There are few products that Carling Technologies hasn’t turned “ON” and fewer industries that haven’t turned to Carling for solutions. With ISO and TS registered manufacturing facilities and technical sales offices worldwide, Carling ranks among the world’s largest manufacturers of circuit breakers, switches, power distribution units, digital switching systems and electronic controls.
On/Off Highway
Switches and Controls

With years of design and manufacturing experience, Carling Technologies is the market leader in transportation application switches & control modules providing solutions to most all major OEMs. Carling's switches are widely used and the most recognizable switch brand in the industry with unmatched quality and aesthetics. By drawing upon over 90 years of design experience, Carling Technologies is also able to provide custom product solutions such as operator control modules and custom electronic controls, that are sure to meet the most stringent design requirements.

Within This Catalog, you will find comprehensive product information for each product series including applications, specifications and ordering schemes.

Available Online are tools such as part configurator, product selectors and stock checks. Please visit www.carlingtech.com for the latest information on all our products.

Application Solution Engineers are readily available to assist you in selecting the appropriate product for your application. For further assistance, please email us at custservice@carlingtech.com

Custom Design Solutions are available for OEMs that require specific product design and performance.

Other Circuit Protection Products such as thermal protection and ground fault circuit protection are also available. Please refer to www.carlingtech.com for a complete list of product offering.
### SEALED TOGGLE

<table>
<thead>
<tr>
<th>Poles</th>
<th>ST-Series</th>
<th>V-Series</th>
<th>V-Series Rotary</th>
<th>V-Charger</th>
<th>W-Series</th>
<th>L-Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>16A 12V</td>
<td>up to 20/15A 12/24VDC 15A 125VAC 10A 250VAC</td>
<td>up to 15A 24VDC 20A 12VDC</td>
<td>12V/24V DC</td>
<td>up to 15A 125VAC 10A 250VAC 20A 18VDC</td>
<td></td>
</tr>
<tr>
<td>Ratings</td>
<td>16A 18V</td>
<td>14A 24V</td>
<td>15A 125VAC 10A 250VAC</td>
<td>1A 14VDC</td>
<td>.5A 28VDC</td>
<td>8A 14VDC</td>
</tr>
<tr>
<td>Actuator</td>
<td>toggle (bat)</td>
<td>rocker, paddle, locking rocker</td>
<td>ergonomic knob</td>
<td>sealed spring-loaded access doors</td>
<td>bezel-less rocker, paddle &amp; locking rocker</td>
<td>IP67, rocker, paddle, locking rocker</td>
</tr>
<tr>
<td>Mounting Hole Specifications</td>
<td>.500&quot; dia [12.7mm] bushing mount</td>
<td>.830&quot; x 1.450&quot; [21.08mm x 36.83mm] snap-in mount</td>
<td>.830&quot; x 1.450&quot; [21.08mm x 36.83mm] snap-in mount</td>
<td>.830&quot; x 1.450&quot; [21.08mm x 36.83mm] snap-in mount</td>
<td>.830&quot; x 1.450&quot; [21.08mm x 36.83mm] snap-in mount</td>
<td></td>
</tr>
<tr>
<td>Termination</td>
<td>.250 tabs screw terminals</td>
<td>.250 tabs solder lug wire leads</td>
<td>.250 tabs solder lug .250 tabs wire leads</td>
<td>.250 tabs</td>
<td>.110 tabs</td>
<td>.187 tab .250 tabs</td>
</tr>
<tr>
<td>Sealing</td>
<td>IP68</td>
<td>IP66/68 above panel</td>
<td>IP67 above panel</td>
<td>IP64 above panel</td>
<td>IP67 above and below panel, fully submersible</td>
<td>IP67 above panel</td>
</tr>
<tr>
<td>Illumination</td>
<td>n/a</td>
<td>incandescent, LED, neon</td>
<td>incandescent, LED</td>
<td>LED</td>
<td>LED</td>
<td>incandescent, LED</td>
</tr>
<tr>
<td>Approvals</td>
<td>UL, cUL pending</td>
<td>UL, CSA pending</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
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</tbody>
</table>

### SEALED ROCKERS

<table>
<thead>
<tr>
<th>Poles</th>
<th>ST-Series</th>
<th>V-Series</th>
<th>V-Series Rotary</th>
<th>V-Charger</th>
<th>W-Series</th>
<th>L-Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>16A 12V</td>
<td>up to 10A 12VDC</td>
<td>up to 10A 12VDC 5A 24VDC</td>
<td>up to 1A 14VDC 5A 28VDC</td>
<td>up to 10A 12VDC 5A 24VDC</td>
<td>up to 1A 14VDC 5A 28VDC</td>
</tr>
<tr>
<td>Ratings</td>
<td>16A 18V</td>
<td>14A 24V</td>
<td>15A 125VAC 10A 250VAC</td>
<td>1A 14VDC</td>
<td>.5A 28VDC</td>
<td>8A 14VDC</td>
</tr>
<tr>
<td>Actuator</td>
<td>bezel-less rocker</td>
<td>rocker, paddle</td>
<td>rocker, paddle</td>
<td>joystick</td>
<td>rocker, paddle</td>
<td>ergonomic knob</td>
</tr>
<tr>
<td>Mounting Hole Specifications</td>
<td>.787&quot; x 1.575&quot; [22mm x 44mm] snap-in mount</td>
<td>.867&quot; x 1.734&quot; [22mm x 44mm] snap-in mount</td>
<td>.867&quot; x 1.734&quot; [22mm x 44mm] snap-in mount</td>
<td>.867&quot; x 1.734&quot; [22mm x 44mm] snap-in mount</td>
<td>.867&quot; x 1.734&quot; [22mm x 44mm] snap-in mount</td>
<td>2.75&quot; diameter; 70.1 mm diameter</td>
</tr>
<tr>
<td>Termination</td>
<td>.110 Tabs</td>
<td>.187 tabs</td>
<td>.250 tabs</td>
<td>wire leads with connector</td>
<td>.187 tabs</td>
<td>M10 Stud</td>
</tr>
<tr>
<td>Sealing</td>
<td>n/a</td>
<td>IP67 above panel</td>
<td>IP67 above panel</td>
<td>Water Resistant</td>
<td>n/a</td>
<td>IP67</td>
</tr>
<tr>
<td>Illumination</td>
<td>LED</td>
<td>LED</td>
<td>LED</td>
<td>n/a</td>
<td>LED</td>
<td>n/a</td>
</tr>
<tr>
<td>Approvals</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

*Options and approvals shown may apply to specific construction combinations only, consult factory for clarification. Manufacturer reserves the right to change product specifications without prior notice.
# THERMAL CIRCUIT PROTECTION

<table>
<thead>
<tr>
<th></th>
<th>CMB-Series</th>
<th>CLB-Series</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Poles</strong></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Actuator</strong></td>
<td>pushbutton</td>
<td>pushbutton</td>
</tr>
<tr>
<td><strong>Leakage Current Trip Level</strong></td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Leakage Current Trip Time</strong></td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Max Current &amp; Voltage Ratings</strong></td>
<td>3 to 20A, 125-250VAC, 32VDC</td>
<td>3 to 60A, 125-250VAC, 32VDC</td>
</tr>
<tr>
<td><strong>Max Interrupting Capacity</strong></td>
<td>2500A@32 VDC</td>
<td>2500A@32 VDC</td>
</tr>
<tr>
<td><strong>Available Circuits</strong></td>
<td>series trip, manual reset</td>
<td>series trip, manual reset</td>
</tr>
<tr>
<td><strong>Termination</strong></td>
<td>.250 tab, .250 tab with 90° bend, screw terminal, screw terminal with 90° bend</td>
<td>.250 tab, .250 tab with 90° bend, screw terminal, screw terminal with 90° bend</td>
</tr>
<tr>
<td><strong>Mounting Method</strong></td>
<td>threaded bushing, front panel snap-in</td>
<td>threaded bushing, front panel snap-in</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>UL, CUL, CSA, TUV, CE, UL 1500 / ISO 8846 for ignition protection / marine</td>
<td>UL, CUL, CSA, TUV, CE, UL 1500 / ISO 8846 for ignition protection / marine</td>
</tr>
</tbody>
</table>

# ELECTRONIC SWITCHING PRODUCTS

<table>
<thead>
<tr>
<th></th>
<th>CKP-Series</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Software</strong></td>
<td>SAE J1939 CAN 2.0b Protocol</td>
</tr>
<tr>
<td><strong>Circuitry</strong></td>
<td>12 individual loads</td>
</tr>
<tr>
<td><strong>Operating Voltage</strong></td>
<td>8-32 V</td>
</tr>
<tr>
<td><strong>Illumination</strong></td>
<td>1, 2, or 3 LED’s per load</td>
</tr>
<tr>
<td><strong>Sealing</strong></td>
<td>IP69 Front Panel; IP68 Back Panel when connected</td>
</tr>
<tr>
<td><strong>Termination</strong></td>
<td>Deutsch DT-Series Connector</td>
</tr>
<tr>
<td><strong>Legends</strong></td>
<td>Custom or standard laser etched back-lighting</td>
</tr>
</tbody>
</table>

# CUSTOM ELECTRONIC CONTROLS, POWER MANAGEMENT MODULES & DISPLAYS

*Options and approvals shown may apply to specific construction combinations only, consult factory for clarification.*
V-Series
CONTURA SWITCHES

Carling Technologies’ sealed V-Series Contura switches are well known for their cutting edge design, high quality, maximum performance and unmatched reliability. These switches are a staple in the marine and transportation industries and have passed a range of environmental, corrosion, temperature, vibration, shock and sealing tests including MIL Std 202F, MIL Std 510.1, UL 1500, ISO 8846, IEC 60529 and BS 5490 among others, making them one of the most rugged and reliable switches ever manufactured.

Product Highlights:
- Certified to IP66/68 with dual seals around lamps and rocker stem.
- Silver plated butt contact mechanism provides reliability up to and beyond 100K electrical cycles.
- Greaseless construction withstands temperature extremes down to -40°C.
- The switch accommodates up to 10 terminals and endless illumination and circuit options.
- The switch connector allows the user to preload FQC terminals for ease of assembly.
- Numerous choices of removable rockers allow for style change without having to retest or re-qualify the switch base.

Resources:
- Download 3D CAD Files
- IGS ▶️ STP ▶️
- Watch Product Video

www.carlingtech.com
V-Series Switch
DESIGN FEATURES

INTERCHANGEABLE ACTUATORS
Panel redesign is a snap with our wide range of rocker styles. Achieve maximum design variety with minimum inventory. Simply swap rockers to create an entirely new look for your panel.

DUAL SEAL PROTECTION
Seals out water, dust, debris, and enables switch certification to IP66/68 for front panel components.

CLEAN CONNECTIONS
Options for both eight and ten terminal base styles with AMP & Packard compatible connectors affords myriad circuit options while providing ease of assembly.

OPTIONAL PANEL SEAL
Prevents water/dust ingress behind panel.

MULTIPLE LIGHTING OPTIONS
In addition to Incandescent lamps, our LED illumination is offered in a wide array of light intensities, colors, as well as dual level, tri-color, and flashing options.

BRASS ROLLER PIN
Robust mechanism eliminates the need for lubricants. Enables switch to withstand -40°C to +85°C temperatures.

SILVER PLATED BUTT CONTACT MECHANISM
Providing 50k to 100k electrical cycles and a variety of different electrical ratings.
Contura II & III
The Contura II & III actuators are constructed of thermoplastic polycarbonate and are offered with a hard nylon overlay or a “soft-touch” elastomer overlay. These models incorporate aesthetic designs on the top and bottom of the rocker featuring two rows of raised “bumps” on the Contura II and three “indented” lines on the Contura III.

Contura IV
The Contura IV’s “Shape to create a Shape” actuator works with the curves, contours & advanced styling of the latest panel designs, flowing with these advanced curves & radii. This actuator style fits on the Contura flush bracket/bezel.

Contura V
The symmetrically curved Contura V actuator provides the perfect complement to the Contura IV’s “Shape to create a Shape” design concept. With its flush style mounting bracket, Contura V can be mounted in between two Contura IV’s, by itself, or in groups.

Contura VI (WAVE)
The Contura VI WAVE sealed rocker switches, when used in a row, create an uniquely appealing “wave” design on your panel. A variety of colors and finishes are available for both rocker and wave insert. Contura VI features bar and oval lenses.

Contura VII
Contura VII featuring gently curved corners and edges assuring compatibility with most any panel design. Intuitive feel is maximized by the use of 2 embossed circular pads located at opposite ends of the rocker. Any combination of Bar or Oval style lenses can be located in the pads providing a truly unique look, exclusive to Contura VII.

Contura X
The raised bracket/bezel on the Contura X helps prevent inadvertent actuation of the rocker, as well as preventing debris from being trapped under the actuator. This curved rocker style is available with a variety of lenses and legends.

Contura XI
The raised bracket/bezel on the Contura XI helps prevent inadvertent actuation of the rocker, as well as preventing debris from being trapped under the actuator. This convex style rocker is available with a wide variety of lenses and legends.

Contura XII
The Contura XII version features a paddle style actuator with the raised bracket/bezel of Contura X and XI. The contoured handle design provides intuitive recognition and ease of operation and is available with all Contura X and XI lens and legend offerings.

Contura XIV
The Contura XIV represents a sleek new crossover rocker design which should appeal to Trucks, Buses and Heavy Vehicles as well as the Marine Industry. Intuitive feel is provided by recessed ridges along with a Center Groove which effectively defines the boundary between top and bottom switch functions.

Illuminated Indicators & Accessories
Alert operator of systems functions or malfunctions, are offered with removable/replaceable lamps in Contura II, II, V or X styles. Accessories include connectors, mounting panels, hole plugs, panel seals, and actuator removal tools. Refer to accessories page for full details.
**V–Series Contura Sealed Rocker Switches - General Specifications**

**Electrical**

- **Contact Rating**
  - .4VA @ 24VDC (MAX) resistive
  - 15 amps, 125VAC
  - 10 amps, 250VAC
  - 1/2 HP 125-250VAC
  - 20 amps, 4-14VDC
  - 15 amps, 15-28VDC
  - 10A, 14VT
  - 6A, 125VAC L

- **Dielectric Strength**
  - 1500 Volts RMS

- **Insulation Resistance**
  - 50 Megohms

- **Initial Contact Resistance**
  - 10 milliohms max. @ 4VDC

- **Life**
  - 50,000 - 100,000 cycles circuit dependent

- **Contacts**
  - Silver alloy, silver tin-oxide, fine silver

- **Terminals**
  - Brass or copper/silver plate 1/4" (6.3mm) Quick Connect terminations standard. Solder lug, Wire Lead

**Mechanical**

- **Endurance**
  - 150,000 cycles minimum circuit dependent

**Physical**

- **Lighted**
  - Incandescent - rated 10,000 hours
  - Neon - rated 25,000 hours
  - LED - rated 100,000 hours 1/2 life (LED is internally ballasted for voltages to 24VDC)

- **Seals**
  - Optional external gasket panel seal

- **Base**
  - Polyester blend rated to 125°C with a UL flammability rating of 94V0.

- **Contura II,III,IV,V, VI, VII Actuator**
  - **Hard Surface**: Basic actuator structure molded of thermoplastic polycarbonate with a hard Nylon 66 thermoplastic surface overlay.
  - **Soft Surface**: Basic actuator structure molded of thermoplastic polycarbonate with an elastomer overlay.

- **Contura X,XI,XII Actuator, VP**
  - Nylon 66 Reinforced rated to 105°C
  - Polycarbonate rated at 100°C
  - Polycarbonate lens/sub-rocker with ABS shell

**Actuator Travel (Angular Displacement)**

- 2 position 18°
- 3 positions 9° from center

**Mounting Specifications**

- **Gaskets**
  - Acceptable Panel Thickness
    - 0 .030 to .250 (.76 to 6.35mm)
    - 1 .030 to .109 & .147 to .157 (.76 to 2.77mm & 3.73 to 3.98mm)

- **Recommended**: No gasket with panel thickness of .032, .062, .093, .125, .187 or .250

**Agency Certifications**

**Environmental**

- **Sealing**
  - Sealed version: IP66/68, this rating applies to front panel components of the actual switch only, and signifies complete protection against dust as well as powerful jets of water.

- **Corrosion**
  - Mixed Flowing Gas (MFG) Class III
  - 3 year accelerated exposure per ASTM B-827, B-845 Silver and gold contacts

- **Operating Temp.**
  - Vibration 1
    - -40°C to +85°C
  - Vibration 2
    - 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, pre and post test contact resistance.

- **Vibration 2**
  - Resonance search
  - 24-50 Hz 0.40 DA
  - 50-2000 Hz ±10 G’s peak
  - Horizontal Axis 3-5 G’s max.

- **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, 96 Hrs. Sealed version only.

- **Dust**
  - Mil STD 810, Method 510.2 Air Velocity 300 Ft/Min Duration 16Hr

- **Thermal Shock**
  - Per Mil-Std 202F, Method 107F, Test Cond. 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.

- **Ignition Protection**
  - All Contura switches with sealed construction meet the requirements of UL1500/ISO8846 for ignition protection, in addition to conformance with EC directive 94/25/EC for marine products.
### V-Series Contura Sealed Rocker Switches - Contura II & III - Ordering Scheme

<table>
<thead>
<tr>
<th>1 SERIES</th>
<th>2 CIRCUIT</th>
<th>3 RATING</th>
<th>4 TERMINATION / BASE STYLE</th>
<th>5 ILLUMINATION</th>
<th>6 LAMPS</th>
<th>7 ACTUATOR</th>
<th>8 BRACKET</th>
<th>9 LENS</th>
<th>10 COLOR</th>
<th>11 LEGEND</th>
<th>13 LEGEND ORIENTATION</th>
<th>14 ACTUATOR LENS LEGEND</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2 CIRCUIT

Terminal Connections as viewed from bottom of switch:

- **SP**: Single pole - uses terminals 1, 2 & 3.
- **DP**: Double pole uses terminals 1, 2, 3, 4, 5 & 6.

Terminals 7, 8, 9 & 10 for lamp circuit only.

Position:

- **SP**: 2 & 3, 5 & 6
- **DP**: 2 & 3, 5 & 6

Special Circuits:

- **OFF**: 1 & 2, 4 & 5
- **ON**: 1 & 2, 4 & 5

### 3 RATING

- **4VA @ 28VDC Resistive**
- **15A @ 12V**
- **20A @ 12V**
- **20A @ 14V**
- **10A @ 14VTC**
- **20A @ 14V, 10A @ 14VT**
- **20A @ 18V**
- **15A @ 24V**
- **20A @ 24V, 10A @ 14VT**
- **20A @ 28VDC**

### 4 TERMINATION / BASE STYLE

<table>
<thead>
<tr>
<th>8 Term</th>
<th>10 Term</th>
<th>Termination</th>
<th>Jumper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>.250 TAB (QC) no barriers</td>
<td>No</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>.250 TAB (QC) with barriers</td>
<td>Yes T2 to 5</td>
</tr>
<tr>
<td>J</td>
<td>K</td>
<td>.250 NC no barriers</td>
<td>No</td>
</tr>
<tr>
<td>C</td>
<td>D</td>
<td>Solder Lug no barriers</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Wire Leads no barriers</td>
<td>No</td>
</tr>
<tr>
<td>E</td>
<td>F</td>
<td>Wire Leads No</td>
<td>No</td>
</tr>
</tbody>
</table>

Note: Codes J & K for circuits H, G, M, R & S are specified in selection 4. External jumper between terminals 2 & 4 for circuit E is provided by customer. Circuit E may be used for SP OFF-ON-ON circuit.

### 5 ILLUMINATION

Lamp #1 above terminals 1 & 4 for switch. Lamp #2 above terminals 3 & 6 end of switch. Positive (+) and negative (-) symbols apply to LED lamps only.

#### Sealed Unsealed Lamps

<table>
<thead>
<tr>
<th>S</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>U</th>
<th>Y</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
<td>U</td>
<td>Y</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I</td>
<td>N</td>
<td>T</td>
<td>V</td>
<td>W</td>
<td>X</td>
<td>Y</td>
<td>Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Lamp wired to Terminals

<table>
<thead>
<tr>
<th>Lamp Type</th>
<th>Lamp wired to Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1, 2</td>
</tr>
<tr>
<td>1</td>
<td>2, 3</td>
</tr>
<tr>
<td>2</td>
<td>3, 4</td>
</tr>
<tr>
<td>3</td>
<td>4, 5</td>
</tr>
<tr>
<td>4</td>
<td>5, 6</td>
</tr>
</tbody>
</table>

### 6.7 LAMPS

<table>
<thead>
<tr>
<th>LED Type</th>
<th>Lamp Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>2</td>
</tr>
<tr>
<td>Amber</td>
<td>3</td>
</tr>
<tr>
<td>Green</td>
<td>4</td>
</tr>
<tr>
<td>Superbright</td>
<td>5</td>
</tr>
</tbody>
</table>

### 8 FLUSH BRACKET COLOR 1, PANEL SEAL

- **Black**
- **White**
- **Gray**

### 9 ACTUATOR

- **A, B**
- **0**
- **No Actuator**

### 10 LENS

- **Clear White**
- **Amber**
- **Green**
- **Red**
- **Blue**

### 11 ACTUATOR COLOR 1 AND TEXTURE

- **Black**
- **White**

### 12 ACTUATOR LENS OR BODY LEGENDS

- **11**
- **12**
- **13**
- **14**

### 13 LEGEND ORIENTATION

- **0**
- **1**
- **2**
- **3**
- **4**

### 14 ACTUATOR LENS LEGEND

- **0**
- **1**
- **2**
- **3**
- **4**

#### Notes:

- Consult factory to verify horsepower rating for your particular circuit choice.
- Custom colors are available. Consult factory.
- Body legends not available on Soft Surface actuators; White imprinting is standard on black actuators; Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
- Additional ratings available. See V-Series Switch Accessories page.
- Consult factory to verify horsepower rating for your particular circuit choice.
- For additional legend options & codes, visit us at www.carlingtech.com.
### V-Series Contura Sealed Rocker Switches - Contura II & III Locking - Ordering Scheme

**1. SERIES**

| V |

**2. CIRCUIT**

**Terminal Connections as viewed ( ) - momentary**

<table>
<thead>
<tr>
<th>8 terminal 10 terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP - single pole - uses terminals 1, 2 &amp; 3.</td>
</tr>
<tr>
<td>DP - double pole uses terminals 1, 2, 3, 4, 5 &amp; 6.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

**3. RATING**

<table>
<thead>
<tr>
<th>1</th>
<th>4.4VA @ 28VDC Resistive</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>15A 24V</td>
</tr>
<tr>
<td>C</td>
<td>20A 18V</td>
</tr>
<tr>
<td>D</td>
<td>12A 25V</td>
</tr>
<tr>
<td>E</td>
<td>10A 14V, 10A 14VT (circuit 1, 4, A &amp; D only)</td>
</tr>
<tr>
<td>F</td>
<td>10A 14V, 6A 14VT (circuit G only)</td>
</tr>
<tr>
<td>M</td>
<td>.4VA/20A 12V</td>
</tr>
<tr>
<td>N</td>
<td>.4VA/15A 24V</td>
</tr>
</tbody>
</table>

**4. TERMINATION / BASE STYLE**

<table>
<thead>
<tr>
<th>8 Term</th>
<th>10 Term</th>
<th>Termination</th>
<th>Jumper</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Z</td>
<td>SP, DP</td>
<td>.250 TAB (QC) no barriers</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>250 TAB (QC) with barriers</td>
<td>No</td>
</tr>
<tr>
<td>J</td>
<td>K</td>
<td>250 TAB (QC) no barriers</td>
<td>Yes T2 to 5</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Solder Lug</td>
<td>No</td>
</tr>
<tr>
<td>C</td>
<td>D</td>
<td>Solder Lug</td>
<td>No</td>
</tr>
<tr>
<td>G</td>
<td>6</td>
<td>Wire Leads</td>
<td>No</td>
</tr>
<tr>
<td>E</td>
<td>F</td>
<td>Wire Leads</td>
<td>No</td>
</tr>
</tbody>
</table>

Note: Codes J & K for circuits H, G & M. Do not use silicone-based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

**5. ILLUMINATION & SWITCH SEALING**

**Lamp #1 above terminals 1 & 4 end of switch.**

<table>
<thead>
<tr>
<th>Lamp wired to Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp #1 above terminals 3 &amp; 6 end of switch</td>
</tr>
<tr>
<td>No lamp</td>
</tr>
<tr>
<td>Neon</td>
</tr>
<tr>
<td>125VAC</td>
</tr>
</tbody>
</table>

**6. LOCK**

| Lock above terminals 1 & 4 end of switch |
| W |

**7. LAMP**

| Lamp above terminals 3 & 6 end of switch |
| No lamp |

**8. FLUSH BRACKET COLOR 1, PANEL SEAL**

<table>
<thead>
<tr>
<th>Black</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>W</td>
</tr>
<tr>
<td>One Seal</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Y</td>
</tr>
</tbody>
</table>

**9. HARD SURFACE ACTUATOR 1**

| Contura II |
| A | B | G |
| Contura III |
| C | D | E | F |

**10. LENS**

| Z | No Lens |
| Black | White |
| Clear | White |
| Amber | Green |
| Red | Blue |

**11. ACTUATOR LOCK FUNCTION AND COLOR 1**

<table>
<thead>
<tr>
<th>Lock Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Match Actuator A</td>
</tr>
<tr>
<td>Black</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>White</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>Red</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>Safety Orange</td>
</tr>
<tr>
<td>E</td>
</tr>
</tbody>
</table>

**12. ACTUATOR LENS OR BODY LEGEND 2**

<table>
<thead>
<tr>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>ON</td>
<td>O</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
</tr>
<tr>
<td>F</td>
<td>N</td>
<td>F</td>
<td></td>
</tr>
</tbody>
</table>

**13. LEGEND ORIENTATION**

<table>
<thead>
<tr>
<th>Orientation 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation 2</td>
</tr>
<tr>
<td>Orientation 3</td>
</tr>
<tr>
<td>Orientation 4</td>
</tr>
</tbody>
</table>

Notes:
- Consult factory for “daylight bright” LED options. Typical current draw for 24VDC is 20mA.
- Additional ratings available. See V-Series Switch Accessories page.
V Series Contura Sealed Rocker Switches - Contura IV - Ordering Scheme

1 SERIES

V

2 CIRCUIT

Terminal Connections as viewed: ( ) - momentary from bottom of switch:

SP - single pole - uses terminals 1, 2 & 3.
DP - double pole uses terminals 1, 2, 3, 4, 5 & 6.

Position: 1 2 3
1 - 4 1 - 4
2 - 5 2 - 5
3 - 6 3 - 6

10 - 9

10 - 9

SPECIAL CIRCUITS

H’ 2 & 3 2 & 3 & 4 5 & 4
G’ 2 & 3 & 5 & 6 2 & 3
S’ 2 & 3 & 5 & 6 2 & 3 1 & 2
M’ (2 & 3 & 5 & 6) 2 & 3 OFF
R’ (2 & 3 & 5 & 6) 2 & 3 & 1
E’ 5 & 6 5 & 6 5 & 1

*Jumper between terminals 2 & 5 for circuits H, G, M, R & S are specified in selection 4. External jumper between terminals 2 & 4 for circuit E are provided by customer. Circuit E may be used for SP OFF-ON-ON circuit.

3 RATING

4.4VA @ 28VDC Resistive
B 15A 24V
C 20A 18V
D 20A 18V
E 20A 14V, 10A 14VT (circuit 1, 4, A & D only)
F 20A 14V, 10A 14VT (circuit G only)
M .4VA/20A 12V
N .4VA/15A 24V

4 TERMINATION / BASE STYLE

8 term 10 Term Termination Jumper
A B .250 TAB (OC) no barriers No
B C .250 TAB (OC) with barriers No
J K .250 TAB (OC) no barriers Yes T2 to 5
3 5 Solder Lug no barriers No
D E Solder Lug No
5 6 Wire Leads no barriers No
F G Wire Leads No

Note: Codes J & K for circuits H, G & M. Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

5 ILLUMINATION & SWITCH SEALING

Lamp #1 above terminals 1, 6 end of switch; Lamp #2 above terminals 3 & 6 end of switch. Positive (+) and negative (-) symbols apply to LED lamps only.

Sealed Unsoldered Lamps Illumination Type Lamp Wired to Terminals
S 0 0 INDEPENDENT 8 (8) 7 (8)
A 1 1 DOWM 3 (3) 7 (3)
B 2 2 UP 3 (3) 7 (3)
C 3 3 DOWN 3 (3) 7 (3)
D 4 4 UP 3 (3) 7 (3)
E 5 5 DOWN 3 (3) 7 (3)
F 6 6 UP 3 (3) 7 (3)
G 7 1 DOWM 8 (8) 7 (8)
H 8 2 UP 8 (8) 7 (8)
I 9 3 DOWM 10 (+) 9 (9)

14 ACTUATOR LENS LEGEND

0 No lens (used with codes 11-18 in selection 12) 1 2
1 Orientation 1 2 3
2 Orientation 2 3 4
3 Orientation 3 4
4 Orientation 4

Notes:
1 Custom colors are available. Consult factory.
2 White imprinting is standard on black actuators; Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
3 Gloss brown is on left side of E actuator and right side of F actuator.
4 Additional ratings available. See V-Series Switch Accessories page.
5 Laser etched rocker only available with lens code Z & actuator colors black, nickel or pewter.
6 Pewter and nickel colors only available with laser etched actuator.

9 ACTUATOR COLOR

0 No Actuator C Black D Gray E Red
1 C Black F Gray G Red
2 H Nickel J Pewter K Nickel L Pewter
3 M White N Red O Blue P Red

10 LENS

White
Nickel
Pewter

11 ACTUATOR LENS OR BODY LEGENDS

1 On 12 OFF 13 14 On
OFF ON 1 0

12 ACTUATOR LENS OR BODY LEGENDS

For additional legend options & codes, visit us at www.carlingtech.com.

13 LEGEND ORIENTATION

0 No legend (used with codes 11-18 in selection 12)
1 Orientation 1
2 Orientation 2
3 Orientation 3
4 Orientation 4

Notes:
Consult factory to verify horsepower rating for your particular circuit choice.
1 Custom colors are available. Consult factory.
2 White imprinting is standard on black actuators; Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
3 Gloss brown is on left side of E actuator and right side of F actuator.
4 Additional ratings available. See V-Series Switch Accessories page.
5 Laser etched rocker only available with lens code Z & actuator colors black, nickel or pewter.
6 Pewter and nickel colors only available with laser etched actuator.

14 ACTUATOR LENS LEGEND

0 No legend this location / no actuator

For legend options & codes, visit us at www.carlingtech.com.
V-Series Contura Sealed Rocker Switches - Contura V - Ordering Scheme

### 1 SERIES

| V |

### 2 CIRCUIT

Terminal Connections as viewed from bottom of switch:

<table>
<thead>
<tr>
<th>8 terminal 10 terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 - - 7 8 - - 7</td>
</tr>
<tr>
<td>1 - - 4 1 - - 4</td>
</tr>
<tr>
<td>2 - - 5 2 - - 5</td>
</tr>
<tr>
<td>3 - - 6 3 - - 6</td>
</tr>
<tr>
<td>10 - - 9</td>
</tr>
</tbody>
</table>

Position:

- SP: DP 2 & 3, 5 & 6, 2 & 1
- DP: - & 6, 2 & 3

### 3 RATING

- 1.4VA @ 28VDC Resistive
- 1.15A 24V
- 2.20A 18V
- 3.20A 12V
- 4.10A 14V, 10A 14VT (circuit 1, 4, A & D only)
- 5.10A 14V, 6A 14VT (circuit 1, 4, A & D only)
- 6.4A/20A 12V
- 7.4A/20A 12V

### 4 TERMINATION / BASE STYLE

- 8 term 10 Term
- I - A 250TAB (CC) no barriers No
- J - B 250TAB (CC) with barriers No
- K - C 250TAB (CC) no barriers Yes T2 to 5
- L - D Solder Lug no barriers No
- M - E Solder Lug No
- N - F Wire Leads no barriers No
- O - G Wire Leads No

Note: Codes J & K for circuits H, G & M. Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

### 5 ILLUMINATION & SWITCH SEALING

<table>
<thead>
<tr>
<th>Lamp #1 above terminals 1 &amp; 4</th>
<th>Lamp #2 above terminals 3 &amp; 6</th>
<th>Lamp wired to Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealed</td>
<td>Unsealed</td>
<td>Lamps</td>
</tr>
<tr>
<td>S 0 1</td>
<td>NONE</td>
<td>1</td>
</tr>
<tr>
<td>A 2</td>
<td>B 1</td>
<td>8</td>
</tr>
<tr>
<td>C 3</td>
<td>D 2</td>
<td>7</td>
</tr>
<tr>
<td>E 4</td>
<td>F 3</td>
<td>6</td>
</tr>
<tr>
<td>G 5</td>
<td>H 4</td>
<td>5</td>
</tr>
<tr>
<td>I 6</td>
<td>J 5</td>
<td>4</td>
</tr>
<tr>
<td>K 7</td>
<td>L 6</td>
<td>3</td>
</tr>
<tr>
<td>M 8</td>
<td>N 7</td>
<td>2</td>
</tr>
<tr>
<td>O 9</td>
<td>P 8</td>
<td>1</td>
</tr>
</tbody>
</table>

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

Selection 6: above terminals 1 & 4; Selection 7: above terminals 3 & 6

- No lamp
- Neon
- Incandescent: 4.3V 5.6V 6.12V 7.18V 8.24V superbright
- LED: Red, Amber, Green, Red superbright

* Consult factory for “daylight bright” LED options. Typical current draw for LED is 20mA.

### 8 FLUSH BRACKET COLOR 1, PANEL SEAL

- No Seal
- B  W  G
- One Seal
- C  Y  H

### 9 ACTUATOR

- 0 No Actuator
- G Contura V
- P Contura V, laser etched

### 10 Lens

- 0 No Actuator
- Z - No Lens
- Clear
- White
- Amber
- Red
- Blue

### 11 ACTUATOR COLOR 1, 3, 5

- No Actuator 0 Black C Gray H Red S
- White Y Nickel D Pewter E

### 12 ACTUATOR LENS OR BODY LEGENDS 2, 6

- OFF ON O I
- 16 16 O 17 O 18 O 20 O
- F N F
- 15 15 O

For additional legend options & codes, visit us at www.carlingtech.com.

### 13 LEGEND ORIENTATION

- 0 No legend (used with codes 11-18 in selection 12)
- 1 Orientation 1
- 2 Orientation 2
- 3 Orientation 3
- 4 Orientation 4

### 14 ACTUATOR LENS LEGEND

- 0 No legend this location / no actuator
- (used with codes 11-18 in selection 12) Selection 14 required when switch requires two legends. If the two legends consist of one lens and one body legend, lens legend must be specified in selection 12; body legend specified in selection 14.

For legend options & codes, visit us at www.carlingtech.com.

Notes:
1. Custom colors are available. Consult factory.
2. White imprinting is standard on black actuators; Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
3. Laser Etched rocker only available with lens code Z & actuator colors black, nickel or pewter.
5. Nickel and Pewter colors only available with laser etched actuator.
6. Consult factory for laser etched lens cutout.

www.carlingtech.com
### V-Series Contura Sealed Rocker Switches - Contura IV & V Locking - Ordering Scheme

<table>
<thead>
<tr>
<th>Series</th>
<th>Circuit</th>
<th>Rating</th>
<th>Termination</th>
<th>Illumination</th>
<th>Lock</th>
<th>Lamp</th>
<th>Bracket</th>
<th>Actuator</th>
<th>Lens</th>
<th>Function</th>
<th>Legend</th>
<th>Legend Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 2 Circuit 3

**Terminal Connections as viewed:**

- Single pole - uses terminals 1, 2 & 3.
- Double pole - uses terminals 1, 2, 3, 4, 5 & 6.

**Rating:**

- 120VAC 4.3VA
- 250VAC 5.6V
- 6VDC 0.4VA
- 12VDC 0.4VA

**Lock Color:**

- Black
- White
- Red
- Amber
- Green
- Red

**LED Option:**

- Standard: Superbright
- Option: Daylight Bright

**Lamp Above Terminals:**

- Above terminals 3 & 6 end of switch
- Above terminals 2 & 3 end of switch

**Flush Bracket Color:**

- Black
- White
- Gray

**Hard Surface Actuator:**

- Orientation:
  - Black
  - Gray
  - Red
  - White
- Actuator orientation over terminals:
  - 3, 6

**Lens Color:**

- Clear
- White
- Amber
- Gray
- Red

**Function:**

- Off
- On
- None

**Legend Orientation:**

- No legend
- Orientation 1
- Orientation 2
- Orientation 3
- Orientation 4

**Notes:**

1. Custom colors are available. Consult factory.
2. White imprinting is standard on black actuators. Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
3. Only available with 3 position circuits.
4. Center OFF and special circuits only available with center position lock function.
5. Additional ratings available. See V-Series Switch Accessories page.
6. Located at T3-6 end of switch.
7. Contura V style only.

For additional legend options & codes, visit us at www.carlingtech.com.
## V-Series Contura Sealed Rocker Switches - Contura VI WAVE - Ordering Scheme

### 1 SERIES

| V |

### 2 CIRCUIT

<table>
<thead>
<tr>
<th>Terminal Connections as viewed</th>
<th>( ) - momentary from bottom of switch:</th>
<th>SP - single pole - uses terminals 1, 2 &amp; 3; DP - double pole uses terminals 1, 2, 3, 4 &amp; 5.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 terminal 10 terminal</td>
<td>8 - 7 8 - 7 2 - 5 2 - 5 3 - 6 3 - 6 10 - 9 10 - 9</td>
<td>Terminals 7, 8, 9 &amp; 10 for lamp circuit only.</td>
</tr>
</tbody>
</table>

**Position:**

1. **SP DP:** 2 & 3, 5 & 6 Connected Terminals 1 & 2, 4 & 5
2. **ON:** 2 & 3
3. **NONE:** 2 & 3
4. **OFF:** 2 & 3

**Special Circuits:**

1. **R**: 2 & 3, 5 & 6, 7 & 8, 9 & 10
2. **S**: 2 & 3, 5 & 6, 7 & 8, 9 & 10
3. **M**: 2 & 3, 5 & 6, 7 & 8, 9 & 10
4. **E**: 2 & 3, 5 & 6, 7 & 8, 9 & 10

*Jumper between terminals 2 & 5 for circuits H, G, M, R & S are specified in selection 14. External jumper between terminals 2 & 4 for circuit E are provided by customer. Circuit E may be used for SP OFF-ON-ON circuit.*

### 3 RATING

<table>
<thead>
<tr>
<th>1</th>
<th>.4VA @ 28VDC Resistive</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>15A 24V</td>
</tr>
<tr>
<td>C</td>
<td>20A 18V</td>
</tr>
<tr>
<td>D</td>
<td>25A 12V</td>
</tr>
<tr>
<td>E</td>
<td>20A 14V 10A 14VT</td>
</tr>
<tr>
<td>F</td>
<td>10A 14V 6A 14VT (circuit G only)</td>
</tr>
<tr>
<td>M</td>
<td>.4VA/20 12V</td>
</tr>
<tr>
<td>N</td>
<td>.4VA/15A 24V</td>
</tr>
</tbody>
</table>

### 4 TERMINATION / BASE STYLE

| B | 250 TAB (OC) no barriers No |
| C | 250 TAB (OC) with barriers Yes |
| J | 250 TAB (OC) no barriers No |
| K | 250 TAB (OC) with barriers Yes |
| L | Solder Lug no barriers No |
| M | Solder Lug yes barriers Yes |
| N | Wire Leads no barriers No |
| O | Wire Leads yes barriers Yes |

*Notes: Codes J & K for circuits H, G & M. Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.*

### 5 ILLUMINATION & SWITCH SEALSING

**Sealed Seals**

| Lamp #1 above terminals 1 & 4 end of switch; Lamp #2 above terminals 3 & 6 end of switch. Positive (+) and negative (-) symbols apply to LED lamps only. |

**Unsealed**

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Lamp wired to Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
</tr>
<tr>
<td>F</td>
<td>6</td>
</tr>
<tr>
<td>G</td>
<td>7</td>
</tr>
<tr>
<td>H</td>
<td>8</td>
</tr>
</tbody>
</table>

**Lamp Seals**

| Lamp #1 above terminals 1 & 4 end of switch; Lamp #2 above terminals 3 & 6 end of switch. Positive (+) and negative (-) symbols apply to LED lamps only. |

**Superscript**

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Sealed</th>
<th>Unsealed</th>
<th>Lamp</th>
<th>Sealed</th>
<th>Unsealed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>INDEPENDENT</td>
<td>INDEPENDENT</td>
<td>B</td>
<td>DOWN</td>
<td>DOWN</td>
</tr>
<tr>
<td>C</td>
<td>DOWN</td>
<td>DOWN</td>
<td>D</td>
<td>DOWN</td>
<td>DOWN</td>
</tr>
<tr>
<td>E</td>
<td>UP</td>
<td>UP</td>
<td>F</td>
<td>UP</td>
<td>UP</td>
</tr>
<tr>
<td>G</td>
<td>UP</td>
<td>UP</td>
<td>H</td>
<td>UP</td>
<td>UP</td>
</tr>
<tr>
<td>J</td>
<td>DOWN</td>
<td>DOWN</td>
<td>K</td>
<td>DOWN</td>
<td>DOWN</td>
</tr>
<tr>
<td>L</td>
<td>DOWN</td>
<td>DOWN</td>
<td>M</td>
<td>DOWN</td>
<td>DOWN</td>
</tr>
<tr>
<td>N</td>
<td>DOWN</td>
<td>DOWN</td>
<td>P</td>
<td>DOWN</td>
<td>DOWN</td>
</tr>
<tr>
<td>R</td>
<td>UP</td>
<td>UP</td>
<td>S</td>
<td>UP</td>
<td>UP</td>
</tr>
</tbody>
</table>

**Single Pole Switches Only**

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Lamp wired to Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
</tr>
<tr>
<td>F</td>
<td>6</td>
</tr>
<tr>
<td>G</td>
<td>7</td>
</tr>
<tr>
<td>H</td>
<td>8</td>
</tr>
<tr>
<td>J</td>
<td>9</td>
</tr>
<tr>
<td>K</td>
<td>10</td>
</tr>
</tbody>
</table>

**Double Pole Switches Only**

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Lamp wired to Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
</tr>
<tr>
<td>F</td>
<td>6</td>
</tr>
<tr>
<td>G</td>
<td>7</td>
</tr>
<tr>
<td>H</td>
<td>8</td>
</tr>
<tr>
<td>J</td>
<td>9</td>
</tr>
<tr>
<td>K</td>
<td>10</td>
</tr>
</tbody>
</table>

### 6 LAMP

| Lamp above terminals 3 & 6 end of switch No lamp |
|---|------------------------|
| A | Neutral 125VAC |
| B | 220VAC             |
| C | 12VDC              |
| D | 24VDC              |
| E | Red superbright    |
| F | Amber superbright   |
| G | Green superbright   |
| H | Red                |
| I | Amber              |
| J | Green              |
| K | Red superbright    |
| L | Amber superbright   |
| M | Green superbright   |

### 7 LAMP

| Lamp above terminals 3 & 6 end of switch No lamp |
|---|------------------------|
| A | Neutral 125VAC |
| B | 220VAC             |
| C | 12VDC              |
| D | 24VDC              |
| E | Red superbright    |
| F | Amber superbright   |
| G | Green superbright   |
| H | Red                |
| I | Amber              |
| J | Green              |
| K | Red superbright    |
| L | Amber superbright   |
| M | Green superbright   |

### 8 FLUSH BRACKET COLOR

<table>
<thead>
<tr>
<th>Panel Seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 No Actuator</td>
</tr>
<tr>
<td>1 Black</td>
</tr>
<tr>
<td>2 White</td>
</tr>
<tr>
<td>3 White</td>
</tr>
</tbody>
</table>

### 9 ACTUATOR COLOR

<table>
<thead>
<tr>
<th>Actuator Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Black</td>
</tr>
<tr>
<td>B Black</td>
</tr>
<tr>
<td>C Black</td>
</tr>
<tr>
<td>D Black</td>
</tr>
<tr>
<td>E Black</td>
</tr>
<tr>
<td>F Black</td>
</tr>
</tbody>
</table>

### 10 ACTUATOR ORIGIN / BODY LEGENDS

<table>
<thead>
<tr>
<th>Lens</th>
<th>Lamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear</td>
<td>White</td>
</tr>
<tr>
<td>Amber</td>
<td>Green</td>
</tr>
<tr>
<td>Red</td>
<td>Blue</td>
</tr>
<tr>
<td>Black</td>
<td>Gray</td>
</tr>
<tr>
<td>White</td>
<td>Red</td>
</tr>
<tr>
<td>Blue</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

### 11 INSERT COLOR

<table>
<thead>
<tr>
<th>Insert Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Black</td>
</tr>
<tr>
<td>B Black</td>
</tr>
<tr>
<td>C Black</td>
</tr>
<tr>
<td>D Black</td>
</tr>
<tr>
<td>E Black</td>
</tr>
<tr>
<td>F Black</td>
</tr>
</tbody>
</table>

### 12 ACTUATOR LENS OR BODY LEGENDS

<table>
<thead>
<tr>
<th>Lens Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Black</td>
</tr>
<tr>
<td>B Black</td>
</tr>
<tr>
<td>C Black</td>
</tr>
<tr>
<td>D Black</td>
</tr>
<tr>
<td>E Black</td>
</tr>
<tr>
<td>F Black</td>
</tr>
<tr>
<td>G Black</td>
</tr>
<tr>
<td>H Black</td>
</tr>
<tr>
<td>I Black</td>
</tr>
<tr>
<td>J Black</td>
</tr>
<tr>
<td>K Black</td>
</tr>
<tr>
<td>L Black</td>
</tr>
<tr>
<td>M Black</td>
</tr>
<tr>
<td>N Black</td>
</tr>
<tr>
<td>O Black</td>
</tr>
<tr>
<td>P Black</td>
</tr>
<tr>
<td>Q Black</td>
</tr>
<tr>
<td>R Black</td>
</tr>
<tr>
<td>S Black</td>
</tr>
<tr>
<td>T Black</td>
</tr>
<tr>
<td>U Black</td>
</tr>
<tr>
<td>V Black</td>
</tr>
</tbody>
</table>

### 13 ACTUATOR/LENSE BODY LEGENDS

<table>
<thead>
<tr>
<th>Body Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Black</td>
</tr>
<tr>
<td>B Black</td>
</tr>
<tr>
<td>C Black</td>
</tr>
<tr>
<td>D Black</td>
</tr>
<tr>
<td>E Black</td>
</tr>
<tr>
<td>F Black</td>
</tr>
<tr>
<td>G Black</td>
</tr>
<tr>
<td>H Black</td>
</tr>
<tr>
<td>I Black</td>
</tr>
<tr>
<td>J Black</td>
</tr>
<tr>
<td>K Black</td>
</tr>
<tr>
<td>L Black</td>
</tr>
<tr>
<td>M Black</td>
</tr>
<tr>
<td>N Black</td>
</tr>
<tr>
<td>O Black</td>
</tr>
<tr>
<td>P Black</td>
</tr>
<tr>
<td>Q Black</td>
</tr>
<tr>
<td>R Black</td>
</tr>
<tr>
<td>S Black</td>
</tr>
<tr>
<td>T Black</td>
</tr>
<tr>
<td>U Black</td>
</tr>
<tr>
<td>V Black</td>
</tr>
</tbody>
</table>

### 14 LENS LEGEND ORIENTATION

<table>
<thead>
<tr>
<th>Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Black</td>
</tr>
<tr>
<td>B Black</td>
</tr>
<tr>
<td>C Black</td>
</tr>
<tr>
<td>D Black</td>
</tr>
<tr>
<td>E Black</td>
</tr>
<tr>
<td>F Black</td>
</tr>
<tr>
<td>G Black</td>
</tr>
<tr>
<td>H Black</td>
</tr>
<tr>
<td>I Black</td>
</tr>
<tr>
<td>J Black</td>
</tr>
<tr>
<td>K Black</td>
</tr>
<tr>
<td>L Black</td>
</tr>
<tr>
<td>M Black</td>
</tr>
<tr>
<td>N Black</td>
</tr>
<tr>
<td>O Black</td>
</tr>
<tr>
<td>P Black</td>
</tr>
<tr>
<td>Q Black</td>
</tr>
<tr>
<td>R Black</td>
</tr>
<tr>
<td>S Black</td>
</tr>
<tr>
<td>T Black</td>
</tr>
<tr>
<td>U Black</td>
</tr>
<tr>
<td>V Black</td>
</tr>
</tbody>
</table>

### 15 LEGEND ORIENTATION

<table>
<thead>
<tr>
<th>Legend Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Black</td>
</tr>
<tr>
<td>B Black</td>
</tr>
<tr>
<td>C Black</td>
</tr>
<tr>
<td>D Black</td>
</tr>
<tr>
<td>E Black</td>
</tr>
<tr>
<td>F Black</td>
</tr>
<tr>
<td>G Black</td>
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<tr>
<td>H Black</td>
</tr>
<tr>
<td>I Black</td>
</tr>
<tr>
<td>J Black</td>
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<tr>
<td>K Black</td>
</tr>
<tr>
<td>L Black</td>
</tr>
<tr>
<td>M Black</td>
</tr>
<tr>
<td>N Black</td>
</tr>
<tr>
<td>O Black</td>
</tr>
<tr>
<td>P Black</td>
</tr>
<tr>
<td>Q Black</td>
</tr>
<tr>
<td>R Black</td>
</tr>
<tr>
<td>S Black</td>
</tr>
<tr>
<td>T Black</td>
</tr>
<tr>
<td>U Black</td>
</tr>
<tr>
<td>V Black</td>
</tr>
</tbody>
</table>

### 16 ACTUATOR LENS LEGEND

<table>
<thead>
<tr>
<th>Lens Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Black</td>
</tr>
<tr>
<td>B Black</td>
</tr>
<tr>
<td>C Black</td>
</tr>
<tr>
<td>D Black</td>
</tr>
<tr>
<td>E Black</td>
</tr>
<tr>
<td>F Black</td>
</tr>
<tr>
<td>G Black</td>
</tr>
<tr>
<td>H Black</td>
</tr>
<tr>
<td>I Black</td>
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<tr>
<td>J Black</td>
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<tr>
<td>K Black</td>
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<tr>
<td>L Black</td>
</tr>
<tr>
<td>M Black</td>
</tr>
<tr>
<td>N Black</td>
</tr>
<tr>
<td>O Black</td>
</tr>
<tr>
<td>P Black</td>
</tr>
<tr>
<td>Q Black</td>
</tr>
<tr>
<td>R Black</td>
</tr>
<tr>
<td>S Black</td>
</tr>
<tr>
<td>T Black</td>
</tr>
<tr>
<td>U Black</td>
</tr>
<tr>
<td>V Black</td>
</tr>
</tbody>
</table>

Notes:

- Consult factory to verify horsepower rating for your particular circuit choice.
- Custom colors are available. Consult factory.
- White imprinting is standard on black actuators. Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
- Additional ratings available. See V-Series Switch Accessories page.
### V-Series Contura Sealed Rocker Switches - Contura VII - Ordering Scheme

<table>
<thead>
<tr>
<th>V1</th>
<th>DABT</th>
<th>0B-ZRC00-00</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Series</td>
<td>2</td>
</tr>
</tbody>
</table>

#### 1 SERIES

V

#### 2 CIRCUIT

Terminal Connections as viewed from bottom of switch:

<table>
<thead>
<tr>
<th>8 terminal</th>
<th>10 terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>No lamp</td>
<td>0</td>
</tr>
<tr>
<td>Neon</td>
<td>1 125VAC 2 250VAC</td>
</tr>
<tr>
<td>Incandescent</td>
<td>3 4V 5 6V 7 6V 8 24V</td>
</tr>
<tr>
<td>LED</td>
<td>Red Amber Green Red</td>
</tr>
<tr>
<td>2VDC</td>
<td>A F R</td>
</tr>
<tr>
<td>6VDC</td>
<td>B M G S</td>
</tr>
<tr>
<td>12VDC</td>
<td>C N H T</td>
</tr>
<tr>
<td>24VDC</td>
<td>D P J V</td>
</tr>
</tbody>
</table>

* Consult factory for “daylight bright” LED options. Typical current draw for LED is 20mA.

#### 3 RATING

1 .4VA @ 28VDC Resistive
2 B 15A 24V
3 C 20A 18V
4 D 20A 12V
5 E 20A 14V, 10A 14V
6 F 10A 14V, 6A 14V (circuit G only)
7 G .4VA/20A 12V
8 H .4VA/15A 24V

#### 4 TERMINATION / BASE STYLE

<table>
<thead>
<tr>
<th>8 term</th>
<th>10 Term</th>
<th>Jumper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A B C D</td>
<td>(QC) no barriers</td>
</tr>
<tr>
<td>2</td>
<td>A B C D</td>
<td>no barriers</td>
</tr>
<tr>
<td>3</td>
<td>A B C D</td>
<td>Solder Lug no barriers</td>
</tr>
<tr>
<td>4</td>
<td>A B C D</td>
<td>Wire Leads no barriers</td>
</tr>
<tr>
<td>5</td>
<td>A B C D</td>
<td>Wire Leads</td>
</tr>
</tbody>
</table>

Note: Codes J & K for circuits H, G, M & S. Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

#### 5 ILLUMINATION & SWITCH SEALING

Lamp #1above terminals 1 & 4; Lamp #2 above terminals 3 & 6 of switch. Positive (+) and negative (-) symbols apply to LED lamps only.

<table>
<thead>
<tr>
<th>0</th>
<th>Sealed</th>
<th>Unsealed</th>
<th>Lamps</th>
<th>Illumination Type</th>
<th>Lamp wired to Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>1</td>
<td>INDEPENDENT</td>
<td>8 (+) 7 (-)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>2</td>
<td>DOWN</td>
<td>3 (+) 7 (-)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>1</td>
<td>UP</td>
<td>3 (+) 7 (-)</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>1</td>
<td>DOWN</td>
<td>3 (+) 7 (-)</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>1</td>
<td>UP</td>
<td>1 (+) 7 (-)</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>6</td>
<td>1</td>
<td>UP</td>
<td>1 (+) 7 (-)</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>7</td>
<td>2</td>
<td>UP</td>
<td>8 (+) 7 (-)</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>8</td>
<td>2</td>
<td>UP</td>
<td>8 (+) 7 (-)</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>8</td>
<td>2</td>
<td>INDEPENDENT</td>
<td>10 (+) 9 (-)</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>8</td>
<td>2</td>
<td>INDEPENDENT</td>
<td>10 (+) 9 (-)</td>
<td></td>
</tr>
</tbody>
</table>

**SINGLE POLE SWITCHES ONLY**

| 0 | 8 | DOWN | 3 (+) 8 (-) |
| 2 | INDEPENDENT | 6 (+) 7 (-) |
| 6 | INDEPENDENT | 6 (+) 7 (-) |

**DOUBLE POLE SWITCHES ONLY**

| 0 | 1 | 1 | UP | 3 (+) 6 (-) |
| 2 | 1 | UP | 1 (+) 6 (-) |

#### 6.7 LAMP (same coding for both selections)

Selection 6: above terminals 1 & 4; Selection 7: above terminals 3 & 6

<table>
<thead>
<tr>
<th>Lamp #1</th>
<th>Lamp #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neon</td>
<td>0</td>
</tr>
<tr>
<td>Incandescent</td>
<td>1 125VAC 2 250VAC</td>
</tr>
<tr>
<td>LED</td>
<td>Red Amber Green Red</td>
</tr>
<tr>
<td>2VDC</td>
<td>A F R</td>
</tr>
<tr>
<td>6VDC</td>
<td>B M G S</td>
</tr>
<tr>
<td>12VDC</td>
<td>C N H T</td>
</tr>
<tr>
<td>24VDC</td>
<td>D P J V</td>
</tr>
</tbody>
</table>

#### 8 FLUSH BRACKET COLOR 1, PANEL SEAL

9 ACTUATOR

| 0 | No Actuator |
| 2 | Contura VII |

**ACTUATOR orientation over terminals:**

| 3.6 | 1.4 |

#### 10 LENS

Lens color for LEDs must be clear, white, or match color of LED. Green or blue lenses are not recommended with Neon lamps.

| 0 | No Actuator |
| 2 | Contura VII |

**ACTUATOR LENS LEGEND**

| 3.6 | 1.4 |

#### 11 ACTUATOR COLOR / THUMB PRINT COLOR 1

**ACTUATOR LENS LEGEND**

| 0 | N/A - No Actuator |
| 2 | Contura VII |

**ACTUATOR LENS OR BODY LEGENDS**

<table>
<thead>
<tr>
<th>11</th>
<th>ON 12</th>
<th>OFF 13</th>
<th>14</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>15</td>
<td>0</td>
<td>16</td>
<td>O</td>
</tr>
<tr>
<td>1</td>
<td>17</td>
<td>0</td>
<td>18</td>
<td>O</td>
</tr>
<tr>
<td>2</td>
<td>24V</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>120V</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ACTUATOR orientation over terminals:**

| 3.6 | 1.4 |

For additional legend options & codes, visit us at www.carlingtech.com.

#### 13 LEGEND ORIENTATION

| 0 | No legend (used with codes 11-18 in selection 12) |
| 1 | Orientation 1 |
| 2 | Orientation 2 |
| 3 | Orientation 3 |
| 4 | Orientation 4 |

#### 14 ACTUATOR LENS LEGEND

| 00 | No legend this location / no actuator |

(used with codes 11-18 in selection 12) Selection 14 required when switch requires two legends. If the two legends consist of one lens and one body legend, lens legend must be specified in selection 12. Body legend specified in selection 14.

For legend options & codes, visit us at www.carlingtech.com.

**Notes:**

- Consult factory to verify horsepower rating for your particular circuit choice.
- Custom colors are available. Consult factory.
- White imprinting is standard on black actuators. Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
- Additional ratings available. See V-Series Switch Accessories page.
- Legends available for lighted oval lens version only.

For legend options & codes, visit us at www.carlingtech.com.
V-Series Contura Sealed Rocker Switches - Contura X, XI & XII - Ordering Scheme

### 1 SERIES
- **V**

### 2 CIRCUIT
**Terminal Connections as viewed**
- **from bottom of switch:**
  - **SP** - single pole - uses terminals 1, 2 & 3.
  - **DP** - double pole - uses terminals 1, 2, 3, 4, 5 & 6.

**8 terminal 10 terminal**
- 1 - 4
- 2 - 5
- 3 - 6
- 7, 8, 9 & 10 for lamp circuit only.

**Jumper between terminals 2 & 5 for circuits H, G, M, R & S are specified in selection 4.**

### 3 RATING
- **.4VA @ 28VDC Resistive**
- **.4VA @ 20VAC Resistive**
- **.4VA @ 20VAC with Bar**
- **.6VA @ 20VAC Resistive**
- **.6VA @ 20VAC with Bar**

### 4 TERMINATION / BASE STYLE
**8 term 10 Term**
- **Jumper**
  - **1**
  - **2**
  - **3**
  - **4**
  - **5**
  - **6**
  - **7**
  - **8**

**Note:**
- **Codes J & K for circuits H, G & M.**
- **Do not use silicone based lubricants**
- **During connector assembly,**
- **Consult factory for “daylight bright” LED.**

### 5 ILLUMINATION & SWITCH SEALING
**Lamp #1 above terminals 1 & 4 end of switch:**
- **Lamp #2 above terminals 3 & 6 end of switch.**
- **Positive (+) and negative (-) symbols apply**
- **To LED lamps only**

**Sealed**
- **Unsealed**
- **Lamps**
- **Illumination Type**
- **Lamp wired to Terminals**

### 6.7 LAMP (same coding for both selections)
- **Selection 6:** above terminals 1 & 4; **Selection 7:** above terminals 3 & 6
- **No lamp**
- **1 125VAC**
- **2 125VAC**
- **3 4V**
- **4 5V**
- **5 6V**
- **6 6.3V**
- **7 7.5V**
- **8 8.4V**

**LED**
- **Red**
- **Amber**
- **Green**
- **Red**

**2VDC**
- **A**
- **B**
- **C**
- **D**

**6VDC**
- **E**
- **F**
- **G**
- **H**

**24VDC**
- **I**
- **J**
- **K**
- **L**

### 8 BRACKET COLOR
- **X & XI with Flush Bracket**
- **X, XI, XII with Raised Bracket**

**# of gaskets**
- **0**
- **1**
- **2**
- **3**
- **4**
- **5**
- **6**
- **7**
- **8**

**Bracelet Color**
- **Red**
- **Amber**
- **Green**
- **Red**

**6V**
- **B**
- **C**
- **D**
- **E**

**24V**
- **F**
- **G**
- **H**
- **I**

**10 ACTUATOR LENS ABOVE LAMP #1 TERMINALS**

**11 LENS ABOVE LAMP #2 TERMINALS**

**12 ACTUATOR LENS OR BODY LEGEND**

**13 LEGEND ORIENTATION**

**14 ACTUATOR LENS LEGEND**

**Notes:**
- **Consult factory to verify horsepower rating for your particular circuit choice.**
- **Custom colors are available.**
- **Consult factory.**
- **Additional ratings available.**
- **See V-Series Switch Accessories page.**

www.carlingtech.com
V-Series Contura Sealed Rocker Switches - Contura X Locking - Ordering Scheme

### V1DASW01 - 1PB000

#### 1 SERIES

- **V**

#### 2 CIRCUIT

**Terminal Connections as viewed from bottom of switch:**

- **8 terminal 10 terminal**
  - **SP** - single pole - uses terminals 1, 2 & 3.
  - **DP** - double pole uses terminals 1, 2, 3, 4 & 5.

**Position:**

- **10 - 9**
- **1 - 2**
- **3 - 6**
- **5 & 6**

**Jumper between terminals 2 & 5 for circuits H, G, M, R, & S are specified in selection 4. External jumper between terminals 2 & 4 for circuit E also provided by customer. Circuit E may be used for SP OFF-ON-ON circuit.**

#### 3 RATING

- **1** - .4VA @ 28VDC Resistive
- **2** - 15A 24V
- **3** - 20A 18V
- **4** - 20A 14V
- **5** - 10A 14V
- **6** - 6V
- **7** - 3V
- **8** - 1.4V
- **9** - 125VAC
- **10** - 250VAC

#### 4 TERMINATION / BASE STYLE

**Term 10 Term**

- **1** - 250 TAB (QC) no barriers No
- **2** - 250 TAB (QC) with barriers No
- **3** - Solder Lug no barriers No
- **4** - Solder Lug no barriers Yes T2 to 5
- **5** - Wire Leads no barriers No
- **6** - Wire Leads no barriers No

- **Note:** Codes J & K for circuits H, G, M & S. Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

#### 5 ILLUMINATION & SWITCH SEALING

**Double Pole Switches Only**

- **M** - R
- **R** - UP
- **H** - 7 (+) 7 (–)
- **Z** - 8 (–)
- **C** - 3 (–)
- **S** - 2 (–)
- **N** - 1 (–)

**Lamp**

- **0** - NONE
- **1** - UP
- **2** - INDEPENDENT
- **3** - 6 (–)

- **U**

#### 6 LOCK

- **W** - Lock above terminals 1 & 4 end of switch

**Notes:**

- Consult factory to verify horsepower rating for your particular circuit choice.
- Custom colors are available. Consult factory.
- White imprinting is standard on black actuators; Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
- Located over T1-4 end of switch.
- Additional ratings available. See V-Series Switch Accessories page.
- Located over T3-6 end of switch.

#### 6.7 LAMP (same coding for both selections)

**Selection 6:** above terminals 1 & 4; **Selection 7:** above terminals 3 & 6

- **No lamp**
- **Neutral**
- **Incandescent**
- **LED**

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>6VDC</td>
<td>Red</td>
</tr>
<tr>
<td>12VDC</td>
<td>Red</td>
</tr>
<tr>
<td>24VDC</td>
<td>Red</td>
</tr>
</tbody>
</table>

- **Consult factory for “daylight bright” LED options. Typical current draw for LED is 20mA.**

#### 8 FLUSH BRACKET COLOR

- **1 PANEL SEAL**
  - **Black**
  - **White**
  - **Gray**
  - **Red**

**Actuator orientation over terminals:**

- **3.6**
- **1.4**

#### 9 HARD SURFACE ACTUATOR

- **Contura X**
- **Black**
- **Gray**
- **Red**
- **White**

**Actuator orientation over terminals:**

- **1**
- **2**
- **3**
- **4**

#### 10 LENS - ABOVE LAMP #2 TERMINALS

<table>
<thead>
<tr>
<th>Z</th>
<th>Clear</th>
<th>White</th>
<th>Amber</th>
<th>Green</th>
<th>Red</th>
<th>Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Two piece Square</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Two piece Square*</td>
<td>(with clear top protective lens)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Two piece Square*</td>
<td>(with smoke top protective lens)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legend Style**

- **3 8 J P V**
- **5 A F L S Y**
- **Two piece Square**

#### 11 ACTUATOR LOCK FUNCTION AND COLOR

<table>
<thead>
<tr>
<th>Match</th>
<th>A</th>
<th>H</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>B</td>
<td>J</td>
<td>S</td>
</tr>
<tr>
<td>White</td>
<td>C</td>
<td>K</td>
<td>T</td>
</tr>
<tr>
<td>Red</td>
<td>D</td>
<td>L</td>
<td>V</td>
</tr>
<tr>
<td>Gray</td>
<td>E</td>
<td>M</td>
<td>W</td>
</tr>
</tbody>
</table>

- **Safety Orange**
- **F N Y**

#### 12 ACTUATOR LENS OR BODY LEGEND

<table>
<thead>
<tr>
<th>0</th>
<th>No Legend</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>ON</td>
<td>O</td>
<td>I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>N</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**For additional legend options & codes, visit us at www.carlingtech.com.**

#### 13 LEGEND ORIENTATION

<table>
<thead>
<tr>
<th>0</th>
<th>No legend (used with codes 11-18 in selection 12)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation 1</td>
<td>Orientation 2</td>
<td>Orientation 3</td>
<td>Orientation 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**V-Series Contura Sealed Rocker Switches - Contura XIV - Ordering Scheme**

**V**

**2 CIRCUIT**

Terminal Connections as viewed from bottom of switch:
- **SP** - single pole - uses terminals 1, 2 & 3.
- **DP** - double pole uses terminals 1, 2, 3, 4, 5 & 6.

**8 terminal 10 terminal**

- **Terminals 7, 8, 9 & 10 for lamp circuit only.**
- **SP** - single pole - uses terminals 1, 2 & 3.
- **DP** - double pole uses terminals 1, 2, 3, 4, 5 & 6.

**Position:**
- **SP DP**
- **2 & 3, 5 & 6**
- **Connected Terminals** 1 & 2, 4 & 5

**2 & 3, 5 & 6**

- **(ON)**
- **N O N**
- **OFF**

**2 & 3, 5 & 6**

- **(ON)**
- **OFF**
- **T E R M I N A T I O N**
- **J u m p e r**

**SPECIAL CIRCUITS**

- **H**
- **2 & 3, 5 & 6**
- **2 & 3, 5 & 4**
- **5 & 4**

- **C**
- **2 & 3, 5 & 6**
- **2 & 3**
- **OFF**

- **R**
- **2 & 3, 5 & 6**
- **2 & 3**
- **2 & 1**

- **E**
- **2 & 3, 5 & 6**
- **2 & 3**
- **1 & 2**

**Note:** Jumper between terminals 2 & 5 for circuits H, G, M, R & S are specified in selection 4. External jumper between terminals 2 & 4 for circuit E are provided by customer. Circuit E may be used for SP OFF-ON-ON circuit.

**3 RATING**

- **4VA @ 28VDC Resistive**
- **15A 24V**
- **20A 18V**
- **20A 12V**
- **10A 14V, 6A 14V**
- **20A 18V**
- **15A 24V**
- **.4VA @ 28VDC Resistive**

**4 TERMINATION / BASE STYLE**

- **Orientation 1**
- **Orientation 2**
- **Orientation 3**
- **Orientation 4**

**Lamps:**

- **LED**
- **Recall**

**5 ILLUMINATION**

- **Lamp #1:** above terminals 1 & 4 end of switch.
- **Lamp #2:** above terminals 3 & 6 end of switch.

**6 & 7 LAMP**

- **No lamp**
- **1 125VAC**
- **2 250VAC**

**8 BRACKET COLOR & PANEL SEAL**

**Color**

- **No Gasket**
- **1 Gasket**
- **2 Gasket**

**9 ACTUATOR STYLE**

- **0 No Actuator**
- **- Furnished separately**
- **FA Contura XIV**
- **FB Contura XIV - Laser Etched**

**10 LENS COLOR / STYLE**

- **0 - No Actuator**
- **Z - No Lens**

**11 ACTUATOR COLOR**

- **B Black**
- **C Blue**
- **D Green**
- **G Gray**
- **M Red**
- **S White**

**12 ACTUATOR LENS or BODY LEGEND**

- **00 - No Legend this location / No actuator**
- **11 Orientation 1**
- **22 Orientation 2**
- **33 Orientation 3**
- **44 Orientation 4**

**13 LEGEND ORIENTATION**

- **0 No legend**
- **1 Orientation 1**
- **2 Orientation 2**
- **3 Orientation 3**
- **4 Orientation 4**

**14 ACTUATOR / LENS LEGEND**

- **00 No Legend this location / no actuator**
- **(used with codes 11-18 in selection 12) Selection 14 required when switch requires two legends. If the two legends consist of one lens and one body legend, lens legend must be specified in selection 12; body legend specified in selection 14.**

**Notes:**

- Consult factory to verify horsepower rating for your particular circuit choice.
- Custom colors are available. Consult factory.
- White imprinting is standard on white, red and gray actuators.
- Additional ratings available. See V-Series Switch Accessories page.

**www.carlingtech.com**
### 1 SERIES

V

### 2 CIRCUIT

**Terminal Connections as viewed**

| 8 terminal 10 terminal | SP - single pole uses terminals 1, 2, 3 & 4. |
| DP - double pole uses terminals 1, 2, 3, 4, 5 & 6. |
| 8 - 7 | 8 - 7 | 8 - 7 |
| 1 - 4 | 1 - 4 | 1 - 4 |
| 2 - 5 | 2 - 5 | 2 - 5 |
| 3 - 6 | 3 - 6 | 3 - 6 |
| 10 - 9 | 10 - 9 | 10 - 9 |

**Position:**

- **SP DP**
  - 2 & 3, 5 & 6
  - Connected Terminals
  - 1 & 2, 4 & 5

- **1**
  - A
  - ON
  - NONE
  - OFF

- **4**
  - D
  - ON
  - NONE
  - OFF

- **J**
  - ON
  - OFF
  - ON

- **K**
  - ON
  - OFF
  - (ON)

- **L**
  - ON
  - OFF
  - (ON)

- **N**
  - OFF
  - NONE
  - ON

**SPECIAL CIRCUITS**

- H*: 2 & 3
  - 2 & 3, 5 & 4
  - 5 & 4

- G*: 2 & 3, 5 & 6
  - 2 & 3
  - OFF

- M*: (2 & 3, 5 & 6)
  - 2 & 3
  - OFF

- R*: (2 & 3, 5 & 6)
  - 2 & 3
  - 2 & 1

- E*: 5 & 6
  - 5 & 3
  - 5 & 1

- S*: 2 & 3, 5 & 6
  - 2 & 3
  - 1 & 2

* Jumper between terminals 2 & 5 for circuits H, G, M, R & S are specified in selection 4. Externally jumper between terminals 2 & 4 for circuit E are provided by customer. Circuit E may be used for SP OFF-ON-ON circuit.

### 3 RATING

- 1.4VA @ 28VDC Resistive
- B 15A 24V
- C 20A 18V
- D 20A 12V
- E 20A 14V, 10A 14V (circuit 1, 4, A & D only)
- F 10A 14V, 6A 14V (circuit G only)

### 4 TERMINATION / BASE STYLE

<table>
<thead>
<tr>
<th>8 Term</th>
<th>10 Term</th>
<th>Termination</th>
<th>Jumper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>250 TAB (QC) no barriers</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>250 TAB (QC) with barriers</td>
<td>No</td>
</tr>
<tr>
<td>J</td>
<td>K</td>
<td>250 TAB (QC) no barriers</td>
<td>Yes T2 to 5</td>
</tr>
</tbody>
</table>

Note: Codes J & K for circuits H, G, M. Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

### 5 ILLUMINATION

Lamp #1 above terminals 1 & 4 end of switch; Lamp #2 above terminals 3 & 6 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>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>NONE</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>UP</td>
</tr>
<tr>
<td>H</td>
<td>2</td>
<td>INDEPENDENT</td>
</tr>
</tbody>
</table>

**DOUBLE POLE SWITCHES ONLY**

M | 1 | UP | 3 (+) 6 (-)

### 6 LOCK OPTION

- W: Low Profile Lock

### 7 LAMP

- No lamp
- Neon: 125VAC, 2 250VAC
- Incandescent: 3.3V, 5.6V, 6 12V, 7 18V, 8 24V
- LED: Red, Amber, Green, Superbright, Red

### 8 BRACKET COLOR & PANEL SEAL

- Color: No Gasket, 1 Gasket, 2 Gasket
- Black: B, C, D
- Gray: G, H, J
- White: W, Y, Z

### 9 ACTUATOR COLOR / STYLE

- FC: Black - Standard Rocker
- FD: Black - Laser Etched
- FS: Red - Standard Rocker
- FT: Red - Laser Etched

### 10 LENS COLOR / STYLE

- Z: No Lens
- Clear: White, Amber, Green, Red, Blue
- Laser-Etched Actuator Only

### 11 ACTUATOR LOCK COLOR / FUNCTION

**LOCK IN POSITION**

- Match Actuator: A, H, R, 1
- Black: B, J, S, 2
- White: C, K, T, 3
- Red: D, L, V, 4
- Orange: E, M, W, 5
- Gray: F, G, N, 6

### 12 ACTUATOR LENS or BODY LEGEND

- 00: No Legend

### 13 LEGEND ORIENTATION

- 0 No legend
- 1: Orientation 1
- 2: Orientation 2
- 3: Orientation 3
- 4: Orientation 4

**Notes:**

- Consult factory to verify horsepower rating for your particular circuit choice.
- 1 Custom colors are available. Consult factory.
- 2 White imprinting is standard on black actuators; Black imprinting is standard on white, red and gray actuators.
- Additional ratings available. See V-Series Switch Accessories page.
Dimensional Specifications: in. [mm]
V-Series Contura Sealed Rocker Switches - Contura V, VI & VII - Dimensional Specifications

Dimensional Specifications:  in. [mm]

**CONTURA V**
- Shown with bar lens
- Dimensional specifications:
  - 8 Terminal Base W/BARRIERS:
    - 1.020 [25.91]
    - 0.505 [12.83]
    - 0.250 [6.35] x 0.031 [0.78]
  - Bottom View Terminal Arrangement 8 Terminal Base:
    - 2.029 [51.53]

**CONTURA V**
- Shown with low profile lock
- Dimensional specifications:
  - 8 Terminal Base W/O BARRIERS:
    - 1.020 [25.91]
    - 0.505 [12.83]
    - 0.250 [6.35] x 0.031 [0.78]
  - Bottom View Terminal Arrangement 8 Terminal Base:
    - 2.029 [51.53]

**CONTURA VI**
- Shown with oval lens
- Dimensional specifications:
  - 10 Terminal Base W/BARRIER AND LAMP TERMINAL:
    - 1.950 [49.53]
    - 0.985 [25.02]
    - 0.250 [6.35] x 0.031 [0.78]
  - Bottom View Terminal Arrangement 10 Terminal Base:
    - 2.029 [51.53]

**CONTURA VII**
- Shown with large lens and bar lens
- Dimensional specifications:
  - 10 Terminal Base W/O BARRIERS:
    - 1.922 [48.82]
    - 0.985 [25.02]
    - 0.250 [6.35] x 0.031 [0.78]
  - Bottom View Terminal Arrangement 10 Terminal Base:
    - 2.029 [51.53]
V-Series Contura Sealed Rocker Switches - Contura X, XI, XII & XIV - Dimensional Specifications

Dimensional Specifications: in. [mm]

**CONTURA X**
- Shown with raised bracket
- Dimensions:
  - 8 terminal base W/Barriers: 960 [24.38], 780 [19.81], .250 [6.35] x .031 [.78], 390 [9.90], .820 [20.82]

**CONTURA XI**
- Shown with raised bracket and two square lenses
- Dimensions:
  - 8 terminal base W/Barriers: 960 [24.38], 780 [19.81], 390 [9.90], .820 [20.82]
  - 10 terminal base W/O barriers: 1.910 [48.51], .667 [16.94], 1.370 [34.79]

**CONTURA XII**
- Shown with paddle actuator
- Dimensions:
  - 8 terminal base W/O barriers: 1.910 [48.51], 1.506 [38.25], 1.370 [34.79], .350 [8.89]
  - 10 terminal base W/O barriers: 1.928 [48.97], .673 [17.10], 1.370 [34.79]

**CONTURA XIV**
- Shown with large lens
- Dimensions:
  - 8 terminal base W/Barriers: 1.910 [48.51], 1.370 [34.79], .390 [9.90], .820 [20.82], .960 [24.38]
  - 10 terminal base W/O barriers: 1.910 [48.51], 1.370 [34.79], .390 [9.90], .820 [20.82], .970 [24.64]
CIRCUIT CODE | CIRCUIT DIAGRAM | CIRCUIT CODE | CIRCUIT DIAGRAM | CIRCUIT CODE | CIRCUIT DIAGRAM
---|---|---|---|---|---
1 | | | | | 
2 | | | | | 
3 | | | | | 
4 | | | | | 
5 | | | | | 
6 | | | | | 
7 | | | | | 
8 | | | | | 

**SYMBOL LEGEND**

<table>
<thead>
<tr>
<th>SYM.</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>o</td>
<td>DESIGNATES TERMINALS AND CONTACTS</td>
</tr>
<tr>
<td></td>
<td>DESIGNATES MAINTAINED CIRCUITS</td>
</tr>
<tr>
<td></td>
<td>DESIGNATES OTHER POSITION</td>
</tr>
<tr>
<td></td>
<td>DESIGNATES MOMENTARY CIRCUITS</td>
</tr>
<tr>
<td></td>
<td>DESIGNATES TWO POSITION CONNECTION</td>
</tr>
<tr>
<td></td>
<td>DESIGNATES EXTERNAL JUMPER PROVIDED BY CUSTOMER</td>
</tr>
</tbody>
</table>
Lamp Circuit Diagrams:

J-Series Hazard Warning Circuit Diagrams:

NOTE:
- J circuits are available for all non-locking V-Series styles.
- Consult factory for partnumber details.

SYMBOL LEGEND

<table>
<thead>
<tr>
<th>SYM.</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>●</td>
<td>Designates terminals and contacts</td>
</tr>
<tr>
<td>○</td>
<td>Designates lamp location</td>
</tr>
</tbody>
</table>
V-Series Contura Rotary Switches - Introduction

The V-Series Contura Rotary Switch was designed for maximum performance and reliability leveraging the features of the widely popular V-series Contura Rocker Switches. Available in maintained and momentary circuit options, the V-Series Rotary features a sturdy knob construction, up to three separate LEDs, and fits in an industry standard panel opening.

Internally, the V-Series Contura Rotary uses a patented mechanism that translates rotary to linear motion. This allows for common switch functionality and terminal connections with the V-Series rocker version and requires no harness change. A secondary CAM, which helps drive the mechanism, provides definitive detent positions and prevents the switch from stopping between positions, while improving tactile feel.

The V-Series Rotary also features an innovative PC board that supports the LED and surface mount resistors; and IP67 sealing protection above panel by utilizing LED and actuator stem seals. Together, these features make the V-Series Contura Rotary switch the best choice available in the market today.

Product Highlights:
• Accommodates up to three separate LEDs
• Patented mechanism translates rotary into linear motion
• Secondary CAM for definitive detent positions
• PC Board supports LED and surface mount resistors
• IP67 sealing protection above panel
• Common terminal & circuit functionality with V-Series Rocker switches, with no harness change required

Resources:
Download 3D CAD Files
IGS  STP

Watch Product Video
V-Series Rotary Switch

DESIGN FEATURES

- **OPTIONAL PANEL SEAL**
  Prevents water/dust ingress behind panel

- **SEALS**
  LED and stem seals provide IP67 protection above panel

- **PC BOARD**
  Supports LEDs and surface mount resistors

- **TERMINALS**
  Same pinout as V-Series Rocker Switches, requiring no harness change

- **LEDS**
  Up to three separate LEDs

- **ROTARY & LINEAR ACTUATOR**
  Patented mechanism that translates rotary to linear motion

- **SECONDARY CAM**
  Provides definitive detent positions with ball & spring located in rotary actuator
V-Series Contura Rotary Switches - General Specifications

### Electrical

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Voltage</th>
<th>Max Current Resistive</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Position Maintain</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>2 Position Momentary</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>3 Position All</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>2 Position Maintain</td>
<td>24</td>
<td>15</td>
</tr>
<tr>
<td>2 Position Momentary</td>
<td>24</td>
<td>15</td>
</tr>
<tr>
<td>3 Position All</td>
<td>24</td>
<td>15</td>
</tr>
</tbody>
</table>

- **Dielectric Strength**: 1500 Volts RMS
- **Insulation Resistance**: 50 Megohms
- **Initial Contact Resistance**: 10 Milli Ohm max @ 4VDC
- **Life**: 25,000 Cycles Two Position
- **Terminals**: 0.250” (6.3mm) Quick Connect

### Mechanical

- **Mechanical Life**: 100,000 Cycles Maintained Circuits
- **Knob Impact**: 50 Gram weight dropped from a height of 18 inches on Top & Sides

### Environmental

- **Sealing**: IP67, in accordance with IEC 60529, BS 5490, DIN 40050 & NFC 20 010. This rating applies to front panel components of the actual switch only, and signifies protection against dust and the prolonged effects of immersion under pressure.
- **Dust**: Mil STD 810, Method 510.2 Air Velocity 300 Ft/Min Duration 16Hr
- **Corrosion**: IEC 68-2-60 Mixed Flowing Gas (MFG) 14 Days
- **Chemical Splash**: Gasoline, Diesel, Motor Oil, Brake Fluid, Ammonia, Armour All
- **Salt Spray**: Mil STD 202G, Method 101, Test Condition A 96 Hr
- **Vibration Random**: Mil STD 202G, Method 214 test Condition C 10G’s RMS
- **Vibration Sinusoidal**: Mil STD 202G, Method 204D, Test Condition A 0.06DA or 10G’s 10-500Hz
- **Shock**: MIL-STD 202G, Method 213B Test Condition K, 30G’s
- **Handling Shock**: 1 Meter Drop onto Hard Surface
- **Thermal Shock**: MIL-STD 202G, Method 107G Test Condition A -55 C to 85 C
- **Moisture Resistance**: MIL-STD 202G, Method 106F, 10, 25 C to 65 C Cycles 95% RH
- **Thermal Cycling**: ISO 8846 with EC Directive 94/25/EC for Marine Products
- **UV Protection**: 300 hr Xenon Arc, 1.4W/m2 wavelength 420 nm
- **ESD**: Human Static Discharge, +/- 15KV applied during normal operation

### Physical

- **Function Circuits**: Double Pole Single Throw, DPST
- **Operation**: Double Pole Double Throw, DPDT
- **Knob Rotation**: Two Position 60 Degrees
- **Illumination**: LED; Red, Green, Amber, Yellow, White, Blue
- **Seals**: LED O-ring(s) – Silicone, Bezel gasket – Neoprene, Knob seal - NBR
- **Flammability**: Exceeds FVMSS 302 Requirements, Exterior Components, UL 94 V-2 or Better Interior Components, UL 94 HB or Better
- **Base**: Polyester, PBT
- **Bracket**: Nylon 66, PA
- **Knob**: Polybutylene Terephthalate, PBT 6.5%GF
- **Lens**: Polycarbonate, PC
- **Connector**: Nylon 66, PA
- **Mounting**: Front Panel Snap In, 1.450” (36.83mm) X 0.830” (21.08mm) Panel Thickness, 0.030” – 0.187” (0.76 – 4.75mm)

*Manufacturer reserves the right to change product specification without prior notice.*
# V-Series Contura Rotary Switches - Ordering Scheme

<table>
<thead>
<tr>
<th>1 SERIES</th>
<th>2 CIRCUIT 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>RV</td>
<td>Rotary Contura</td>
</tr>
</tbody>
</table>

## Terminal Connections as viewed ( ) - momentary from bottom of switch:
- 1 - 4: DP - double pole uses 1, 2, 3 and 4, 5, 6.
- 2 - 5
- 3 - 6
- 10 - 9

**Position:**
- DP: 2 & 3, 5 & 6 Connected Terminals 1 & 2, 4 & 5
- 21: ON
- 22: (ON) NONE
- 23: ON
- 24: ON
- 26: ON
- 28: (ON) OFF

### SPECIAL CIRCUITS
- 55: ON
- 61: 2 & 3, 5 & 6
- 62: 2 & 3, 5 & 6
- 64: (2 & 3, 5 & 6) & 1 & 2, 4 & 5

## 3 RATING
- 1: 1/4VA 28VDC Resistive
- B: 15A 24V
- D: 20A 12V

## 4 TERMINATION / BASE STYLE

<table>
<thead>
<tr>
<th>8 Term</th>
<th>10 Term</th>
<th>Termination</th>
<th>Jumper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>250 TAB (QC) - no barriers</td>
<td>No</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>250 TAB (QC) - with barriers</td>
<td>No</td>
</tr>
<tr>
<td>4, 5</td>
<td>K</td>
<td>250 TAB (QC) - no barriers</td>
<td>Yes (T2 to T5)</td>
</tr>
</tbody>
</table>

## 5 ILLUMINATION 6, 8

### Sealed Lamps when illuminated Terminals
- S: NONE
- A: # 1 Independent
- B: # 1 Dependent
- C: # 1 Independent
- D: # 1 & # 3 Independent
- E: # 1 Dependent
- F: # 1 Dependent
- G: # 1 Dependent
- H: # 1 Independent
- J: # 1 Independent
- K: # 1 Dependent
- L: # 1 Dependent
- M: # 2 Independent
- N: # 2 Dependent
- P: # 2 Dependent
- R: # 3 Dependent
- T: # 3 Dependent

### Selection 6: above terminal 7; Selection 8: above terminal 8
- No lamp
- LED Red
- Amber
- Green
- Blue
- White

## 6, 7, 8 LAMP #1, 2 AND OR LAMP #3 6, 8

### Selection 6: above terminal 7; Selection 8: above terminal 8
- 12VDC C N H E 6
- 24VDC D P J K 8

## 9 BRACKET COLOR & PANEL SEAL 7

<table>
<thead>
<tr>
<th>Color</th>
<th>No Gasket</th>
<th>1 Gasket</th>
<th>2 Gasket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Gray</td>
<td>G</td>
<td>H</td>
<td>J</td>
</tr>
<tr>
<td>White</td>
<td>W</td>
<td>Y</td>
<td>Z</td>
</tr>
</tbody>
</table>

## 10 ACTUATOR STYLE

<table>
<thead>
<tr>
<th>K</th>
<th>Rotary Knob (Standard)</th>
<th>ACTUATOR ORIENTATION</th>
</tr>
</thead>
</table>

## 11 LENS COLOR 8

- No Lens
- Clear
- White
- Amber
- Green
- Red
- Blue

## 12 KNOB COLOR

- Black
- Gray
- Red
- White
Dimensional Specifications: in. [mm]

- **10 TERMINAL BASE W/ BARRIERS**
  - 1.400 [35.56]
  - 1.700 [43.18]
  - .845 [21.47]
  - 1.079 [27.40]
  - 1.550 [39.37]

- **10 TERMINAL BASE W/O BARRIERS**
  - .960 [24.38]
  - 1.126 [29.24]
  - 250 [6.35] x .03 [0.78]
  - .820 [20.83]
  - .250 [6.35] x .03 [0.78]

- **BOTTOM VIEW TERMINAL ARRANGEMENT 10 TERMINAL BASE**
  - SWITCH SHOWN WITH VC1 CONNECTOR 10 TERMINAL BASE
  - 1.266 [32.16]
  - 1.318 [33.48]
Circuits Diagrams:

<table>
<thead>
<tr>
<th>CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
<th>KNOB POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>![Diagram 21]</td>
<td>1 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 5</td>
</tr>
<tr>
<td>22</td>
<td>![Diagram 22]</td>
<td>1 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 5</td>
</tr>
<tr>
<td>23</td>
<td>![Diagram 23]</td>
<td>1 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 5</td>
</tr>
<tr>
<td>24</td>
<td>![Diagram 24]</td>
<td>1 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 5</td>
</tr>
<tr>
<td>26</td>
<td>![Diagram 26]</td>
<td>1 2 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 5</td>
</tr>
<tr>
<td>28</td>
<td>![Diagram 28]</td>
<td>1 2 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 5</td>
</tr>
</tbody>
</table>

### LEGEND

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>⋁</td>
<td>TERMINAL LOCATION</td>
</tr>
<tr>
<td></td>
<td>MAINTAINED CIRCUIT</td>
</tr>
<tr>
<td></td>
<td>MOMENTARY CIRCUIT</td>
</tr>
<tr>
<td></td>
<td>INTERNAL CONNECTION (JUMPER TERMINAL)</td>
</tr>
<tr>
<td></td>
<td>2 POSITION CONNECTION</td>
</tr>
<tr>
<td></td>
<td>2 POSITION CONNECTION</td>
</tr>
<tr>
<td>P1</td>
<td>2 POSITION</td>
</tr>
<tr>
<td>P2</td>
<td>3 POSITION</td>
</tr>
<tr>
<td>P3</td>
<td>3 POSITION</td>
</tr>
</tbody>
</table>
## Lamp Circuit Diagrams:

<table>
<thead>
<tr>
<th>LAMP CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>![Diagram A]</td>
</tr>
<tr>
<td>B</td>
<td>![Diagram B]</td>
</tr>
<tr>
<td>C</td>
<td>![Diagram C]</td>
</tr>
<tr>
<td>D</td>
<td>![Diagram D]</td>
</tr>
<tr>
<td>E</td>
<td>![Diagram E]</td>
</tr>
<tr>
<td>F</td>
<td>![Diagram F]</td>
</tr>
<tr>
<td>G</td>
<td>![Diagram G]</td>
</tr>
<tr>
<td>H</td>
<td>![Diagram H]</td>
</tr>
<tr>
<td>J</td>
<td>![Diagram J]</td>
</tr>
<tr>
<td>K</td>
<td>![Diagram K]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LAMP CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>![Diagram L]</td>
</tr>
<tr>
<td>M</td>
<td>![Diagram M]</td>
</tr>
<tr>
<td>N</td>
<td>![Diagram N]</td>
</tr>
<tr>
<td>P</td>
<td>![Diagram P]</td>
</tr>
<tr>
<td>R</td>
<td>![Diagram R]</td>
</tr>
<tr>
<td>T</td>
<td>![Diagram T]</td>
</tr>
</tbody>
</table>
Carling Technologies USB V-Charger is designed to charge tablets, e-readers, mobile and gaming devices, digital cameras, as well as other compatible electronic devices.

Providing a total current of 3.15 amps, the V-Charger delivers fast charging times even in extreme temperatures from -40°C to +80°C. This innovative product safeguards its electronics with integrated over-current and thermal overload protection, as well as optional load dump circuitry, assuring prolonged safe and reliable operation. The center LED indicates charging is in progress. Snap-in mounting for an industry standard 1.450” x .830” panel cutout makes installation easy.

*Additionally, the V-Charger’s double torsion spring-loaded access doors automatically close and provide effortless IP64 sealing protection with precision-fit silicone rubber seals.

**Product Highlights:**
- Dual USB Charging Ports
- 3.15 Amps for Faster Charging
- 10,000 Operating Cycles per Port
- IP64 Sealing Protection
- 12-24 V Operating Voltage
- Protection for Internal Components
V-Charger

DESIGN FEATURES

**DUAL USB 2.0 PORTS**
Total current of 3.15 amps, facilitating faster charges

**SPRING LOADED DOORS**
Stylish, wing-shaped double doors automatically close to cover and seal each port when not in use

**LED**
Green LED brightens to indicate charging is in progress

**SEALING PROTECTION**
Silicone rubber seal perfectly mates with door indent to provide IP64 level of sealing protection

**PANEL SEAL**
Prevents water ingress beneath panel to protect critical connections

**MOUNTING**
Fits industry standard panel opening size of 1.450” x .830”

www.carlingtech.com
### V-Charger Dual Port USB 2.0 Charger - General Specifications

#### Electrical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB Type</td>
<td>2.0</td>
</tr>
<tr>
<td>Number of USB Ports</td>
<td>2</td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>12V/24V DC power systems (9 to 29 VDC)</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>5 VDC ± 5%</td>
</tr>
<tr>
<td>Max Output Current</td>
<td>3.15A DC Total</td>
</tr>
<tr>
<td>Current Draw (No Load)</td>
<td>12V: 0.8 mA, 24V: 1.9 mA</td>
</tr>
<tr>
<td>LED Indicator</td>
<td>Green LED brightens when charging is in progress.</td>
</tr>
<tr>
<td>Compatibility</td>
<td>Charges mobile devices including iPad, iPhone, iPod, HTC, Galaxy, Blackberry, MP3 Players, Digital Cameras and PDA’s</td>
</tr>
<tr>
<td>Life</td>
<td>10,000 operating cycles per port minimum</td>
</tr>
<tr>
<td>Terminals</td>
<td>Copper/silver plating 1/4” (6.3 mm) Quick Connect terminations</td>
</tr>
<tr>
<td>Reverse Polarity</td>
<td>Operational with correct polarity after reverse polarity exposure</td>
</tr>
<tr>
<td>ESD</td>
<td>15kV air, 8 kV touch</td>
</tr>
<tr>
<td>Overcurrent Protection</td>
<td>Short Circuit</td>
</tr>
<tr>
<td>Thermal Overload Protection</td>
<td>Operation will cease if internal temperature reaches 125°C. Charging will resume after sufficient heat loss</td>
</tr>
</tbody>
</table>

#### Environmental

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealing</td>
<td>IP64 for front panel components when USB Ports are covered</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40° to +60°C at 3.15A</td>
</tr>
<tr>
<td></td>
<td>-40° to +70°C at 2.4A</td>
</tr>
<tr>
<td></td>
<td>-40° to +80°C at 2.1A</td>
</tr>
<tr>
<td>Vibration 1</td>
<td>Mil-Std 202G, Method 204D,</td>
</tr>
<tr>
<td>Test</td>
<td>Condition A. 0.06DA or 10G, 10-500 Hz</td>
</tr>
<tr>
<td>Shock</td>
<td>Mil-Std 202G, Method 213B,</td>
</tr>
<tr>
<td>Test</td>
<td>Condition K @ 30-G. No loss of circuit during test.</td>
</tr>
<tr>
<td>Chemical Splash</td>
<td>Brush method with USB doors closed: diesel, gasoline, brake fluid, Windex, Armor All</td>
</tr>
<tr>
<td>Thermal Shock</td>
<td>MIL-Std 202F, Method 107D,</td>
</tr>
<tr>
<td>Test</td>
<td>Test Condition A. -55° to +85°C. Test Criteria: Remains functional without damage</td>
</tr>
<tr>
<td>Thermal Cycling</td>
<td>25 Cycles -40° to +85°C, 2 hours for each temperature every cycle</td>
</tr>
<tr>
<td>Salt Spray</td>
<td>MIL-Std 202G, Method 101E, Test Condition A</td>
</tr>
<tr>
<td>Dust</td>
<td>MIL-Std 841C Method 510.2</td>
</tr>
<tr>
<td>Air Velocity</td>
<td>300 ± 200 Ft/min, test duration: 16 Hr</td>
</tr>
</tbody>
</table>

#### Physical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel Opening</td>
<td>1.450” x .830”</td>
</tr>
<tr>
<td>Panel Thickness</td>
<td>.030 -.156 inches</td>
</tr>
<tr>
<td>Panel Mounting Method</td>
<td>Front Panel Insertion</td>
</tr>
<tr>
<td>Seals</td>
<td>Silicone and Poron</td>
</tr>
<tr>
<td>Depth Behind Panel</td>
<td>See Figures 1 and 2</td>
</tr>
<tr>
<td>Connection</td>
<td>VC1, VC2</td>
</tr>
<tr>
<td>Weight</td>
<td>55g (0.12 lbs)</td>
</tr>
<tr>
<td>Styling</td>
<td>Curved USB port doors</td>
</tr>
<tr>
<td>Port Protection</td>
<td>Twin, self-closing doors</td>
</tr>
</tbody>
</table>

#### Mechanical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endurance</td>
<td>10,000 door cycles minimum</td>
</tr>
</tbody>
</table>

*Manufacturer reserves the right to change product specification without prior notice.*

www.carlingtech.com
Ordering Scheme

1 SERIES
2 PRODUCT TYPE
3 SOURCE VOLTAGE
4 LED INDICATOR
5 CIRCUIT PROTECTION
6 TERMINATION
7 DOOR STYLE
8 DOOR COLOR
9 FRAME COLOR
10 PANEL SEAL

V - USB - 24 - G - 1 - 1 - B - B - 1

1 SERIES
V
2 PRODUCT TYPE
USB Charger
3 SOURCE VOLTAGE
24 24 / 12 Volts DC
4 LED INDICATOR
G Green
5 CIRCUIT PROTECTION
1 Reverse Polarity, Thermal Overload & Overcurrent
6 TERMINATION
1 .250 Tab
7 DOOR STYLE
1 Curved
8 DOOR COLOR
B Black
9 FRAME COLOR
B Black
10 PANEL SEAL
1 Yes

Dimensional Specifications: in. [mm]

Notes:
1 Charger to install into 1.450" X 0.830" panel opening
Reduce inventory levels and cost by stocking actuators and base switches separately.
Contura II, III, IV, V Actuator only: VV with code A or C for selection 9, & with selections 10-14 in the ordering schemes.
Contura VI Actuator with lenses and inserts only: VV with code selections 9-16
Contura X, XI, XII, XIV actuators with lenses separately: VV with code selections 9-14 in the ordering schemes.
Panel Seal: VPS

### Contura X & XI actuators without lenses separately:

<table>
<thead>
<tr>
<th>VVR</th>
<th>6</th>
<th>1</th>
<th>00</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Actuator Separately</td>
<td>2 Actuator Style/Color</td>
<td>3 Lens Opening</td>
<td>4 Actuator Legend</td>
<td>5 Legend Orientation</td>
</tr>
</tbody>
</table>

1. **CONTURA X & XI ACTUATOR SEPARATELY**
   - VVR

2. **ACTUATOR STYLE & COLOR**
   - Black
   - Gray
   - White
   - Red

3. **LENS OPENING FOR**
   - 1 One bar lens
   - 2 One bar lenses
   - 3 One square lens
   - 4 Two square lens

4. **ACTUATOR LENS OR BODY LEGEND**
   - 00 - No Legend this location
   - 01 ON
   - 12 OFF
   - 13 I
   - 14 O
   - 15 OFF
   - 16 ON
   - 17 1
   - 18 0
   - 19 N
   - 20 F
   - 21 O
   - 22 1
   - 23 N
   - 24 F
   - 25 0
   - 26 1
   - 27 N
   - 28 F

5. **LEGEND ORIENTATION**
   - 0 No legend
   - 1 Orientation 1
   - 2 Orientation 2
   - 3 Orientation 3
   - 4 Orientation 4

### Contura XI & XII actuators without lenses separately:

<table>
<thead>
<tr>
<th>VVP</th>
<th>J</th>
<th>1</th>
<th>Z</th>
<th>21</th>
<th>1</th>
<th>00</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Actuator Separately</td>
<td>2 Style &amp; Color</td>
<td>3 Lens Opening</td>
<td>4 Lens Opening</td>
<td>5 Legend</td>
<td>6 Legend Orientation</td>
<td>7 Legend</td>
</tr>
</tbody>
</table>

1. **CONTURA XII ACTUATOR SEPARATELY**
   - VVP

2. **ACTUATOR STYLE & COLOR**
   - Black
   - K
   - Gray
   - N
   - White
   - M
   - Red

3. **LENS OPENING FOR**
   - Z No lens
   - 1 Bar lens
   - 2 Square lens

4. **LENS OR BODY LEGEND**
   - 00 - No Legend
   - 21 Off
   - 22 ON
   - 23 O
   - 24 I
   - 25 Off
   - 26 ON
   - 27 O
   - 28 I

For additional legend options & codes, visit us at www.carlingtech.com.

### Contura X, XI, XII top piece of 2-piece lens separately:

<table>
<thead>
<tr>
<th>VVT</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Lens Separately</td>
<td>2 Color</td>
</tr>
</tbody>
</table>

1. **TOP OF LENS SEPARATELY**
   - VVT

2. **COLOR**
   - 1 Clear
   - 2 Smoke
   - 3 White

### Contura X, XI & XII actuator lens assembly:

- actuator stem
- lens assembly
- bottom lens
- top lens
- two piece lens assembly

1. lens/bar lens are positioned the same as bottom lens for assembly, minus the top lens. Lenses snap in from bottom.

Notes:
1. If actuator lens opening for 2 bar or 2 square lenses, legend orientation 0,1, or 2 must be chosen.
2. Center of actuator marking not available for Contura XII.
3. Legend is not available for bar style lens.
4. Not recommended with neon lamps.
5. Must also order top piece of 2 piece square lens separately.

For additional legend options & codes, visit us at www.carlingtech.com.
Easily integrate Contura products into your system, with Contura Accessories

Contura Connectors

<table>
<thead>
<tr>
<th>COMPANY SERIES</th>
<th>PART NO</th>
<th>PLAIN BRASS</th>
<th>TIN PLATED BRASS</th>
<th>AWG</th>
<th>MM² (REF)</th>
<th>ORIENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PACKARD 58 SERIES</td>
<td>02966580</td>
<td>12</td>
<td>3.0</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>02966471</td>
<td>(2) 16-14</td>
<td>(2) 1.0-2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>02965470</td>
<td>16-14</td>
<td>1.0-2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>02965469</td>
<td>20-18</td>
<td>0.8-2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PACKARD METRI-PACK 630 SERIES</td>
<td>02966590</td>
<td>10</td>
<td>5.0</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12052224</td>
<td>12</td>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>12015870</td>
<td>16-14</td>
<td>1.0-2.0</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>12020035</td>
<td>(2) 22-18</td>
<td>(2) 1.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12015832</td>
<td>20-18</td>
<td>0.8-2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMP 250 SERIES FASTIN-FASTON</td>
<td>60253-1</td>
<td>16-12</td>
<td>1.3-3</td>
<td></td>
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<td>60253-2</td>
<td>(2) 16</td>
<td>(2) 1.3</td>
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<tr>
<td></td>
<td>42100-1</td>
<td>18-14</td>
<td>0.8-2</td>
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<td>60295-1</td>
<td>22-18</td>
<td>0.8-2</td>
<td></td>
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</tbody>
</table>

NOTE: Consult Delphi Packard and/or AMP on actual part numbers and availability. AMP is a registered trademark of AMP Inc., Harrisburg, PA. Delphi Packard is a registered trademark of Delphi-Packard Electrical Systems Warren, Ohio.

Contura X Boot (P/N VB1-01)

Contura II, III, IV, V, VI & VII Actuator Removal Tool (P/N VRT)

Additional V-Series Ratings

1. .4VA @ 28VDC Resistive
2. 10A 250VAC 1/2 HP, 15A 125 VAC 1/2 HP, No Agency Listings
3. 10A 250VAC 1/2 HP, 15A 125 VAC 1/2 HP, UL Recognized, CSA Certified
4. B 15A 24V
5. C 20A 18V
6. D 20A 12V
7. E 20A 14V, 10A 14VT (circuits 1, 4, A, & D only)
8. F 10A 14V, 6A, 14VT (circuit G only)
9. G 20A 6V
10. H 20A 3V
11. L 15A 125 VAC, 10A 250VAC, 1/2 HP 125-250 VAC; 6A 125 VAC L
12. M .4VA/20A 12V (combi-contact) (combination gold/silver contacts for borderline dry circuit applications)
13. N .4VA/15A 24V (combi-contact) (combination gold/silver contacts for borderline dry circuit applications)

NOTE: Consult factory to determine availability for individual circuits and their HP rating.
1. Not available with Contura 7 or 14 rocker styles.
2. Rating L available with circuits 1, 4, A & D only.
Contura Mounting Panels
Dimensional Specifications: in. [mm]

V-Series Contura Sealed Rocker Switches - Accessories

Contura Hole Plug
Dimensional Specifications: in. [mm]
The Illuminated Indicator is offered with removable/replaceable lamps, Contura styling, and LED illumination. As a critical safety feature, it’s illumination alerts the operator of essential system functions or malfunctions like: oil pressure, high temperature, transmission or other fluid levels, parking brake, or general system malfunction. Three different style housings (flush, raised panel, oval) assure seamless integration with Contura switches and into most any dashboard panel.

**Product Highlights:**
- 3 Styles to choose from
- Single or double window Illumination
- 25 lens colors and configurations
- Available connector for easily installation
VP-Series Contura Illuminated Indicator - Ordering Scheme

<table>
<thead>
<tr>
<th>VP</th>
<th>1</th>
<th>6</th>
<th>6</th>
<th>-</th>
<th>B</th>
<th>1</th>
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<tbody>
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<td>3 LAMP (same coding for both selections) 4,5,6,9,12</td>
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<tr>
<td>Neon</td>
<td>1</td>
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<td>250VAC</td>
<td>5</td>
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<tr>
<td>*Typical current draw for LED is 20mA.</td>
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</tbody>
</table>

| 5 HOUSING COLOR |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 SQUARE LENS DESIGN (same coding for both selections) 4,5,6,11,12 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Z | No lens |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | transparent diamond square | 10 |  |  |  |  |  |  |  |  |  |  |  |
| 2 | translucent square | 7 |  |  |  |  |  |  |  |  |  |  |  |
| 3 | laser etched | 10 |  |  |  |  |  |  |  |  |  |  |  |
| 4 | transparent oval |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 | translucent oval |  |  |  |  |  |  |  |  |  |  |  |  |

Notes:
1. To order housing with lenses only, specify H2 followed by fields 5-12. (flush bezel only)
2. To order lamp module only, specify H3 followed by fields 2-3. (flush bezel only)
3. Two piece lens not available with oval bezel.
4. If only 1 lamp, specify 0 in selection 4 and Z in selections 7 & 9.
5. Lamp and lens #1 located over terminals 1A and 1B for flush & oval bezel.
7. Available with 2 piece lens option only.
8. Neon lamps not recommended with blue or green lenses.
9. Green or blue lenses not recommended with neon lamps.
10. Available with one piece lens option only.
11. Oval bezel available with oval lens only. Oval lens available with oval bezel only.
12. Lamp & lens #1 located over terminals 7 & 8, & #2 located over 9 & 10 for raised bezel option.
13. Both bracket and insert will be same color. For white bracket with black insert, specify 7. For black bracket with white insert, specify 8.

*Manufacturer reserves the right to change product specification without prior notice.
Notes:
Oval and flush bezel styles use terminals 1A, 1B, 2A, 2B. Raised bezel style uses terminals 7, 8, 9, 10.
Carling Technologies set the standard for performance and aesthetics with the widely successful, often imitated, but never duplicated, V-Series rocker switches. Building further upon that platform, Carling has once again raised the bar with the fully sealed W-Series. The W-Series’ traditional appearance features complete IP68 protection, including below the panel, where the critical connection is made from the wiring harness. When used in conjunction with the integrated connector, the totally submersible W-Series provides a seal for up to ten individual wires, assuring compatibility with even the most complex circuitry.

The W-Series also offers a wide variety of accoutrements, including endless illumination options featuring dual level and multicolor LEDs, progressive and hazard warning circuits, ratings up to 10A 24V, choice of paddle, rocker, locking or laser etched actuators, hundreds of standard legend choices and the electrical performance and reliability that is the hallmark of Carling Technologies products.

**Product Highlights:**
- Fully sealed and submersible
- IP68 protection, including below the panel
- Tri-seal design
- Connector with twin locking tabs
W-Series Fully Sealed Rocker Switches - Design Features

W-Series Switch
DESIGN FEATURES

ILLUMINATION
Choice of highly reliable SMT LED or incandescent lighting with 21 dependent or independent circuit options.

TRI-SEAL DESIGN
Sealing at actuator, an insert molded neoprene base seal, along with wire lead seals, assures water tight, fully submersible protection.

BODY
One piece polyester 94V0 seamless body acts as an umbrella to protect critical internal components.

ROLLER PIN
Proven reliable mechanism is lubricant free and allows for 100k electrical and 250k mechanical cycles, and withstands extreme temperatures from -40°C to +85°C.

INTEGRATED CONNECTOR
Accommodates Tyco/Amp .110 junior power timer contacts with twin locking tabs to provide a safe, secure, sealed connection.

*Manufacturer reserves the right to change product specification without prior notice.
### Electrical
- **Contact Rating**: .4VA @ 24VDC, 10 amps, 3-24VDC
- **Dielectric Strength**: 1500 Volts RMS
- **Insulation Resistance**: 50 Megohms
- **Initial Contact Resistance**: 10 milliohms max. @ 4 VDC
- **Life**: 100,000 cycles
- **Contacts**: Silver tin-oxide, 88/12
- **Terminals**: Copper with silver or gold plating
- **Quick Connect terminations**
- **Voltage**: 3-24 VDC
- **Overcurrent**: 15A for 50 cycles

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

### Physical
- **Lighted**: LED - rated 100,000 hours 1/2 life (LED is internally ballasted for voltages to 24 VDC)
- **Seals**: Neoprene
- **Base**: Polyester blend rated to 125°C with a UL flammability rating of 94V0.
- **Actuator**: Basic actuator structure molded of thermoplastic polycarbonate with a hard Nylon 66 thermoplastic surface overlay.
- **Lens**: Polycarbonate rated at 100°C
- **Function**: 2 & 3 Position Rocker Style
- **Operation**: Maintained & Momentary
- **Base**: PA 6/6 30GF (glass filled)
- **Actuator**: PA 6/6 13GF
- **Bracket**: PBT 10GF
- **Connector**: PBT 10GF, polarized

### Environmental
- **Environmental**: IP68, Fully sealed
- **Corrosion/Chemical Splash**: Flowing Mixed Gas (FMG) Class III, 3 year accelerated exposure per ASTM B-827, B-845
- **Operating Temperature**: -40°C to +85°C, 22 cycles, 300 hours
- **Vibration 1**: Per Mil-Std 202F, Method 204D Test Condition A 0.06 DA or 10G's 10-500 Hz.
- **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
  - One meter onto concrete floor
- **Handling/Drop**: Per Mil-Std 202F, Method 101D, Test Condition A, 48 Hrs.
- **Salt Spray**: Per Mil-Std 202F, Method 107F, Test Condition A, -55°C to 85°C
  - Test criteria - pre and post test contact resistance
- **Dust**: Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance
- **Moisture Resistance/Humidity**: Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance

### Mounting Specifications
- **Panel Thickness Range**: .032 to .125
- For optimum panel fit, the following panel thicknesses are suggested: .032, .062, .093, .125

### Actuator Travel (Angular Displacement)
- 24° full throw
W-Series Fully Sealed Rocker Switches - Ordering Scheme

1 SERIES
W

2 CIRCUIT ( ) - momentary
For terminal arrangement, see dimensional specifications
Position: 1 2 3
SP DP & 2 Independent 6+ 7-

58 -
- 61 3 & 10, 6 & 9 2 & 3, 4 & 5 OFF, OFF
- 62 3 & 10, 6 & 9 2 & 3, 4 & 5 OFF, OFF
- 63 3 & 10, 6 & 9 2 & 3, 4 & 5 OFF, OFF
- 64 3 & 10, 6 & 9 2 & 3, 4 & 5 OFF, OFF
- 65 3 & 10, 6 & 9 2 & 3, 4 & 5 OFF, OFF
- 66 3 & 10, 6 & 9 2 & 3, 4 & 5 OFF, OFF
- 67 3 & 10, 6 & 9 2 & 3, 4 & 5 OFF, OFF
- 68 OFF, OFF 2 & 3, 4 & 5 OFF, OFF

3 RATING
B 10A 24V D 10A 12V G 10A 6V H 10A 3V

4 TERMINATION / BASE STYLE
2 .110 TAB (QC)

5 ILLUMINATION
Lamp #1 above terminals 1&4; Lamp #2 above terminals 3&6; end of switch. Positive (+) and negative (-) symbols apply to LED lamps only

6,7 LAMP (SAME CODING FOR BOTH SELECTIONS)
Selection 6: above terminals 1 & 4; Selection 7: above terminals 3 & 6
No lamp: 0
LED: Red Amber Green White
2VDC: A L F 4
6VDC: B M G 5
12VDC: C N H 6
24VDC: D P J 8
* Consult factory for “daylight bright”, blue/green and white LED options. Typical current draw for LED is 20mA.

8 BRACKET COLOR
1 Black

9 ACTUATOR
1 Black with Laser Etched
A Black

10 LENS COLOR / STYLE - ABOVE LAMP #1 TERMINALS 1 AND 4
11 LENS COLOR / STYLE - ABOVE LAMP #2 TERMINALS 3 AND 6
Z - No Lens
Clear White Amber Green Red Blue
1 - B G M T Large Transparent
2 - 7 C H N U Large Translucent
3 - 3 D J P V Bar Transparent
4 - 9 E K R W Bar Translucent
5 A - - - Laser-Etched

Lens color for LEDs must be clear, white, or match color of LED.

12 ACTUATOR LENS OR BODY LEGEND
0 - No Legend this location/No actuator
11 ON 12 OFF 13 I 14 O
OFF ON O I
15 O 16 O 17 I 18 O
F N F
21 22 23 24
OFF ON O I
25 O 26 O 27 O 28 I
F N F

For additional legend options & codes, visit us at carlingtech.com

13 LEGEND ORIENTATION
0 No legend (used with codes 11-18 in selection 12)
1 Orientation 1
2 Orientation 2
3 Orientation 3
4 Orientation 4
5 A - - - Laser-Etched

For additional legend options & codes, visit us at carlingtech.com

14 ACTUATOR LENS LEGEND
0 No legend this location/no actuator (used with codes 1-8 in selection 12)
1 Orientation 1
2 Orientation 2
3 Orientation 3
4 Orientation 4
5 A - - - Laser-Etched

For additional legend options & codes, visit us at carlingtech.com

Notes:
1 Custom colors are available. Consult factory.
2 White imprinting is standard on black actuators; Black imprinting is standard on white, red & gray actuators. Custom colors are available, consult factory.
### W-Series Fully Sealed Rocker Switches - Locking - Ordering Scheme

<table>
<thead>
<tr>
<th>Series</th>
<th>Circuit</th>
<th>Rating</th>
<th>Termination</th>
<th>Illumination</th>
<th>Lock</th>
<th>Lamp</th>
<th>Bracket</th>
<th>Actuator</th>
<th>Lens</th>
<th>Lock Function</th>
<th>Legend</th>
<th>Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1W</td>
<td>11D</td>
<td>20W</td>
<td>0J</td>
<td>P</td>
<td>7B</td>
<td>00</td>
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</tbody>
</table>

#### 1 Series
- **W**

#### 2 Circuit
- **D**
- **2**
- **0**
- **W**
- **0**
- **J**
- **P**
- **7**
- **B**
- **00**
- **0**

#### 8 Bracket Color
- **J** Black

#### 9 Actuator
- **P** Black
- **R** Red

#### 10 Lens
- **Z** - No Lens
- **1** Clear White
- **2** Amber Green
- **3** Red Blue

#### 11 Lock Function
- **Up** Black
- **Down** White
- **Lock Color** Red Safety Orange

#### 12 Laser Etched, Lens or Body Legend
- **00** No legend this location / no actuator

#### 13 Legend Orientation
- **1** Orientation 1
- **2** Orientation 2
- **3** Orientation 3
- **4** Orientation 4

**Notes:**
- White imprinting is standard on black actuators; Black imprinting is standard on white, red & grey actuators; Custom colors are available, consult factory.

### Part Details

#### 3 Rating
- **1** 0.4VA 28V DC Resistive
- **B** 10A 24V
- **D** 10A 12V

#### 4 Termination / Base Style
- **2** .110 TAB (QC)

#### 5 Illumination
- Lamp #1: above terminals 1 & 4 end of switch.
- Lamp #2 above terminals 3 & 6 end of switch.
- Positive (+) and negative (-) symbols apply to LED lamps only

#### 6 Lock
- **W** Lock Option

#### 7 Lamp
- **#**
- **#**
- **#**
- **#**
- **#**
- **#**
- **#**
- **#**
- **#**
- **#**

**Typical current draw for LED is 20mA.**

---

For terminal arrangement, see dimensional specifications.

Lens color for LEDs must be clear, white, or match color of LED.

For legend options & codes, visit us at carlingtech.com.

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www.carlingtech.com
W-Series Fully Sealed Rocker Switches - Dimensional Specifications

Dimensional Specifications: in. [mm]

Notes:
WCH connector is intended for use with Tyco/Amp .110 Junior Power Timer, female contacts, and wire seals. For 14-16 awg wire, specify Tyco/Amp P/N 927766-3. For 16-20 awg wire, specify Tyco/Amp P/N 927770-3. Tyco/Amp cable seal P/N 628904-1 (20-18 awg wire) or P/N 628905-1 (16-14 awg wire) is required for each individual wire lead, and Tyco/Amp cable plug, P/N 626922-1, is required to seal each unused connector opening. Consult Tyco/Amp for the cable seal recommended for your specific wire gauge and thickness.
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 harness.

**Product Highlights:**

- IP67 certified sealed front panel components
- Withstands temperatures from -40°C to +85°C
- Vibration, shock, thermoshock, moisture and salt spray resistant

**Resources:**

- Download 3D CAD Files
  - IGS
  - STP
- Watch Product Video
L-Series Switch
DESIGN FEATURES

**LED LIGHTING**
Utilize less current and are not affected by vibration, providing long lasting illumination. Available in 3 standard colors.

**SEAL PROTECTION**
Locks out elements such as water, dust & debris. Certified to IP67 for front panel components.

**TERMINALS**
Available with 2 industry standard termination options: .250 or .187 tabs with up to 12 terminal options.

**LENS & LEGENDS**
Lens available in 2 sizes and 6 standard colors in either translucent or transparent materials. Numerous symbols and text available for imprinting or laser etching.

**ACTUATOR**
Available in rocker or paddle styles. Several standard color options also available.

**ROLLER PIN**
Eliminates need for lubricants, increasing the temperature range of the switch from -40°C to +85°C [-40°F to 185°F].

**BASE**
Fits into industry standard mounting hole of 1.734 x .867 in [44.0mm x 22.0mm].

*Manufacturer reserves the right to change product specification without prior notice.*
L–Series Sealed Rocker Switches - General Specifications

**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
  - 3750 Volts RMS between live parts and accessible surfaces

- **Insulation Resistance**: 50 Megohms

- **Initial Contact Resistance Life**: 10 milliohms max. @ 4 VDC
  - 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.

**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.

- **Actuator**: Basic actuator structure molded of thermoplastic polycarbonate with a hard Nylon 66 thermoplastic surface overlay.
  - **Lock**: Acetal
  - **Lens**: Polycarbonate rated at 100°C
  - **Function**: 2 & 3 Position Rocker Style
  - **Bracket**: Nylon Zytel
  - **Connector**: Nylon 66 rated at 85°C. Polarized.

**Actuator Travel (Angular Displacement)**

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

**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**

  - **Vibration 1**: -40°C to + 85°C
    - 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.
  - Test Criteria - pre and post test contact resistance.

- **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.

**Mounting Specifications**

- **Panel Thickness Range**
  - Acceptable Panel Thickness: .030 to .156 (.76mm to 3.96mm)
  - Recommended: .030, .062, .093, .125 and .156
L-Series Sealed Rocker Switches – Ordering Scheme

1 SERIES

2 CIRCUIT

Terminal Orientation

Position: 1 2 3

SP - single pole - uses terminals 1, 2 & 4.
DP - double pole uses terminals 5, 6 & 8.
The terminals 9, 10 & 11 for lamp circuit only.

TERMINATION 3

Notes:

1 Not available with circuits 11-18, 51-57 and 69.
2 Terminal 3 only available with rating codes 1, B, and E.
3 Not available with circuits 11-16, 51-57 and 69.

3 RATING

1 .4VA @ 28VDC Resistive
2 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)
2 .187 (4.7mm) TAB (QC)

Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

Notes:

1. Toy colors are available. Consult factory.
2. Circuits 30, 31, 58, 69 are not available with rating codes C, D, G or H.
3. Termination 3 only available with rating codes 1, B, and E.

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.

6.7 LAMP (SAME CODING FOR BOTH SELECTIONS)

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

No lamp: Rockerguard at Lamp 1
Incandescent: 6V 12V 18V 24V
LED*: Red Amber Green
2VDC Red Amber Green
6VDC B M G
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

Rockerguard at Lamp 1
Black White Gray Red
Rockerguard at Lamp 2
Black White Gray Red

9 ACTUATOR STYLE AND COLOR

Rocker A B C D
Paddle J N K M

10 & 11 LENS STYLE AND COLOR

Lens color for LEDs must be clear, white, or match color of LED.

1 No actuator Z - No Lens
Clear White Amber Green Red
1 - B G M T
Large Transparent
- 7 C H N U
Large Translucent
- 3 D V Bar Transparent
- 9 E K R W
Bar Translucent

12 LASER ETCHED, LENS OR BODY LEGEND

00 - No legend this location / no actuator
For legend options & codes, visit us at carlingtech.com

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

14 ACTUATOR LENS LEGEND

00 - No legend this location / no actuator
For legend options & codes, visit us at carlingtech.com

For legend options & codes, visit us at carlingtech.com
L-Series Sealed Rocker Switches - Locking - Ordering Scheme

1 SERIES

2 TERMINATION 5

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
SP DP 2 & 4, 6 & 8 Connected Terminals 1 & 2, 5 & 6
11 21 ON NONE OFF
14 24 ON NONE ON
16 26 ON OFF ON
17 27 ON OFF (ON)
18 28 (ON)

CIRCUITS WITH JUMPER TERMINALS
30 2 (2,4&5), (1,6&8)
31 2 1, 2 & 5 2, 3 & 7 2, 4 & 8

PROGRESSIVE CIRCUITS
51 3 & 4 2, 3, & 7 1 & 2
52 3 & 4 2, 3, & 7 OFF
53 (3 & 4) 2, 3, & 7 1 & 2
54 (3 & 4) 2, 3, & 7 (OFF)
55 (3 & 4) 2, 3, & 7 (1 & 2)
56 (3 & 4) 2, 3, & 7 (OFF)
57 3 & 4 2, 3, & 7 (OFF)
58 2 & 3 2, 3, & 7 1 & 2
61 3 & 4, 7 & 8 2 & 3, 6 & 7 1 & 2, 5 & 6
62 3 & 4, 7 & 8 2 & 3, 6 & 7 OFF, OFF
63 (3 & 4), (7 & 8) 2 & 3, 6 & 7 1 & 2, 5 & 6
64 (3 & 4), (7 & 8) 2 & 3, 6 & 7 OFF, OFF
65 (3 & 4), (7 & 8) 2 & 3, 6 & 7 (1 & 2), (5 & 6)
66 (3 & 4), (7 & 8) 2 & 3, 6 & 7 (OFF, OFF)
67 (3 & 4), (7 & 8) 2 & 3, 6 & 7 (OFF, OFF)
68 2 & 4, 7 & 8 2 & 3, 6 & 7 OFF, OFF
69 2 & 4, 1, 7 & 8 2 & 3, 6 & 7 (OFF, OFF)
70 2 & 4, (7 & 8) 2 & 3, 6 & 7 (1 & 2), (5 & 7)
71 2 & 4, (7 & 8) 2 & 3, 6 & 7 1 & 2, 5 & 7
72 2 & 4, (7 & 8) 2 & 3, 6 & 7 1 & 2, 5 & 7
73 2 & 4, (7 & 8) 2 & 3, 6 & 7 OFF, OFF
74 2 & 4, (7 & 8) 2 & 3, 6 & 7 OFF, OFF
75 2 & 4, (7 & 8) 2 & 3, 6 & 7 (OFF, OFF)
76 2 & 4, (7 & 8) 2 & 3, 6 & 7 (OFF, OFF)
77 (2 & 4), (7 & 8) 2 & 3, 6 & 7 (1 & 2), (5 & 7)
78 (2 & 4), (7 & 8) 2 & 3, 6 & 7 1 & 2, 5 & 7
79 (2 & 4), (7 & 8) 2 & 3, 6 & 7 1 & 2, 5 & 7
80 2 & 4, 6 & 8 2 & 4, OFF OFF, OFF

3 RATING 2
1 .4VA @ 28VDC Resistive
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 4
1 .250 (6.4mm) TAB (QC)
3 .187 (4.7mm) TAB (QC)

Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

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>Lamp</th>
<th>Illumination Type</th>
<th>Lamp Wired to Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>None</td>
<td>12+ 11-</td>
</tr>
<tr>
<td>B</td>
<td>#2 Independent</td>
<td></td>
</tr>
</tbody>
</table>

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 3 only available with ratings 1, B and E.
5 Circuits 30, 31, 58 and 69, are not available with rating codes 4, C, D or H.

1 Series 2 Circuit 3 Rating 4 Termination 5 Illumination 6 Lock 7 Lamp 8 Bracket 9 Actuator 10 Lens 11 Lock 12 Legend 13 Legend Orientation

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

12 LASER ETCHED, LENS OR BODY LEGEND
00 No legend this location / no actuator
For legend options & codes, visit us at carlingtech.com

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

www.carlingtech.com
### Dimensional Specifications: in. [mm]

#### Connector

**L-SERIES**
- Shown with Laser Etched Actuator
  - 1.970 [50.04]
  - 1.020 [25.91]
  - 1.450 [36.83]
- Shown with Large Lens and Paddle Actuator
  - .400 [10.16]
- Shown with Bar Lens, Lock and Connector
  - 1.970 [50.04]
  - 1.020 [25.91]
  - 2.380 [60.45]

**LH1**
- Removable Hole Plug with Non-Serrated Wings
  - 1.970 [50.04]
  - 1.020 [25.91]
  - .920 [23.7]

**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**
- Shown with Rocker Guard
  - .435 [10.16]
- Hole Plug
  - 1.970 [50.04]
  - 1.020 [25.91]
  - .855 [21.72]

**LH2**
- Hole Plug with Serrated Wings
  - 1.325 [33.66]
  - .300 [7.62]
  - .855 [21.72]
## Dimensional Specifications: in. [mm]

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMS Mounting Panel Hole</td>
<td>1.900 [48.26]</td>
</tr>
<tr>
<td>TEST CUT HOLE IN ACTUAL MATERIAL</td>
<td>.984 [25.00]</td>
</tr>
<tr>
<td>TEST CUT HOLE IN ACTUAL MATERIAL</td>
<td>1.900 [48.26]</td>
</tr>
<tr>
<td>MOUNTING PANEL OPENING (2) UNITS</td>
<td>2.020 [51.31]</td>
</tr>
<tr>
<td>R .093 MAX TYP</td>
<td>.008 ± .000</td>
</tr>
</tbody>
</table>

**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]

---

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMD Mounting Panel</td>
<td>3.400 [86.36]</td>
</tr>
<tr>
<td>PANEL OPENING SIZE: 1.90 X 3.06 [48.3mm X 77.7mm]</td>
<td>2.300 [58.42]</td>
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</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions</th>
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</thead>
<tbody>
<tr>
<td>LMM Mounting Panel</td>
<td>1.990 [50.55]</td>
</tr>
<tr>
<td>PANEL OPENING SIZE: 1.90 X 4.09 [48.3mm X 103.9mm]</td>
<td>2.300 [58.42]</td>
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</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions</th>
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<tbody>
<tr>
<td>LMM Mounting Panel</td>
<td>1.030 [26.16]</td>
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<tr>
<td>PANEL OPENING SIZE: 1.90 X 2.98 [48.3mm X 75.7mm]</td>
<td>6.490 [164.85]</td>
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<table>
<thead>
<tr>
<th>Component</th>
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<tbody>
<tr>
<td>LMM Mounting Panel</td>
<td>1.340 [34.04]</td>
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<td>PANEL OPENING SIZE: 1.90 X 6.15 [48.3mm X 156.2mm]</td>
<td>4.430 [112.52]</td>
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## Circuit Diagrams:

<table>
<thead>
<tr>
<th>Circuit Code</th>
<th>Circuit Diagram</th>
<th>Circuit Code</th>
<th>Circuit Diagram</th>
<th>Circuit Code</th>
<th>Circuit Diagram</th>
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<tbody>
<tr>
<td>11</td>
<td><img src="image1" alt="Circuit Diagram 11" /></td>
<td>22</td>
<td><img src="image2" alt="Circuit Diagram 22" /></td>
<td>51</td>
<td><img src="image3" alt="Circuit Diagram 51" /></td>
</tr>
<tr>
<td>12</td>
<td><img src="image4" alt="Circuit Diagram 12" /></td>
<td>23</td>
<td><img src="image5" alt="Circuit Diagram 23" /></td>
<td>52</td>
<td><img src="image6" alt="Circuit Diagram 52" /></td>
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<tr>
<td>13</td>
<td><img src="image7" alt="Circuit Diagram 13" /></td>
<td>24</td>
<td><img src="image8" alt="Circuit Diagram 24" /></td>
<td>53</td>
<td><img src="image9" alt="Circuit Diagram 53" /></td>
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<tr>
<td>14</td>
<td><img src="image10" alt="Circuit Diagram 14" /></td>
<td>25</td>
<td><img src="image11" alt="Circuit Diagram 25" /></td>
<td>54</td>
<td><img src="image12" alt="Circuit Diagram 54" /></td>
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<tr>
<td>15</td>
<td><img src="image13" alt="Circuit Diagram 15" /></td>
<td>26</td>
<td><img src="image14" alt="Circuit Diagram 26" /></td>
<td>55</td>
<td><img src="image15" alt="Circuit Diagram 55" /></td>
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<tr>
<td>16</td>
<td><img src="image16" alt="Circuit Diagram 16" /></td>
<td>27</td>
<td><img src="image17" alt="Circuit Diagram 27" /></td>
<td>56</td>
<td><img src="image18" alt="Circuit Diagram 56" /></td>
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<td>17</td>
<td><img src="image19" alt="Circuit Diagram 17" /></td>
<td>28</td>
<td><img src="image20" alt="Circuit Diagram 28" /></td>
<td>57</td>
<td><img src="image21" alt="Circuit Diagram 57" /></td>
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<tr>
<td>18</td>
<td><img src="image22" alt="Circuit Diagram 18" /></td>
<td>30</td>
<td><img src="image23" alt="Circuit Diagram 30" /></td>
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<td><img src="image24" alt="Circuit Diagram 58" /></td>
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<tr>
<td>21</td>
<td><img src="image25" alt="Circuit Diagram 21" /></td>
<td>31</td>
<td><img src="image26" alt="Circuit Diagram 31" /></td>
<td>61</td>
<td><img src="image27" alt="Circuit Diagram 61" /></td>
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## Circuit Diagrams:

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<td>63</td>
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<td>64</td>
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<td><img src="#" alt="Diagram 68" /></td>
<td>A2</td>
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<td>69</td>
<td><img src="#" alt="Diagram 69" /></td>
<td>A3</td>
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<tr>
<td>70</td>
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Lamp Circuit Diagrams:

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<th>LAMP CIRCUIT CODE</th>
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<th>LAMP CIRCUIT CODE</th>
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<tbody>
<tr>
<td>A</td>
<td><img src="image" alt="Circuit Diagram A" /></td>
<td>J</td>
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<tr>
<td>B</td>
<td><img src="image" alt="Circuit Diagram B" /></td>
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<td>G</td>
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<tr>
<td>H</td>
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**LEGEND**

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DEFINITION</th>
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</thead>
<tbody>
<tr>
<td>↓</td>
<td>TERMINAL LOCATION</td>
</tr>
<tr>
<td>○</td>
<td>LAMP LOCATION</td>
</tr>
<tr>
<td>-</td>
<td>MAINTAINED CIRCUIT</td>
</tr>
<tr>
<td>▼</td>
<td>MOMENTARY CIRCUIT</td>
</tr>
<tr>
<td>------</td>
<td>INTERNAL CONNECTION (JUMPER TERMINAL)</td>
</tr>
<tr>
<td>P3</td>
<td>2 POSITION CONNECTION</td>
</tr>
<tr>
<td>P3, P2, P1</td>
<td>3 POSITION</td>
</tr>
</tbody>
</table>
The LP-Series Illuminated Indicators are the perfect complement to the aesthetics, reliability and performance of our L-Series rocker switches. As a critical safety feature, the illumination alerts the operator of essential system functions or malfunctions, such as: Oil Pressure, High Temperature, Transmission or other fluid levels, Parking Brake or General System confirmations. The L-Series styling assures seamless integration into most any dashboard panel.

**Product Highlights:**
- Vibration, Shock, and Thermoshock Resistant
- 12 or 24 Volts
- Laser Etched or Lens Illumination
- IP67 Sealing
Electrical
Terminals
Brass or copper/silver plate
3/16” (4.76mm) & 1/4” (6.3mm)
Quick Connect terminations standard.

Lighted
Incandescent - rated 10,000 hours
LED - rated 100,000 hours 1/2 life
(LED is internally ballasted for
voltages to 24VDC)

Environmental
Environmental
IP67, representing an index of
protection as applied to electrical
equipment in accordance with IEC
529, BS 5490, DIN 400 50 &
NFC 20 010.

Corrosion Resistance
Mixed Flowing Gas MFG Class III
per ASTM B-827 & B-845, Method
H, with 3 years exposure.

Operating Temperature
Vibration 1
-40°C to +85°C
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 0.25
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.

Physical
Seals
Insert, base & bracket are sealed.

Base
Nylon 66 GF rated to 85°C with a
flammability rating of 94VO.

Insert
Polycarbonate rated at 100°C.

Connector
Nylon 66 rated at 85°C. Polarized

Markings
Over 1000 pad printed or laser
etched legends available

Bracket
Nylon 66 GF rated to 85°C

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.*
LW-Series Wiper/Washer Control - Ordering Scheme, Dimensional Specifications

1 SERIES

LP L-Series Illumination Plug

2 TERMINATION

1 .250 (8.35) x .032 (0.51) Quick Connect
3 .187 (4.75) x .032 (0.51) Quick Connect

3 ILLUMINATION

LAMPS ILLUMINATION LAMP WIRED TO TERMINALS
A 1 – 10 (+) 9 (–)
B 1 – 10 (+) 9 (–)
C 1 – 12 (+) 11 (–)
E 1 & 2 Parallel 10 (+) 9 (–)
H 1 & 2 Series 10 (+) 9 (–)

LAMP 1 LOCATED ABOVE TERMINALS 9 & 10 END OF BRACKET.
LAMP 2 LOCATED ABOVE TERMINALS 11 & 12 END OF BRACKET.
POSITIVE (+) AND NEGATIVE (–) SYMBOLS APPLY TO LED LAMPS ONLY.

4,5 LAMP (same coding for both selections)

Selection 4: specifies lamp 1 located above terminals 10 (+) & 9 (–).
Selection 5: specifies lamp 2 located above terminals 12 (+) & 11 (–).

No lamp 0 (position 5 only)
Incandescent 4 3V 5 6V 6 12V 7 18V 8 24V
LED Amber Green Red
2VDC L F R
6VDC M G S
12VDC N H T
24VDC P J V

6 BRACKET COLOR

5 Black

7 INSERT COLOR

9 Painted Black - Laser Etch
A Clear (Transparent)
B White (Translucent)
C Red (Translucent)
D Amber (Translucent)
E Green (Translucent)
F Blue (Translucent)

8, 9 STYLE (same coding for both selections)

Z Not Painted (used with Insert Colors A-F)
5 Clear Laser Etch Background Color (used with Insert Color 9)
A White Laser Etch Background Color (used with Insert Color 9)

10 LEGEND OVER LAMP

00 No legend
Laser Etched or Body Legends
For legend options, visit us at carlingtech.com

11 LEGEND ORIENTATION

0 No legend
1 Orientation 1
2 Orientation 2
3 Orientation 3
4 Orientation 4

12 LEGEND OVER LAMP

00 No legend
Laser Etched or Body Legends
For legend options, visit us at carlingtech.com

Notes:
1 To order separately, specify LPC and selection 7 code. Ex LPC-9
2 For LEDs, insert color must be clear, white or match color of LED.
3 For connector, specify part number LC2-01 (.187 tabs), LC3-01 (.250 tabs).
ST-Series
SEAL ED TOGGLE SWITCHES

Designed to comply with MIL-DTL-3950G requirements for environmentally sealed toggle switches, Carling Technologies® ST-Series Sealed Toggle Switch features innovative design and performance principles sure to withstand the most demanding applications.

The ST-Series features a toggle seal composed of dynamic silicone material that bonds to the metal toggle, pin and bushing, providing ideal sealing and protection against the environment, vibration and shock, while withstanding extreme temperature variations. It also utilizes up to three terminal seals per pole and an optional o-ring assures additional under panel sealing protection. All silicone seals on the ST-Series comply with A-A-59588 for silicone rubber performance specifications and, together, these features meet the international IEC 60529 standard for sealing performance to an IP68 level.

Product Highlights:
- Designed to comply with MIL-DTL-3950G requirements
- IEC 60529 IP68 sealing performance
- Toggle seal bonds to toggle, pin and bushing
- Complies with UL 61058-1 electrical spacing requirements

Resources:
Download 3D CAD Files
- IGS
- STP

Watch Product Video
ST-Series Switch
DESIGN FEATURES

PINNED TOGGLE / BUSHING
Keeps metal toggle firmly in place and prevents rotation

BRASS ROLLER PIN
Provides rolling metal on metal actuation for maximum endurance

BASE SEAL CHANNEL
Perfectly fits the toggle assembly seal decreasing the dependence on clamping forces and rivets

TERMINAL BARRIERS
Comply with UL-61058-1 electrical spacing requirements

OPTIONAL O-RING
Assures additional under panel sealing protection

BUSHING/TOGGLE SEAL
Composed of dynamic silicone material that bonds to the metal toggle, pin and bushing

RIVETS
High purity copper composite and silver alloy materials handle various electrical loads and maintain low contact resistance

TERMINAL SEALS
Assure a secure seal at extreme temperatures. Eliminates potential for separated joints associated with insert molded constructions
## ST-Series Sealed Toggle Switch - General Specifications

### Electrical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contact Rating</strong></td>
<td>16A 12V/24V</td>
</tr>
<tr>
<td><strong>Dielectric Strength</strong></td>
<td>MIL-STD-202G, Method 301</td>
</tr>
<tr>
<td>(1500 Volts RMS)</td>
<td></td>
</tr>
<tr>
<td><strong>Insulation Resistance</strong></td>
<td>MIL-STD-202G, Method 302</td>
</tr>
<tr>
<td>(50 MegOhms, 500 VDC)</td>
<td></td>
</tr>
<tr>
<td><strong>Initial Contact Resistance</strong></td>
<td>MIL-STD-202G, Method 307</td>
</tr>
<tr>
<td>(10 milliOhms max.)</td>
<td></td>
</tr>
<tr>
<td><strong>Life</strong></td>
<td></td>
</tr>
<tr>
<td>Overload: MIL-DTL-3950G, Section 4.8.11.1</td>
<td></td>
</tr>
<tr>
<td>Electrical Endurance and</td>
<td></td>
</tr>
<tr>
<td>Temperature: UL 61058-1</td>
<td></td>
</tr>
<tr>
<td>Momentary circuits: 25,000</td>
<td></td>
</tr>
<tr>
<td>operations, minimum.</td>
<td></td>
</tr>
<tr>
<td>Maintained circuits: 50,000</td>
<td></td>
</tr>
<tr>
<td>operations, minimum.</td>
<td></td>
</tr>
<tr>
<td>Testing ongoing to determine</td>
<td></td>
</tr>
<tr>
<td>maximum values.</td>
<td></td>
</tr>
<tr>
<td><strong>Contacts Terminals</strong></td>
<td></td>
</tr>
<tr>
<td>Silver Alloy</td>
<td></td>
</tr>
<tr>
<td>Brass or Copper / silver plated.</td>
<td></td>
</tr>
<tr>
<td>Tab Terminal: ¼” quick-connect</td>
<td></td>
</tr>
<tr>
<td>Screw Terminal: #6-32 brass</td>
<td></td>
</tr>
<tr>
<td>screw and cage clamp</td>
<td></td>
</tr>
<tr>
<td>MIL-STD-202G, Method 211 Test</td>
<td></td>
</tr>
<tr>
<td>Condition A, and B: 25 lb. pull</td>
<td></td>
</tr>
<tr>
<td>test, two terminal bends.</td>
<td></td>
</tr>
</tbody>
</table>

### Mechanical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Life</strong></td>
<td>Mechanical Endurance: 150,000 cycles total (at 25°C)</td>
</tr>
</tbody>
</table>

### Environmental

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td>Operating: -40°C to +85°C</td>
</tr>
<tr>
<td></td>
<td>Storage: -65°C to +85°C</td>
</tr>
<tr>
<td><strong>Vibration</strong></td>
<td>MIL-STD-202G, Method 204D, Test Condition A (10 G peak, Harmonic, 10Hz to 500Hz sweeps, 9 hours total).</td>
</tr>
<tr>
<td><strong>Handling Drop</strong></td>
<td>SAE J1455, Section 4.11.3.1, 1 meter drop in each of three planes</td>
</tr>
<tr>
<td><strong>Sealing</strong></td>
<td>MIL-STD-202G, Method 110 (sand and dust)</td>
</tr>
<tr>
<td></td>
<td>IEC 60528, IP68 (dust-tight and continuous immersion in water)</td>
</tr>
<tr>
<td><strong>Salt Atmosphere</strong></td>
<td>MIL-STD-202G, Method 101, Test Condition A (96 hrs)</td>
</tr>
<tr>
<td></td>
<td>No permanent loss of function, obvious loss of sealing, distortion, softening, embrittlement, discoloration or corrosion after being brushed for 10 minutes, wetting all exposed surfaces, Relevant chemical compatibility documentation may be used in place of testing.</td>
</tr>
</tbody>
</table>

### Physical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Function</strong></td>
<td>Single/Double Pole with Single/Double Throw functions</td>
</tr>
<tr>
<td><strong>Operation</strong></td>
<td>Two/Three position, Maintained/ Momentary circuits</td>
</tr>
<tr>
<td><strong>Toggle</strong></td>
<td>Tin plated brass</td>
</tr>
<tr>
<td><strong>Actuator</strong></td>
<td>Polyester PBT, UL94-V0 and fungus resistant per ASTM G-21</td>
</tr>
<tr>
<td><strong>Internal Seals</strong></td>
<td>All internal seals are silicone per A-A-59588-1A.</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td>15/32”-32 UNS-2A threaded bushing with a keyway. A single nut and lock washer are supplied unassembled.</td>
</tr>
<tr>
<td><strong>Bushing/Top Plate</strong></td>
<td>Zinc/aluminum die cast, with tin plating.</td>
</tr>
<tr>
<td><strong>Base</strong></td>
<td>Polyester PBT, UL94-V0 and fungus resistant per ASTM G-21</td>
</tr>
<tr>
<td><strong>Actuation Force</strong></td>
<td>Initial Actuation Forces ± 0.3 lb (2-Pole circuits)</td>
</tr>
<tr>
<td><strong>Angular Movement</strong></td>
<td>14.5 degrees, each side of center</td>
</tr>
</tbody>
</table>

---

*Manufacturer reserves the right to change product specification without prior notice.*
ST-Series Sealed Toggle Switch - Ordering Scheme

### 1 SERIES

ST  Sealed Toggle

### 2 CIRCUIT

<table>
<thead>
<tr>
<th>Position</th>
<th>1 &amp; 2, 4 &amp; 5 Connected Terminals</th>
<th>1 &amp; 2, 4 &amp; 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>ON</td>
<td>NONE</td>
</tr>
<tr>
<td>B</td>
<td>(ON)</td>
<td>OFF</td>
</tr>
<tr>
<td>C</td>
<td>ON</td>
<td>NONE</td>
</tr>
<tr>
<td>D</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>F</td>
<td>ON</td>
<td>NONE</td>
</tr>
<tr>
<td>J</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>K</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>L</td>
<td>(ON)</td>
<td>OFF</td>
</tr>
</tbody>
</table>

#### Special Circuits

- **E** 2, 3: 5 & 6
- **G** 2, 3, 5 & 6: 2 & 3
- **M** 2, 3, 5 & 6: OFF

### 3 POLES

- **1** Single pole using terminals 1, 2 & 3
- **2** Double pole using terminals 1, 2, 3, 4, 5 & 6

### 4 RATING

E 16A, 12/24V

### 5 TERMINATION

- **1** .250 (6.4mm) TAB (QC)
- **4** Screw with Cage Clamps
- **B** 5 .250 (6.4mm) TAB (QC). Jumper T2 to T5. No terminal at T5
- **E** 5 Screw with Cage Clamps. Jumper T2 to T5. No terminal at T5

### 6 TOGGLE STYLE

- **Without Panel Seal**
  - Toggle Length: .561
  - Bushing Length: .385
- **With Panel Seal (Bulk)**
  - Toggle Length: .561
  - Bushing Length: .385

### Notes:

1. Standard hardware is (1) inner tooth lock washer and (1) hex nut bulk.
2. Available only with 2 pole option in selection box # 3.
3. External customer supplied jumper required between terminals 2 & 4 to get SP ON-ON-ON circuit.
4. Available with termination B and E only.
5. Available with special circuit G and M only.
Dimensional Specifications:  in. [mm]

TERMINALS

SCREW (AND CAGE) TERMINAL
- 46-32 UNC-2A
- 0.146 [3.71]
- 0.078 [1.98]

.250 TAB (O.C.) TERMINAL
- 0.439 [11.15]
- 0.250 [6.35]

PANEL CUTOUTS

MOUNTING HOLE
- 0.500 [12.70]
- 0.062 [1.57]

WITH KEYWAY
- 0.500 [12.70]
- 0.062 [1.57]

WITH FLAT
- 0.500 [12.70]
- 0.469 [11.91]

WITH KEYWAY, FLAT
- 0.500 [12.70]
- 0.469 [11.91]
S-Series ROCKER SWITCHES

S-Series rocker switches are designed for use in the enclosed cabs of today’s trucks, with special focus afforded to the vehicle operator. With features including abbreviated travel ½ throw actuation, ergonomic rockers, illumination in up to three detent switch positions, and a non-teasable snap action circuit, these switches provide the driver with easily recognizable and simple to operate controls. Designers will appreciate the 10A, 28VDC rating, space saving compact envelope, clean bezel-less design, integrated low insertion force connector and polarized switch base for quick installation. Most any illumination and switch circuitry is easily accommodated with the S-Series 10 terminal base.

Product Highlights:
- Abbreviated travel ½ throw actuation
- Ergonomic rockers
- Recognizable and simple to operate controls
- Compact Design
S-Series Rocker Switches - General Specifications

**Electrical**

- **Contact Rating**: 10A @ 28VDC
- **Dielectric Strength**: 1500 Volts RMS between pole to pole
- **Insulation Resistance**: 50 Megaohms
- **Contact Resistance**: 10 milliohms max. @ 4VDC
- **Contact Bounce Life**: <20 milliseconds, 100,000 cycles maintained, 50,000 cycles momentary circuit at rated voltage and current gold plated
- **Circuitry**: SP, DP 2 & 3 position, 1/2 or full throw
- **Terminals**: .110 Tabs, Silver Plated Brass

**Environmental**

- **Operating Temperature**: -40°C to +85°C
- **Vibration**: Per IEC 68-2.6 test Fc and 68-2.47 Test Criteria - no noise or contact chatter below 10ms.
- **Cold Test**: Per IEC 68-2-1 -40°C for 72 hours Test Criteria - pre & post test contact resistance.
- **Dry Heat Test Criteria**: Per IEC 68-2-2 + 85°C for 72 hours Test Criteria - no loss of circuit during test, pre & post test contact resistance.
- **Handling Shock**: Drop from height of 1 meter, 3 times,
- **Thermal Shock**: Per IEC 68-2-14, -40°C to +85°C. Test criteria - pre & post test contact resistance.

**Mechanical**

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

**Physical**

- **Lighted LED**: rated 100,000 hours 1/2 life (LED is internally ballasted for voltages to 24VDC.)
- **Bracket**: Acetal
- **Base**: Nylon 66 GF
- **Rocker**: Polycarbonate
- **Weight**: 25 gms max.

**Mounting Specifications**

- **Connector**: Amp/Tyco MCP 2.8 receptacle housing P/N 1418994-1 mates with Amp/Tyco MCP 2.8 flat type receptacle. Based on wire size, choose P/N below:
  - 1-968880-1: 20-24 awg wire
  - 1-968849-1: 17-20 awg wire
  - 1-968851-1: 13.5-17 awg wire

- **Snap in Mount**: 40mm x 20mm keyed hole (see dimensional specifications for details.)

**Actuator Travel (Angular Displacement)**

- 2 position (1/2 throw): 12°
- 3 position (full throw): 12° from center

*Manufacturer reserves the right to change product specifications without prior notice.*
## S-Series Rocker Switches - Ordering Scheme

### 1 SERIES

**S**

### 2 CIRCUIT

Terminal Connections as viewed from bottom of switch:

- **SP** - single pole uses terminals 1, 3, 5 & 7.
- **DP** - double pole uses terminals 1, 3, 5, 6 & 8.

<table>
<thead>
<tr>
<th>Position</th>
<th>Terminal Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>1 - 2 (momentary)</td>
</tr>
<tr>
<td>3, 5 &amp; 7</td>
<td></td>
</tr>
<tr>
<td>3, 4</td>
<td></td>
</tr>
<tr>
<td>5 - 6</td>
<td></td>
</tr>
<tr>
<td>7 - 8</td>
<td></td>
</tr>
</tbody>
</table>

### 3 RATING

- **A**
  - 1: 0.4VA 28VDC Resistive
  - 2: 10.5mA 1.5A 28VDC,
  - 3: 5A 28V 50A Inrush Lamp Load

- **B**
  - 1: 3.5A 28VDC, 18A Inrush

- **C**
  - 1: 10mA 10A 28VDC
  - 2: 20mA 10A 14VDC

- **D**
  - 1: 20mA 10A 14VDC

### 4 ILLUMINATION

<table>
<thead>
<tr>
<th>Lamps</th>
<th>Illumination Type</th>
<th>Lamp wired to Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>INDEPENDENT</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>C</td>
<td>INDEPENDENT</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>2</td>
<td>INDEPENDENT</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>D</td>
<td>INDEPENDENT</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>1 &amp; 3</td>
<td>INDEPENDENT</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>E</td>
<td>SNAP</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>F</td>
<td>SNAP</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>G</td>
<td>DEPENDENT</td>
<td>(+) 10 (-)</td>
</tr>
<tr>
<td>H</td>
<td>DEPENDENT</td>
<td>(+) 10 (-)</td>
</tr>
<tr>
<td>1 &amp; 2</td>
<td>DEPENDENT</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>2 &amp; 3</td>
<td>DEPENDENT</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>J</td>
<td>INDEPENDENT</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>K</td>
<td>INDEPENDENT</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>1 &amp; 2</td>
<td>INDEPENDENT</td>
<td>(+) 2 (-)</td>
</tr>
<tr>
<td>1 &amp; 3</td>
<td>3.3K RESISTOR IN</td>
<td></td>
</tr>
</tbody>
</table>

### 5, 6, 7 LAMP (SAME CODING FOR ALL 3 SELECTIONS)

- **Selection 5:** specifies lamp 1 located above terminals 1 (+) & 2 (-).
- **Selection 6:** specifies lamp 2 located in center of rocker.
- **Selection 7:** specifies lamp 3 located above terminals 9 (+) & 10 (-).

### 8 BRACKET COLOR

- **1:** Black
- **4:** Dark Carbon

### 9 ACTUATOR

- **Standard Rocker, Laser Etched**
  - Black
  - Titan Gray
  - Dark Carbon

### 10, 11, 12 LEGEND COLOR

- **Z:** No Legend
- **1:** Clear

### 13 LEGEND

- **1:** 5
- **00:** No Legend

### 14 LEGEND ORIENTATION

- **0:** No legend
- **1:** Orientation 1
- **2:** Orientation 2
- **3:** Orientation 3
- **4:** Orientation 4

### 15, 16 LEGEND

- **2, 3:** 6
- **00:** No legend

**Notes:**

1. Indicates 1/2 travel for actuator.
2. Snap Action Contact Mechanism
3. Not available with circuit 98.
4. Available with circuit 98 only.
5. Located over T1-2.
6. Legend 2 located in center of rocker. Legend 3 located over T9-10. Legend 2 options are limited due to a very small marking area. Consult factory for specifics.
Dimensional Specifications: in. [mm]

- Swing Radius: 1.529 [38.84]
- Panel key: .048 [1.22]
- Panel opening clearance: ±5°
- Scale: 2.000
- Panel thickness: 2.5±0.1mm
- Panel opening clearance: ±5°
- Scale: 2.000

Mates with TYCO/AMP MCP connector 141899-1

ROH

www.carlingtech.com
The N-Series Addressable Switch combines the look and feel of a traditional electro-mechanical control coupled with a built in PCB and provides a flexible, cost effective alternative to a CAN/LIN based switch. The N-Series produces up to 144 individual switch IDs by using a resistive ladder circuit. Different switch IDs are achieved by changing the resistor values tied to individual loads, which can then be assigned to the specific functions that the switch is controlling. Each switch is connected to an ECU and the application software is written to recognize the switch IDs to determine which load is being controlled as well as the selected actuator position. As a result, the wiring harnesses are more simplified and specific loads can now be rearranged without the need for a costly and time consuming harness redesign, giving designers the ultimate in design flexibility.

**Product Highlights:**
- Cost effective alternative to CAN/LIN based switch
- Up to 144 individual switch IDs
- Simplified wiring harnesses
- Readressable loads without harness redesign
- Available with paddle or rocker actuator

**Resources:**
- Download 3D CAD Files
  - IGS
  - STP
N-Series Addressable Rocker Switches - General Specifications

**Electrical**
- Contact Rating: .4VA @ 28VDC (MAX)
- Dielectric Strength: 1250 Volts RMS between pole to pole; 3750 Volts RMS between live parts and accessible surfaces
- Insulation Resistance: 50 Megohms
- Contact Bounce: 20 milliseconds max.
- Contacts: gold plated
- Terminals: Brass or copper/silver plate 3/16" (4.76mm)
  - Quick Connect terminations standard.

**Environmental**
- Environmental: IP67 for above the 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.
- Operating Temperature: -40°C to +85°C
- Vibration: Per SAE J1399 “electronic Tachometer Specification” for Class II truck and bus applications.
  - Test Criteria: No change in resistance and no evidence of physical damage.
- Salt Spray: Exposure to 95% water, 5% NCI fog solution at 95 degrees F according to ASTM B 117-90 “Standard Method of Salt Spray (fog) Testing”.
  - Test Criteria: No visual evidence of corrosion or external physical damage.
- Humidity: Samples were exposed to selected temperature profile, while maintaining 90% +- 5% relative humidity for 30 cycles.
  - Test Criteria: No evidence of external physical deterioration.

**Endurance**
- 250,000 cycles minimum

**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 24VDC)
- Seals: Rocker, base & bracket are sealed.
- Base: Nylon 66 GF rated to 85°C with a flammability rating of 94V0.
- Rocker and Paddle: Nylon 66 Reinforced, rated to 105°C
- Laser Etched Rocker Lens: Polycarbonate rated at 100°C.
- Connector: Nylon 66 rated at 85°C. Polarized.
- Bracket: Nylon Zytel

**Actuator Travel (Angular Displacement)**
- 2 position: 26°
- 3 position: 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.*
# N-Series Addressable Rocker Switches - Ordering Scheme

## 1 SERIES

**N**

## 2 CIRCUIT

Terminal Orientation

<table>
<thead>
<tr>
<th>Position:</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>STANDARD</td>
<td>2 &amp; 4</td>
<td>Connected Terminals</td>
<td>1 &amp; 2</td>
</tr>
<tr>
<td>4</td>
<td>ON</td>
<td>NONE</td>
<td>ON</td>
</tr>
<tr>
<td>5</td>
<td>ON</td>
<td>NONE</td>
<td>ON</td>
</tr>
<tr>
<td>7</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>8</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

## 3 R1 RESISTIVE IDENTIFICATION

| 1 | 1020 | 7 | 3570 |
| 2 | 1300 | 8 | 4320 |
| 3 | 1620 | A | 5230 |
| 4 | 2000 | B | 6340 |
| 5 | 2430 | C | 7870 |
| 6 | 2940 | D | 10000 |

## 4 R2 RESISTIVE IDENTIFICATION

| 1 | 1020 | 7 | 3570 |
| 2 | 1300 | 8 | 4320 |
| 3 | 1620 | A | 5230 |
| 4 | 2000 | B | 6340 |
| 5 | 2430 | C | 7870 |
| 6 | 2940 | D | 10000 |

## 5 RESISTOR CONSTANTS (INDICATES SWITCH STATE)

<table>
<thead>
<tr>
<th>R3</th>
<th>R4</th>
<th>R5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1300</td>
<td>10000</td>
</tr>
<tr>
<td>2</td>
<td>825</td>
<td>6650</td>
</tr>
</tbody>
</table>

## 6 ILLUMINATION

Lamp #1: above terminals 10 & 9; Lamp #2: above terminals 12 & 11

<table>
<thead>
<tr>
<th><strong>S</strong></th>
<th><strong>A</strong></th>
<th><strong>B</strong></th>
<th><strong>C</strong></th>
<th><strong>R</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1</td>
<td>#2</td>
<td>Standard</td>
<td>11+</td>
</tr>
<tr>
<td>#1 &amp; 2</td>
<td>Special Parallel</td>
<td>9-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1 &amp; 2</td>
<td>Special Parallel</td>
<td>10+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1</td>
<td>Independent</td>
<td>10+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td>Independent</td>
<td>12+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1</td>
<td>Independent</td>
<td>10+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td>Independent</td>
<td>12+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1</td>
<td>Independent</td>
<td>12+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 7.8 LAMP (SAME CODING FOR BOTH SELECTIONS)

Selection 7: above terminals 10 & 9; Selection 8: above terminals 12 & 11

- No lamp
- LED*
- Red
- Amber
- Green

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

## 9 BRACKET COLOR

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>White</td>
<td>Gray</td>
<td>Red</td>
</tr>
</tbody>
</table>

## 10 ACTUATOR STYLE AND COLOR

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>White</td>
<td>Gray</td>
<td>Red</td>
</tr>
</tbody>
</table>

## 11 & 12 LENS STYLE AND COLOR

Lens color for LEDs must be clear, white, or match color of LED.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Actuator</td>
<td>Z</td>
<td>No Lens</td>
<td>Clear</td>
<td>White</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Black</td>
<td>White</td>
<td>Green</td>
<td>Red</td>
<td>Blue</td>
</tr>
<tr>
<td>Laser Etched</td>
<td>Laser Etch background color</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 13 LEGEND ORIENTATION

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No legend this location / no actuator</td>
<td>Orientation 1 - vertical, lamp 1 on top</td>
<td>Orientation 2 - horizontal, lamp 1 on right</td>
<td>Orientation 3 - vertical, lamp 1 on bottom</td>
<td>Orientation 4 - vertical, lamp 1 on left</td>
</tr>
</tbody>
</table>

## 14 LEGEND ORIENTATION

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No legend (used with codes 11-18 in selection 12)</td>
<td>Orientation 1 - vertical, lamp 1 on top</td>
<td>Orientation 2 - horizontal, lamp 1 on right</td>
<td>Orientation 3 - vertical, lamp 1 on bottom</td>
<td>Orientation 4 - vertical, lamp 1 on left</td>
</tr>
</tbody>
</table>

## 15 ACTUATOR LENS LEGEND

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>
| No legend this location / no actuator | For legend options & codes, see pages 54-65 of this catalog.

Notes:
1. Custom colors are available. Consult factory.
2. Switch supplied with .187 tab terminals.
Dimensional Specifications: in. [mm]

N-SERIES
SHOWN WITH LASER ETCHED ACTUATOR

N-SERIES
SHOWN WITH ROCKER GUARD

N-SERIES
SHOWN WITH LARGE LENS AND PADDLE ACTUATOR

N-SERIES
SHOWN WITH BARS LENS AND CONNECTOR

N-SERIES
LC2-01 BLACK .187 TAB CONNECTOR (PACKARD 480 SERIES)

N-SERIES
LH1 REMOVABLE HOLE PLUG WITH NON-SERRATED WINGS
LH2 HOLE PLUG WITH SERRATED WINGS

Dimensions listed in inches and millimeters.
The LD-Series represents a dynamic breakthrough in dashboard technology, with its programmable circuitry, superior design, and unparalleled performance that affords seamless integration into most any dash panel. A variety of options, along with superior performance, functionality, and aesthetics assure compliance with the most stringent customer requirements. Key features include: robust design package with all components encased in switch housing, eliminating wire chafing and providing cost-savings as well with minimized electrical connections; IP67 sealing which prevents PCB degradation and eliminates short circuit potential. Superior heat dissipation is achieved with a heat sink mass which is over 50% larger than competitive products. Fully programmable circuitry lets the designer decide illumination levels and detent positions. EMC eliminates electrical “noise” and provides interference-free radio signals. Ease of assembly is accommodated with polarized integral connectors and an industry standard mounting hole.

Product Highlights:
- 3 Choices for incremental dimming rates
- 12 or 24 Volts
- Laser Etched or Lens Illumination
- IP67 Sealing
LD-Series Electronic Dimmer Control - General Specifications

*Manufacturer reserves the right to change product specification without prior notice.

**Environmental**

- Operating Temperature: -40°C to +85°C
- Vibration: Resonance Search Individual resonance searches were conducted with vibration applied along each of the three mutually perpendicular axes. 24-50 Hz 0.40DA 50-2000 Hz ± 10 G’s peak
- Random Vibration The random vibration endurance test conditions were sequentially conducted in each of the three mutually perpendicular axes, 1hr/axis

**Mechanical**

- Endurance: 100,000 cycles minimum

**Physical**

- Function: Incremental for continuous dimming
- Operation: Momentary
- Lighted: LED’s internally dimmed
- Base: PBT Polyester V-0 flammability
- Rocker: Polycarbonate or Nylon 6/6 Glass filled
- Bracket: PBT Polyester V-0 flammability
- Connector: Nylon 6/6 toughened
- Actuation Force: 300 gm ± 50 gm
- Weight: 52 grams

**Mounting Specifications**

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

- TEST CUT HOLE IN ACTUAL MATERIAL

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

- Mounting Hole

  - Diameter: .867 [22.02 mm]
  - Depth: 1.734 [44.04 mm]

**Contact Rating**

- 9-16VDC, 2-10Amp.
- 6.3mm (0.250” TAB)
- solid-state load switching

**Terminals**

- SAE J 1113 and SAE J 1455 Conducted Transient Emissions
- RF Conducted Emissions
- Conducted Susceptibility:
  - Test pulse #1
  - Test pulse #2
  - Test pulse #3a, #3b
  - Load Dump: Test Pulse #5
  - Power lead Disturbance (Power Dips)
  - AF Conducted Immunity
  - Direct RF Injection (DRFI)
  - Abnormal Vehicle Operating Conditions
  - RF Radiated Emissions
  - Radiated Immunity-Absorber Lined Chamber
  - Electrostatic Discharge: Shipping / handling Electrostatic Discharge: Human Static Discharge

**Dielectric Strength**

- 1000V @ 60 Hz was applied for each unit for 1 minute

**Reverse Polarity**

- 24VDC for 5 minutes

**EMI/EMC**

- Conduction Transient Emissions
- RF Conducted Emissions
- Conducted Susceptibility:
  - Test pulse #1
  - Test pulse #2
  - Test pulse #3a, #3b
  - Load Dump: Test Pulse #5
  - Power lead Disturbance (Power Dips)
  - AF Conducted Immunity
  - Direct RF Injection (DRFI)
  - Abnormal Vehicle Operating Conditions
  - RF Radiated Emissions
  - Radiated Immunity-Absorber Lined Chamber
  - Electrostatic Discharge: Shipping / handling Electrostatic Discharge: Human Static Discharge

**Dielectric Strength**

- 1000V @ 60 Hz was applied for each unit for 1 minute

**Reverse Polarity**

- 24VDC for 5 minutes
### LD-Series Electronic Dimmer Control - Ordering Scheme, Dimensional Specifications

#### 1 SERIES
LD Electronic Dimmer Control

#### 2 RATING
1. 4A, 12 volts
2. 10A, 12 volts

#### 3 DIMMING RATE
1. 30 - 100% 8 positions
2. 10 - 100% 10 positions

#### 4 TERMINATION
1. .230 TABS (5.84 mm)

#### 5 & 6 ILLUMINATION
- No lamp
- 12V LED
- 24V LED

- Red
- Amber
- Green

#### 7 BRACKET COLOR
1. Black
2. White
3. Gray

#### 8 ACTUATOR STYLE / COLOR
- Laser Etched
- Black
- White
- Gray
- Red

- Rocker: 3 A B C D
- Paddle: 4 J K M N

#### 9 & 10 LENS COLOR
- Z: No Lens
- Clear
- White
- Amber
- Green
- Red
- Blue

- Lens Style:
  1. Large Transparent
  2. Large Translucent
  3. Bar Transparent
  4. Laser Etch

#### 11 LEGEND #1
1. No legend
2. FC Dim
3. FE Bright

For legend options, visit us at carlingtech.com

#### 12 LEGEND ORIENTATION
- Vertical (lamp 1 on top)
- Horizontal (lamp 1 on right)
- Vertical (lamp 1 on bottom)

#### 13 LEGEND #2
1. No legend
2. FC Dim
3. FE Bright

For legend options, visit us at carlingtech.com

Notes:
- 1 Custom colors are available. Consult factory.

---

### Diagrams

- Mounting hole dimensions
- Actuator styles and dimensions
- Panel thickness range
- Q.C. Selection Guide

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www.carlingtech.com
MIRROR ROTATE CONTROLS

As an extension of the L-Series family of control products, the LMR-Series provides the means to control one or two mirrors and up to four separate motors from one easy to operate joy stick control. When used in conjunction with our dimmer control and wiper/washer control, Carling Technologies provides a solution to most any dashboard control need within the Transportation market.

Product Highlights:
- Two or four axis
- Controls up to four separate motors
- Industry standard 44 x 22mm mounting hole
- Includes Delphi-Packard 8 pin connector
**Actuator**
4 axis joy stick style

**Electrical**
1A 14V; .5A 28V

**Sealing**
internal boot and potted wire leads protect critical components from dust and moisture

---

**Termination**
9" wire leads with Delphi-Packard connector #12047886

**Mechanism**
Sliding contacts in conjunction with a circuit board

---

**LMR - 01 - 1**

<table>
<thead>
<tr>
<th>1 Base Part Number</th>
<th>2 Color</th>
<th>3 Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMR</td>
<td>01</td>
<td>Black</td>
</tr>
</tbody>
</table>

**1 BASE PART NUMBER: SERIES / RATING / FUNCTION / TERMINATION**
LMR 2 position (left, right), 4 axis (N,S,E,W) with wire leads

**2 ACTUATOR / BRACKET COLOR**
01 Black

**3 LEGEND 2**
- Z: no legend
- 1: 2 arrows symbol (left, right)
- 2: 4 arrows symbol (front, back and left, right)

**Notes:**
1 Compatible with Delphi-Packard #12045688.
2 All legends are imprinted in white. All product supplied with Mirror L & R legend on top of bracket and detent and directional legend on actuator.
3 Delphi-Packard is a registered trademark of Delphi-Packard Electrical Systems, Warren, Ohio.

---

**Schematic**

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*Manufacturer reserves the right to change product specifications without prior notice.*
LW-Series

WIPER/WASHER CONTROLS

The LW-Series Electronic Wiper Washer Control combines two switches into one self-contained unit allowing effortless control of both wash and wipe functions from a singular location. A variety of features and options including, Continuous low and high speed wiper positions, Six intermittent delay intervals ranging from 3-18 seconds, Push-to-wash button and an LED Night-light indicator combine to provide the flexibility to meet most any Cab design. The LW series is available for 14 or 28 volt operation and can be adapted to single or dual relay systems.

Product Highlights:
- Controls both wash and wipe functions of vehicles
- 14 or 28 Volts
- Illuminated or Non-illuminated options
- Laser etched legends available
LW-Series Wiper/Washer Control - General Specifications

Physical Characteristics

Illumination  
LED, rated 100,000 hours 1/2 life

Cover  
Acetate

Washer Actuator  
Silicone

Toggle Actuator  
Nylon 6/6 glass filled

Bracket  
Nylon 6/6

Connector  
Nylon 6/6 rated 85°C polarized

Washer Function  
Momentary

Toggle Function  
Maintained Intermittent

Operation  
Momentary

Weight  
44 grams

Environmental

Operating Temperature  
-25°C to +85°C

Temperature Cycle  
According to SAE J1455, Sec. 4.1.3.1 (See Figure below)

Thermal Shock  
According to SAE J1455, Sec. 4.1.3.2 (See Figure below)

Humidity  
According to SAE J1455, Sec. 4.2.3 (30 cycles for 8 hrs. with maximum temperature of 85°C and 95% relative humidity.

Dust Bombardment  
According to SAE J1455, Sec. 4.7.3 (with dust concentration of 0.88gm/m³ for 24 hours.)

Salt Spray  

Electrical

Contact Rating  
1 relay
8 amps, 14VDC
4 amps, 28VDC
2 relays
1 amp, 14VDC
1 amp, 28VDC

Terminals  
.187 (7.4mm) Quick Connect terminations standard.

Protection  
Reverse polarity protection
Over voltage protection
Cold cranking protection according to SAE J1455, Sections. 4.11.1.1 and 4.11.1.2.1
Transient voltage protection which includes load dump and inductive switching according to SAE J1455, sec. 4.11.2.2
Electrostatic discharge protection according to SAE J1455 Sec. 4.11.2.2.5.1 (Discharge a 150 pf capacitor that has been charged to a potential of 15kV through 150 Ohm resistor.)
Meets all other EMI/EMC requirements for class C trucks.

Mechanical

Mechanical Vibration  
Sinusoidal Vibration: 10-55-10 Hz, 0.06" DA, one minute-cycle, three hours/axis
Random Vibration: Three hours/axis, three mutually perpendicular axes with a test level 4G’s.

Frequency  
5Hz  
0.16 G²/Hz

Amplitude  
100Hz  
0.16 G²/Hz

500Hz  
-3dB/octave roll-off

Tests were conducted according to SAE J1455, Sec 5.7 and Sec. 4.9.4


Endurance  
According to SAE J2349, March 97 for windshield washer switch for Trucks, Buses and Multipurpose Vehicles (20,000 cycle minimum).

*Manufacturer reserves the right to change product specification without prior notice.*
# LW-Series Wiper/Washer Control - Ordering Scheme, Dimensional Specifications

**LW** 1 A 1 1 Z - 1 1 AG 1 00

## 1 SERIES
- LW: Wiper/Washer Control with six intermittent positions: low, high, wash/wipe

## 2 RATING
1. 1A, 14VDC (1 relay)
2. 4A, 28VDC (1 relay)
3. 1A, 14VDC (1 relay)
4. 1A, 14VDC (1 relay)
5. 1A, 14VDC (2 relay)
6. 1A, 28VDC (2 relay)

## 3 INTERMITTENT TIMING
- A: 2-15 seconds

## 4 WIPER/WASHER TIMING
- 1: 3 seconds

## 5 LAMP #1 (ABOVE WASH)
- Z: No Lamp
- 1: Green LED
- 2: Red LED
- 3: Amber LED

## 6 LAMP #2 (ABOVE WIPE)
- Z: No Lamp
- 1: Green LED
- 2: Red LED
- 3: Amber LED

## 7 BRACKET COLOR
- 1: Black

## 8 ROCKER / PADDLE COLOR
- 1: Black

## 9 LEGEND #1
- 00: No legend
  - For legend options, visit us at carlingtech.com

## 10 LEGEND ORIENTATION
- 0: No legend
  - Vertical (lamp 1 on top)
  - Horizontal (lamp 1 on right)

## 11 LEGEND #2
- 00: No legend
  - For legend options, visit us at carlingtech.com

### Notes:
1. Relay coil current is 1A max. Relay must have an arc suppression in parallel with the coil. Ref P/N LC2-01 for black wiper/washer connector housing.

---

**Principles of operation:**
From the OFF position, moving the toggle one step up puts the function into the intermittent slower mode (18 sec.). Moving the toggle another step up reduces the delay time by 3 sec for each of the next six steps. The seventh step up puts the motor into a continuous low-speed mode and the last step up puts the motor into the high-speed mode. Reversing the previous steps puts the motor finally into the stop/parking mode. During the OFF position, intermittent and low-speed modes, pressing the wash button activates the wash function. Wipe function starts after a two second delay from the onset of the washing and continues for three continuous wipes after the wash button is released. For convenience, the wash function is not active during the high-speed mode.

The Wiper Control is designed to interface with single or dual relay systems for intermittent delay and the park function. The high speed is driven directly via a power transistor internal to the module. The coil of the relay is pulled down to ground during the intermittent, low-speed and high-speed modes respectively. (Contact Carling Technologies for wiring diagrams)
Carling Technologies BD-Series battery disconnect switch is designed to minimize battery drain, ensure maintenance personnel safety, and when used in conjunction with a padlock, provide vehicle theft protection.

**Product Highlights:**
- 100-250 Amps
- 12VDC/24VDC
- IP67 Sealing Protection
- Lock Compatible

**Resources:**
- Download 3D CAD Files
  - IGS  
  - STP
- Watch Product Video
BD-Series

DESIGN FEATURES

- STUD
- SHAFT SEALS
- SLIDING CONTACT
- BODY SEAL
- ROTARY KNOB
- LOCK COMPATIBLE
**BD-Series Battery Power Switch - General Specifications**

### Electrical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Voltage</td>
<td>DC</td>
</tr>
<tr>
<td>Rated voltage:</td>
<td>12VDC / 24VDC</td>
</tr>
<tr>
<td>Range of operating voltage:</td>
<td>12VDC: min 9VDC, max 16VDC; 24VDC: min 18VDC, max 32VDC</td>
</tr>
<tr>
<td>Current Ratings</td>
<td>12VDC/24VDC: rated 100A, max 250A</td>
</tr>
<tr>
<td>Intermittent Current</td>
<td>24VDC/1500A, 3 seconds on, 60 seconds off, 10 cycles: voltage drop should not exceed 400mV between main terminals. 28V/1500A/30 seconds: voltage drop should not exceed 400mV 28V/2000A/5 seconds followed by 28V/750A/30 seconds followed by 28V/250A/24 hours: voltage drop should not exceed 100mV</td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>50HZ, 550VAC for 1 minute between electrically / isolated terminals in main circuit; between terminals of main circuit, knob and enclosure.</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>Minimum of 100 Megohms 1 min @ 500VDC</td>
</tr>
<tr>
<td>Temperature Rise</td>
<td>Terminal should not exceed 60°C above ambient.</td>
</tr>
<tr>
<td>Endurance</td>
<td>2 seconds ON and 2 seconds OFF per operation, load with rated current &amp; voltage. 12V test @14V±0.1V, 24V test @28V±0.2V. 50,000 cycles: 100A current; 20,000 cycles: 200A current; 3,000 cycles: 250A current.</td>
</tr>
<tr>
<td>Number of Poles</td>
<td>1 pole</td>
</tr>
<tr>
<td>Wiring Terminals</td>
<td>Line/Load terminal: M10 brass nuts</td>
</tr>
<tr>
<td>Torque value</td>
<td>(6-8 Nm.)</td>
</tr>
<tr>
<td>Mounting</td>
<td>M8 Iron nut, torque value: (10-15 Nm.)</td>
</tr>
<tr>
<td>Torque Operation</td>
<td>1.0-3.0 Nm.</td>
</tr>
<tr>
<td>Body Color</td>
<td>Black</td>
</tr>
<tr>
<td>Actuator Color</td>
<td>Red handle, with white color “Arrow” legends.</td>
</tr>
<tr>
<td>Weight</td>
<td>340g</td>
</tr>
<tr>
<td>Material</td>
<td>Base (PBT glass filled), Bracket &amp; Knob (nylon glass filled), Studs (Copper + Tin plating), Nuts (Brass)</td>
</tr>
</tbody>
</table>

### Mechanical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handling Shock</td>
<td>Fully functional after 3 drops from 1000 mm height. Surface damage may occur.</td>
</tr>
<tr>
<td>Endurance</td>
<td>More than 100,000 cycles without load</td>
</tr>
</tbody>
</table>

### Environmental

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temp.</td>
<td>-40 ºC to +85 ºC.</td>
</tr>
<tr>
<td>Moisture Resistance</td>
<td>IEC 60068-2-38 or G/T 2423.34, Test Z/AD: Composite temperature/humidity cycle test, ten 24-hour cycles @ -10°C to +65°C, ≤80-96% RH.</td>
</tr>
<tr>
<td>Thermal Cycling</td>
<td>IEC 60068-2-14 or GB/T 2423.22, Test Nb, 25 Cycles -40°C to +85°C</td>
</tr>
<tr>
<td>Thermal Shock</td>
<td>IEC 60068-2-14 or GB/T 2423.22, Test Na (Five cycles @ -55°C to +25°C to +85°C to +25°C)</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>IEC 60068-2-1 or GB/T 2423.1 Cold: Test A, operate 8 hours @ -40°C IEC 60068-2-2 or GB/T 2423.2 Heat: Test B, operate 8 hours @ +85°C</td>
</tr>
<tr>
<td>Vibration</td>
<td>IEC 60068-2-34 or GB/ T2423.11,10~500Hz, Random vibration test for 8 hours in each of the 3 mutually perpendicular axes. 25Gs @ Z axes, 12.5Gs @ X/Y axes. powered.</td>
</tr>
<tr>
<td>Salt Spray</td>
<td>IEC 60068-2-11 or GB/T 2423.17, 48 hrs.</td>
</tr>
<tr>
<td>Fire and Smoke</td>
<td>IEC 60695-11-10 or GB/T 2408, HB</td>
</tr>
<tr>
<td>Dust / Waterproof</td>
<td>IEC 60529 or GB4208, IP 67</td>
</tr>
<tr>
<td>Chemical Splash</td>
<td>Gasoline, Diesel, Motor Oil, Brake Fluid, Ammonia, Armor All</td>
</tr>
<tr>
<td>UV Protection</td>
<td>ASTM G155-05a, cycle 11, 300 hr Xenon Arc, 1.4W/(m2·nm ), wavelength 420 nm.</td>
</tr>
</tbody>
</table>

*Manufacturer reserves the right to change product specification without prior notice.*
BD-Series Battery Power Switch - Ordering Scheme & Dimensional Specifications

**Dimensional Specifications: in. [mm]**

**1 SERIES**
- **BD** Battery Disconnect Power Switch

**2 RATING / OPERATION CYCLE**
- **A**
  - 100A @ 24VDC: 50,000 Operation
  - 200A @ 24VDC: 20,000 Operation
  - 250A @ 24VDC: 3,000 Operation

Note: Refer to General Specifications for test parameters.

**3 TERMINATION**
- **10** M10 Stud

**4 KNOB COLOR**
- **R** Red

**5 LEGEND**
- **A** Arrow Legend, White Color

*ON/OFF* SINGLE POLE SINGLE THROW SWITCH CIRCUIT DIAGRAM
Mounting Method 1: in. [mm]

Mounting Step 1: Attach mounting gasket with the switch orientation as shown.

Mounting Step 2: Orient as shown and install the switch in mounting panel hole, then insert studs and washers.

Mounting Step 3: Tighten 2 pcs M6 nuts (RED: TORQUE 10-15Nm)

Notes:
1. Switch can be mounted horizontally or vertically.
Mounting Method 2: in. [mm]

Mounting Step 1: Install switch with mounting bracket orientation as shown.

Mounting Step 2: Orient as shown and install the switch in customer panel.

L Shape Mounting Bracket

Z Shape Mounting Bracket

Notes:
1 Switch can be mounted horizontally or vertically.
Wiring: in. [mm]

Wiring 1: Disconnect washers and nuts.

Wiring 2: Attach 2 pcs M10 "O" ring terminals as shown, then re-fasten washers and nuts.

Wiring 3: Tighten 2 pcs brass M10 nuts (incl. torque 2-4 Nm).

When used in conjunction with a padlock, switch can be locked in the "off" position as a safety measure.
Compliant with SAE J1939 CAN standards, the CKP-Series is a customizable keypad featuring laser etched legends and up to three dimmable LED function lights per button, which also offer diagnostic feedback by blinking if there is a fault.

Sealed to an IP69 protection level, the CKP-Series can be installed inside or outside the cab making it ideal for any on/off-highway application. Its low profile design affords a seamless dashboard look and can be mounted either vertically or horizontally.

The CKP-Series offers significant advantages over traditional electromechanical switches such as 1,000,000 actuation cycles, reduced wire harnessing, and easy installation.

**Product Highlights:**
- SAE J1939 CAN 2.0b Protocol
- IP69 Front Panel Sealing Protection
- Up to 3 LED Function Lights Per Button
- Diagnostic Feedback
- Standard or Custom Laser Etched Legends
- 1,000,000+ Button Actuation Cycles
- Low Current Switching
- 8 to 32V Operating Voltage
- Tactile and Audible Feedback

**Typical Applications:**
- Military
- On/Off-Highway
  - Trucks & Buses
  - Construction
  - Mining
  - Agriculture
  - Among Others

**Resources:**
- Download 3D CAD Files
- IGS ➤ STP ➤
- Watch Product Video
**CKP-Series DESIGN FEATURES**

**LOW PROFILE DESIGN**
0.57 inch [14.48 mm] thickness (see dimensional specifications for more detail)

**CONNECTOR**
Mates to the Deutsch DT-Series Connector

**LED FUNCTION LIGHTS**
One, two, or three LED Function Lights per button. Colors include Amber, Green, Red or Blue.

**SEALING PROTECTION**
- Fully sealed IP69 front panel
- Fully sealed IP68 back panel when connected

**CUSTOMIZABLE ICONS**
Choose from our standard library of icons or use custom icons.

**10-32 MOUNTING STUDS (2x)**
Max tightening torque 30 inch lbs.

*Front View*
### General

**Illumination**
- LED backlit icons and function lights
- Up to 3 function lights per button
- Dimmable illumination, controlled by CAN messages

**Connection / Wiring**
- Duetsch DT series connector
- (See Dimensional Specifications)

### Electrical

**Operating Voltage**
- Designed for 12/24 Volt systems
- Minimum 8 VDC
- Maximum 32VDC

**Sleep Mode**
- Low current sleep mode draws less than 1.5 mA throughout the supply voltage range wakes on keypress or CAN message

**Supply Voltage ratings**
- The keypad passes SAE J1455 section 4.13.1 for power up, operating voltage, over voltage, reverse polarity, and short circuit

**EMC**
- Transient immunity: ISO 11452-2, 100 V/m, 20 MHz to 2,000 MHz, Class A per ISO 11451-1
- Conducted Transient immunity: ISO 7637-2:2004, Annex A Table A2 (for 24V systems), Class A
- ESD immunity: ISO 10605:2001, Test level IV (8 kV direct discharge, 15 kV air discharge)

### Mechanical

**Overall Dimensions**
- See Dimensional Specifications

**Panel cutout**
- See Dimensional Specifications

**Endurance**
- Each button functions for at least 1,000,000 total actuations (100,000 actuations at -40°C, 100,000 actuations at +85°C, and 800,000 actuations at +25°C ± 10°C)

### Software

**CAN Protocol**
- CAN 2.0b type interface as defined by SAE J1939

### Environmental

**Thermal**
- -40°C to +85°C
- The following codes were passed:
  - Cold Soak (IEC 60068-2-1)
  - Heat Soak (IEC 60068-2-2)
  - Cycling/Shock (IEC 60068-2-14)
  - IEC 60068-2-5, procedure B, 10 cycles, Total irradiation per cycle = 22.4 kWh/m2

**Solar Radiation:**
- IEC 60068-2-13

**Low pressure**
- IEC 6068-2-13

**Humidity**
- Soak: IEC 60068-2-78, 93% RH (±3%), 10 days

**Cyclic**
- IEC 60068-2-30, test Db: Damp Heat Cyclic (12hr + 12hr cycle), variant 1, 6 cycles

**Ingress Protection**
- IP669k per ISO 20653 (front side)
- IP6k8 per ISO 20653 when connected (back side)

**Shock and Bump**
- IEC 60068-2-27, Shock 500 m/s² 11 milliseconds, Bump 400 m/s² 6 milliseconds 600 cycles
- IEC 60068-2-31, Free fall, Procedure 1, 1000 mm height, drop in all 3 axes in both directions

**Vibration**
- IEC 60068-2-6, Swept sine wave section 8.2, 5 - 500 Hz 20 cycles 5g acceleration
- IEC 60068-2-6, Vibration sinusoidal, section 8.1, 10 - 2000 Hz, 5g acceleration
- IEC 60068-2-64, Method 1, random excitation, 10 - 350 Hz, 5 hours in each axis

**Chemical Resistance**
- IEC 60068-2-74, Class B, Engine oil, Diesel, Hydraulic oil, Ethylene Glycol, Urea Notsrogen, Liquid Lime, NPK Fertiliser, Ammonia, Calcium Chloride, Brake fluid

**Corrosion Resistance**
- IEC 60068-2-52, Test Kb, Severity level 4

**Weathering/Cracking**
- ASTM D1171-99, method A, 72 hours

**Resistance:**
- 40 cycles of ASTM F2357 testing with 0.25” paper at 175 grams of force

### Software Interface Integration
Click below for details on integrating the CKP-Series into J1939 CAN network:

*Manufacturer reserves the right to change product specification without prior notice.*

www.carlingtech.com
Ordering Scheme: Part 1 (Keypad)

CKP 1 - 1 A 1 - A B - A - J 000 /

1 SERIES
CKP Carling Keypad

2 KEYPAD STYLING
1 Standard

3 BUTTON LAYOUT
1 Two by Six

4 ORIENTATION
A Landscape C Reverse Landscape
B Portrait D Reverse Portrait

5 KEYPAD COLOR
1 Black

6 BACKLIGHT
A White

7 FUNCTION LIGHT COLOR
B Amber C Green D Red E Blue

8 NON-ILLUMINATED IMAGE CODE
A White

9 NETWORK TYPE
J J1939

10 SOURCE ADDRESS
The Source Address is a unique number (000-248) assigned to each node on a CAN network, and is determined based on the specific CAN architecture of each customer application.

Ordering Scheme: Part 2 (Icon Artwork)

Button 1 8 NN 8 PU 5 PR 5 PP 4 RH 4 NU

FUNCTION LIGHT CODE (Select for positions 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33)

1 No Function Light
2 Open-Closed-Closed
3 Closed-Open-Closed
4 Closed-Closed-Open
5 Closed-Open-Open
6 Open-Closed-Open
7 Open-Open-Closed
8 Open-Open-Open

Additional function light colors available, please consult factory.

ICON CODE
00 For standard icons, see next page. For additional icons, please consult factory.

Continue to next page for layout and icons.
Orientation - Icon Artwork Button Number Layout
(see dimensional specifications for more detail)

A: Landscape

B: Reverse Landscape

C: Portrait

D: Reverse Portrait

Standard Icons Codes:

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<td>RX</td>
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</table>

Dimensional Specifications: in. [mm]

Panel Cutout +/- .020
Panel thickness to be .050 min and .300 max

10-32 studs (max tightening torque 30 in lbs.)
Connector to be mated to Deutsch DT series connector

Pin out as shown below

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<thead>
<tr>
<th>NO. DESIGNATION</th>
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Dimensional Specifications: in. [mm]

Orientation - Icon Artwork Button Number Layout

Landscape

Portrait

Reverse Landscape

Reverse Portrait
CMB-Series
THERMAL CIRCUIT PROTECTORS

The CMB-Series is a compact, single pole, push-to-reset family of thermal circuit breakers designed to protect equipment. Utilizing simple, precision design with few moving parts, these breakers offer cost effective, extremely reliable circuit protection with high resistance against shock and vibration.

Product Highlights:
- Ratings from 3-20A, 125, 250VAC, 32VDC
- 2500 VAC/1 minute
- 60°C Max Operating Temperature
- 2500A @ 32VDC Interrupting Capacity
- 100M ohms Insulation Resistance
- Voltage drop <0.25 V
- UL, cUL, CSA, TUV, CE
- UL1500/ISO8846 for ignition protection/marine

Dimensional Specifications: in. [mm]
CMB-Series - Ordering Scheme, Time Delay

**CMB - 10 3 - 11 C 3 N - B - A /10**

1 SERIES
CMB

2 RATING
03 10 amps
04 12 amps
05 14 amps
06 15 amps
07 16 amps
08 20 amps

3 VOLTAGE
125-250VAC/ 32 VDC

4 MOUNTING HOLE
11 M11
12 M12
13 Snap In Style
27 3/8” 27 UNS (double flatted)

6 MOUNTING NUT
N None
1 Type 1
3 Type 3
4 Type 4
5 Type 5
6 Type 6
7 Type 7
8 Type 8

8 BUTTON
B Black
R Red
W White

9 TERMINAL
A Type A
B Type B
C Type C
D Type D
E Type E
F Type F
G Type G
H Type H
J Type J
R Type R

10 BUTTON MARKING
03 3 amp
05 5 amp
06 6 amp
07 7 amp
08 8 amp
09 10 amp
10 12 amp
11 14 amp
12 16 amp
13 13 amp
14 15 amp
15 16 amp
20 20 amp

**Time Delay**

<table>
<thead>
<tr>
<th>Overload</th>
<th>Trip Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>No Trip</td>
</tr>
<tr>
<td>150%</td>
<td>Trip in 1 hr</td>
</tr>
<tr>
<td>200%</td>
<td>4.0 ~ 40 sec.</td>
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<tr>
<td>300%</td>
<td>0.9 ~ 8.0 sec.</td>
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<tr>
<td>400%</td>
<td>0.42 ~ 5.0 sec.</td>
</tr>
<tr>
<td>500%</td>
<td>0.25 ~ 3.0 sec.</td>
</tr>
<tr>
<td>600%</td>
<td>0.01 ~ 1.8 sec.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Overload</th>
<th>Trip Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>No Trip</td>
</tr>
<tr>
<td>150%</td>
<td>-10°C x 1.70</td>
</tr>
<tr>
<td>200%</td>
<td>-5°C x 1.60</td>
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<tr>
<td>300%</td>
<td>0°C x 1.50</td>
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<tr>
<td>500%</td>
<td>10°C x 1.30</td>
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<tr>
<td>600%</td>
<td>15°C x 1.20</td>
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<td>700%</td>
<td>20°C x 1.10</td>
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<tr>
<td>800%</td>
<td>25°C x 1.00</td>
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Notes:
1. Trip Time factor is a guideline that indicates ambient temperature effect on trip times at various overload values.

*Manufacturer reserves the right to change product specification without prior notice.*
The CLB-Series is a compact, single pole, push-to-reset family of thermal circuit breakers designed to protect equipment. Utilizing simple, precision design with few moving parts, these breakers offer cost effective, extremely reliable circuit protection with high resistance against shock and vibration.

**Product Highlights:**
- Ratings from 3-60A, 125, 250VAC, 32VDC
- 2500 VAC/1 minute
- 60°C Max Operating Temperature
- 2500A @ 32VDC Interrupting Capacity
- 100M ohms Insulation Resistance
- Voltage drop <0.25 V
- UL, cUL, CSA, TUV, CE
- UL1500/ISO8846 for ignition protection/marine

**Dimensional Specifications: in. [mm]**
### CLB-Series - Ordering Scheme, Time Delay

#### 1 SERIES
- **CLB**

#### 2 RATING
- **Series**
- **Rating**
  - 03: 3 amps
  - 04: 4 amps
  - 05: 5 amps
  - 06: 6 amps
  - 07: 7 amps
  - 08: 8 amps
  - 12: 12 amps

#### 3 VOLTAGE
- **Voltage**
  - 125-250VAC / 32 VDC

#### 4 MOUNTING HOLE
- **Hole Type**
  - M11
  - M12
  - Snap In Style
  - 3/8’ 27 UNS

#### 5 BUSHING
- **Type**
  - Type A
  - Type B
  - Type C
  - Type D
  - Type E

#### 6 MOUNTING NUT
- **Type**
  - Type 1
  - Type 2
  - Type 3
  - Type 4
  - Type 5
  - Type 6
  - Type 7
  - Type 8

#### 7 INDICATOR PLATE
- **Plate Type**
  - None
  - Embossed
  - Silver Printing on Black

#### 8 BUTTON
- **Color**
  - Black
  - Red
  - White

#### 9 TERMINAL
- **Type**
  - Type A
  - Type B
  - Type C
  - Type D
  - Type E
  - Type F
  - Type G
  - Type H
  - Type J
  - Type R

#### 10 BUTTON MARKING
- **Marking Orientation**
  - Line
  - Load

---

### Time Delay

#### Overload Trip Time
- **Current**
  - 100% No Trip
  - 150% Trip in 1 hr
- **Temperature**
  - -10°C: x 1.70
  - -5°C: x 1.60
  - 0°C: x 1.50
  - 5°C: x 1.30
  - 10°C: x 1.20
  - 15°C: x 1.10
  - 20°C: x 1.00
  - 25°C: x 0.90
  - 30°C: x 0.80
  - 35°C: x 0.70
  - 40°C: x 0.60
  - 45°C: x 0.50
  - 50°C: x 0.45
  - 55°C: x 0.40
  - 60°C: x 0.35

#### Notes:
- 1. Trip Time factor is a guideline that indicates ambient temperature effect on trip times at various overload values.
Cruise Control

The cruise control assembly digitally communicates with the VECU to provide the proper signal when the operator presses a button on one of the controls. The left control includes acceleration and deceleration, while the right control panel includes the OFF/ON and Resume buttons.

This product withstands temperatures from -40°C to +85°C, relative humidity up to 95%, condensation, direct sunlight and mechanical vibrations. The two controls are housed in an integrated assembly to minimize wiring. The expert design integrates seamlessly with the vehicle steering and wheel styling and is designed to meet customer-specific requirements for safety and ease of accurate assembly. Carling engineers will work with you and your vehicle design team to develop a customized cruise control solution for your specific needs.

Horn Control

The horn control is housed in an integrated assembly to minimize wiring and provides a flexible, yet durable actuator cover to endure exponential presses. It withstands temperatures from -40°C to +85°C, relative humidity up to 95%, condensation, direct sunlight and mechanical vibrations and was designed as a cost-effective alternative to traditional horn controls.

This rugged control has an operating voltage of 12 to 24VDC. Carling engineers will work with you and your vehicle design team to develop a customized cruise control solution for your specific needs.

Light Control Module

The light control module is a multifunctional package that encompasses four critical controls within one easy-to-install, space saving unit. Controls include a high-current rotary switch, which controls parking lights and headlights; a push-pull feature on the switch to operate fog lights; an adjacent high-current thumb wheel dimmer switch to select the desired brightness for dash lighting; and an additional miniature rocker switch for auxiliary high-current lighting functions.

The light control module is a compact, sleek, operator friendly, cost effective module. The rugged high-current switch design allows high-current loads to be handled without the need to include costly relays in the switch circuit. The snap-in design and integrated keyed connector make installation easy, and the compact design uses little valuable dashboard space.

HVAC Motor Controller

The HVAC motor controller efficiently controls heating and ventilation and interfaces with the vehicle’s VECU to adjust the speed of the HVAC blower motor. There are two connections in the controller, one to the load through the harness and another to the VECU. The signal from the VECU controls the motor speed and creates a soft start that will suppress any inrush during the motor’s start up.

The HVAC motor controller operates at 12 or 24VDC and drives DC motors up to 30A. It provides overvoltage protection, up to 100V for two minutes, meeting automotive requirements for EMC, vibration and shock. These features help extend the life of the HVAC unit and prevent the nuisance blowing of fuses or circuit breakers. The HVAC controller is sealed to IP68, providing protection from the extreme environmental conditions experienced by the blower housing. The HVAC Motor Controller is compact and uses fewer components and connections than traditional motor control devices.
Keypads

Operator control modules utilize industry standard SAE J1939 CAN and NMEA communication protocols. By incorporating a single connector to the CAN bus via a communications cable, wire harnesses are greatly simplified, saving space, weight and cost. Through the use of embedded software, these modules are configurable to your specific load requirements and diagnostic needs.

The compact keypad, available in standard or custom silicone designs, is the perfect interface for the many HMI functions that it controls. These sleek control pads provide a distinctive tactile feel for the operator, while incorporating wear-resistant lasered graphics for long life. Operator Control Modules are available with many features including multiple function lighting, CAN data-controlled variable dimming, and backlighting.

Solid State Power Control

Module Features:
- 12 Channel/24 VDC electronic circuit breakers
- J1939 Communication
- Software Selectable Trip Characteristics
- Dimming and Soft Start PWM
- Reverse Polarity Protection
- Up to 15 Amps per channel
- Rated for 80 Amps Continuous Operation
- Load Shedding Capability

VOCM

Multiplexed V-Series rocker modules use industry standard SAE J1939, LIN, and NMEA communications protocols. The rocker module provides the look and feel of a traditional electromechanical switch with the connection benefits of a multiplexed module. Using one cut-out for six switch functions, the multiplexed V-Series rocker modules save assembly time, and greatly simplify wiring and harness requirements, providing a high-tech yet cost-effective solution.
Below is a list of useful product catalogs. Please scan the QR codes below or visit carlingtech.com/onthego for complete details.

**WEBSITE**
Product Selector, Resources, Configurator, Find Rep, Product Materials and Videos.

**SWITCHES AND CONTROLS**
Rocker, toggle, pushbutton, rotary, battery disconnects and controls.

**MINI & SUB-MINI SWITCHES**
Sealed and non-sealed rocker, toggle, pushbutton and slide options.

**HYDRAULIC-MAGNETIC CIRCUIT PROTECTION**
1-6 poles from .02 to 700A with CSA, VDE, TUV, UL489, UL489A, UL1500 approvals.

**THERMAL CIRCUIT PROTECTION**
1 pole from 3 to 60A with UL, cUL, CE, UL1500/ISO 8846 approvals.

**GFCI/ELCI CIRCUIT PROTECTION**
1-3 poles from 0.10 to 50A with CSA, UL489, UL1077, UL1053, UL1500 approvals.
Below is a list of useful market specific catalogs and brochures. Please scan the QR codes below or visit carlingtech.com/onthego for complete details.

**ON-OFF HIGHWAY**
Switches, Controls and Custom Solutions

- [QR Code](#) (Brochure)
- [QR Code](#) (Catalog)

**MARINE**
Circuit Protection and Switches

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**RENEWABLE ENERGY**
Circuit Breakers and Disconnect products

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**MILITARY**
COTS Switches and Circuits Breakers

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**TELECOM/DATACOM**
Hydraulic-Magnetic Circuit Breakers

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**INDUSTRIAL AUTOMATION**
Switches and Circuit Breakers

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Founded in 1920, Carling Technologies is a leading manufacturer of electrical and electronic switches and assemblies, circuit breakers, electronic controls, power distribution units, and multiplexed power distribution systems. With four ISO registered manufacturing facilities and technical sales offices worldwide, Carling Technologies Sales, Service and Engineering teams do much more than manufacture electrical components, they engineer powerful solutions! To learn more about Carling please visit www.carlingtech.com/company-profile.

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