

# IP series

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



## DISTINCTIVE FEATURES

- Illuminated or non-illuminated
- Tactile feedback
- Wide variety of configurations
- Flat round actuator for optional marking
- Sealed to IP67 and IP69K



## ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing: IP67 according to IEC 60529  
IP69K according to DIN 40050-9 (non-illuminated) with cap U5125
- Shock resistance: 100 g according to IEC 512-4, test 6c
- Vibration resistance: 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray: IEC 512-6, test 11f
- Robustness (non-illuminated): IK06 according to EN 62262 (1 joule)
- Operating temperature: -40 °C to +85 °C (-40 °F to +185 °F)



## ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load (gold plated silver contacts):  
5 A 28 VDC, 70,000 cycles (only function 3)  
0.2 A 48 VDC, 500,000 cycles  
0.5 A 48 VAC, 500,000 cycles  
For W terminals, current has to be limited to 400 mA.
- Initial contact resistance: 100 mΩ max.
- Insulation resistance: 1 GΩ min. at 500 VDC
- Dielectric strength: 1,500 Vrms
- Contact bounce: 10 ms



### LED COMPONENT SPECIFICATIONS

LED color	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20 mA	2.1 V	2.3 V
Yellow (LOY)	20 mA	2.1 V	2.3 V
Green (LOG)	20 mA	2.1 V	2.3 V
Blue (LOB)	20 mA	3.2 V	3.8 V
White (LOW)	20 mA	3.35 V	4.25 V
Red/green (LSG)	20 mA	Red: 1.95 V / green: 2.1 V	2.5 V
Yellow/green (LYG)	20 mA	Yellow: 2 V / green: 2.1 V	2.5 V

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

The company reserves the right to change specifications without notice.

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## GENERAL SPECIFICATIONS

- Panel thickness: 1.5 mm (.059) min.  
4 mm (.157 max.)
- Total travel:  
Function 3: 1.7 mm (.067) ± 0.3 mm (0.012)  
Function 5: 1.3 mm (.051) ± 0.3 mm (0.012)
- Typical operating force: 6 N ± 2 N
- Low level/mech. life: 1,000,000 cycles
- Torque: 1.5 Nm max. applied to nut
- Soldering: 320 °C (608 °F) max. for 3 sec.

## MATERIALS

- Case: thermoplastic UL94-V0
- Actuator: polyamide 6/6
- Bushing/bezel: zinc die-cast (zamak), black painted
- Contacts: - silver, gold plated (std)  
- brass, gold plated (for option 104)
- Output wires (flying lead terminals):  
**F version:** AWG20, section 0.6 mm<sup>2</sup>  
**W version:** AWG24, section 0.23 mm<sup>2</sup>
- LED wires:  
**F version:** AWG26, section 0.12 mm<sup>2</sup>  
**W version:** AWG24, section 0.23 mm<sup>2</sup>
- Lens: polycarbonate
- Terminal seal: epoxy

APEM products may be recycled at end-of-life for the re-claiming of valuable metal components.

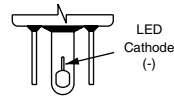
## AGENCY APPROVAL



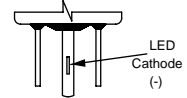
2 A 125 VAC/250 VAC  
File E83438  
See following pages.

## TERMINALS

### ILLUMINATED MODELS

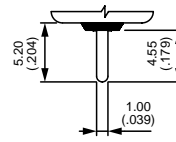


Solder lug S

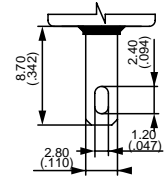


Straight P

### NON-ILLUMINATED MODELS



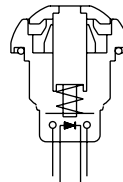
Straight P



Quick-connect Z1

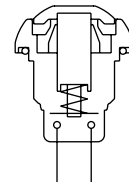
## ELECTRICAL FUNCTIONS

### ILLUMINATED MODELS

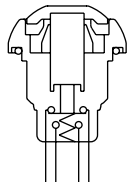


Function 3 (NO)

### NON-ILLUMINATED MODELS



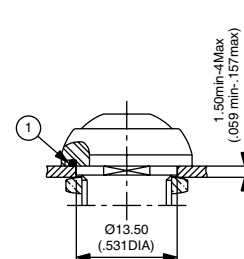
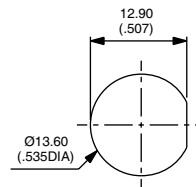
Function 3 (NO)



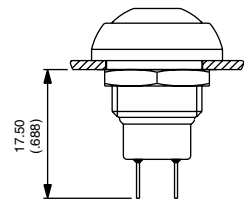
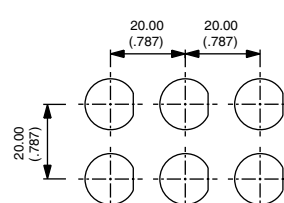
Function 5 (NC/NO)

## MOUNTING

### PANEL CUT-OUT



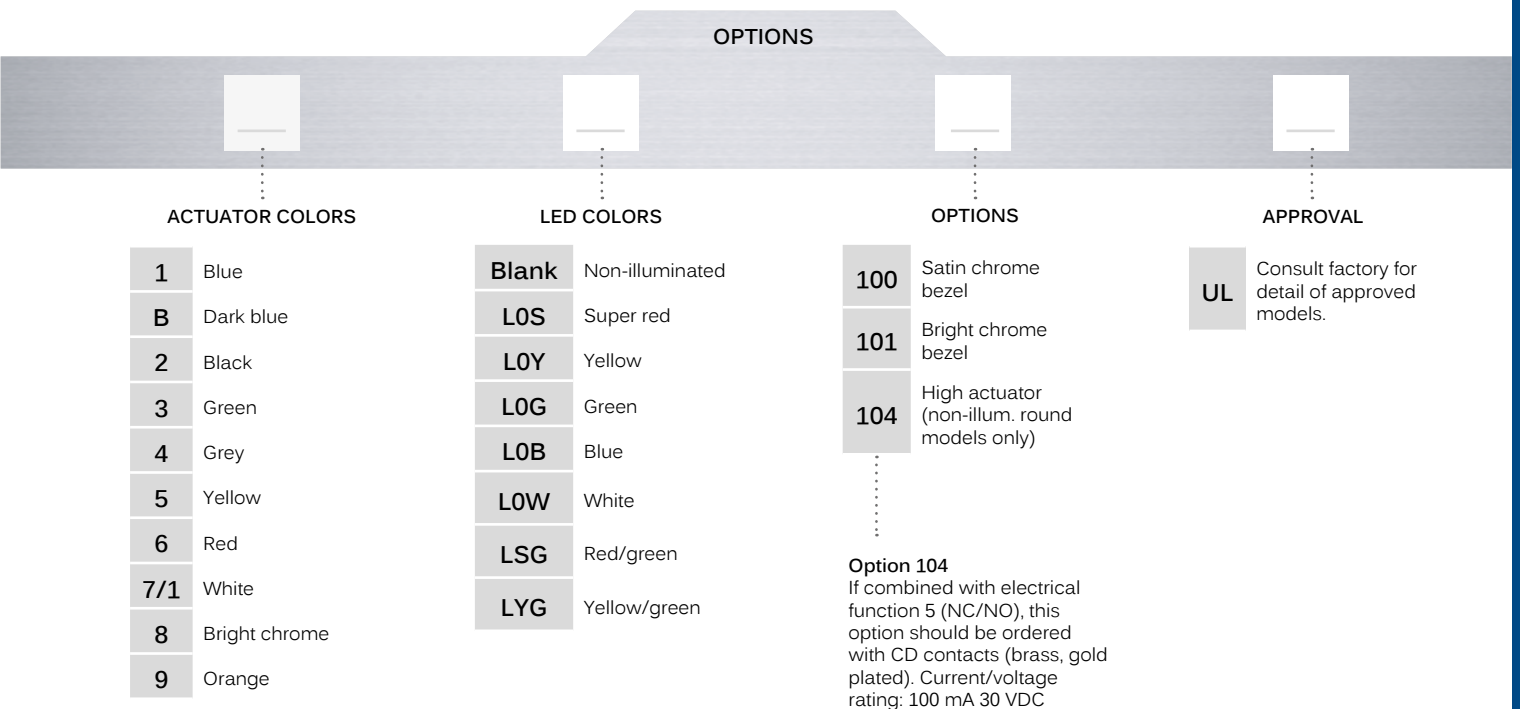
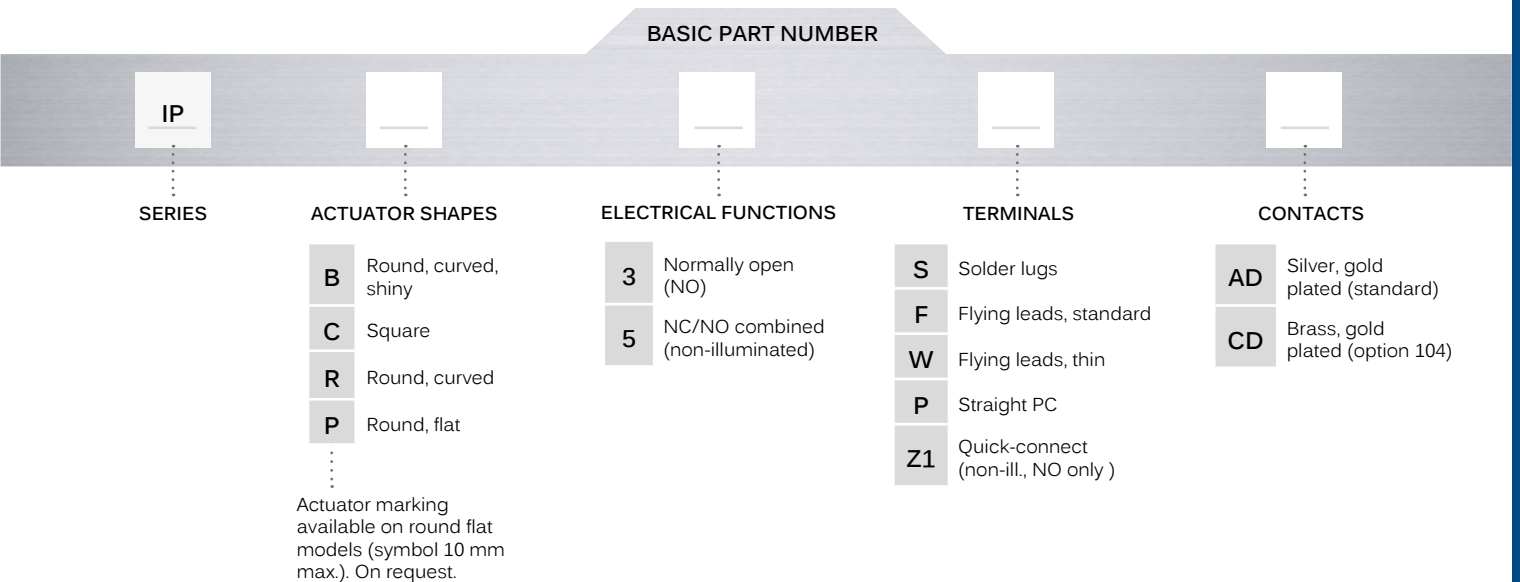
### MATRIX MOUNTING - BACK OF PANEL SPACE REQUIREMENT



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



## BUILD YOUR PART NUMBER



## ABOUT THIS SERIES

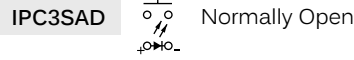
On the following pages, you will find successively basic part numbers of switches and options in the same order as in above chart.

- Notice:** please note that not all combinations of above numbers are available. Refer to the following pages for further information.
- A sealing boot** is available to protect the switches against frost and sand. See "Sealing Boots" section of website.
- Mounting accessories:** Standard hardware supplied: 1 hex nut 14 mm (.551) across flats and 1 O-ring. Hex nut part number U166.

# IP series

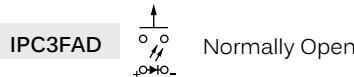
Pushbutton switches for harsh environments •  
bushing Ø 12 mm • momentary

## SQUARE - ILLUMINATED SOLDER LUG TERMINALS



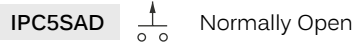
Also available with straight PC terminals: **IPC3PAD**  
LED color is indicated by the bottom of the switch.

## SQUARE - ILLUMINATED FLYING LEAD TERMINALS



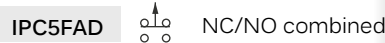
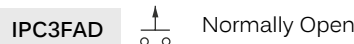
For THIN flying leads, replace F with W.  
**Wire colors:** black: NO contact, red: LED anode(+), blue: LED cathode(-)  
Shown with standard flying lead terminals.

## SQUARE - NON ILLUMINATED SOLDER LUG TERMINALS



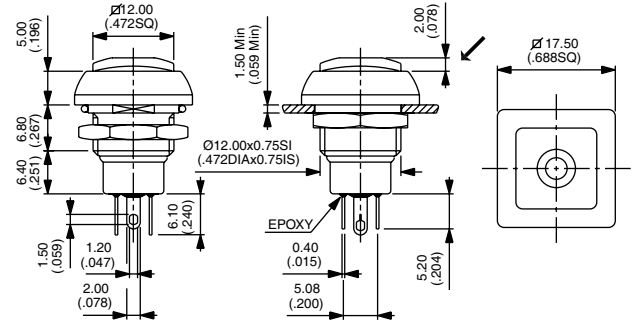
Also available with straight PC terminals: **IPC3PAD** (NO) or **IPC5PAD** (NC/NO)  
and quick-connect terminals: **IPC3Z1AD** (NO only)

## SQUARE - NON ILLUMINATED FLYING LEAD TERMINALS

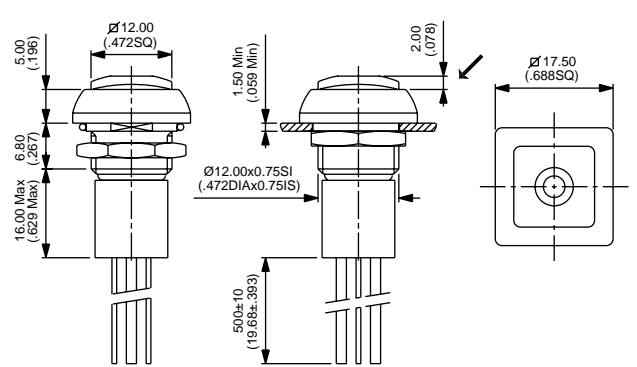


For THIN flying leads, replace F with W.  
**Wire colors** (NC/NO): black: NO, blue: NC.  
Shown with standard flying lead terminals.

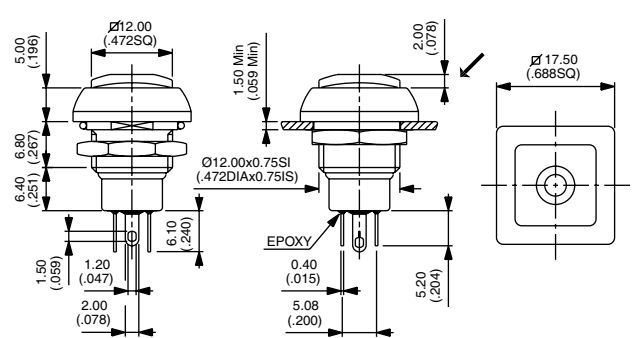
→ FLAT



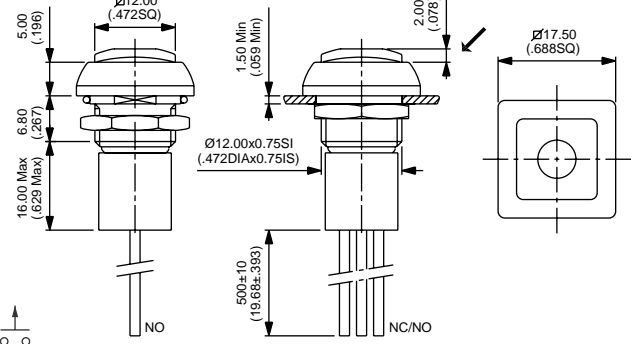
→ FLAT



→ FLAT



→ FLAT



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## ROUND - ILLUMINATED SOLDER LUG TERMINALS



**IPR3SAD**



Normally Open

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

## ROUND - ILLUMINATED FLYING LEAD TERMINALS



**IPR3FAD**



Normally Open

For THIN flying leads, replace F with W.  
Wire colors: black: NO contact, red: LED anode(+), blue: LED cathode(-)  
Shown with standard flying lead terminals.

## ROUND - NON ILLUMINATED SOLDER LUG TERMINALS



Curved actuator, NO

**IPR3SAD**



Curved actuator, NC/NO

**IPR5SAD**



Flat actuator, NO

**IPP3SAD**



Flat actuator, NC/NO

**IPP5SAD**



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

## ROUND - NON ILLUMINATED FLYING LEAD TERMINALS



Curved actuator, NO

**IPR3FAD**



Curved actuator, NC/NO

**IPR5FAD**



Flat actuator, NO

**IPP3FAD**



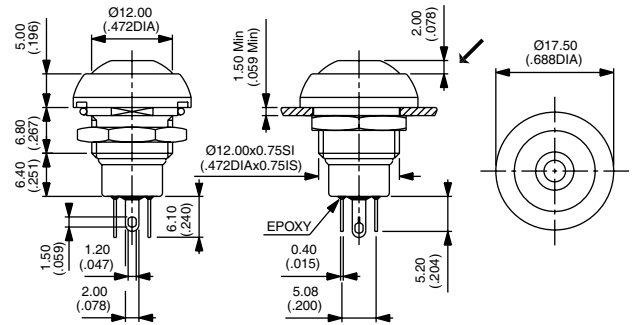
Flat actuator, NC/NO

**IPP5FAD**

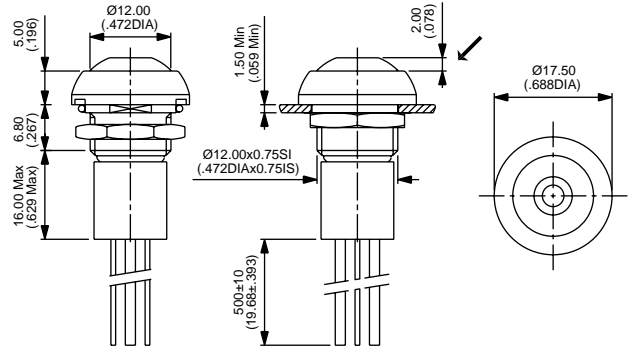


For THIN flying leads, replace F with W.  
Wire colors (NC/NO): black: NO, blue: NC  
Shown with standard flying lead terminals.

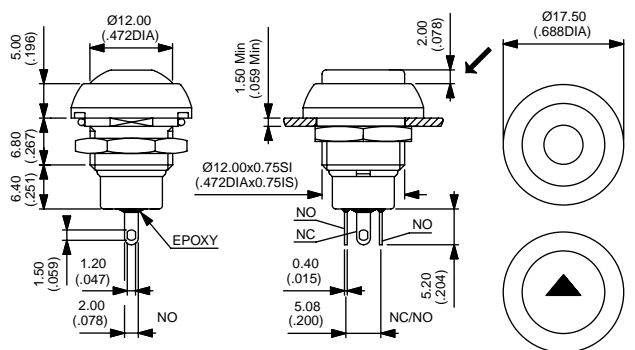
→ FLAT



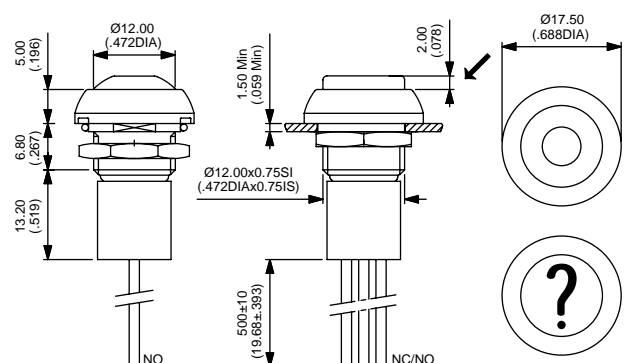
→ FLAT



→ FLAT



→ FLAT



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## ACTUATOR COLORS



- |   |           |     |               |
|---|-----------|-----|---------------|
| 1 | Blue      | 6   | Red           |
| B | Dark blue | 7/1 | White         |
| 2 | Black     | 8   | Bright chrome |
| 3 | Green     | 9   | Orange        |
| 4 | Grey      | A   | Satin chrome  |
| 5 | Yellow    |     |               |

## LED COLORS

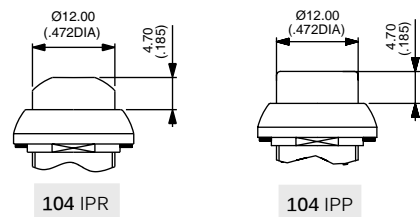


- |       |                 |
|-------|-----------------|
| Blank | Non-illuminated |
| LOS   | Super red       |
| LOY   | Yellow          |
| LOG   | Green           |
| LOB   | Blue            |
| LOW   | White           |
| LSG   | Red/green       |
| LYG   | Yellow/green    |

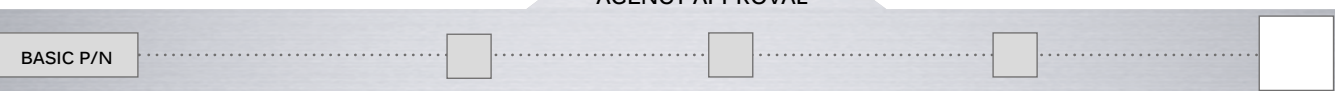
## OPTIONS



- |     |  |
|-----|--|
| 100 | Satin chrome bezel   |
| 101 | Bright chrome bezel  |
| 104 | High actuator - For round, non-illuminated only<br>If combined with function 5 (NC/NO), order with CD contacts (instead of AD contacts). |



## AGENCY APPROVAL



### UL

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



# IP series

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



## DISTINCTIVE FEATURES

- Latching action
- Illuminated or non-illuminated
- Compact
- Flat round actuator for optional marking
- Sealed to IP67



## ENVIRONMENTAL SPECIFICATIONS

- Front panel sealing : IP67 according to IEC 60529
- Shock resistance : 100 g according to IEC 512-4, test 6c
- Vibration resistance : 10-500Hz - 10 g according to IEC 512-4, test 6d
- Salt spray : IEC 512-6, test 11f
- Robustness (non-illuminated) : IK06 according to EN 62262 (1 joule)
- Operating temperature : -40 °C to +85 °C (-40 °F to +185 °F)



## ELECTRICAL SPECIFICATIONS

- Max. current/voltage rating with resistive load:

4 A 12 VDC, 200,000 cycles

1 A 48 VDC, 200,000 cycles

2 A 48 VDC, 100,000 cycles

3 A 48 VDC, 75,000 cycles

1 A 72 VDC, 15,000 cycles

For W terminals, current has  
to be limited to 400 mA.

- Initial contact resistance : 100 mΩ max.
- Insulation resistance : 1 GΩ min. at 500 VDC
- Dielectric strength : 1,500 Vrms between terminals  
1,000 Vrms between terminals and frame



### LED COMPONENT SPECIFICATIONS

LED color	Forward current	Typ. forward voltage	Max. forward voltage
Super red (LOS)	20 mA	1.95 V	1.95 V
Yellow (LOY)	20 mA	2 V	2.05 V
Green (LOG)	20 mA	2.1 V	2.5 V
Blue (LOB)	20 mA	3.2 V	4 V

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

The company reserves the right to change specifications without notice.



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portugal@ermec.com<sup>1</sup>

# IP series

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

## GENERAL SPECIFICATIONS

- Panel thickness : 1.5 mm (.059) min.  
5.5 mm (.217) max.
- Total travel : 2.5 mm (.098) ± 0.3 mm
- Typical operating force : 10 N
- Low level/mech. life : 200.000 cycles
- Torque : 1.5 Nm max. applied to nut
- Soldering : 320 °C (608 °F) max. for 3 sec.

## MATERIALS

- Case : thermoplastic, UL 94-V0
- Actuator : polyamide 6/6
- Bushing/bezel : zinc die-cast (zamak), black painted
- Contacts : silver, gold plated
- Output wires (flying lead terminals) :  
**F version** : AWG20, section 0.6 mm<sup>2</sup>  
**W version** : AWG24, section 0.23 mm<sup>2</sup>
- LED wires :  
**F version** : AWG26, section 0.12 mm<sup>2</sup>  
**W version** : AWG24, section 0.23 mm<sup>2</sup>
- Lens : polycarbonate
- Terminal seal : epoxy

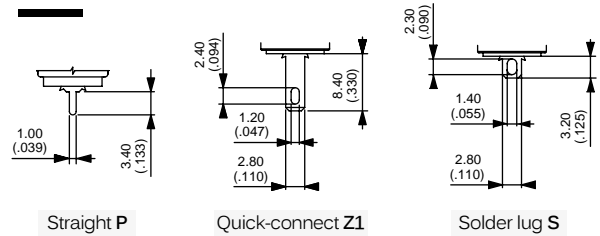
APEM products may be recycled at end-of-life for the re-claiming of valuable metal components.

## AGENCY APPROVAL

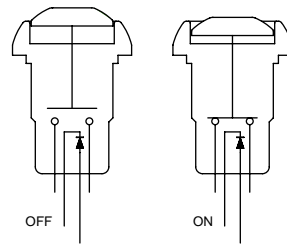


2 A 125 VAC/250 VAC  
File E83438  
See following pages.

## TERMINALS

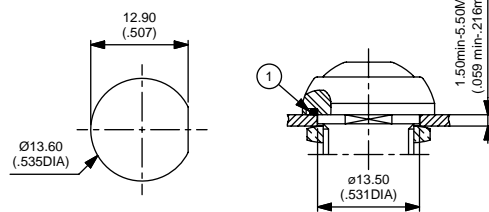


## ELECTRICAL FUNCTION



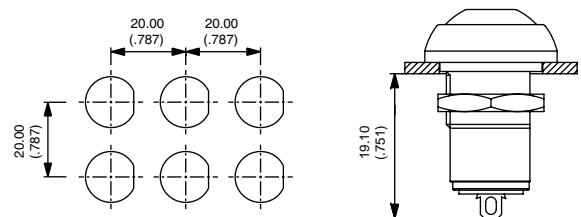
## MOUNTING

### PANEL CUT-OUT



① - Flat seal

### MATRIX MOUNTING - BACK OF PANEL SPACE REQUIREMENT

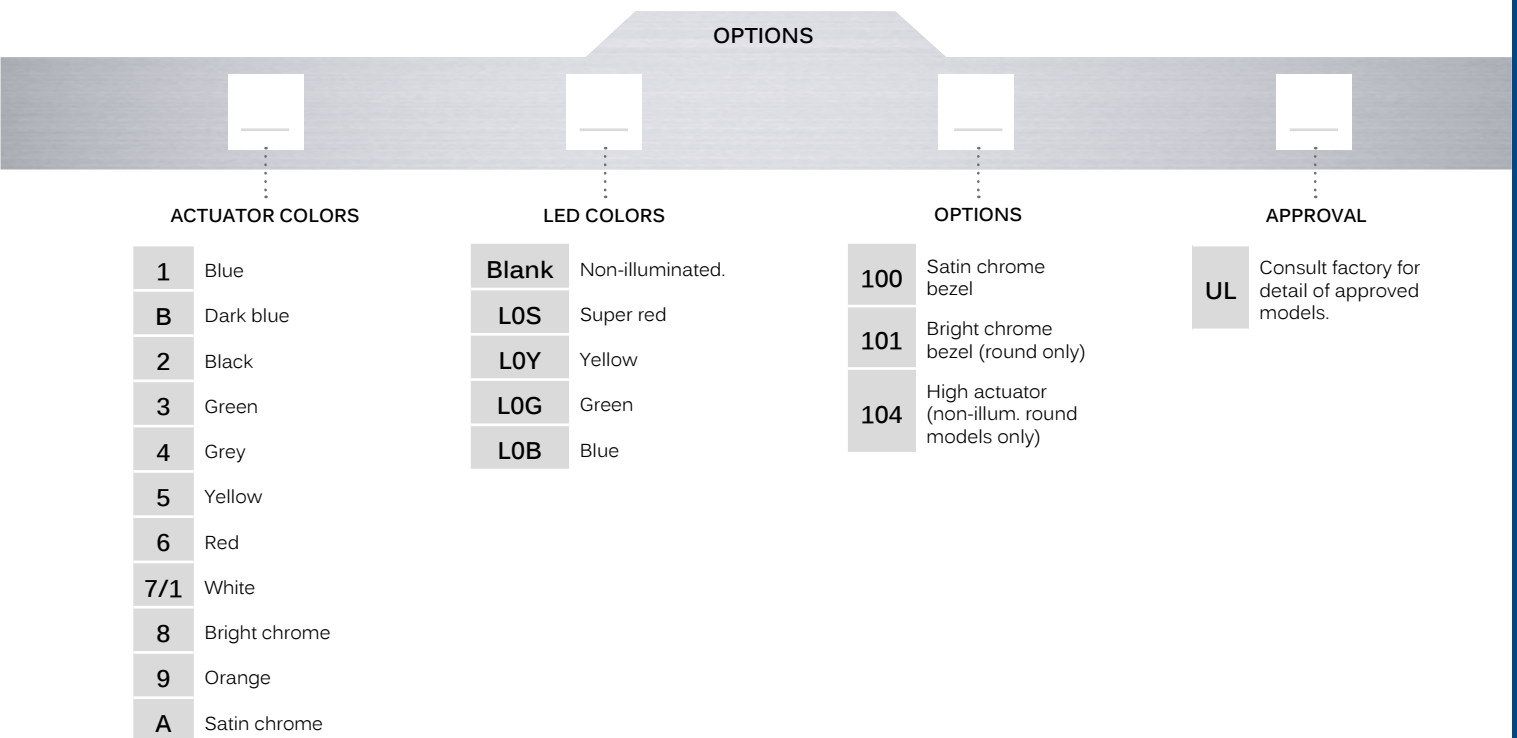
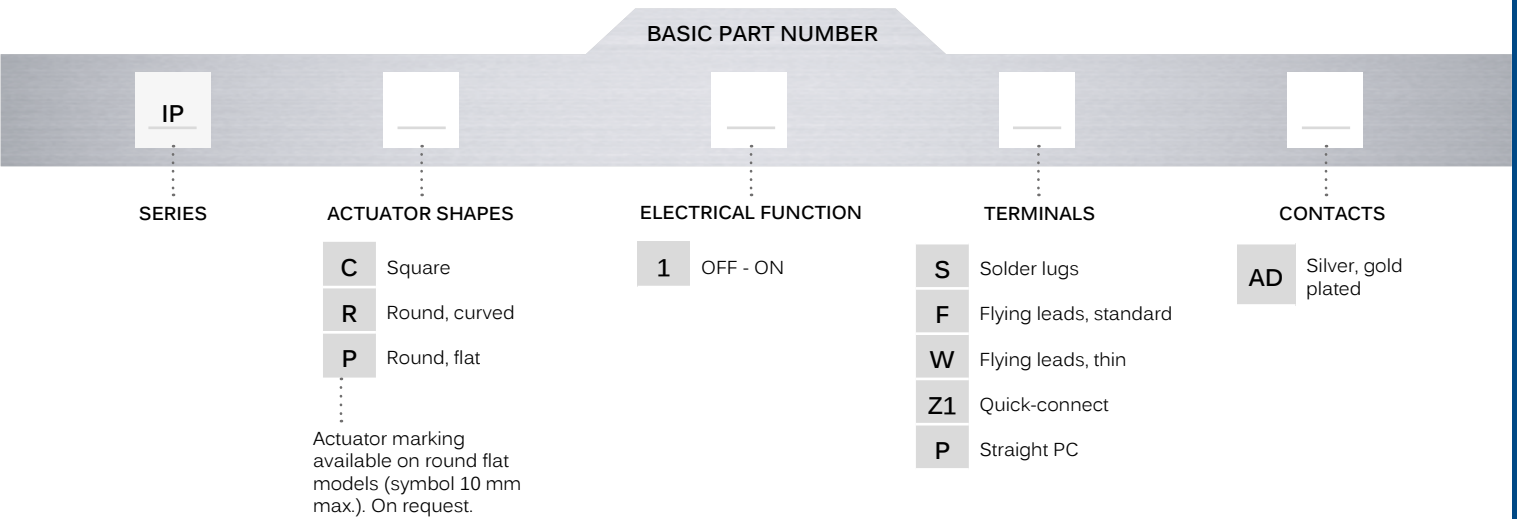




Pushbutton switches for harsh environments •  
bushing Ø 12 mm • latching



## BUILD YOUR PART NUMBER



## ABOUT THIS SERIES

On the following pages, you will find successively basic part numbers of switches and options in the same order as in above chart.

- Notice** : please note that not all combinations of above numbers are available. Refer to the following pages for further information.
- A sealing boot** is available to protect the switches against frost and sand (P/N U5125). See "Sealing Boots" section of website.
- Mounting accessories** : Standard hardware supplied : 1 hex nut 14 mm (551) across flats and 1 O-Ring.

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## ILLUMINATED - SQUARE MODELS



- Solder lug terminals  
**IPC1SAD** OFF - ON
- Flying lead terminals  
**IPC1FAD** OFF - ON

For THIN flying leads, replace F with W.  
Also available with straight PC : **IPC1PAD** or quick-connect terminals : **IPC1Z1AD**.  
Wire colors : black : contact, red : LED anode(+), blue : LED cathode(-)

## ILLUMINATED - ROUND MODELS



- Solder lug terminals  
**IPR1SAD** OFF - ON
- Flying lead terminals  
**IPR1FAD** OFF - ON

For THIN flying leads, replace F with W.  
Also available with straight PC : **IPR1PAD** or quick-connect terminals : **IPR1Z1AD**.  
Wire colors : black : contact, red : LED anode(+), blue : LED cathode(-)

## NON-ILLUMINATED - SQUARE MODELS



- Solder lug terminals  
**IPC1SAD** OFF - ON
- Flying lead terminals  
**IPC1FAD** OFF - ON

For THIN flying leads, replace F with W.  
Also available with straight PC : **IPC1PAD** or quick-connect terminals : **IPC1Z1AD**.

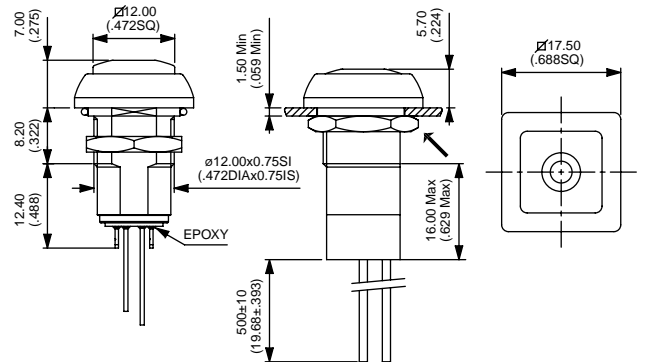
## NON-ILLUMINATED - ROUND MODELS



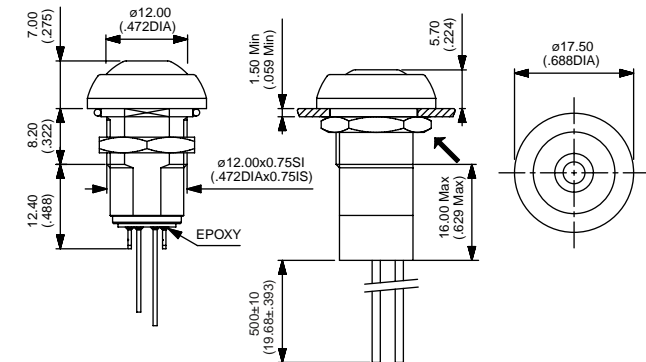
- CURVED ACTUATOR
- Solder lug terminals **IPR1SAD** OFF - ON
- Flying lead terminals **IPR1FAD** OFF - ON
- FLAT ACTUATOR
- Solder lug terminals **IPP1SAD** OFF - ON
- Flying lead terminals **IPP1FAD** OFF - ON

For THIN flying leads, replace F with W.  
Also available with straight PC : **IP•1PAD** or quick-connect terminals : **IP•1Z1AD**

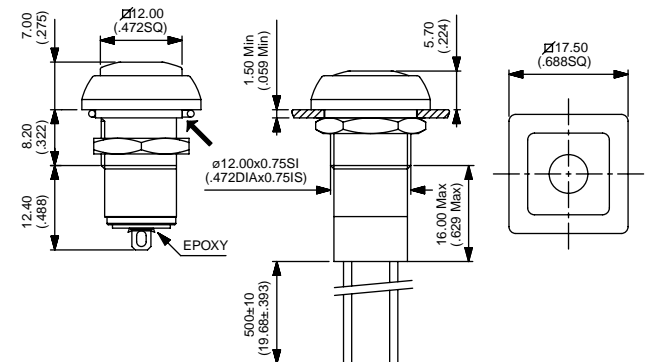
→ FLAT All drawings with standard flying lead terminals.



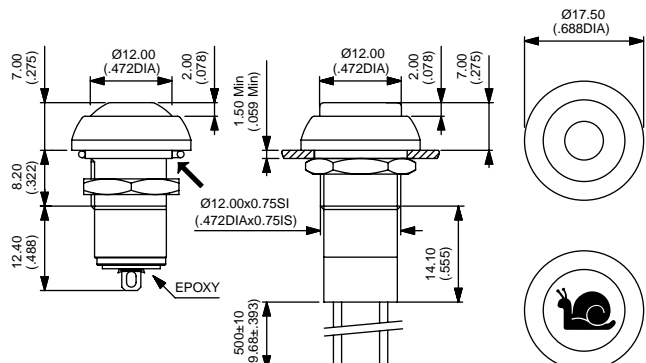
→ FLAT



→ FLAT



→ FLAT



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bushing Ø 12 mm • latching

## ACTUATOR COLORS



- |   |           |     |               |
|---|-----------|-----|---------------|
| 1 | Blue      | 6   | Red           |
| B | Dark blue | 7/1 | White         |
| 2 | Black     | 8   | Bright chrome |
| 3 | Green     | 9   | Orange        |
| 4 | Grey      | A   | Satin chrome  |
| 5 | Yellow    |     |               |

## LED COLORS

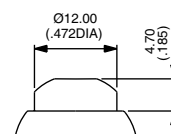


- |       |                 |
|-------|-----------------|
| Blank | Non-illuminated |
| LOS   | Super red       |
| LOY   | Yellow          |
| LOG   | Green           |
| LOB   | Blue            |

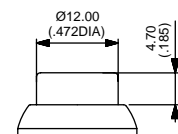
## OPTIONS



- |     |   |
|-----|---|
| 100 | Satin chrome bezel                              |
| 101 | Bright chrome bezel (round only)                |
| 104 | High actuator - For round, non-illuminated only |



104 IPR



104 IPP

## AGENCY APPROVAL



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