

# Industrial Automation Catalog Section - U906

## Switches & Pilot Devices

### **Switches & Pilot Devices**

#### **L6 Series**

- Selection Guide
- Miniature, Non-Illuminated Pushbuttons. HA1B.HA1E E-Stop & Pilot Lights
- Illuminated Pushbuttons, Selector Switches
- Key Switches, Illuminated Selector Switches, Pushbutton Selectors
- Accessories
- Dimensions
- General Instructions

For up-to-date information, or to request a full copy of this catalog, contact us at [www.idec.com](http://www.idec.com) or 800-262-IDEC..

Due to continuous product improvements, specifications are subject to change without notice.



## L6 Series Switches and Pilot Devices 5/8" (16mm)

Series Model	LAΔB/HAΔB	LAΔP/HAΔP	LAΔL/HAΔL	HA1B-V/HA1E-V	LAΔS/HAΔS	LAΔK/HAΔK	LAΔF/HAΔF	
Appearance								
See Page	A-35	A-39	A-37	A-38	A-43	A-45	A-47	
Operator Types	Non-illuminated: • Momentary • Maintained	Pilot Light Illuminated: • Momentary • Maintained	Illuminated: • Momentary • Maintained	E-Stop • Pushlock/Turn Reset	Selector Switch • 2 pos/3pos • Spring/Maint	Key Switch • 2pos/3pos • Spring/Maint • Key Remove Option	Illuminated Selector • 2 pos/3pos • Spring/Maint	
Lens Shape and Size	Round: 0.702" (18mm) Square: 0.702" (18mm) Rectangle: 0.702" x 0.936" (18 x 24mm)	Round Square Rect Oversize Round Oversize Square	Round: 0.702" (18mm) Square: 0.702" (18mm) Rectangle: 0.702" x 0.936" (18 x 24mm)	Round: 25mm	Round Square Rect Oversize	Round Square Rect Oversize	Round Square Rect Oversize	
Light Source	–	LED or Incandescent 6, 12 or 24V	LED or Incandescent 6, 12 or 24V	–	–	–	LED or Incandescent 6, 12 or 24V	
Lens/Button Colors	Amber, Green, Red, Blue, White, Yellow	Amber, Green, Red, Blue, White, Yellow	Amber, Green, Red, Blue, White, Yellow	Red	Black	Black/Silver	Amber, Green, Red, Blue, White, Yellow	
Contact Configuration	SPDT, DPDT	–	SPDT, DPDT	DPST-NC (positive action)	DPDT	DPDT	DPDT	
Electrical Life	100,000 operations min.	Incandescent: 2000 hrs LED: 50,000 hrs	100,000 operations min.					
Mechanical Life	Momentary: 2,000,000 Maintained: 250,000	–	Momentary: 2,000,000 Maintained: 250,000	250,000 operations	Momentary: 2,000,000 Maintained: 250,000	Momentary: 2,000,000 Maintained: 250,000	Momentary: 2,000,000 Maintained: 250,000	
Degree of Protection	IP65 NEMA Type 1, 2, 3, 3R, 3S, 4, 4X, 5, 12, 13							
Termination	0.110" solder/quick connect, PCB pins							
Approvals	UL Listed File No. E55996	CSA Certified File No. LR2145	TÜV Rheinland Reg. No. R9551089 Reg. No. J9551458 Reg. No. J9650511					

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## General Information

### Information About LED Lamps

Light-emitting diodes (LEDs) are P-N junction semiconductors with mechanisms called "junction electro-luminescence." Application of direct current results in radiation or emission of a monochromatic light.

Different semiconductor materials produce different wavelengths of light as shown below:

<b>Specifications</b>	Green	Gallium Phosphide (GaP)	5600 Å
	Yellow	Gallium Arsenide Phosphide (GaAsP)	5800 Å
	Amber	Gallium Arsenide Phosphide (GaAsP)	6300 Å
	Red	Gallium Arsenide Phosphide (GaAsP)	6600 Å
	Infrared	Gallium Arsenide (GaAs)	9000 Å



#### Advantages of Using LEDs

- LEDs are used when heat generated by incandescent lamps would damage nearby equipment or interfere with a precision process. This is particularly advantageous when multiple lights are grouped.
- LEDs can operate at low temperatures which would cause incandescent lamps to fail, since glass cracks during rapid cooling.
- LEDs consume 50 times less power than incandescent lamps, thereby reducing energy consumption.
- LEDs last 500 times longer than incandescent lamps. LEDs average a million hours (114 years) while incandescent lamps average 2000 hours.
- LEDs do not generally "blow out" unless subjected to a severe overvoltage. They exhibit a half-life type dimishment in brightness over time. After 50,000 hours (6 years) of use, IDEC LEDs will retain approximately half of their original intensity.
- IDEC's SUPERBRIGHT LEDs have high visibility.
- LEDs require little or no maintenance because of long life and high reliability.

#### IDEC Recommendations

For optimum results, especially when using switches and pilot lights in operating environments which are conducive to overheating, use IDEC LED illuminated units. Transformers are available for use with incandescent illuminated units, which operate at lower voltages to avoid overheating.

**When IDEC's L-120L lamp is used, make sure ambient temperatures do not exceed 30°C (86°F). If a lamp from another supplier is used, it should be rated for less than 1.8 watts (15mA at 120V AC), with ambient temperatures as stated above.**

### Information About Incandescent Lamps

Filament-type incandescent lamps operate within the following parameters.

Light output and life expectancy depend on operating voltage. Light output varies to the 3rd or 4th power of the voltage. Life expectancy varies inversely to the 12th power of voltage. In other words, over-voltage of 5% reduces life expectancy by 50%. Under-voltage of 5% doubles life expectancy at the price of light output efficiency.

Inrush current (initial current through the filament) has an adverse effect on life expectancy. Cold resistance (room temperature) will have a more detrimental effect than hot resistance to inrush current. Life expectancy of incandescent lamps can be maximized by reducing occurrences of cold resistance to inrush current.

Continued intermittent flashing will significantly reduce life expectancy. When using an incandescent lamp with a tungsten filament, flashing will not reduce life expectancy as long as light output does not exceed that of steady burning.

When an incandescent lamp must withstand shock and vibration, use low voltage/high amperage (5-6V/60-120mA) lamps. These lamps have a short, thick filament with a high resonant frequency.

Provide cooling by using a heat sink, particularly when multiple incandescent lamps are grouped or when air circulation is limited. Make sure ambient temperatures do not exceed 100°C (212°F) for maximum life of incandescent lamps.

## Comparison: LED vs. Incandescent Lamps

	<i>Superbright LEDs</i>	<i>Incandescent</i>	
<b>Characteristics</b>	<b>Heat Dissipation</b>	Very Low	High
	<b>Life Expectancy</b>	Very Long	Short
	<b>Reliability</b>	Very High	Low
	<b>Mechanical Strength</b>	Not Susceptible	Susceptible to Shock/Vibration
	<b>Maintenance Required</b>	Negligible	Frequent
	<b>Operation at Low Temps.</b>	Possible	Not Possible
	<b>Inrush Current</b>	Negligible	Very Large
	<b>Voltage Effects on Life</b>	Insignificant	Significant
	<b>Brightness</b>	Slightly Less	Slightly More

## Ordering Information

1. IDEC offers assembled and sub-assembled switches and pilot lights for your convenience. In some cases there is a cost difference, with sub-assembled units costing slightly less. Since assembled units are custom made to your order, a couple of days for assembly is added to delivery . To minimize delivery or inventory requirements, it is recommended that switches and pilot lights be ordered as sub-components.
2. When ordering pilot lights or illuminated pushbuttons, make sure to specify the color code in place of the asterisk in the part number, (LED or incandescent lamp included). Spare lamps can be ordered and are listed with sub-assembly components.
3. Accessories, such as locking ring wrench, lens removal tool, and lamp holder, are available to make installation and assembly easier. IDEC recommends using these accessories and is not responsible for damage as a result of using the wrong tool.
4. Marking plates are available for switches and pilot lights which feature a flat lens. Printed mylar (not included) can also be inserted under lens for labeling purposes.
5. Nameplates are available for TW, 7/8" (22mm), HW 7/8" (22mm), and TWTD series, Ø1-13/64" (30mm). For prompt delivery, order standard legends. Custom engraving is also offered for an additional charge.

## Installation and Operation

1. Use the appropriate lamp holder to remove or install LED or incandescent lamps. Using pliers will damage the lamp.
2. When mounting switches and pilot lights into a panel, use locking ring wrench. Using pliers or tightening excessively will damage the locking ring.
3. A series, 21/64" (8mm), can be mounted on a panel 0.019" (0.5mm) to 0.236" (6mm) thick.
4. LW 7/8" (22mm), TW, 7/8" (22mm), and TWTD series, Ø1-13/64" (30mm), feature an adjustment ring for mounting on a panel 0.038" (1mm) to 0.236" (6mm) thick. Using a nameplate or an anti-rotation ring adds 0.031" (0.8mm) to the panel thickness.
5. When applicable, solder terminals within 20W/5sec or 260°/3sec without exerting external force to the terminals. Use a non-corrosive resin liquid flux.
6. The operating voltage for LED units represents a complete DC value. When using a pulsing voltage, such a full-wave rectification, keep peak currents within the forward current  $I_f$ . Peak currents exceeding  $I_f$  may shorten the life of the LED lamp.
7. To avoid a short circuit, never connect NO and NC contacts to different voltages or power sources.
8. Optimum performance of TW and TWTD illuminated pushbuttons, selector switches, and pilot lights is obtained with IDEC LED and incandescent lamps.
9. For maximum life of incandescent lamps (approximately 2000 hours), use within the rated operating voltage. If it is necessary to use a higher voltage, keeping ambient temperature below 30°C (86°F) will help prolong the life of an incandescent lamp.



*If excessive voltage is applied (over 50V), the lamp may blow and the lens holder may pop out.*

## L6 Series — Miniature Switches and Pilot Devices

**Key features of the 5/8" L6 Series include:**

- 5/8" (16mm) mounting holes
- Locking lever removable contact blocks
- Solder terminal or PCB terminal options
- Available assembled or as sub-components
- Worldwide approvals
- Incandescent or LED illumination
- snap action contacts


 UL Recognized  
File No. E55996









 Registration No. R9551089 (E-stops)  
Registration No. J9551458 (all other switches)  
Registration No. J9650511 (Pilot Lights)

 CSA Certified  
File No. LR21451


<b>Contact Ratings</b>	<b>Conforming to Standards</b>	EN60947-1, EN60947-5-1, VDE0660-200, UL508, CSA C22-2 No.14																																														
	<b>Operating Temperature</b>	Operation: -25 to +55°C (without freezing), 45 to 85% rh Storage: -30 to +80°C (without freezing)																																														
	<b>Vibration Resistance</b>	5 to 55Hz, 1.0 peak-peak amplitude max																																														
	<b>Shock Resistance</b>	Operating limit: 100 in/sec <sup>2</sup> (approximately 10G) Damage limit: 1000 in/sec <sup>2</sup> (approximately 100G)																																														
	<b>Mechanical Life</b>	Momentary pushbuttons 2,000,000 operations minimum All others: 250,000 operations minimum																																														
	<b>Degree of Protection</b>	IP65 (conforming to IEC 60529) NEMA 1, 2, 3, 3R, 3S, 4, 4X, 5, 12, 13 (conforming to NEMA ICS6-110)																																														
	<b>Dielectric Strength</b>	Switch unit: between live and ground: 2500 volt AC, 1 minute between terminals of different poles: 2500 volt AC, 1 minute between terminals of same pole: 1000 volt AC, 1 minute Illumination unit: between live part and ground: 2500 volt AC, 1 minute																																														
	<b>Insulation Resistance</b>	100 MΩ minimum (using 500V DC megger)																																														
	<b>Rated Insulation Voltage</b>	250 V AC/DC																																														
	<b>Rated Thermal Current</b>	Gold Contacts (pcb): 3A Silver Contacts (solder): 5A																																														
	<b>Contact Resistance</b>	50 Ω maximum initial value																																														
	<b>Rated Operating Current</b>		<table border="1"> <thead> <tr> <th></th> <th colspan="3">Silver Contacts (Solder Terminals)</th> <th></th> <th colspan="2">Gold Clad Contacts (PCB terminals)</th> </tr> <tr> <th></th> <th>30V</th> <th>125V</th> <th>250V</th> <th></th> <th>30V</th> <th>125V</th> </tr> </thead> <tbody> <tr> <td>resistive</td> <td>-</td> <td>3A</td> <td>2A</td> <td>AC inductive</td> <td>-</td> <td>0.1A</td> </tr> <tr> <td>inductive</td> <td>-</td> <td>2A</td> <td>1.5A</td> <td>DC resistive</td> <td>0.1A</td> <td>-</td> </tr> <tr> <td>resistive</td> <td>2A</td> <td>0.4A</td> <td>-</td> <td></td> <td></td> <td></td> </tr> <tr> <td>inductive</td> <td>1A</td> <td>0.2A</td> <td>-</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Silver Contacts (Solder Terminals)				Gold Clad Contacts (PCB terminals)			30V	125V	250V		30V	125V	resistive	-	3A	2A	AC inductive	-	0.1A	inductive	-	2A	1.5A	DC resistive	0.1A	-	resistive	2A	0.4A	-				inductive	1A	0.2A	-				
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<b>Terminal Style</b>	0.110" Solder Tab /PCB																																															
<b>Contact Form</b>	Snap Action, Double Throw																																															
<b>Contact Material</b>	Solder Tab: Pure Silver /PCB thermal Gold Plated Silver																																															
<b>Electrical Life (at full load)</b>	Momentary pushbuttons: 100,000 operations minimum (1800 operations / hour) All others: 100,000 operations minimum (1200 operations / hour)																																															
<b>Lamp Ratings</b>	<b>Lamp Current Draw</b>	<table border="1"> <tr> <td>6V LED: 8mA</td> <td>6V incandescent: 100 mA</td> </tr> <tr> <td>12V LED: 8mA</td> <td>12V incandescent: 50 mA</td> </tr> <tr> <td>24V LED: 8mA</td> <td>24V incandescent: 25 mA</td> </tr> </table>					6V LED: 8mA	6V incandescent: 100 mA	12V LED: 8mA	12V incandescent: 50 mA	24V LED: 8mA	24V incandescent: 25 mA																																				
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<b>Lamp Life</b>	Incandescent: 2000 hours./LED: 50,000 hours. (on pure DC, half-life intensity)																																															
<b>Buzzer Ratings</b>	<b>Frequency</b>	2 khz ± 500 HZ																																														
	<b>Amplitude</b>	80db @ 0.1m (at rated voltage)																																														
	<b>Operating Voltage</b>	6V AC/DC or 12 - 24V AC/DC ± 10%																																														
	<b>Adjustable Cycle</b>	55 to 600 cycles per minute																																														
	<b>Current Draw</b>	DC: 7mA AC: 20mA																																														
	<b>Life</b>	1000 hrs. minimum																																														
<b>Insulation Voltage</b>	60V AC/DC																																															
<b>Operating Temperature</b>	-20 to 55 C (no freezing), 45 to 85% rh																																															

## Non-Illuminated Pushbuttons (Assembled)

### Part Numbers: Non-Illuminated Pushbuttons

Style	Operation	Contact	Terminal Style	
			Solder Tab	PCB
Round 	Momentary	SPDT DPDT	LA1B-M1C5-① LA1B-M1C6-①	LA1B-M1C1V-① LA1B-M1C2V-①
	Maintained	SPDT DPDT	LA1B-A1C5-① LA1B-A1C6-①	LA1B-A1C1V-① LA1B-A1C2V-①
Square 	Momentary	SPDT DPDT	LA2B-M1C5-① LA2B-M1C6-①	LA2B-M1C1V-① LA2B-M1C2V-①
	Maintained	SPDT DPDT	LA2B-A1C5-① LA2B-A1C6-①	LA2B-A1C1V-① LA2B-A1C2V-①
Rectangular 	Momentary	SPDT DPDT	LA3B-M1C5-① LA3B-M1C6-①	LA3B-M1C1V-① LA3B-M1C2V-①
	Maintained	SPDT DPDT	LA3B-A1C5-① LA3B-A1C6-①	LA3B-A1C1V-① LA3B-A1C2V-①
Oversize Round Flush 	Momentary	SPDT DPDT	HA1B-M1C5-① HA1B-M1C6-①	HA1B-M1C1V-① HA1B-M1C2V-①
	Maintained	SPDT DPDT	HA1B-A1C5-① HA1B-A1C6-①	HA1B-A1C1V-① HA1B-A1C2V-①
Oversize Round Extended 	Momentary	SPDT DPDT	HA1B-M2C5-① HA1B-M2C6-①	HA1B-M2C1V-① HA1B-M2C2V-①
	Maintained	SPDT DPDT	HA1B-A2C5-① HA1B-A2C6-①	HA1B-A2C1V-① HA1B-A2C2V-①
Oversize Square Flush 	Momentary	SPDT DPDT	HA2B-M1C5-① HA2B-M1C6-①	HA2B-M1C1V-① HA2B-M1C2V-①
	Maintained	SPDT DPDT	HA2B-A1C5-① HA2B-A1C6-①	HA2B-A1C1V-① HA2B-A1C2V-①
Oversize Square Extended 	Momentary	SPDT DPDT	HA2B-M2C5-① HA2B-M2C6-①	HA2B-M2C1V-① HA2B-M2C2V-①
	Maintained	SPDT DPDT	HA2B-A2C5-① HA2B-A2C6-①	HA2B-A2C1V-① HA2B-A2C2V-①
Mushroom 	Momentary	SPDT DPDT	HA1B-M3C5-① HA1B-M3C6-①	HA1B-M3C1V-① HA1B-M3C2V-①
	Maintained	SPDT DPDT	HA1B-A3C5-① HA1B-A3C6-①	HA1B-A3C1V-① HA1B-A3C2V-①

### Button Color Codes

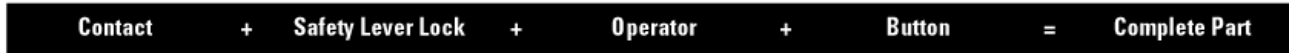
Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y

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- In place of ① specify button color code from table on right.
- Illuminated (translucent) style lenses also available, specify as such: instead of LA1B-M1C5-① use LA1B-M1C5L-② in place of ② specify lens color code from next page.)
- PCB terminal models also available with silver contacts (change "1" or "2" to "5" or "6" respectively, ie LA1B-M1C1V-③ becomes LA1B-M1C5V-③).

## Non-Illuminated Pushbuttons (Sub-Assembled)





### Part Numbers: Operators

Style	Momentary	Maintained
Round 	LA1L-M0	LA1L-A0
Square 	LA2L-M0	LA2L-A0
Rectangular 	LA3L-M0	LA3L-A0
Oversize Round 	HA1B-M0	HA1B-A0
Oversize Square 	HA2B-M0	HA2B-A0
Mushroom 	HA1B-M0L	HA1B-A0L


### Part Numbers: Buttons/Lenses

Style	Button	Lens
Round 	AB6M-BK2-①	AL6M-LK2-②
Square 	AB6Q-BK2-①	AL6Q-LK2-②
Rectangular 	AB6H-BK2-①	AL6H-LK2-②
Oversize Round Flush 	HA1A-B1-①	HA1A-L1-②
Oversize Round Extended 	HA1A-B2-①	-
Oversize Square Flush 	HA2A-B1-①	HA2A-L1-②
Oversize Square Extended 	HA2A-B2-①	-
Mushroom 	HA1A-B3-①	HA1A-L3-②

### Part Numbers: Contacts

Appearance	Contacts	Terminal Style	
		Solder Tab	PCB
	Gold SPDT DPDT	-	HA-C1V HA-C2V
	Silver SPDT DPDT	HA-C5 HA-C6	HA-C5V HA-C6V

### Part Number: Safety Lever Lock

Appearance	Part Number
	HA9Z-LS-TK1971

### ① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
White	W
Yellow	Y

### ② Lens Color Code

Color	Code
Amber	A
Green	GD: light green GL: dark green
Red	R
Blue	S
Yellow	Y
White	W



1. In place of ① specify button color code from table on right.  
2. In place of ② specify lens color code from table on right.

## HA1B/HA1E E-Stop

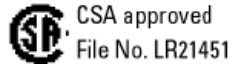
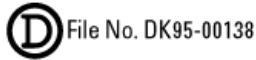
### Miniature Switches and Pilot Devices: 5/8"(16mm)

Key features of HA1B/HA1E Push lock Turn Reset include:

- PCB or Solder Terminals
- Quick Release Contact Blocks
- Positive Action Contacts
- 1 or 2 form B (SPST-NC) Contacts
- IP65 Protection
- 16mm Mounting Hole
- Tamper Proof Construction



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<b>Specifications</b>	<b>Contact Ratings</b>	24VDC/2A 120VAC/3A	
	<b>Contact Form</b>	1 or 2 form B (2-SPST-NC)	
	<b>Termination</b>	PCB or Solder Terminal	
	<b>Contact Material</b>	Silver	
	<b>Applicable Standards</b>	EN 60947-5-1, UL-508, CSA 22.2. No. 14	
	<b>Rated Insulation Voltage</b>	250V	
	<b>Degree of Protection</b>	IP65, when mounted in an enclosure	
	<b>Conditional Short-Circuit Current &amp; Short-Circuit Protective Device</b>	50 A (at 250V) 10A 250V Fuse, operation class aM according to IEC269-1 and IEC269-2	
	<b>Positive Opening Operation</b>	Positive opening travel	3.4mm
		Minimum force required to achieve positive opening operation of all break contacts.	10.3 N (2 form B contacts)
Maximum travel including travel beyond the minimum travel position		5.5mm	
Maximum frequency of actuation		1,200 operations/hour	
<b>Pollution Degree</b>		3	


#### Part Numbers: Nameplates HAAV-Yellow Plastic




	Part Number
Blank	HAAV-0Y
Engraved Emergency Stop	HAAV-27

#### Part Numbers: Positive Action E-Stop

Appearance	Operation	Contact	Terminal Style	
			Solder Tab	PCB
E-Stop 	Pushlock/ Turn Reset	DPST (NC) (2 form B)	HA1B-V2E2R	HA1B-V2E2VR
		Short Body	SPST-NC (1 form B) DPST-NC (2 form B)	HA1E-V2S1R HA1E-V2S2R
Conditional short circuit and protective device		10A 250V fuse operating class acc. to IEC 269-1 and IEC 269-2		
Positive opening operation		min travel: 3.4 mm min force: 10.3N max travel: 5.5mm max. frequency: 1200 ops/hr.		
Pollution Degree		3		

 Button is non-removable, available in red and as complete assembled unit only.

#### Part Number: Buzzers

Appearance	Operating Voltage	Terminal Style	
		Solder/Tab	PCB
Buzzer-Rectangular 	6V AC/DC ± 10%	LA3Z-1X2	LA3Z-1X2V
	12V to 24 AC/DC ± 10%	LA3Z-1X4	LA3Z-1X4V

Frequency: 2kHz ± 500 hz  
Amplitude: 80db at 0.1m  
Beeping: Adjustable from steady tone to 600 beeps per minute.



## Pilot Lights (Assembled)

### Part Numbers: Pilot Lights (LED)

Style	Voltage	Terminal Style	
		Solder Tab	PCB
Round 	24V AC/DC LED 24VAC/DC Incandescent	LA1P-1C04-② LA1P-1C07-②	LA1P-1C04V-② LA1P-1C07V-②
Square 	24V AC/DC LED 24V AC/DC Incandescent	LA2P-1C04-② LA2P-1C07-②	LA2P-1C04V-② LA2P-1C07V-②
Rectangle 	24V AC/DC LED 24V AC/DC Incandescent	LA3P-1C04-② LA3P-1C07-②	LA3P-1C04V-② LA3P-1C07V-②
Oversize Round 	24V AC/DC LED 24V AC/DC Incandescent	HA1P-1C04-② HA1P-1C07-②	HA1P-1C04V-② HA1P-1C07V-②
Oversize Square 	24V AC/DC LED 24V AC/DC Incandescent	HA2P-1C04-② HA2P-1C07-②	HA2P-1C04V-② HA2P-1C07V-②
Oversize Round Monolithic 	24V AC/DC LED 24V AC/DC Incandescent	HA1P-14-② HA1P-17-②	-
Oversize Square Monolithic 	24V AC/DC LED 24V AC/DC Incandescent	HA2P-14-② HA2P-17-②	-

### ② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
Yellow	Y
White	W

### Voltage/Lamp Code

Voltage	Code
6V AC/DC LED	2
12V AC/DC LED	3
24V AC/DC LED	4
120 V AC LED	8
6V AC/DC Incandescent	5
12V AC/DC Incandescent	6
24V AC/DC Incandescent	7



1. In place of ② specify lens color code from table.
2. Lamps also available in 6V AC/DC, 12 V AC/DC or 12V AC, change "4" or "7" using voltage/lamp codes (ie LA1P-1C03-② uses 12V AC/DC LED).

## Pilot Lights (Sub-Assembled)

Terminals + Safety Lever Lock + Lamp Holder + Lamp + Operator + Lens = Completed Unit




A

### Part Numbers: Operators



Style	Part Number
Round 	LA1P-0
Square 	LA2P-0
Rectangular 	LA3P-0
Oversize Round 	HA1P-0
Oversize Square 	HA2P-0
Oversize Round Monolithic 	HA1P-00
Oversize Square Monolithic 	HA2P-00


### Part Numbers: Lenses

Style	Part Number
Round 	AL6M-LK3-②
Square 	AL6Q-LK3-②
Rectangular 	AL6H-LK3-②
Oversize Round 	HA1A-P1-②
Oversize Square 	HA2A-P1-②

 In place of ② specify lens color code.

### Part Numbers: Lamps


Style	Voltage	Part Number
LED 	6V AC/DC 12V AC/DC 24V AC/DC 120 V AC	LFTD-6② LFTD-1② LFTD-2② LFTD-H2②
Incandescent 	6V AC/DC 12V AC/DC 24V AC/DC	LH-06 LH-14 LH-28

 In place of ② specify LED color code from table below.


### Part Numbers: Terminals

Appearance	Solder Tab	PCB
	HA-C00	HA-C00V

### Part Number: Lamp Holder


Appearance	Part Number
	HA9Z-AH

### Part Number: Safety Lever Lock

Appearance	Part Number
	HA9Z-LS-TK1971

### ② Lens/LED Color Codes

Color	Code
Amber	A
Green	G (LED lamps) GD (LED lenses) GL (Incandescent lenses)
Red	R
Blue	S
Yellow	Y
White	W

 GD lens is lighter in color than GL lens.

## Illuminated Pushbuttons (Assembled)

### Part Numbers: Illuminated Pushbuttons

Style	Operation	Lamp Voltage	Contact	Terminal Style	
				Solder Tab	PCB
	Momentary	24V AC/DC LED	SPDT DPDT	LA1L-M1C54-② LA1L-M1C64-②	LA1L-M1C14V-② LA1L-M1C24V-②
		24V AC/DC Incandescent	SPDT DPDT	LA1L-M1C57-② LA1L-M1C67-②	LA1L-M1C17V-② LA1L-M1C27V-②
	Maintained	24V AC/DC LED	SPDT DPDT	LA1L-A1C54-② LA1L-A1C64-②	LA1L-A1C14V-② LA1L-A1C24V-②
		24V AC/DC Incandescent	SPDT DPDT	LA1L-A1C57-② LA1L-A1C67-②	LA1L-A1C17V-② LA1L-A1C27V-②
	Momentary	24V AC/DC LED	SPDT DPDT	LA2L-M1C54-② LA2L-M1C64-②	LA2L-M1C14V-② LA2L-M1C24V-②
		24V AC/DC Incandescent	SPDT DPDT	LA2L-M1C57-② LA2L-M1C67-②	LA2L-M1C17V-② LA2L-M1C27V-②
	Maintained	24V AC/DC LED	SPDT DPDT	LA2L-A1C54-② LA2L-A1C64-②	LA2L-A1C14V-② LA2L-A1C24V-②
		24V AC/DC Incandescent	SPDT DPDT	LA2L-A1C57-② LA2L-A1C67-②	LA2L-A1C17V-② LA2L-A1C27V-②
	Momentary	24V AC/DC LED	SPDT DPDT	LA3L-M1C54-② LA3L-M1C64-②	LA3L-M1C14V-② LA3L-M1C24V-②
		24V AC/DC Incandescent	SPDT DPDT	LA3L-M1C57-② LA3L-M1C67-②	LA3L-M1C17V-② LA3L-M1C27V-②
	Maintained	24V AC/DC LED	SPDT DPDT	LA3L-A1C54-② LA3L-A1C64-②	LA3L-A1C14V-② LA3L-A1C24V-②
		24V AC/DC Incandescent	SPDT DPDT	LA3L-A1C57-② LA3L-A1C67-②	LA3L-A1C17V-② LA3L-A1C27V-②
	Momentary	24V AC/DC LED	SPDT DPDT	HA1L-M1C54-② HA1L-M1C64-②	HA1L-M1C14V-② HA1L-M1C24V-②
		24V AC/DC Incandescent	SPDT DPDT	HA1L-M1C57-② HA1L-M1C67-②	HA1L-M1C17V-② HA1L-M1C27V-②
	Maintained	24V AC/DC LED	SPDT DPDT	HA1L-A1C54-② HA1L-A1C64-②	HA1L-A1C14V-② HA1L-A1C24V-②
		24V AC/DC Incandescent	SPDT DPDT	HA1L-A1C57-② HA1L-A1C67-②	HA1L-A1C17V-② HA1L-A1C27V-②
	Momentary	24V AC/DC LED	SPDT DPDT	HA2L-M1C54-② HA2L-M1C64-②	HA2L-M1C14V-② HA2L-M1C24V-②
		24V AC/DC Incandescent	SPDT DPDT	HA2L-M1C57-② HA2L-M1C67-②	HA2L-M1C17V-② HA2L-M1C27V-②
	Maintained	24V AC/DC LED	SPDT DPDT	HA2L-A1C54-② HA2L-A1C64-②	HA2L-A1C14V-② HA2L-A1C24V-②
		24V AC/DC Incandescent	SPDT DPDT	HA2L-A1C57-② HA2L-A1C67-②	HA2L-A1C17V-② HA2L-A1C27V-②
	Momentary	24V AC/DC LED	SPDT DPDT	HA1L-M3C54-② HA1L-M3C64-②	HA1L-M3C14V-② HA1L-M3C24V-②
		24V AC/DC Incandescent	SPDT DPDT	HA1L-M3C57-② HA1L-M3C67-②	HA1L-M3C17V-② HA1L-M3C27V-②
	Maintained	24V AC/DC LED	SPDT DPDT	HA1L-A3C54-② HA1L-A3C64-②	HA1L-A3C14V-② HA1L-A3C24V-②
		24V AC/DC Incandescent	SPDT DPDT	HA1L-A3C57-② HA1L-A3C67-②	HA1L-A3C17V-② HA1L-A3C27V-②

### ② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
Yellow	Y
White	W

### Voltage/Lamp Code

Voltage	Code
6V AC/DC LED	2
12V AC/DC LED	3
24V AC/DC LED	4
120V AC LED	8
6V AC/DC Incandescent	5
12V AC/DC Incandescent	6
24V AC/DC Incandescent	7



- In place of ② specify lens color code from table at right.
- Lamps also available in 6V AC/DC, 12 V AC/DC or 120V AC, change "4" or "7" using voltage/lamp codes (ie LA1P-1C03-② uses 12V AC/DC LED).
- PCB terminal models also available with silver cotacts (change "1" or "2" to "5" or "6" respectively, ie LA1L-M1C14V-① becomes LA1L-M1C54V-①).

## Illuminated Pushbuttons (Sub-Assembled)

**Contacts + Safety Lever Lock + Lamp Holder + Lamp + Operator + Lens = Completed Unit**

A




### Part Numbers: Operators



Style	Momentary	Maintained
 Round	LA1L-M0	LA1L-A0
 Square	LA2L-M0	LA2L-A0
 Rectangular	LA3L-M0	LA3L-A0
 Oversize Round	HA1L-M0	HA1L-A0
 Oversize Square	HA2L-M0	HA2L-A0
 Mushroom	HA1B-M0L	HA1B-A0L

### Part Numbers: Lenses

Style	Part Number
 Round	AL6M-LK2-②
 Square	AL6Q-LK2-②
 Rectangular	AL6H-LK2-②
 Oversize Round	HA1A-L1-②
 Oversize Square	HA2A-L1-②
 Mushroom	HA1A-L3-②

 In place of ②specify lens color code from table.



### Part Numbers: Lamps

Appearance	Voltage	Part Number
 LED	6V AC/DC 12V AC/DC 24V AC/DC 120V AC	LFTD-6② LFTD-1② LFTD-2② LFTD-H2②
 Incandescent	6V AC/DC 12V AC/DC 24V AC/DC	LH-06 LH-14 LH-28




In place of ②specify LED color code from table below.


### Part Numbers: Contacts

Appearance	Contacts	Terminal Style	
		Solder Tab	PCB
 Gold	SPDT DPDT	-	HA-C10V HA-C20V
 Silver	SPDT DPDT	HA-C50 HA-C60	HA-C50V HA-C60V

### Part Number: Lamp Holder

Appearance	Part Number
	HA9Z-AH

### Part Number: Safety Lever Lock

Appearance	Part Number
	HA9Z-LS-TK1971

### ② Lens/LED Color Codes

Color	Code
Amber	A
Green	G (LED lamps) GD (LED lenses) GL (Incandescent lenses)
Red	R
Blue	B

**Selector Switches (Assembled)**
**Part Numbers: Selector Switches**

Style	Position	Position	Contact	Terminal Style		
				Solder Tab	PCB	
Round 	90° 2-Position	Maintained		DPDT	LA1S-2C6	LA1S-2C2V
		Spring return from right		DPDT	LA1S-21C6	LA1S-21C2V
	45° 3-Position	Maintained		DPDT	LA1S-3C6	LA1S-3C2V
		Spring return from right		DPDT	LA1S-31C6	LA1S-31C2V
		Spring return from left		DPDT	LA1S-32C6	LA1S-32C2V
		2-Way spring return		DPDT	LA1S-33C6	LA1S-33C2V
Square 	90° 2-Position	Maintained		DPDT	LA2S-2C6	LA2S-2C2V
		Spring return from right		DPDT	LA2S-21C6	LA2S-21C2V
	45° 3-Position	Maintained		DPDT	LA2S-3C6	LA2S-3C2V
		Spring return from right		DPDT	LA2S-31C6	LA2S-31C2V
		Spring return from left		DPDT	LA2S-32C6	LA2S-32C2V
		2-Way spring Return		DPDT	LA2S-33C6	LA2S-33C2V
Rectangular 	90° 2-Position	Maintained		DPDT	LA3S-2C6	LA3S-2C2V
		Spring return from right		DPDT	LA3S-21C6	LA3S-21C2V
	45° 3-Position	Maintained		DPDT	LA3S-3C6	LA3S-3C2V
		Spring return from right		DPDT	LA3S-31C6	LA3S-31C2V
		Spring return from left		DPDT	LA3S-32C6	LA3S-32C2V
		2-Way spring Return		DPDT	LA3S-33C6	LA3S-33C2V
Oversize Round 	90° 2-Position	Maintained		DPDT	HA1S-2C6	HA1S-2C2V
		Spring return from right		DPDT	HA1S-21C6	HA1S-21C2V
	45° 3-Position	Maintained		DPDT	HA1S-3C6	HA1S-3C2V
		Spring return from right		DPDT	HA1S-31C6	HA1S-31C2V
		Spring return from left		DPDT	HA1S-32C6	HA1S-32C2V
		2-Way spring Return		DPDT	HA1S-33C6	HA1S-33C2V

**Contact Operations**  
 (for all selectors)

Contacts	Operator Position and Contact Operation	
2-pos. (DPDT)	Left	
	Right	
3-pos. (DPDT)	Left	
	Center	
	Right	

1. All assembled selector switches use DPDT contacts.
2. For SPDT contacts see sub-components on next page.
3. PCB terminal models also available with silver contacts (change "1" or "2" to "5" or "6" respectively, ie LA1S-21C2C becomes LA1S-21C6V).

## Selector Switches (Sub-Assembled)

**Contacts + Safety Lever Lock + Operator = Complete Part**






**A**

### Part Numbers: Operators


Style	Position	Function	Part Number
 Round	2	Maintained Spring from right	LA1S-2Y LA1S-21Y
	3	Maintained Spring from right Spring from left Spring from both	LA1S-3Y LA1S-31Y LA1S-32Y LA1S-33Y
 Square	2	Maintained Spring from right	LA2S-2Y LA2S-21Y
	3	Maintained Spring from right Spring from left Spring from both	LA2S-3Y LA2S-31Y LA2S-32Y LA2S-33Y
 Rectangular	2	Maintained Spring from right	LA3S-2Y LA3S-21Y
	3	Maintained Spring from right Spring from left Spring from both	LA3S-3Y LA3S-31Y LA3S-32Y LA3S-33Y
 Oversize Round	2	Maintained Spring from right	HA1S-2Y HA1S-21Y
	3	Maintained Spring from right Spring from left Spring from both	HA1S-3Y HA1S-31Y HA1S-32Y HA1S-33Y

### Part Numbers: Contacts

Appearance		Contacts	Terminal Style	
			Solder Tab	PCB
 	Gold	SPDT DPDT	-	HA-C1V HA-C2V
	Silver	SPDT DPDT	HA-C5 HA-C6	HA-C5C HA-C6V





- 
 1. All assembled switches listed on previous page use DPDT contacts.  
 2. SPDT Contacts for use on 2 position selector switch only

### Part Number: Safety Lever Lock

Appearance	Part Number
	HA9Z-LS-TK1971

## Key Switches (Assembled)

### Part Numbers:Key Switches

Style	Operation	Contacts	Terminal Type			
			Solder Tab	PCB		
Round 	90° 2-Position	Maintained		DPDT	LA1K-2C6 <sup>③</sup>	LA1K-2C2V <sup>③</sup>
		Spring return from right		DPDT	LA1K-21C6B	LA1K-21C2VB
	45° 3-Position	Maintained		DPDT	LA1K-3C6 <sup>③</sup>	LA1K-3C2V <sup>③</sup>
		Spring return from right		DPDT	LA1K-31C6 <sup>③</sup>	LA1K-31C2V <sup>③</sup>
		Spring return from left		DPDT	LA1K-32C6 <sup>③</sup>	LA1K-32C2V <sup>③</sup>
		2-Way spring return		DPDT	LA1K-33C6D	LA1K-33C2VD
Square 	90° 2-Position	Maintained		DPDT	LA2K-2C6 <sup>③</sup>	LA2K-2C2V <sup>③</sup>
		Spring return from right		DPDT	LA2K-21C6B	LA2K-21C2VB
	45° 3-Position	Maintained		DPDT	LA2K-3C6 <sup>③</sup>	LA2K-3C2V <sup>③</sup>
		Spring return from right		DPDT	LA2K-31C6 <sup>③</sup>	LA2K-31C2V <sup>③</sup>
		Spring return from left		DPDT	LA2K-32C6 <sup>③</sup>	LA2K-32C2V <sup>③</sup>
		2-Way spring return		DPDT	LA2K-33C6D	LA2K-33C2VD
Rectangular 	90° 2-Position	Maintained		DPDT	LA3K-2C6 <sup>③</sup>	LA3K-2C2V <sup>③</sup>
		Spring return from right		DPDT	LA3K-21C6B	LA3K-21C2VB
	45° 3-Position	Maintained		DPDT	LA3K-3C6 <sup>③</sup>	LA3K-3C2V <sup>③</sup>
		Spring return from right		DPDT	LA3K-31C6 <sup>③</sup>	LA3K-31C2V <sup>③</sup>
		Spring return from left		DPDT	LA3K-32C6 <sup>③</sup>	LA3K-32C2V <sup>③</sup>
		2-Way spring return		DPDT	LA3K-33C6D	LA3K-33C2VD
Oversize Round 	90° 2-Position	Maintained		DPDT	HA1K-2C6 <sup>③</sup>	HA1K-2C2V <sup>③</sup>
		Spring return from right		DPDT	HA1K-21C6B	HA1K-21C2VB
	45° 3-Position	Maintained		DPDT	HA1K-3C6 <sup>③</sup>	HA1K-3C2V <sup>③</sup>
		Spring return from right		DPDT	HA1K-31C6 <sup>③</sup>	HA1K-31C2V <sup>③</sup>
		Spring return from left		DPDT	HA1K-32C6 <sup>③</sup>	HA1K-32C2V <sup>③</sup>
		2-Way spring return		DPDT	HA1K-33C6D	HA1K-33C2VD

### Contact Operations (for all selectors)

Contacts	Operator Position and Contact Operation	
	Left	Right
2-pos. (DPDT)		
3-pos. (DPDT)		



- In place of <sup>③</sup> specify key retention code from next page.
- All assembled key switches have DPDT contacts. For SPDT see sub-assembled on next page.
- PCB terminal models also available with silver contacts (change "1" or "2" to "5" or "6" respectively, ie LA1K-2C2V<sup>③</sup> becomes LA1K-2C6V<sup>③</sup>).





## Key Switches (Sub-Assembled)

**Contacts + Safety lever lock + Operator = Complete Part**



A

### Part Numbers: Operators


Style	Positions	Operation	Part Number
Round 	2	Maintained Spring from right	LA1K-2 <sup>Ⓧ</sup> LA1K-21B
	3	Maintained Spring from right Spring from left Spring from both	LA1K-3 <sup>Ⓧ</sup> LA1K-31 <sup>Ⓧ</sup> LA1K-32 <sup>Ⓧ</sup> LA1K-33D
Square 	2	Maintained Spring from right	LA2K-2 <sup>Ⓧ</sup> LA2K-21B
	3	Maintained Spring from right Spring from left Spring from both	LA2K-3 <sup>Ⓧ</sup> LA2K-31 <sup>Ⓧ</sup> LA2K-32 <sup>Ⓧ</sup> LA2K-33D
Rectangular 	2	Maintained Spring from right	LA3K-2 <sup>Ⓧ</sup> LA3K-21B
	3	Maintained Spring from right Spring from left Spring from both	LA3K-3 <sup>Ⓧ</sup> LA3K-31 <sup>Ⓧ</sup> LA3K-32 <sup>Ⓧ</sup> LA3K-33D
Oversize Round 	2	Maintained Spring from right	HA1K-2 <sup>Ⓧ</sup> HA1K-21B
	3	Maintained Spring from right Spring from left Spring from both	HA1K-3 <sup>Ⓧ</sup> HA1K-31 <sup>Ⓧ</sup> HA1K-32 <sup>Ⓧ</sup> HA1K-33D



1. In place of <sup>Ⓧ</sup> specify key removable code from table on right.

2. Operator includes two keys.

### Part Numbers: Contacts

Appearance	Contacts	Terminal Style	
		Solder Tab	PCB
	Gold SPDT DPDT	-	HA-C1V HA-C2V
	Silver SPDT DPDT	HA-C5 HA-C6	HA-C5V HA-C6V



1. All assembled selectors listed on previous page use DPDT contacts.

2. SPDT contacts are for use on 2 position key switches only.

### ③ Key Retention Option Codes

Code	Description
A	Key not retained in any position (removable in all positions)
B	Key retained in right position only
C	Key retained in left position only
D	Key retained in left and right (3 position only)
E	Key retained in center only (3 position only)
G	Key retained right and center (3 position only)
H	Key retained left and center (3 position only)



## Illuminated Selector Switches

### Part Numbers: Illuminated Selectors Switches

Style			Contact	Voltage	Terminal Style		
					Solder Tab	PCB	
Round	90° 2-Position	Maintained		DPDT	24V LED 24V Incand.	LA1F-2C64-② LA1F-2C67-②	LA1F-2C24V-② LA1F-2C27V-②
		Spring return from right		DPDT	24V LED 24V Incand.	LA1F-21C64-② LA1F-21C67-②	LA1F-21C24V-② LA1F-21C27V-②
	45° 3-Position	Maintained		DPDT	24V LED 24V Incand.	LA1F-3C64-② LA1F-3C67-②	LA1F-3C24V-② LA1F-3C27V-②
		Spring return from right		DPDT	24V LED 24V Incand.	LA1F-31C64-② LA1F-31C67-②	LA1F-31C24V-② LA1F-31C27V-②
		Spring return from left		DPDT	24V LED 24V Incand.	LA1F-32C64-② LA1F-32C67-②	LA1F-32C24V-② LA1F-32C27V-②
		2-Way spring return		DPDT	24V LED 24V Incand.	LA1F-33C64-② LA1F-33C67-②	LA1F-33C24V-② LA1F-33C27V-②
Square	90° 2-Position	Maintained		DPDT	24V LED 24V Incand.	LA2F-2C64-② LA2F-2C67-②	LA2F-2C24V-② LA2F-2C27V-②
		Spring return from right		DPDT	24V LED 24V Incand.	LA2F-21C64-② LA2F-21C67-②	LA2F-21C24V-② LA2F-21C27V-②
	45° 3-Position	Maintained		DPDT	24V LED 24V Incand.	LA2F-3C64-② LA2F-3C67-②	LA2F-3C24V-② LA2F-3C27V-②
		Spring return from right		DPDT	24V LED 24V Incand.	LA2F-31C64-② LA2F-31C67-②	LA2F-31C24V-② LA2F-31C27V-②
		Spring return from left		DPDT	24V LED 24V Incand.	LA2F-32C64-② LA2F-32C67-②	LA2F-32C24V-② LA2F-32C27V-②
		2-Way spring return		DPDT	24V LED 24V Incand.	LA2F-33C64-② LA2F-33C67-②	LA2F-33C24V-② LA2F-33C27V-②
Rectangular	90° 2-Position	Maintained		DPDT	24V LED 24V Incand.	LA3F-2C64-② LA3F-2C67-②	LA3F-2C24V-② LA3F-2C27V-②
		Spring return from right		DPDT	24V LED 24V Incand.	LA3F-21C64-② LA3F-21C67-②	LA3F-21C24V-② LA3F-21C27V-②
	45° 3-Position	Maintained		DPDT	24V LED 24V Incand.	LA3F-3C64-② LA3F-3C67-②	LA3F-3C24V-② LA3F-3C27V-②
		Spring return from right		DPDT	24V LED 24V Incand.	LA3F-31C64-② LA3F-31C67-②	LA3F-31C24V-② LA3F-31C27V-②
		Spring return from left		DPDT	24V LED 24V Incand.	LA3F-32C64-② LA3F-32C67-②	LA3F-32C24V-② LA3F-32C27V-②
		2-Way spring return		DPDT	24V LED 24V Incand.	LA3F-33C64-② LA3F-33C67-②	LA3F-33C24V-② LA3F-33C27V-②
Oversize Round	90° 2-Position	Maintained		DPDT	24V LED 24V Incand.	HA1F-2C64-② HA1F-2C67-②	HA1F-2C24V-② HA1F-2C27V-②
		Spring return from right		DPDT	24V LED 24V Incand.	HA1F-21C64-② HA1F-21C67-②	HA1F-21C24V-② HA1F-21C27V-②
	45° 3-Position	Maintained		DPDT	24V LED 24V Incand.	HA1F-3C64-② HA1F-3C67-②	HA1F-3C24V-② HA1F-3C27V-②
		Spring return from right		DPDT	24V LED 24V Incand.	HA1F-31C64-② HA1F-31C67-②	HA1F-31C24V-② HA1F-31C27V-②
		Spring return from left		DPDT	24V LED 24V Incand.	HA1F-32C64-② HA1F-32C67-②	HA1F-32C24V-② HA1F-32C27V-②
		2-Way spring return		DPDT	24V LED 24V Incand.	HA1F-33C64-② HA1F-33C67-②	HA1F-33C24V-② HA1F-33C27V-②

### Contact Operations (for all selectors)

Contacts	Operator Position and Contact Operation	
2-pos. (DPDT)	Left	
	Right	
3-pos. (DPDT)	Left	
	Center	
	Right	

### Lens Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
Yellow	Y
White	W

### Voltage/Lamp Code

Voltage	Code
6V AC/DC LED	2
12V AC/DC LED	3
24V AC/DC LED	4
120V AC LED	8
6V AC/DC Incandescent	5
12V AC/DC Incandescent	6
24V AC/DC Incandescent	7



- In place of ② specify lens color code from table above.
- Lamps also available in 6V AC/DC or 12 V AC/DC, change "4" or "7" using voltage/lamp codes (ie LA1F-2C63-② uses 12V AC/DC LED).
- All switches listed have DPDT contacts. For SPDT see sub-assembled on next page.
- PCB terminal models also available with silver contacts (change "1" or "2" to "5" or "6" respectively, ie LA1F-2C24V-② becomes LA1F-2C64V-②).

## Illuminated Selector Switches (Sub-Assembled)

**Contacts + Lamp Holder + Lamp + Operator + Lens/Handle = Completed Unit**




A

### Part Numbers: Operators


Style	Positions	Function	Part Number
 Round	2	Maintained Spring fom right	LA1F-20 LA1F-210
	3	Maintained Spring from right Spring from left Spring from both	LA1F-30 LA1F-310 LA1F-320 LA1F-330
 Square	2	Maintained Spring from right	LA2F-20 LA2F-20
	3	Maintained Spring from right Spring from left Spring from both	LA2F-30 LA2F-310 LA2F-320 LA2F-330
 Rectangular	2	Maintained Spring from right	LA3F-20 LA3F-210
	3	Maintained Spring from right Spring from left Spring from both	LA3F-30 LA3F-310 LA3F-320 LA3F-330
 Oversize Round	2	Maintained Spring from right	HA1F-20 HA1F-210
	3	Maintained Spring from right Spring from left Spring from both	HA1F-30 HA1F-310 HA1F-320 HA1F-330

### Part Numbers: Lenses/Handles


Appearance	Part Number
 Standard	LA1A-F-②
 Oversize	HA1A-F-②


 In place of ② specify lens color code from table.

### Part Number: Safety Lever Lock

Appearance	Part Number
	HA9Z-LS-TK1971

### Part Numbers: Contacts

Appearance	Terminal Style		
	Contacts	Solder Tab	PCB
	Gold SPDT DPDT	-	HA-C10V HA-C20V
	Silver SPDT DPDT	HA-C50 HA-C60	HA-C50V HA-C60V

 1. All assembled selectors on previous pages use DPDT contacts. SPDT contacts are for use on ② position selectors only.



### ② LED/Lens Color Code


Color	Code
Amber	A
Green	G
Red	R
Blue	S
Yellow	Y
White	W

### Part Number: Lamp Holder

Appearance	Part Number
	HA9Z-AH


### Part Numbers: Lamps

Appearance	Voltage	Part Numbers
 LED	6V AC/DC 12V AC/DC 24V AC/DC 120V AC	LFTD-6② LFTD-1② LFTD-2② LFTD-H2②
 Incandescent	6V AC/DC 12V AC/DC 24V AC/DC	LH-06 LH-14 LH-28

 In place of ② specify LED color code from table.

## Pushbutton Selectors (Assembled)

### Part Numbers: Pushbutton Selectors

Style	Terminal Style	Terminal Style	
		Solder Tab	PCB
 2 Position		HA1R-2C6-①	HA1R-2C2V-①
		3 Position	HA1R-3C6-①










### ① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y











- In place of ① specify button color code.
- PCB terminal models also available with silver contacts (change "1" or "2" to "5" or "6" respectively, ie HA1R-2C2V-① becomes HA1R-2C6V-①).

### Contact Operation

Style	Operator Position					
	Left		Center		Right	
	Normal	Depressed	Normal	Depressed	Normal	Depressed
2 Position			—	—		
3 Position				Blocked		

## Lever Switch (Assembled)








### Part Numbers: Lever Switches

Style	Operation	Contacts	Terminal Type		
			Solder Tab	PCB	
 2-Position	Maintained		DPDT	LA1T-2C6	LA1T-2C2V
	Spring return from up		DPDT	LA1T-21C6	LA1T-21C2V
	Spring Return from down		DPDT	LA1T-22C6	LA1T-22C2V
3-Position	Maintained		DPDT	LA1T-3C6	LA1T-3C2V
	Spring return from up		DPDT	LA1T-31C6	LA1T-31C2V
	Spring return from down		DPDT	LA1T-32C6	LA1T-32C2V
	Spring return from both		DPDT	LA1T-33C6	LA1T-33C2V




PCB terminal models also available with silver contacts (change "1" or "2" to "5" or "6" respectively, ie LA1T-2C2V becomes LA1T-2C6V).

### Contact Operation

Contacts	Operator Position & Contact Operation	Operator Position & Contact Operation		
		Down	Center	Up
2-pos. (DPDT)	Maintained Spring from Up			
2-pos. (DPDT)	Spring Return from Down			
3-pos. (DPDT)	All models			

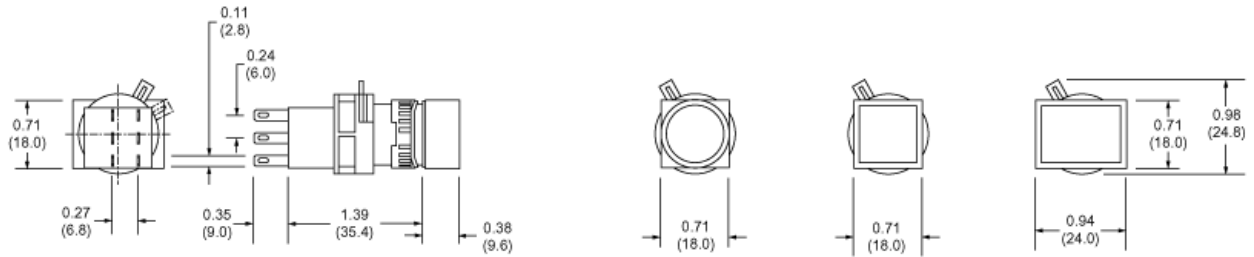
## Accessories

Part	Specifications	Part Number	Notes	
Ring Wrench 	Made of metal	MT-001	Used for tightening the plastic locking ring when installing the L6 series unit on a panel. Tightening torque should not exceed 9kgf·cm when tightening a locking ring.	
Lamp Holder Tool (Made of Rubber) 	Made of rubber. Used for removing and replacing LED and incandescent lamps in illuminated units.	OR-44	Rubber tool used for replacing LED and incandescent lamps.	
Lens Removal Tool 	For illuminated pushbuttons and pilot lights.	MT-101	Used for removing the lens or button from the housing.	
LED Lamp 	6V AC/DC 12V AC/DC 24V AC/DC 120V AC	LFTD-6② LFTD-1② LFTD-2② LFTD-H2②	T 1-3/4 miniature flange base. In place of ② specify LED color code (see page A-48).	
Incandescent Lamp 	6V AC/DC 12V AC/DC 24V AC/DC	LH-06 LH-14 LH-28	0.5W, T 1-3/4 miniature flange base	
Switch Guard 	90 degrees opening maintained	Round/Square	AL-K6	Prevents inadvertent switch operation. IP40 dust-tight rated.
		Rectangular	AL-KH6	
	180 degrees opening, spring return	Round/Square	AL-K6SP	Prevents inadvertent switch operation. IP65 oiltight rated.
		Rectangular	AL-KH6SP	
Dust-proof Cover 	For round units	AL-D6	Provides extra level of sealing for "front-panel" portion of switches.	
	For square units	AL-DQ6		
	For rectangular units	AL-DH6		
Terminal Cover 	Made of white nylon	H6-VL2	Fills unused panel cut-outs. Made of nitrile rubber. Push-in installation from front of panel. IP 65 (oiltight) rated.	
Mounting Hole Plug 	Rubber	AL-B6	Fills unused panel cutouts. Made of nitrile rubber. Push-in installation from front of panel. IP65 (oiltight) rated.	
	Aluminum	AL-BM6	Fills unused panel cutouts. Made of aluminum. Screw-on locking ring from inside of panel. IP65 (oiltight) rated.	
Replacement Keys 	for LA1K (#132)	AS6-SK	Pair of keys.	
	for HA1K (#231)	KG9Z-SK		
Replacement Engraving Inserts 		Round Square Rectangle Oversize Round Oversize Square Mushroom	AL6M-W AL6Q-W AL6H-W	

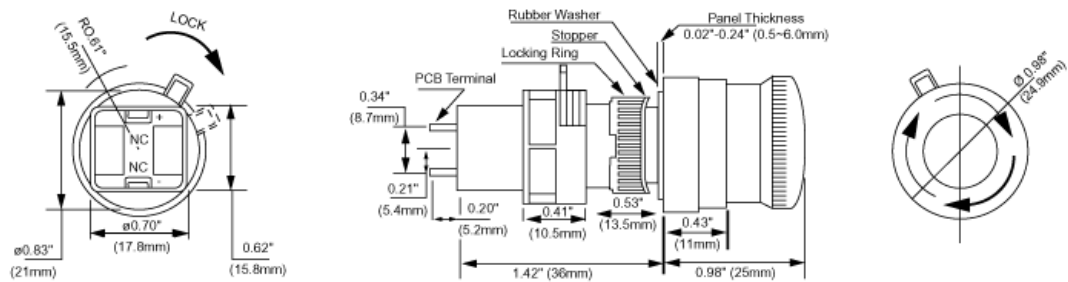
 In place of ② specify LED color code from table.

## Dimensions

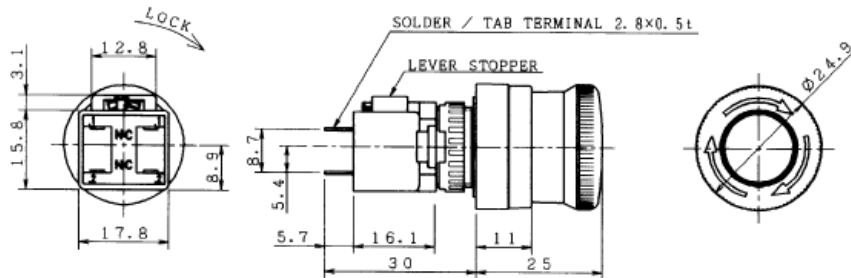
### Non-Illuminated Pushbuttons (LA\*B)



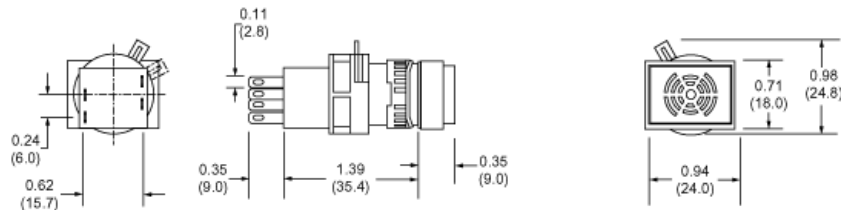
### Emergency Stop Switch (HA1B)



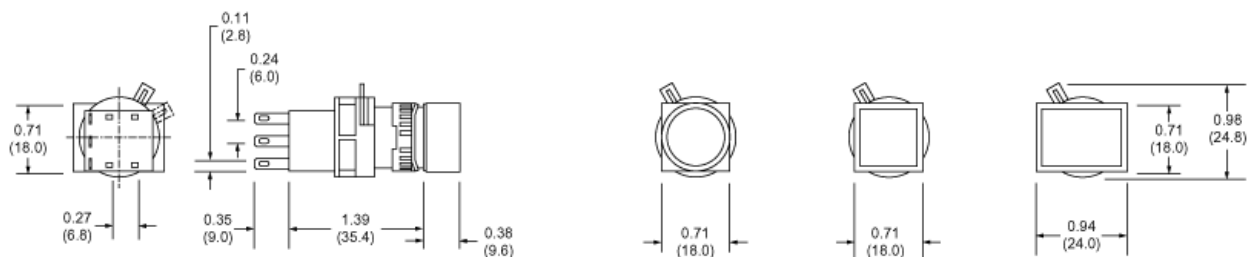
### Emergency Stop Switch (HA1E)



### Buzzer (LA3Z)

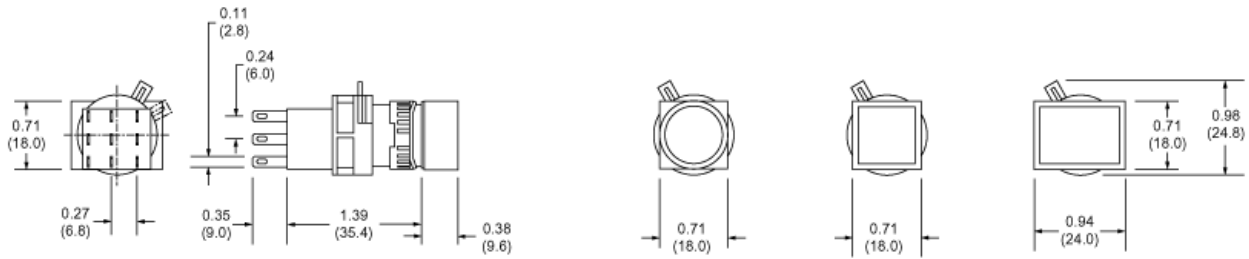


### Pilot Lights (LA\*P)

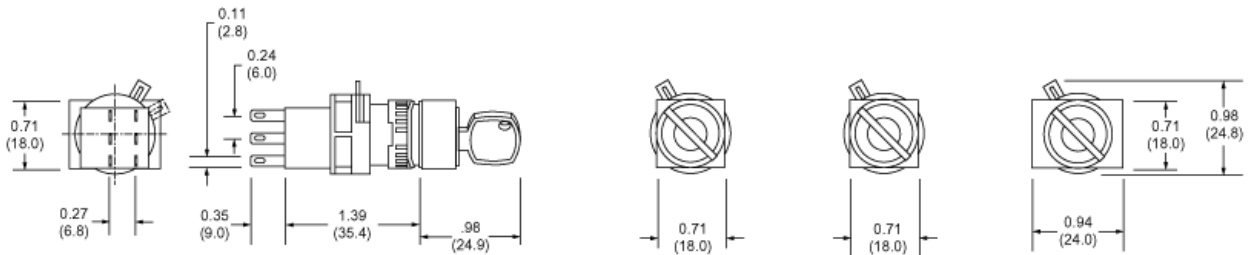


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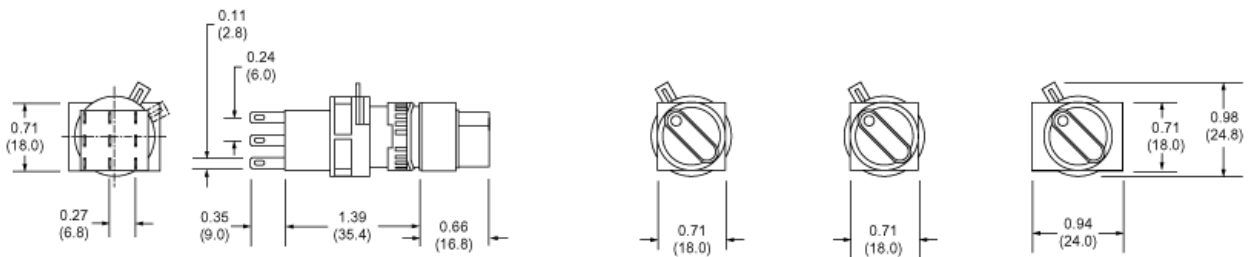
### Illuminated Pushbuttons (LA\*L)



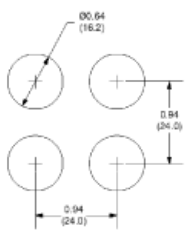
### Key Switches (LA\*K)



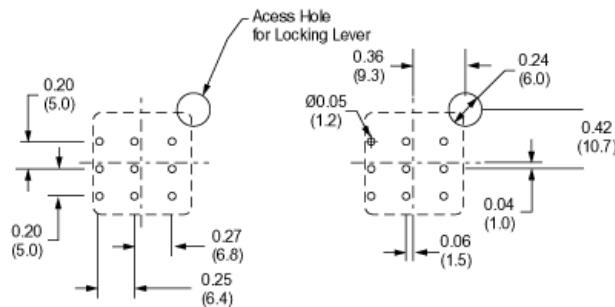
### Selector Switches (LA\*S)



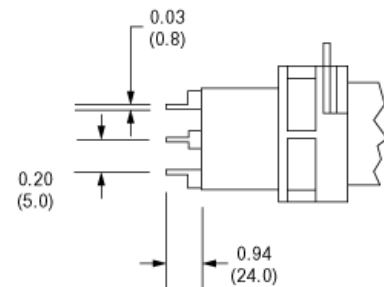
### Panel Cut-Out



### PCB Layout (except for Buzzer and E-Stop)

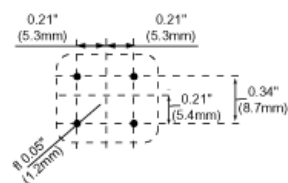


### PCB Pins



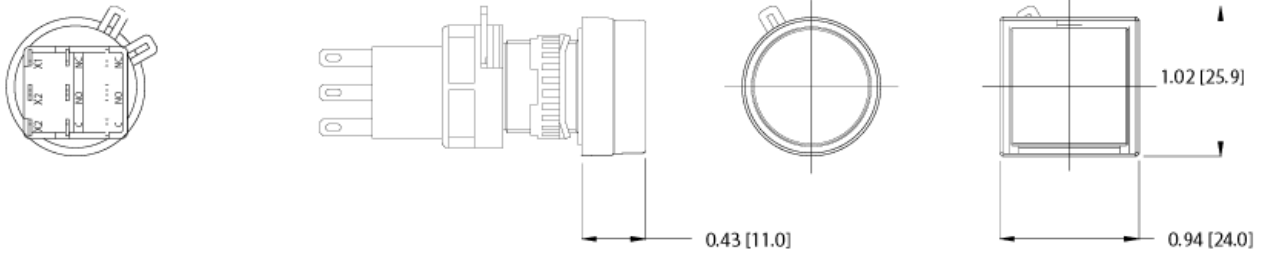
### HA1B E-Stop

#### PCB Mounting Pattern

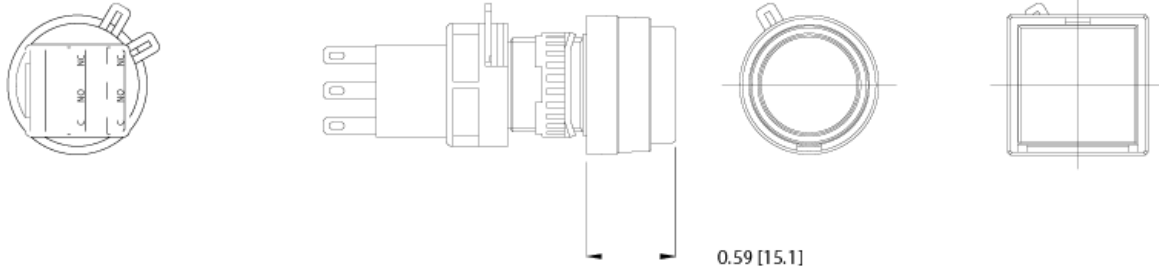


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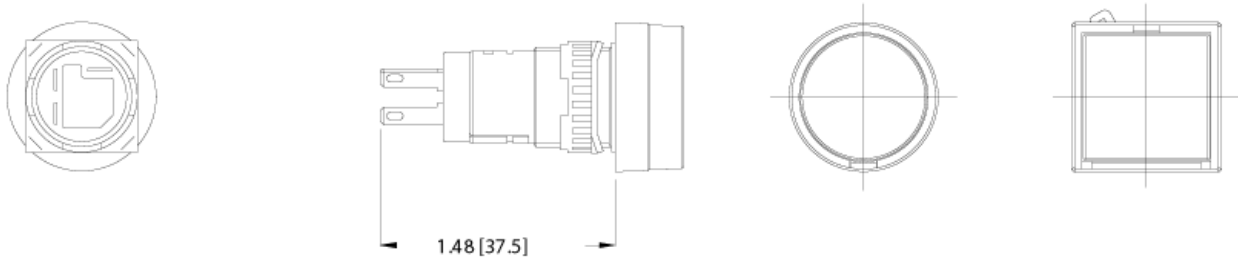
**Oversize Flush Pushbutton and Pilot Lights**



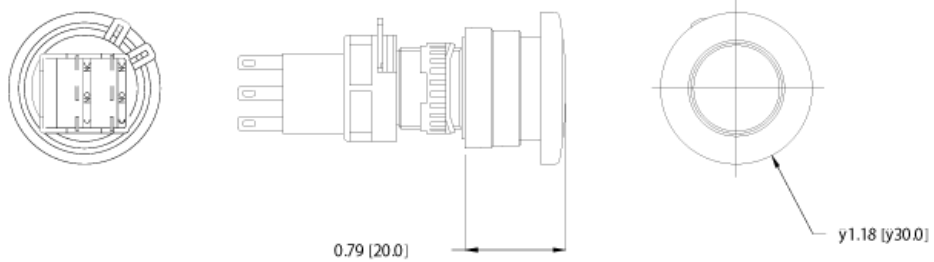
**Oversize Extended Non-Illuminated Pushbutton**



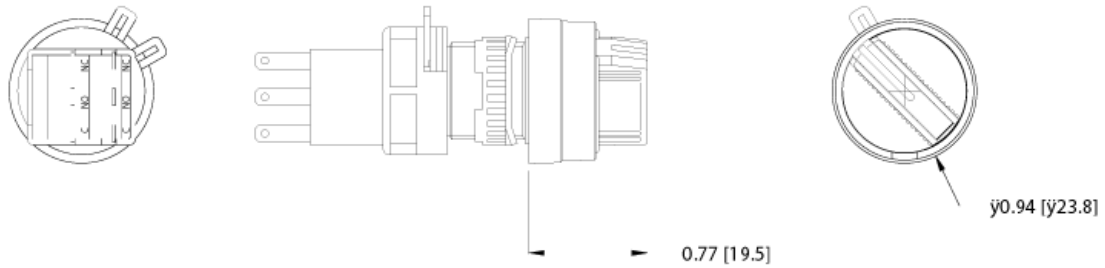
**Oversize Monolithic Pilot Lights**



**Mushroom Pushbuttons**

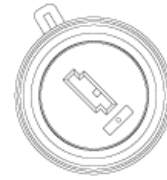
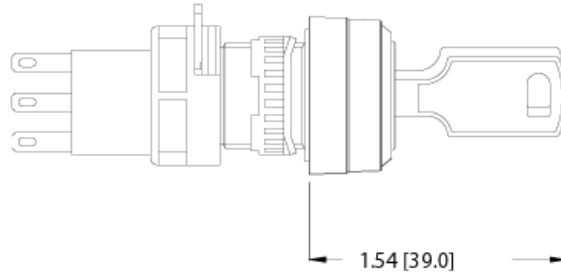
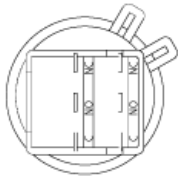


**Oversize Selector Switch**



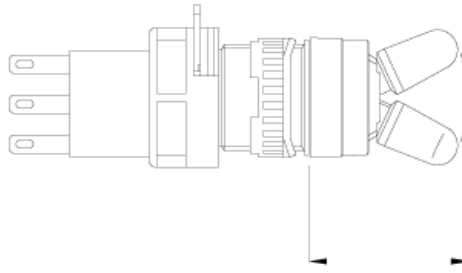
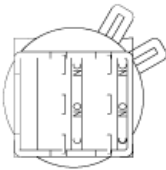
## Dimensions con't

### Overize Key Switch



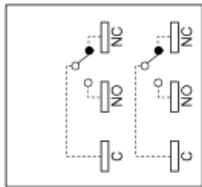
A

### Lever Switch

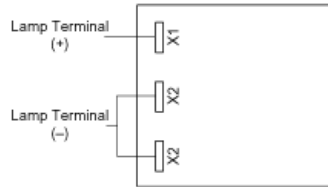


## Terminal Configurations

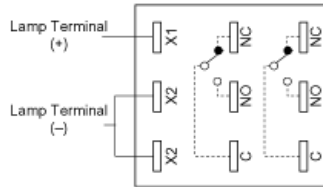
### Non Illuminated Pushbutton



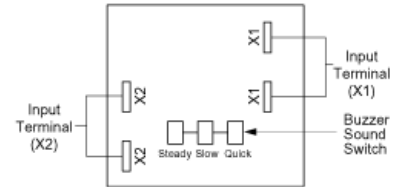
### Pilot Lights



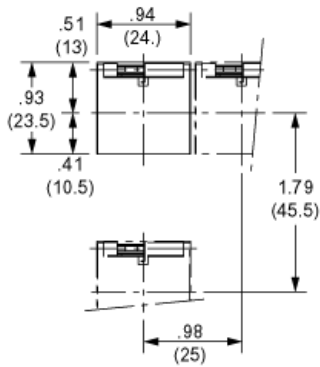
### Illuminated Pushbuttons



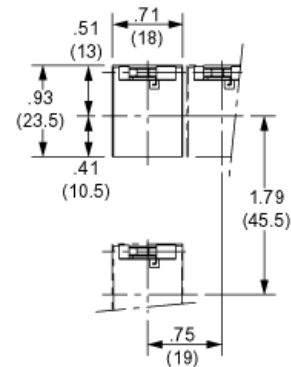
### Buzzer



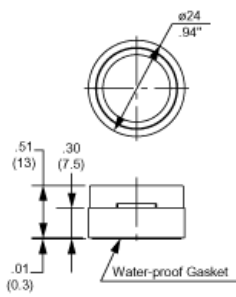
### AL-KH6SP



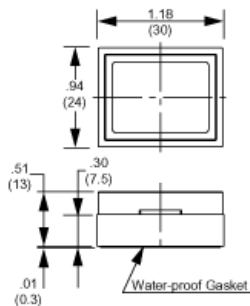
### AL-K6SP



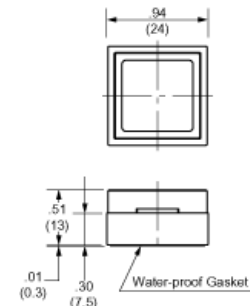
### AL-D6



### AL-DQ6



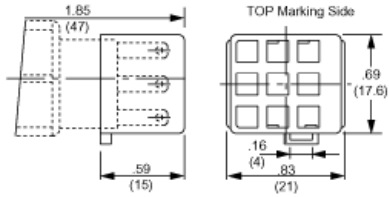
### AL-DH6



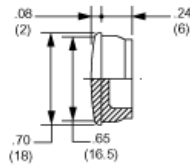


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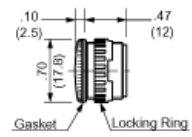
**H6-VL2**



**AL-B6**



**AL-BM6**



## General Instructions

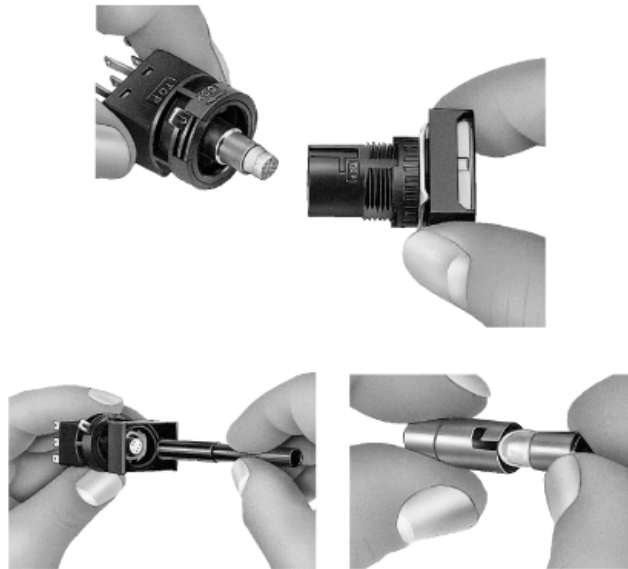
### Pushbutton Assembly

#### Lamp Installation

Lamps can be replaced in two ways:

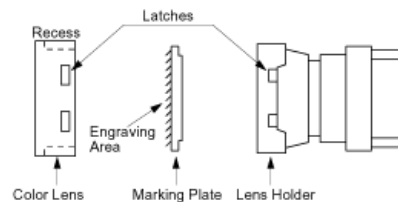
1. If contacts are accessible (or pushbutton not installed in a panel) then it is easiest to first remove the contacts from the operator. This will allow easy access to the lamp/lamp-holder assembly. Grab lamp, depress slightly, and turn counter clockwise. Lamp can then be removed by pushing it back through the lamp holder.

2. If contacts are not accessible, then the lamp can be replaced by first removing the lens from the operator. Just pull lens straight out either with a fingernail or optional lens removal tool (MT-101). Lamp/lamp-holder assembly can then be removed with lamp removal tool (OR-44). Insert lamp removal tool through operator, depress slightly, turn counter clockwise, then pull lamp/lamp-holder assembly out. Lamp can then be removed by pushing it back through the lamp holder.



#### Engraving Lenses

All buttons and lenses can be engraved directly on the outside surface. Illuminated lenses also allow for engraving on a plate that is underneath the colored section of the lens. Remove the colored section of the lens by pulling on the edge while simultaneously unhooking it from the latches on the lens holder. The marking plate will then be accessible. It can then be engraved or a thin marked insert (such as mylar or paper) can be sandwiched between the marking plate and colored section of the lens.



### Panel Mounting

Before any unit can be mounted into a panel, the contact block must be removed. Slide metal locking lever and pull contact off. Loosen and remove the locking ring and square anti-rotation ring from the operator and insert operator through panel cutout from the front of the panel. Slide on anti-rotation ring and tighten locking ring, using locking ring wrench (MT-001). Slide contact block onto operator, observing TOP marking on both parts. Slide metal locking lever in direction indicated by LOCK. The yellow plastic safety lever lock can then be snapped onto the locking lever; this will prevent vibration or maintenance actions from releasing the contact from the operator.

### PCB Mounting

Being able to separate the contacts from the operator allows for assembly of the front panel components (operator and lens) to be performed in tandem with the PC board assembly and soldering. For applications where multiple rows of pushbuttons are mounted closely together, or where other components may obstruct access to the contact locking lever, be sure to include access holes in the PC board (refer to PC board layout dimensions for location). Also be sure to allow for space above and to the side of contact to ensure that no components block the contact block locking lever. PC board pins are designed to rest on the PCB, take this into consideration to ensure that pins do not short closely spaced traces.

