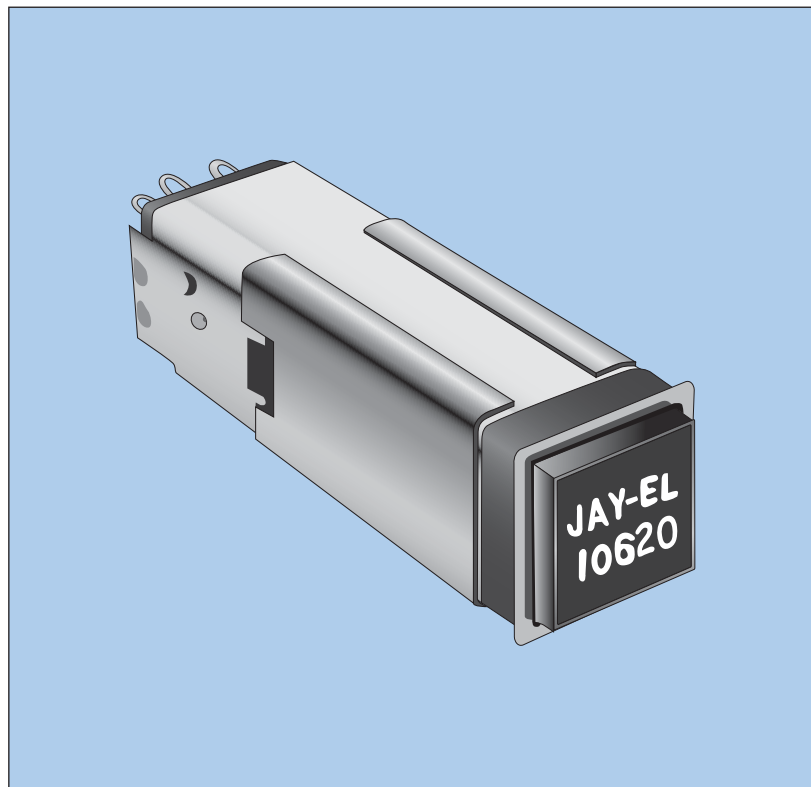


**MARK 8
P/N 10620**



JAY-EL

PRODUCTS



**JAY-EL MARK 8 P/N 10620
ILLUMINATED PUSHBUTTON SWITCH
MIL-S-22885/67 ON THE
QUALIFIED PRODUCTS LIST**



**Ducommun
Technologies**



MARK 8 is designated as Mil-S-22885/67 on the Qualified Products List.



SUNLIGHT READABLE DISPLAYS

The Mark 8, P/N 10620 is available with a legend that is hidden before lighted and provides lighted characters readable in direct sunlight (10,000 FC). It is designated as Display Type 8. This display type utilizes maximum lighted contrast enhancing techniques.

Available with T-1 or T-1 $\frac{3}{4}$ based lamps. Most efficient Display Type 8 is with the "T" type pushbutton using T-1 lamps. This "T" type pushbutton eliminates high legend surface temperatures and can provide power saving up to 70% with no loss of luminance. Luminances far exceed requirements of MIL-STD-411 when using .15 MSCP lamps.

Details for legend information and viewing area on Page 10.

ALL INFORMATION IN THIS CATALOG IS EFFECTIVE AT TIME OF PUBLICATION AND IS SUBJECT TO CHANGE WITHOUT NOTICE.

COMPACT SIZE

The Mark 8 is designed for maximum use of available panel space. Two types of mountings are available, both having .688 square chassis.

The Type I switch has a standard bezel, mounting sleeve and self contained mounting hardware. It mounts on .750 centers.

Type II is designed for dense matrix mounting to customers requirements. Mounting in this manner allows for centers of .689. Jay-El will design and supply brackets or customers may specify.

SEVERAL PUSHBUTTON STYLES AVAILABLE

From standard with .53 square legend area to the largest with .64 x .84 legend area.

Jay-El can provide P/N 10620 switches and indicators with NVIS compatible lighting.

ENVIRONMENTAL SEALING -MIL- STD-108

The Mark 8 may be ordered with an integral seal which has passed Splash Proof requirements to Mil-Std-108, High Shock per Mil-S-901C and Mil-S-22885. This is available for push button styles B, C and D. See Page 7.

Also available for the standard pushbutton only is a drip proof external seal. See Page 6.

MOUNTING

Type I incorporates a mounting sleeve with rotating cams and removable spacer to allow the switch bezel to be mounted flush with a .220 thick edge lighted panel.

Type II contains no mounting hardware and is supplied with or without mounting brackets. These mounting brackets can be of practically any configuration and are to customer requirements. Both mounting methods afford secure shock and vibration proof mounting.

DESIGN FEATURES

Switch is .688 square. Available with T1, or T 1 $\frac{3}{4}$ lamps. From one to four pole. Switch action is momentary, alternate, or magnetic holding.

Solder tab termination is standard. Printed Circuit termination available in indicator, 2, 3 or 4 pole configurations. Contact Jay-El for details.



ENGINEERING SPECIFICATIONS

ELECTRICAL

Switch Contacts:

Silver alloy contacts are standard. Gold contacts are recommended for reliable low level switching below 1.0 amperes.

Switch Ratings:

SILVER CONTACTS Maximum 2/

Load	Sea Level		50,000 FT 28VDC
	28VDC	115VAC, 60Hz	
Resistive	7.0 Amps	7.0 Amps	4.0 Amps
Inductive	4.0 Amps	7.0 Amps	2.5 Amps
Lamp 1/	2.5 Amps	2.0 Amps	2.5 Amps

1/ Inrush. 10:1 for 20 milliseconds maximum.

2/ Minimum conditions are dependent on use and atmospheric conditions. Contact Jay-El for detailed application information.

GOLD CONTACTS

	Sea Level and 50,000 Feet	Maximum Contact Res. OHM
Max. Voltage	28VDC	.025
Max. Current	1 Amp.Res. .5 Amp.Ind.	.025
Min. Current	5 Microamps	50
Min. Voltage	15 Millivolts	50

MECHANICAL

Actuation force:

Sealed and Unsealed 2 to 5.5 pounds

Actuation travel: .160 ± .031 inches

Push button extraction force: 1 to 4 pounds

Mechanical life: 100,000 cycles

Weight - Maximum ounces - Complete with with standard pushbutton.)

	Indicator	Mom. and Alt	Mag. Hold
Type I	1.0 oz.	1.6 oz.	2.0 oz.
Type II	1.0 oz.	1.4 oz.	1.8 oz.

Contact Resistance:

25 Milliohms maximum in accordance with MIL-S-22885 for switch contacts and 1 OHM maximum in accordance with MIL-S-22885 for lamp contacts.

Holding Coil: H Action Only

.04 + .01 Amps @ 28VDC. Will hold in at ≥ 18VDC and drops out at ≤ 14 VDC. Other coil voltages available on request.

Electrical Life:

25,000 cycles at rated loads per Para. 3.33 of MIL-S-22885C.

Lamp Type:

T-1 ¾ midget flange base incandescent is standard.

Available on special order:

T-1 ¾ Neon

T-1 sub-midget flange base with special pushbutton modifications.

T-1 ¾ midget flange base LED

(Recommended for back lighting only)

ENVIRONMENTAL

Temperature: High +85°C Low -55° C

Explosion: Per Mil-Std-810, Method 511, Procedure II

Humidity: Per Mil-Std-202 Method 106

Vibration: 10 to 500Hz @ 0.06DA or 10G (peak) whichever is less.

Shock: 75G's, 6 milliseconds, half sine

EMI: Per Mil-Std-285

Basic switch contacts per Mil-S-8805/4

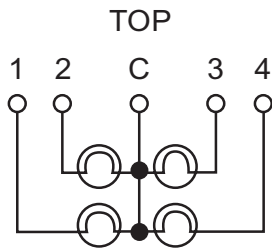


LAMP TERMINATION

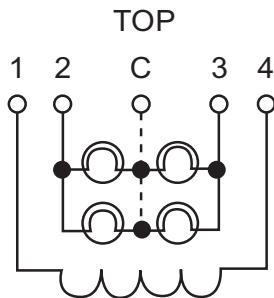
*Lamp schematics indicate lamp positions as viewed from front of unit.

For two color full face, all divided legends are supplied with lamps in all four positions.

MOMENTARY, ALTERNATE ACTION AND INDICATOR



MAGNETIC HOLDING



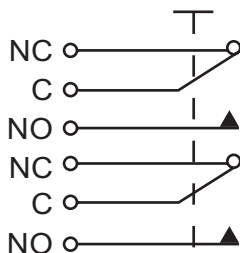
Available for full face, horizontally or vertically divided legend display only.

Terminals 1 and 4 are holding coil terminals. Coil voltage 28VDC, .04 Amps standard. Other voltages on request.

Switch body is rotated 90° to right for magnetic holding units to accommodate horizontally divided legend displays.

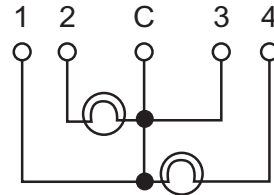
SWITCH CONTACT SCHEMATIC

Ref : 2 Pole unit shown



Full face legend display is supplied with lamps in the upper left and lower right positions. Other positions supplied with reflectors.

TOP



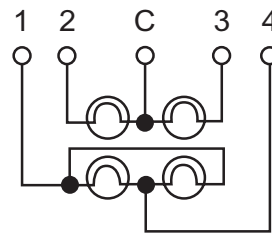
DT8 lamps will be in all 4 positions.

SPLIT GROUND

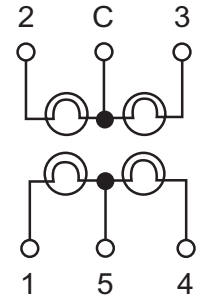
MOMENTARY AND ALTERNATE ACTION

INDICATOR ONLY

TOP



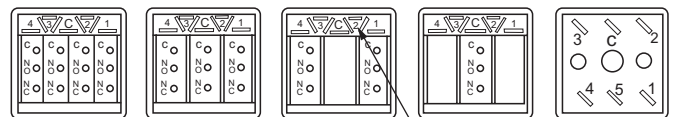
TOP



When split ground switches or indicators are required housings must be rotated 90° to right to accommodate vertically divided, or 3 way divided legend displays.

REAR VIEW

4 POLE 3 POLE 2 POLE 1 POLE INDICATOR



Lamp terminal numbers Ref.

For single pole units, switch position B will be supplied.
For 2 pole units, switch positions A and C will be supplied.
For 3 pole units, switch positions A, B and C will be supplied.
For 4 pole units, switch positions A, B, C and D will be supplied.
Terminal 5 is used for split ground only (Indicator)

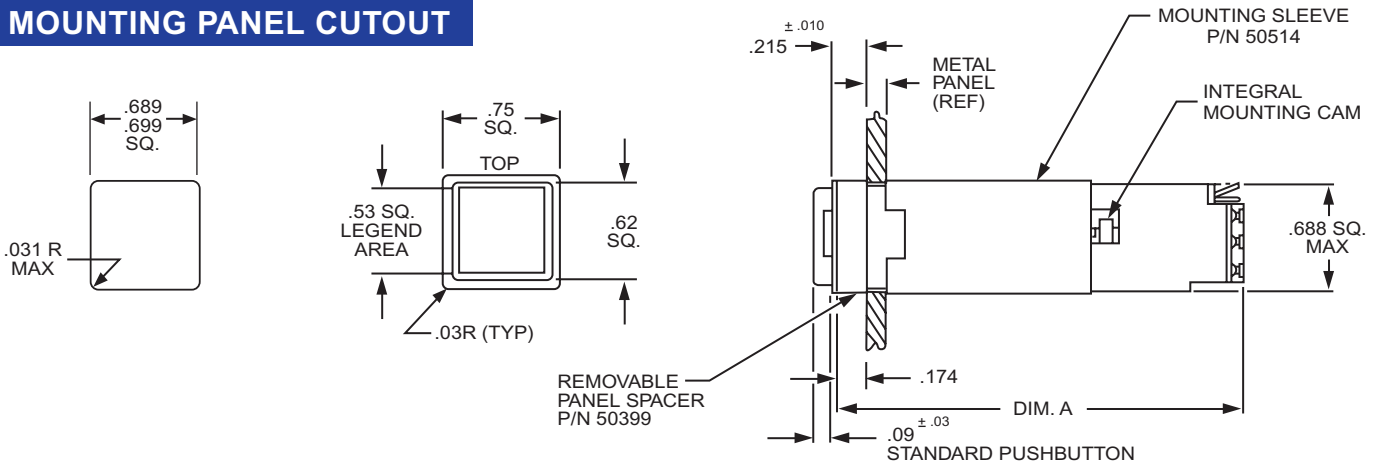


MAJOR OUTLINE DIMENSIONS

MOUNTING TYPE I

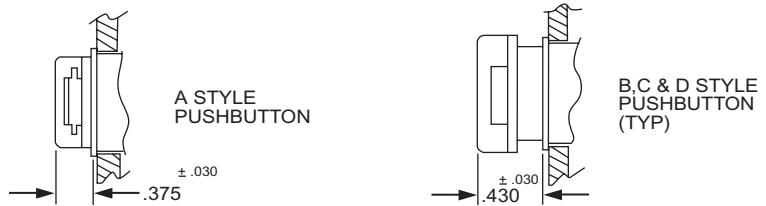
Mounting Type I switch mounts in panel .031 to .350 thick.
Mounting Type I indicator mounts in panel .031 to .30 thick.

MOUNTING PANEL CUTOUT



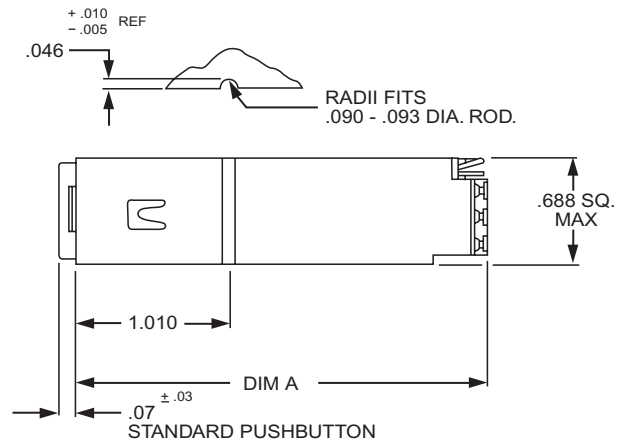
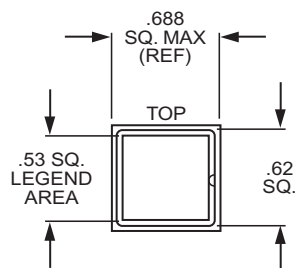
DIMENSION A MAXIMUM

INDICATOR	1.970
MOMENTARY	2.620
ALTERNATE	2.620
MAGNETIC HOLDING	2.620



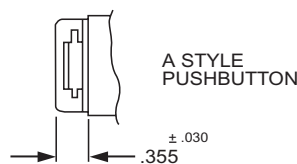
MOUNTING TYPE II

Black finish is standard.



DIMENSION B MAXIMUM

INDICATOR	2.060
MOMENTARY	2.680
ALTERNATE	2.680
MAGNETIC HOLDING	2.680



Tolerances: Unless otherwise specified - Fraction $\pm 1/32$ ",
XX $\pm .01$, XXX $\pm .005$

Note: Only standard and "A" style pushbutton may be used with Type II.

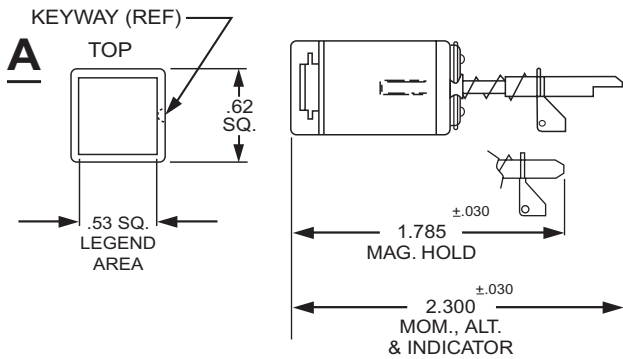
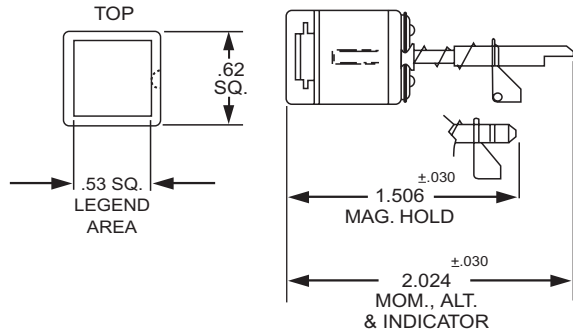


MAJOR OUTLINE DIMENSIONS

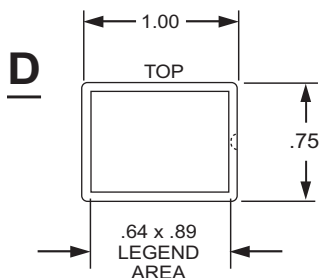
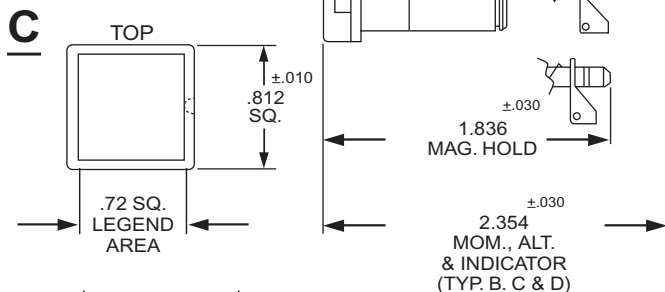
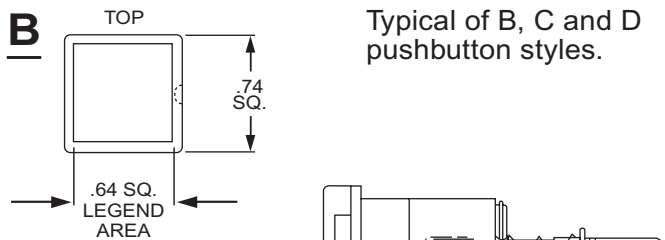
PUSHBUTTON STYLES (UNSEALED)

Standard

Standard pushbutton style will be supplied unless otherwise specified.



B Typical of B, C and D pushbutton styles.



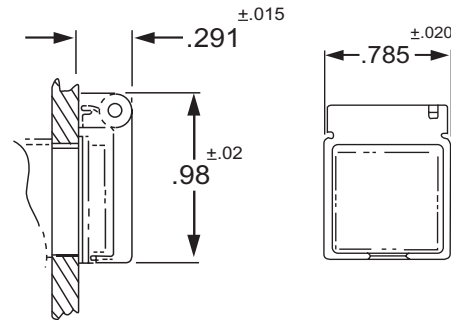
Tolerances: Unless otherwise specified - Fraction $\pm 1/32"$, .XX ± 0.01 , XXX $\pm .005$

ACCESSORIES

Standard Pushbutton Only

SWITCH GUARD P/N 51056

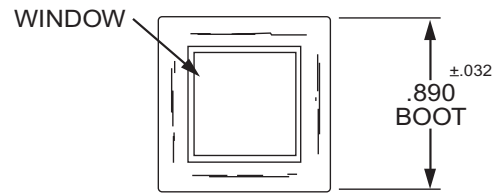
Spring loaded clear polycarbonate switch guard.



RUBBER BOOT KIT P/N 50682

- C-1 (Clear w/EMI)
- BLK-2 (w/o EMI)
- BLK-1 (w/EMI)

Flush mounted black silicone rubber boot with clear nylon window, for sand, dust and moisture protection. For standard pushbutton only.

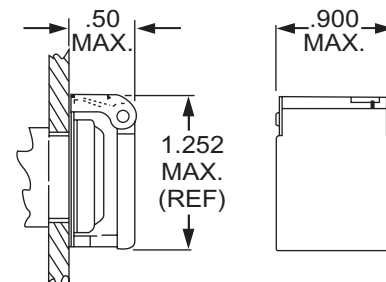


RUBBER BOOT KIT P/N 50680

Available for edge lit panel mounting.

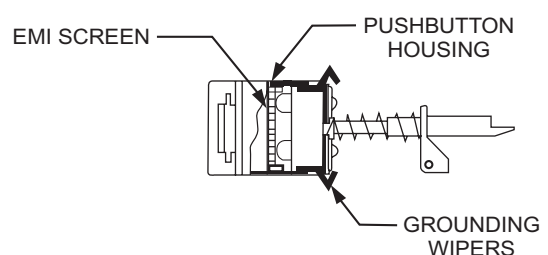
SWITCH GUARD P/N 50632

Spring loaded clear polycarbonate switch guard to use with P/N 50682 boot.



EMI SHIELDING

Welded 300 Series stainless steel grounding wipers provide chassis ground for EMI.





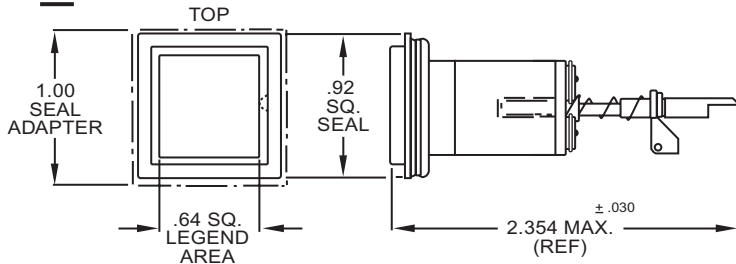
MAJOR OUTLINE DIMENSIONS
INTEGRAL SEALED UNITS

Single station only

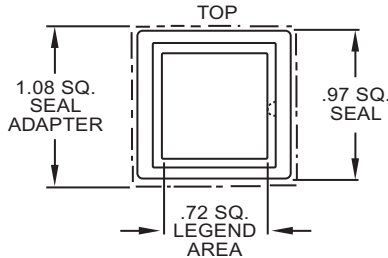
PUSHBUTTON STYLES (SEALED)

Splashproof per Mil-Std-108

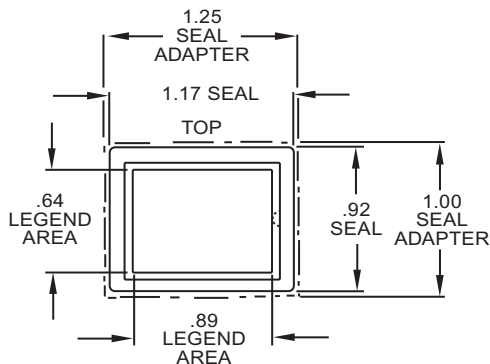
B



C



D



Mounting hole size (Single Unit)

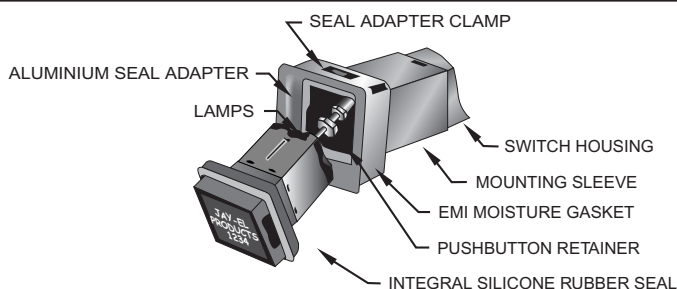
"B" Style Pushbutton : .927 ^{+.010}/_{-.000} SQ.

"C" Style Pushbutton : .990 ^{+.010}/_{-.000} SQ.

"D" Style Pushbutton : .927 ^{+.010}/_{-.000} X 1.180 ^{+.010}/_{-.000}

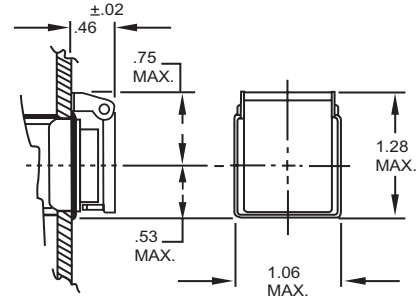
Mounting panel thickness: .31–.187 THK.

Note: All mounting hole have to have .062 corner radius.

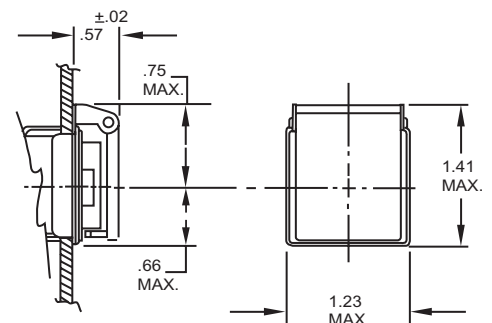


ACCESSORIES

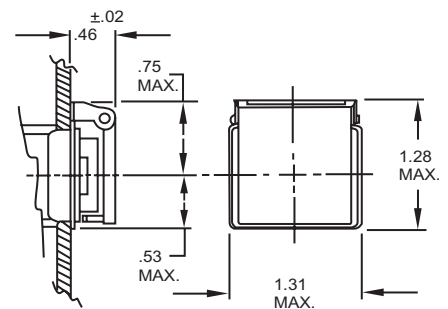
Switch Guard P/N 51034 for use with "B" pushbutton.



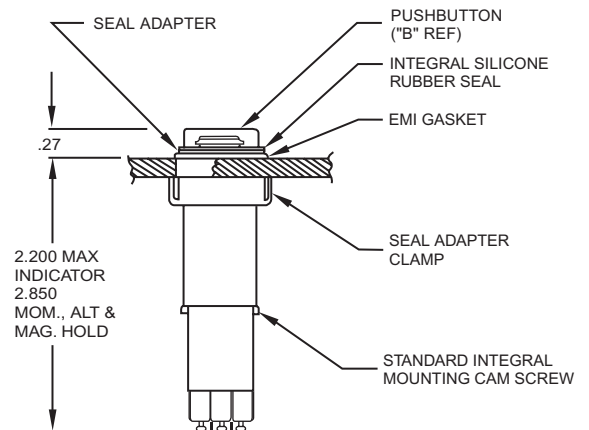
Switch Guard P/N 51059 for use with "C" pushbutton.



Switch Guard P/N 50937 for use with "D" pushbutton.



Type I - Mounts in panel .031 to .187 thick





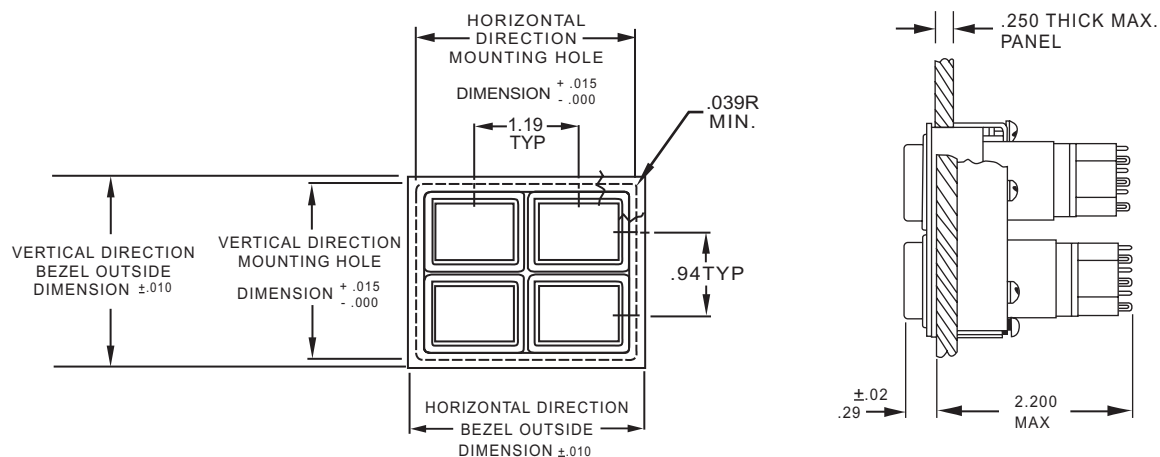
MAJOR OUTLINE DIMENSIONS, SEALED MATRIX

Matrix Mounting - Type I matrix shown.

Example: 2 x 2 "D" style, sealed pushbutton panel cutout dimension shown.

"C" style mounting center dimensions are 1.00 typical (2 places)

"B" style mounting center dimension is .94 typical (2 places)



Panel cutouts and mounting centers for single and matrix units.

Note: When ordering matrices, contact Jay-El for part numbers.

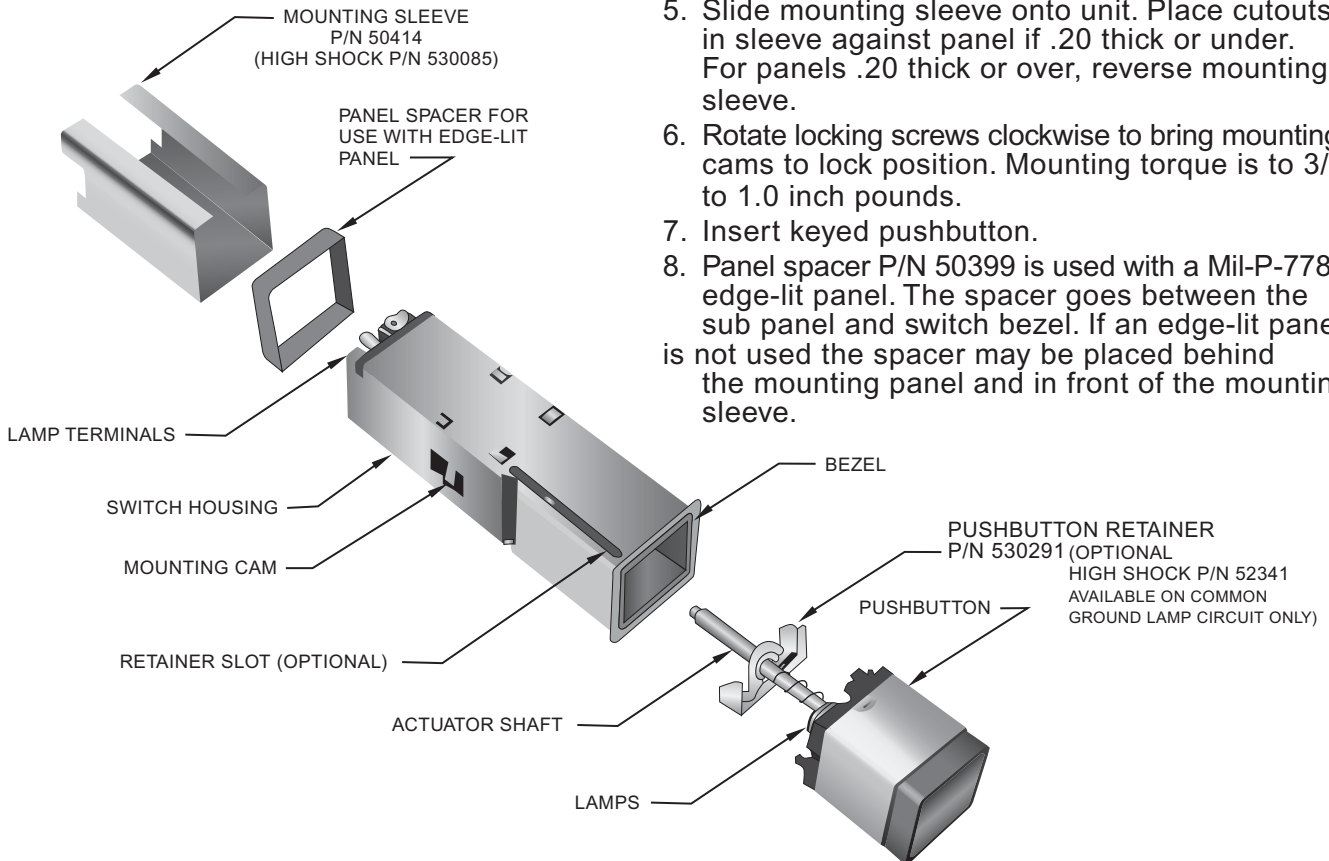
HORIZONTAL DIRECTION										
Number of Positions	1	2	3	4	5	6	7	8	9	10
Mounting Hole Dim.										
B Style P/ B	1.062	2.002	2.942	3.882	4.822	5.762	6.702	7.642	8.582	9.522
C Style P/ B	1.122	2.122	3.122	4.122	5.122	6.122	7.122	8.122	9.122	10.122
D Style P/ B	1.312	2.502	3.692	4.882	6.072	7.262	8.452	9.642	10.832	12.022
Bezel Outline Dim.										
B Style P/ B	1.240	2.180	3.120	4.060	5.000	5.940	6.880	7.820	8.760	9.700
C Style P/ B	1.300	2.300	3.300	4.300	5.300	6.300	7.300	8.300	9.300	10.300
D Style P/ B	1.490	2.680	3.870	5.060	6.250	7.440	8.630	9.820	11.010	12.200
VERTICAL DIRECTION										
Number of Positions	1	2	3	4	5	6	7	8	9	10
Mounting Hole Dim.										
B Style P/ B	1.062	2.002	2.942	3.882	4.822	5.762	6.702	7.642	8.582	9.522
C Style P/ B	1.122	2.122	3.122	4.122	5.122	6.122	7.122	8.122	9.122	10.122
D Style P/ B	1.062	2.002	2.942	3.882	4.822	5.762	6.702	7.642	8.582	9.522
Bezel Outline Dim.										
B Style P/ B	1.240	2.180	3.120	4.060	5.000	5.940	6.880	7.820	8.760	9.700
C Style P/ B	1.300	2.300	3.300	4.300	5.300	6.300	7.300	8.300	9.300	10.300
D Style P/ B	1.240	2.180	3.120	4.060	5.000	5.940	6.880	7.820	8.760	9.700

Tolerances: Unless otherwise specified - Fraction $\pm 1/32$,
.XX \pm .01, XXX \pm .005

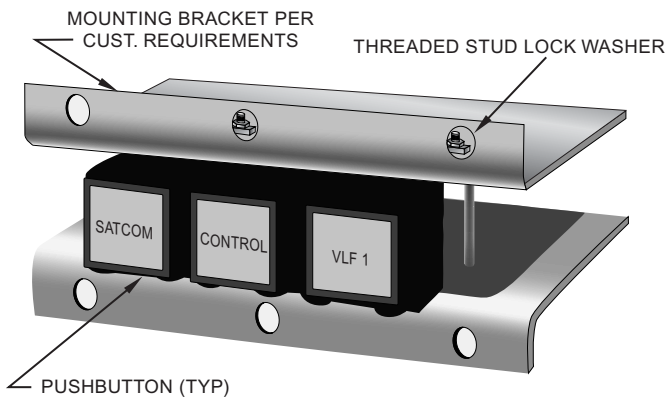


INSTALLATION PROCEDURE TYPE I

1. Extract pushbutton.
2. Rotate locking screws inside housing counter clockwise with small screw driver.
3. Slide mounting sleeve off of unit.
4. Install unit through front of panel with the word "TOP" to top of the panel.
5. Slide mounting sleeve onto unit. Place cutouts in sleeve against panel if .20 thick or under. For panels .20 thick or over, reverse mounting sleeve.
6. Rotate locking screws clockwise to bring mounting cams to lock position. Mounting torque is to 3/4 to 1.0 inch pounds.
7. Insert keyed pushbutton.
8. Panel spacer P/N 50399 is used with a Mil-P-7788 edge-lit panel. The spacer goes between the sub panel and switch bezel. If an edge-lit panel is not used the spacer may be placed behind the mounting panel and in front of the mounting sleeve.



INSTALLATION PROCEDURE TYPE II



1. Matrix mounts to back of panel.
2. Studs supplied customer or countersunk screws may be used.
3. Units may be ordered as assembled matrixes or as individual switches



CHARACTER INFORMATION

(HORIZONTAL DIRECTION ONLY)

** To obtain more characters per line other type fonts are available.
Contact Jay-El for further information.

PUSHBUTTON STYLE	LEGEND SEGMENTS					CHARACTERS PER LINE			NUMBER OF LINES	
						SEGMENT	SEGMENT	SEGMENT	SEGMENT	SEGMENT
	CONDENSED BLOCK	SIZE	STROKE	HEIGHT	-1	-2-3	-4-5-6	-1-4-5	-2-3-6	
<p>.53 SQ. LEGEND AREA</p> <p>STANDARD .62 SQ.</p> <p>A .62 SQ.</p>	JAY-EL PRODUCTS INC.	-1	.010	.072	8	8	3	5	2	
	JAY-EL PRODUCTS INC.	-2	.012	.087	7	7	3	4	2	
	JAY-EL PRODUCTS INC.	-3	.015	.109	6	6	3	3	1	
	JAY-EL PRODUCTS	-4	.018	.125	5	5	2	3	1	
	JAY-EL PRODUCTS	-5	.020	.145	4	4	2	3	1	
	JAY-EL PRODU	-6	.025	.175	4	4	1	2	1	
	JAY-EL PRO	-7	.035	.222	3	0	1	2	0	
	JAY-EL P	-8	.040	.290	2	0	0	1	0	
<p>.48 LEGEND AREA</p> <p>*DISPAY TYPE 8 ONLY</p>	JAY-EL PRODUCTS INC.	-1	.012	.072	11	11	5	5	2	
	JAY-EL PRODUCTS INC.	-2	.012	.087	9	9	4	4	2	
	JAY-EL PRODUCTS INC.	-3	.012	.109	7	7	3	3	1	
	JAY-EL PRODUCTS	-4	.012	.125	6	6	3	3	1	
	JAY-EL PRODUCTS	-5	.012	.145	5	5	2	3	1	
	JAY-EL PRODU	-6	.012	.175	4	4	1	2	1	
	JAY-EL PRO	-7	.012	.222	3	3	0	2	0	

* BASIC INFORMATION

Legend area .480 square for full face on all push button styles.

(.230 x .480 for 1/2 section (may be used with combination of other Display Types)



CHARACTER INFORMATION (continued)

PUSHBUTTON STYLE	LEGEND SEGMENTS				CHARACTERS PER LINE		NUMBER OF LINES	
					SEGMENT	SEGMENT	SEGMENT	SEGMENT
	CONDENSED BLOCK	SIZE	STROKE	HEIGHT	-1-2-3	-4-5-6	-1-4-5	-2-3-6
<p>B .74 SQ.</p>	JAY-EL PRODUCTS INC.	-1	.010	.072	10	5	5	2
	JAY-EL PRODUCTS INC.	-2	.012	.087	9	4	4	2
	JAY-EL PRODUCTS INC.	-3	.015	.109	7	3	4	2
	JAY-EL PRODUCTS	-4	.018	.125	6	3	3	1
	JAY-EL PRODUCTS	-5	.020	.145	5	2	3	1
	JAY-EL PRODU	-6	.025	.175	4	2	2	1
	JAY-EL PRO	-7	.035	.222	3	2	2	1
	JAY-EL P	-8	.040	.290	3	1	1	1
<p>C .812 SQ.</p>	JAY-EL PRODUCTS INC.	-1	.010	.072	12	6	6	3
	JAY-EL PRODUCTS INC.	-2	.012	.087	11	4	5	2
	JAY-EL PRODUCTS INC.	-3	.015	.109	8	4	5	2
	JAY-EL PRODUCTS	-4	.018	.125	7	3	4	2
	JAY-EL PRODUCTS	-5	.020	.145	6	3	4	1
	JAY-EL PRODU	-6	.025	.175	5	2	3	1
	JAY-EL PRO	-7	.035	.222	4	2	3	1
	JAY-EL P	-8	.040	.290	3	1	2	1
<p>D .75 x 1.00</p>	JAY-EL PRODUCTS INC.	-1	.010	.072	16	8	5	2
	JAY-EL PRODUCTS INC.	-2	.012	.087	14	6	4	2
	JAY-EL PRODUCTS INC.	-3	.015	.109	11	5	4	2
	JAY-EL PRODUCTS	-4	.018	.125	9	4	3	1
	JAY-EL PRODUCTS	-5	.020	.145	8	4	3	1
	JAY-EL PRODU	-6	.025	.175	7	3	2	1
	JAY-EL PRO	-7	.035	.222	5	2	2	1
	JAY-EL P	-8	.040	.290	4	2	1	1



A Manufacturer of Quality Switches for over 40 years
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Phone: (310) 513-7200 - FAX: (310) 513-0741

Federal Mfg. Code No. 08719