L-Series Switch

The L-Series rocker switch is an innovative product offering total design flexibility, while at the same time setting new standards for performance and reliability. Its versatile design features include a neatly proportioned size that fits into an industry standard mounting hole of 1.734 x .867 (44.0mm x 22.0mm), countless unique choices for ratings, circuits, colors, illuminations and laser etched legends. These single or double pole switches also feature a broad choice of actuator styles, colors, and lenses with up to twelve terminals offering an extensive range of switch and lamp circuit options, including LED or incandescent illumination. Additionally, an optional plug-in terminal connector enables pre-wiring of wire your harness.

Typical Applications:
- Construction machinery
- Agricultural equipment
- On-highway transportation equipment

Performance Features:
- IP67 certified sealed front panel components
- Withstands temperatures from -40°C to +85°C
- Vibration, shock, thermoshock, moisture and salt spray resistant
L-Series Switch
DESIGN FEATURES

WITHSTANDS EXTREME TEMPERATURES
Roller pin mechanism eliminates need for lubricants, Withstanding temperatures from -40°C to +85°C.

ELIMINATES NEED FOR RETOOILING
Neatly proportioned, the L-Series fits into an industry standard mounting hole of 1.734 x .867 [44.0mm x 22.0mm].

ENSURES GREATER SHOCK PROTECTION
Welded lamp connection and one-piece internal, jumperless terminal withstand extreme shock and vibration.

MAXIMIZES YOUR DESIGN FLEXIBILITY
Twelve terminals offers an extensive range of switch and lamp circuit options, including LED or incandescent illumination.

INTEGRATES EASILY INTO YOUR SYSTEM
Available with two industry standard termination options, .250 TAB or .187 TAB.
**Electrical**

- **Contact Rating**: 
  - .4VA @ 24VDC (MAX) resistive
  - 15 amps, 125VAC
  - 10 amps, 250VAC
  - 20 amps, 4-14VDC
  - 15 amps, 15-28VDC
- **Dielectric Strength**: 1250 Volts RMS between pole to pole
- **Insulation Resistance**: 50 Megohms
- **Initial Contact Resistance**: 10 milliohms max. @ 4VDC
- **Life**: 100,000 cycles maintained, 50,000 cycles momentary at rated voltage and current
- **Contacts**: 90/10 silver-nickel, silver tin-oxide, gold
- **Terminals**: Brass or copper/silver plate
  - 3/16” (4.76mm) & 1/4” (6.3mm) Quick Connect terminations standard.

**Environmental**

- **Environmental**: IP67 for above panel components of the actual switch, representing an index of protection as applied to electrical equipment in accordance with IEC 529, BS 5490, DIN 400 50 & NFC 20 010.
- **Corrosion**: Mixed Flowing Gas MFG Class III per ASTM B-827 & B-845, Method H, with 3 years exposure.
- **Operating Temperature**: -40°C to + 85°C
- **Vibration 1**: Per Mil-Std 202F, Method 204D Test Condition A 0.06 DA or 10G’s 10-500 Hz. Tested with VCH connector. Test criteria - No loss of circuit during test and pre and post test contact resistance.
- **Vibration 2**: Resonance search
  - 24-50 Hz 0.40 DA
  - 50-2000 ±10 G’s peak
  - Results Horizontal Axis 3-5 G’s max.
  - Random
    - 24 Hz 0.06 PSD-Gsq/Hz
    - 60 Hz 0.50
    - 100 Hz 0.50
    - 200 Hz 0.025
    - 2000 Hz 0.025
  - No loss of circuit during test; <10µ chatter.
- **Shock**: Per Mil-Std 202F, Method 213B, Test Condition K @ 30G’s. Tested with VCH connector. Test criteria - No loss of circuit during test, pre, and post test contact resistance.
- **Salt Spray**: Per Mil-Std 202F, Method 101D, Test Condition A, 48 Hrs.
- **Thermal Shock**: Per Mil-Std 202F, Method 107F, Test Condition A, -55°C to 85°C. Test criteria - pre and post test contact resistance.
- **Moisture Resistance**: Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance.

**Mechanical**

- **Endurance**: 250,000 cycles minimum

**Physical**

- **Lighted**: Incandescent - rated 10,000 hours
  - LED - rated 100,000 hours 1/2 life
  - (LED is internally ballasted for voltages to 24 VDC)
- **Seals**: Rocker, base & bracket are sealed.
- **Base**: Nylon 66 GF rated to 85°C with a flammability rating of 94V0.
- **Lock**: Acetal
- **Lens**: Polycarbonate rated at 100°C.
- **Bracket**: Nylon Zytel
- **Connector**: Nylon 66 rated at 85°C. Polarized.

**Actuator Travel (Angular Displacement)**

- **2 position**: 26°
- **3 positions**: 13° from center

**Mounting Specifications**

- **Panel Thickness Range**
  - Acceptable Panel Thickness: .030 to .156 (.76mm to 3.96mm)
  - Recommended: .030, .062, .093, .125 and .156

*Manufacturer reserves the right to change product specification without prior notice.*
Dimensional Specifications: in. [mm]

L-SERIES
SHOWN WITH LASER ETCHED ACTUATOR

1.970 [50.04]
1.020 [25.91]
.400 [10.16]
1.450 [36.83]
.855 [21.72]

L-SERIES
SHOWN WITH ROCKER GUARD

1.970 [50.04]
.435 [11.51]
.453 [11.51]
2.380 [60.45]

L-SERIES
SHOWN WITH LARGE LENS AND PADDLE ACTUATOR

1.970 [50.04]
1.020 [25.91]
.400 [10.16]

L-SERIES
SHOWN WITH BAR LENS, LOCK AND CONNECTOR

1.970 [50.04]
1.020 [25.91]
.453 [11.51]
2.380 [60.45]

Connector
L-SERIES CONNECTOR
LC1-01 BLACK .250 TAB CONNECTOR (PACKARD 630 SERIES)
LC2-01 BLACK .187 TAB CONNECTOR (PACKARD 480 SERIES)
LC3-01 BLACK .250 TAB CONNECTOR (AMP ONLY)

Hole Plug
L-SERIES HOLE PLUG
LH1 REMOVABLE HOLE PLUG WITH NON-SERRATED WINGS
LH2 HOLE PLUG WITH SERRATED WINGS

Connector
L-SERIES CONNECTOR
LC1-01 BLACK .250 TAB CONNECTOR (PACKARD 630 SERIES)
LC2-01 BLACK .187 TAB CONNECTOR (PACKARD 480 SERIES)
LC3-01 BLACK .250 TAB CONNECTOR (AMP ONLY)

Hole Plug
L-SERIES HOLE PLUG
LH1 REMOVABLE HOLE PLUG WITH NON-SERRATED WINGS
LH2 HOLE PLUG WITH SERRATED WINGS

60 Johnson Avenue • Plainville, CT 06062–1177 • Phone: (860) 793–9281 • Fax: (860) 793–9231
Email: sales@carlingtech.com • www.carlingtech.com
Dimensional Specifications: in. [mm]

- Test cut hole in actual material:
  - LMS Mounting Panel Hole: +.008 - .000, 1.900 [48.26]
  - MOUNTING PANEL OPENING (2) UNITS: +.008 - .000, 2.020 [51.31]

- MOUNTING PANEL
  - FOR ADDITIONAL UNITS, ADD 1.03 [26.2] PER UNIT.
  - FOR MORE THAN 2 L-SERIES SWITCHES, ADD MIDDLE SECTION. AVAILABLE IN PANEL THICKNESSES LISTED BELOW. CONSULT FACTORY.

- DIMENSIONS: LME 2.02 [51.3mm] PLUS NUMBER OF CENTER BEZELS (LMM) X 1.034 [26.26mm]

- MOUNTING PANEL THICKNESS
  - .062 [1.57]
  - .093 [2.36]
  - .125 [3.17]
  - .156 [3.96]

- Panel opening size:
  - LM3 Mounting Panel: 1.90 X 3.06 [48.3mm X 77.7mm]
  - LM4 Mounting Panel: 1.90 X 4.09 [48.3mm X 103.9mm]
  - LM6 Mounting Panel: 1.90 X 6.15 [48.3mm X 156.2mm]
### L-Series Switch – Circuit Diagrams

<table>
<thead>
<tr>
<th>CIRCUIT CODE</th>
<th>SCHEMATIC</th>
<th>CIRCUIT CODE</th>
<th>SCHEMATIC</th>
<th>CIRCUIT CODE</th>
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<td>K</td>
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**LEGEND**

- **SYMBOL**
  - ● TERMINAL LOCATION
  - ○ LAMP LOCATION
  - — MAINTAINED CIRCUIT
  - — MOMENTARY CIRCUIT
  - — INTERNAL CONNECTION (JUMPER TERMINAL)
  - 2 POSITION CONNECTION
  - ⬇️ 2 POSITION
  - ⬇️ 3 POSITION

- **DEFINITION**
  - TERMINAL LOCATION
  - LAMP LOCATION
  - MAINTAINED CIRCUIT
  - MOMENTARY CIRCUIT
  - INTERNAL CONNECTION (JUMPER TERMINAL)
  - 2 POSITION CONNECTION
  - 2 POSITION
  - 3 POSITION
### 1 SERIES

#### Notes:
- Custom colors are available. Consult factory.
- Circuits 30, 31, 58, 69 are not available with rating codes 4, C, D, G or H.
- Termination 3 only available with rating codes 1, B, and E.
- Termination 1 not available with rating code 4.
- Not available with circuits 11-18, 51-57 and 69.

### 2 CIRCUIT

**Terminal Orientation**: ( ) - momentary
- SP - single pole - uses terminals 1, 2 & 4.
- DP - double pole uses terminals 5, 6 & 8.

#### Position:

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
<th>Code</th>
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<tbody>
<tr>
<td>1</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>OFF</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>OFF</td>
<td>3</td>
</tr>
</tbody>
</table>

#### CIRCUITS WITH JUMPER TERMINALS

- 30° (2, 4, 6, 5) OFF, OFF
- 31° (2, 4, 6, 5) OFF, OFF

#### PROGRESSIVE CIRCUITS

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
<th>Code</th>
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<tbody>
<tr>
<td>51</td>
<td>3 x 4</td>
<td>1</td>
</tr>
<tr>
<td>52</td>
<td>3 x 4</td>
<td>2</td>
</tr>
<tr>
<td>53</td>
<td>3 x 4</td>
<td>3</td>
</tr>
<tr>
<td>54</td>
<td>3 x 4 (6, 8)</td>
<td>4</td>
</tr>
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<td>55</td>
<td>3 x 4</td>
<td>5</td>
</tr>
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<td>56</td>
<td>3 x 4</td>
<td>6</td>
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<td>57</td>
<td>3 x 4</td>
<td>7</td>
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<tr>
<td>58</td>
<td>3 x 4 (6, 8)</td>
<td>8</td>
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<tr>
<td>61</td>
<td>3 x 4, 7 x 8</td>
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<td>3 x 4, 7 x 8</td>
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<td>63</td>
<td>3 x 4, 7 x 8</td>
<td>11</td>
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<td>64</td>
<td>3 x 4, 7 x 8</td>
<td>12</td>
</tr>
<tr>
<td>65</td>
<td>3 x 4, 7 x 8 (1, 2, 5, 6)</td>
<td>13</td>
</tr>
<tr>
<td>66</td>
<td>3 x 4, 7 x 8 (1, 2, 5, 6)</td>
<td>14</td>
</tr>
<tr>
<td>67</td>
<td>3 x 4, 7 x 8 (1, 2, 5, 6)</td>
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</tr>
<tr>
<td>68</td>
<td>3 x 4, 7 x 8 (1, 2, 5, 6)</td>
<td>16</td>
</tr>
<tr>
<td>69</td>
<td>3 x 4, 7 x 8 (1, 2, 5, 6)</td>
<td>17</td>
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<tr>
<td>70</td>
<td>3 x 4, 7 x 8 (1, 2, 5, 6)</td>
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<td>72</td>
<td>3 x 4, 7 x 8 (1, 2, 5, 6)</td>
<td>20</td>
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<tr>
<td>73</td>
<td>3 x 4, 7 x 8 (1, 2, 5, 6)</td>
<td>21</td>
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<tr>
<td>74</td>
<td>3 x 4, 7 x 8 (1, 2, 5, 6)</td>
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</tr>
</tbody>
</table>

#### HAZARD WARNING CIRCUITS

- A2: 6 x 4, 8, 9 OFF, OFF, OFF
- A3: 6 x 4, 8, 9 OFF, OFF, OFF

*Available with ratings 1, 4, & E only.

### 3 RATING

<table>
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<th>Number</th>
<th>Description</th>
<th>Code</th>
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<tr>
<td>1</td>
<td>0.4VA @ 28VDC Resistive</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>10A 250VAC 1/2 HP, 15A 125VAC 1/2 HP, No Listings</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>15A 24V</td>
<td>B</td>
</tr>
<tr>
<td>C</td>
<td>20A 18V</td>
<td>C</td>
</tr>
<tr>
<td>D</td>
<td>20A 12V</td>
<td>D</td>
</tr>
<tr>
<td>E</td>
<td>15A 12V</td>
<td>E</td>
</tr>
<tr>
<td>G</td>
<td>20A 6V</td>
<td>G</td>
</tr>
<tr>
<td>H</td>
<td>20A 3V</td>
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### 4 TERMINATION

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<thead>
<tr>
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<th>Description</th>
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<tr>
<td>1</td>
<td>0.250 (6.4mm) TAB (QC)</td>
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<tr>
<td>3</td>
<td>0.187 (4.7mm) TAB (QC)</td>
</tr>
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</table>

### 5 ILLUMINATION

Lamp #1 above terminals 9 & 10 end of switch. Lamp #2 above terminals 11 & 12 end of switch. Positive (+) and negative (−) symbols apply to LED lamps only.

<table>
<thead>
<tr>
<th>Lamps</th>
<th>Illumination Type</th>
<th>Lamp wired to Terminals</th>
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<tbody>
<tr>
<td>A</td>
<td># 1</td>
<td>Independent</td>
</tr>
<tr>
<td>B</td>
<td># 2</td>
<td>Independent</td>
</tr>
<tr>
<td>C</td>
<td># 1</td>
<td>Independent</td>
</tr>
<tr>
<td>D</td>
<td># 1</td>
<td>Independent</td>
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<td>E</td>
<td># 1</td>
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</tr>
<tr>
<td>F</td>
<td># 1</td>
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<tr>
<td>G</td>
<td># 1</td>
<td>Independent</td>
</tr>
<tr>
<td>H</td>
<td># 1</td>
<td>Independent</td>
</tr>
</tbody>
</table>

### 6.7 LAMP (SAME CODING FOR BOTH SELECTIONS)

#### Selection 6: above terminals 10 & 9; Selection 7: above terminals 12 & 11

- No lamp: 0
- Incandescent: 10
- LED: 10
- Laser Etch: 10

#### 2VDC

- A
- L
- F

#### 6VDC

- B
- G
- H

#### 12VDC

- C
- N
- H

#### 24VDC

- D
- P
- J

*Consult factory for "daylight bright", blue/green and white LED options.
Typical current draw for LED is 20mA.

### 8 BRACKET COLOR

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<tr>
<td>Rocker</td>
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<tr>
<td>Paddle</td>
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### 9 ACTUATOR STYLE AND COLOR

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<th>Style</th>
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<td>Z</td>
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<td>Black</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Gray</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Red</td>
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### 10 & 11 LENS STYLE AND COLOR

- Lens color for LEDs must be clear, white, or match color of LED.
- No - No Actuator
- Z - No Lens

<table>
<thead>
<tr>
<th>Lens</th>
<th>Color</th>
<th>Clear</th>
<th>White</th>
<th>Amber</th>
<th>Red</th>
<th>Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B</td>
<td>G</td>
<td>M</td>
<td>T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>C</td>
<td>H</td>
<td>U</td>
<td>Large Transparent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>D</td>
<td>V</td>
<td>Bar Transparent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>E</td>
<td>K</td>
<td>R</td>
<td>W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 12 LASER ETCH, LENS OR BODY LEGEND

#### 00

- No legend this location / no actuator

For legend options & codes, see pages 54-65 of the Carling Transportation catalog.

### 13 LEGEND ORIENTATION

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Orientation 1 - vertical, lamp 1 on top</td>
</tr>
<tr>
<td>2</td>
<td>Orientation 2 - horizontal, lamp 1 on right</td>
</tr>
<tr>
<td>3</td>
<td>Orientation 3 - vertical, lamp 1 on bottom</td>
</tr>
<tr>
<td>4</td>
<td>Orientation 4 - vertical, lamp 1 on left</td>
</tr>
</tbody>
</table>

### 14 ACTUATOR LENS LEGEND

- No legend this location / no actuator

For legend options & codes, see pages 54-65 of the Carling Transportation catalog.
1 SERIES
L

2 CIRCUIT®
Terminal Orientation ( ) - momentary
SP - single pole - uses terminals 1, 2 & 4.
DP - double pole uses terminals 5, 6 & 8.
Terminals 9, 10 & 11 for lamp circuit only.

Position: 1 2 3 (Lock location)
SP DP 1 2 & 3, 6 & 8 Connected Terminals 1 & 2, 5 & 6
11 21 ON OFF ON
14 24 ON OFF ON
16 26 OFF OFF ON
17 27 OFF OFF (ON)
18 28 (ON) OFF (ON)

CIRCUITS WITH JUMPER TERMINALS
30 (2.4A), (1.6A)
31 2.4A (1.6A), (4.6A)
32 2.4A (1.6A), (4.6A)
33 2.4A 2.4A 2.4A
34 2.4A 2.4A 2.4A
35 2.4A 2.4A 2.4A
36 2.4A 2.4A 2.4A
37 2.4A 2.4A 2.4A
38 2.4A 2.4A 2.4A
39 2.4A 2.4A 2.4A
40 2.4A 2.4A 2.4A
41 2.4A 2.4A 2.4A
42 2.4A 2.4A 2.4A
43 2.4A 2.4A 2.4A
44 2.4A 2.4A 2.4A
45 2.4A 2.4A 2.4A
46 2.4A 2.4A 2.4A
47 2.4A 2.4A 2.4A
48 2.4A 2.4A 2.4A
49 2.4A 2.4A 2.4A
50 2.4A 2.4A 2.4A
51 2.4A 2.4A 2.4A
52 2.4A 2.4A 2.4A
53 2.4A 2.4A 2.4A
54 2.4A 2.4A 2.4A
55 2.4A 2.4A 2.4A
56 2.4A 2.4A 2.4A
57 2.4A 2.4A 2.4A
58 2.4A 2.4A 2.4A
59 2.4A 2.4A 2.4A
60 2.4A 2.4A 2.4A
61 2.4A 2.4A 2.4A
62 2.4A 2.4A 2.4A
63 2.4A 2.4A 2.4A
64 2.4A 2.4A 2.4A
65 2.4A 2.4A 2.4A
66 2.4A 2.4A 2.4A
67 2.4A 2.4A 2.4A
68 2.4A 2.4A 2.4A
69 2.4A 2.4A 2.4A
70 2.4A 2.4A 2.4A
71 2.4A 2.4A 2.4A
72 2.4A 2.4A 2.4A
73 2.4A 2.4A 2.4A
74 2.4A 2.4A 2.4A
75 2.4A 2.4A 2.4A
76 2.4A 2.4A 2.4A
77 2.4A 2.4A 2.4A
78 2.4A 2.4A 2.4A
79 2.4A 2.4A 2.4A
80 2.4A 2.4A 2.4A

3 RATING®
1 .4VA @ 28VDC Resistor
4 10A 250VAC 1/2 HP, 15A 125VAC 1/2 HP, No Listings
B 15A 24V
C 20A 18V
D 20A 12V
E 15A 12V
G 20A 6V
H 20A 3V

4 TERMINATION®
1 .250 (6.4mm) TAB (QC)
3 .187 (4.7mm) TAB (QC)

5 ILLUMINATION®
Lamp #1 above terminals 9 & 10 end of switch. Lamp #2 above terminals 11 & 12 end of switch. Positive (+) and negative (-) symbols apply to LED lamps only.

Lamps illumination Type Lamp wired to Terminals
S NONE # 2 independent 12+ 11-

8 Bracket Color®
J Black
K Red

9 ACTUATOR STYLE AND COLOR®
Locking Actuator P R

10 LENS STYLE AND COLOR®
0 No Lens
1 Incandescent C Blue
2 Incandescent B Green
3 Incandescent M Red
4 Incandescent G Yellow
5 Incandescent H Orange
6 Incandescent J White
7 Incandescent N Black
8 Incandescent P Lens Transparent
9 Incandescent R Lens Translucent

11 LOCK FUNCTION AND COLOR
Locking Position
Up Down Up & Down Center3 Lock Color
A H R 1 Match Actuator
B J S 2 Black
C K T 3 White
D L U 4 Red
E M V 5 Safety Orange

12 LASER ETCH, LENS OR BODY LEGEND
0 No legend this location / no actuator
12 Laser etch, Lens or Body Legend

13 LEGEND ORIENTATION
0 No legend (used with codes 11-18 in selection 12)
1 Orientation 1 - vertical, lamp 1 on top
2 Orientation 2 - horizontal, lamp 1 on right
3 Orientation 3 - vertical, lamp 1 on bottom
4 Orientation 4 - vertical, lamp 1 on left

Notes:
Consult factory to verify horsepower rating for your particular circuit choice.
1 Custom colors are available. Consult factory.
2 Additional lamp circuits available. Consult factory.
3 Available only with 3 position circuits.
4 Termination 1 not available with rating 4.
5 Termination 3 only available with ratings 1, B and E.
6 Circuits 30, 31, 56 and 69, are not available with rating codes C, D, G or H.