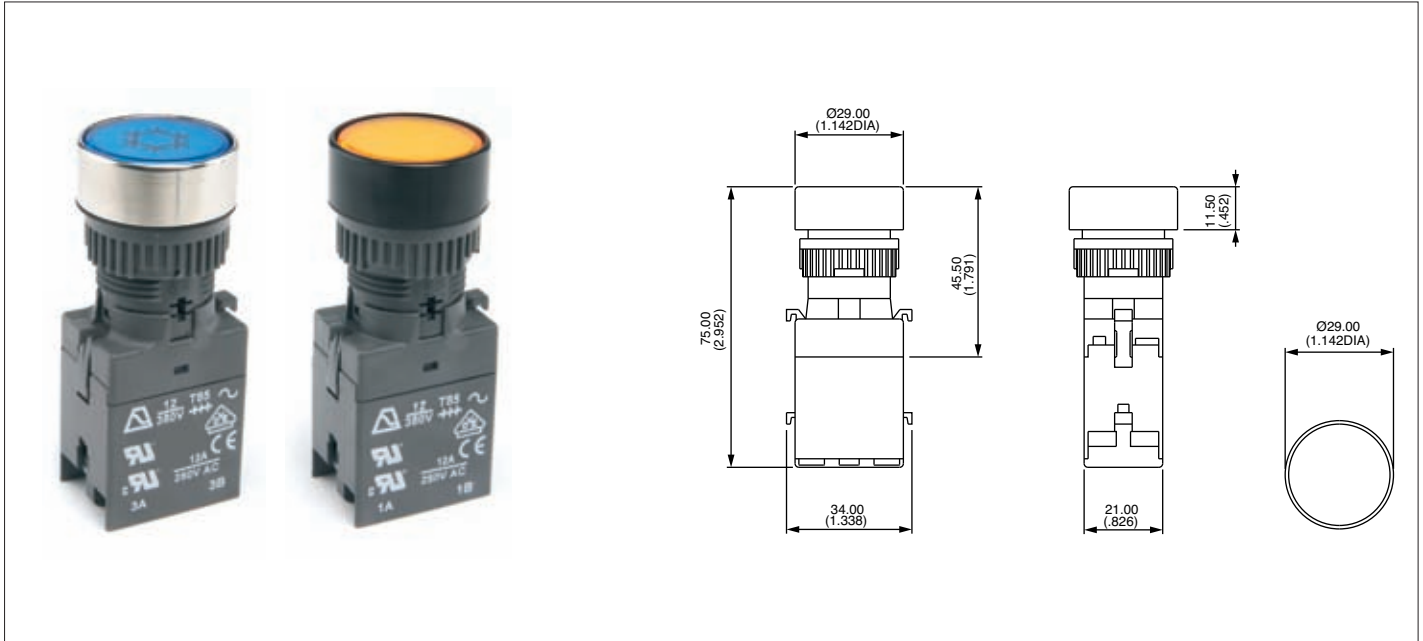
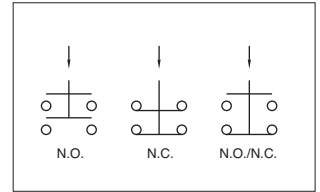
screen + lamp (if illuminated) + operator + one or two switch blocks.

An indicator assembly requires :

screen + lamp + operator

To order these elements, select desired model numbers from tables below.

Example : IP65 illuminated metal bezel maintained pushbutton, switch block with 2 N.O. contacts, red screen and 12V red LED assembly = A0263B, A0244J1, A0211X and A02503UL.



Screen

Bezel	Colour	Part No
○	black	A0263A
○	red	A0263B
○	amber	A0263C
○	yellow	A0263D
○	green	A0263E
○	blue	A0263F
○	clear	A0263G
○	white	A0263J

Lamp

Lamp	Voltage	Part No
Filament	6.3V	A0141A
Filament	14V	A0141B
Filament	28V	A0141C
Filament	36V	A0141D
Filament	48V	A0141E
Filament	60V	A0141F
Neon	110V	A0143G
Neon	220V	A0143H
LED	model numbers: see A01 pages G6-G7.	
LED assy ○	6V	A0244H*
LED assy ○	12V	A0244J*
LED assy ○	24V	A0244K*
Replace * with colour code for LED assemblies:	1: red	
	2: green	
	3: amber	

White or blue LED assembly : contact APEM.

Operator

Bezel	Description	Lamp type	Part No
○	illum, momentary	Lamp/LED	A0210Y
○	illum, maintained	Lamp/LED	A0210X
○	illum, momentary	LED assy	A0211Y
○	illum, maintained	LED assy	A0211X
○	Non-illum, momentary		A0212Y
○	Non-illum, maintained		A0212X
○	illum, indicator	Lamp/LED	A0277
○	illum, indicator	LED assy	A0278

Std bezel material : nickel plated brass.
For optional black finish, add "G" to the end of operator model number.

UNSEALED SWITCHES (IP40) :

add "01" to end of operator model number.

Switch block

Contacts	Part No
1 N.O.	A02501UL
1 N.C.	A02502UL
2 N.O.	A02503UL
2 N.C.	A02504UL
1 N.O./1 N.C.	A02505UL

Second switch block

Contacts	Part No
1 N.O.	A02506UL
1 N.C.	A02507UL
2 N.O.	A02508UL
2 N.C.	A02509UL
1 N.O./1 N.C.	A02510UL

To achieve 3 or 4 pole switching, add second switch block, from above table.

SCREEN ENGRAVING / INSERTABLE LEGENDS : contact APEM.

Bezel: □ rectangular, ◻ square, ○ round, 'illum' - illuminated, 'Non-illum' - non illuminated

A02 series

Flush mounting pushbutton switches and indicators

Panel cut-out Ø 30 (1.181)

A pushbutton assembly requires :

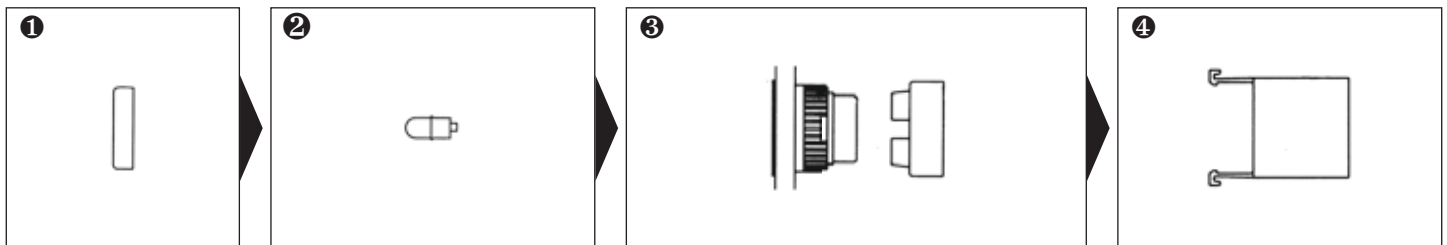
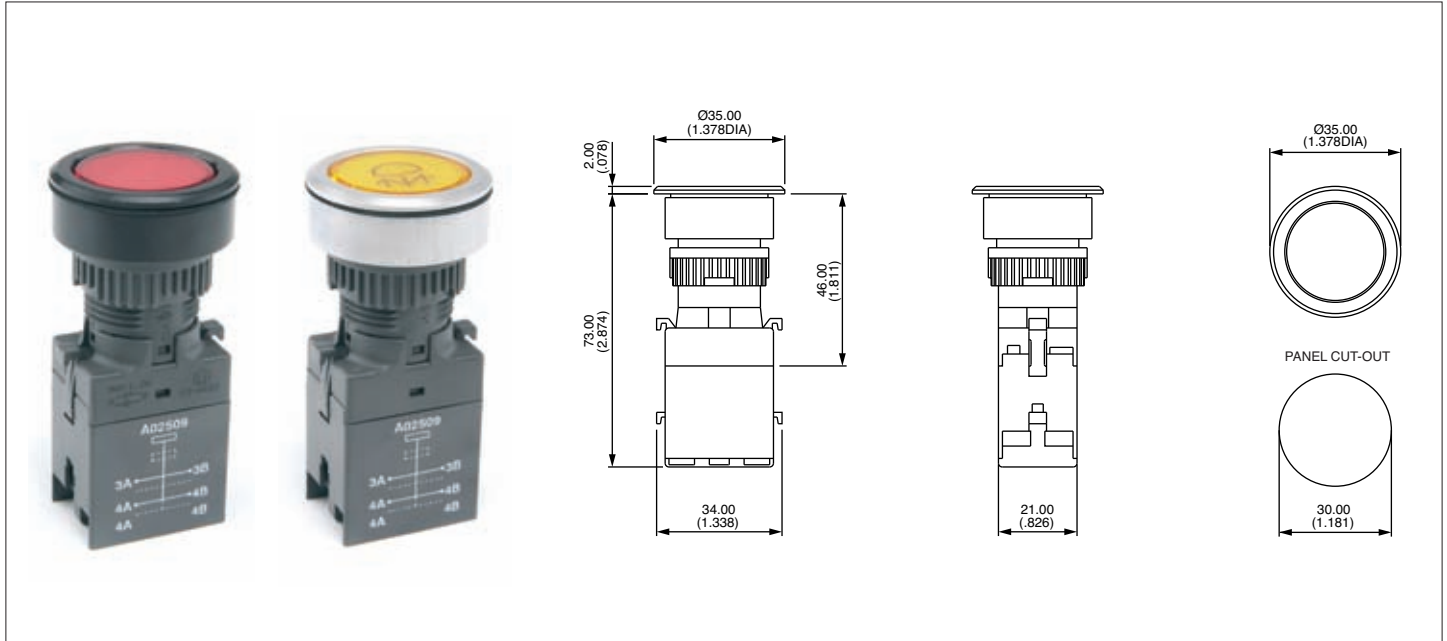
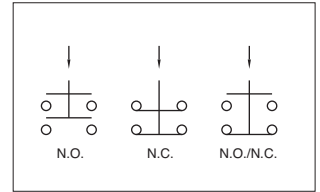
screen + lamp (if illuminated) + operator + one or two switch blocks.

An indicator assembly requires :

screen + lamp + operator

To order these elements, select desired model numbers from tables below.

Example : IP65 illum. flush mounting maintained pushbutton, switch block with 2 N.O. contacts, red screen and 12V red LED assembly = A0263B, A0244J1, A0213X and A02503UL.



Screen

Bezel	Colour	Part No
○	black	A0263A
○	red	A0263B
○	amber	A0263C
○	yellow	A0263D
○	green	A0263E
○	blue	A0263F
○	clear	A0263G
○	white	A0263J

Lamp

Lamp	Voltage	Part No
Filament	6.3V	A0141A
Filament	14V	A0141B
Filament	28V	A0141C
Filament	36V	A0141D
Filament	48V	A0141E
Filament	60V	A0141F
Neon	110V	A0143G
Neon	220V	A0143H
LED	model numbers: see A01 pages G6-G7.	
LED assy	○ 6V	A0244H*
LED assy	○ 12V	A0244J*
LED assy	○ 24V	A0244K*
Replace *	with colour code	1: red
for LED assemblies:		2: green
		3: amber

White or blue LED assembly : contact APEM.

Operator

Bezel	Description	Lamp type	Part No
○	illum, momentary	Lamp/LED	A0214Y
○	illum, maintained	Lamp/LED	A0214X
○	illum, momentary	LED assy	A0213Y
○	illum, maintained	LED assy	A0213X
○	Non-illum, momentary		A0215Y
○	Non-illum, maintained		A0215X
○	illum, indicator	Lamp/LED	A02791
○	illum, indicator	LED assy	A02792

Std bezel material : silver anodised aluminium.
For optional black anodised aluminium, add "G" to end of operator model number.

UNSEALED SWITCHES (IP40) :

add "01" to end of operator model number.

Switch block

Contacts	Part No
1 N.O.	A02501UL
1 N.C.	A02502UL
2 N.O.	A02503UL
2 N.C.	A02504UL
1 N.O./1 N.C.	A02505UL

Second switch block

Contacts	Part No
1 N.O.	A02506UL
1 N.C.	A02507UL
2 N.O.	A02508UL
2 N.C.	A02509UL
1 N.O./1 N.C.	A02510UL

To achieve 3 or 4 pole switching, add second switch block, from above table.

SCREEN ENGRAVING / INSERTABLE LEGENDS : contact APEM.

Bezel: □ rectangular, ◻ square, ○ round, 'illum' - illuminated, 'Non-illum' - non illuminated

A02 series

Indicators

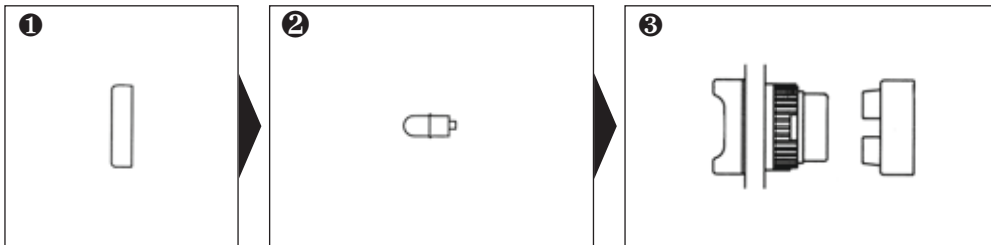
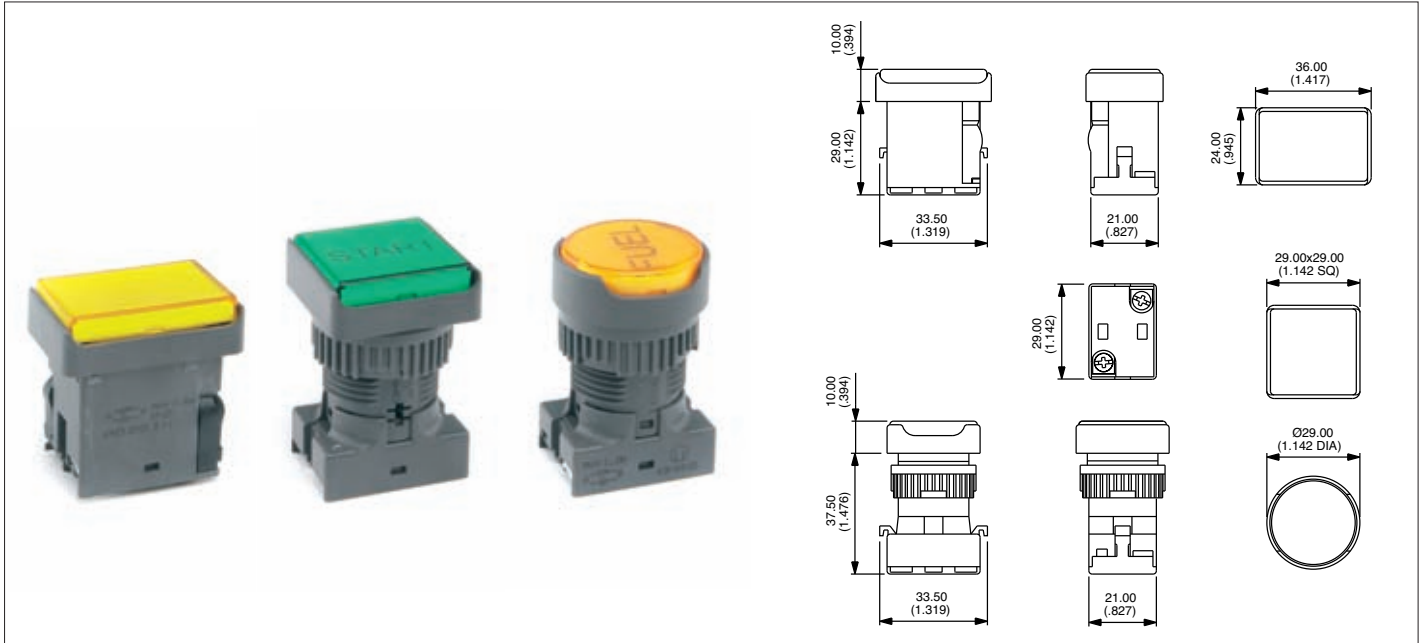
Panel cut-out \varnothing 22 (.866) or 29,5 x 21,5 (1.160x.846)

An indicator assembly requires :

Screen + lamp, LED or LED assembly + operator.

To order these elements, select desired model numbers from tables below.

Example : IP65 rectangular indicator with red screen and 12V red LED assembly = A0261B, A0242J1 and A0272.



Screen

Bezel	Colour	Part No	Lamp	Voltage	Part No
□	black	A0261A	Filament	6.3V	A0141A
□	red	A0261B	Filament	14V	A0141B
□	amber	A0261C	Filament	28V	A0141C
□	yellow	A0261D	Filament	36V	A0141D
□	green	A0261E	Filament	48V	A0141E
□	blue	A0261F	Filament	60V	A0141F
□	clear	A0261G	Neon	110V	A0143G
□	white	A0261J	Neon	220V	A0143H
□	black	A0262A	LED	model numbers: see A01 pages G6-G7.	
□	red	A0262B	LED assy	□ 6V	A0242H*
□	amber	A0262C	LED assy	□ 12V	A0242J*
□	yellow	A0262D	LED assy	□ 24V	A0242K*
□	green	A0262E	LED assy	□ 6V	A0243H*
□	blue	A0262F	LED assy	□ 12V	A0243J*
□	clear	A0262G	LED assy	□ 24V	A0243K*
□	white	A0262J	LED assy	□ 6V	A0244H*
□	black	A0263A	LED assy	○ 12V	A0244J*
○	red	A0263B	LED assy	○ 24V	A0244K*
○	amber	A0263C			
○	yellow	A0263D			
○	green	A0263E	Replace * with colour code	1: red	
○	blue	A0263F	for LED assemblies:	2: green	
○	clear	A0263G		3: amber	
○	white	A0263J			

Lamp

Operator

Bezel	Description	Lamp type	Part No
□	Indicator	Lamp/LED	A0271
□	Indicator	LED assy	A0272
□	Indicator	Lamp/LED	A0273
□	Indicator	LED assy	A0274
○	Indicator	Lamp/LED	A0275
○	Indicator	LED assy	A0276

UNSEALED INDICATORS (IP40) :

add "01" to end of operator model number.

White or blue LED assembly :
contact APEM.

SCREEN ENGRAVING / INSERTABLE LEGENDS : contact APEM.

Bezel: □ rectangular, □ square, ○ round,

A02 series

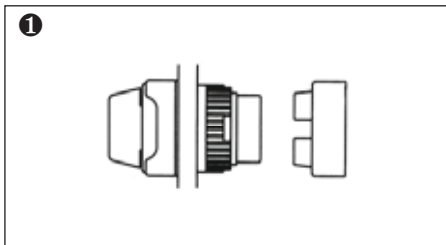
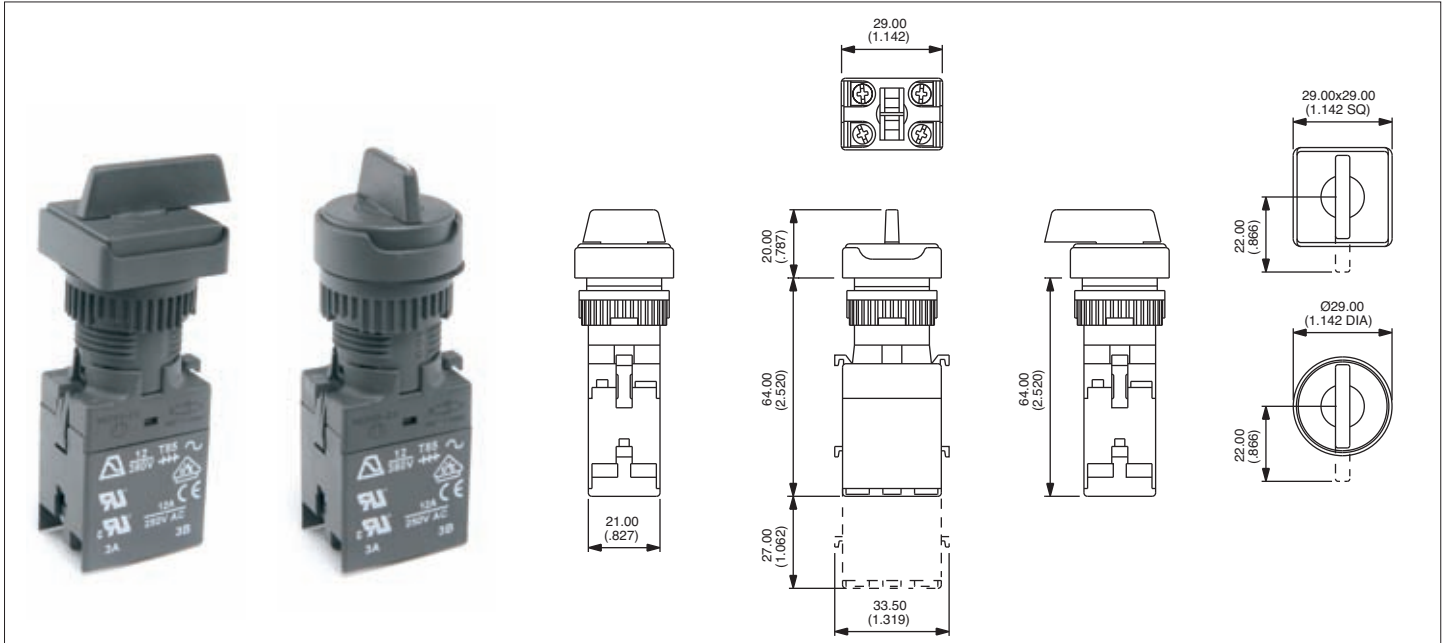
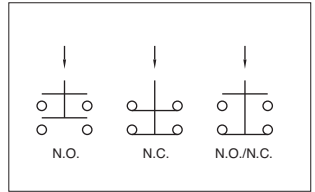
Rotary switches

Panel cut-out Ø 22 (.866)

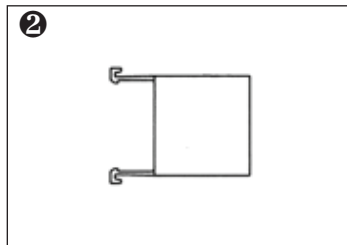
A rotary lever assembly requires :
operator + one or two switch blocks.

To order these elements, select desired model numbers from tables below.

Example : IP65 square 2 position maintained rotary switch with long lever, clockwise rotation, switch block with 2 N.O. contacts = A029107 and A02503UL.

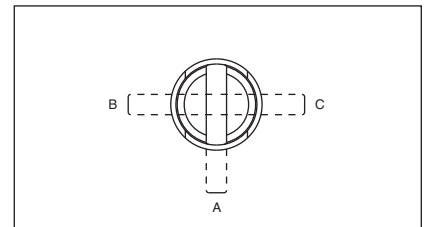


Operator



Switch block

Lever positions



• Lever Rotation - 2 position switches

The model numbers shown are for switches with clockwise lever rotation.

For anticlockwise rotation, replace :

07 with **01**
08 with **02**

at the end of the model number.

Bezel	Description	Short lever	Long lever
□	2 pos. maintained	A029207	A029107•
□	2 pos. momentary	A029208	A029108•
□	3 pos. maintained	A029203	A029103
□	3 pos. momentary	A029204	A029104
□	3 pos. mainL, momR	A029205	A029105
□	3 pos. momL, mainR	A029206	A029106
○	2 pos. maintained	A029407	A029307•
○	2 pos. momentary	A029408	A029308•
○	3 pos. maintained	A029403	A029303
○	3 pos. momentary	A029404	A029304
○	3 pos. mainL, momR	A029405	A029305
○	3 pos. momL, mainR	A029406	A029306

OPTION

To specify flush mounting (30 mm Ø) option, add "FM" to the end of the part number (for round operators only).

Example : A029407FM.

Contacts	Part No
1 N.O.	A02501UL
1 N.C.	A02502UL
2 N.O.	A02503UL
2 N.C.	A02504UL
1 N.O./1 N.C.	A02505UL

Second switch block

Contacts	Part No
1 N.O.	A02506UL
1 N.C.	A02507UL
2 N.O.	A02508UL
2 N.C.	A02509UL
1 N.O./1 N.C.	A02510UL

To achieve 3 or 4 pole switching, add second switch block, from above table.

Optional engraving on lever end



To order, add "WL" to the end of the part No.
Example : A029407WL.

Bezel: □ square, ○ round,

A02 series

Keylock switches

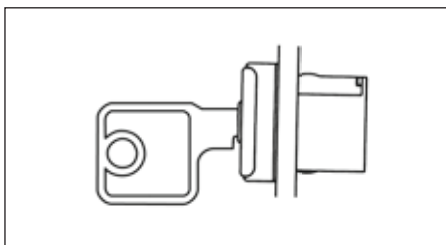
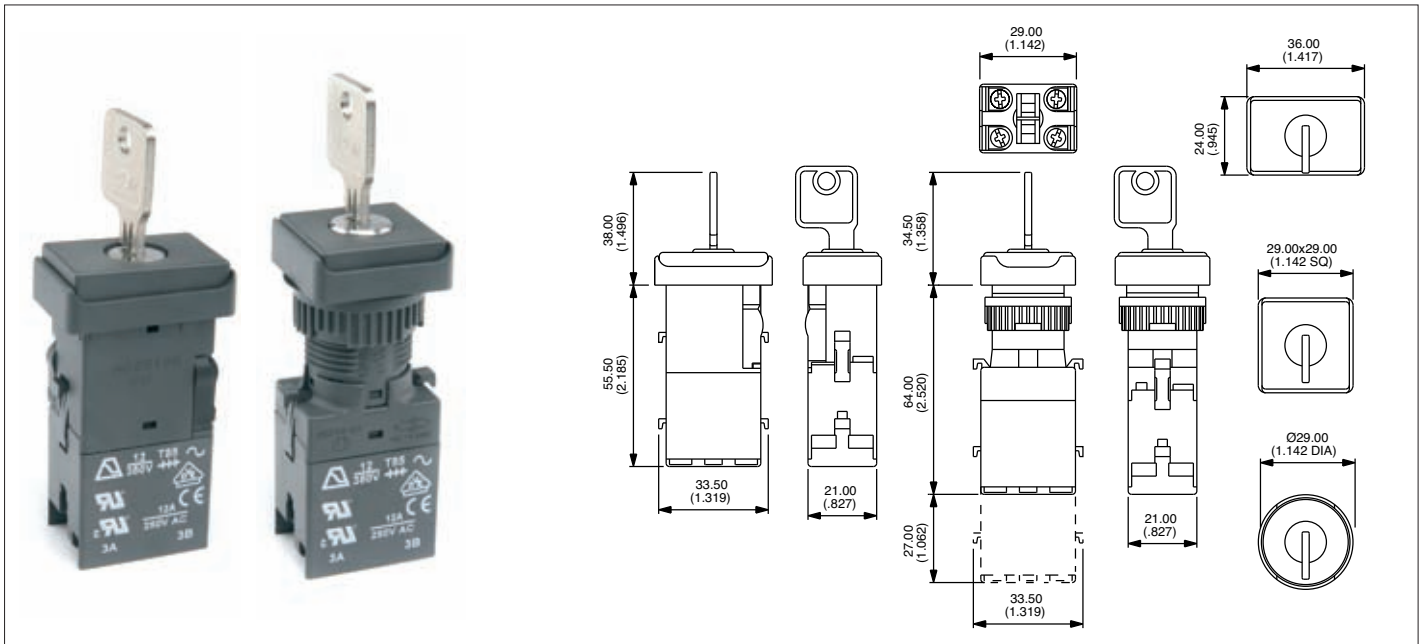
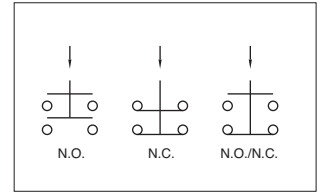
Panel cut-out Ø 22 or 29,5 x 21,5

A keyswitch assembly requires :

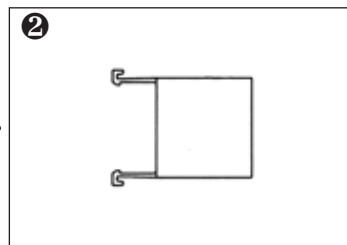
operator + one or two switch blocks.

To order these elements, select desired model numbers from tables below.

Example : IP65 square 2 position keyswitch, clockwise rotation, switch block with 2 N.O. contacts = A028220 and A02503UL.

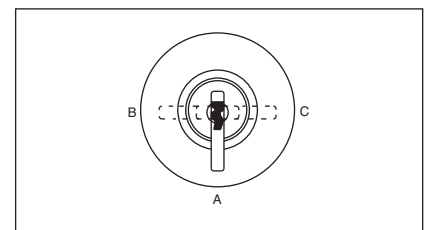


Operator



Switch block

Key positions



Bezel	Description	Part No	Key removable in positions
□	2 pos. maintained	A028120•	A-B
□	2 pos. momentary	A028119•	A
□	3 pos. maintained	A028105	A-B-C
□	3 pos. momentary	A028106	A
□	3 pos. mainL, momR	A028107	A-B
□	3 pos. momL, mainR	A028108	A-C
□	2 pos. maintained	A028220•	A-B
□	2 pos. momentary	A028219•	A
□	3 pos. maintained	A028205	A-B-C
□	3 pos. momentary	A028206	A
□	3 pos. mainL, momR	A028207	A-B
□	3 pos. momL, mainR	A028208	A-C
○	2 pos. maintained	A028320•	A-B
○	2 pos. momentary	A028319•	A
○	3 pos. maintained	A028305	A-B-C
○	3 pos. momentary	A028306	A
○	3 pos. mainL, momR	A028307	A-B
○	3 pos. momL, mainR	A028308	A-C

Contacts	Part No
1 N.O.	A02501UL
1 N.C.	A02502UL
2 N.O.	A02503UL
2 N.C.	A02504UL
1 N.O./1 N.C.	A02505UL

Second switch block

Contacts	Part No
1 N.O.	A02506UL
1 N.C.	A02507UL
2 N.O.	A02508UL
2 N.C.	A02509UL
1 N.O./1 N.C.	A02510UL

To achieve 3 or 4 pole switching, add second switch block, from above table

• Key Rotation - 2 position switches

The model numbers shown are for switches with clockwise key rotation.

For anticlockwise rotation, replace:

20 with **01**
19 with **02**

at the end of the model number

• 2 standard keys are supplied.

• 20 key barrel types available from stock.

Non-removable key positions : contact APEM.

OPTION

To specify **flush mounting (30 mm Ø) option**, add "FM" to the end of the part number (for round operators only). Example : A028320FM.

Bezel: □ rectangular, □ square, ○ round,

A02 series

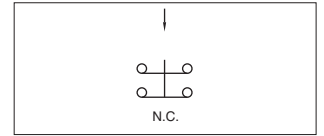
Emergency stop switches

Panel cut-out Ø 22 (.866)

- Prominent 40 mm (1.575) dia. red mushroom actuator
- Highly reliable positive break switch
- Push to shut off switch, twist to reset to ON
- Approved to UL 1054 / EN 60947-5-5

An emergency stop switch assembly requires : operator + switch block.

To order, specify with single pole or double pole positive break switch block.

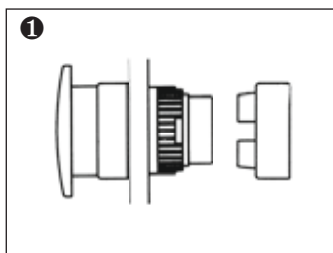
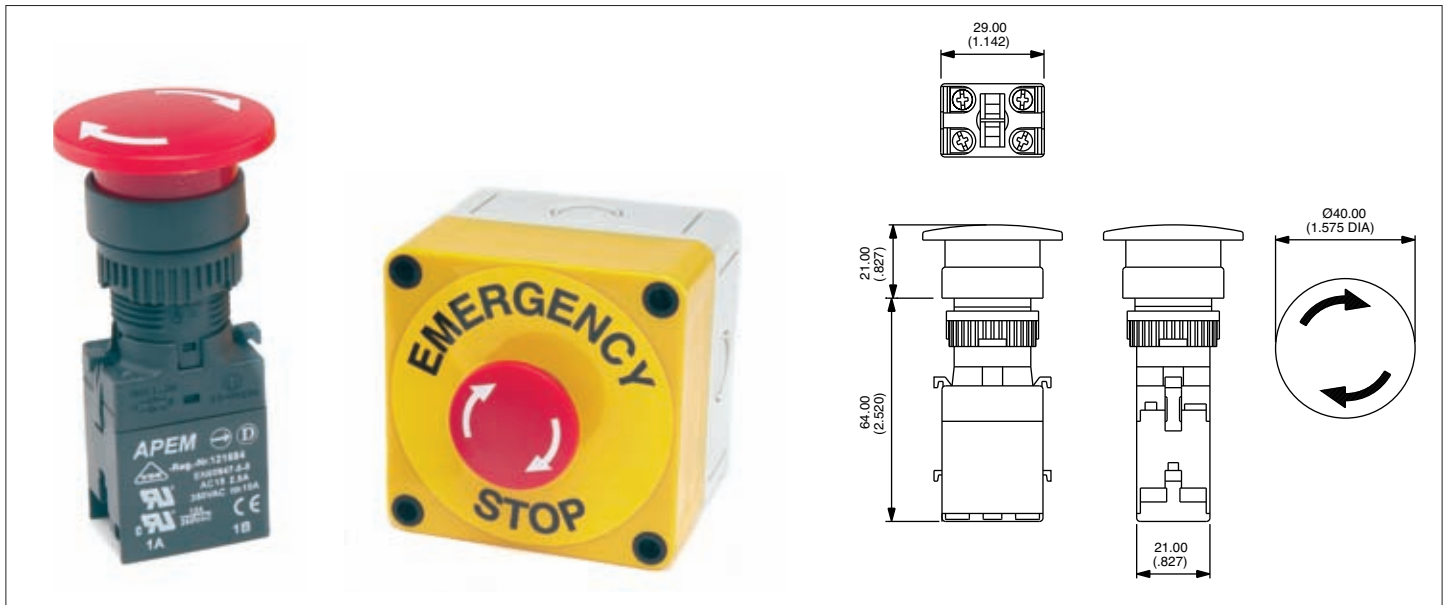


General specifications

- Mechanical life : 6.050 cycles (6 cycles per minute)
- Operating force : 20 N
- Operating temperature : -20°C to +85°C
- Degree of environ. protection (IEC529) : IP65 front of panel, IP40 back of panel
- Switch terminals : M3 screws - wire 2x0.75mm² max.

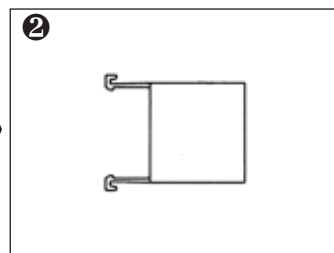
Electrical specifications

- Current/voltage rating : 2,5A 380VAC AC-15
- Contact gap : > 3 mm (.118)
- Dielectric strength : 2.500V
- Electrical life : 6.050 cycles



Operator

Bezel	Description	Part No
	Emergency stop	A02ES



Switch block

No of poles	Part No
Double pole	A02511
Single pole	A02512

Accessory



90 mm Ø Self Adhesive Label

Description	Part No
Yellow label with text	A02YL1
Yellow label	A02YL2

EMERGENCY STOP SWITCH ENCLOSURE

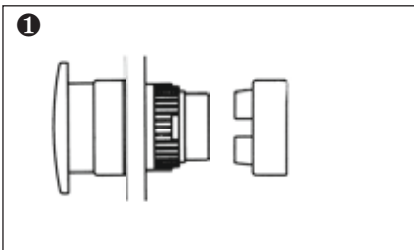
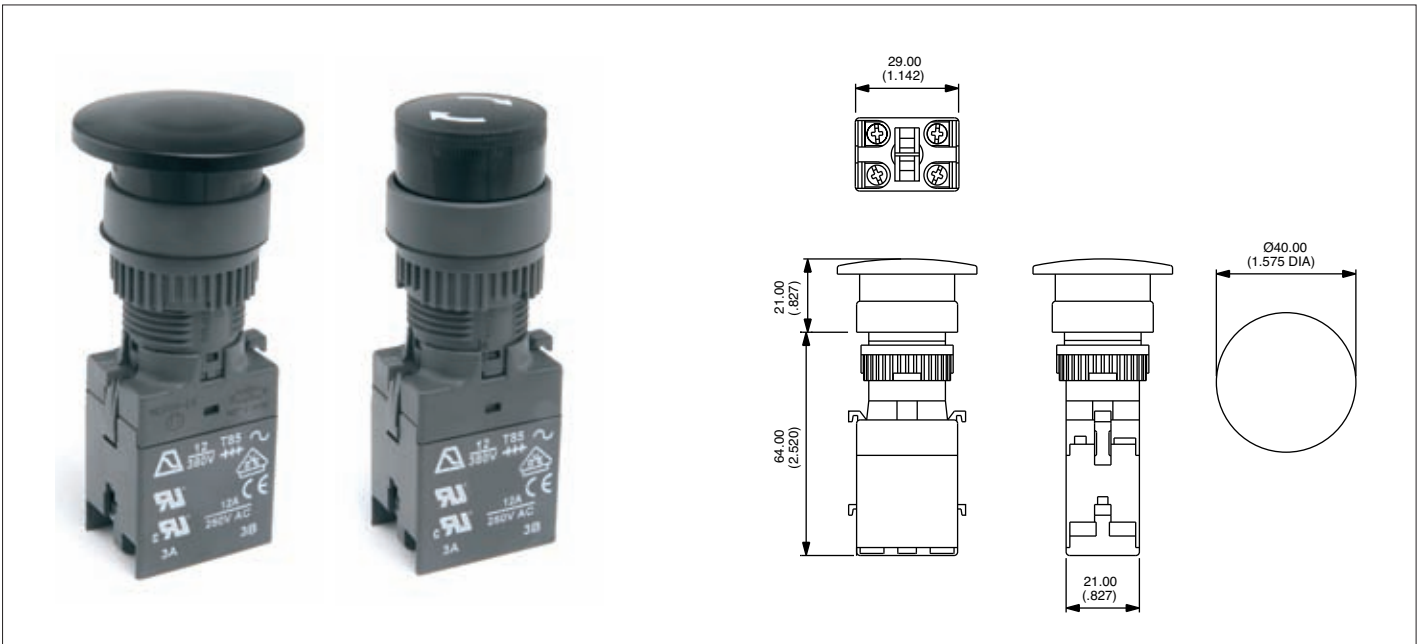
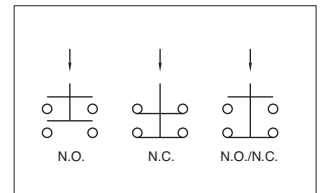
To order the Emergency Stop Switch in the Plastic Enclosure (94 x 94 x 81 mm) with a 2 pole Positive Break Switch Block and Emergency Stop label, use Part number : A02PE2L.

A02 series

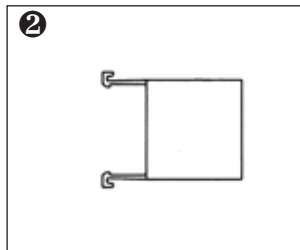
Mushroom head pushbutton switches

Panel cut-out Ø 22 (.866)

- Prominent 40 mm (1.575) dia. mushroom actuator or optional 26 mm (1.024) actuator
- Momentary and maintained functions
Momentary function versions are unmarked
Maintained function versions are twist to release (arrows indicate direction of twist)
- Various coloured mushroom actuators are available



Operator



Switch block

Bezel	Description	Part No	Contacts	Part No
○	Black momentary	A02MMA	1 N.O.	A02501UL
○	Red momentary	A02MMB	1 N.C.	A02502UL
○	Yellow momentary	A02MMD	2 N.O.	A02503UL
○	Green momentary	A02MME	2 N.C.	A02504UL
○	Blue momentary	A02MMF	1 N.O./1 N.C.	A02505UL
○	Black maintained	A02MXA		
○	Red maintained	A02MXB		
○	Yellow maintained	A02MXD		
○	Green maintained	A02MXE		
○	Blue maintained	A02MXF		

Second switch block

Contacts	Part No
1 N.O.	A02506UL
1 N.C.	A02507UL
2 N.O.	A02508UL
2 N.C.	A02509UL
1 N.O./1 N.C.	A02510UL

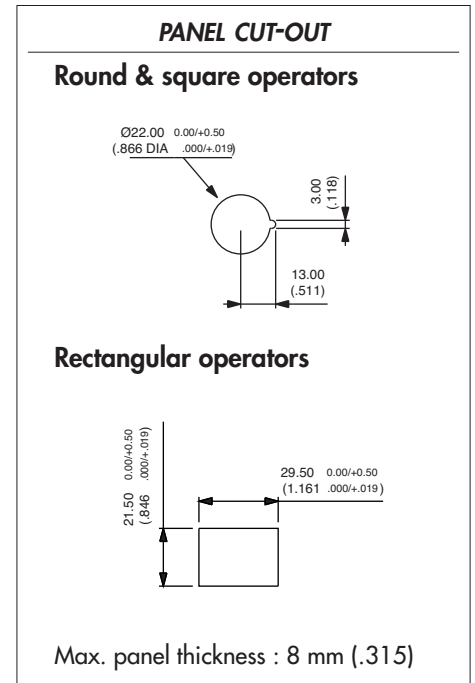
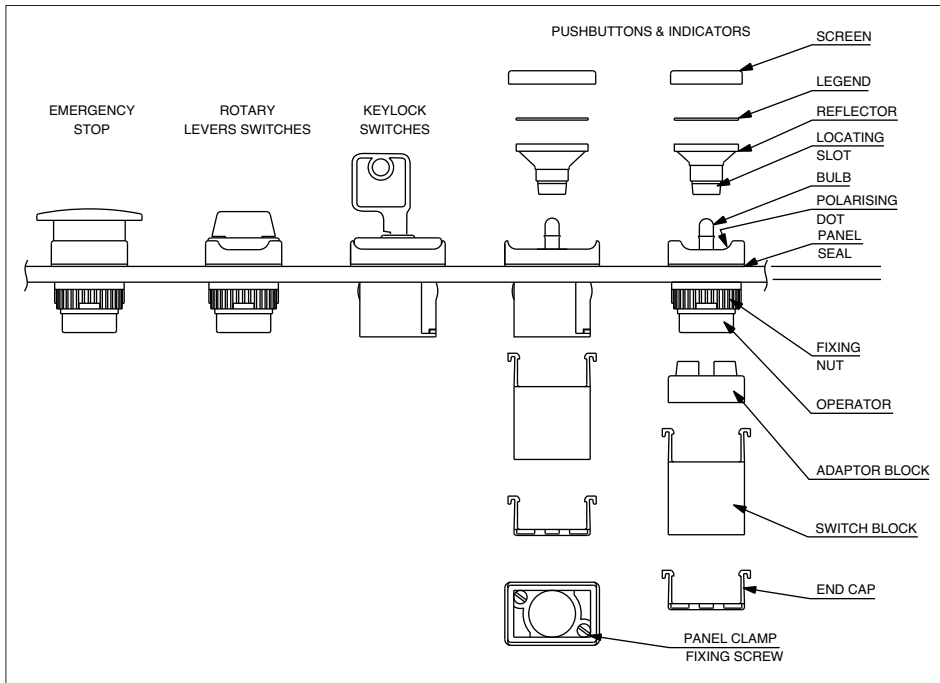
OPTION

For optional reduced (Ø 26 mm) mushroom head operators : contact APEM.

To achieve 3 or 4 pole switching, add second switch block, from above table

Bezel: ○ round

Modular construction / panel mounting



PANEL MOUNTING ASSEMBLY

- Drill/punch hole in panel as shaped above.
- Assemble front operator through hole and :
 - Round & square types* : tighten nut to a maximum torque of 0,8Nm using tool No 30-0001. Snap on adaptor block
 - Rectangular types* : tighten two panel fixing screws in front to a maximum torque of 0,06Nm.
- Wire chosen switch block as required and snap onto front operator.
- Snap end cap onto switch block.
- Fit bulb if required using tool No 30-0002.
- Snap screen onto reflector assembly with legend in between if required and snap into front operator **TAKING CARE TO LINE UP THE LOCATING SLOT WITH THE POLARISING DOT**, and not to damage the seal.

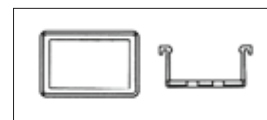
TO REMOVE BULB

Remove reflector/screen assembly. Use the bulb extractor 30-0002 to remove the bulb.

TO REMOVE SWITCH BLOCK

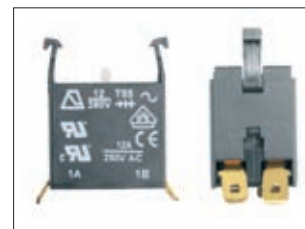
Lever out latches using small screwdriver taking care not to overbend, and pull off the block from the front operator.

A02 Accessories



Part No : 14-0005

End cap terminal guard offering unique terminal protection.



6.35 mm push on tab terminals.

Specify "SP" to the end of the switchblock and operator P/N. Example : A02503SP.

A03 series

Illuminated or non-illuminated pushbutton switches and indicators

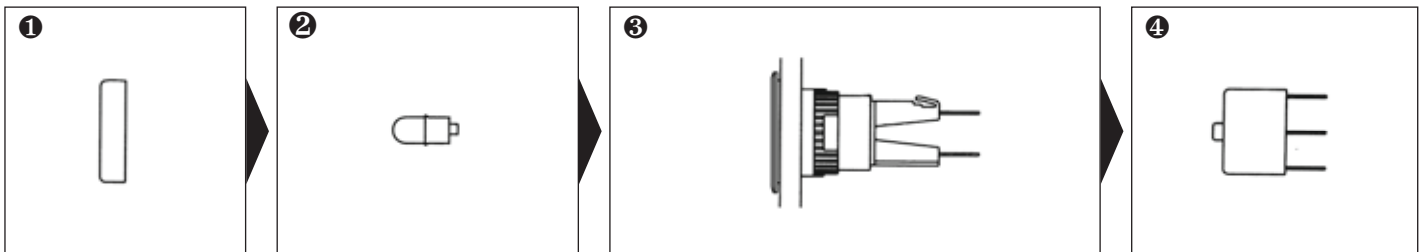
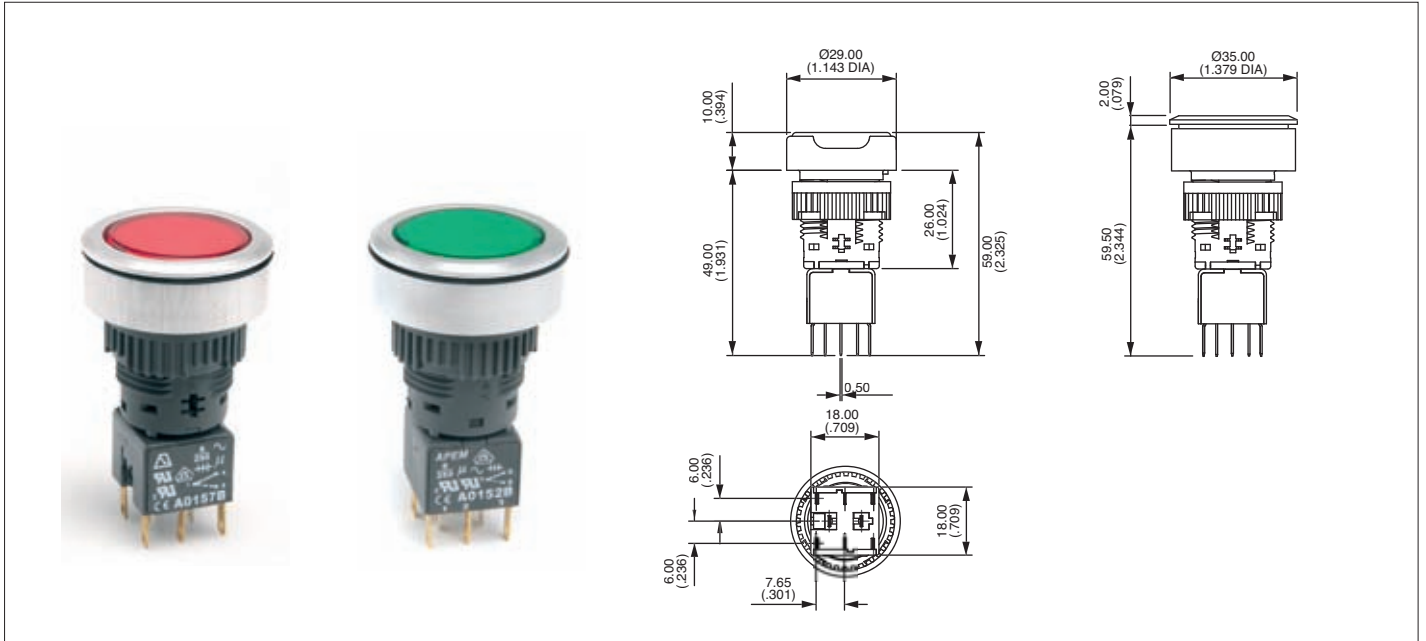
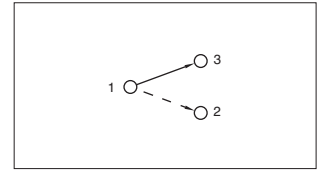
Panel cut-out Ø 22 (.866) or 30 (1.181) - Plastic or metal flush mounting bezel

A pushbutton assembly requires :

screen + lamp (if illuminated) + operator + switch block.

To order these elements, select desired model numbers from tables below.

Example : IP65 flush mounting round pushbutton, maintained function, red screen, 12V red LED and single pole switch block = A0314X, A0263B, A0142M1 and A0151BUL.



Screen

Bezel	Colour	Part No
○	black	A0263A
○	red	A0263B
○	amber	A0263C
○	yellow	A0263D
○	green	A0263E
○	blue	A0263F
○	clear	A0263G
○	white	A0263J

Lamp

Lamp	Voltage	Part No
Filament	6.3V	A0141A
Filament	14V	A0141B
Filament	28V	A0141C
Filament	36V	A0141D
Filament	48V	A0141E
Filament	60V	A0141F
Neon	110V	A0143G
Neon	220V	A0143H
LED	6V red	A0142L1
LED	6V green	A0142L2
LED	6V amber	A0142L3
LED	12V red	A0142M1
LED	12V green	A0142M2
LED	12V amber	A0142M3
LED	12V blue	A0142M4
LED	12V white	A0142M5
LED	24V red	A0142N1
LED	24V green	A0142N2
LED	24V amber	A0142N3
LED	24V blue	A0142N4
LED	24V white	A0142N5
LED	48V red	A0142P1
LED	48V green	A0142P2
LED	48V amber	A0142P3

Operator

Bezel	Description	Lamp type	Part No
○	Plastic illum, momentary	Lamp/LED bulb	A0307Y
○	Plastic illum, maintained	Lamp/LED bulb	A0307X
○	Plastic non-illum, momentary		A0309Y
○	Plastic non-illum, maintained		A0309X
○	Metal illum, momentary	Lamp/LED bulb	A0310Y
○	Metal illum, maintained	Lamp/LED bulb	A0310X
○	Metal non-illum, momentary		A0312Y
○	Metal non-illum, maintained		A0312X
○	F/mount illum, momentary	Lamp/LED bulb	A0314Y
○	F/mount illum, maintained	Lamp/LED bulb	A0314X
○	F/mount non-illum, momentary		A0315Y
○	F/mount non-illum, maintained		A0315X
○	Plastic indicator		A0375
○	Metal indicator		A0377
○	F/mount indicator		A0379I

Switch block

No of poles	Part No
Single pole	A0151BUL
Double pole	A0152BUL
Three pole	A0155BUL
Four pole	A0153BUL

UNSEALED SWITCHES (IP40) :
add "01" to end of operator model number.

SCREEN ENGRAVING / INSERTABLE LEGENDS : contact APEM.

Bezel: ○ round. 'illum' - illuminated, 'Non-illum' - non illuminated

New!



- 2 and 3-pole configurations
- Rugged version : 100.000 cycle mechanical life
- Locked/unlocked status indicator
- Lower behind-panel depth
- Sealed to IP65, IP67 and IP69K
- Complies with EN 60947-5-1

ELECTRICAL SPECIFICATIONS

- Electrical function : push-pull ON-ON
- Current/voltage rating : 1A 24VDC DC-14
- Electrical life : 6.050 cycles
- 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

ENVIRONMENTAL SPECIFICATIONS

- Sealing : IP65, IP67 and IP69K according to IEC 60529 and DIN 40050
- Salt spray : 96 hours according to IEC 68-2-11
- Vibrations : 10-500 Hz - 10 g according to IEC 68-2-6
- Shock resistance : 50 g according to IEC 68-2-27
- Robustness (axial) : IK10
- Operating temperature : -40°C to +85°C
- According to EN 60947-5-1

GENERAL SPECIFICATIONS

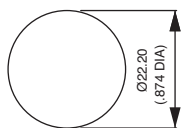
- Panel thickness : 6 mm (.236) max.
- Low level or mechanical life :
100.000 cycles
- Travel to lock : 2,20 mm ± 0,3 mm
- Total travel : 4,20 mm ± 0,3 mm
- Torque : 5 Nm min. - 14 Nm max.
applied to nut
- Operating force :
2 pole models : Push : 30N ± 7N
pull : 25N ± 5N
3 pole models : Push : 45N ± 7N
pull : 25N ± 5N

MATERIALS

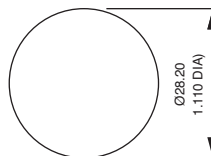
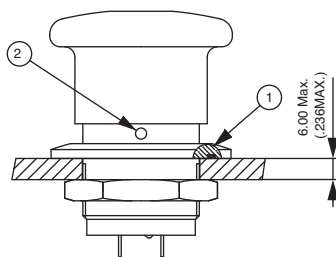
- Case : diallylphthalate (DAP)
- Actuator : aluminium, red anodised
- Bushing : aluminium, yellow anodised
- Contacts : silver, gold plated
- Terminal seal : epoxy

PANEL CUT-OUT

- ① O-ring
- ② Hole



2 pole



3 pole

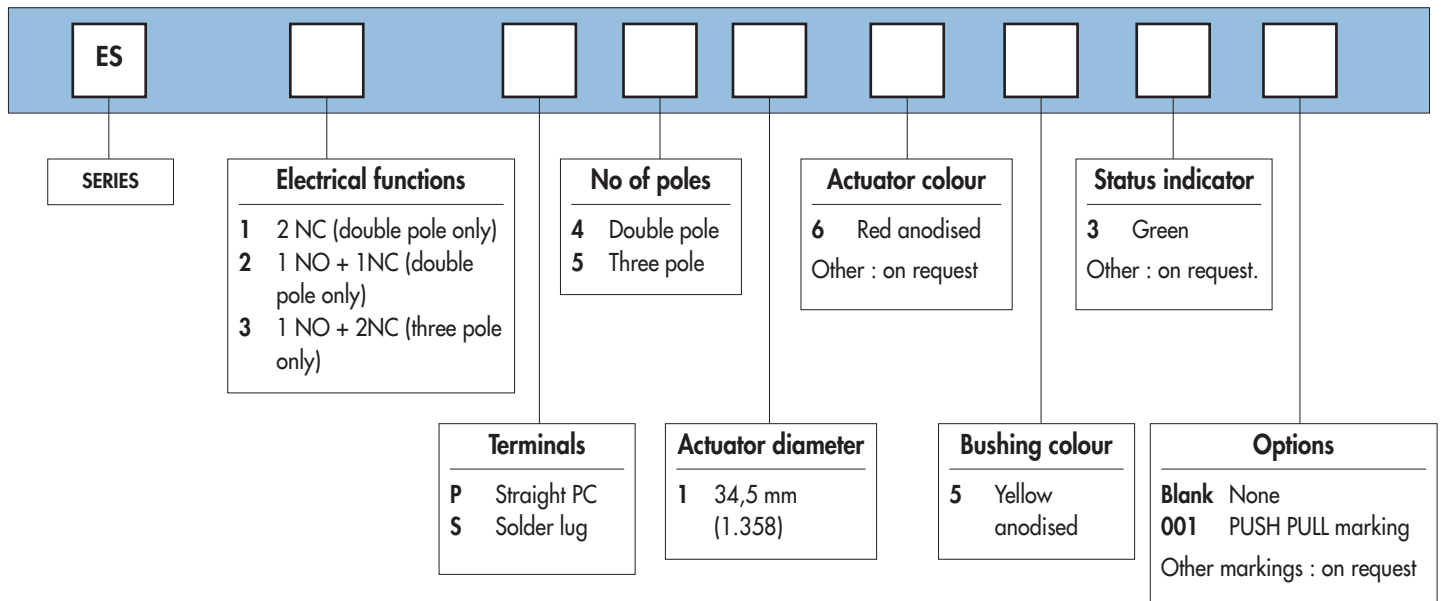
Note : **the hole in the bushing** is designed for insertion of a \varnothing 2 mm metal rod helping to fasten the switch on the panel.

ES series

Heavy-duty emergency stop

New!

Overview



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



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



Mounting accessories : Standard hardware supplied : 1 hex nut 25 (.984) or 32 (1.260) across flats and 1 O-ring



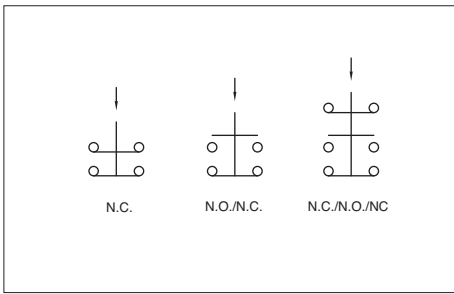
Packaging unit : 10 pieces

ES series

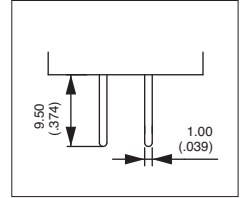
Heavy-duty emergency stop

Panel cut-out $\varnothing 22 (.866)$ or $\varnothing 28 (1.102)$

New!



Straight PC terminal



MODEL STRUCTURE



Shown with solder lug terminals

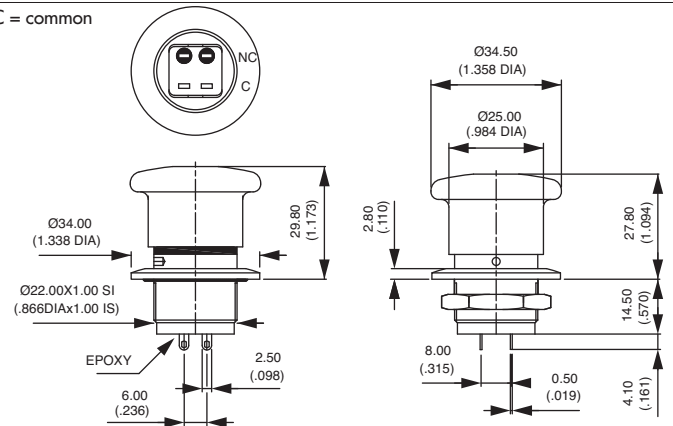
Double pole - 2 N.C. contacts



Solder lug terminals
ES1S41653

Straight PC terminals
ES1P41653

C = common



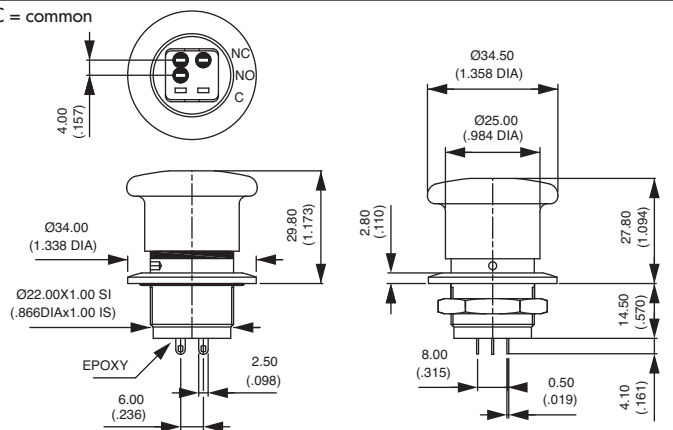
Double pole - 1 N.O. and 1 N.C. contacts



Solder lug terminals
ES2S41653

Straight PC terminals
ES2P41653

C = common



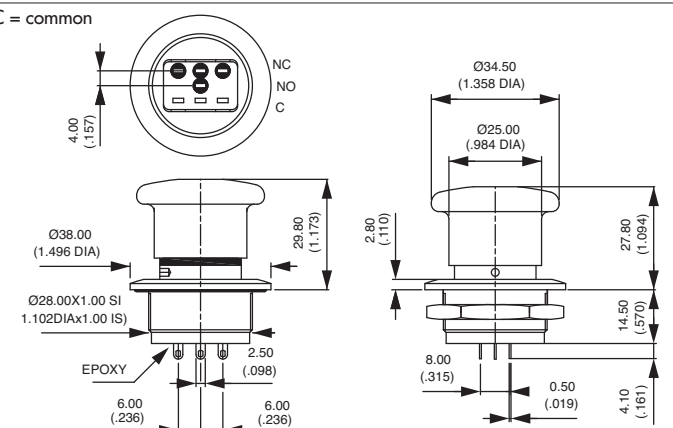
Three pole - 1 N.O. and 2 N.C. contacts



Solder lug terminals
ES3S51653

Straight PC terminals
ES3P51653

C = common



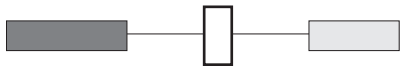
ES series

Heavy-duty emergency stop

New!

Options

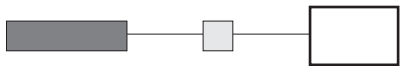
STATUS INDICATOR COLOUR



3 Green

Other : on request.

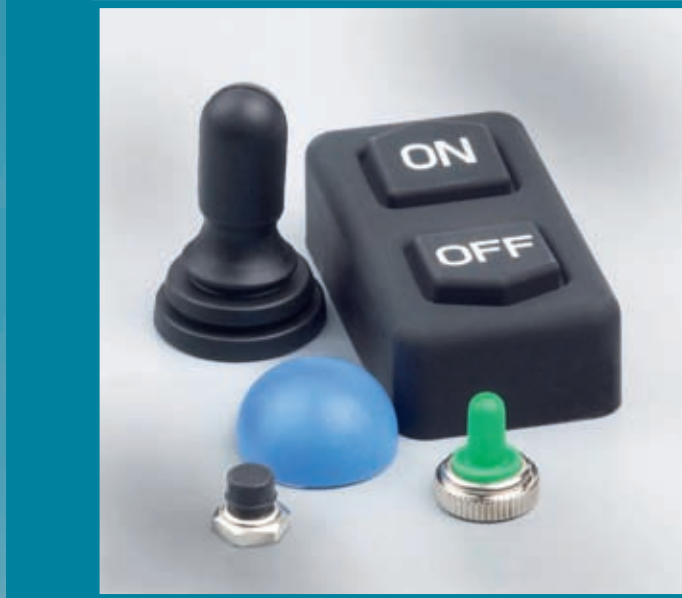
OPTIONS



Blank None
001 PUSH PULL marking

Other markings : on request

Sealing boots



Section H

Sealing boots

- Prevent dust, sand and water from getting into switches.
- On toggle versions, also prevent ice from blocking lever action
- Compatible with frontal sealing options (K and X408).
- Available in a wide range of colours.
- When necessary, a sealing ring or washer is supplied with the boot.



MATERIALS AND SPECIFICATIONS

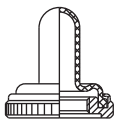
- Boot material : neoprene or silicone (see comparative advantages below)
 - Nut material : brass, nickel plated or matt black
 - Operating temperature :
 - neoprene boots : -20°C to +50°C
 - silicone boots : -40°C to + 85°C
- ++ : excellent, + : good, - : poor

COMPARATIVE ADVANTAGES	TEMPERATURE RANGE		ELASTICITY	MECHANICAL RESISTANCE
	LOW	HIGH		
Silicone	++	++	++	-
Neoprene	-	+	-	++

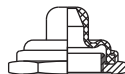
DIFFERENT TYPES OF BOOTS

* Colour options available

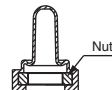
Full-toggle (standard) *



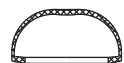
Half-toggle *



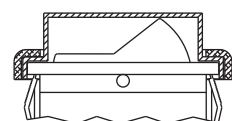
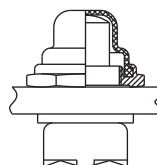
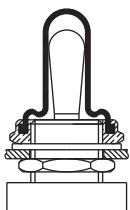
Two-part (no metal parts accessible) *



For double sealing



EXAMPLES OF MOUNTING



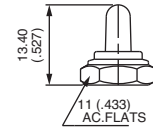
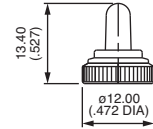
Sealing boots

For toggle switches

For bushing $\varnothing 6 \times 0.75$ (.236 x 0.75) - 5500 series



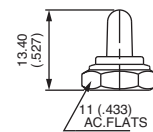
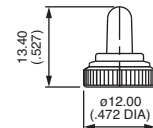
NUT	FULL-TOGGLE SILICONE BOOTS			
	Black	Red	Green	White
Knurled Nickel plated	N32161005 (U1341)	N32162005 (U1341-6)	N3216V005 (U1341-3)	N3216B005 (U1341-7)
Knurled Matt black	N32161002 (U1343)	N32162002 (U1343-6)	N3216V002 (U1343-3)	N3216B002 (U1343-7)
Hex Nickel plated	N32121005 (U1302)	N32122005 (U1302-6)	N3212V005 (U1302-3)	N3212B005 (U1302-7)
Hex Matt black	N32121002 (U1304)	N32122002 (U1304-6)	N3212V002 (U1304-3)	N3212B002 (U1304-7)



For bushing $\varnothing 6,35-40NS$ (1/4-40UNS) - 5000 and 11000 series



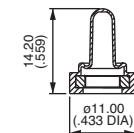
NUT	FULL-TOGGLE SILICONE BOOTS			
	Black	Red	Green	White
Knurled Nickel plated	N33161005 (U1331)	N33162005 (U1331-6)	N3316V005 (U1331-3)	N3316B005 (U1331-7)
Knurled Matt black	N33161002 (U1333)	N33162002 (U1333-6)	N3316V002 (U1333-3)	N3316B002 (U1333-7)
Hex Nickel plated	N33121005 (U1229)	N33122005 (U1229-6)	N3312V005 (U1229-3)	N3312B005 (U1229-7)
Hex Matt black	N33121002 (U1231)	N33122002 (U1231-6)	N3312V002 (U1231-3)	N3312B002 (U1231-7)



For bushing $\varnothing 6,35-40NS$ (1/4-40UNS) - 5000 and 11000 series



BOOTS SUPPLIED AS 2 SEPARATE PARTS			
NEOPRENE	SILICONE		
Black	Red	Green	White
N33136119 (U5149)	N33137119 (U5149-6)	N3313V119 (U5149-3)	N3313B119 (U5149-7)

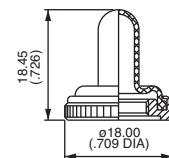


Once the boot is mounted onto the panel, no switch metal part is accessible any more.

For bushing $\varnothing 10 \times 0.75$ (.393 x 0.75) - 10600 series



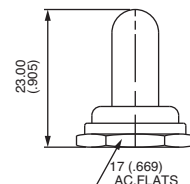
KNURLED NUT	FULL-TOGGLE SILICONE BOOTS			
	Black	Red	Green	White
Nickel plated	N34151005 (U1612)	N34152005 (U1612-6)	N3415V005 (U1612-3)	N3415B005 (U1612-7)
Matt black	N34151002 (U1614)	N34152002 (U1614-6)	N3415V002 (U1614-3)	N3415B002 (U1614-7)



For bushing $\varnothing 11,9-32 NS$ (15/32-32NS) - 12000, 5000M, 3500 and 6000 series



HEX NUT	FULL-TOGGLE SILICONE BOOTS			
	Black	Red	Green	White
Nickel plated	N35111005 (U1031)	N35112005 (U1031-6)	N3511V005 (U1031-3)	N3511B005 (U1031-7)
Matt black	N35111002 (U1024)	N35112002 (U1024-6)	N3511V002 (U1024-3)	-



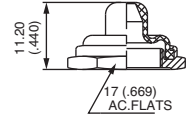
Sealing boots

For toggle switches

For bushing Ø 11,9-32 NS (15/32-32NS) - 12000, 3500 and 6000 series



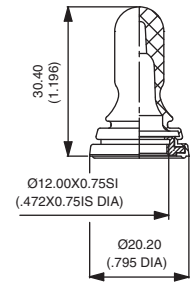
HEX NUT	HALF-TOGGLE SILICONE BOOTS			
	Black	Red	Green	White
Nickel plated	N35111015 (U1600)	N35112015 (U1600-6)	N3511V015 (U1600-3)	N3511B015 (U1600-7)
Matt black	N35111012 (U1602)	N35112012 (U1602-6)	N3511V012 (U1602-3)	-



For bushing Ø12 x 0.75 SI (.472x.075 IS) - 12000, 3500, 3600 and 600 series



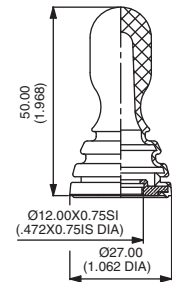
FULL-TOGGLE BLACK NEOPRENE BOOT	
N36346009	(U2252)



For bushing Ø12 x 0.75 SI (.472x.075 IS) - 600 series with -5 long lever



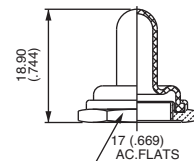
FULL-TOGGLE BLACK NEOPRENE BOOT	
N36346209	(U2197)



For bushing Ø12 x 0.75 SI (.472x.075 IS) - 4450, 4650 and 1600 series



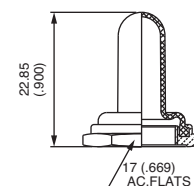
HEX NUT	FULL-TOGGLE BLACK NEOPRENE BOOTS	
Nickel plated	N36116045	(U09)
Matt black	N36116042	(U223)



For bushing Ø 12 x 0.75 SI (.472x.075 IS) - 600H, 660, 1000, 1500 and 3600



HEX NUT	FULL-TOGGLE SILICONE BOOTS			
	Black	Red	Green	White
Nickel plated	N36111005 (U1565)	N36112005 (U1565-6)	N3611V005 (U1565-3)	N3611B005 (U1565-7)
Matt black	N36111002 (U1567)	N36112002 (U1567-6)	N3611V002 (U1567-3)	-
	FULL-TOGGLE BLACK NEOPRENE BOOTS			
Nickel plated	N36116005		(U851)	
Matt black	N36116002		(U853)	



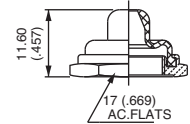
Sealing boots

For toggle switches or pushbutton switches

For bushing Ø 12 x 0.75 SI (.472x.075 IS) - 600H, 660, 1000 and 3600 series



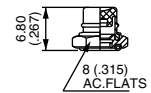
HEX NUT	HALF-TOGGLE SILICONE BOOTS			
	Black	Red	Green	White
Nickel plated	N36111015 (U1151)	N36112015 (U1151-6)	N3611V015 (U1151-3)	N3611B015 (U1151-7)
Matt black	N36111012 (U1153)	N36112012 (U1153-6)	N3611V012 (U1153-3)	-
HALF-TOGGLE BLACK NEOPRENE BOOTS				
Nickel plated	N36116015 (U598)			
Matt black	N36116012 (U600)			



For bushing Ø 4 x 0.70 (.157 x 0.70) - 9500 series



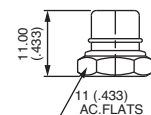
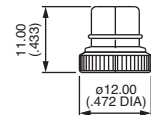
HEX NUT	PUSHBUTTON SILICONE BOOTS			
	Black	Red	Green	White
Nickel plated	N31221005 (U1829)	N31222005 (U1829-6)	N3122V005 (U1829-3)	N3122B005 (U1829-7)
Matt black	N31221002 (U1831)	N31222002 (U1831-6)	N3122V002 (U1831-3)	N3122B002 (U1831-7)



For bushing Ø 6,35-40NS (1/4-40UNS) - 18000, 9000 and 13000 series



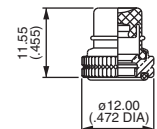
NUT	PUSHBUTTON SILICONE BOOTS			
	Black	Red	Green	White
Knurled Nickel plated	N33261005 (U1401)	N33262005 (U1401-6)	N3326V005 (U1401-3)	N3326B005 (U1401-7)
Knurled Matt black	N33261002 (U1403)	N33262002 (U1403-6)	N3326V002 (U1403-3)	N3326B002 (U1403-7)
Hex Nickel plated	N33221005 (U1318)	N33222005 (U1318-6)	N3322V005 (U1318-3)	N3322B005 (U1318-7)
Hex Matt black	N33221002 (U1320)	N33222002 (U1320-6)	N3322V002 (U1320-3)	N3322B002 (U1320-7)



For bushing Ø 6,35-40NS (1/4-40 UNS) - 8000 series



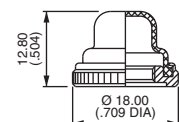
KNURLED NUT	PUSHBUTTON SILICONE BOOTS			
	Black	Red	Green	White
Nickel plated	N33261125 (U4301)	N33262125 (U4301-6)	N3326V125 (U4301-3)	N3326B125 (U4301-7)



For bushing Ø 10 x 0.75 (.393 x 0.75) - 10400 series



KNURLED NUT	PUSHBUTTON SILICONE BOOTS			
	Black	Red	Green	White
Nickel plated	N34251005 (U1624)	N34252005 (U1624-6)	N3425V005 (U1624-3)	N3425B005 (U1624-7)
Matt black	N34251002 (U1626)	N34252002 (U1626-6)	N3425V002 (U1626-3)	N3425B002 (U1626-7)



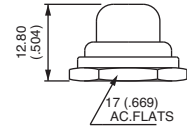
Sealing boots

For pushbutton switches

For bushing \varnothing 11,9-32 NS (15/32-32UNS) - 13000X778, 13000X768 and 8000-6X934 series



HEX NUT	PUSHBUTTON SILICONE BOOTS			
	Black	Red	Green	White
Nickel plated	N35211005 (U589)	N35212005 (U589-6)	N3521V005 (U589-3)	N3521B005 (U589-7)
Matt black	N35211002 (U590)	N35212002 (U590-6)	N3521V002 (U590-3)	-

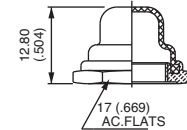


For long plunger (-9) care should be taken over the panel thickness.

For bushing \varnothing 12 x 0.75 SI (.472x.075 IS) - 1200, 4700 and 4800 series



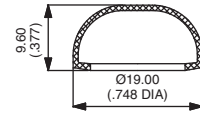
HEX NUT	PUSHBUTTON SILICONE BOOTS			
	Black	Red	Green	White
Nickel plated	N36211005 (U1654)	N36212005 (U1654-6)	N3621V005 (U1654-3)	N3621B005 (U1654-7)
Matt black	N36211002 (U1656)	N36212002 (U1656-6)	N3621V002 (U1656-3)	-
	PUSHBUTTON BLACK NEOPRENE BOOTS			
Nickel plated	N36216005		(U31)	
Matt black	N36216002		(U225)	
Chrome plated	N36216001		(U224)	



For double sealing on IP and IB-IS series



SILICONE BOOT	
Transparent	U5125
Blue	U5125-1
Black	U5125-2
Red	U5125-6

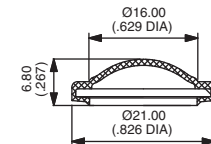


Operating temperature : -40°C to +85°C
The flat seal or O-Ring supplied with the switch should not be used with this boot.

For double sealing on IA seriesa



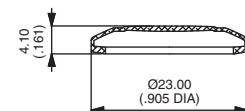
SILICONE BOOT	
Black	U6602
Yellow	U6605
Red	U6606



For AV series (models with \varnothing 19 mm bushing)



SILICONE BOOT	
Black	U2187-2
Green	U2187-3
Grey	U2187-4
Yellow	U2187-5
Red	U2187-6
White	U2187-7
Transparent	U2187-8



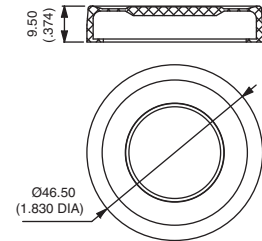
Sealing boots

For pushbutton switches or rocker switches

For LPI series



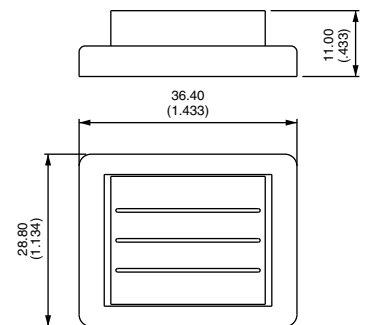
SILICONE BOOT	
Black	U3082
Transparent	U3088



For 2600 series



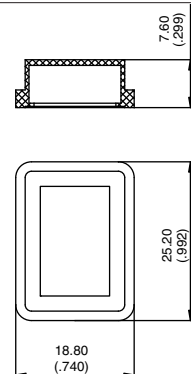
TRANSPARENT SILICONE BOOT
U2150



For FM series



TRANSPARENT PVC BOOT
U5720

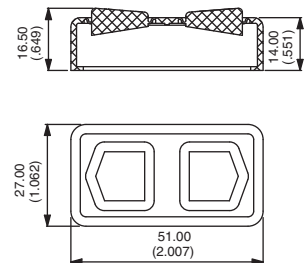


For KG series



BLACK SILICONE BOOT
U3084

Also available with pad-printed symbols : on request.



Indicators / Accessories Hardware



Section I

With the recent introduction of new versions, APEM now offers the broadest range of LED indicators in the market:

- 7 diameters: 6, 8, 12, 14, 16, 19 and 22 mm,
- 3 bezel styles: prominent, recessed and flush
- 3 bezel finishes: bright chrome, black chrome and satin grey
- 6 standard power supply voltages: 6VDC, 12VDC, 24VDC, 28VDC, 110VAC and 230VAC
- 5 LED colours: red, green, yellow, blue and white
- Optional bicolour or tricolour LED's
- 3 output styles: solder lug/faston terminals, pins or wires

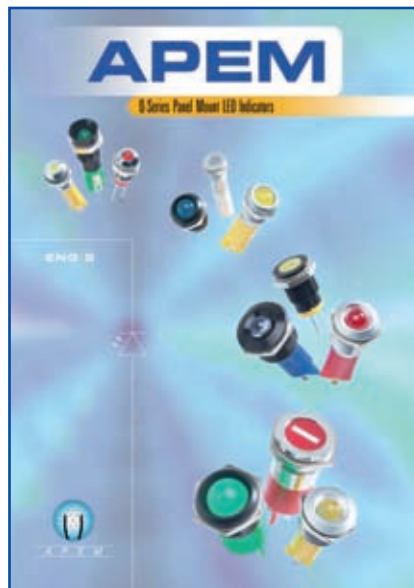
Options

- High brightness LED's (sunlight readable)
- Panel sealing to IP67
- Custom engraving on flush bezel versions
- Plastic bezels on 16 and 22 mm

Main specifications

- Typical viewing angle: 70° to 100° depending on model
- Long life expectancy: 100.000 hours
- Operating temperature range: -40°C to + 85°C

To benefit by the numerous advantages of LED technology (long life, low electrical consumption, low thermal dissipation, good impact resistance), APEM also offers a range of based LED lamps intended for replacement of less efficient filament lamps.



36-page catalogue on line and on request - www.apem.com

B series

15A and 25A terminal posts

SPECIFICATIONS

- Dielectric strength : 15A type : 3.000 Vrms 50 Hz min. between shaft and panel
25A type : 4.000 Vrms 50 Hz min. between shaft and panel
- Short overload (< 2mn) : 50 % with cable lug
- Terminal connection by : - plug \varnothing 4 mm (.157), solder lugs, wire lead
- Operating temperature : -40°C to +70°C
- Packaging unit : 100 pieces or multiple per type and colour.

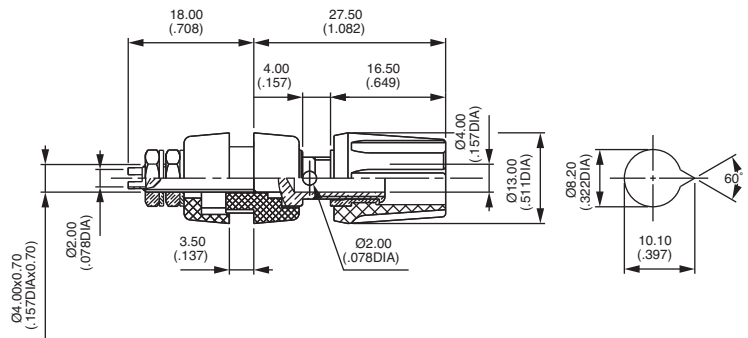
MATERIALS

- Shaft : brass, nickel plated
- Insulated nut : ABS molding over brass
- Other insulated parts : phenolic resin or melamine

Insulated terminal posts 15A



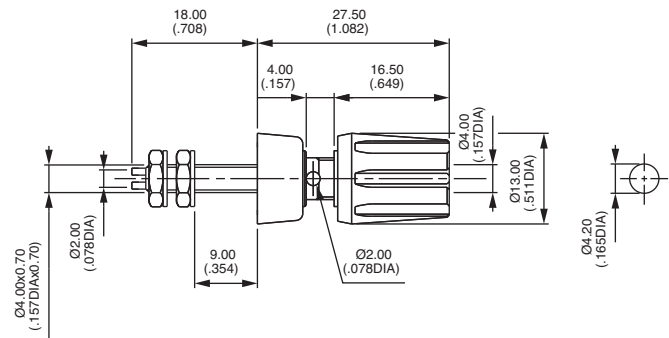
B1	Black
B11	Red
B12	Green
B13	Blue
B14	White
B15	Yellow
B16	Green / Yellow
B19	Orange



Non-insulated terminal posts 15A



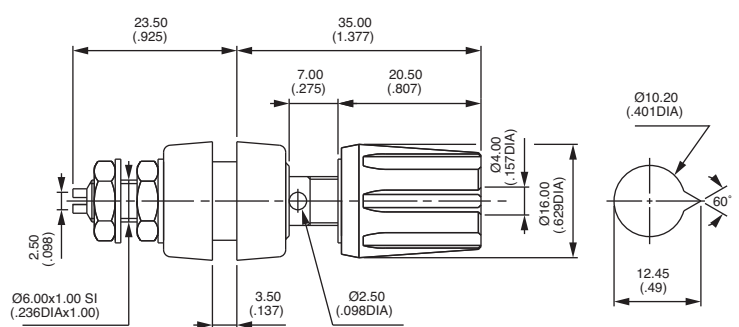
B2	Black
B21	Red
B22	Green
B23	Blue
B24	White
B25	Yellow
B26	Green / Yellow
B29	Orange



Insulated terminal posts 25A



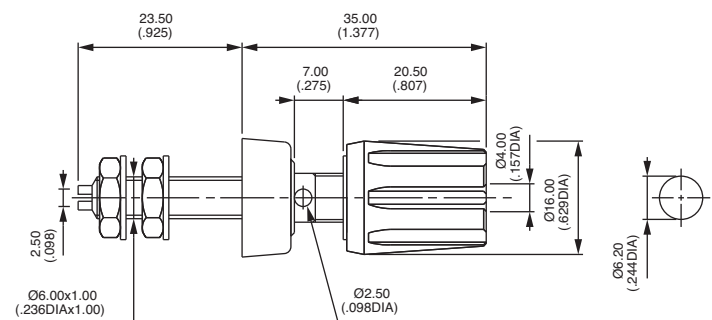
B3	Black
B31	Red
B32	Green
B33	Blue
B34	White
B35	Yellow
B36	Green / Yellow
B39	Orange



Non-insulated terminal posts 25A



B4	Black
B41	Red
B42	Green
B43	Blue
B44	White
B45	Yellow
B46	Green / Yellow
B49	Orange



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

Security caps

For switch series 12000 - 3500 - 600H - 6000

With standard bushing

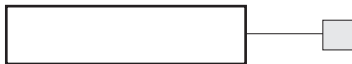
Security caps prevent any inadvertent lever operation. When the cap is raised, the lever can be operated freely. When the cap is fully depressed, the lever is reset/locked in a stable position. They are designed for use on switches with $\varnothing 11,9$ (.468) or $\varnothing 12$ (.472) threaded bushing and lever length 17,5 (.688) outside bushing.

Note : For correct switch operation, the security cap should be adjusted properly by means of 2 nuts.

MATERIALS

- Support plate : matt black steel
- Cap : thermoset or thermoplastic (20PN, 200PN, 300PN)

MODEL STRUCTURE

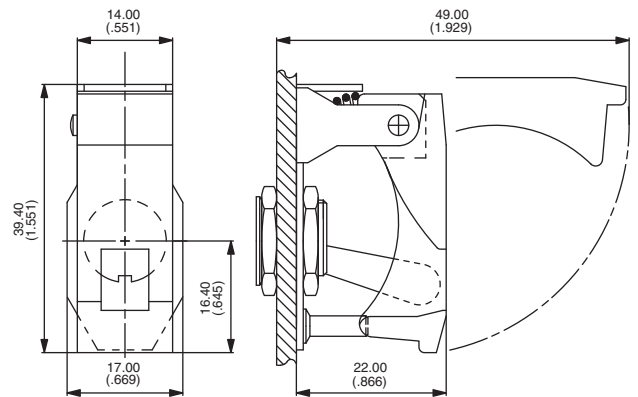


Series 20 - for 2-position switches

- Lever returned then locked in down position (OFF)



Model No	Colour
22	Grey
23	White
24	Orange
25	Black
26	Red
27	Green
28	Yellow
29	Blue
25/28	Black/yellow striped

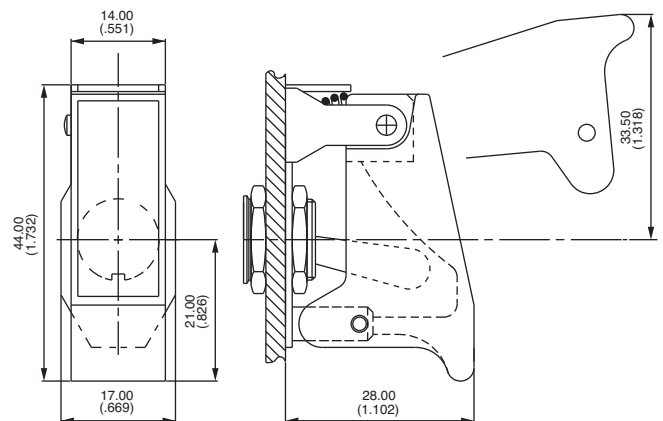


Series 20PN - for 2-position switches

- Lever returned then locked in down position (OFF)



Model No	Colour
22PN	Grey
23PN	White
24PN	Orange
25PN	Black
26PN	Red
27PN	Green
28PN	Yellow
29PN	Blue



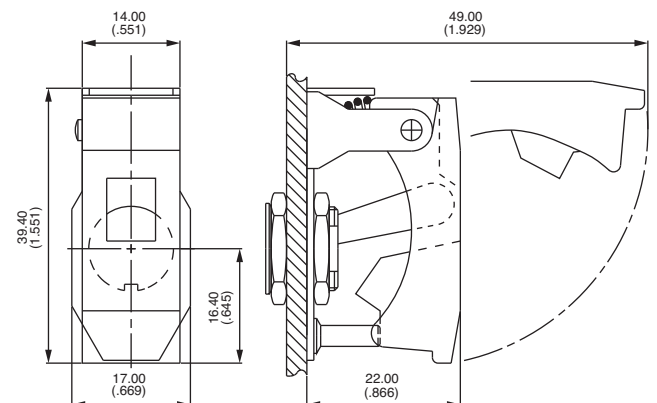
On this model, holes for wiring a seal are standard.

Series 30 - for 3-position switches

- Lever returned then locked in upper position



Model No	Colour
32	Grey
33	White
34	Orange
35	Black
36	Red
37	Green
38	Yellow
39	Blue
35/38	Black/yellow striped



Security caps

For switch series 12000 - 3500 - 600H - 6000

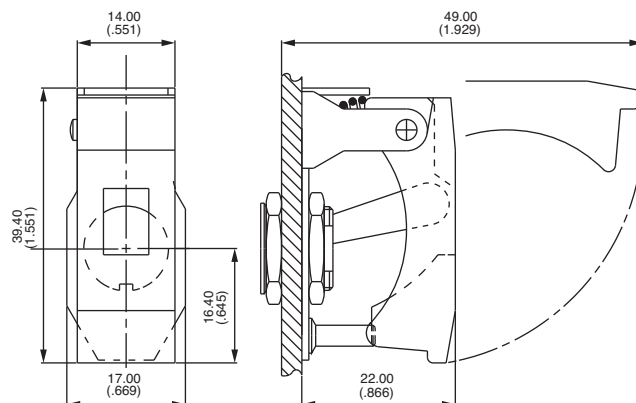
With standard bushing

Series 40 - for 2-position switches

- Lever returned then locked in upper position



Model No	Colour
42	Grey
43	White
44	Orange
45	Black
46	Red
47	Green
48	Yellow
49	Blue
45/48	Black/yellow striped



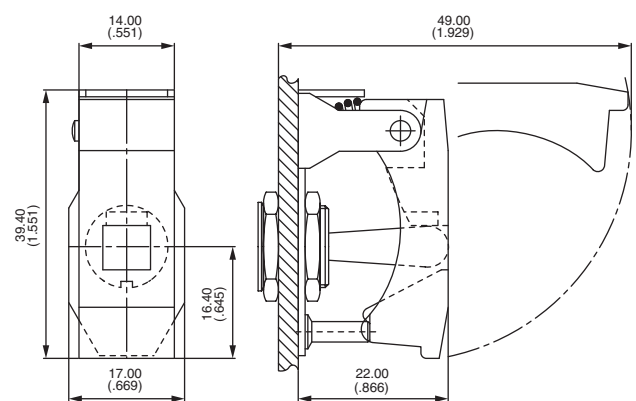
Model 140 (with smaller aperture) recommended for the 12000 series.

Series 80 - for 3-position switches

- Lever returned then locked in center position



Model No	Colour
82	Grey
83	White
84	Orange
85	Black
86	Red
87	Green
88	Yellow
89	Blue

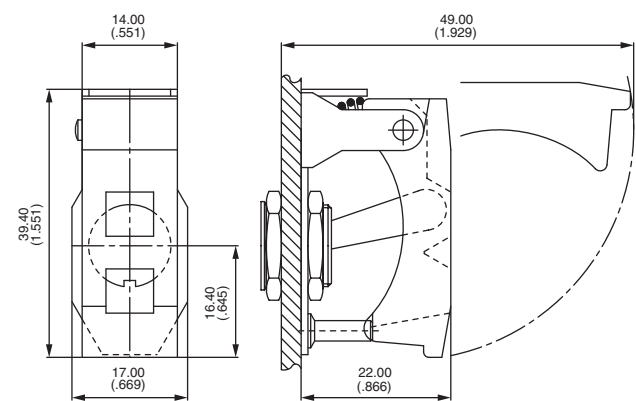


Series 200 - for 2-position switches

- Lever returned then locked either in lower or in upper position



Model No	Colour
202	Grey
203	White
204	Orange
205	Black
206	Red
207	Green
208	Yellow
209	Blue

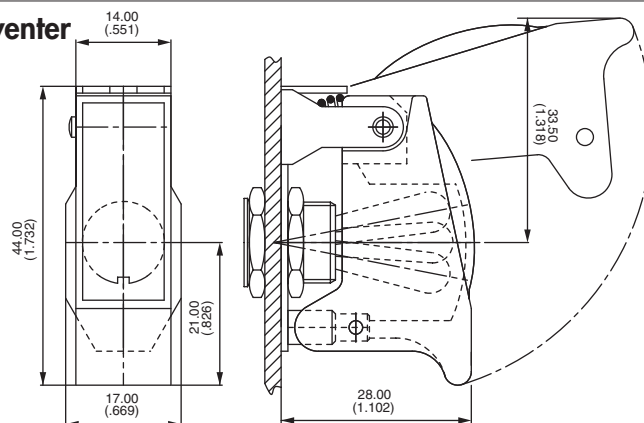


Series 200PN - for 2 or 3-position switches - action preventer

- Lever not locked, but protected in the position where left by the user



Model No	Colour
202PN	Grey
203PN	White
204PN	Orange
205PN	Black
206PN	Red
207PN	Green
208PN	Yellow
209PN	Blue



Security caps

For switch series 12000 - 3500 - 600H - 6000

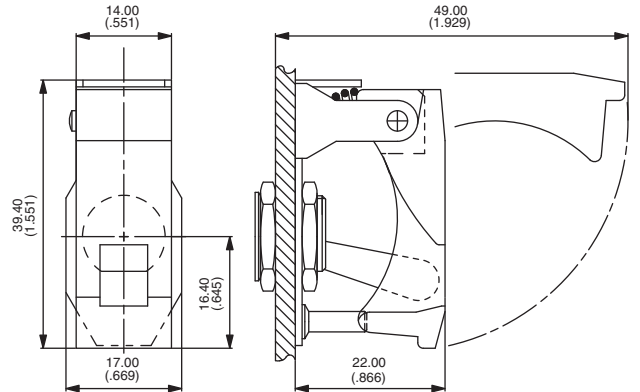
With flatted bushing

Series 50 - for 2-position switches

- Lever returned then locked in down position (OFF)



Model No	Colour
52	Grey
53	White
54	Orange
55	Black
56	Red
57	Green
58	Yellow
59	Blue
55/58	Black/yellow striped

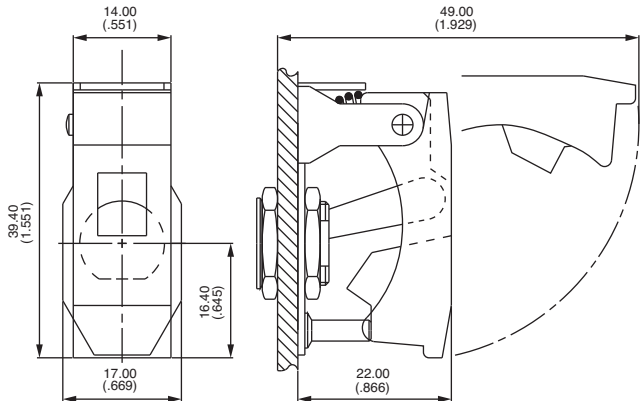


Series 60 - for 3-position switches

- Lever returned then locked in upper position



Model No	Colour
62	Grey
63	White
64	Orange
65	Black
66	Red
67	Green
68	Yellow
69	Blue
65/68	Black/yellow striped

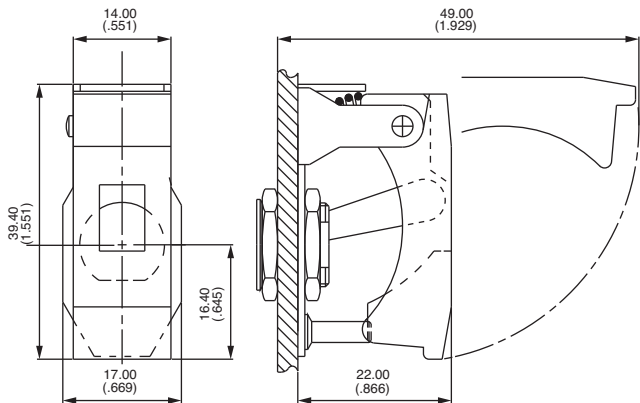


Series 70 - for 2-position switches

- Lever returned then locked in upper position



Model No	Colour
72	Grey
73	White
74	Orange
75	Black
76	Red
77	Green
78	Yellow
79	Blue
75/78	Black/yellow striped



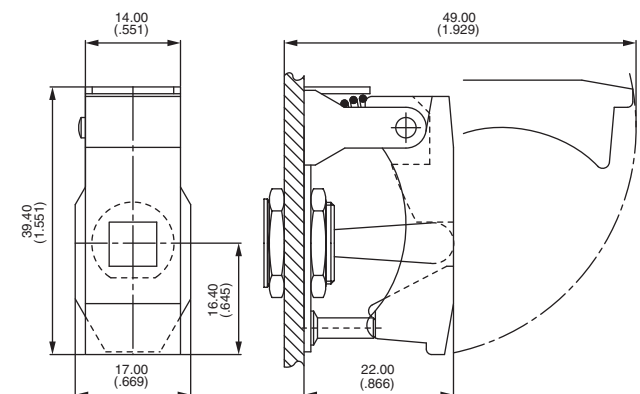
Model 170 (with smaller aperture) recommended for the 12000 series.

Series 100 - for 3-position switches

- Lever returned then locked in center position



Model No	Colour
102	Grey
103	White
104	Orange
105	Black
106	Red
107	Green
108	Yellow
109	Blue



Security caps

For switch series 12000 - 3500 - 600H - 6000

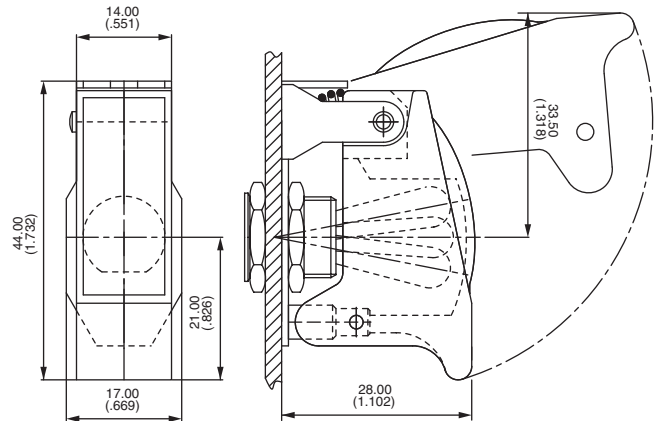
With flatted bushing

Series 300PN - for 2 or 3-position switches

- Lever not locked, but protected in the position where left by the user.



Model No	Colour
302PN	Grey
303PN	White
304PN	Orange
305PN	Black
306PN	Red
307PN	Green
308PN	Yellow
309PN	Blue

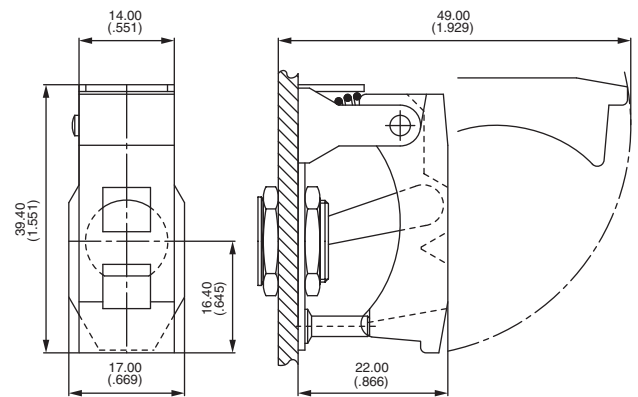


Series 500 - for 2-position switches

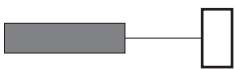
- Lever returned then locked either in lower or in upper position



Model No	Colour
502	Grey
503	White
504	Orange
505	Black
506	Red
507	Green
508	Yellow
509	Blue

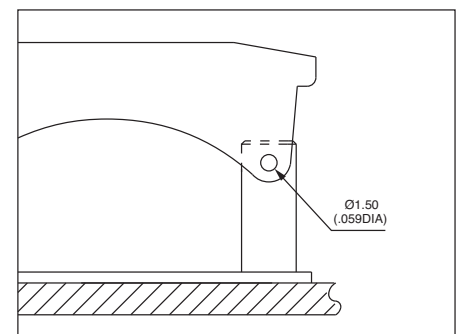


OPTIONS



P Holes for wiring a seal

Cap engraving available : consult factory.



Security caps

For switch series 3500 - 600H - 6000

With standard or flatted bushing

Series 90

- Lever locked in center position

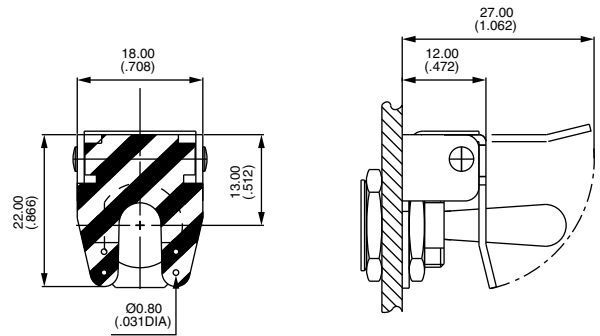


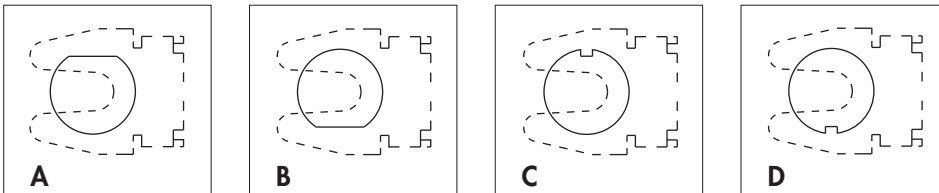
Plate features holes for wiring a seal.

To build a part number, select desired option from each category here below.

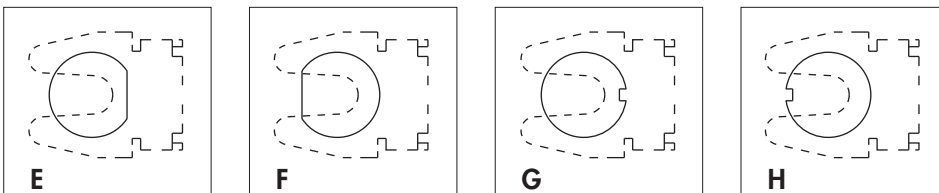
BUSHING SHAPES



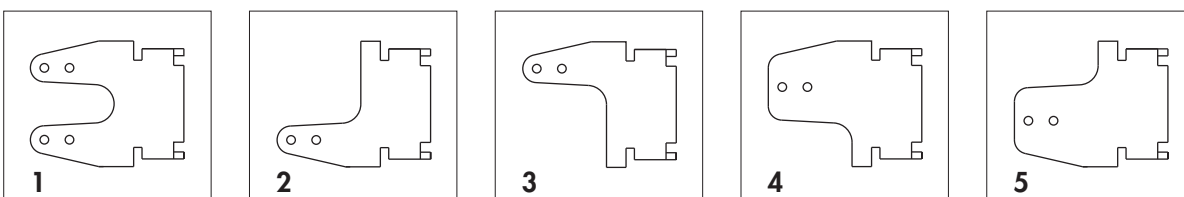
For standard products



For other products



SECURITY CAP SHAPE



1
Locks in center position

2
Prevents down position

3
Prevents up position

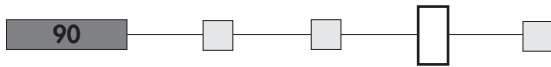
4
Locks in down position

5
Locks in up position

Security caps

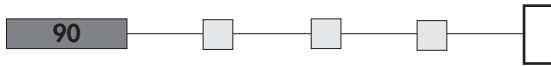
For switch series 3500 - 600H - 6000 (continued) - For pushbutton series 13000

SECURITY CAP COLOURS

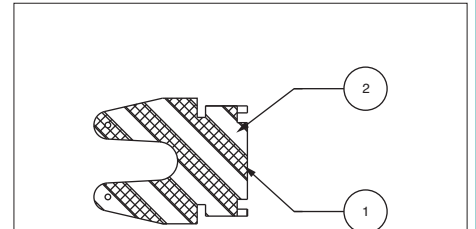


1	Blue
2	Black
3	Green
4	Grey
5	Yellow
6	Red
7/1	White
9	Orange
0	Striped (see below)

COLOUR OF STRIPES



	Stripe ①	Stripe ②
A	Red	Black
B	Yellow	Black
C	Red	White
D	White	Black

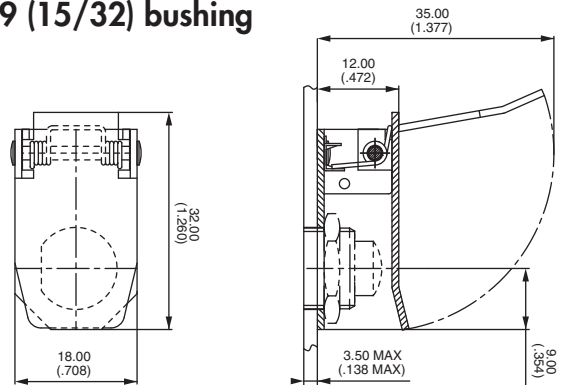


Series 90AX2328 for pushbutton series 13000 with \varnothing 11,9 (15/32) bushing

- Spring-loaded cover returning automatically in lower position. The user has to keep the cover raised while actuating the switch.



Model No	Colour
90AX2328-27	Black with white stripe
90AX2328-67	Red with white stripe



Hardware

For miniature switches

- Standard hardware is automatically supplied with the switches
- Non standard hardware is to be ordered separately



Hardware supplied with sealing options :

- K version : 2 hex nuts + sealing washer
- X408 option : 1 hex nut + 1 O-ring

STANDARD HARDWARE FOR SWITCHES Ø 6 (.236) - 5000 SERIES

HEX NUT	LOCKING RING	LOCKWASHER
<p>9.00 (.354) 2.00 (.078) Ø6.00 x 0.75 SI (.236 DIA x 0.75SI)</p>	<p>Ø11.80 (.464 DIA) 6.20 (.244) Ø6.10 (.240 DIA) 5.50 (.216) 2.00 (.078) 0.80 (.031)</p>	<p>Ø9.50 (.374 DIA) 0.80 (.031) Ø6.50 (.255 DIA) 0.40 (.015)</p>
Nickel plated Matt black	Nickel plated Matt black	Stainless steel
U208 U726	U198 U728	U215

NON STANDARD HARDWARE FOR SWITCHES Ø 6 (.236) - 5000 SERIES

KNURLED NUT	SPECIAL NUT 12 (.472) ACROSS FLATS	KNURLED CAP NUTS
<p>Ø9.00 (.354 DIA) 2.20 (.086) Ø6.00 x 0.75 SI (.236 DIA x 0.75SI)</p>	<p>12.00 (.472) 2.00 (.086) Ø6.00 x 0.75 SI (.236 DIA x 0.75SI)</p>	<p>Ø9.00 (.354 DIA) 2.70 (.106) Ø5.20 (.204 DIA) Ø6.00 x 0.75 SI (.236 DIA x 0.75SI)</p> <p>Ø12.00 (.472 DIA) 2.60 (.102) Ø4.80 (.188 DIA) Ø6.00 x 0.75 SI (.236 DIA x 0.75SI)</p>
Chrome plated	Chrome plated	Chrome plated Matt black
U826	U1916	U461 U502
		Chrome plated U232

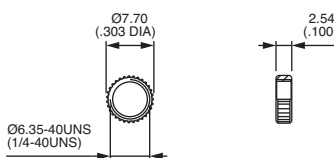
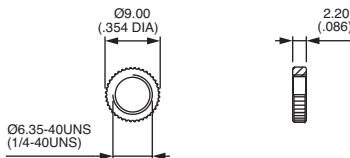
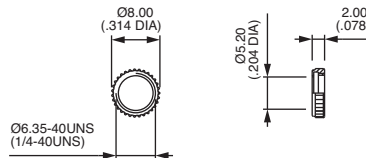
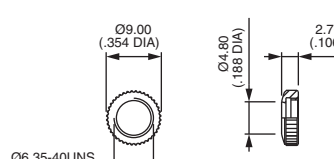
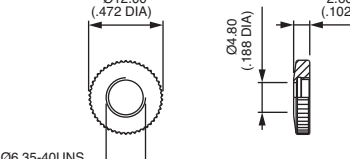
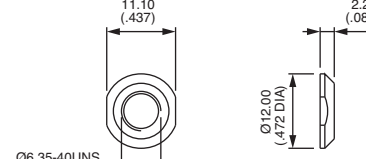
STANDARD HARDWARE FOR SWITCHES Ø 6,35 (1/4) - ALL SERIES

HEX NUT	LOCKING RING	LOCKWASHER
<p>8.00 (.314) 1.60 (.062) Ø6.35-40UNS (1/4-40UNS)</p>	<p>Ø9.60 (.377 DIA) 5.20 (.204) Ø6.50 (.255 DIA) 2.00 (.078) 0.80 (.031)</p>	<p>Ø9.50 (.374 DIA) 0.80 (.031) Ø6.50 (.255 DIA) 0.40 (.015)</p>
Nickel plated Matt black	Nickel plated Matt black	Stainless steel
U76 U94	U78 U93	U215

HARDWARE SUPPLIED (unsealed types)

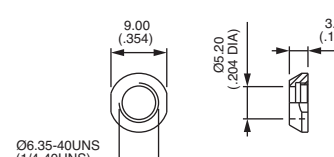
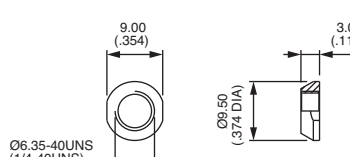
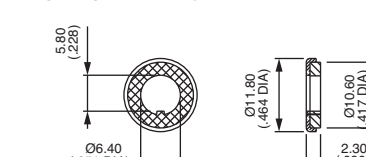
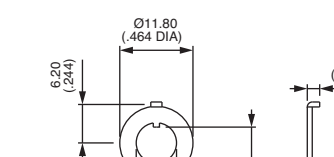
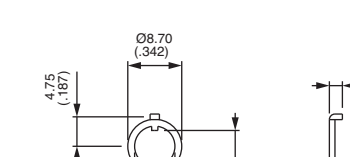
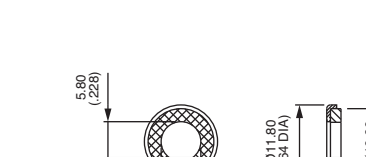
SERIES	HEX NUT	LOCKING RING	LOCKWASHER
SF	2	1	1
11000	2	1	1
13000	2	1	1
18000-8000-SP	2	1	1
21000N	2	-	-
5000	2	1	1
9400-9600	2	-	1

NON STANDARD HARDWARE FOR SWITCHES Ø 6,35 (1/4) - ALL SERIES

<p>KNURLED NUT</p>  <p>Nickel plated U369</p>	<p>KNURLED NUT</p>  <p>Nickel plated U229 Matt black U230</p>	<p>KNURLED NUT</p>  <p>Chrome plated U501</p>
<p>KNURLED CAP NUT</p>  <p>Chrome plated U216 * Matt black U218</p>	<p>KNURLED CAP NUT</p>  <p>Chrome plated U268 * Matt black U725</p>	<p>DRESS NUT</p>  <p>Nickel plated U443 Matt black U848</p>

* U216 and U268 : consult factory for mounting on 11000 three and four pole, and 5000 locking lever models.

OTHER HARDWARE FOR SWITCHES Ø 6,35 (1/4) - ALL SERIES

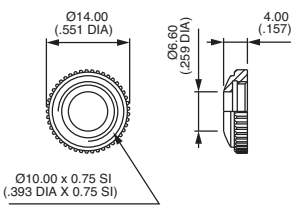
<p>CONIC CAP NUT</p>  <p>Nickel plated U500</p>	<p>CONIC NUT</p>  <p>Chrome plated U542 Nickel plated U561</p>	<p>SEALING WASHER for keyway bushing</p>  <p>U360</p>
<p>SPECIAL LOCKING RING Spacing 6,2 mm (.244)</p>  <p>Nickel plated U368</p>	<p>SPECIAL LOCKING RING Spacing 4,75 mm (.187)</p>  <p>Nickel plated U409</p>	<p>SEALING WASHER for flatted bushing</p>  <p>U5141</p>

Hardware

For miniature switches

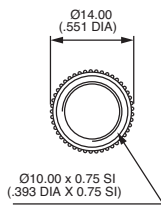
STANDARD HARDWARE FOR SWITCHES Ø 10 (.393) - 10400 AND 10600 SERIES

KNURLED CAP NUT
(std for 10600)



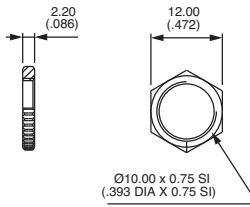
Chrome plated
U2220

KNURLED NUT
(std for 10400)



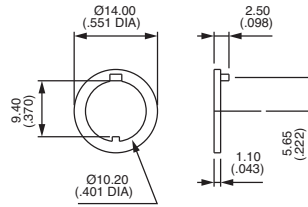
Nickel plated
U2311

HEX NUT



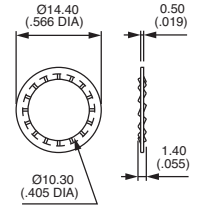
Nickel plated
U842

LOCKING RING



Nickel plated
U844

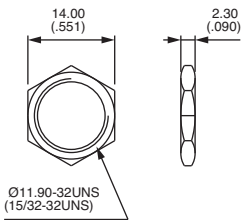
LOCKWASHER



Zinc plated steel
U843

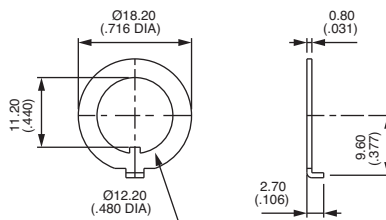
STANDARD HARDWARE FOR SWITCHES Ø 11,9 (15/32) - 12000, 13000X768 AND 5600M SERIES

HEX NUT



Nickel plated
Matt black
U162
U41

LOCKING RING

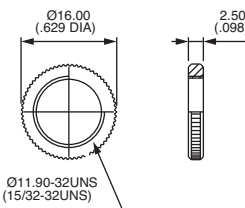


Nickel plated
Matt black
U121
U12

SERIES	HARDWARE SUPPLIED	
	HEX NUT	LOCKING RING
12000	2	1
13000X768	1	-
5600M	2	1
8000X718	2	1

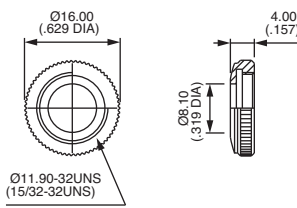
NON STANDARD HARDWARE FOR SWITCHES Ø 11,9 (15/32) - 12000, 13000X768 AND 5600M SERIES

KNURLED NUT

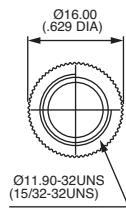


Nickel plated
Matt black
U53
U1634

KNURLED CAP NUTS

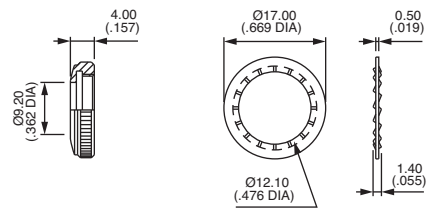


Chrome plated
U124



Chrome plated
U123

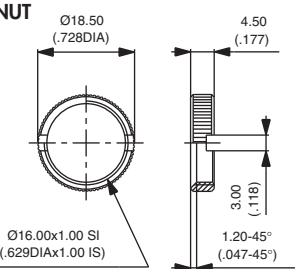
LOCKWASHER



Zinc plated steel
U13

HARDWARE FOR SWITCHES Ø 16

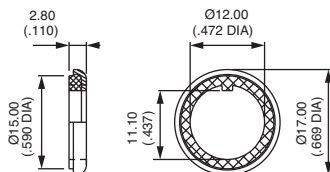
KNURLED NUT



U3327

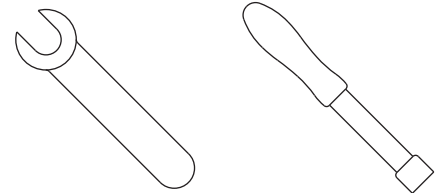
OTHER HARDWARE

SEALING WASHER



U60

WRENCHES



Available for some accessories.
Consult factory.

- Standard hardware is indicated by darkened boxes.
For details of hardware supplied, please refer to beginning of each series.
- Special hardware is to be ordered separately.

NUTS	Bushing Ø 11,9 (15/32) thread 0,794-32UNS Series 3500 - 6000			Bushing Ø 12 (.472) thread 0,75 Series IB/IS - IP - 660 - 600H - 600NH 1000 - 1200 - 1500 - 1600 - 1700 - 3600 - 4000		
	Chrome plated brass	Nickel plated brass	Matt black brass	Chrome plated brass	Nickel plated brass	Matt black brass
 Ø16.00 (.63DIA) 2.50 (.098)		U53	U1634	U412	U411	U413
 14.00 (.551) 2.30 (.09)	U92	U162	U41	U212	U166	U183
 16.00 (.629DIA) 3.50 (.137) Hex cap nut				U35		
 16.00 (.629DIA) 2.20 (.086) PAL nut					U42 (passive zinc plated steel)	
 Ø16.00 (.629DIA) 4.00 (.157) Knurled cap nut	U123			U117 $\alpha = 8,5 (.334)$ U118 $\alpha = 10,3 (.405)$		U129 $\alpha = 8,5 (.334)$ U130 $\alpha = 10,3 (.405)$

INSULATED NUT U520

 Ø17.00 (.669DIA) 4.00 (.157) ABS or polyamide with glass fibre	For threaded bushing Ø 12 (.472) x 0,75 IS Series 1500 - 4000 - 600NH - 6-600NH								
	Blue	Black	Green	Grey	Yellow	Red	White	Chrome plated	Orange
	U521	U522	U523	U524	U525	U526	U527/1	U528	U529

The locking ring U121 (nickel plated) or U12 (matt black) is only provided with tropicalized switches version T or G and with series 3500 - 6000.

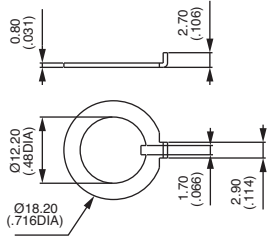
The lockwasher U13 must be ordered separately, except for series 660, 3500 and 6000.

Hardware

For industrial switches

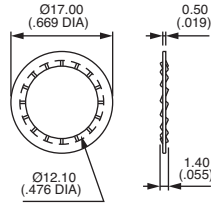
HARDWARE FOR SWITCHES Ø 12 (.472) AND 11,9 (15/32)

LOCKING RING



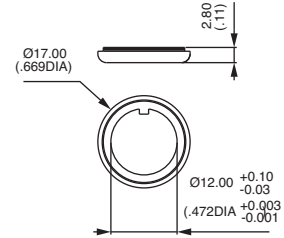
Nickel plated **U121**
Matt black **U12**

LOCKWASHER



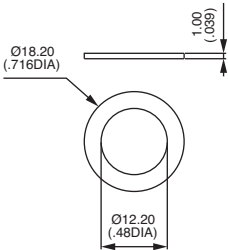
Zinc plated steel **U13**

SEALING WASHER



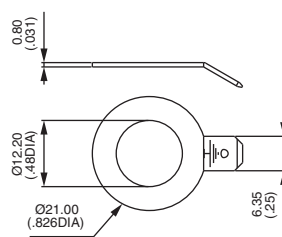
Stainless steel and neoprene **U60**

SEALING WASHER FOR BOOTS



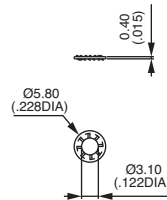
Nylon **U21**

GROUND CONNECTOR



Nickel plated **U187**

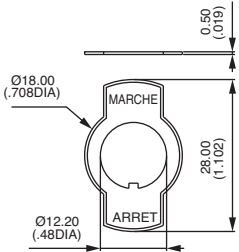
LOCKWASHER



Zinc plated steel **U14**

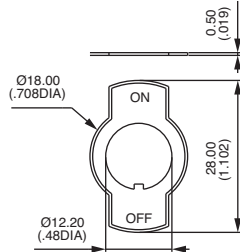
PLATES FOR SWITCHES Ø 12 (.472) AND 11,9 (15/32)

Marche - arrêt



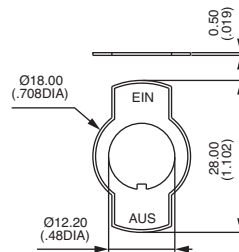
U17

ON - OFF



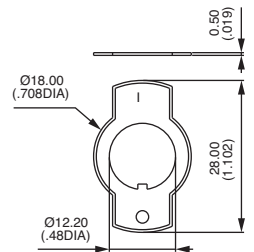
U19

EIN - AUS



U99

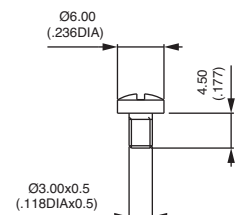
I - 0



U1050

CONNECTING SCREW

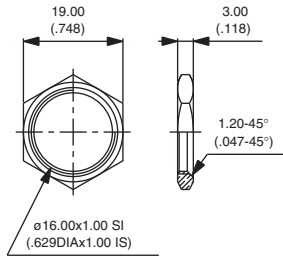
Supplied with the switches



U03

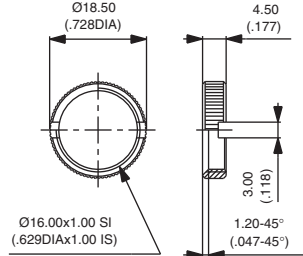
HARDWARE FOR AV SERIES (ANTI-VANDAL AND SECURITY PUSHBUTTON SWITCHES)

HEX NUT FOR MODELS Ø 16 (.629)



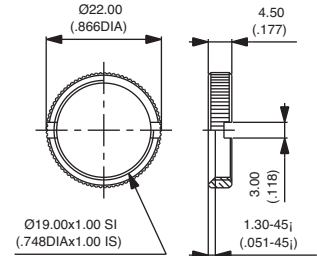
10-621

KNURLED NUT FOR MODELS Ø 16 (.629)



10-960-5

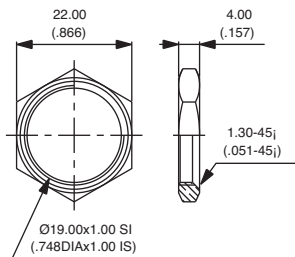
KNURLED NUT FOR MODELS Ø 19 (.748)



U1977-5

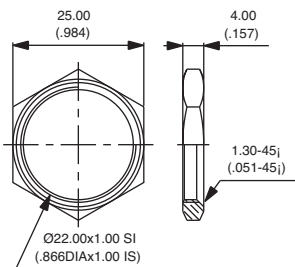
Wrench for nut U1977-5 available under part number **U1929**.

HEX NUTS FOR MODELS Ø 19 (.748)



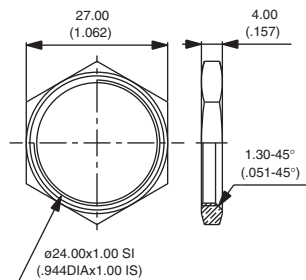
10-855-5

HEX NUTS FOR MODELS Ø 22 (.866)



10-856-5

HEX NUT FOR MODELS Ø 24 (.944)



U2059-5

All above nuts are made of nickel plated brass.
For switches with front panel sealing (option K), a neoprene O-ring is supplied with each nut.

Custom products



Section J

Custom Products

Available for sale

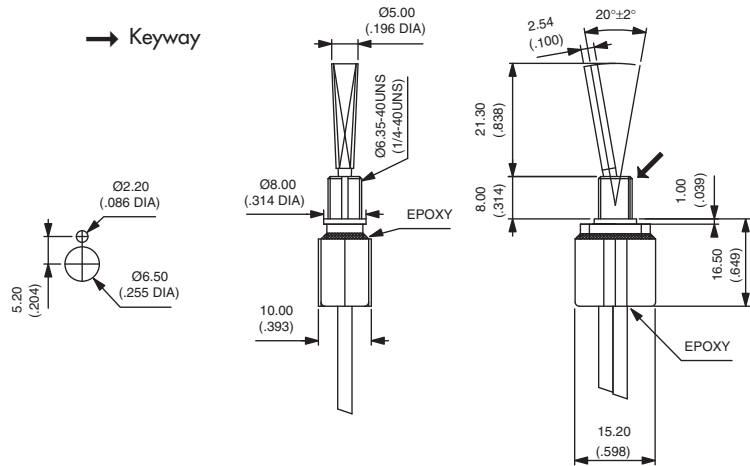
The SWITCHES shown below are examples of catalog products adapted to meet a specific need. They illustrate APEM's capability to develop custom products. They are available for sale and can be purchased under the model number indicated in bold characters.

5000 series class II

- Double insulation
- Wire lead terminals to customer's specifications
- Flatted lever of 21,3 mm (.838) outside bushing



5636A-8 X1231



IR with translucent backlighted bezel

New!

This model is intended to offer better illumination. It allows the user to see the status of the switch even if not in front of the device and the illumination remains visible when the finger is on the plunger. This option is available on nearly all IR models. On request.



Fully sealed module including 2 pushbuttons

New!

This module consists of a specific plate and 2 standard IP pushbuttons. Front panel sealing is enhanced with the use of U5125 sealing boots. Rear panel sealing is also reinforced with additional resin. This solution is ideal for outdoor applications where sand, dust, rain or condensation may occur. On request.



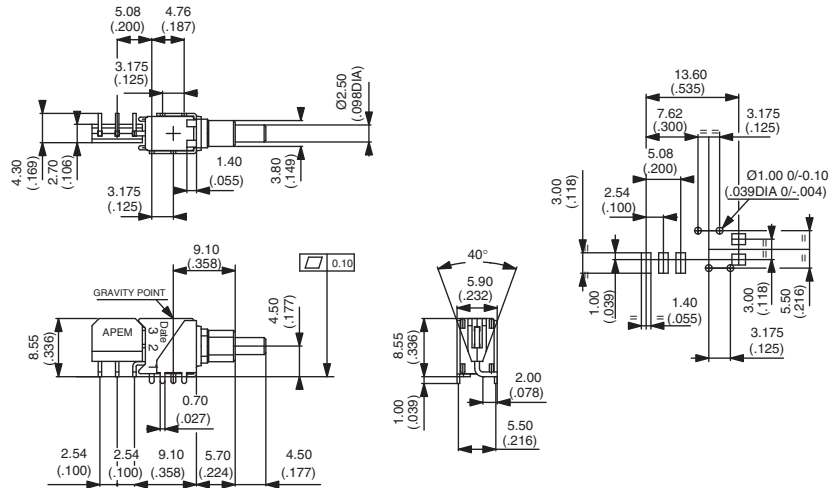
The **PUSHBUTTON SWITCHES** shown below are examples of catalog products adapted to meet a specific need. They illustrate APEM's capability to develop custom products. They are available for sale and can be purchased under the model number indicated in bold characters.

Vertical right angle SMT TP series

- Excellent stability and mechanical strength
- Saves space on the printed circuit board
- Supplied in tape and reel packaging for pick and place equipment
- Also available for TL series toggle switches



TP32VS83585

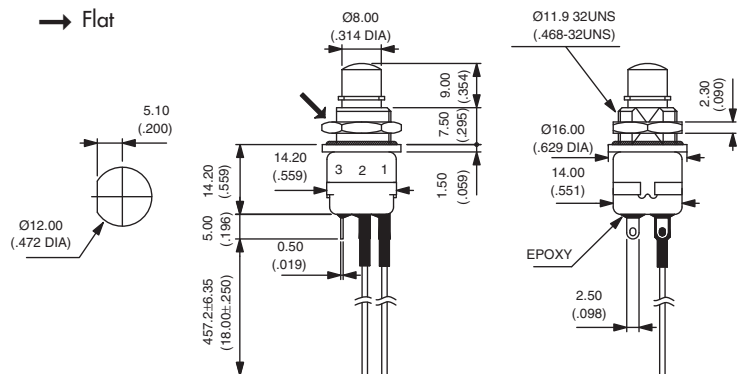


13000 series with mechanical stop and stranded wire leads

- External mechanical stop designed to protect contact mechanism against excessive force
- Stranded wire leads to customer specifications : AWG24, MIL approved
- Terminals/wires protected by heatshrink sleeves
- Matt black finish



13445CDG-29 X1204



Custom Products

Available for sale

The **PUSHBUTTON SWITCHES** shown below are examples of catalog products adapted to meet a specific need. They illustrate APEM's capability to develop custom products. They are available for sale and can be purchased under the model number indicated in bold characters.

Limit switch

A limit switch is an electro-mechanical device consisting of an actuator mechanically linked to a set of contacts. When an object comes into contact with the actuator, the device operates the contacts to make or break an electrical connection.

This custom switch has been developed to detect the extreme position of a clutch pedal, to operate the electrical clutch in a very harsh environment.

- Stainless steel actuator
- Sealing : rear IP67, front IP40
- Operating temperature : -30°C to + 65°C
- Electrical life : 1.000.000 cycles
- Silver contacts
- Current/voltage rating : 2A 12VDC



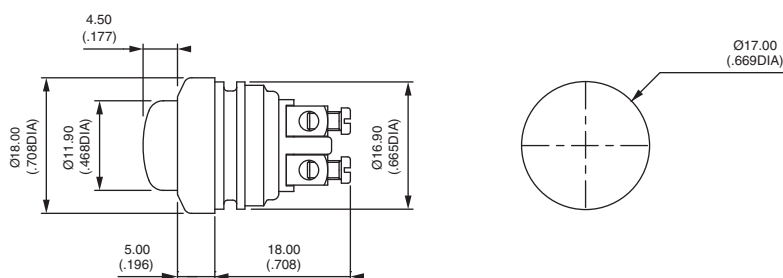
DA058

AV pushbutton with very long life expectancy

- Highly reliable contact mechanism - Silver contacts
- Electrical life : 5 million cycles at 250mA 24VDC
- Mechanical life : 10 million cycles
- No sealing



AV1630A9X2346



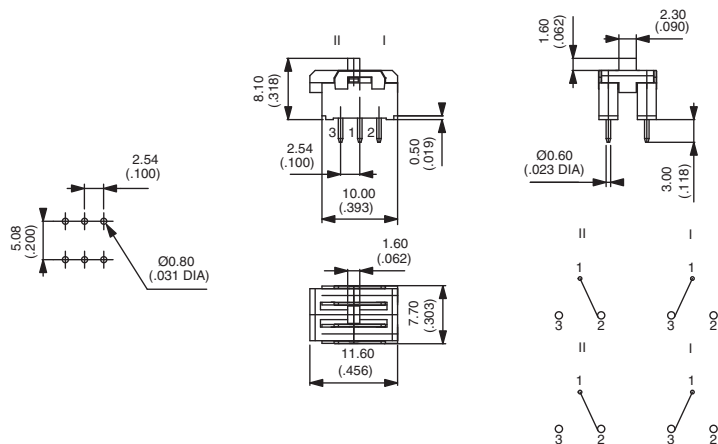
The SWITCHES shown below are examples of catalog products adapted to meet a specific need. They illustrate APEM's capability to develop custom products. They are available for sale and can be purchased under the model number indicated in bold characters.

Double pole NK series

- Two switches with a common actuator
- Terminal spacing : 5,08 mm (.200)
- Travel : 1,60 mm (.062)



NK246 X1211

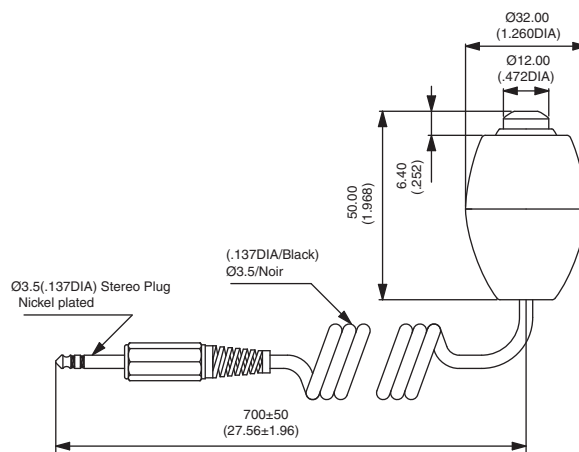


Pendant switch

- Remote hand-held pushbutton
- Sealed to IP67
- Coiled cord with a 3,5 mm jack plug, cord length up to 4 meters
- Applications : nurse call, push-to-talk...



ISR3SAD200107



Custom Products

Customer exclusivity - switches

The custom switches shown below have been entirely developed to APEM's customers' specifications. They are the exclusive propriety of the customer who has supported the tooling costs. They illustrate APEM's capability to find solutions to the most specific switch requirements.

Rocker detect switch



This rocker is used as a detect switch to stop a motor. It has been engineered to fit a tight space specified by the customer. The actuator shape has been specially designed for detection of the extreme positions of the linear motor in which the switch is mounted.

"One key - one function" switch



This custom switch includes 3 keys designed to control a window blind motor.

The two side keys are available in momentary or maintained functions or a combination momentary/maintained configuration.

This product was developed to meet NF-EN6066-1, a requirement of the application.

"Reed" rocker switch



This rocker switch features :

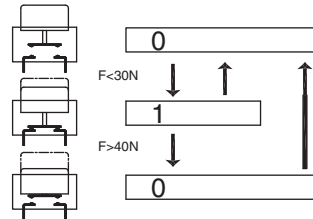
- Very long electrical life : > 2.000.000 cycles
- 2 electrical functions (3 maintained or momentary positions)
- Mounting from rear of panel
- Stranded wire lead terminals

Safety enabling switch



- Three position switch for safety “dead man” application, complying with IEC 60947-5-8.
- Redundant contacts with “emergency stops”.
- Patent pending

0 = open contact
1 = closed contact



APEM's experienced switch design team, advanced development tools and vertical integration enable the company to develop products beyond conventional switches. The highest level of integration is achieved with modules combining several technologies to offer added value and reduced cost.

- The integration of the different functions begins at the design stage and results in higher product reliability, improved performance, reduced weight and easier assembly.
- This approach reduces costs and development time for the equipment manufacturer.
- Each module is an innovative solution and therefore requires specific tooling for injection, stamping, testing and assembly.
- Tooling costs are amortized on large production runs.

The example below is an integrated module for an automotive application.

Door latch module



• Customer problem

Several components (PC boards, connectors, switches, connector pins for motors, motors), thus several suppliers and assembly stages. Lack of reliability due to the numerous electrical connections.

• APEM solution

A single integrated module, 100 % tested, ready for mounting.

Technical information

SPECIFICATIONS

Dimensions, specifications and data shown in this catalogue are subject to change without notice. Consequently, they are not contractual in any case. Electrical, mechanical and endurance specifications are based upon in-house tests made by APEM. These tests are conducted using internationally recognised procedures. In the event of a product being used under different conditions, the user must ensure the product's suitability for use under those conditions. Incorrect storage, handling, operation or application of the product may result in damage to the product or equipment.

The negative value indicated under "Operating temperature" is given for normal usage conditions (products free of moisture, which could generate frost or ice and block the mechanism).

The specifications give the technical performances of the switches. If the equipment on which our products are mounted is submitted to safety standards, the customer should select approved models or models conforming to the standards (marked CE only). Consult factory for details of models that can be marked CE.

DRAWINGS

Products are shown with their standard actuator (for other actuators, see options).

Scale : drawings in this catalogue are to different scales : ask for a data sheet if you need other dimensions for a specific part number.

TOLERANCES

Unless otherwise specified, the general tolerance for dimensions in this catalogue is $\pm 0,3$ (.012).

Overall dimension tolerance is $\pm 0,5$ (.020). Ask for a data sheet for further information.

SOLDERING CONDITIONS

Hand soldering with iron : 300°C, 3 seconds max.

SEALING OF TERMINALS

Due to the new generations of active flux, epoxy sealing of terminals is preferred, to prevent any risk of switch contamination.

ROHS COMPLIANCE

The RoHS directive 2002/95/EC of the European parliament and of the Council of 27 January 2003 restricts the use of certain hazardous substances in electrical and electronic equipment: Mercury (Hg), Cadmium (Cd), Hexavalent Chrome (Cr+6), Polybrominated biphenyls (PBB) and Polybrominated diphenyl ethers (PBDE including decaBDE), Lead (Pb).

. Standard products manufactured by APEM are already and will remain in compliance with the restriction of the marketing and use of the above mentioned substances imposed by such directive.

. Switches for printed circuit boards with tin/lead plated terminals (SnPb) have been replaced by components with pure tin plating.

. For specific options using LED illumination, wires are soldered with lead-free solder.

There is no change of part number for RoHS compliant products.

Some specific products or options can still be supplied in non-RoHS version with customer's agreement.

Technical information

Contacts and ratings

CONTACT MATERIALS

Several contact technologies are available depending on models :

For miniature switches

- A** End contacts : silver.
Center contacts and terminals : brass, silver plated.
For high ratings at 125VAC - 250VAC or over 0,1A 30VDC (levels III and IV).
- AD** End contacts : silver with gold plating over nickel barrier.
Center contacts and terminals : brass, gold plated.
For low level applications (levels I and II).
Can be used for high ratings (level IV),
the gold layer being considered only as a protection against oxidation during storage.
- CD** Contacts and terminals : brass with gold plating over nickel barrier.
- or **LD** For low level applications up to 20mA 20VDC or 80mA 5VDC (levels I and II).
- X780** Silver rivet, gold plated (11000 and 12000 series).

For industrial switches

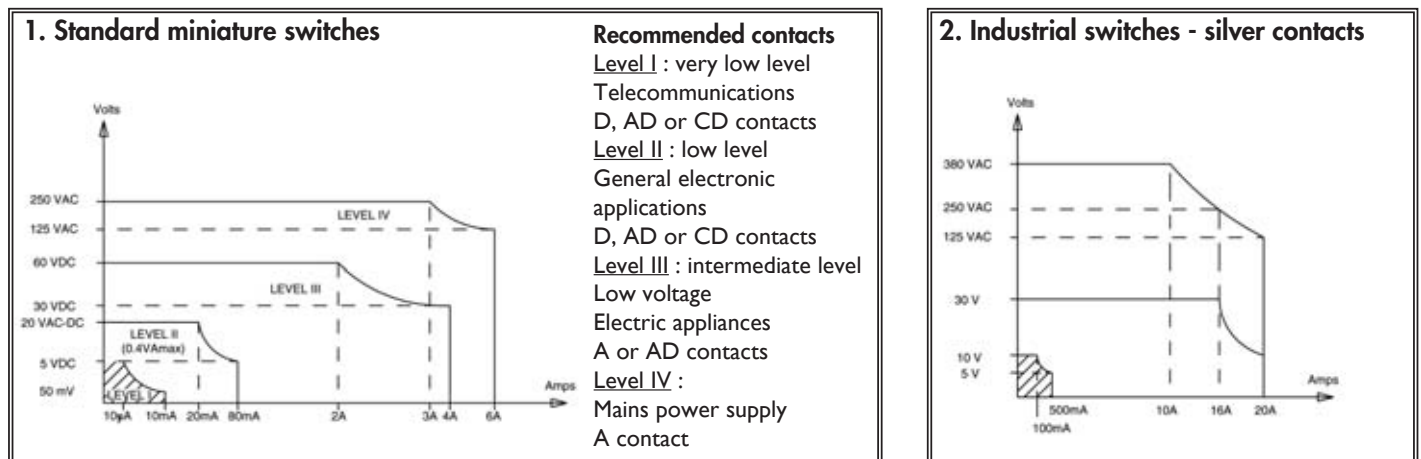
- A** End contacts : silver rivet or silver inlay.
If not specified in model number, the contact material is indicated in the specifications of each series.
- C** Silver plated copper or brass.

Silver cadmium oxide contacts (**S**) which used to be available on the 4000 - 600H - 600NH and 2600 series, are discontinued and will be replaced by silver tin oxyde contacts before 2005.

HIGH INRUSH CURRENTS

Special contact materials and switch constructions allow particularly high inrush currents to be taken by some models of the 5000, 11000 and 12000 series.

ELECTRICAL LEVELS



The above curves feature all the ratings available in our product range. Hatched areas show minimum ratings. Maximum ratings are indicated in the specifications of each series. Note that max. current is given for standard life expectancy. For specific applications, higher currents can be applied, resulting in reduced life expectancy and vice-versa. Consult factory.

LOW CURRENT OR DRY CIRCUIT (level I)

The quality of the gold plating (hardness, porosity, adherence) and the design of the contacts (pressure or sliding contact) allow the use of very low currents down to 10µA 5V or 10mA 50mV depending on models, measurable according to IEC 512-2, test 2a.

Technical information

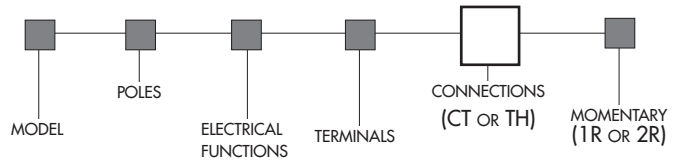
Positions and connections for 3-way switches

Function 4

MINIATURE SWITCHES

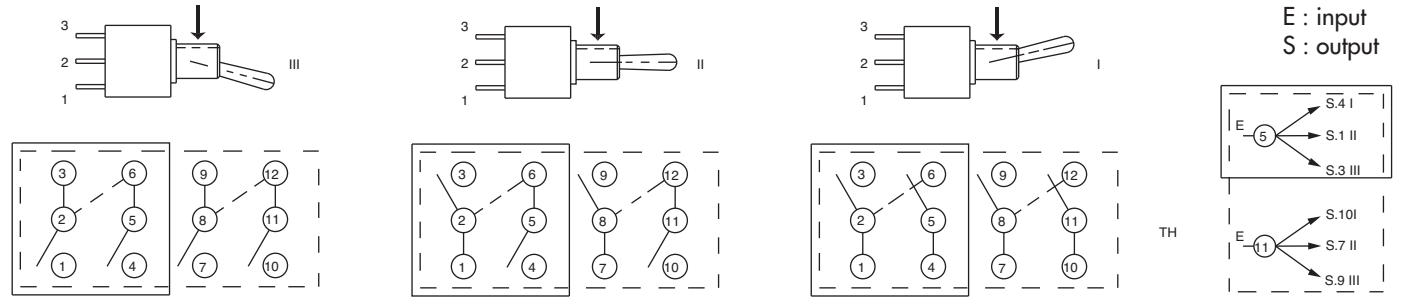
5000 and 7000 series are available with CT or TH connections.
Desired connections are to be specified in enlarged box of model structure.
12000 and S series are available with TH connections only.

Model structure 5000 and 7000 series

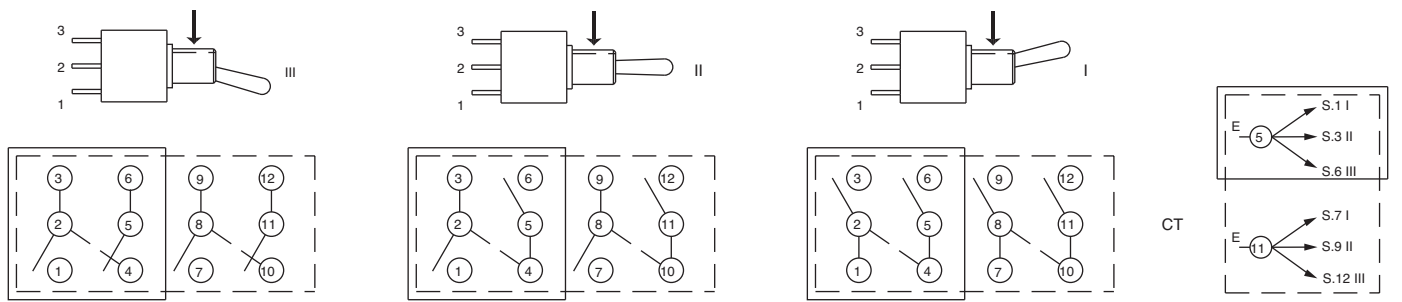


FUNCTION 4 - TYPE TH (preferred) - 5000 - 7000 - 12000 - S - SR series

→ Keyway



FUNCTION 4 - TYPE CT (reversed) - 5000 - 7000 series



Single pole switches in a double pole case SP DP
Double pole switches in a four pole case



Dotted line between poles : jumper to be wired by the user.

INDUSTRIAL SWITCHES : 600 600H - 3600NF - 6000 AND 2600 SERIES

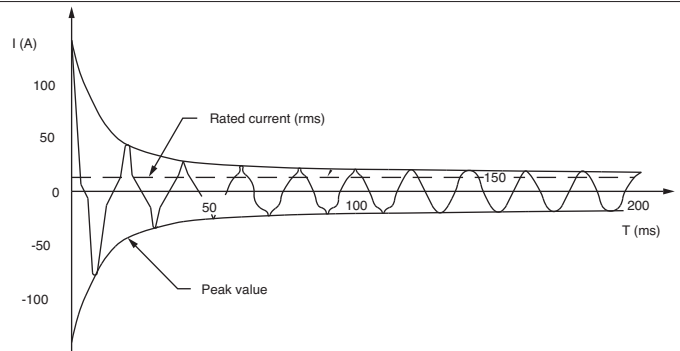
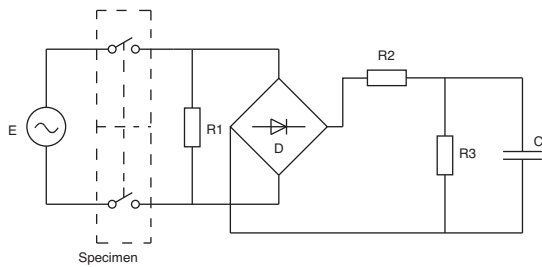
FUNCTION 4			FUNCTION 4-1R (momentary one side)			FUNCTION 4-2R (momentary both sides)		
ON 5-6 2-3	ON 5-6 2-1	ON 5-4 2-1	MOM 5-6 2-3 ▲	ON 5-6 2-1	ON 5-4 2-1	MOM 5-6 2-3 ▲	ON 5-6 2-1	MOM 5-4 ▲ 2-1
4 5 6 1 2 3	4 5 6 1 2 3	4 5 6 1 2 3	4 5 6 1 2 3	4 5 6 1 2 3	4 5 6 1 2 3	4 5 6 1 2 3	4 5 6 1 2 3	4 5 6 1 2 3
<ul style="list-style-type: none"> • Common ◦ Maintained ▲ Momentary <p>Terminals 2 and 6 must be connected by the user for a 3 way switch. Single pole switches in a double pole case.</p>								
			ON			ON		
			5 3 1 4			5 3 1 4		
			5 3 1 4			5 3 1 4		

Technical information

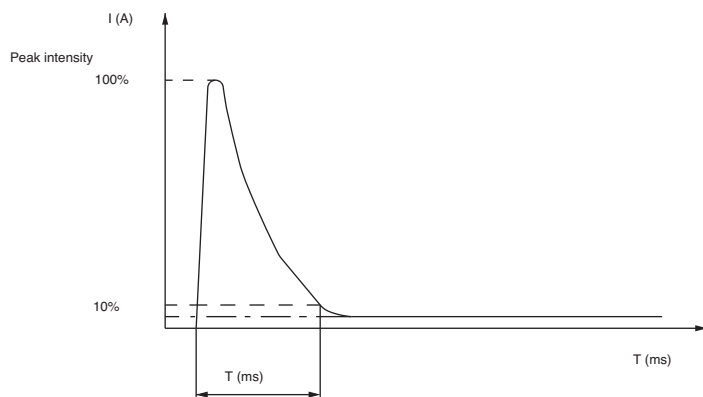
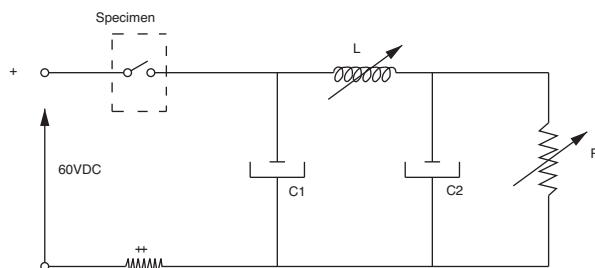
Switches for peak currents

- For switching power supplies, DC-DC converters, motors ...
- Peak current with 125/250VAC according to IEC 1058 (Fig 1) and direct current 60VDC (Fig 2)
- 2 maintained positions

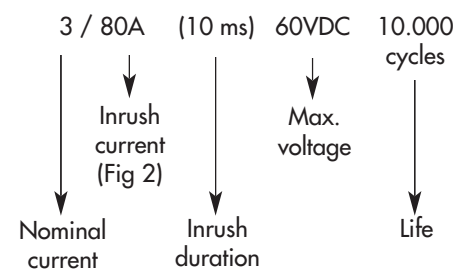
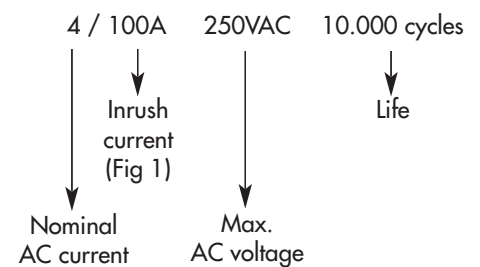
Testing circuit AC voltage
Figure 1



Testing circuit DC voltage
Figure 2



Current/voltage rating examples :



See 11000 and 12000 series, section A, special option X910.

Technical information

Degrees of protection : IP and IK codes

The degree of protection is indicated by 2 letters and 2 numbers.

Example : IP 6 5



IP•• degree of protection provided by the enclosures of electric appliances according to IEC 60529 and DIN 40050.

IK•• degree of protection provided by the enclosures of electric appliances against external mechanical impacts according to EN 62262.

1st number : protection against ingress of solid objects		
IP	tests	
0		Non-protected
1	$\varnothing 52.5\text{ mm}$	Protected against solid objects of 50 mm (1.968) and greater
2	$\varnothing 12.5\text{ mm}$	Protected against solid objects of 12,5 mm (.492) and greater
3	$\varnothing 2.5\text{ mm}$	Protected against solid objects of 2,5 mm (.098) and greater
4	$\varnothing 1\text{ mm}$	Protected against solid objects of 1 mm (.039) and greater
5	Dust-protected (no harmful ingress)	
6	Dust-tight (no ingress)	

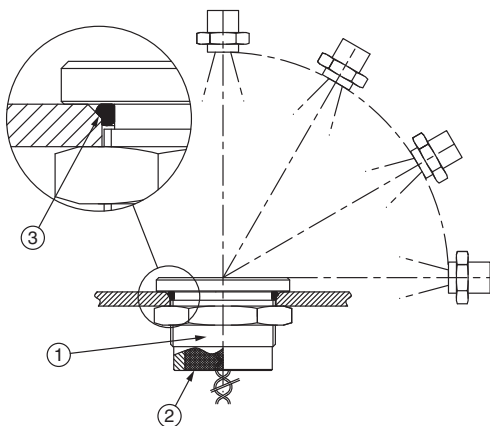
2nd number : protection against liquids		
IP	tests	
0		Non-protected
1	Protected against vertically falling water drops	
2	15° Protected against vertically falling water drops when enclosure tilted up to 15°	
3	60° Protected against water sprayed vertically at an angle up to 60°	
4	Protected against splashing water	
5	Protected against water jets from any direction	
6	Protected against powerful water jets	
7	Protected against the effects of temporary immersion in water (1 m water, 30 minutes)	
8	Protected against the effects of continuous immersion in water (depth x to be specified)	

IK code : mechanical protection
The degree of mechanical protection is now defined by the letters IK according to EN 62262.



For an additional protection of switches used in harsh environments against sand, frost or other contaminants that may cause switch failure, **we recommend the use of sealing boots**, section H.

Sealing IP69K



High pressure, high temperature wash down

IP69K test conditions

- . Pressure : 80 - 120 bars
- . Distance : 15 cm
- . Temperature : 80°C ± 5°C
- . Flow : 14 - 16 l/mn
- . Duration : 30 seconds per position

Illustration : PBA series switch.

- ① One-piece bushing
- ② Epoxy sealed terminals
- ③ O-ring

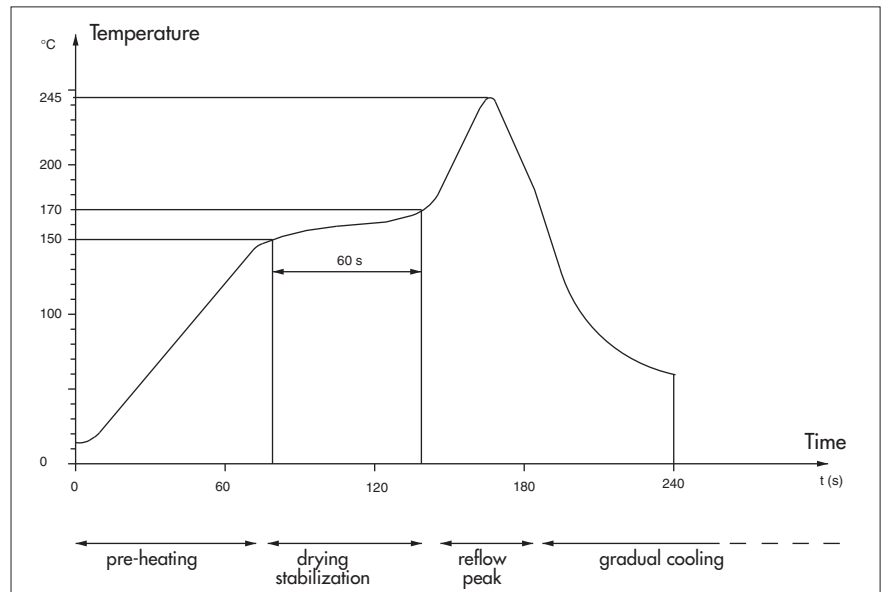
Technical information

Surface mount

TYPICAL SMT REFLOW PROFILE

The P.C. board, carried by a conveyor belt, goes through the different areas of a reflow soldering oven :

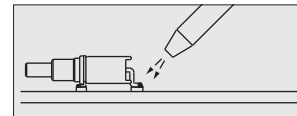
- pre-heating (maximum 170°C, 60 secs)
- reflow peak (maximum 245°C)
- final cleaning (optional)



BOARD REWORK TECHNIQUE

Hot air reflow technique is preferred. Avoid use of a traditional soldering iron.

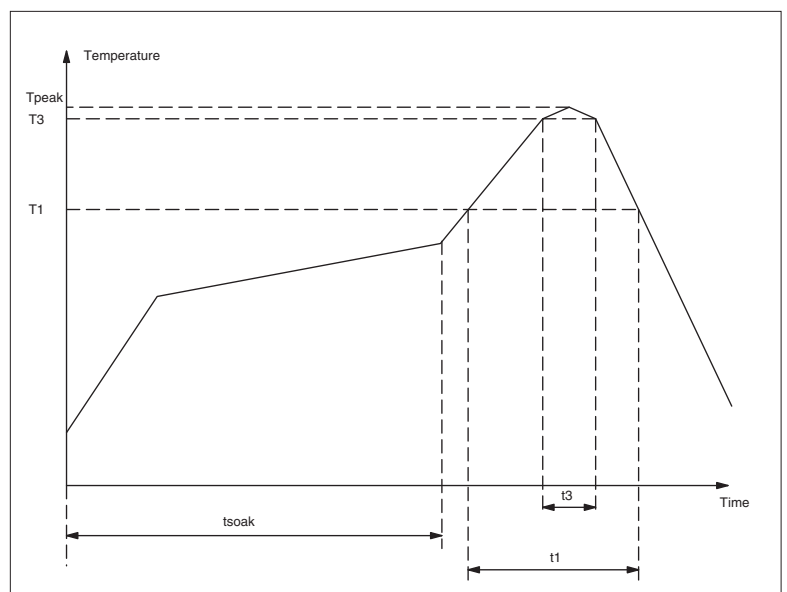
Caution : Excessive and/or repeated high temperature exposure may affect switch performance and reliability.



TYPICAL LEAD-FREE SMT REFLOW PROFILE

Complying with the ROHS directive.

Example of Pb-free profile requirements for soldering heat resistance		
Parameter	Reference	Specification (small case)
Temperature gradient in preheating		3°C/s max.
Soak time	t_{soak}	2-3 minutes
Time above 217°C	t_1	60-150 seconds
Time within 5°C of actual peak temperature	t_3	20-40 seconds
Peak temperature in reflow	T_{peak}	260°C (+0/-5°C)
Temperature gradient in cooling		6°C/second max.
Time 25°C to peak temperature		8 minutes max.



Glossary

AC : Alternating current; electric current that continually reverses direction at a fixed frequency (see VAC).

ACTUATION FORCE : (Operating Force) : The force required to change the actuator of a switch from one position to another. Torque for rotary products.

ACTUATOR : A movable part of a switch which causes a change in the electrical configuration of the switch. e.g. : Toggle, Rocker, Slider, Paddle, Pushbuttons, Shaft

ALLOY : A metal created by combining two or more metals to obtain a specific physical property

ALTERNATE ACTION : Push to close and push to open the switch. A given circuit condition remains after removal of actuating force. Also known as "push-push switching action". Typically, alternate action pushbuttons do not visually indicate the position of the contacts. Contrast to latching action.

ANGLE OF THROW : Indicates total travel arc on toggle or rocker switches. Unit of measure : degrees

ANTISTATIC : An antistatic device will withstand a specified potential without conducting between the actuator and any conducting element. Usually the terminals or bushing. Unit of measure : typical value 8-20 kilovolts DC.

ANSI : American National Standard Institute; a standard-setting agency of the United States which approves the design and/or performances of electronic/electrical components distributed in the world market.

ARCING : The flow of electric current between switch contacts during opening or closing of the contacts. This current flow can be damaging to the contacts of a switch.

BIFURCATED CONTACT : A wiping movable contact consisting of spring fingers that grip fixed contacts. Typically found in slide switches. Self cleaning action. See Wiping Contact.

BOUNCE : The repeated rebounding of the moveable contact during the transfer from one throw to the next.

BRASS : An alloy of zinc and copper

BREAK-BEFORE-MAKE (Non shorting - B.B.M.) : On actuation, the movable contact breaks contact with one fixed contact before making contact with another fixed contact. Contrast with make-before break. Typical of toggle and pushbutton switches.

BUTT CONTACT : A contact mechanism in which the movable contact makes contact with the fixed (stationary) contact without wiping motion between the surfaces. Typical of toggle and pushbutton switches. See Wiping Contact.

CAPACITIVE LOAD : A load in which the initial current on making (closing) of the contacts is higher than the steady state current. Current leads voltage in capacitive loads. See Resistive Load, Inductive Load, Power Factor, Inrush.

CARRYING CURRENT : The maximum current that can be passed through the already closed contacts of a switch. Contrast with "Contact Rating".

CLEARANCE (spacing) : Distance through air between electrically live parts of opposite polarity or to ground.

CONTACT (Contact area) : The metal surfaces that come into physical contact to complete an electrical circuit. These surfaces are found on movable contacts (see) and terminals (see).

CONTACT BLOCK : A switching element which is added singly or in groups to an operator to make a complete switch. Typically used with industrial controls (APEM A01 and A02 series).

CONTACT BOUNCE (Bounce) : The time during switching in which electrical instability (bounce) caused by the rebound of the contacts is observed. Relative mass of the contacts, forces and frequency of supporting members are all components that determine the extent of bounce. Total transfer time consists of the time for the contacts to close plus bounce. Transfer time should be rapid so natural bounce time is short.

CONTACT GAP : The distance between a stationary contact and a movable contact in the open position.

CONTACT RATING (Switching rating) : The capacity to switch (connect or interrupt) an electrical load. Load characteristic (resistive, inductive, capacitive, power factor). Contrast with non-switching rating.

CONTACT RESISTANCE : The resistance across the two closed contacts : contact interface and terminals.

CREEPAGE : The unwanted flow of electrical current from one conductive part to another.

CSA : Canadian Standard Association

CYCLE : The complete sequence of indexing through all successive switch positions and returning to the original position.

DC : Direct Current : electric current that flows only in one direction (see VDC).

DETENT : A mechanical stop that holds the contacts in a given position after the actuation force is removed or prevents the changing of contact position at less than a specified actuation force. Can also be referred to as tactile feel.

DIELECTRIC STRENGTH : The ability of an insulating material to withstand a voltage without arcing across its surface. The standard voltage that can be applied between two open terminals or between a terminal and ground without causing short. Most often applied to insulator between switch terminals and metal exposed to operator of the switch. Also known as Dielectric Withstanding Voltage, DWV, Leakage resistance, Breakdown Voltage.

DIFFERENTIAL TRAVEL : The distance an actuator moves between the point where contacts snap over and where they snap back, or when contact is made and then brakes.

DIP : DIP-in-line Package (in Europe also, DIL : Dual-in-line) refers to a component with two rows of PC terminals. The terminals are most commonly on a 0,100" pitch with 0,300" between rows.

DOUBLE-BREAK CONTACTS : A contact mechanism using two sets of contacts to make or break a given circuit. The contact gap opens twice as fast, reducing the arc duration, contact surface temperature and material erosion. This improves heat dissipation and provides better power handling capacity for a longer switch life. Typical of high power industrial switches and DC Circuit application. See Single-Break Contacts.

DP : Double pole. See pole.

DRY CIRCUIT : An application in which power level do not cause arcing melting, or softening of the contacts . Typically requires gold plated contacts for reliable switch operation. At such low levels, and since no arc occurs, silver contacts would not be self-cleaned and would be less reliable. Typical Definition : for ex. 0.4VA max. 20 V DC or peak AC max. Also known as "Low Energy", "Logic Level", TTL.

DWV : Dielectric Withstanding Voltage. See Dielectric Strength.

DT : Double Throw. See Throw.

Glossary

DUST TIGHT : Sealed switch will withstand sand and dust contamination.

ELECTRICAL LIFE : The number of operations at a given electrical load that does not result in a degradation of any electrical or mechanical parameter beyond the standard set by the applicable end-of-life criteria.

END OF LIFE CRITERIA : Those specifications that a switch must meet at the end of its specified electrical life. Typically contact resistance and/or heat rise of contacts at full rated load at end of life.

ENVIRONMENTAL SEAL : A seal that totally encapsulates the switch providing a specified level of protection against intrusion of solids, liquids or gases into the body of the device.

ESD : Electrostatic discharge.

FIXED CONTACT (Stationary contact) : The non-moving contact. Typically integral to the end of the terminal inside the switch body.

FLASH PLATING : A very thin or "instant" plating (usually less than 0.25 microns in thickness).

FLUX : Chemical used for cleaning metal surfaces for welding. Fluxes turn contaminated metal surfaces into clean, solderable part.

GOLD FLASH : A plating of gold typically less than 10 micro-inches (millionths) thick. Used only as a barrier to oxidation or corrosion of terminals to maintain solderability.

GULL WING : A type of surface mount terminal which extends from the side of the switch and has a L-shaped bend at its end (terminals are formed away from the switch body).

HEAT RISE : An indirect measurement of contact resistance used by rating agencies. The temperature rise over ambient of a contact set carrying a prescribed current is measured to determine whether it falls within safe limits.

IEC : International Electrotechnical Commission

IECQ : IEC's Quality Assessment system for Electronic Components, created in 1983 to facilitate national and international trade in certified electronic components. A worldwide certification system which provides a method whereby electronic components made and handled by approved manufacturers and distributors can be used anywhere without further testing.

INDUCTIVE LOAD : A load in which the initial current on making (closing) of the contacts is lower than steady state and rises slowly. On breaking (opening) of the contacts, the current is greater than steady state. The stored energy of the inductor provokes a long and severe arcing time. Current lags voltage in inductive loads. Motors are the most common inductive load. Inductive loads are the most troublesome of circuit conditions. See Resistive Load. Capacitive Load.

INFRARED REFLOW : A method of mass soldering Surface Mount Devices with Infra Red (IR) thermal radiation heating the PCB solder paste and components.

INRUSH : The initial transitory high-level of current at contact closing (making). A characteristic of capacitive and some resistive loads. The inrush currents can be large and long enough to cause severe degradation of the contacts. See Resistive Load. Capacitive Load. Power Factor.

INSERT MOLD : In switches and relays used to refer to terminations that are placed in the mold so that plastic is molded around the terminations. The chief benefit is an inherent seal against the intrusion of flux into the body of the device. Therefore no epoxy terminal seal is required.

INSULATION RESISTANCE : The electrical resistance between two normally insulated parts measured at a specified DC voltage.

IP : An industrial specification (Part of the IEC529 standard) used worldwide to indicate the degree of protection provided by components against accidental contact, penetration of solids or liquids into or through the component. See NEMA.

LAMP LOAD (Tungsten) : A load characterised by a high inrush current at make (approximately 10 to 16 times the steady state).

LATCHING ACTION : See alternate action (or push-push). Actuator position typically indicates contact position.

LEAKAGE BARRIER : A ridge or web molded into a switch housing between terminals or contacts to increase the surface distance between them.

LEAKAGE RESISTANCE : Dielectric strength

LED : Light Emitting Diode. Long life and low consumption illumination

LIFE : See Electrical life, Mechanical Life.

LOGIC LEVEL : Refers to power levels typical of solid state electronic circuits (TTL, CMOS, etc.). Levels at which no arcing, melting or softening of the contacts occur. Typically require gold contacts for reliability since no arcing occurs to self clean the contacts. See Dry circuit. Also referred to as low energy

LOW ENERGY : See Dry circuit.

MAINTAINED : A position of a switch which remains unchanged when actuation force is removed from switch actuator. Contrast with Momentary.

MAKE-BEFORE-BREAK (shorting, MBB) : Movable contacts make the next circuit before breaking the first circuit. Typically found in slide switches. Contrast with Break-before-make.

MAKE AND BREAK : Opening one circuit before completing another on the same pole

MECHANICAL LIFE : The number of operations of a switch without electrical load that does not result in a degradation of parameters beyond the standard set by the applicable end-of-life criteria.

MOISTURE PROOF : Sealed switch will withstand high humidity and limited exterior environment such as rain.

MOMENTARY ACTION : Mechanically returning from a temporary switch position to the normal switch position

MOVABLE CONTACT : The contact moved by the switch actuator into and away from contact with a fixed contact thus forming the electrical circuits possible for a given device.

NC : See Normally Closed

NEMA : National Electrical Manufacturers' Association. A US Standards setting group. For switch products most often applied to switches mounted in various enclosures offering specified degrees of protection against intrusion of liquids, dust, corrosive elements, etc. NEMA ratings are common in industrial or outdoor applications. See IP.

NO : See Normally Open.

NON-SHORTING : See Break-Before-Make

NON-SWITCHING RATING : The power carrying capacity of a switch after contact closure and end of contact bounce. Typically far higher than the contact rating (switching rating) of a switch.

NORMALLY CLOSED (NC) : Normally closed contacts are closed when the switch actuator is in its unactuated position (e.g., the plunger is in the resting position in the

case of a pushbutton switch).

NORMALLY OPEN (NO) : Normally open contacts are open when the switch actuator is in its unactuated or resting position.

OIL-TIGHT : A generic term for a panel seal (see) commonly used in industrial settings. Defined by NEMA (see) standard.

OPEN FRAME : Typical to slide switches ; open frame construction allows for automatic solder process and post solder cleaning. Contrast with "washable".

OPERATING FORCE : See Actuation Force.

OPERATING TEMPERATURE : The range of temperature within which the device may be used.

OPERATOR : A panel-mounted mechanical device (pushbutton, selector, keylock, etc.) without contacts to which one or more contact blocks may be added to make a complete switch (See APEM A01-A02 Series).

OVERTRAVEL : The distance the actuator may move between initial electrical contact position and the extreme mechanical position of the actuator. See Travel, Pretravel.

PANEL SEAL : A panel seal provides a defined level of protection against penetration of liquids through the switch and switch-to-panel interface to the rear of a panel.

PCB : Printed circuit board

POLE : Single common electrical input having one or more outputs. The number of separate circuits that can be active through a switch at any one time. A single-pole switch allows one closed circuit at a time. A double-pole switch allows two closed circuits, etc.

POWER FACTOR (PF) : A measure of the inductive or capacitive character of an electrical load.

PRETRAVEL : The distance the actuator moves from a rest position (or free position) to electrical make at another position. See Travel, Overtravel.

PUSH-ON / PUSH-OFF : See Alternate Action.

PUSH-PUSH : See Alternate Action.

QUICK-CONNECT TERMINAL : Flat tab or blade style terminals designed to accept push-on female wire connectors (instead of soldering). The most popular sizes are : 0.250". 0.187". 0.110" wide.

RATING : See contact rating

RESISTIVE LOAD : Current and voltage are in steady state on opening or closing the switch. See capacitive load, Inductive load, Power factor, Inrush.

SEMKO : Svenska Elektriska Materielkontrollanstalten of Sweden

SEV : Schweizerischer Elektrotechnischer Verein of Switzerland

SHORTING CONTACT : Contacts which make-before-break.
See Make-before-Break

SILICON RUBBER : Rubber made from silicone elastomers which keeps its high level of flexibility, resilience and tensile strength over a wide temperature range.

SINGLE BREAK CONTACTS : A contact mechanism using one set of contacts to make or break a given circuit. Typical of electronic or low power switches.
See Double-Break Contacts.

SNAP ACTION : The fast transfer of contacts from one position to another, this action is

rather independent of the speed of actuator travel

SPACING : See Clearance

SPDT : Single pole double throw. See Pole, See Throw.

SPLASHPROOF : Sealed switch will withstand heavy rain or stream of water.
See Panel Seal.

SPRING RETURN : See momentary.

STORAGE TEMPERATURE : The range of temperature within which the device may be stored. Typically this is a wider range than operating temperature.

SURFACE MOUNT DEVICES (SMD) : Components that are compatible with surface mount PC board technology. Holes are not used for component mounting. Component leads are soldered to pads on the surface of the PC board (on the same side as the components). For switches, typically defined by surface mount terminations (e.g., J-Bend, L-Bend, butt, etc.) and compatibility with surface mount soldering (e.g., vapor phase reflow, infrared, etc.) and cleaning processes.

SURFACE MOUNT TECHNOLOGY (SMT) : See SMD

TACTILE FEEL (FEEDBACK) : The switching action felt by the operator of the switch (same as click action or positive action). Audible or "feel" snap or click that indicates contact movements.

TERMINAL : The metal portion of a switch, exterior to the body, that is used to connect the switch to an electrical circuit. Example : PC, wire lug, quick-connect, wire-wrap, etc.

THROW : The number of circuits that can be controlled by any one pole of a switch. Example : In a single-pole-double-throw (SPDT) switch, only one circuit may be completed at a time. However, there are two possible circuits (throws) that can be made.

TRANSLUCENT : Transmitting light so that objects lying beyond cannot be seen distinctly.

TRANSPARENT : Transmitting light so that objects lying beyond can be seen distinctly.

TRAVEL : The total distance the actuator can move. See Pretravel, Overtravel.

TWO CIRCUITS : A circuit in which one circuit is completed in one position and another separate circuit is completed in an other position.

UL : Underwriters laboratories Inc.

VAC : Voltage, alternating current (see AC)

VDC : Voltage, direct current (see DC)

VDE : Verband Deutscher Elektrotechniker of Germany

WASHABLE : Applied to PC board mounted devices indicating compatibility with cleaning processes used after soldering. No degradation of electrical or mechanical parameters occurs. The switch is sealed to keep contaminants out of the contact area.

WAVE SOLDERING : A method of soldering in which a wave of molten solder contacts the components on the PCB as the PC Board with the components is conveyed through the process.

WIPING ACTION : Sliding of contacts over one another resulting in cleaning of the contacts.

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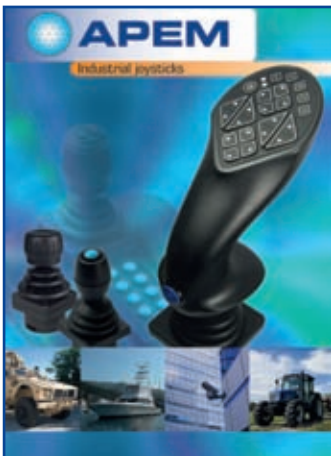
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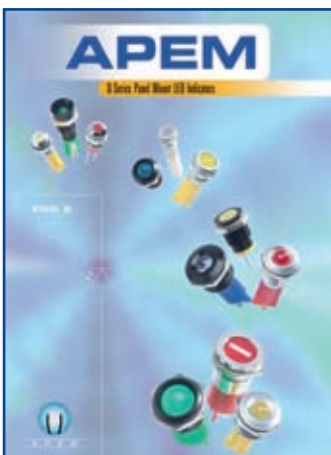
Switch panels

APEM offers several switch panel technologies suitable for transportation, industrial, vending, military and other professional custom applications. APEM has expertise in designing and manufacturing membrane switch panels, stainless steel keyboards and complete custom interfaces incorporating switch solutions, illumination, shielding, housing, touch screens and associated electronics.



Joysticks

APEM manufactures joysticks for professional applications. Easy to operate and highly reliable, APEM joysticks are suitable for all size and shape requirements from thumb & finger operation to full hand grip products. Leading the market with new technologies and features, APEM joysticks are available with potentiometer, switch, inductive and hall effect sensing. All APEM joysticks are highly customisable and are offered with a large range of standard configurations and options.



LED indicators

The Q series panel mount LED indicators complement the APEM range of products. This series comprises seven different diameters, from 6 mm to 22 mm. They are available with prominent, recessed and flush bezel styles, different bezel finishes, five LED colours, as well as bicolour, tricolour and flashing LEDs. Integral resistors permit direct connection to 6VDC, 12VDC, 24VDC, 110VAC and 220VAC.

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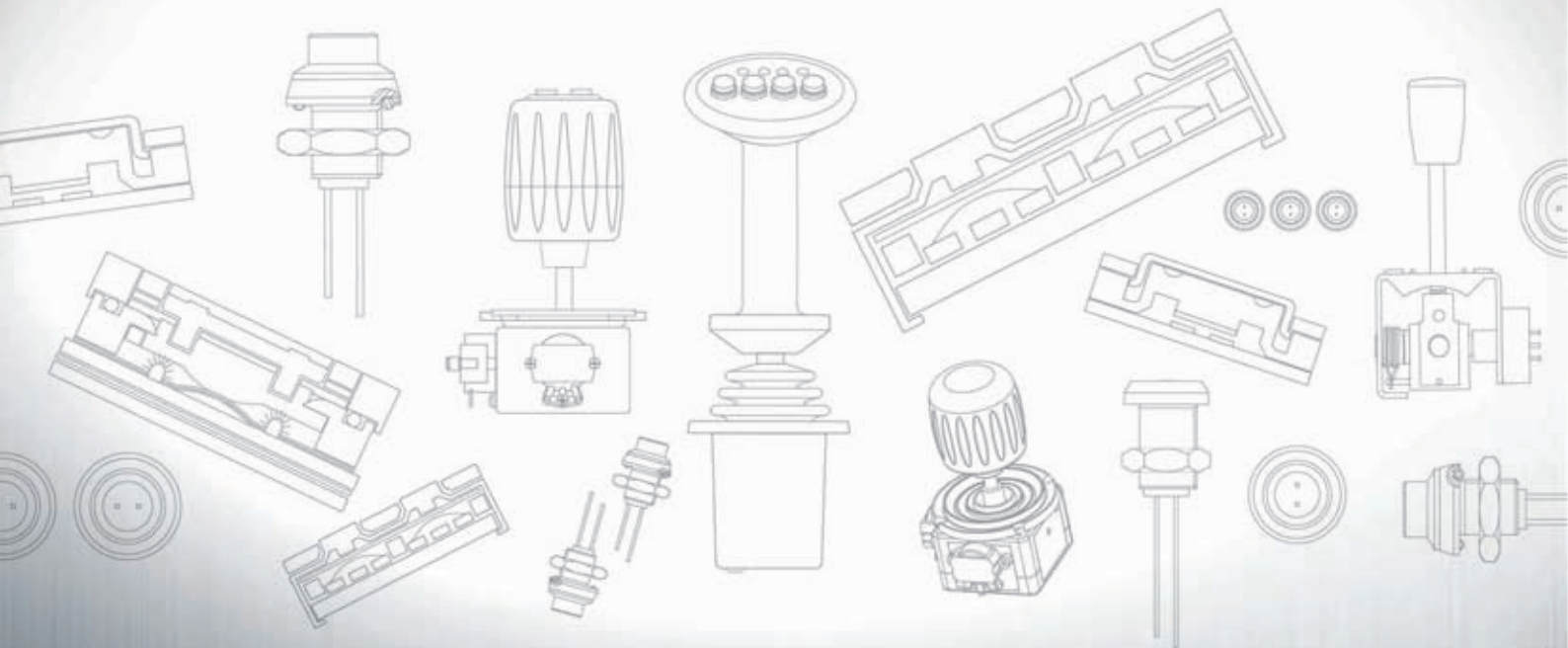
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