

Industrial Automation Catalog Section - U906

Switches & Pilot Devices

L6 Series Miniature Switches & Pilot Devices

- Miniature Switches & Pilot Devices
- HA1B/HA1E Stop
- Pilot Lights

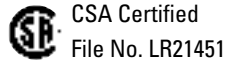
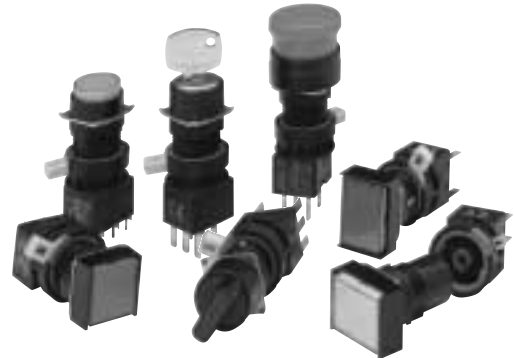
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Due to continuous product improvements, specifications are subject to

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











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

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

A



- 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-① becomes LA1B-M1C5V-①).

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



A

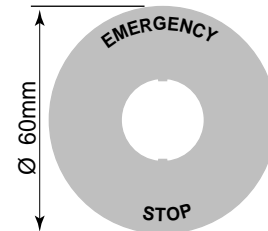
File No. DK95-00138

CSA approved
File No. LR21451

UL approved
File No. E55996

| | | | |
|--|--|---|----------------------------|
| Specifications | Contact Ratings | 24VDC/2A 120VAC/3A | |
| | Contact Form | 1 or 2 form B (2-SPST-NC) | |
| | Termination | PCB or Solder Terminal | |
| | Contact Material | Silver | |
| | Applicable Standards | EN 60947-5-1, UL-508, CSA 22.2. No. 14 | |
| | Rated Insulation Voltage | 250V | |
| | Degree of Protection | IP65, when mounted in an enclosure | |
| | Conditional Short-Circuit Current & Short-Circuit Protective Device | 50 A (at 250V) 10A 250V Fuse, operation class aM according to IEC269-1 and IEC269-2 | |
| | Positive Opening Operation | 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 | |
| Pollution Degree | | 3 | |

Part Numbers: Nameplates HAAV–Yellow Plastic



| | Part Number |
|-------------------------|-------------|
| Blank | HAAV-OY |
| 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




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.