



## Features/Benefits

- **Subminiature size**—capable of switching 1 AMP
- **Vertical & right angle terminations**
- **PC & panel mount models**
- **Snap-in front panel mounting available**
- **Epoxy terminal seal-compatible with bottom wash cleaning**
- **RoHS compliant models available**



Models Available

## Typical Applications

- **Telecommunications and networking equipment**
- **Computers and peripherals**
- **Instrumentation and controls**



## Specifications

**CONTACT RATING:** B contact material: 0.4 VA max. @ 20 V AC or DC max. Q contact material: 1 AMP @ 120 V AC or 28 V DC. See page A-19 for additional ratings.

**ELECTRICAL LIFE:** TP11, TP21 MODELS: 60,000 make-and-break cycles at full load. TP12 MODELS: 30,000 cycles.

**CONTACT RESISTANCE:** Below 20 mΩ typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

**INSULATION RESISTANCE:** 10<sup>9</sup>Ω min.

**DIELECTRIC STRENGTH:** 1000 Vrms min. @ sea level.

**OPERATING TEMPERATURE:** -30°C to 85°C.

**SOLDERABILITY:** Per MIL-STD-202F method 208D, or EIA RS-186E method 9 (1 hour steam aging).

**NOTE:** Any models supplied with Q, B, P, R or G contact material are RoHS compliant.

**NOTE:** Specifications and materials listed above are for switches with standard options. For information on specific and custom switches, consult Customer Service Center.

## Materials

**CASE:** Glass filled nylon 4/6 or 6/6, flame retardant, heat stabilized or diallyl phthalate (DAP), (UL 94V-0).

**PLUNGER:** Thermoplastic polyester (UL 94V-0).

**CAP & FRAME:** Nylon, black standard.

**BUSHING:** Brass, nickel plated.

**HOUSING:** Stainless steel.

**SWITCH SUPPORT:** Brass, matte-tin plated.

**END CONTACTS:** B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Coin silver, silver plated. See page A-19 for additional contact materials.

**CENTER CONTACT & ALL TERMINALS:** B contact material: Copper alloy, with gold plate over nickel plate. Q contact material: Copper alloy, silver plated. See page A-19 for additional contact materials.

**TERMINAL SEAL:** Epoxy. Refer to soldering and cleaning in Technical Data Chapter

**HARDWARE:** Nut & Locking Ring: Brass nickel plated. Lockwasher: Steel, nickel plated.

## Build-A-Switch

To order, simply select desired option from each category and place in the appropriate box. Available options are shown and described on pages A-16 thru A-20. For additional options not shown in catalog, consult Customer Service Center. All models have epoxy terminal seal and are compatible with all "bottom-wash" PCB cleaning methods.

<p><b>Switch Function</b></p> <p><b>TP11</b> SPST Off-Mom.</p> <p><b>TP12</b> SPDT On-Mom.</p> <p><b>TP21</b> DPST Off-Mom.</p>	<p><b>Actuator or Bushing</b></p> <p><b>SH</b> .155" high plunger, threaded, .220" high bushing, flat</p> <p><b>SH8</b> .155" high plunger, unthreaded, .220" high bushing, round</p> <p><b>SH9</b> .155" high plunger, unthreaded, .220" high bushing, flat</p> <p><b>J81</b> Snap-in with frame</p> <p><b>LT</b> .215" high plunger, threaded, .310" high bushing, flat</p> <p><b>LT9</b> .215" high plunger, unthreaded, .310" high bushing, flat</p> <p><b>MS9</b> .130" high plunger, .020" high bushing, round</p>	<p><b>Terminations</b></p> <p><b>A</b> Right angle, PC thru-hole</p> <p><b>C</b> PC Thru-hole</p> <p><b>Z</b> Solder lug</p> <p><b>AV</b> Vertical right angle, PC thru-hole</p> <p><b>V3</b> Vertical mount, v-bracket</p> <p><b>W</b> Wire wrap</p>	<p><b>Contact Material</b></p> <p><b>B</b> Gold</p> <p><b>P</b> Gold, matte-tin</p> <p><b>Q</b> Silver</p> <p><b>G</b> Gold over silver</p> <p><b>R</b> Gold over silver, matte-tin</p>	<p><b>Seal</b></p> <p><b>E</b> Epoxy</p>	<p><b>Cap Color</b></p> <p><b>2</b> Black</p> <p><b>NONE</b> Models with no cap</p> <p><b>1</b> White</p>	<p><b>Frame Color</b></p> <p><b>2</b> Black</p> <p><b>NONE</b> Models with no frame</p>
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# TP Series Tiny Pushbutton Switches

Pushbutton  
A

## SWITCH FUNCTION

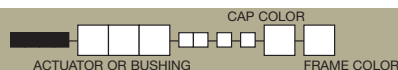


NO. POLES	MODEL NO.	SWITCH FUNCTION		CONNECTED TERMINALS		SCHEMATIC
		POS. 1	POS. 2	POS. 1	POS. 2	
SP	<b>TP11</b>	OFF	MOM.	OPEN	1-3	SPST
	<b>TP12</b>	ON	MOM.	2-1	2-3	SPDT
<b>SPDT</b>  Part number shown: TP12SHZQE Terminal Nos. For Reference Only						
DP	<b>TP21</b>	OFF	MOM.	OPEN	1-3,4-6	DPST
<b>DPST</b>  Part number shown: TP21SHZQE						

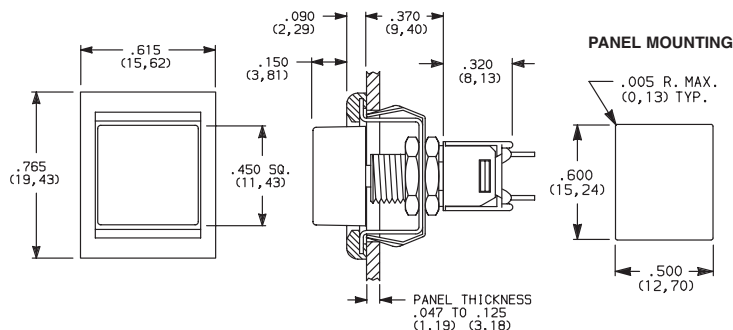
MOM. = Momentary

All models with all options when ordered with G, Q or R contact material.

## ACTUATOR—SNAP-IN FRONT MOUNT



### J81 SNAP-IN WITH FRAME



OPTION CODE	CAP COLOR
<b>2</b>	BLACK
<b>1</b>	WHITE

OPTION CODE	FRAME COLOR
<b>2</b>	BLACK
<b>NONE</b>	No Frame Color (J80 option)

Cap and Frame Finish: matte. Other colors available, consult Customer Service Center.

**NOTE:** Available with Z, C, or W terminations.

**NOTE:** Caps & frames available separately, see page A-20.



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



# TP Series Tiny Pushbutton Switches



A

Pushbutton

**SH** .155" HIGH PLUNGER,  
.220" HIGH BUSHING,  
THREADED, FLAT

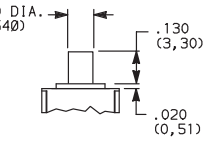
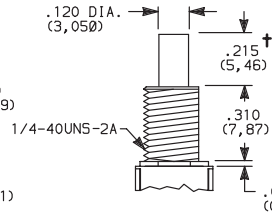
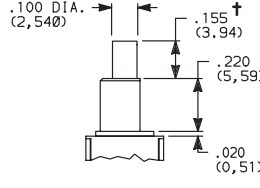
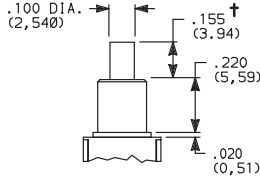
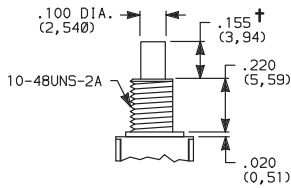
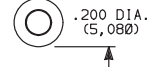
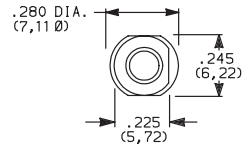
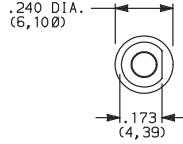
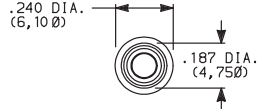
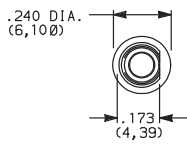
**SH8** .155" HIGH PLUNGER,  
.220" HIGH BUSHING,  
UNTHREADED

**SH9** .155" HIGH PLUNGER,  
.220" HIGH BUSHING,  
UNTHREADED, FLAT

**LT** .215" HIGH PLUNGER,  
.310" HIGH BUSHING,  
THREADED

**LT9** .215" HIGH PLUNGER,  
.310" HIGH BUSHING,  
UNTHREADED

**MS9** .130" HIGH  
PLUNGER



Standard with Z, C, W terminations.

Standard with A, AV, V3 terminations.

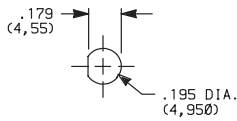
Not available with Z terminations.

† Subtract .016 (0,41) for models with A, AV or V3 terminations.

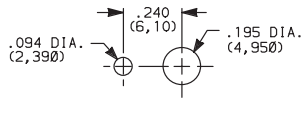
NOTE: Caps available for plunger options, see page A-20.

## PANEL MOUNTING

### 10-48 BUSHING

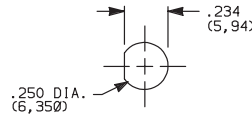


Without locking ring

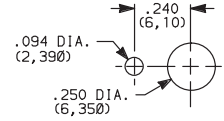


With standard locking ring

### 1/4 IN. BUSHING



Without locking ring



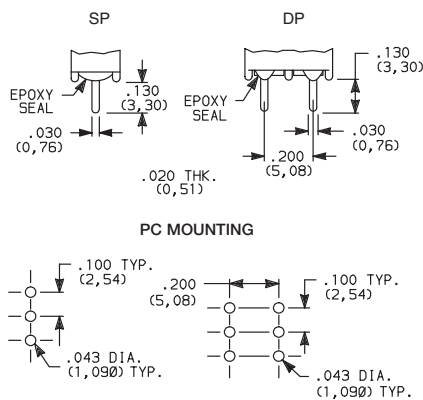
With standard locking ring

NOTE: One mounting nut, locking ring and lockwasher supplied standard with 10-48 threaded bushings (two nuts with 1/4-40 bushings). Optional mounting nut and locking ring styles and finishes available separately, see section "Technical Data and Additional Hardware".

## TERMINATIONS

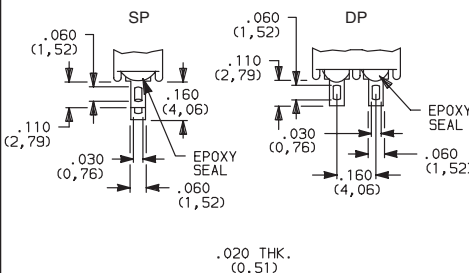


### C PC THRU-HOLE



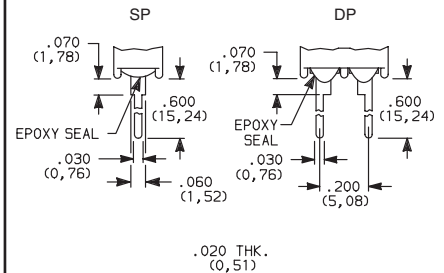
Omit center holes for TP11 models

### Z SOLDER LUG



Not available with MS9 bushing or P or R contact material.

### W WIRE WRAP



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change





# TP Series Tiny Pushbutton Switches

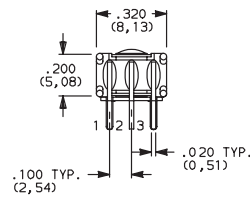
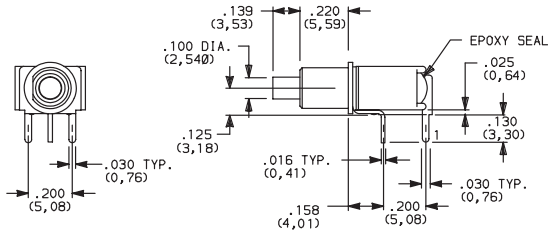
## TERMINATIONS

Pushbutton  
A

### A RIGHT ANGLE, PC THRU-HOLE

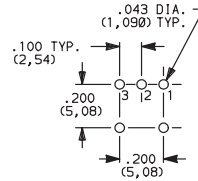


TP12SH9ABE  
SPDT



TP11 Models:  
omit terminal 2.

### PC MOUNTING

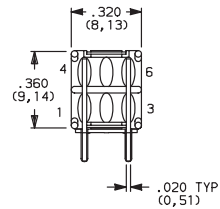
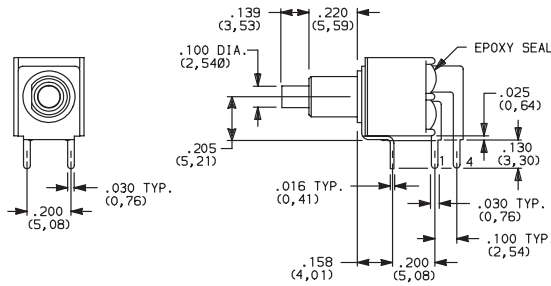


TP11 Models:  
omit hole 2.

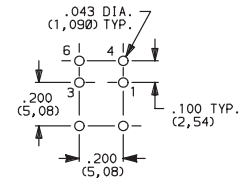
### A RIGHT ANGLE, PC THRU-HOLE



TP21SH9ABE  
DPST



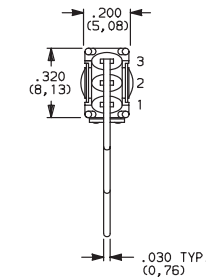
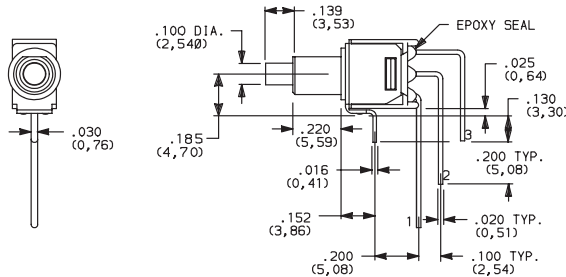
### PC MOUNTING



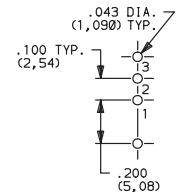
### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE



TP12SH9AVBE  
SPDT



### PC MOUNTING

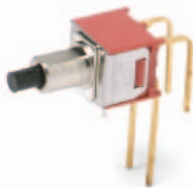


TP11 Models:  
omit hole 2.

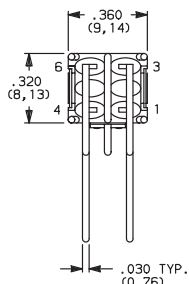
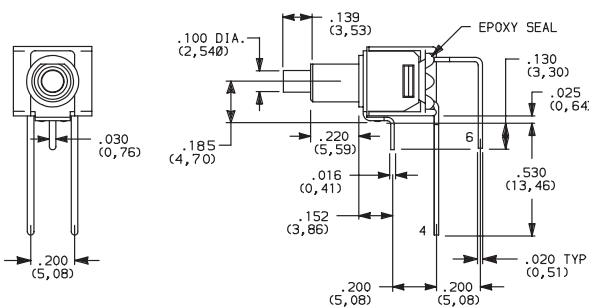
TP11 Models:  
omit terminal 2.

NOTE: Terminal bend radii and lead-in manufacturing option.

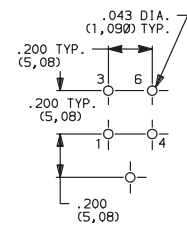
### AV VERTICAL RIGHT ANGLE, PC THRU-HOLE



TP21SH9AVBE  
DPST



### PC MOUNTING



NOTE: Terminal bend radii and lead-in manufacturing option.



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

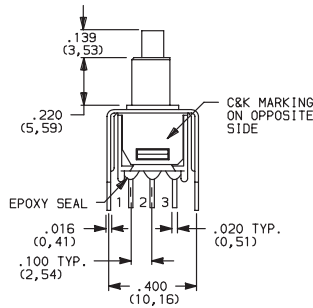


A

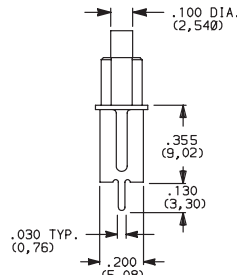
Pushbutton

## TERMINATIONS

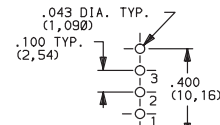
### V3 VERTICAL MOUNT, V-BRACKET



TP11 Models:  
omit terminal 2.



#### PC MOUNTING

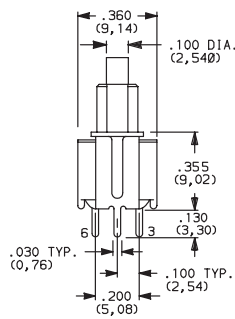
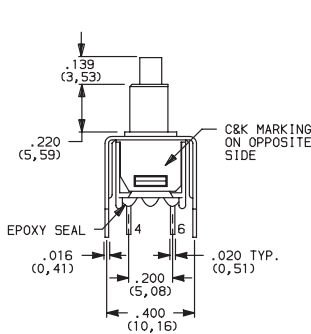


TP11 Models:  
omit hole 2.

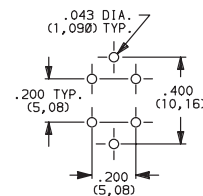


TP12SH9V3BE  
SPDT

### V3 VERTICAL MOUNT, V-BRACKET



#### PC MOUNTING



TP21SH9V3BE  
DPST

## CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD <sup>1</sup>	GOLD <sup>1</sup>	LOW LEVEL/DRY CIRCUIT	0.4 VA MAX. @ 20 V AC OR DC MAX.
P		MATTE-TIN <sup>6</sup>		
Q	SILVER <sup>4,5</sup>	SILVER <sup>5</sup>	POWER	1 AMP @ 120 V AC OR 28 V DC.
G	GOLD OVER SILVER <sup>2,3</sup>	GOLD <sup>3</sup>	LOW LEVEL/DRY CIRCUIT OR POWER	0.4 VA MAX @ 20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC.
R		MATTE-TIN <sup>6</sup>		

\* Note: See Technical Data section of this catalog for RoHS compliant and compatible definitions and specifications.

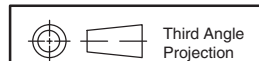
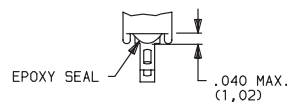
- <sup>1</sup> CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>2</sup> END CONTACTS: Coin silver, with gold plate over nickel plate.
- <sup>3</sup> CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
- <sup>4</sup> END CONTACTS: Coin silver, silver plated.
- <sup>5</sup> CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
- <sup>6</sup> TERMINALS: Copper alloy, with matte-tin over nickel plate.

**NOTE:** Any models supplied with P, R, Q, B or G contact material are RoHS compliant.

All models with all options when ordered with R, G, or Q contact material.  
B contact material standard with A, AV, V3 & W terminations.  
Q contact material standard with C & Z terminations.  
P, R contact materials not available with Z terminations.

## SEAL

### E EPOXY SEAL



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change



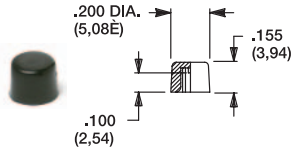


# TP Series Tiny Pushbutton Switches

Pushbutton  
A

## AVAILABLE HARDWARE

### Cap, .100" DIA. Plungers

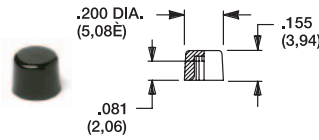


**PART NO.**

- 508101000** WHITE
- 508102000** BLACK

Material: Nylon  
Finish: Gloss

### Cap, .100" DIA. Plungers (Recommended for S9 plunger)

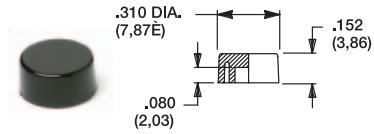


**PART NO.**

- 538701000** WHITE
- 538702000** BLACK

Material: Nylon  
Finish: Gloss

### Cap, .100" DIA. Plungers

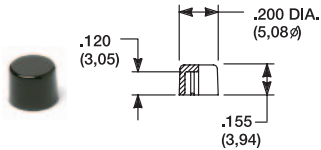


**PART NO.**

- 465801000** WHITE
- 465802000** BLACK

Material: Nylon  
Finish: Gloss

### Cap, .120" DIA. Plungers

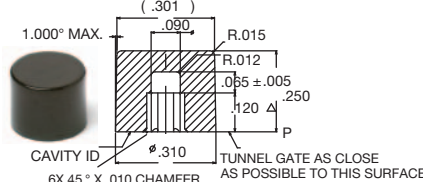


**PART NO.**

- 708901000** WHITE
- 708902000** BLACK

Material: Nylon  
Finish: Gloss

### Cap, .120" DIA. Plungers (.301)

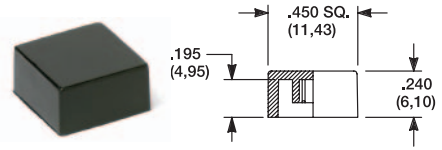


**PART NO.**

- 891D01000** WHITE
- 891D02000** BLACK

Material: Nylon  
Finish: Gloss

### Cap, J81 option only



**PART NO.**

- 484601000** WHITE
- 484602000** BLACK

Material: Nylon  
Finish: Gloss

**PART NO.**

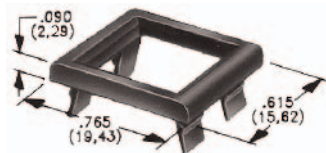
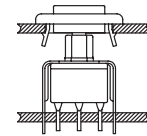
- 798201000** WHITE
- 798202263** BLACK

Material: Nylon  
Finish: Matte

**NOTE:** Additional nuts, locking rings and lockwashers available separately, see section "Technical Data and Additional Hardware".  
Other cap colors available, consult Customer Service Center.

Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the PC mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and four panel thicknesses .047-.125 in. Material: Nylon. Finish: Matte.

### TYPICAL APPLICATION

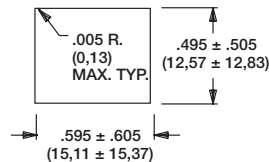


- .047" (1,19) PANEL THK.
- .062" (1,57) PANEL THK.
- .090" (2,29) PANEL THK.
- .125" (3,18) PANEL THK.

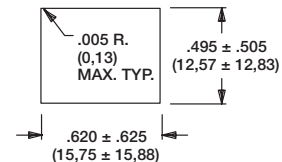
- |                  |                  |                  |                        |
|------------------|------------------|------------------|------------------------|
| <b>PART NO.</b>  | <b>PART NO.</b>  | <b>PART NO.</b>  | <b>PART NO.</b>        |
| <b>432502263</b> | <b>432602263</b> | <b>432702263</b> | <b>432802263</b> BLACK |

### PANEL MOUNTING

For part numbers  
432502263, 432602263

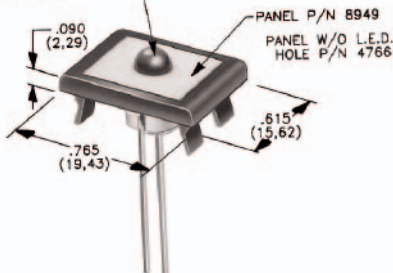


For part numbers  
432702263, 432802263



### Panel Inserts

L.E.D. (.200 DIA. (5,08E)) SNAPS  
SECURELY INTO INSERT (P/N 8949).  
HEIGHT DEPENDS ON L.E.D. USED.



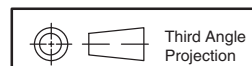
Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. **LED not included.**

PANEL INSERT  
WITH HOLE FOR LED

- PART NO.**  
**894902000**

BLANK PANEL INSERT  
WITHOUT HOLE FOR LED

- PART NO.**  
**476602000** BLACK



Dimensions are shown: Inches (mm)  
Specifications and dimensions subject to change

