

# Fuse Holders, Panel Mounting

## TECHNICAL DATA AND DIMENSIONS

# BULGIN

List No.	Fixing Details	Projection from Front of Panel	Max. Amps @ 250V.
DF.827/110V/ Lens Colour*	One hole 0.555" 14.1 mm. Ø flatted one side 0.246" 6.5 mm. from centre of hole	Front 5/16" 7.9 mm.	5 (5 × 20 mm. fuses)
DF.827/250V/ Lens Colour*		Rear 2 1/8" 54.0 mm.	
F.296	One hole 0.505" —0.510" 12.83– 12.96 mm. Ø + keyway 0.093" 0.098" 2.36– 2.5 mm. wide × 0.045" – 0.050" 1.16–1.27 mm. deep	Front 1 1/32" 8.7 mm. Rear 1 3/32" 27.8 mm.	5 (5 × 20 mm. fuses)
F.296/S		Front 23/64" 9.1 mm. Rear 1 3/32" 27.8 mm.	
F.296/POT		Front 1 1/32" 8.7 mm. Rear 1 39/64" 33.7 mm.	
F.296/S/POT		Front 23/64" 9.1 mm. Rear 1 39/64" 33.7 mm.	
F.297		Front 1 1/32" 8.7 mm. Rear 1 3/32" 27.8 mm.	
F.297/S		Front 23/64" 9.1 mm. Rear 1 3/32" 27.8 mm.	
F.297/POT		Front 1 1/32" 8.7 mm. Rear 1 39/64" 33.7 mm.	
F.297/S/POT		Front 23/64" 9.1 mm. Rear 1 39/64" 33.7 mm.	
F.298	One hole 0.506" 12.85 mm. Ø + keyway 0.068" 1.73 mm. wide × 0.046" 1.17 mm. deep	Front 1 1/32" 8.7 mm. Rear 1 3/32" 25.4 mm.	10A. at 32V. max. (3/16" × 5/8" fuse)
F.396		Front 1 1/32" 8.7 mm. Rear 1 39/64" 34.5 mm.	
P. No. 9820	Black moulded, push-fit, flexible terminal shrouds for use on F.296, F.296/S, F.297, F.297/S, and F.298.		

\* **Lens Colours.** Water Clear supplied as standard. Red available to agreed quantity orders.

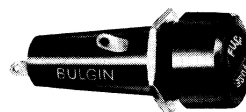


**List No: F.296/S**  
for 5 × 20 mm. fuses

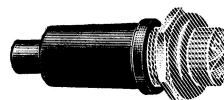
**List No: F.297/S**  
for  $\frac{3}{16}$ " ×  $\frac{5}{8}$ " fuses

Extra safe models with shrouded fuse carrier.

Also available with tags accepting 110 series push-on-tabs. Add /POT to List No. if required.



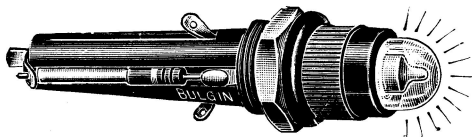
**List No: F.396**  
for 5 × 20 mm. fuses  
Intrinsically Safe Model



**Part No: 9820**  
Rear Insulation Cover

# BULGIN

## Fuse Holders, Panel Mounting,



**List No: D.F.826/V.**  
for  $1\frac{1}{4}" \times \frac{1}{4}"$   $\varnothing$  Fuses  
**U.K. Patent Number 930330**  
**U.S.A. Patent No. 1,132,224**

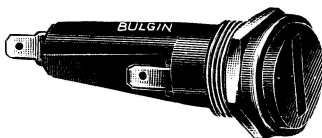
**S.P. Neon Fuse-Holder D.F.826**  
*"It glows when it Blows"*  
This unique model has a neon in front lens-cover. On mains (100/125V or 200/250V), "Neon glows" if Fuse blows saving time and money. **Patented.** Users find it invaluable. (Also to quantify order, models to stay alight until fuse is blown).



**List No. F.315,**  
or  $1\frac{1}{4}" \times \frac{1}{4}"$   $\varnothing$  Fuses  
**List No. F.316,**  
for  $1" \times \frac{1}{4}"$   $\varnothing$  Fuses

### Heavy-Duty Fuse Holders F.315, F.316 and F.316/S.

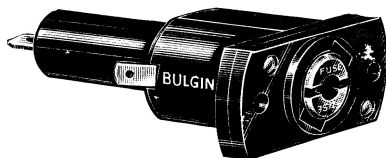
All moulded body with screw in front cover and tags accepting 187 series push-on connectors which we can supply, if requested. Generous current ratings at 13A. 250V. A.C./D.C. and 20A. at 32V.~ and inherently safe design F.316/S identical to F.316 but with an extra shallow fuse retaining cap, which can only be removed with the aid of a screwdriver or coin, thus conferring extra safety. For  $\frac{1}{4}"$   $\varnothing$  Fuse links, lengths as captioned. Fuse links, lengths as captioned. Max. working temperature 120°C. (ambient + internal heating). Withstanding 5KV proof. test.



**List No: F.316/S**  
for  $1" \times \frac{1}{4}"$   $\varnothing$  Fuses

### Flush Fitting Holders F.317 and F.318.

A moulded Fuseholder, 250V. 5 Amp rating, intrinsically safe design, slotted front cap avoids accidental removal of fuse link. Flush fitting with minimum panel projection. Tags accepting 187 series Push-On-Tabs.



**List No: F.317 for  $1" \times \frac{1}{4}"$   $\varnothing$  Fuses**  
**List No: F.318 for  $1\frac{1}{4}" \times \frac{1}{4}"$   $\varnothing$  Fuses**  
**Patent No. 1,159,999**

### Standard S.P. Panel-Fix Holders F.55, 155, 156.

3 popular types of panel mounting fuse-holder F.55 has metal and S.R.B.P. body with screw-in front cover. F.155-156 have all moulded body, and front-cover fixes by bayonet action.



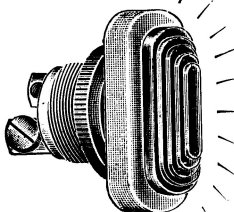
# Lamp Holders, Signal; Neon

## TECHNICAL DATA AND DIMENSIONS

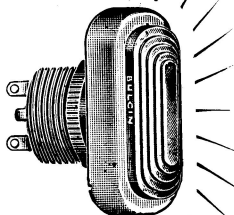
# BULGIN

List No.	For Glass Lenses add :	Panel Hole $\varnothing$	Bezel $\varnothing$	Max. Panel	Projection from Front of Panel	Lamp or Lamp Holder
D.808/110V./Colour		$\frac{17}{32}$ " 13.5 mm	$\frac{7}{16}$ " 22.2 mm	No Limit	Front $\frac{33}{64}$ " 13.1 mm Rear $\frac{21}{32}$ " 16.6 mm + Leads	
D.808/250V./Colour						
D.712/110V./Colour		$\frac{1}{2}$ " 12.7 mm clearing	$\frac{17}{32}$ " 15.1 mm	$\frac{9}{16}$ " 7.1 mm	Front $\frac{1}{16}$ " 11.1 mm Rear $\frac{27}{32}$ " 21.4 mm + Leads	
D.712/250V./Colour						
D.841/110V./Colour					Front $\frac{1}{4}$ " 6.4 mm Rear $1\frac{1}{8}$ " 34.9 mm + Leads	
D.841/250V./Colour		$\frac{3}{8}$ " 9.5 mm clearing	$\frac{3}{8}$ " 19.1 mm	$\frac{1}{4}$ " 3.2 mm		
D.875/110V./Colour	Plastic only, Transparent				Front $\frac{33}{64}$ " 9.1 mm Rear $\frac{27}{32}$ " 23 mm	Neon inbuilt, with Resistor
D.875/250V./Colour	Water-clear or Red	$\frac{5}{8}$ " 15.9 mm	$\frac{23}{32}$ " 19.8 mm	$\frac{1}{4}$ " 6.4 mm		
D.715/110V./Colour					Front $\frac{27}{64}$ " 10.7 mm Rear $\frac{25}{32}$ " 19.8 mm	
D.715/250V./Colour	† /T means 6 B.A. screw terminals in place of solder tags					
D.715/T/110V./Col.†						
D.715/T/250V./Col.†						
D.715/P.O.T./110V./Colour	/P.O.T. means tags to accept 110 series AMP push on connectors	$\frac{21}{32}$ " 16.7 mm clearing	$\frac{18}{32}$ " 20.6 mm X $1\frac{1}{4}$ " 34.1 mm	$\frac{9}{16}$ " 7.9 mm	Front $\frac{27}{64}$ " 10.7 mm Rear $\frac{27}{64}$ " 22.6 mm	
D.715/P.O.T./250V./Colour						
D.807/110V.		2-6 B.A. c/sk h- @ "	$1\frac{1}{4}$ "		Front $\frac{9}{16}$ " 9.5 mm	Twin neons inbuilt with
D.807/250V.						
D.740/110V./Col.	Pla. Transparent Red	Clearing holes @ $1\frac{1}{8}$ " 31.8 mm X $\frac{1}{2}$ " 12.7 mm	$1\frac{1}{8}$ " 31.8 mm	$\frac{3}{16}$ " 7.9 mm	Front $\frac{15}{32}$ " 15.4 mm	
D.740/250V./Col.	Water-clear Also Amber			With screws provided		

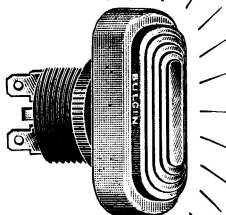
Colour Code:  
BLACK Spot—110V;  
RED Spot—250V.



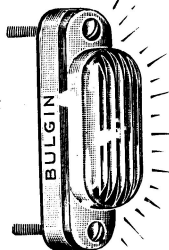
List No: D.715/T/..... V.  
Neon only.



List No: D.715/..... V.  
Neon only



List No: D.715/P.O.T./..... V  
Colour



List No: D.740/..... V  
Neon only.

# Lamp Holders, Signal, L.E.S., M.E.S., M.B.C. TECHNICAL DATA AND DIMENSIONS

# BULGIN

List No	For Glass Lenses add:	Panel Area Occupied	Fixing Dimensions	Depth at Rear	Lamp Holders
D.857*	/G	$\frac{3}{64}$ " 15.5 mm wide x $\frac{1}{32}$ " 24.6 mm. high	One hole $\frac{3}{16}$ " 7.9 mm. $\varnothing$ clearing Max. Panel $\frac{1}{8}$ " 3.2 mm	$\frac{1}{32}$ " 13.4 mm	L.E.S. B.S. 98/E.5
D.858†					

Recommended Lamps: See current Bulgin Leaflet. Bulb Nos. 21, 22

Terminals	G	$1\frac{1}{8}$ " 28.6 mm. wide x $2\frac{1}{32}$ " 51.6 mm high	One hole $\frac{3}{8}$ " 9.5 mm. $\varnothing$ clearing Max. panel $\frac{3}{16}$ " 7.9 mm.	$\frac{3}{16}$ " 20.2 mm	M.E.S. E.10 B.S.98
D.170*					
D.177†					
TAGS	/G	$1\frac{1}{16}$ " 27 mm. wide x $1\frac{43}{64}$ " 43.3 mm. high	3 x 8 BA. 2.4 mm. $\varnothing$ clearing on $1\frac{1}{16}$ " 36.5 mm. P.C.D. at 120° apart + central hole $\frac{1}{4}$ " 22.2 mm Max. panel $\frac{3}{64}$ " 9.1 mm.	$1\frac{7}{8}$ " 47.6 mm	& M.B.C. B.A.9s B.S.52
D.180*					
D.187†					
Terminals		$1\frac{1}{2}$ " 38.1 mm wide x $2\frac{19}{32}$ " 62.7 mm high			
D.7*	/G				
D.108†					
Tags		$1\frac{1}{2}$ " 38.1 mm. wide x $2\frac{3}{64}$ " 52.8 mm. high			
D.450*					
D.457†					

Note: Above models are M.E.S., for M.B.C. add "/M.B.C." to List No.

*Transparent	Red, Amber (Yellow for /G), Green, Blue, Water-clear Max. Working Temp. Plastic Lenses 100°C.
†Translucent	Red, Orange, Green, Blue, White Max. Working Temp. Plastic Lenses 100°C.

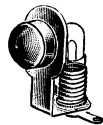
Recommended Lamps: See current Bulgin Leaflet for M.E.S., Bulb Nos.—1, 5, 9, 19. For M.B.C. Bulb Nos. 2, 6, 10, 17, 18.

List No.	For Glass Lenses add:	Panel Hole $\varnothing$	Bezel $\varnothing$	Max. Panel	Projection from Front of Panel	Lamp Holders
D.350*	G	$\frac{3}{4}$ " 19.1 mm clear.	$\frac{7}{8}$ " 22.2 mm	$\frac{3}{16}$ " 4.8 mm	$\frac{3}{64}$ " 12.3 mm	M.E.S. E.10 B.S.98
D.357†						
D.580*		$\frac{3}{8}$ " 9.5 mm clear.	$\frac{1}{2}$ " 12.7 mm	$\frac{5}{16}$ " 7.9 mm	$\frac{3}{32}$ " 18.3 mm	M.E.S. E.10 B.S.98
D.330†						
D.270*		$\frac{3}{4}$ " 19.1 mm clear.	$\frac{1}{2}$ " 12.7 mm	$\frac{5}{16}$ " 7.9 mm	$\frac{3}{16}$ " 14.3 mm	& M.B.C. B.A.9s B.S.52
D.277†						
D.370*		$\frac{3}{4}$ " 19.1 mm clear.	$\frac{1}{2}$ " 12.7 mm	$\frac{15}{64}$ " 6 mm	$\frac{3}{16}$ " 14.3 mm	
D.377†						
D.360*		$\frac{3}{4}$ " 19.1 mm clear.	$\frac{1}{2}$ " 12.7 mm	$\frac{3}{16}$ " 4.8 mm	$\frac{1}{32}$ " 13.4 mm	
D.367†						
D.590*	Plastic only	$\frac{3}{4}$ " 19.1 mm clear.	$\frac{1}{2}$ " 12.7 mm	$\frac{3}{16}$ " 4.8 mm	$\frac{3}{32}$ " 18.3 mm	
D.340†						
D.952*	Plastic only	$\frac{3}{4}$ " 19.1 mm clear.	$\frac{1}{2}$ " 12.7 mm	$\frac{3}{16}$ " 4.8 mm	$\frac{1}{4}$ " 6.4 mm	
D.953†						

Note: Above models are M.E.S., for M.B.C. add "/M.B.C." to List No.

*Transparent	Red, Amber (Yellow for /G), Green, Blue, Water-clear Max. Working Temp. Plastic Lenses 100°C.
†Translucent	Red, Orange, Green, Blue, White Max. Working Temp. Plastic Lenses 100°C.

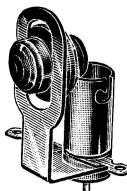
Recommended Lamps: See current Bulgin Leaflet, Bulb Nos. (for D.270—77 5.), (D.350—57, No. 5.) (D.580—330, 370—377, D.590—340, 360—367, 952—953, Nos. 5, 9, 19.) (D.270—277/M.B.C., 952—953/M.B.C., No. 6.) (D.370—377/M.B.C., Nos. 6, 10, 18.) (D.360—367/M.B.C., Nos. 6, 10, 18.) (D.590—340/M.B.C., Nos. 6, 10, 18.)



List No: D.857/Colour  
Transparent

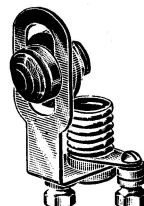
List No: D.858/Colour  
Translucent

If required with spring shell  
add /L.S.S. to List No.



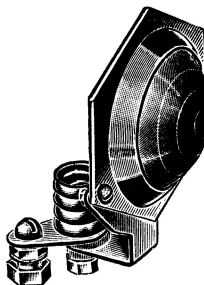
List No: D.180/M.B.C/Colour  
Transparent

List No: D.187/M.B.C./Colour  
Translucent



List No: D.170/Colour  
Transparent

List No: D.177/Colour  
Translucent



List No: D.7/Colour  
Transparent

List No: D.108/Colour  
Translucent

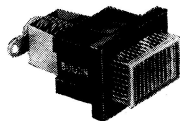
When required with M.B.C.  
Lampholder order as—

List No: D.7/M.B.C./Colour  
Transparent

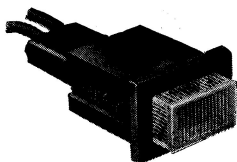
List No: D.108/M.B.C./Colour  
Translucent

# BULGIN

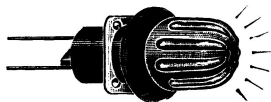
## Lamp Holders, Signal; Neon, L.E.S.



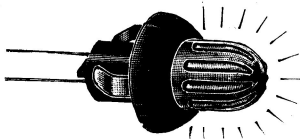
List No: D.22/Colour  
Transparent  
List No: D.23/Colour  
Translucent  
L.E.S.



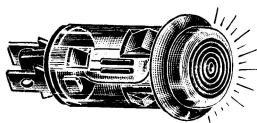
List No: D.22/Neon/Voltage



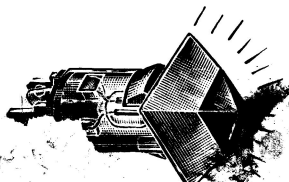
List No: D.744  
L.E.S.  
List No: D.795  
Neon



List No: D.816  
L.E.S.  
List No: D.815  
Neon



List No: D.925/Voltage



List No: D.914  
pages 90-91

Illustrated on these two pages are a range of models either accepting L.E.S. lamps or containing in-built neon lamps.

**D.864**, a small metal bodied model with a fluted lens, accepting L.E.S. lamps. The front of panel appearance matches that of D.662 shown on pages 90-91.

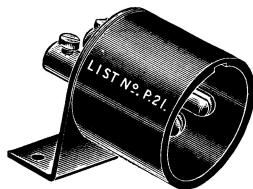
**D.855-6**, a similar model to D.864 but having two L.E.S. lampholders giving a "fail-safe" facility, the unit remaining lit if one lamp blows.

**D.22, D.22/Neon**, two versions of the same modern rectangular unit, D.22 having a clip-in holder to accept L.E.S. lamps and D.22/Neon, containing an in-built neon lamp and resistor.

**D.744, 795, 815 and 816**, four similar models either having lampholders accepting L.E.S. lamps or in-built neon lamps as tabulated. The latter need an external resistor added.

**D.925-927**, two basically similar neon models push fixing to panel and with tags accepting 250 series push-on tabs. The appropriate resistor is in-built.

**D.914**, a very small model, have expensive "five" ratings.

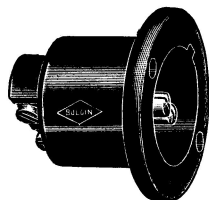


**S.A.475, Plug**  
with Slit Pins left

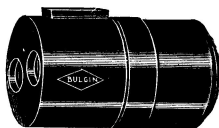


**The pair, List No: P.21**

**S.A.1988, Socket**  
with Solid Sockets right

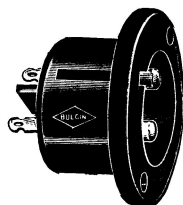


**S.A.468, Plug**  
with Slit pins left



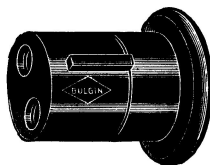
**The Pair, List No: P.20**

**S.A.472 Socket**  
with Solid Sockets right



**S.A. 1383, Plug with**  
Solid Pins left

**The Pair**  
List No: P.350



**S.A. 1373 with Slit**  
Sockets right

### 2-Pole Inlets, Polarised;

Mains Connectors for a wide field of applications. These are all 2-pole type INLETS, for use where Earthing is not required, or is carried out separately. Mouldings are in glossy phenolic, highly polished, normally BLACK. As with most other Bulgin products, however, other colours can be moulded to quantity order, if previously agreed. Pins and Sockets are non-ferrous, highly Nickel-plated, 6BA. terminals are fitted to both members of P.20 and P.21, and tags are fitted to both members of P.350. Axial-entry Sockets predominate, generally being preferred by Users, but side-entry models (with clamp-bar cable-grip) are equally suitable in many cases and often essential; they are illustrated on pages 136-137. All models have high current ratings, based on separation whilst carrying; as *carrying*-ratings the figures may be much higher. Intermating is possible between members of P.20, P.21 and P.350 but note that Solid Pin items cannot mate with Solid Socket items although items with Slit Pins can mate with Slit Sockets. With these Connectors, mains-leads can be disconnected from apparatus, and interchanged. Uses extend from Professional and Domestic to Laboratory, Industrial, etc.

In all above models polarised, non-reversibility is given by male key upon socket, mating with a cup-shaped slot in the side of the plug.

Intermating is possible between members of P.20, P.21 and P.350 but note that Solid Pin items cannot mate with Solid Socket items although models with Slit Pins can mate with Slit Sockets.

# Plugs and Sockets, 2 pole

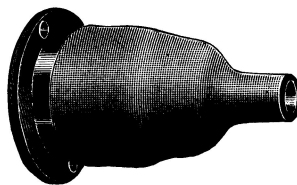
## TECHNICAL DATA AND DIMENSIONS

# BULGIN

### MODELS WITH TERMINALS TO BOTH MEMBERS

List No.		Amps at V:			Dimensions (Proj: is from front face of panel)
Pair	Members	6	250	500	
P.21 2-Pole	S.A.475 Plug	7	5	1	2 $\frac{3}{4}$ " 62.3 mm. long $\times$ 1 $\frac{1}{2}$ " 38.1 mm. wide. Max. $\varnothing$ 1 $\frac{1}{8}$ " 34.9 mm. fixed* by bracket $\frac{1}{16}$ " 20.6 mm. off centre. 2 $\times$ 6 BA. 3.3 mm. clear holes at $\frac{3}{32}$ " 19.8 mm. crs. Terminal connections.
	S.A.1988 Socket	$\approx$	$\approx$	$\approx$	
P.20 2-Pole	S.A.468 Plug	7	5	1	Proj to front 1 $\frac{1}{4}$ " 25.8 mm., to rear: 1 $\frac{1}{4}$ " 28.2 mm.. O.A. $\varnothing$ : 1 $\frac{1}{8}$ " 41.3 mm. Panel hole: * 1 $\frac{1}{8}$ " 27 mm. $\varnothing$ Fixing holes: 2 $\times$ 6 BA. 3.3 mm. Clear at 1 $\frac{1}{8}$ " 32.5 mm. crs., Max. panel: Unlimited. Terminal connections.
	S.A.472 Socket	$\approx$	$\approx$	$\approx$	

Accessories for Standard Mains Connectors Ideal for use with P.350 and P.20 shown on these pages and the panel mounting Mains-inlet plugs of the standard size 3—5 Amp. connectors on pages 134-137. The terminals, tags, and the wiring connections are covered using this flexible moulded cover, Part No: 8878 which confers an extra degree of safety against inadvertent contact inside apparatus.



**Part No: 8878**  
Plug-COVER, normally BLACK

#### Plug-Cover, Part No: 8878

Can fit on:—P.437/Sk., P.340, P.350, P.73, P.73/SE., P.73/RT, P.73/RS., P.73/SE./RT., P.74, P.74/RT, P.20.

### MODELS WITH TAGS TO BOTH MEMBERS

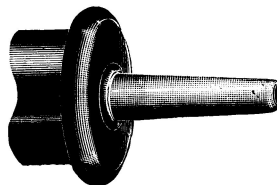
List No.		Amp. rating per pole at V.				Dimensions (‘Proj.’ from Front of Panel)
Pair	Members	6	110	250	500	
P.350 2-pole	S.A.1383 Plug§	6	4	3	1	Proj: $\frac{7}{8}$ " 22.6 mm. To Rear: $\frac{61}{64}$ " 24.2 mm. O.A. $\varnothing$ : 1 $\frac{1}{16}$ " 39.7 mm. Panel hole: * 1 $\frac{1}{16}$ " 27 mm. clear. Fixing holes: 2 $\times$ 6 BA. @ 1 $\frac{1}{4}$ " 32.5 mm. crs.
	S.A.1373 Socket	$\approx$	$\approx$	$\approx$	$\approx$	

\* PLUG is fixable member in ALL these connectors

§ Member with Pins

Intermating is possible between members of P.20, P.21 and P.350 but note that Solid Pin items cannot mate with Solid Socket items although models with Slit Pins can mate with Slit Sockets.

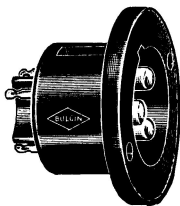
The standard Connectors can also have a flexible grip-sleeve added to their Sockets or Flex-Members, ask for Part No: 8037.



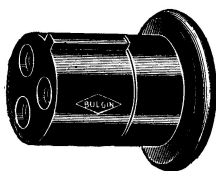
**Part No: 8037**  
Cable-SLEEVE, normally BLACK

#### Socket-Sleeve Part No: 8037

Can fit on:—P.437/Pl, P.340, P.350, P.73, P.73/BB., P.73/RT., P.73/RS., P.74, P.74/RT., P.74/BB., P.161, P.162, P.166, P.18, P.21.

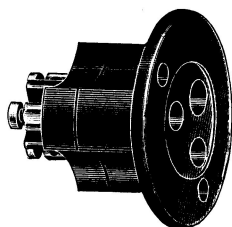


S.A.1403, Plug with  
Solid Pins left

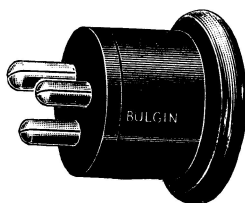


SA. 1393 with Slit  
Sockets right

The Pair  
List No. P.340



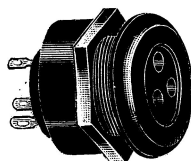
S.A.2020, Socket  
left



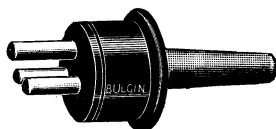
S.A. 2019, Plug  
right

The pair, List No: P.437

P.437 above and P.438 below are **FACILITY OUTLETS**, not Inlets. Accordingly it is the SOCKET or 'live' half and not the PLUG that is fixed, or apparatus, member.



S.A. 2026, Socket  
left



S.A.2025, Plug  
right

The pair, List No: P.438



Part No: 10450

New, screw-on, black moulded phenolic cover which enables the normally panel mounting socket SA. 2026 to be used as a flex-member

### 3-Pole Inlet

### 3-Pole 'Facility Outlets'

Further Mains Connectors for a wide field of applications. Mouldings are in glossy phenolic, highly polished, normally BLACK. As with most other Bulgin products, however, other colours can be moulded to quantity order, if previously agreed. Pins and Sockets are non-ferrous, highly Nickel-plated. The inlet model P.340 is for connecting and disconnecting the Mains-Lead at the Apparatus or Appliance itself. Widely used Domestically, and Professionally for Power and Lighting, and in Laboratories, especially where alternative portable apparatus is used selectively with common Mains-Lead, often made up as Laboratory fittings of differing lengths Plug has Solid Pins with Solder Tag connections and the Socket has Slit Sockets also with Solder Tag connections. The FACILITY OUTLETS allow 2-poles and Earth out of apparatus in subsidiary or auxiliary manner e.g. mains to dependent-unit and sub-unit, or to gram-motor, or similar. P.437, 6BA. terminals to both members; P.438 connections are soldered to either member. See left and right for accessories.

# Plugs & Sockets, 3 Pole

## TECHNICAL DATA AND DIMENSIONS

# BULGIN

List No.		Amps. at Volts:-				Dimensions ( <i>'Proj.'</i> from front of panel)
Pair	Members	6	110	250	500	
P.340 3-pole	S.A.1403 Plug§	6	4	3	1	<b>Proj.</b> $\frac{29}{32}$ " 23.0 mm. <b>To Rear:</b> $1\frac{1}{32}$ " 26.2 mm. <b>O.A.</b> $\varnothing$ : $1\frac{1}{16}$ " $\frac{39}{32}$ " 39.7 mm. <b>Panel hole:</b> $\frac{1}{4}$ " 27-mm. clear. <b>Fixing holes:</b> 2 × 6 BA. @ $1\frac{1}{32}$ " 32.5 mm. crs.
	S.A.1393 Socket	~	~	~	~	

\* **PLUG** is fixable member in **ALL** these connectors

§ Member with Pins

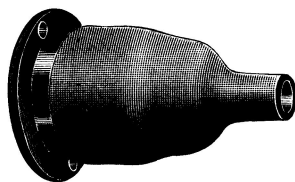
List No.		Amps at V:				Dimensions ( <i>Proj.</i> is from front face of panel)
Pair	Members	6-12	250	250		
P.437 3-Pole	S.A.2019 Plug	6	5	* 1		<b>Proj to front</b> $1\frac{3}{4}$ " 30.2mm. <b>to rear:</b> $1\frac{1}{32}$ " 32.5mm. <b>O.A.:</b> $\varnothing$ $1\frac{1}{16}$ " 39.7mm. <b>Panel hole:</b> $1\frac{1}{16}$ " 27.0mm. clearing <b>Fixing holes:</b> 2×6 BA., 2.8 mm. clear at $1\frac{1}{32}$ " 32.5 mm. crs. <b>Max</b> <b>panel:</b> Unlimited Terminal connections.
	S.A.2020 Socket	~	~	~		
P.438 3-Pole	S.A.2025 Plug††	3	1.5	† 0.5		<b>Proj to front</b> $1\frac{5}{16}$ " 48.8mm. <b>to rear:</b> $\frac{1}{8}$ " 20.6mm., including sleeve. <b>O.A.:</b> $\varnothing$ : $\frac{1}{8}$ " 23.8mm. <b>Panel hole:</b> $\frac{3}{4}$ " 19.1 mm. wide × $\frac{1}{32}$ " 0.8 mm. deep. <b>Fixing holes:</b> see panel hole. <b>Max.</b> <b>panel:</b> $\frac{3}{16}$ " 4.8 mm. Solder tags.
	S.A.2026 Socket	~	~	~		

\* For separation or de-mating whilst loaded; otherwise 3A. Not for 500V.

† For separation or de-mating whilst loaded; otherwise 1.5A. No. for 500V.

†† Supplied complete with cable sleeve.

**Accessories for Standard Mains-Connectors.** Ideal for use with P.437 and P.340 shown on these pages and the panel mounting Mains-inlet plugs of the standard size 3—5 Amp. connectors on pages 132-133, 136-137. The terminals, tags, and the wiring connections are covered using this flexible moulded cover, Part No: 8878 which confers an extra degree of safety against inadvertent contact inside apparatus.

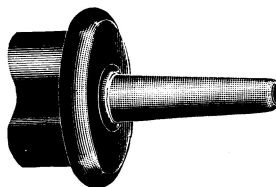


**Part No: 8878**  
Plug-COVER, normally BLACK

### Plug-Cover, Part No: 8878

Can fit on:—P.437/Sk., P.340, P.350, P.73, P.73/SE., P.73/RT, P.73/RS., P.73/SE./RT., P.74, P.74/RT, P.20.

The standard Connectors can also have a flexible grip-sleeve added to their Sockets or Flex-Members, ask for Part No: 8037.



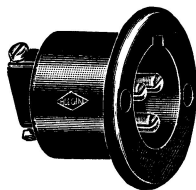
**Part No: 8037**  
Cable-SLEEVE, normally BLACK

### Socket-Sleeve Part No: 8037

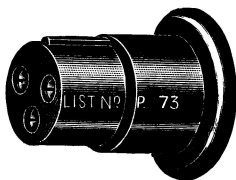
Can fit on:—P.437/Plug, P.340, P.350, P.73, P.73/BB., P.73/RT., P.73/RS., P.74, P.74/RT., P.74/BB., P.161, P.162, P.166, P.18, P.21.

# BULGIN

## Plugs and Sockets, 5 Amp.

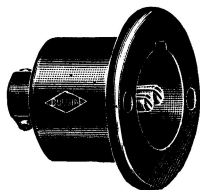


SA. 1861. Plug with  
Slit Pins left

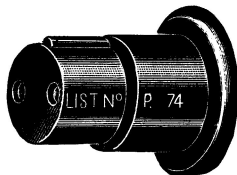


SA. 1862 with Solid  
Sockets right

The Pair  
List No. P.73



SA. 468. Plug with  
Slit Pins left

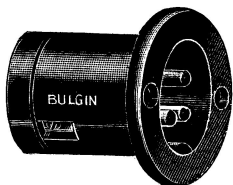


SA. 1988 with Solid  
Sockets right

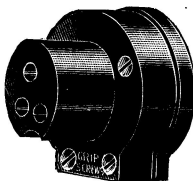
The Pair  
List No. P.74

Famous Bulgin Mains Inlet Connectors, moulded in highest commercial grades of phenolic material, normally BLACK. All metal parts are highly nickel-plated. In general, models have solid, tubular SOCKETS (in SOCKET-members), and slit-PINS (in PLUG-members), and terminals with 6 BA. pinch screws. Models with resilient-SOCKETS (and Solid-PINS) not for cross-mating, are now also listed, with solder-tag connections. Note, however, SA.1861-PLUG is also available with rear Tags. ORDER as SA.2190-PLUG (+ SA.1862 = P.73/RT) and SA.468-PLUG with rear tags becomes SA.2221 (+ SA.1988 = P.74/RT). Axial-entry All models have high current ratings, based on separation whilst carrying; as carrying-ratings the figures may be much higher.

## Side Entry Plugs and Sockets, 5 Amp.

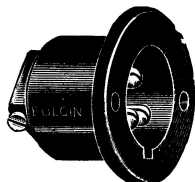


Plug: S.A.2096



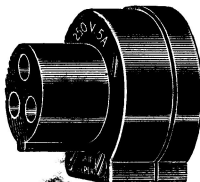
Socket: S.A.2097

List No:  
The Pair P.493

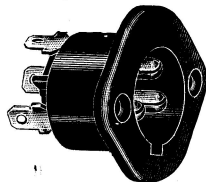


Plug: S.A. 1861

List No:  
The Pair P.73/SE

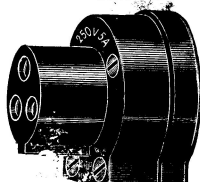


Socket: S.A. 2111



Plug: S.A. 2341

List No:  
The Pair P.545



Socket: S.A. 2111

Female push-on connectors for S.A.2341 can be supplied if requested.

These models have side-entry for the cable on the flex-member and approved clamping for cable-grip. They are of the latest design, having conformity with modern specifications. One-piece electrodes (terminals integral with pins or sockets) that float, resilient sockets with solid pins wherever possible, and screws concealed whilst mated, for greatest safety, and highest ratings. Mouldings are of high grade phenolics, polished in appearance Connector P.493 (approved by G.P.O. and many Authorities, here and Overseas) also has versions with retention-lock and neon-glow. ("It glows whilst live") These are additional variations by means of different SOCKETS. (The PLUG remains common to all three versions). P.73/Side Entry mates with other P.73 versions; note the newest PLUG in this range fully cross mating, with Push-on tabs type male tags.



# Plugs and Sockets, 5 Amp.

## TECHNICAL DATA AND DIMENSIONS

# BULGIN

### MODELS WITH TERMINALS TO BOTH MEMBERS

List No.		Amps. at Volts:-				Dimensions ('Proj.' from Front of panel)
Pair	Members	6	110	250	500	
P.74‡ 2-pole	S.A.468‡ Plug §	7	6	5	1	Proj: 1 1/16" 27 mm. To Rear: 1 1/4" 28.2 mm. O.A. Ø: 1 1/16" 39.7 mm. Panel hole: * 1 1/16" 27mm. clear. Fixing holes: 2 × 6 BA. @ 1 1/32" 32.5 mm. crs.
	S.A.1988 Socket	≈	~	~	~	
P.73 3-pole	S.A.1861 Plug §	7	6	5	1	Proj: 1 1/16" 27 mm. To Rear: 1 1/4" 28.2 mm. O.A. Ø: 1 1/16" 39.7 mm. Panel hole: * 1 1/16" 27mm. clear. Fixing holes: 2 × 6 BA. @ 1 1/32" 32.1 mm. crs.
	S.A.1862 Socket	≈	~	~	~	
P.73/RT. ↑ 3-pole	S.A.2190 Plug † §	7	6	5	1	Proj: 1 1/16" 27 mm. To Rear: 1 1/4" 33.3 mm. O.A. Ø: 1 1/16" 39.7 mm. Panel hole: * 1 1/16" 27mm. clear. Fixing hole: 2 × 6 BA. @ 1 1/32" 32.1 mm. crs.
	S.A.1862 Socket	≈	~	~	~	
P.73/B.B. 3-pole	S.A.2042 Plug §	7	6	5	1	Proj: 2 3/4" 60.7 mm. To Rear: Nil. O.A. Ø: 1 3/4" 48.8 mm. Panel hole: * None. Fixing holes: 2 × 4 BA. @ 1 1/32" 38.9 mm. crs.
	S.A.1862 Socket	≈	~	~	~	

P.73/B.B. can be supplied with Side-Entry. = S.A.2042 + S.A.2111  
P.73/B.B. plug\* has two knockouts at each side of base 180° apart for  
cable acceptance.

‡Also available with REAR TAGS, plug No. becomes S.A.2221  
complete item P.74/RT.

## Side Entry Plugs and Sockets, 5 Amp.

### MODELS WITH TERMINALS TO BOTH MEMBERS

List No.		Amps. at Volts:-				Dimensions ('Proj.' from Front of Panel)
Pair	Members	6	110	250	500	
P.73/S.E. 3-pole	S.A.1861 Plug §	7	6	5	1	Proj: 6 1/4" 24.2 mm. To Rear: 1 1/4" 28.2 mm. O.A. Ø: 1 1/16" 39.7 mm. Panel Hole: * 1 1/4" 27 mm. clear. Fixing holes: 2 × 6 BA. @ 1 1/32" 32.1 mm. crs.
	S.A.2111 Socket	≈	~	~	~	
P.73/S.E./ R.T.† 3-pole	S.A.2190 Plug † §	7	6	5	1	Proj: 6 1/4" 24.2 mm. To Rear: 1 1/4" 33.3 mm. O.A. Ø: 1 1/16" 39.7 mm. Panel Hole: * 1 1/4" 27 mm. clear. Fixing holes: 2 × 6 BA. @ 1 1/32" 32.1 mm. crs.
	S.A.2111 Socket	≈	~	~	~	
P.493†† 3-pole	S.A.2096 Plug §	5	5	5	1	Proj: 6 1/4" 24.2 mm. To Rear: 1 3/4" 36.7 mm. O.A. Ø: 1 1/32" 40.5 mm. Panel hole: * 1 1/16" 27 mm. clear. Fixing holes: 2 × 6 BA. @ 1 1/32" 32.1 mm. crs. csk. 7/32" 5.6 mm. Ø @ 90°.
	S.A.2097 Socket	≈	~	~	~	

### MODEL WITH TERMINALS for SOCKET and TAGS ACCEPTING series 250 Push-on Connectors to Plug

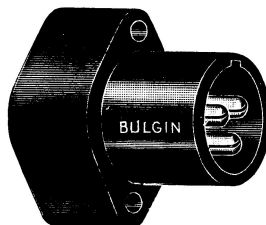
P.545 3-pole	S.A.2341 Plug §	7	6	5	1	Proj: 6 1/4" 24.2 mm. To Rear: 1 1/4" 31 3/4" mm. Flange Size: 1 1/4" 46.0 mm. × 1 1/16" 39.7 mm. Panel Hole: 4 1/4" 27.0 mm. Fixing Holes: 2 × 0.147" 3.7 mm. Ø csk 7/32" 5.4 mm. Ø @ 90°, on 1 1/32" 32.5 mm. crs.
	S.A.2111 Socket	≈	~	~	~	

\* PLUG is fixable member in ALL these connectors.

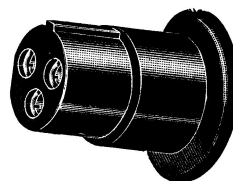
† Plug member only has tags.

†† These do not cross-mate into members of other pairs.

§ Member with Pins.

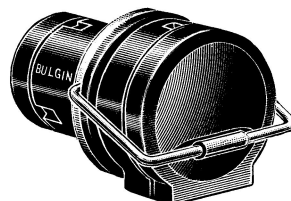


S.A. 2042. Plug with  
Slit Pins.



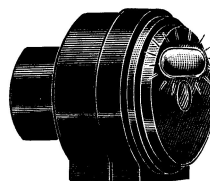
S.A. 1862 Socket with  
Solid Sockets.

The Pair List No.  
P.73/BB.



List No: P.493/Clip Retainer

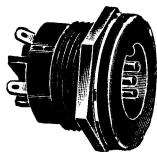
A supplementary device to fix  
between plug-flange and panel  
(using same bolts) to provide a  
lock against accidental de-mating.



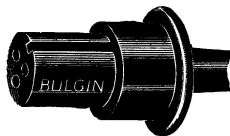
S.A. 2097/Neon Socket

As S.A. 2097 but with warning  
neon. Available RED or Water  
Clear Lens for 110V. or 250V.  
Please state voltage and colour  
when ordering

ACCESSORIES LISTED ON  
PAGE 135



Plug: P.429

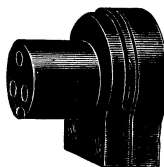


Socket: P.430

The Pair, List No: P.360

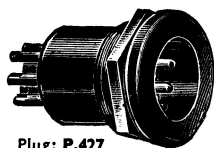


Plug: P.427



Socket: P.430/SE

The Pair, List No: P.360/SE.

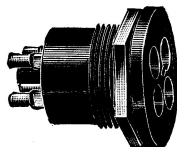


Plug: P.427

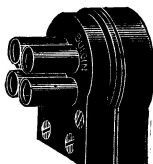


Socket: P.428

The Pair, List No: P.194

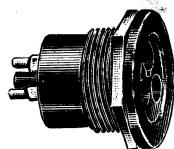


Socket: S.A. 2368

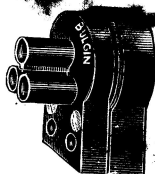


Plug: S.A. 2367

The Pair, List No: P.560



Socket S.A.2404



Plug: S.A. 2403

The Pair, List No: P.561

These Polarised 3, 4 and 6-pole Connectors accept cables up to 14/36" flex., or metric equivalent, the resilient sockets are protected and maintain their grip to the plug-pins, for sure and low-resistance contact. A cable sleeve is provided with P.430 and P.428 which is drawn over the flex to minimise strain due to any sharp bending. P.430/SE, SA.2367 and SA.2403 are fitted with internal cable clamp straps. Protection against accidental contact is given by ordering the flexible-cover accessory, Part No. 9455. All models are fully non-reversible with coded poles whilst contacts and solderable parts are heavily SILVER plated.

P.360, P.360/SE and P.194 are three and six pole connectors moulded from glossy black bakelite material with solder tags to both members. In all cases the Plug (item with pins) is the panel mounting member and the Socket (item with sockets) is the flex lead member and use is primarily intended to be for Mains Inlet Connections.

P.560 and P.561 are new models, four and three pole respectively, with shrouded, pins and sockets, keyed to prevent reversed polarity. In these items the Socket members have Solder Tag connections and are the panel mounting items, whilst the Plugs have Screw Terminal connections and are the flex-lead members. Rated at 2A. 250V. they are equally suitable for use as Inlet or Outlet connectors.

# Plugs and Sockets 3, 4 & 6 Pole

## TECHNICAL DATA AND DIMENSIONS

# BULGIN

List No.		Amp. rating per pole at V.			Dimensions ( <i>'Proj.'</i> from Front of Panel)
Pair	Members	6	110	250	
P.360 3 pole	P.429 Plug	3 112	2 112	1.5 112	Proj: $1\frac{13}{32}$ " 43.7 mm. (To Rear: $\frac{3}{8}$ " 19.1 mm. O.A. $\varnothing$ : $\frac{1}{4}$ " 19.1 mm. Panel Hole: $\frac{3}{4}$ " 19.1 mm. $\varnothing$ clear & keyway $\frac{1}{16}$ " 3.2 mm. min. wide $\times$ $\frac{1}{32}$ " 0.8 mm. min. deep. Max. Panel: $\frac{1}{4}$ " 6.4 mm.
	P.430 Socket				
P.360/S.E. 3 pole	P.429 Plug	3 112	2 112	1.5 112	Proj: $\frac{3}{4}$ " 15.5 mm. To Rear: $\frac{3}{4}$ " 19.1 mm. O.A. $\varnothing$ : $1\frac{1}{16}$ " 27 mm. Panel Hole: As P.360 Max Panel: $\frac{1}{4}$ " 6.4 mm.
	P.430/S.E. Socket				
P.194 6 pole	P.427 Plug	3 112	2 112	1.5 112	Proj: $1\frac{1}{4}$ " 44.5 mm. To Rear: $1\frac{15}{16}$ " 31.4 mm. O.A. $\varnothing$ : $1\frac{1}{4}$ " 25.4 mm. Panel Hole: As P.360 Max panel: $\frac{1}{2}$ " 3.4 mm.
	P.428 Socket				
P.560 4 pole	S.A. 2367 Plug	4 112	3 112	2 112	Proj: $\frac{45}{64}$ " 17.6 mm. To Rear: $1\frac{1}{8}$ " 25.4 mm. O.A. $\varnothing$ : $1\frac{1}{8}$ " 25.4 mm. Max. Panel: $\frac{3}{8}$ " 7.1 mm. Panel Hole: $\frac{3}{4}$ " 19.1 mm. $\varnothing$ clear plus keyway on P.560 $\frac{1}{16}$ " 1.6 mm. deep $\times$ 0.03" 0.8 mm. rad., on P.561 .100" 2.55 mm. deep $\times$ .050" 1.27 mm. rad.
	S.A. 2368 Socket				
P.561 3 pole	S.A. 2403 Plug				
	S.A. 2404 Socket				

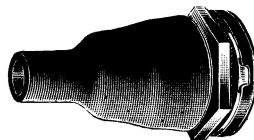
N.B.—110 and 250 V. D.C. rating subject to not being de-mated whilst loaded

### Accessories

**Part No: 9455.** Flexible, back solder tag cover, fitting to the Plug portions of P.360, P.360/SE, P.194, P.560 and P.561. Provides neat, tangle free cable connection and gives protection against accidental contact.

**Part No: 10450.** New, screw-on, black moulded phenolic cover which enables the normally panel mounting plug P.429 to be used as a flex member.

### Accessories



**Part No: 9455**

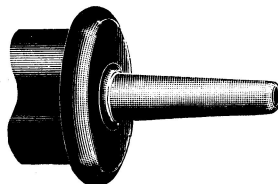
Flexible, black solder tag cover, fitting to the Plug portions of P.360, P.360/SE., P.194, P.560 and P.561. Provides neat, tangle free cable connection and gives protection against accidental contact.



**Part No: 10450**

### Part No: 10450

New, screw-on, black moulded phenolic cover which enables the normally panel mounting plug P.429 to be used as a flex-member.



### Part No: 8819

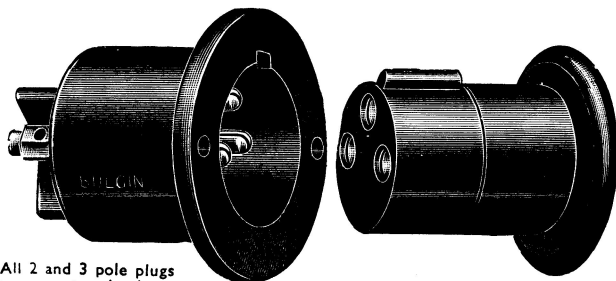
Cable sleeve fitted as standard to P.428 and P.430.

### Part No: 10936

Metric equivalent, suitable for metric cables of 6.5–6.6 mm. nominal  $\varnothing$ . To obtain add /METRIC to List No.

# BULGIN

## Plugs and Sockets, 7 Amp



All 2 and 3 pole plugs have rear termination as this.

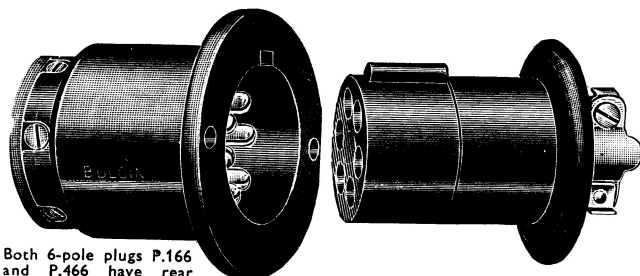
Socket

**The Pair, List No: P.161 (2-Pole).**

**The Pair, List No: P.162 (3-Pole; or 2-Pole + E.)**

**The Pair, List No: P.166 (6-Pole; or 5-Pole + E.)**

These Three Models, 2-pole, 2-pole+E or 3-pole, 5-pole+E or 6-pole, cover a wide range of Mains-Input uses, and are also used for inter-apparatus connection. Cable Sleeve (below) can be added. Generous terminals in each Member.



Both 6-pole plugs P.166 and P.466 have rear termination as this.

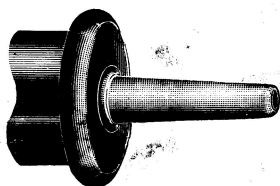
Socket

**The Pair, List No: P.461 (2-Pole)**

**The Pair, List No: P.462 (3-Pole; or 2-Pole + E.)**

**The Pair, List No: P.466 (6-Pole; or 5-Pole + E.)**

These Three Models: 2-pole, 2-pole+E or 3-pole, 5-pole+E or 6-pole, fill further uses where a metallic external Cable-Clamp is appropriate, for Mains-Input or other Mains uses. Cable-Sleeve (below) can also be added.



Part No: 8037

Where shown, BULGIN Connector Sockets have metal cable-grip for relieving cable-strain from terminals. Additional cable grip or avoidance of sharp exit-angle can be had, however, on all models by separately purchasing and applying the BULGIN sleeve-bushing, for cables approx.  $\frac{1}{4}$ " (6.3 mm.)  $\varnothing$  max., Part No. 8037, as here shown.

Strong, efficient, reliable Moulded Mains Connectors for Input-to-Apparatus, enabling the Mains-Lead to be detached from the Apparatus if wanted; alternatively for one Mains-Lead to serve to connect several pieces of apparatus. Widely used Domestically, Professionally and Industrially in all types of equipment, they are fully shrouded for safety, have well spaced pins and sockets with adequate clearances, generous-size terminals and massive non-ferrous Pins and Sockets, the diameter of which is British 5-Amp. size, used here with special spacing, which achieves greater safety of use by not intermating with other items. Polarisation is by body-key and slot, not by current carrying parts alone, a most desirable design feature. All models can be "locked" to cabinet-back (or apparatus-door) by the mushroom-head of the Socket or flex.-member. All metal parts are highly plated as befits high-quality components, not only for appearance but also for maintenance of good contacting. Mouldings are of highest commercial grade phenolic material, glossy, and normally BLACK. Materials and Finishes to special Specs. —e.g. DEF. 5000, to agreed orders.

# Plugs and Sockets, 7 Amp

## TECHNICAL DATA AND DIMENSIONS

# BULGIN

List No.	Members	Max Amps. at:-			Dimensions Proj: Is from front of panel
		6 V	250 V	500 V	
P.461 2-Pole	SA.479 Plug	10 ≈	7 ~ 5 =	1 ~ ½ =	Proj:—  P.461 1 <sup>17</sup> / <sub>32</sub> " 46.8 mm P.462 1 <sup>4</sup> / <sub>32</sub> " 44.1 mm P.466 1 <sup>1</sup> / <sub>32</sub> " 40.5 mm
	SA.1932 Socket				
P.462 3-Pole	SA.480 Plug	8 ≈	7 ~ 5 =	1 ~ ½ =	to rear:— P.461 1 <sup>25</sup> / <sub>32</sub> " 48.2 mm P.462 1 <sup>25</sup> / <sub>32</sub> " 45.2 mm P.466 1 <sup>4</sup> / <sub>32</sub> " 42.5 mm
	SA.1933 Socket				
P.466* 6-Pole	SA.601 Plug	8 ≈	7 ~ 5 =	1 ~ ½ =	O.A. ∅: P.461, P.462, P.466 2" 50.8 mm
	SA.1934 Socket				
P.161 2-Pole	SA.479 Plug	10 ≈	7 ~ 5 =	1 ~ ½ =	Panel hole: P.461, P.462, P.466 1 <sup>1</sup> / <sub>16</sub> " 36.5 mm. ∅ Clearing
	SA.478 Socket				
P.162 3-Pole	SA.480 Plug	8 ≈	7 ~ 5 =	1 ~ ½ =	Fixing holes: P.461, P.462, P.466 2 × 6 BA. 2.8 mm clear at 1 <sup>1</sup> / <sub>16</sub> " 42.9 mm crs.
	SA.516 Socket				
P.166* 6-Pole	SA.601 Plug	8 ≈	7 ~ 5 =	1 ~ ½ =	Proj:—  P.161 1" 25.4 mm P.162 1" 25.4 mm P.166 7 <sup>7</sup> / <sub>16</sub> " 22.6 mm
	SA.602 Socket				

\*NOTE:—In the 6-pole models, the plug TERMINALS are removable for easy connections; they are held in position by a circular disc.

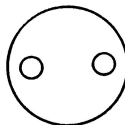
List Nos: P.161 or P.461, suitable for two poles. Either NO EARTH, or EARTHING SEPARATELY. Max. current rating, for all models, based on carrying. Lesser currents in Table are based upon possible separation of D.C. (whilst loaded).

List Nos: P.162 and P.462, suitable for three poles, or two-poles + Earth. Coded terminals on Members. Current rating as above-tabled and noted. Insulation-resistance on all models is < 40M Ω measured with 500V., dry or recovered. Max. proof stress V. on all models is 2K.V.

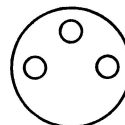
List Nos: P.166 and P.466, suitable for 5-poles+E or 6-pole connections. One-piece electrodes in PLUG. Note nomenclature for all models: PLUGS have PINS; SOCKETS have SOCKETS.

Plugs have PINS

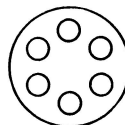
Sockets have SOCKETS



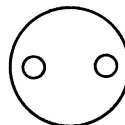
List No: P.161 Plug: SA.479  
Socket: SA. 478



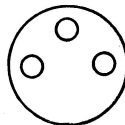
List No: P.162 Plug: SA. 480  
Socket: SA. 516



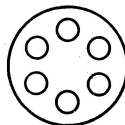
List No: P.166 Plug: SA. 601  
Socket: SA. 602



List No: P.461 Plug: SA. 479  
Socket: SA. 1932



List No: P.462 Plug: SA. 480  
Socket: SA. 1933



List No: P.466 Plug: SA. 601  
Socket: SA. 1934

# BULGIN

## Switches, Micro, Basic Type

### INTRODUCTION

Micro switches are switches with high electrical ratings but operated by light pressures, and small movements. They also have long mechanical and electrical lives, and are consequently increasingly used.

All Micro switches have particular and special characteristics, often with unfamiliar names, of which the most important are as follows:—

#### MOVEMENT:—

##### (FORWARD STROKE)

1. **START-POSITION.** The position at which any driving shall commence to move the Button or Drive-blade; this may not be the 'free' or relaxed position, especially in 'open' or uncased switches, for longest operating-life. Also, it may not always be the natural fully outwards position of the Button of a cased Micro switch.

2. **PRE-TRAVEL.** The amount of movement from START POSITION to the CONTACTS-OPERATE-position.

3. **OVER-TRAVEL.** The amount of permitted movement beyond CONTACTS-OPERATE-position to LIMIT-OF-TRAVEL. For longest life, use less than is stated as the allowable maximum. In many models, LIMIT-OF-TRAVEL is not a mechanical 'stop' at all.

##### (RETURN STROKE)

4. **MOVEMENT-DIFFERENTIAL.** The difference (as a dimension) between the point at which CONTACTS-OPERATED, and the point at which CONTACTS-RE-OPERATE (which is always nearer to the START-POSITION).

5. **POST-TRAVEL.** The distance that the Button or Drive-blade continues to re-arrive at START-POSITION. Getting a satisfactory minimum POST-TRAVEL may in fact actually determine the best START-POSITION (1) for longest life.

6. **TOTAL-TRAVEL.** The sum of the individual dimensions defined by 2+3 or by 3+4+5, and with respect to the diagram on the right.

In driving a Micro switch through the above dimensions or distances, certain forces or strengths of pressure are required. Definitions are:—

#### PRESSURES:—

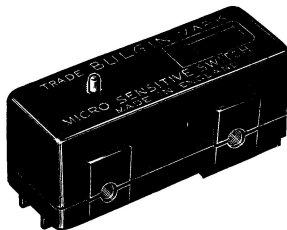
A. **OPERATING-PRESSURE** The pressure to be overcome to drive the Button or the Drive-blade from START-POSITION to CONTACTS-OPERATE-position through the PRE-TRAVEL distance.

B. **OVER-TRAVEL-PRESSURE.** The next pressure to be overcome, to drive from CONTACTS-OPERATE to LIMIT-OF-TRAVEL through the OVER-TRAVEL-distance, and then to hold the Micro switch as 'operated'. It is usually less than OPERATING PRESSURE.

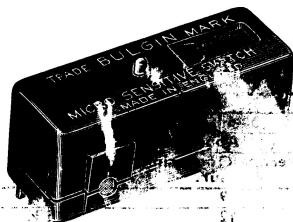
C. **RELEASE-PRESSURE.** The pressure at which the CONTACTS RE-OPERATE, upon return stroke. Is always less than OPERATING-PRESSURE.

**NOTE:—**As B (& C) are less than A, there is always possibility of driving a switch too far—a 'springy' drive might over-travel excessively, and should therefore itself be 'stopped' at a suitable point.

Movement through 2+3 is the first or *forward* half-cycle of an operation; movement-back through 3+4+5 is the second or *return* half-cycle of an operation.



List Nos: S.500-S.502



List

### SENSITIVE NON-LOCKING ACTION

Bulgin Micro-Switches are the finest obtainable—clean action, consistently long life, the famous "Rolling-Spring," BERYLLIUM-COPPER springs (precipitation hardened), Fine SILVER contacts, NYLON operating buttons for highest insulation. The Rolling Spring action was introduced by us to U.K. in 1950, and has since been copied all over the world. Our years of knowledge and experience in the Miniature Switching field for nearly half-a-century assure to every user superlative Micro-Switches of uniform characteristics and exceptionally high standards, every one guaranteed and triple-tested by automatic equipment of unique design. Every Switch is s.p.c.d. for ON, OFF or ON-ON. The Normal operation and Normal

Operating  
and  
On-  
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1/4oz.

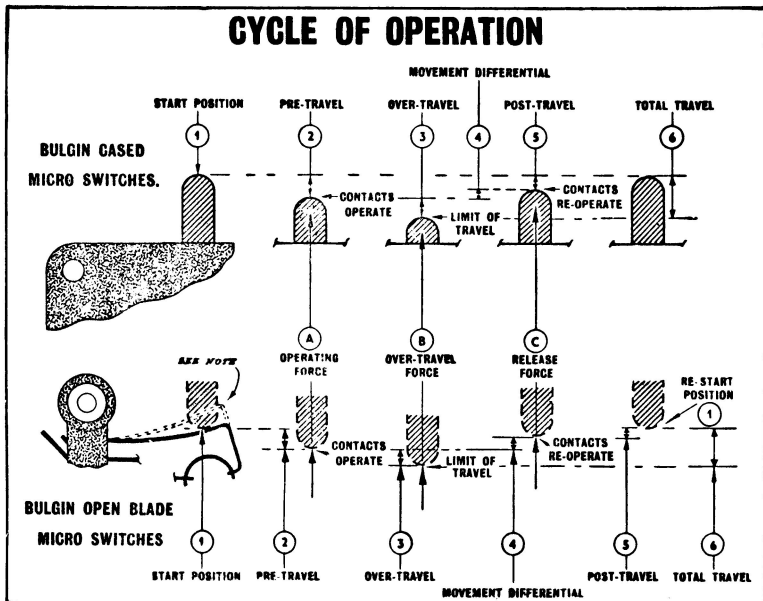
15

# Switches, Micro, Basic Type

## TECHNICAL DATA AND DIMENSIONS

# BULGIN

### CYCLE OF OPERATION



**NOTE:** For longest life START POSITION may not be the 'Free' or relaxed position, especially in Open Blade Switches. Free position is shown dotted, in above illustration.

**FOR ALL TYPES AND MODELS OF BULGIN MICROSWITCHES**

### ELECTRICAL DATA, 50 ~ RATINGS

1	2	3	4	5	6	7	8	9
List No.	Max. V. across open contacts	Max. V. to mounting bolts	Max. V. contacts to button	Up to 125	Carrying and Peak-breaking Amps at V.~			
					130—250	260—460	470—600	110—460
S.500 S.503	800 V. Test 400 V. working	1,000 V. Test 600 V. working	1,000 V. Test 600 V. working	10 A.	5 A.	—	—	—
S.501 S.502 S.503 S.505	2,000 V. Test 600 V. working	1,000 V. Test 600 V. working	1,000 V. Test 600 V. working	10 A.	5 A.	3 A.	2 A.	Motors 1/4 h.p. max. direct switching

**NOTES:** -For C.Y. condition, current may be three times actual use. is, at N.T. & P. De-rate. amp & L.P. states. Cols. 2—4 One minute tests Cols. 5—9 voltage drops to normal within 10 ms. All D.C. ratings must be derated, except below 30 V., or in high-Ω circuits

### ANAL DATA

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g Average Maintain

Pressure

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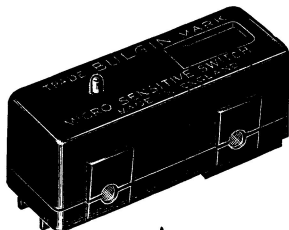
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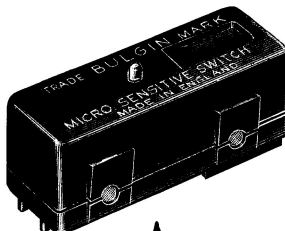
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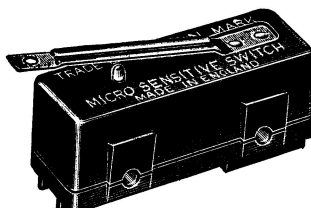
Reset Button—  
below

List No: S.502/Reset

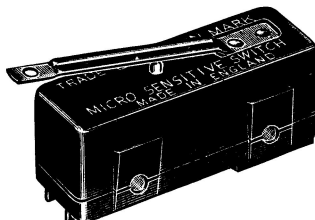


Reset Button—  
below

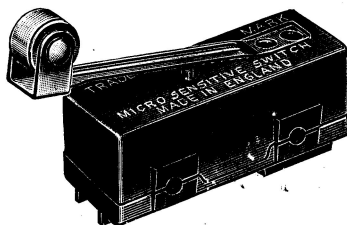
List No: S.505/Reset



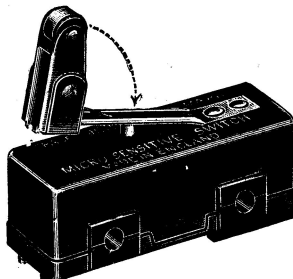
List No: S.506-508



List No: S.509-511



Brass Roller for S.506-511  
range ADD/RB. to List No:  
(See tabulation for Roller in  
other materials)



'One-way' Operation Roller  
for S.509-511 range ADD/RB.1W.  
to List No.

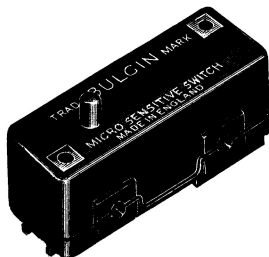
### Micro Switches with Reset-Button in Base

Whilst all foregoing Bulgin Micro-Sensitive Switches have 'biased or 'non-locking' action (the button and contacts returning to unstressed position as soon as pressure is removed), we can now offer two models with locking action ; return of drive button and contacts is effected by a second, "RESET", button, at base. Only after operation of the Reset-button, may the Drive-button again be depressed to re-operate the switch. Mechanical-data as right; Elec-data as types of same List No. (but without 'RESET'-suffix) on this page.

### External Leaf Operators

This further group of Bulgin Micro Switches covers the basic types on pages 152-153, but with added external-leaf 'operator'. This extra fitment is made in a spring alloy, for a working life of normal deflexions equal at least to the normal working life of the basic Switch. Some 5,000,000 operations is usually assured, under approved working conditions. The leaf-operator, acting as a lever, multiplies the distance of movement for operating the Switch, and slightly lessens the operating force, as w.ll as increasing the permitted over travel. The operator-leaves are essential where Button-deflexion is not by direct push but is by Slides or Cams, for drive. Drive or Wipe, should always be away from leaf-anchorage. These are plain, or with-Roller pivoted on Leaf-end.

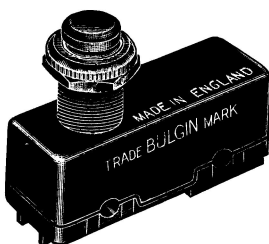




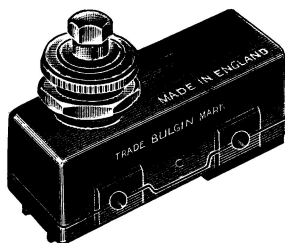
List No : S.725



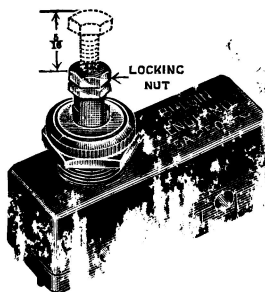
List No: S.778



List No: S.720



List Nos: S.610-612



### Face Mounting Micro-Switches

Face mounting Micro-Switches; fixing by  $2 \times 6$  BA. screws (not provided unless requested) to enter by  $\pm 0.1$ " (2.5 mm.) on the button face. The long insulated button is  $\cdot 156$ " (4 mm.) diameter; allow  $\cdot 171$ " (4.4 mm.) diameter hole through fixing surface. Button projects  $\frac{1}{4}$ " (6.3 mm.) from Micro-Switch face. Second model has slender cased plunger. Manufactured in the highest grade materials, so as to give a precise and long operating life. Users often obtain over 1,000,000 operations. Exceptionally useful for window and door alarm circuits, in many cases for burglar prevention.

### Micro-Switches for Direct-Drive

Strong, very popular Micro-Switches, with piston action plungers, on a standard type moulded casing; internal springs of the best hardened BERYLLIUM-COPPER-alloy and heavy contacts are of fine SILVER. Best operation obtained by axial movement, rather than sliding or rotating surfaces. Standard transverse fixing at  $1\frac{1}{2}$ " centres.

Exceptionally long life. Tested, many obtain over 1,000,000 operations. Further, the design is simple, and the operation is reliable.

# Switches, Micro, Special

## TECHNICAL DATA AND DIMENSIONS

# BULGIN

### FACE MOUNTING MICRO SWITCHES

List No.	Actuator Description	Max. Length	Max. Width	Max. Height	Max. Panel	Panel Hole	Fixing Dimensions	Electrical and Mechanic'l Data
S.725	Insulated button	$1\frac{1}{4}"$ 49.6mm	$\frac{3}{32}"$ 18.3 mm	$1\frac{1}{8}"$ 28.6 mm	—	—	2 x 6 BA. clearing holes at $1\frac{1}{32}"$ 40.5 mm. crs.	See page 153 List No. S.501
S.778	Bushed, Metal Button	$1\frac{1}{4}"$ 49.6mm	$\frac{3}{32}"$ 18.3 mm	$1\frac{3}{4}"$ 35.3 mm	—	—	2 x 6 BA. clearing holes at $1\frac{1}{32}"$ 40.5 mm. crs.	See page 153 List No. S.501

These models have the added facility of the provision for face mounting in addition to the normal side mounting holes. S.778 also has a special plunger allowing a greater total travel to be obtained with a limit of 0.075".

### PISTON-BUTTON MICRO SWITCH

List No.	Actuator Description	Max. Length	Max. Width	Max. Height	Max. Panel	Panel Hole	Fixing Dimensions	Electrical and Mechanic'l Data
S.730	Bushed, Metal Button	$1\frac{1}{4}"$ 49.6 mm	$\frac{3}{32}"$ 18.3 mm	$1\frac{3}{8}"$ 34.9 mm	—	—	2 x 4 B.A. clearing holes at $1" 25.4$ mm. crs.	See page 153 List No. S.501

Special model with button allowing a total travel figure of 0.075" max. this is larger than is normal for this switch.

### ONE-HOLE FIXING MICRO SWITCHES

List No.	Actuator Description	Max. Length	Max. Width	Max. Height	Max. Panel	Panel Hole	Fixing Dimensions	Electrical and Mechanic'l Data
S.610	Metal Button designed to give large overtravel	$1\frac{1}{4}"$ 49.6 mm	$\frac{3}{32}"$ 18.3 mm	$1\frac{1}{32}"$ 37.3mm	$\frac{15}{32}"$ 6.0 mm	$\frac{15}{32}"$ 11.9 mm. $\varnothing$ clearing + lug $\frac{1}{16}"$ 1.6 mm wide x $\frac{1}{32}"$ 0.8 mm high Retain Hex. nut behind Panel	—	See page 153 List No. S.500
S.611								See page 153 List No. S.501
S.612								See page 153 List No. S.502
S.775 /S.500	Metal Button Adjustable height by up to $\frac{5}{16}"$ 7.9 mm	$1\frac{1}{4}"$ 49.6 mm	$\frac{3}{32}"$ 18.3 mm	$2\frac{1}{16}"$ 52.5 mm	$\frac{15}{32}"$ 6.0 mm	$\frac{15}{32}"$ 11.9 mm. $\varnothing$ clearing + lug $\frac{1}{16}"$ 1.6 mm wide x $\frac{1}{32}"$ 0.8 mm high Retain Hex. nut behind Panel	—	See page 153 List No. S.500
S.775 /S.501								See page 153 List No. S.501
S.775 /S.502								See page 153 List No. S.502

With one-hole-fixing bush and back-of- and front-of-panel nuts, for panels of up to  $\frac{1}{4}"$  max. thickness and Metal button, all highly plated. Models S.775 etc., have Button-height Adjustment, the Button head may be unscrewed by up to  $\frac{1}{16}"$ . Reasonably-axial drive is best. Side fixing holes also provided.

### MICRO SWITCH FOR DIRECT-DRIVE OPERATION

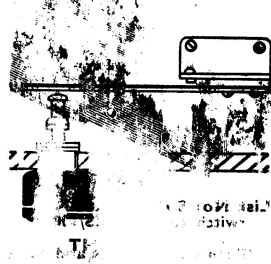
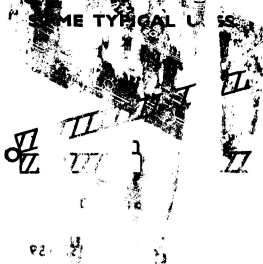
List No.	Actuator Description	Max. Length	Max. Width	Max. Height	Max. Panel	Panel Hole	Fixing Dimensions	Electrical and Mechanic'l Data
S.720 /Colour	Casein Plunger Button	$1\frac{1}{4}"$ 49.6 mm	$\frac{3}{32}"$ 18.3 mm	$1\frac{1}{4}"$ 41.7 mm	$\frac{1}{16}"$ 11.1 mm	$\frac{15}{32}"$ 11.9 mm. $\varnothing$ clearing + lug $\frac{1}{16}"$ 1.6 mm. wide x $\frac{1}{32}"$ 0.8 mm. high	—	See page 153 List No. S.501

**Colour Button:**—Normally Black, Red if required.

This model ideally suited for direct drive operation. It is fitted with a Casein Plunger Button and requires not more than 2 lbs. operating pressure. Total maximum allowable travel =  $\frac{1}{16}"$  1.6 mm. VERY SUITABLE FOR MANUAL USE.

### GENERAL NOTES

Switches of these types are widely used for Alarm Circuits, etc., and one-hole-fix types are very useful where adjustment of switch towards a striker or driving device helps in setting-up operation. The adjustable plunger type is very useful for this. Face-mounting types are widely used to fix to doors and to windows as well as to panels, and are ideal for protection-circuits on Crittal and other metal windows, in industrial as well as domestic applications.



List No.	Operator Description	Max. Length	Max. Width	Max. Height	Max. Panel	Panel Hole	Fixing Dims	Elec. and Mech. Data
S.715	Roller Plunger	1 <sup>1</sup> / <sub>64</sub> " 49.6 mm	23 <sup>3</sup> / <sub>32</sub> " 18.3 mm	2 <sup>3</sup> / <sub>64</sub> " 52.8 mm	7 <sup>1</sup> / <sub>64</sub> " 11.1 mm	15 <sup>1</sup> / <sub>8</sub> " 11.9 mm Ø clearing with lug 1 <sup>1</sup> / <sub>32</sub> " 0.8 mm high × 1 <sup>1</sup> / <sub>16</sub> " 1.6 mm wide	—	See page 152-153 List No. S.501
P.No.8541 †*		2 <sup>3</sup> / <sub>32</sub> " 53.2 mm	7 <sup>1</sup> / <sub>64</sub> " 22.2 mm	4 <sup>1</sup> / <sub>64</sub> " 16.3 mm	—	—	2 holes 4 BA. 3.6 mm Ø clearing at 1" ±0.005" 25.4 mm ±0.125 mm crs.	—
S.710/RB./ **	Leaf Drive with Nickel Plated Brass Roller	†† 3 <sup>3</sup> / <sub>32</sub> " 80.2 mm	1 <sup>1</sup> / <sub>2</sub> " 38.1 mm	†† 1 <sup>3</sup> / <sub>64</sub> " 37.7 mm	5 <sup>1</sup> / <sub>64</sub> " 7.9 mm With screws supplied	See Fixing Dims	2 hole 4 BA. 3.6 mm Ø clearing at 1" ±0.005" 25.4 mm ±0.125 mm crs.	See page 152-153 List No. S.500-S.505
S.710/L**	Leaf-Drive Without Roller	††3 <sup>3</sup> / <sub>64</sub> " 79.6 mm		††1 <sup>5</sup> / <sub>64</sub> " 27.4 mm				

† Can be used on List Nos. S.500-S.511

\* Increase Max. Height of switches by 1<sup>1</sup>/<sub>64</sub>" 1.6 mm. when using Terminal enclosure

\*\* Add List No. (from range S.500-S.505) of Bulgin Micro switch required—Duplicates must be used

†† Max. Dimensions are with the leaf in extreme position

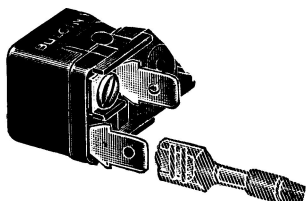


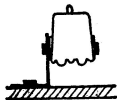
Illustration showing special Base Tags accepting series 250 "push-on" connectors, to obtain add /P.O.T. to List No. Connectors not supplied unless specially requested.

### "Push-on" Connection Terminals for all Basic Type Micro Switches.

All Basic Type Micro-Switches, shown on this page and pages 152-153, 154-155 and 156-157 can be supplied with special base tags for easy connection by push-on type cable connectors. These tags are 1<sup>1</sup>/<sub>4</sub>" (6.4 mm.) wide and accept series 250 'Push-on' connectors, the latter can be supplied by us, if requested. To obtain switches with this feature add /P.O.T. to List No. (e.g. S.502/P.O.T.).

### Base Cover and Surface Mounting Accessory for Basic Micro-Switches

This black, moulded phenolic unit can be used with all Basic Type Micro-Switches except List No. S.710 etc., Reset types and any models fitted with the 'Push-on' connection tags described above. It is designed for use where shrouding of the terminals/tags is needed to ensure extra safety, and fixes by the same 4 BA. bolts used to mount the switch. Alternatively it may itself be Base Mounted, the micro-switch being held in place by the accessory only. Order as P./No. 8541.



Diagrams illustrating the various mounting positions for Bulgin Micro Switches when used with Part No: 9832.

### Side-Mounting Brackets for Basic Switches

Mounting Brackets for all of these switches make them even easier to use in a great number of applications, facilitating fixing to surfaces near button, or near base. Switch may now be operated at several different heights. One bracket or two can be used. Ideal for Alarm Circuits, Safety-doors in Cages, Windows, etc.

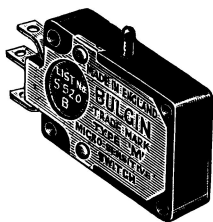
Order Bracket as: P./No. 9832.

This mounting bracket may also be used in conjunction with the basic switches and P./No. 8541 Base Cover.

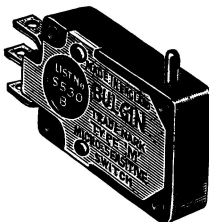
# BULGIN

## Switches, Micro, Miniature

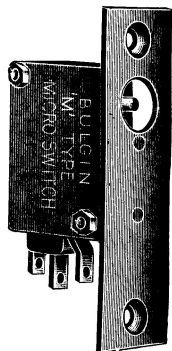
All Standard Types have NYLON Button



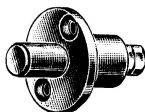
List Nos: S.520—S.528



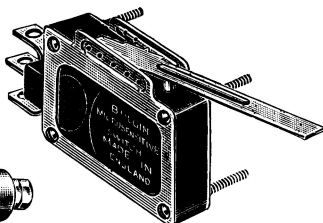
List Nos: S.530—S.532



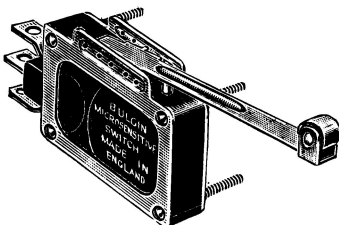
Mortice Plate Switch  
S.A.2261



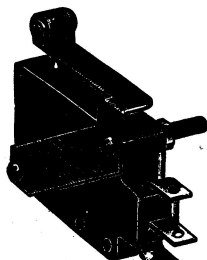
Push-Button  
S.A.2262



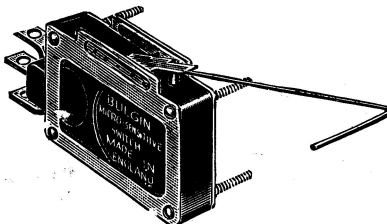
List Nos: S.530—S.532  
illustrated with Leaf operator  
Order as S.530/L.  
(Also fits S.520-528.)



List Nos: S.530—S.532  
illustrated with Roller operator  
Order as S.530/L.R.B.  
(Also fits S.520-528.)



List Nos: S.530—S.532  
illustrated with  
Side Bracket and Roller.  
Order as S.530/L.R.B.



List Nos: S.530—S.532  
illustrated with Wire operator  
Order as S.530/W.  
(Also fits S.520-528.)

Note: Leaf, Roller and Wire operators  
may also be reversed to project towards  
the Solder Tags

BRITISH PATENT No: 738422  
U.S.A. PATENT No: 2828372

These Bulgin Miniature Micro-Switches are made with high grade BLACK moulded 'Bakelite' bodies (with styron colour-code covers), fitted with internal springs of hardened Beryllium-copper alloy and with heavy contacts of fine SILVER. Operating buttons are Standard in Nylon for high insulation, but Stainless-Steel are available by pre-arrangement, for special purposes. The switching action is fully 'snap', Q.M.B., with the unique 'C-spring' or rolling spring principle, and solder-tags are provided for connections, firmly anchored against direct pull, 5 lb. test. The Buttons are to be operated by push action, and not smeared or wiped. When driven by cams or slides use leaf-operators.

### Operating Attachments

All Bulgin Miniature or 'M' type Micro-Switches, available in a choice of different operating-characteristics, can be further varied, and their use and applications extended, by the 'OPERATOR' accessories. These include a variety of simple Levers or 'Operators', blade-type, wire-type, and roller-blade type, all used with side-plates that give a choice of up to five pivot-positions, at leverages. Additionally, there is a side-plate and 1:1 roller-lever, and the new flush-mounting bracket and adjustable striker, very useful for alarm circuits to Doors. Bulgin Patents 738422 British and 2828372 American apply.

# Switches, Micro, Operators

## TECHNICAL DATA AND DIMENSIONS

BRITISH PATENT No: 738422

U.S.A. PATENT No: 2828372

# BULGIN

### MAX. ELECTRICAL DATA @ 50 ~

List Nos.	Making, Carrying & Peak-Breaking A.		R.M.S. Working V.		R.M.S. Proof Test V.*	
	@ Up to 12V. ≈	@ 125 to 250V. ~	Across Contacts; Contacts to E.	Contacts to Drive Means	Between Contacts & Contacts to E.	Cont'ts to drive Means
† S.520 to † S.528	6A.	3A.	250V.	250V. 500V.	500V.	500V. 1KV.
† S.530 to † S.532	4A.	3A.	250V.	250V. 500V.	500V.	500V. 1KV.

\* I.R. is taken @ 500V. = (i.e. D.C.), for < 100MΩ dry or recovered

### MECHANICAL DATA

List No.	Colour Code	Nom. Contact Gap	Average Pre-Travel	Max. Differential	Max. Over-Travel	Operating Pressure
† S.520	Red	0.01"	1/32"	0.015" 0.4mm	0.025"	3-6 ozs.
† S.521	Yellow	0.01"	1/32"	0.015" 0.4mm		6-10 ozs.
† S.522	Green	0.25 mm	0.8 mm	0.020" 0.5 mm		10-16 ozs.
† S.524	Yellow	0.02"	1/32"	0.015" 0.4 mm	0.62 mm (For Longest Life Limit to 0.010")	6-10 ozs.
† S.525	Green	0.5 mm	0.8 mm	0.020" 0.5 mm		10-16 ozs.
† S.527	Yellow	0.03"	1/32"	0.020" 0.5 mm	0.050" 1.3 mm	6-10 ozs.
† S.528	Green	0.75 mm	0.8 mm	0.030" 0.75 mm		10-16 ozs.
† S.530	Red	0.01"	0.055"	0.03" 0.75 mm	0.025" 0.62 mm	25-50 gms.
† S.532	Green	0.25 mm	1.4 mm			50-100 gms.

Every model has S.P.C.O. contacting, and so is universal for ON OFF, OFF ON, or CHANGE OVER, giving minimum stocking. Normal Max. and Min. Sinusoidal Rates of Operation (incl. permitted 'pretravel' and 'over travel' for all models).

**FASTEST:** 1 full cycle of total drive plus total retraction in 0.1 Sec. (100 mS.), = all drive in 0.05 Sec., = 10 cycles of movement per Sec.

**SLOWEST:** 1 full cycle in 4.0 Sec. = total drive in 2 Sec. = 1/2" C/S.

† Stainless Steel Button specially to quantity order. Add /A to List No.

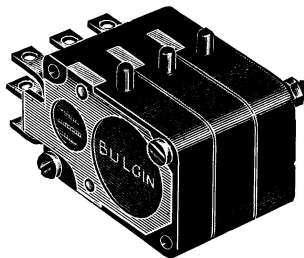
Add Suffix to List No. of Switch	Description
/W.*	Operator-leaf (short) with Stainless Steel Wire extension
/L.*	Operator-leaf-Blade Nickel-Silver
/L./R.B.* † /L./P. †	Operator-leaf fitted with Brass Roller Operator-leaf fitted with Nylon Roller
/SL./R.B.	Side bracket and integral leaf-operator fitted with Brass Roller
SA.2260	Bracket and Push Button attachment for S.530 and S.532 <b>Fixing Dimensions</b> Bracket and Case: 2 x 4 BA. 3.6 mm. ∅ clearing holes at 2 5/8" 60.3 mm. crs. Push Button: 2 x 8 BA. 2.2 mm. ∅ clearing holes at 1 3/4" 13.9 mm. crs.

\* Complete with side brackets and fixing nuts and bolts.

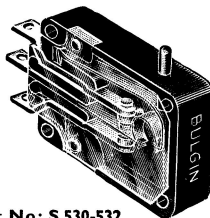
† Brass and Nylon are Standard Roller Materials. Other materials to special order only.

### FIXING HOLE DETAILS

4 HOLES 3/16" (2.4 mm) DIA @ 1" ± 0.003 (25.4 mm CR'S. x 3/16" ± 0.003 15.9 mm)



Bulgin 'M' type Micro-Switches can easily be stacked in groups, as illustrated above, either plain or when fitted with attachments.

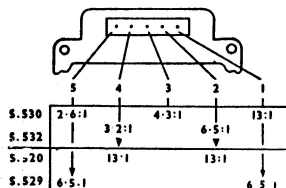


List No: S.530-532

Illustration showing internal mechanism of switch, as seen through new TRANSPARENT covers.

Bulgin Miniature Micro-Switches List Nos. S.520-528 and S.530-532 can have side covers which are moulded in clear TRANSPARENT material, which enables the switch mechanism to be inspected, as illustrated above. A small extra charge may be incurred.

DIAGRAM OF LEVERAGES



Leaf, Roller and Wire operators pivot in side plates as illustrated, which are provided with holes giving five different pivot positions. The ratios of the reduction in operating pressure is shown on the above diagram (where 1 = the listed pressure for the basic switch).

# BULGIN Switches, Introduction

## STANDARD OPERATING METHODS AND CONNECTIONS

Seven operating means are available as standard on Bulgin Moulded Insulation Switches and connection is normally to Solder Tags.



**Pear Dolly**  
Standard Operator  
Toggle Switches



**Push Button**  
Standard Operator  
Biased Push Switches



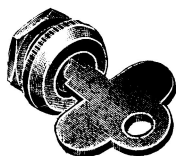
**Push Button**  
Standard Operator  
Push-Push Successional  
Action Switches



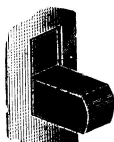
**Long Knob**  
Standard Operator  
Push-Pull Switches



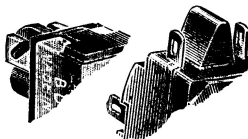
**1/4" Dia. Flatted Shaft**  
Standard Operator  
Semi-Rotary Switches



**Key** (removable in anti-  
clockwise position)  
Standard Operator  
Key Switches



**Slider**  
Standard Operator  
Slide Switches



**Solder Tags**  
Standard Connection  
Moulded Switches  
S.P. left, D.P. right



**Screw Terminals**  
Alternative Connection  
on some Single  
Pole Switches

## ALTERNATIVE OPERATORS AND CONNECTIONS

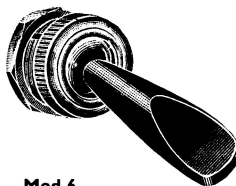
A range of nine alternative operators and connections (Modifications) are available to agreed quantity orders. Different switches take a different selection of these modifications, which these are, is shown by the inclusion of the relevant "Mod No" in the Modification column of the tabulation.



**Mod 4**  
Insulated Pear Dolly  
Order as List No. /PD/INS  
(e.g. SM.259/PD/INS)



**Mod 5**  
Insulated Ball Dolly  
Order as List No. /INS  
(e.g. SM.259/INS)



**Mod 6**  
Duck Bill Dolly  
Order as List No. /DB  
(e.g. SM.259/DB)



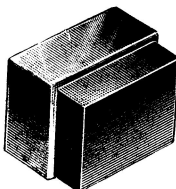
**Mod 7**  
Ball Dolly  
Order as List No. less  
normal /PD Suffix  
(e.g. SM.259)



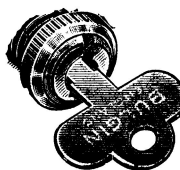
**Mod 8**  
Tags accepting 250  
series Push-On-Tabs  
Order as List No. /POT  
(e.g. SM.259/PD/POT)



**Mod 9**  
Short Knob  
Order as List No. /6134  
(e.g. SM.443/6134)



**Mod 10**  
Square Button Operator  
Order as List No. /SQ.  
(e.g. SRM.259/SQ.)



**Mod 11**  
Key removable in  
Both Positions  
Order as List No. /D.  
(e.g. SM.320/D)



**Mod 12**  
Screw Terminals  
Order as List No.  
/TERM  
(e.g. SM.315/PD/  
TERM)

## FRONT OF PANEL FINISHES

**Standard Finishes** The standard front of panel finish on metal parts is Bright Chrome Plating except for Successional Action Switches which have a Turned Aluminium Push Button. All Moulded front of panel parts are Black.

**Special Finishes** Polished Chrome, Satin Chrome, Bright Nickel and Hard Gold (to 0.15 micro-m approx.), platings, together with colour matched mouldings and/or the appropriate finishes for DEF. Specifications can also be supplied to agreed quantity orders.

**Panel Hole size** For all switches fixing by a threaded bush is  $\frac{15}{32}$ " 11.9 mm.  $\varnothing$  clearing + keyway  $\frac{1}{16}$ " 1.6 mm. wide  $\times$   $\frac{1}{32}$ " 0.8 mm. deep.

## NEW MOULDED SWITCHES REPLACING OLD LAMINATED TYPES - EQUIVALENT LISTS

The original range of Bulgin Laminated S.R.B.P. Body Switches has now been almost completely replaced by a new range with Moulded BS.771 type Phenolic Bodies. These modern design switches have superior electrical ratings and life, and most are virtually identical in physical size to the old laminated models, thereby being completely interchangeable. The table below gives the conversion from Old Laminated types to the New Moulded Equivalents.

### SINGLE POLE RANGE

Type of Switching	New Moulded Switch	Original Laminated Type
S.P.M.B. Toggle	SM.259/PD SM.259/PD/TERM SM.480/PD	S.259, S.400 S.258, S.278, S.279, S.401, S.403 S.480
S.P.M.B. Biased to ON, Toggle	SM.314/PD	.314, S.272
S.P.M.B. Biased to OFF, Toggle	SM.315/PD	S.315, S.271
S.P.C.O. Toggle	SM.265/PD SM.265/PD/TERM SM.482/PD	S.265 S.264 S.482
S.P.C.O. Biased, Toggle	SM.273/PD	S.273, S.274
S.P.M.B. Push for ON	SM.365 SM.365/TERM	S.365 S.358
S.P.M.B. Push for OFF	SM.366 SM.366/TERM	S.366 S.359
S.P.C.O. Push	SM.357 SM.357/TERM	S.357 S.371
S.P.M.B. Push-Push	SRM.259 SRM.259/TERM	SR.259 SR.258
S.P.C.O. Push-Push	SRM.265 SRM.265/TERM	SR.265 SR.264
S.P.M.B. Pull for OFF	SM.443	S.443, S.390
S.P.M.B. Pull for ON	SM.444	S.444, S.220
S.P.C.O. Push-Pull	SM.445	S.445
S.P.M.B. Slide	SM.591 SM.591/TERM	S.591 S.590
S.P.C.O. Slide	SM.593 SM.593/TERM	S.593 S.592
S.P.M.B. Semi-Rotary	SM.253 SM.253/TERM	S.253 S.565
S.P.C.O. Semi-Rotary	SM.254 SM.254/TERM	S.254 S.566
S.P.M.B. Key	SM.319 SM.319/TERM	S.319 S.570
S.P.C.O. Key	SM.320 SM.320/TERM	S.320 S.571

### DOUBLE POLE RANGE

D.P.M.B. Toggle	SM.267/2/PD	S.267
D.P.M.B. Biased to OFF, Toggle	SM.328/2/PD	S.328
D.P.C.O. Toggle	SM.270/2/PD	S.270, SM.270
D.P.C.O., Biased, Toggle	SM.327/2/PD	S.327, S.329, SM.327
D.P.M.B. Toggle	SM.277/2/PD	S.277, S.300
D.P.C.O. 8-Contact, Toggle	SM.301/2/PD	S.301, S.302
D.P.M.B. Push for ON	SM.417/2	S.417
D.P.M.B. Push for OFF	SM.418/2	S.418
D.P.C.O. Push	SM.419/2	S.419, SM.419
D.P.M.B. Push-Push	SRM.267/2	SR.267
D.P.C.O. Push-Push	SRM.270/2	SR.270, SRM.270
D.P.C.O. Push-Pull	SM.446/2	S.446, S.447, S.448, SM.446
D.P.M.B. Semi-Rotary	SM.256/2	S.256
D.P.C.O. Semi-Rotary	SM.257/2	S.257
D.P.M.B. Key	SM.321/2	S.321
D.P.C.O. Key	SM.324/2	S.324
D.P.M.B. Slide	SM.594/2	S.594
D.P.C.O. Slide	SM.596/2	S.596

Switches, Moulded, S.P., Toggle  
TECHNICAL DATA AND DIMENSIONS



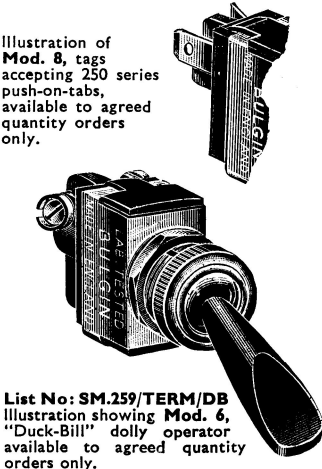
List No. with Solder Tags	Modifi- cations available‡	Ideogram	Switching	Ratings†	Max. Panel
SM.259/PD*	4, 5, 6, 7, 8		S.P.M.B.	3A. at 250V. A.C.	1 1/64" 4.4 mm
SM.480/PD	8, 12				51/64" 20.2 mm
SM.315/PD	7, 8, 12		S.P.M.B. Biased to OFF		1 1/64" 7.5 mm
SM.314/PD			S.P.M.B. Biased to ON		
SM.265/PD*	4, 5, 6, 7, 8		S.P.C.O.	2A. at 250V. A.C.	1 1/64" 4.4 mm
SM.482/PD	8, 12				51/64" 20.2 mm
SM.273/PD	7, 8, 12		S.P.C.O. Biased		1 1/64" 7.5 mm

†All ratings are based on Non-Inductive Circuits. For special circuit conditions including D.C. uses please consult us.

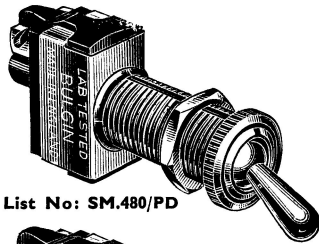
\*Also available to order with Screw Terminal connections, to obtain add /TERM to List No.

‡Modifications Available. (See pages 170-171 for full details).

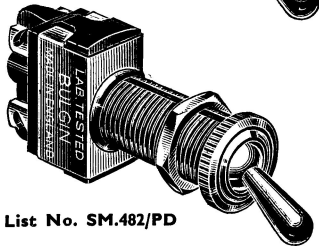
- 4. Insulated Pear Dolly, add /PD/INS to List No.
- 5. Insulated Ball Dolly, add /INS to List No.
- 6. Duck-Bill Dolly, add /DB to List No.
- 7. Ball Dolly, no /suffix required, order as SM. --- No. only.
- 8. Tags accepting 250 series push-on-tabs, add /POT to List No.
- 12. Screw Terminal connections, add /TERM to List No.



List No: SM.259/TERM/DB  
Illustration showing Mod. 6, "Duck-Bill" dolly operator available to agreed quantity orders only.



List No: SM.480/PD



List No. SM.482/PD

Switches, Moulded, S.P., Toggle, Special

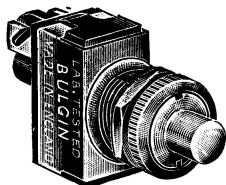
List No.	Ideogram	Switching	Peak Amps.	Fixing
S.805/ Colour*		S.P.M.-B.	6-10 at 250 V. ~ Depending on circuit conditions	Push fit to panel, rectangular hole 0.665" 16.9 mm. × 0.525" 13.4 mm. Max. Panel 1/8" 3.2 mm.

N.B. When using Part No: 9623/69/Colour\* max. panel becomes 3/32" 2.4 mm.

\*WHITE or BLACK to order, state which is required.

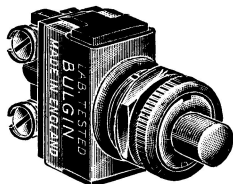
is by push-in spring fit to a rectangular hole .665" (16.9 mm.) × .525" (13.4 mm.) and electrical connection is made to nickel silver plated rear solder-tags, which are also shaped to take series 187 push-on connectors. If requested, we can also supply the Push-on-connectors, order Part No. 10906. Supplementary ON - OFF escutcheon also available, order Part No. 9623/69/Colour.





List No: S.M.365

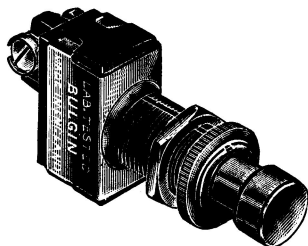
All switches on these two pages have 2KV. Proof Test and Insulation Resistance > 100MΩ @ 500V. DC.



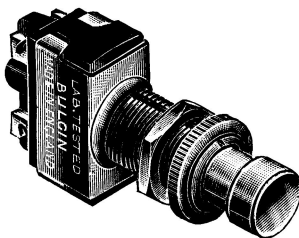
List No: S.M.357/TERM

There are three types of manual press Action Switches as tabulated on the right all of which have best quality moulded phenolic insulation for highest resistance, even under adverse conditions. Screw terminals or solder tags to choice. Typical average life of 25,000 operations; primarily for manual use but may be mechanically operated. The operating button is standard Chrome plated.

## Switches, Moulded, S.P., Successional Action



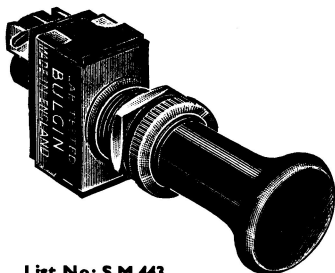
List No: S.R.M.259/TERM



List No: S.R.M.265

These switches are similar to those described above but have successional Push Action, that is push to operate and push again to revert. The operating button is standard turned aluminium but can be supplemented with a Square Push Knob moulded BLACK, and CHROME Panel Escutcheon (Mod. 9) as illustrated left. All are one hole fixing and have SILVER-plated tags/terminals; terminal models are fitted with cup-washers to prevent wire straying and the tags of tag types are hooked for easy wiring.

## Switches, Moulded, S.P., Push-Pull

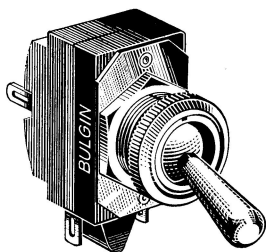


List No: S.M.443

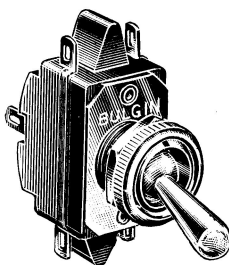
Here we illustrate alternative Push-Pull models with similar circuiting, insulation and plating characteristics to those displayed above. The attractive, easy to grip, polished moulded knob is normally supplied in BLACK but other colours can be supplied by pre-arrangement. Please note that the panel holes for all switches on this page may have re-entrant key to prevent rotation; always retain the hex-nut behind panel.

# BULGIN

## Switches, Moulded, D.P., Toggle



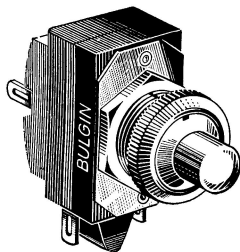
List No: SM.267/2/PD



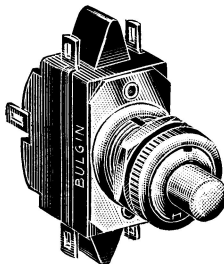
List No: SM.270/2/PD

New Double Pole Switches with all-moulded insulation of highest grades of phenolic. The soldering tags, heavily Ag-plated are integral with the heavy internal contacts and will also accept 110 series Push-on connectors Fully snap Q.M.B. Action, but with fine Silver, self-cleaning contact surfaces suitable for Mains or Low Voltage uses. Heavy fixing bush  $\frac{15}{32}$ "  $\varnothing$ , 32 T.P.I. Whit. as Standard.

## Switches, Moulded, D.P., Biased Press & Successional Action



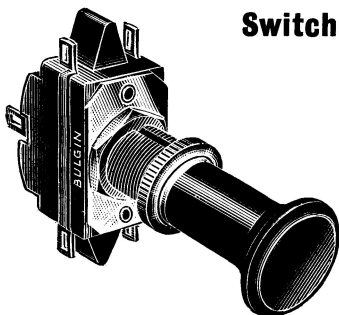
List No: SM.417/2



List No: SM.419/2

Further New Double Pole Switches. These models have the same contacting and terminal tags arrangements, and the same ratings and uses, and fixings arrangement, but have either Biased Push or Push-Push Successional action. The former changes contact only whilst held pressed and has a chrome operating button; the latter is pushed to change contact and holds upon release, then requires a second push to revert to the original contacts and has an aluminium button. Fixing-bush hole  $\varnothing$  unchanged, but max. panel thickness alters as tabulated opposite.

## Switches, Moulded, D.P., Push-Pull



List No: SM.446/2

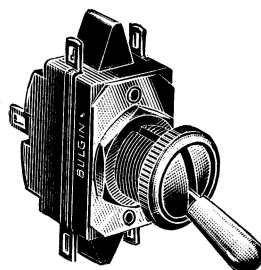
An extension of the range of New D.P. Switches. These models have the same general features, ratings, fixing, etc., but have Push/Pull operation. Push the Knob to change contacting—it stays in; to revert the contacting, Pull the Knob. Fixing-bush hole  $\varnothing$  unchanged.

# Switches, Moulded, D.P., Toggle

## TECHNICAL DATA AND DIMENSIONS

# BULGIN

List No.	Modifications†	Ideogram	Switching	Ratings†	Max. Panel
SM.270/2 /PD	7		D.P.C.O.	2A. at 250V. A.C.	$\frac{17}{64}$ " 4.4 mm
SM.327/2 /PD			D.P.C.O. Biased		$\frac{19}{64}$ " 7.5 mm
SM.267/2 /PD			D.P.M.B.		$\frac{17}{64}$ " 4.4 mm
SM.328/2 /PD			D.P.M.B. Biased to OFF		$\frac{19}{64}$ " 7.5 mm



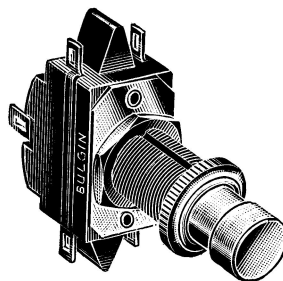
List No: SM.327/2/PD  
Biased or "non-locking" version

## Switches, Moulded, D.P., Biased Press & Successional Action

List No.	Modifications†	Ideogram	Switching	Ratings†	Max. Panel
<b>BIASED PUSH MODELS</b>					
SM.419/2	None		D.P.C.O.	2A. at 250V. A.C.	$\frac{23}{64}$ " 8.3 mm
SM.417/2			D.P.M.B. Push for ON		
SM.418/2			D.P.M.B. Push for OFF		

### SUCCESSIONAL ACTION PUSH MODELS (Fitted with Circular Push Button)

List No.	Modifications†	Ideogram	Switching	Ratings†	Max. Panel
SRM.270/2	9		D.P.C.O.	2A. at 250V. A.C.	$\frac{17}{32}$ " 13.5 mm
SRM.267/2			D.P.M.B.		



List No: SRM. 270/2

## Switches, Moulded, D.P., Push-Pull

List No.	Modifications†	Ideogram	Switching	Ratings†	Max. Panel
SM.446/2	10		D.P.C.O., can be used as D.P.M.B. by not connect- ing two contacts*	2A. at 250V. A.C.	$\frac{23}{64}$ " 9.1 mm

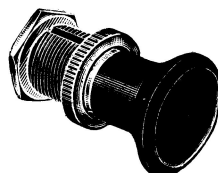


Illustration showing Mod. 10,  
short operating knob,  
available to agreed quantity  
orders only.

**Notes.** All models have Tags which will accept either Solder connections or 110 series push-on-tabs.

†All ratings are based on Non-Inductive Circuits. For special circuit conditions including D.C. uses please consult us.

‡Modifications Available. (See pages 170-171 for full details.)

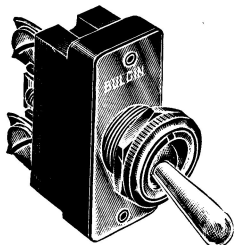
7. Ball Dolly, no suffix required, order as SM. --- No. only.

9. Supplementary Square Button and Escutcheon, add /SQ to List No.

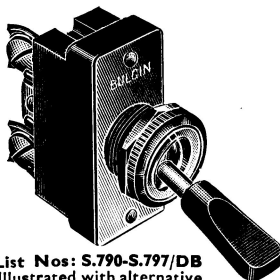
10. Short Knob  $\frac{3}{16}$ " long only, add /6134 to List No.

# BULGIN

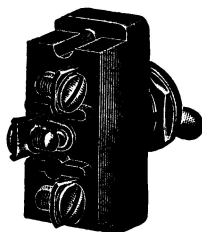
## Switches, Rocker Contact



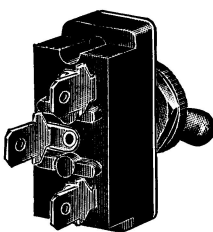
List Nos: S.790-S.797



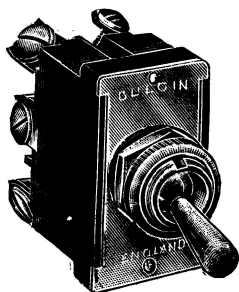
List Nos: S.790-S.797/DB  
Illustrated with alternative  
Duck-Bill Dolly



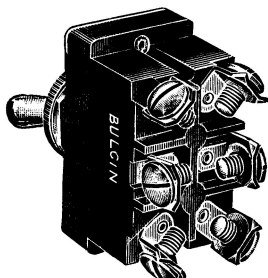
List Nos: S.790-S.797  
Typical Rear View



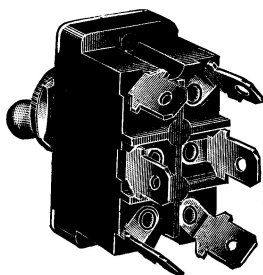
List Nos: S.790/P.O.T.  
S.797/P.O.T.  
Rear View showing  
'Push-on' Type Tags.



List Nos: S.780-S.787



List Nos: S.780-S.787  
Typical Rear View






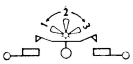
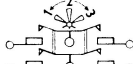

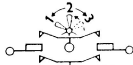
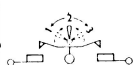

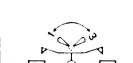
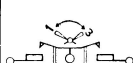

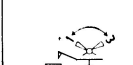


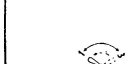
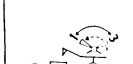


List Nos: S.780/P.O.T.-  
S.787/P.O.T.  
Rear View showing  
'Push-on' Type Tags.

**Moulded Rocker Switches,**  
6—10 Amp. 250 Volts. A.C.  
Several years of intensive research and design were completed before production of these switches started. As a result, the action is now firmer, smoother and more reliable than was previously thought possible. The finish and appearance are also in keeping with the very high quality of performance and make these switches ideal for the electronic equipment designer who needs a switch of the highest calibre. DEF. 5000 and other Specifications can also be met by special manufacture if previously agreed. Body mouldings are in high grade phenolic, and front-of-panel parts finished in brilliant CHROME. Contacts are of SILVER and all metal parts are SILVER-plated where appropriate, or otherwise suitably plated against corrosion. Normally supplied fitted with 4 BA. terminal screws, but tags accepting 250 series push-on-tabs are also available (as illustrated) and can be supplied to agreed quantity orders. We can also supply the female connectors for use with these tags. The Single-Pole range covers 8 different types, 3 with CENTRAL-OFF position and 5 without, including ON-OFF, CHANGE-OVER, BIASED and NOT-BIASED to complete a comprehensive range of top quality snap action mains switches. The Double-Pole versions also include all the same 8 types and conform to the very high standards of the Single-Pole range, and every one is similarly checked before despatch to customers. In addition to the standard dolly the Single Pole (S.790-797) range can also be fitted with a moulded Duck-Bill Dolly, add /DB to List No. when ordering, to agreed quantity orders only. **THESE SWITCHES ARE USED ON ALL TYPES OF HIGH QUALITY ELECTRONIC APPARATUS**

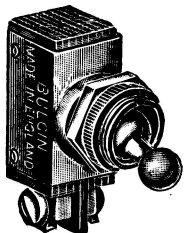
# Switches, Rocker Contact

## TECHNICAL DATA AND DIMENSIONS

# BULGIN

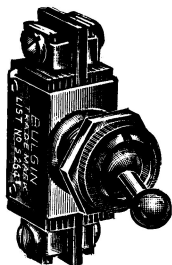
List No.	Single Pole Ideogram (Showing No. of Terminals)	List No.	Double Pole Ideogram (Showing No. of Terminals)	Description				Max. Amp. Rating for all 8 models
S.790		S.780		Change-over, Centre-Off, Non-biased.	Remains ON	Remains OFF	Remains ON	6-10 A. @ 200-250 V. AC. (Depending on circuit conditions.)
S.791		S.781		Change-over, Centre-Off, Biased One-way.	Remains ON	Remains OFF	Temp'y ON	10 A. @ 0-125 V AC. 10 A. @ 0-28 V DC.
S.792		S.782		Change-over, Centre-Off, Sides biased to Off.	Temp'y ON	Remains OFF	Temp'y ON	(Non-reactive circuits.) MAX. WKG. V.:—250 to E.
S.793		S.783		Change-over, Two positions (No centre off), Non-biased.	Remains ON	(No Position)	Remains ON	MAX. TEST V.:—2 KV., Dry or recovered and clean.
S.794		S.784		ON/OFF Two Positions, Non-biased.	Remains OFF	(No Position)	Remains ON	Note.— DC. Ratings in general, and at MAINS voltage in particular, can only be assessed for reactive circuits (or where "surges" are present) when the characteristics of the "LOAD" are known.  Our technical staff will be pleased to advise customers in such instances.
S.795		S.785		ON/OFF Two Positions Biased "ON".	Temp'y OFF	(No Position)	Remains ON	
S.796		S.786		ON/OFF Two Positions, Biased "OFF".	Remains OFF	(No Position)	Temp'y ON	
S.797		S.787		Change-over, Two positions (No centre off), Biased One-way.	Temp'y ON	(No Position)	Remains ON	

N.B.—In addition to the standard dolly the Single Pole (S.790-797) range can also be fitted with a moulded Duck-Bill Dolly to agreed quantity orders only (see illustration) add /DB to List No. when ordering.



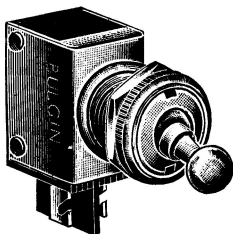
**List No. S.258**

See Pages 174-175 for Equivalent  
Moulded Type SM.259/TERM  
Illustration shows Mod. 7  
Ball Dolly, available to  
agreed quantity orders only  
The Standard is a Pear Dolly



**List No. S.264**

See Pages 174-175 for Equivalent  
Moulded Type SM.265/TERM  
Illustration shows Mod. 7  
Ball Dolly, available to  
agreed quantity orders only  
The Standard is a Pear Dolly



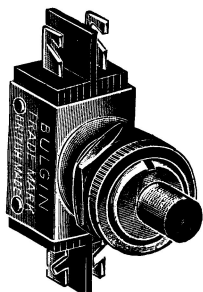
**List No. S.263**

Illustration shows Mod. 7  
Ball Dolly, available to  
agreed quantity orders only  
The Standard is a Pear Dolly

These pages detail various popular Laminated Construction switches. S.258—S.259 are single pole On-Off rated 3A. at 250V.~, S.264—S.265 are single pole Change-Over rated 2A. at 250V.~, and S.261—263 are single pole On-Off long-earth-path types rated 4A. at 250V.~.

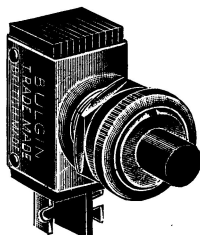
For the convenience of our customers we are continuing to produce these switches, even though most are readily available in a superior quality, less expensive, moulded insulation version (see pages 174-175). All models are available to order fitted with a chrome plated Pear Dolly but various other operators (modifications) can be supplied to agreed quantity orders. Connection is normally to solder tags or screw terminals, but tags accepting 250 series push-on-tabs can also be supplied.

## Switches, Biased Press



**List No. S.357**

SEE PAGES 176-177 FOR  
EQUIVALENT MOULDED TYPE  
S.M.357



**List Nos. S.365, 366**

SEE PAGES 176-177 FOR  
EQUIVALENT MOULDED TYPES  
S.M.365, 366

The Press-Action Switches shown here are again retained for the convenience of our customers. Materials used are all of highest commercial quality and include insulation of laminated S.R.B.P., SILVER plated contacts and solder tags and chrome plated push button and fixing ring. The switching combinations cover Single Pole Make-and-Break, 'push for ON', 'push for OFF' and changeover. Also shown, P.No.6137, chromium plated mounting plate, useful when the switches have to be mounted into a wooden cabinet.

List no. with Term's	List no. with Tags	Modifi- cations Avail- able	Ideogram	Switching	Peak Amps. †	Maxi- mum Panel
S.258††	S.259††	4, 5, 7, 8		S.P.M.—B.	3 at 250V. ~ 4 at 110V. ~ 6 at 6–25V. ≈	$\frac{1}{4}$ " 4.4 mm.
S.264††	S.265††	4, 5, 7, 8		S.P.C.—O.	2 at 250V. ~ 3 at 110V. ~ 4 at 6–12V. ≈	$\frac{1}{4}$ " 4.4 mm.
S.261	S.263	7		S.P.M.—B. Long-earth -path	4 at 250V. ~ 6 at 110V. ~ 8 at 6–25V. ≈	$\frac{1}{4}$ " 4.4 mm.

† All ratings are based on Non-Inductive Circuits. For special circuit conditions including D.C. uses please consult us.

†† See pages 174–175 for equivalent moulded types.

‡ **Modification Available.** (To agreed quantity orders only, check with us.)

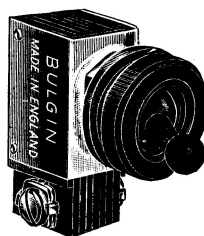
4. Insulated Pear Dolly, add /**PD/INS** to List No.
5. Insulated Ball Dolly, add /**INS** to List No.
7. Ball Dolly, no /suffix required, order as S.— No. only.
8. Tags accepting 250 series push-on-tabs, add /**POT** to List No.

## Switches, Biased Press

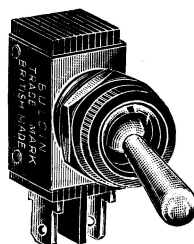
List No. with Term.	List No. with Tags	Ideogram	Switching	Peak Amps.	Maximum Panel
S.358 ††	S.365 ††		S.P.M.—B. Push for 'ON'	3 at 250V. ~	$\frac{5}{16}$ " 7.9 mm.
S.359 ††	S.366 ††		S.P.M.—B. Push for 'OFF'	4 at 110V ~ 6 at 6–12V. ≈	
S.371 ††	S.357 ††		S.P.C.—O. Push for 'Change over'	2 at 250V. ~ 3 at 110V. ~ 4 at 6–12V. ≈	

**Drive:**— Approx. 8 lb. thru approx.  $\frac{1}{8}$ " 3.2 mm.

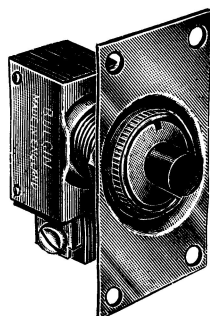
†† SEE PAGES 176–177 FOR EQUIVALENT MOULDED TYPES.



**List No: S.258/INS.**  
 Illustration shows Mod. 5,  
 Insulated Ball Dolly  
 available to agreed  
 quantity orders only.



**List No: S.259/P.D./POT**  
 See Pages 174–175 for Equivalent  
 Moulded Type SM.259/P.D./POT  
 Illustration shows Mod. 8  
 tags accepting 250 series  
 push-on-tabs.  
 Available to agreed quantity  
 orders only.



**List Nos: S.358 or S.359**  
 See Pages 176–177 for Equivalent  
 Moulded Types SM.365/TERM  
 or SM.366/TERM  
 with **Part No: 6137**  
 mounting plate or escutcheon  
 See Pages 172–173.