Since its founding, Carling Technologies has continually forged a tradition of leadership in quality and product innovation. 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.

<table>
<thead>
<tr>
<th>SWITCHES &amp; CONTROLS</th>
<th>CIRCUIT PROTECTION</th>
<th>CUSTOM SOLUTIONS</th>
<th>MULTIPLEXED POWER SYSTEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Rocker</td>
<td>• Hydraulic-Magnetic</td>
<td>• PDU’s</td>
<td>• HMI Devices &amp; I/O Modules</td>
</tr>
<tr>
<td>• Toggle</td>
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</tr>
<tr>
<td>• Pushbutton</td>
<td>• GFCI / ELCI</td>
<td>• Control Modules</td>
<td>• Data Communication Interfaces</td>
</tr>
<tr>
<td>• Rotary</td>
<td></td>
<td></td>
<td>• Electrical Systems Monitoring</td>
</tr>
</tbody>
</table>

**STRATEGIC MARKETS SERVED:**
- On/Off Highway
- Marine
- Telecom/Datacom
- Military
- Renewable Energy

**GLOBAL LOCATIONS:**
- Carling Technologies
  - World Headquarters
    - Haubeck, CT, USA
    - ISO 9001:2015
    - IATF16949:2016
- Marettron
  - Phoenix, AZ, USA
- Carling Technologies
  - Brownsville, TX, USA
  - ISO 9001:2015
  - IATF16949:2016
- Carling Technologies
  - Marshall, Missouri
  - ISO 9001:2015
  - IATF16949:2016
- Carling Technologies
  - Jupiter, FL, USA

**COMPETITIVE ADVANTAGES**
- Innovative & Eco-Friendly Products
- Excellent Quality & Customer Service
- Reliable & On-Time Delivery
- Vertical Integration

**OTHER SERVED INDUSTRIES:**
- Medical
- Industrial Control
- Audio / Visual
- Commercial Food
- HVAC
- Floor Care
- Generators
- Small Appliances
- Security Systems
- Test & Measurement

**WORLDWIDE NUMBERS:**
- 2400+ Employees
- 150+ Engineers
- 70+ Distributors
- 50+ Rep Firms
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Available Online are tools such as a configurit, product selector and stock check. 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 team2@carlingtech.com

Custom Design Solutions can be tailor-made for most any application using our extensive engineering resources.

Other Products such as miniature switches, hydraulic-magnetic, thermal and ground fault circuit breakers are also available.

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These CAN based, 6 pack of SAE J1939 compatible controls provide myriad options for the Transportation Market designers of today. Controlling up to 12 individual loads, these fully customizable products feature programmable illumination, diagnostic feedback, extended life and offer many other advantages over traditional switch products. Multiplexing is made easy by the use of rear mounted Deutsch connectors, eliminating the extra weight and cost of traditional wire harnesses.

**SELECTOR GUIDE**

<table>
<thead>
<tr>
<th>CKP-Series</th>
<th>VM-Series</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SAE J1939 CAN 2.0b Protocol</td>
<td>SAE J1939 CAN 2.0b Protocol</td>
<td><strong>Software</strong></td>
</tr>
<tr>
<td>12 individual loads</td>
<td>6 individual rockers, up to 12 total loads</td>
<td><strong>Circuitry</strong></td>
</tr>
<tr>
<td>8-32 V</td>
<td>12 or 24 V</td>
<td><strong>Operating Voltage</strong></td>
</tr>
<tr>
<td>1, 2, or 3 LED’s per load</td>
<td>Dependent or Independent LED’s</td>
<td><strong>Illumination</strong></td>
</tr>
<tr>
<td>IP69 Front Panel; IP68 Back Panel when connected</td>
<td>IP68 Front Panel; IP68 Back Panel when connected</td>
<td><strong>Sealing</strong></td>
</tr>
<tr>
<td>Deutsch DT-Series Connector</td>
<td>Deutsch DT-Series Connector</td>
<td><strong>Termination</strong></td>
</tr>
<tr>
<td>Custom or standard laser etched backlighting</td>
<td>Custom or standard laser etched backlighting</td>
<td><strong>Legends</strong></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.
CKP-Series
SAE J1939 CAN KEYPAD

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:
Configure a Complete Part
Download CAD & Sales Drawing
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

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

SEALING PROTECTION
Fully sealed IP68 back panel when connected

CONNECTOR
Mates to the Deutsch DT-Series Connector

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

| **EMC** | **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)  

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

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

| **Ingress Protection** | IP6k9k 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 |

| **Drop test** | 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 |

### 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 600,000 actuations at +25°C ± 10°C) |

| **Software** | CAN 2.0b type interface as defined by SAE J1939 |

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

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

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

| **Abrasion/Wear Resistance** | 40 cycles of ASTM F2357 testing with 0.25” paper at 175 grams of force |

### 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)  

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

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

| **Abrasion/Wear 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:  
Ordering Scheme: Part 1 (Keypad)

**CKP Series** - SAE J1939 CAN Keypad - Keypad and Icon Artwork Ordering Scheme

**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  
See “icon artwork button layout” section for details.

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)

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

<table>
<thead>
<tr>
<th></th>
<th>Landscape</th>
<th>Portrait</th>
<th>Reverse Landscape</th>
<th>Reverse Portrait</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No Function Light</td>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>2</td>
<td>Open-Closed-Closed</td>
<td><img src="image4.png" alt="Image" /></td>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td>3</td>
<td>Closed-Open-Closed</td>
<td><img src="image7.png" alt="Image" /></td>
<td><img src="image8.png" alt="Image" /></td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
<tr>
<td>4</td>
<td>Closed Closed-Open</td>
<td><img src="image10.png" alt="Image" /></td>
<td><img src="image11.png" alt="Image" /></td>
<td><img src="image12.png" alt="Image" /></td>
</tr>
<tr>
<td>5</td>
<td>Closed-Open-Open</td>
<td><img src="image13.png" alt="Image" /></td>
<td><img src="image14.png" alt="Image" /></td>
<td><img src="image15.png" alt="Image" /></td>
</tr>
<tr>
<td>6</td>
<td>Open-Closed-Open</td>
<td><img src="image16.png" alt="Image" /></td>
<td><img src="image17.png" alt="Image" /></td>
<td><img src="image18.png" alt="Image" /></td>
</tr>
<tr>
<td>7</td>
<td>Open-Open-Closed</td>
<td><img src="image19.png" alt="Image" /></td>
<td><img src="image20.png" alt="Image" /></td>
<td><img src="image21.png" alt="Image" /></td>
</tr>
<tr>
<td>8</td>
<td>Open-Open-Open</td>
<td><img src="image22.png" alt="Image" /></td>
<td><img src="image23.png" alt="Image" /></td>
<td><img src="image24.png" alt="Image" /></td>
</tr>
</tbody>
</table>

Additional function light colors available, please consult factory.

**ICON CODE**  
00 For standard icons, see next page. For additional icons, please consult factory.
Orientation - Icon Artwork Button Number Layout
(see dimensional specifications for more detail)

A: Landscape

B: Portrait

D: Reverse Portrait

C: Reverse Landscape

Standard Icon Codes:

<table>
<thead>
<tr>
<th>Icon</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>UB</td>
<td>UV</td>
</tr>
<tr>
<td>UW</td>
<td>UX</td>
</tr>
<tr>
<td>UX</td>
<td>UY</td>
</tr>
<tr>
<td>MP</td>
<td>MR</td>
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<td>PX</td>
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<tr>
<td>RN</td>
<td>RP</td>
</tr>
<tr>
<td>YG</td>
<td>TX</td>
</tr>
<tr>
<td>DASH LIGHTS</td>
<td>BEACON</td>
</tr>
<tr>
<td>SN</td>
<td>SR</td>
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<td>UF</td>
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Standard Icon Codes continued on next page.
Standard Icon Codes:

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<tr>
<td>ON</td>
<td>OFF</td>
<td>O</td>
<td>O</td>
<td>ON</td>
<td>OFF</td>
<td>I</td>
<td>O</td>
<td>II</td>
<td>RAISE</td>
<td>LOWER</td>
<td>HIGH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RZ</td>
<td>YP</td>
<td>WN</td>
<td>WP</td>
<td>WW</td>
<td>WX</td>
<td>SA</td>
<td>SB</td>
<td>SC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOW</td>
<td>FWD</td>
<td>REV</td>
<td>ACC</td>
<td>REAR</td>
<td>PARK</td>
<td>AUTO</td>
<td>RU</td>
<td>RV</td>
<td>RX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WV</td>
<td>SV</td>
<td>SW</td>
<td>VK</td>
<td>SF</td>
<td>SG</td>
<td>SS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dimensional Specifications: in. [mm]

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

2.300 [58.42]
6.400 [164.85]
3.700 [94.00]
$\phi0.225$ [5.72]
$\phi1.500$ [38.10]
$\phi0.225$ [5.72]

STuds (max tightening torque 30 in lbs.)
Connector to be mated to Deutsch DT series connector

No. Designation
1 BATT
2 CAN L
3 BATT
4 IGN-ON
5 CAN H
6 CAN SHIELD

CLA-0146 Rev. A
Dimensional Specifications: in. [mm]

ORIENTATION - ICON ARTWORK BUTTON NUMBER LAYOUT

LANDSCAPE

PORTRAIT

REVERSE LANDSCAPE

REVERSE PORTRAIT
The VM-Series is a multiplexed operator control module ideal for Construction, Agriculture and Commercial vehicles. Rugged and sealed to IP68, the VM-Series can be used in open or closed cab environments and it connects to industry standard SAE J1939 CAN Bus protocol.

The VM-Series reduces the complexity and cost of traditional wire harnesses, increases product life and reliability, and improves assembly efficiencies.

The VM-Series was developed in conjunction with the globally successful Contura® family of switches, providing the look and feel of our traditional rocker switches, but offering the benefits of a multiplexed product.

**Product Highlights:**
- SAE J1939 Compatible
- IP68 Sealing Protection with Connector
- Dimming Capabilities
- Horizontal or Vertical Mounting Options
- Variety of V-Series Contura® actuator styles

**Typical Applications:**
- On/Off-Highway
  - Construction
  - Agriculture
  - Commercial Vehicles
  - Among Others

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

SEALING PROTECTION
Fully sealed IP68 front panel and back panel (when connected)

CUSTOMIZABLE ICONS
Choose from our extensive library of legends, or customize your own.

ROCKERS
Variety of V-Series Contura® actuator styles

SNAP-IN MOUNTING
For fast, easy assembly.

6 PIN CONNECTOR
Mates to the Deutsch DT-Series Connector.

4 PIN CONNECTOR
Mates to the Deutsch DT-Series Connector. Can be used to Daisy-chain multiple VM-Series.
### Electrical

**Operating Voltage**
- 12VDC or 24VDC systems

**Max Current**
- Operation: 300mA
- Sleep Mode: 3mA

**Communication Programming**
- Master: CAN 2.0b (SAE J1939)
- At factory or via CAN (special tool)

**Reverse Polarity**
- 12V systems: -24V for 5 minutes
- 24V systems: -36V for 5 minutes

**Withstand Voltage**
- ISO 16750-2 500Vrms (50Hz to 60Hz) with a duration of 60s
- ISO 16750-2 Minimum 10 Mohms at 500Vdc with a duration of 60s
- ISO 16750-2 severity 2, Upp of 4V for Un=12V and Un=24V

**Overvoltage**
- ISO 16750-2 Apply voltage DC 36V for 60min at 65 °C

**Slow Decrease/Increase of Supply Voltage**
- Test Method according to ISO 16750-2: 4-5

**Momentary Drop in Supply Voltage**
- Apply the test pulse according to ISO 16750-2 (Figure 4 for 12V system, Figure 5 for 24V system)

**Electrical Endurance**
- Minimum 250K Operations (50K cycles at Tmin, 150K cycles at Tnom, 50K cycles at Tmax)

### Physical

**Number of Switches**
- 6 per module

**Actuator Type**
- Rockers – all Contura styles (No locking feature available)

**Materials**
- Housing - Acetal, UV stabilized
- Back Cover - Acetal, UV stabilized
- Rocker – Polycarbonate / Nylon
- Mounting Clips – Stainless steel

**Weight**
- ≈0.5 lbs

**Functions**
- 2 position maintained, 2 position momentary top, 2 position momentary bottom, 3 position maintained, 3 position momentary top/bottom, 3 position momentary top, 3 position momentary bottom

**Sleep Mode**
- Defined as the state after a pre-defined time of no activity to reduce current draw on the system. Any switch can be configured to wake the unit, and doing so will also activate the switch function.

**Illumination**
- Single-color LED
- Red, Green, Amber, Blue, White

**Dimming**
- LED dimming controlled by the ECU through the CAN bus

**Connection Mounting**
- Deutsch DT-Series 4 and 6 pin
- Front panel, removable from a-side See dimensional specifications

**Panel Opening**
- ≈1.6in (41mm) to bottom of header

**Depth Behind Panel**
- ≈1.6in (41mm) to bottom of header

### Environmental

**Operating Temperature**
- -40 °C to +85°C
- IEC 6068-2-2 Test Bb, 85°C for 96 hours
- IEC 6068-2-1 Test Ad, -40°C for 96 hours
- IEC 6068-2-14 Test Na, -40°C to 85°C, 1 hours per cycle (30 minutes at -40°C, 30 minutes at +85°C), total 10 cycles.

**Humidity, Soak**
- IEC 6068-2-78 Test Cab, 30°C at 93% RH for 10 days

**Humidity, Cyclic**
- IEC 6068-2-30 Test Db Method 1, 55°C to 25°C at >90% RH, 6 cycles of 24 hours each
- IEC 6068-2-14 Test Nb, -40°C to 85°C, 2 cycles of 8 hours each

**Ingress Protection**
- IEC 60529, IP68, 1.2m deep water for 60+/2 min
- IEC 6068-2-27, 3 shocks in each direction of the 3 axes (18 total shocks) at 500 m/s2 for 11 ms

**Shock**
- IEC 6068-2-27, 100 shocks in each direction of the 3 axes (600 total shocks) at 400 m/s2 for 6 ms
- IEC 6068-2-31 Test Ec Free Fall – Procedure 1, drop in each direction of the 3 axes (6 drops) from 500mm
- IEC 6068-2-6, swept sine wave from 5-500 Hz, +/-15 mm amplitude, 5g, 20 cycles in each plane

**Vibration, General**
- IEC 6068-2-64 Test Fh Method 1, random excitation at 10, 150, 220, and 350 Hz breakpoint frequencies, 5 hours in each axis
- IEC 6068-2-6, sinusoidal from 10-2000 Hz, 5 minutes at resonant points

**Chemical Resistance**
- ISO 16750-5 Method II for Engine oil, hydraulic oil, diesel fuel, Grease and Urea at Tmax 

**Salt Spray**
- IEC 6068-2-52 Test Kb, severity level 4

### Electromagnetic (EMC)

**Reference limits from ISO 13766 (Earth Moving Machinery) and EN 13309 (Construction Machinery)**
- Absorbed-Lined Chamber: ISO 11452-2, 100V/m, 20MHz to 2GHz
- Bulk Current Injection: ISO 11452-4, 100mA, 20MHz to 400MHz
- Transient Emission: ISO 13768 Annex D and E, 30MHz-1GHz
- Conducted Transients: All test pulses according to ISO 7637-2:2004, Annex Table A2 for 24V systems Level 3 minimum
- ESD: ISO 10605, ±15kV air discharges, ±8kV contact discharges

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

GPS-0009 Rev. A
Software Interface Integration
Click below for details on integrating the VM-Series into J1939 CAN network:

Tables

Table A: Illumination Table (for each switch position)

<table>
<thead>
<tr>
<th>Location</th>
<th>Type</th>
<th>Color</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top LED</td>
<td>Backlight</td>
<td>Red, Green, Amber, Blue or White</td>
<td>Continuous Flashing</td>
</tr>
<tr>
<td></td>
<td>Function</td>
<td>Red, Green, Amber, Blue or White</td>
<td>ON with Switch, ON with Device</td>
</tr>
<tr>
<td>Bottom LED</td>
<td>Backlight</td>
<td>Red, Green, Amber, Blue or White</td>
<td>Continuous Flashing</td>
</tr>
<tr>
<td></td>
<td>Function</td>
<td>Red, Green, Amber, Blue or White</td>
<td>ON with Switch, ON with Device</td>
</tr>
</tbody>
</table>

Connector Pin Layout:
Connector 1 (mating connector: Deutsch DT-Series 4 pins)

<table>
<thead>
<tr>
<th>Pin</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal</td>
<td>VCC</td>
<td>GND</td>
<td>CAN_H</td>
<td>CAN_L</td>
</tr>
</tbody>
</table>

or

<table>
<thead>
<tr>
<th>Pin</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal</td>
<td>Out 1</td>
<td>Out 2</td>
<td>Out 3</td>
<td>Out 4</td>
</tr>
</tbody>
</table>

Out 1 to Out 4 is to control loads with max. output current 0.5A @ 24V

Connector 2 (mating connector: Deutsch DT-Series 6 pins)

<table>
<thead>
<tr>
<th>Pin</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal</td>
<td>CAN_L</td>
<td>CAN_H</td>
<td>NC</td>
<td>NC</td>
<td>GND</td>
<td>VCC</td>
</tr>
</tbody>
</table>
Ordering Scheme: Part 1 (Module and Rocker Style)

VM 6 - 1 F 1

1 SERIES
VM V-Series Module System

2 SIZE
6 6 Positions

3 COMMUNICATION PROTOCOL
1 J1939
3 J1939 with Control Relay

4 ROCKER STYLE
A Contura II
B Contura III
C Contura IV
D Contura IV - Laser Etched
E Contura V
F Contura V - Laser Etched
G Contura VI
H Contura VII
J Contura X
K Contura XI
L Contura XII
M Contura XIV
N Contura XIV - Laser Etched
Z No Rockers

5 ORIENTATION
1 Landscape
2 Portrait
3 Reverse Portrait
4 Reverse Landscape

Ordering Scheme: Part 2 (Module Circuit and Lamps)

<table>
<thead>
<tr>
<th>Switch 1</th>
<th>Switch 2</th>
<th>Switch 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 B 2 A</td>
<td>2 A 1 0</td>
<td>6 0 0 0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switch 4</th>
<th>Switch 5</th>
<th>Switch 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 B 2 A</td>
<td>2 A 1 0</td>
<td>6 0 0 0</td>
</tr>
</tbody>
</table>

**SWITCH CIRCUIT**
1 2 Position Maintained
2 2 Position Momentary Top
3 2 Position Momentary Bottom
4 3 Position Momentary Bottom
5 3 Position Maintained
6 3 Position Momentary Top and Bottom
7 3 Position Momentary Top

**LAMP CIRCUIT**
A L1 Backlight
B L1, L2 Backlight
C L2 Backlight
D L1 Backlight, L2 Function Light
E L1, L2 Function Light
F L1 Function Light, L2 Backlight
G L1 Function Light
H L2 Function Light
I No Lamp

**LAMP 1**
1 LED 1, Red
2 LED 1, Green
3 LED 1, Blue
4 LED 1, Amber
5 LED 1, White
0 No LED

**LAMP 2**
A LED 2, Red
B LED 2, Green
C LED 2, Blue
D LED 2, Amber
G LED 2, White
0 No LED

Continue to next page for Part 3 (Rockers)
### VM-Series - Operator Control Module - Ordering Scheme Part 3

#### Ordering Scheme: Part 3 (Rockers)

All Rocker options must match box 4 from part 1. For additional options, consult factory.

Contura II, III, IV, V, VII and XIV Rockers

<table>
<thead>
<tr>
<th>2 ACTUATOR STYLE</th>
<th>3 LENS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contura II</td>
<td>Z - No Lens</td>
</tr>
<tr>
<td>A Thick over terminals 1-4</td>
<td>1 6 8</td>
</tr>
<tr>
<td>B Thick over terminals 3-6</td>
<td>2 7</td>
</tr>
<tr>
<td>Contura III</td>
<td>C Thick over terminals 1-4</td>
</tr>
<tr>
<td>D Thick over terminals 3-6</td>
<td>4 9</td>
</tr>
<tr>
<td>Contura IV</td>
<td>E Left brow, lens</td>
</tr>
<tr>
<td>F Right brow, lens</td>
<td>5 F</td>
</tr>
<tr>
<td>R Right brow, laser-etched</td>
<td>5 R</td>
</tr>
<tr>
<td>Only Contura VII</td>
<td>Z - No Lens</td>
</tr>
<tr>
<td>6 B G M T</td>
<td>6</td>
</tr>
<tr>
<td>7 C H N U</td>
<td>7</td>
</tr>
<tr>
<td>8 D J P V</td>
<td>8</td>
</tr>
<tr>
<td>9 E K R W</td>
<td>9</td>
</tr>
<tr>
<td>A F L S Y</td>
<td>A</td>
</tr>
<tr>
<td>5 1 2 3 4 5</td>
<td>5</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>4 ACTUATOR COLOR AND TEXTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contura II &amp; Contura III</td>
</tr>
<tr>
<td>B black G gray R red W white (Soft Surface)</td>
</tr>
<tr>
<td>C black H gray S red Y white (Hard Surface)</td>
</tr>
<tr>
<td>Contura IV &amp; Contura V</td>
</tr>
<tr>
<td>C black H gray S red Y white</td>
</tr>
<tr>
<td>Laser-Etched only D nickel E pewter</td>
</tr>
<tr>
<td>Contura VII</td>
</tr>
<tr>
<td>C black H gray S red Y white</td>
</tr>
<tr>
<td>Contura XIV</td>
</tr>
<tr>
<td>C black S red Y white</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5 ACTUATOR LENS OR BODY LEGENDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 ON 12 OFF 13 I 14 O</td>
</tr>
<tr>
<td>15 O O 16 O 17 O I 18 I O</td>
</tr>
</tbody>
</table>

See next page for standard icons. Consult factory for additional icons.

<table>
<thead>
<tr>
<th>6 LEGEND ORIENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 No legend</td>
</tr>
<tr>
<td>1 Orientation 1</td>
</tr>
<tr>
<td>2 Orientation 2</td>
</tr>
<tr>
<td>3 Orientation 3</td>
</tr>
<tr>
<td>4 Orientation 4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7 ACTUATOR LENS LEGEND</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 No legend this location (used with codes 11-18 in box 5) Box 7 required when rocker requires two legends. If the two legends consist of one lens and one body legend, lens legend must be specified in box 5; body legend specified in box 7. See next page for standard icons. Consult factory for additional icons.</td>
</tr>
</tbody>
</table>

Continue to next page for Contura VI (WAVE), Contura X, XI and XII rocker styles.
Contura VI (WAVE) Rocker Style

<table>
<thead>
<tr>
<th>2 ACTUATOR STYLE</th>
<th>Contura VI Style &amp; Color</th>
<th>V-Series</th>
<th>3 Lens 1</th>
<th>4 Lens 2</th>
<th>5 Rocker Color</th>
<th>6 Insert Color</th>
<th>7 Legend</th>
<th>8 Orientation</th>
<th>9 Lens Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Contura VI High Insert</td>
<td>V-Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Contura VI Low Insert</td>
<td>V-Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**7 ACTUATOR LENS OR BODY LEGENDS**

- **00** - No Legend this location
- **11** ON
- **12** OFF
- **13** I
- **14** O
- **15** OFF
- **16** ON
- **17** O
- **18** I
- **19** F
- **20** N
- **21** F
- **22** F

See next page for standard icons. Consult factory for additional icons.

**8 LEGEND ORIENTATION**

- **0** No legend (used with codes 11-18 in box 7)
- **1** Orientation 1
- **2** Orientation 2
- **3** Orientation 3
- **4** Orientation 4

**9 ACTUATOR LENS LEGEND**

- **00** - No Legend this location
- **11** ON
- **12** OFF
- **13** I
- **14** O
- **15** OFF
- **16** ON
- **17** O
- **18** I
- **19** F
- **20** N
- **21** F
- **22** F

See next page for standard icons. Consult factory for additional icons.

**6 INSERT COLOR**

- **B** - Black
- **C** - Bright Nickel Plated
- **D** - Bright Chrome Plated
- **E** - Bar Lens Translucent
- **F** - Bar Lens Translucent
- **G** - Satin Nickel Plated
- **H** - Satin Chrome Plated
- **I** - Satin Chrome Plated
- **K** - Satin Nickel Plated
- **L** - Satin Chrome Plated
- **M** - Satin Nickel Plated
- **N** - Satin Chrome Plated
- **O** - Satin Nickel Plated
- **P** - Satin Chrome Plated
- **Q** - Satin Nickel Plated
- **R** - Satin Chrome Plated
- **S** - Satin Nickel Plated
- **T** - Satin Chrome Plated
- **U** - Satin Nickel Plated
- **V** - Satin Chrome Plated
- **W** - Satin Nickel Plated
- **X** - Satin Chrome Plated
- **Y** - Satin Nickel Plated
- **Z** - Satin Chrome Plated

Contura XI Rockers

<table>
<thead>
<tr>
<th>2 ACTUATOR STYLE</th>
<th>Contura XI Style &amp; Color</th>
<th>V-Series</th>
<th>3 Lens 1</th>
<th>4 Lens 2</th>
<th>5 Rocker Color</th>
<th>6 Insert Color</th>
<th>7 Legend</th>
<th>8 Orientation</th>
<th>9 Lens Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contura XI Black</td>
<td>V-Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Contura XI Gray</td>
<td>V-Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Contura XI White</td>
<td>V-Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Contura XI Red</td>
<td>V-Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Contura XII Rockers

<table>
<thead>
<tr>
<th>2 ACTUATOR STYLE</th>
<th>Contura XII Style &amp; Color</th>
<th>V-Series</th>
<th>3 Lens 1</th>
<th>4 Lens 2</th>
<th>5 Rocker Color</th>
<th>6 Insert Color</th>
<th>7 Legend</th>
<th>8 Orientation</th>
<th>9 Lens Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Contura XII Black</td>
<td>V-Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Contura XII Gray</td>
<td>V-Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Contura XII White</td>
<td>V-Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Contura XII Red</td>
<td>V-Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**4 LENS - ABOVE LAMP #1 TERMINALS**

<table>
<thead>
<tr>
<th>Z 4 Lens</th>
<th>3 4 Lens</th>
<th>5 4 Lens</th>
<th>2 4 Lens</th>
<th>1 4 Lens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear</td>
<td>White</td>
<td>Amber</td>
<td>Green</td>
<td>Red</td>
</tr>
<tr>
<td>3 8</td>
<td>D</td>
<td>J</td>
<td>P</td>
<td>V</td>
</tr>
<tr>
<td>4 9</td>
<td>E</td>
<td>K</td>
<td>R</td>
<td>W</td>
</tr>
<tr>
<td>5 A</td>
<td>F</td>
<td>L</td>
<td>S</td>
<td>Y</td>
</tr>
<tr>
<td>2 7</td>
<td>C</td>
<td>H</td>
<td>N</td>
<td>U</td>
</tr>
<tr>
<td>1 6</td>
<td>B</td>
<td>G</td>
<td>M</td>
<td>T</td>
</tr>
</tbody>
</table>

**5 ACTUATOR LENS OR BODY LEGEND**

- **00** - No Legend this location
- **11** ON
- **12** OFF
- **13** I
- **14** O
- **15** OFF
- **16** ON
- **17** O
- **18** I
- **19** F
- **20** N
- **21** F
- **22** F

See next page for standard icons. Consult factory for additional icons.

**6 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

**7 ACTUATOR LENS LEGEND**

- **00** - No Legend this location
- **11** ON
- **12** OFF
- **13** I
- **14** O
- **15** OFF
- **16** ON
- **17** O
- **18** I
- **19** F
- **20** N
- **21** F
- **22** F

See next page for standard icons. Consult factory for additional icons.

For additional legend options & codes, visit us at www.carlingtech.com.
### Standard Legend Imprinting Codes:

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**Notes:**
1. ISO compliant symbols. Consult factory for custom legends.
2. New legend codes recommended for new part setups. Previous codes still valid for existing customers.
Dimensional Specifications: in. [mm]
Dimensional Specifications: in. [mm]
Carling Technologies offers a variety of Control products for the Transportation Industry including Dimmer Control, Mirror Rotate Control, Wiper Washer Control, and USB Dual Port Charger. Engineers trust our products not only for their style but also for their performance.

### SELECTOR GUIDE

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<th>LW Wiper</th>
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<td>joystick</td>
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<td>.830” x 1.450” [21.08mm x 36.83mm] snap-in mount</td>
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*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.
The 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 up to IP65 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
- Up to IP65 Sealing Protection
- 12-24V Operating Voltage
- Protection for Internal Components
- Curved or Square Style Doors

**Typical Applications:**
- On/Off-Highway Equipment
- Golf Carts
- Lawn & Garden Equipment
- Marine
- Military
**V-Charger**

**DESIGN FEATURES**

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

**SEALING PROTECTION**
Silicone rubber seal perfectly mates with door indent to provide up to IP65 level of sealing protection

**SPRING LOADED DOORS**
Stylish, curved or square double doors automatically close to cover and seal each port when not in use

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

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

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

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<td>Operating Voltage</td>
<td>12V/24V DC power systems (9 to 29 VDC)</td>
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<td>Output Voltage</td>
<td>5.0 VDC</td>
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<td>Max Output Current</td>
<td>3.15A DC Total</td>
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<td>Current Draw (No Load)</td>
<td>12V: 1.5 mA, 24V: 3.5 mA</td>
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<td>Compatibility</td>
<td>Charges mobile devices including iPad, iPhone, iPod, HTC, Galaxy, Blackberry, MP3 Players, Digital Cameras and PDA's</td>
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<td>LED Indicator</td>
<td>Green LED brightens when charging is in progress.</td>
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<td>Receptacle Insertion Life</td>
<td>10,000 operating cycles per port minimum</td>
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<td>Copper/silver plating 1/4&quot; (6.3 mm) Quick Connect terminations</td>
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<td>Reverse Polarity</td>
<td>Operational with correct polarity after reverse polarity exposure</td>
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<td>Output Protection</td>
<td>Short Circuit and Overload</td>
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<td>Thermal Overload Protection</td>
<td>Operation will cease if internal temperature reaches 125°C. Charging will resume after sufficient heat loss</td>
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<td>15kV air, 8kV touch per ISO10605 for Operational; Packaging and Handling Tests</td>
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<td>Load Dump Protection</td>
<td>ISO 16750-2: 10 pulses to 174V at 1 minute intervals (Pulse 5a, Ri= 8 ohms)</td>
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<tr>
<td>Radiated Immunity</td>
<td>ISO 11452-2, 200 MHz to 2.7 GHz Field Strength for 200 MHz to 1 GHz: 60 V/m Field Strength for 1 to 2.7 GHz: 50 V/m Field Strength for 1 to 400 MHz: 80 mA</td>
</tr>
</tbody>
</table>

## Environmental

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealing</td>
<td>IP65 for front panel components (with curved style doors)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40° to +60°C at 3.15A -40° to +70°C at 2.4A -40° to +80°C at 2.1A</td>
</tr>
<tr>
<td>Vibration</td>
<td>MIL-STD 202G, Method 204D, Test Condition A, 0.06DA or 10G, 10-500 Hz</td>
</tr>
<tr>
<td>Chemical Exposure</td>
<td>Brush method with USB doors closed: diesel, gasoline, brake fluid, Windex, Armor All</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>Blowing Dust</td>
<td>MIL-STD 810G Method 510.5, Air Velocity: 1750 ± 250 ft/min, Test Duration: 12 hours</td>
</tr>
</tbody>
</table>

## Physical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>Housing: Polycarbonate/PBT Doors: Polyester Light Pipe: Polycarbonate Torsion Springs and Pins: Stainless Steel Door Seal: Silicone PCBA Gasket and Panel Gasket: Closed Cell Neoprene Terminals: Silver plated Copper Electronics: Two PCB Assemblies 1.450” x .830” Panel Opening .030 - .156 inches Panel Thickness Panel Mounting Method Front Panel Insertion Installation Insertion Force 12-28 lbs typical (dependent on panel design) Panel Retention Force Greater than 35 lbs (dependent on panel design) Depth Behind Panel Connectors See Dimensional Specifications VC1, VC2 Weight Approximately 45g (1.6 oz) Styling Options Port Protection Curved or square USB port doors (See Dimensional Specifications) Twin, self-closing doors</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>1 SERIES</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 PRODUCT TYPE</td>
<td>USB</td>
</tr>
<tr>
<td>3 SOURCE VOLTAGE</td>
<td>24 / 24 Volts DC</td>
</tr>
<tr>
<td>4 LED INDICATOR (VOLTAGE MATCHES SOURCE)</td>
<td>G (Green)</td>
</tr>
<tr>
<td>5 CIRCUIT PROTECTION</td>
<td>1 Reverse Polarity, Thermal Overload &amp; Overcurrent</td>
</tr>
<tr>
<td>6 TERMINATION</td>
<td>1 .250 Tab</td>
</tr>
<tr>
<td>7 DOOR STYLE</td>
<td>1 Curved</td>
</tr>
<tr>
<td>8 DOOR COLOR</td>
<td>B (Black)</td>
</tr>
<tr>
<td>9 FRAME COLOR</td>
<td>B (Black)</td>
</tr>
<tr>
<td>10 PANEL SEAL</td>
<td>1 Yes</td>
</tr>
</tbody>
</table>

### Dimensional Specifications: in. [mm]

**Curved Door Style Option**

[Dimensions Diagram]

**Notes:**
1. Charger to install into 1.450” X 0.830” panel opening
Dimensional Specifications:  in. [mm]

Square Door Style Option

Notes:
1. Charger to install into 1.450" X 0.830" panel opening
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

Typical Applications:
- On/Off-Highway Equipment
- Agricultural Equipment
- Construction Equipment

Resources:
Configure a Complete Part
Download CAD & Sales Drawing
### Electrical
- **Contact Rating**: 9-16VDC, 2-10Amp.
- **Terminals**: 6.3mm (0.250” TAB) solid-state load switching
- **Output**: PWM 200 Hz.
- **EMI/EMC**: SAE J 1113 and SAE J 1455 Conducted Transient Emissions

### Environmental
- **Operating Temperature**: -40°C to + 85°C
- **Resonance Search**: Individual resonance searches were conducted with vibration applied along each of the three mutually perpendicular axes.
- **Vibration**: 24-50 Hz 0.40 DA
  - 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, 1 hr/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**: .030 to .156 (.76mm to 3.96mm)
- **Acceptable Panel Thickness**: .030, .062, .093, .125 and .156

---

*Manufacturer reserves the right to change product specification without prior notice.*
LD-Series - Electronic Dimmer Control - Ordering Scheme, Dimensional Specifications

**1 SERIES**
LD  Electronic Dimmer Control

**2 RATING**
1 4A, 12 volts  A  2A, 24 volts
2 10A, 12 volts  C  5A, 24 volts

**3 DIMMING RATE**
1 30 - 100% 8 positions  A  0 - 100% 11 positions
5 10 - 100% 10 positions  C

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

**5 & 6 ILLUMINATION**
No lamp  S
Red  C
Amber  N
Green  H
12V LED  C
24V LED  D

**7 BRACKET COLOR 1**
1 Black  2 White  3 Gray

**8 ACTUATOR STYLE / COLOR 1**
Laser Etched  A
Black  J
White  K
Gray  M
Red  N
Rocker  3
Paddle  4

**9 & 10 LENS COLOR**
Z Clear  No Lens  B  White  G  Green  M  Red  Blue
- 7  C  H  N  U  Large Transparent
- 3  D  J  P  V  Large Translucent
- 9  E  K  R  W  Bar Transparent
5 A  -  -  -  Laser Etch

**11 LEGEND #1**
00 No legend  FC  Dim  FE  Bright
For legend options, visit us at carlingtech.com

**12 LEGEND ORIENTATION**
0 No legend
1 vertical (lamp 1 on top)
2 horizontal (lamp 1 on right)
3 vertical (lamp 1 on bottom)

**13 LEGEND #2**
00 No legend  FC  Dim  FE  Bright
For legend options, visit us at carlingtech.com

Notes:
1 Custom colors are available. Consult factory.

---

## Q.C. SELECTION GUIDE

<table>
<thead>
<tr>
<th>COMPANY SERIES</th>
<th>PACKARD PART NO.</th>
<th>WIRE GAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PACKARD METRI-PACK 630 SERIES</td>
<td>12005222</td>
<td>12</td>
</tr>
<tr>
<td>12005224</td>
<td>12</td>
<td>22-20</td>
</tr>
<tr>
<td>12015870</td>
<td>16-14</td>
<td>22-20</td>
</tr>
<tr>
<td>12015869</td>
<td>16-14</td>
<td>22-20</td>
</tr>
<tr>
<td>TIN PLATED BRASS</td>
<td>12020200</td>
<td>18-18</td>
</tr>
<tr>
<td>12020202</td>
<td>18-18</td>
<td>.050 .050</td>
</tr>
</tbody>
</table>

---

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

**Typical Applications:**
- On/Off-Highway Equipment
- Agricultural Equipment
- Construction Equipment

**Resources:**
- Configure a Complete Part
- Download CAD & Sales Drawing
**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**

1. **Base Part Number**
2. **Color**
3. **Legend**

**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**

- **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.

---

**WIRE**
**COLOR**
**CAV I.D.**
- 40 ORANGE A
- 81A WHITE B
- 82A LT. BLUE C
- 88A YELLOW D
- 88B YEL-BLK ST. E
- 82B LT BL-BLK ST. F
- 81B WHT-NLK ST. G
- 150 BLACK H

---

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

---

**back to table of contents**
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

**Typical Applications:**
- On/Off-Highway Equipment
- Agricultural Equipment
- Construction Equipment
**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)

**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.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Amplitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>5Hz</td>
<td>0.16 G2/Hz</td>
</tr>
<tr>
<td>100Hz</td>
<td>0.16 G2/Hz</td>
</tr>
<tr>
<td>500Hz</td>
<td>-3dB/octave roll-off</td>
</tr>
</tbody>
</table>

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

- **Shock**

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

- **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/m for 24 hours.)

- **Salt Spray**

*Manufacturer reserves the right to change product specification without prior notice.*
**1 SERIES**
LW  Wiper/Washer Control with six intermittent positions: low, high, wash/wipe

**2 RATING**
1  8A, 14VDC (1 relay)  4  1A, 14VDC (1 relay)
2  4A, 28VDC (1 relay)  5  1A, 14VDC (2 relay)
3  1A, 14VDC (1 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  2  Red LED  3  Amber LED
1  Green LED

**6 LAMP #2 (ABOVE WIPE)**
Z  No Lamp  2  Red LED  3  Amber LED
1  Green 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
1  Vertical (lamp 1 on top)
2  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)
N-Series
ADDRESSABLE ROCKER SWITCHES

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
• Readdressable loads without harness redesign
• Available with paddle or rocker actuator

Typical Applications:
• On-Highway Transportation Equipment
• Agricultural Equipment
• Construction Equipment
• Marine

Resources:
Download 3D CAD Files

Resources:
Download 3D CAD Files

IGS  STP
**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**: 3/16” (4.76mm) Quick Connect terminations standard.

**Environmental**

- **Environmental Spec**: 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.

**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.
### 1 SERIES

#### N-Series - Addressable Rocker Switches - Ordering Scheme

<table>
<thead>
<tr>
<th>1 Series</th>
<th>2 Circuit</th>
<th>3 R1 Resistive ID</th>
<th>4 R2 Resistive ID</th>
<th>5 Resistor Constants</th>
<th>6 Illumination Lamp</th>
<th>7 Lamp</th>
<th>8</th>
<th>9 Bracket</th>
<th>10 Actuator</th>
<th>11 Lens Style &amp; Color</th>
<th>12 Lens Style &amp; Color</th>
<th>13 Legend</th>
<th>14 Legend Orientation</th>
<th>15 Actuator Lens Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>A</td>
<td>N</td>
<td>H</td>
<td>1-1</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>1</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

#### 2 CIRCUIT 2

**Terminal Orientation**

- Position: 1, 2, 3
- ( ) - momentary
- STANDARD
  - 2 & 4: Connected Terminals 1 & 2
  - 4 ON: NONE ON
  - 6 ON: ON ON
  - 7 ON: ON ON
  - 8 ON: ON (ON)

#### 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 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>S</th>
<th>None</th>
<th>A #1</th>
<th>Standard</th>
<th>10+ 12-</th>
</tr>
</thead>
<tbody>
<tr>
<td>B #1 &amp; 2</td>
<td>Special Parallel</td>
<td>11+ 9-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C #1 &amp; 2</td>
<td>Special Parallel</td>
<td>10+ 9-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 #1</td>
<td>Independent</td>
<td>10+ 9-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 #2</td>
<td>Independent</td>
<td>12+ 11-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 #1</td>
<td>Independent</td>
<td>10+ 9-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 #2</td>
<td>Independent</td>
<td>12+ 11-</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: 0
- LED* Red Amber Green
- 12VDC C N H
* 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>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>White</td>
<td>Gray</td>
<td>Red</td>
<td></td>
</tr>
</tbody>
</table>

#### 10 ACTUATOR STYLE AND COLOR

<table>
<thead>
<tr>
<th>1</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocker</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Paddle</td>
<td>J</td>
<td>N</td>
<td>K</td>
<td>M</td>
</tr>
</tbody>
</table>

#### 11 & 12 LENS STYLE AND COLOR

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

- 0 - No Actuator
- Z - No Lens
- Clear White Amber Green Red Blue
- 1 - B G M T Large Transparent
- 7 - C H N U Large Translucent
- 9 - E K R W Bar Translucent
- A - - - - Laser Etch background color

#### 13 LEGEND ORIENTATION

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>No legend this location / no actuator</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For legend options & codes, see pages 54-65 of this catalog.

#### 14 LEGEND ORIENTATION

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

#### 15 ACTUATOR LENS LEGEND

| 00 | 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.
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

Dimensional Specifications: in. [mm]
Circuit Diagrams:

<table>
<thead>
<tr>
<th>CIRCUIT CODE</th>
<th>SCHEMATIC</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td><img src="image1.png" alt="Circuit Diagram 4" /></td>
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<tr>
<td>5</td>
<td><img src="image2.png" alt="Circuit Diagram 5" /></td>
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<tr>
<td>6</td>
<td><img src="image3.png" alt="Circuit Diagram 6" /></td>
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<tr>
<td>7</td>
<td><img src="image4.png" alt="Circuit Diagram 7" /></td>
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<td>8</td>
<td><img src="image5.png" alt="Circuit Diagram 8" /></td>
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Lamp Circuit Diagrams:

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<tbody>
<tr>
<td>A</td>
<td><img src="image6.png" alt="Lamp Diagram A" /></td>
</tr>
<tr>
<td>B</td>
<td><img src="image7.png" alt="Lamp Diagram B" /></td>
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<tr>
<td>C</td>
<td><img src="image8.png" alt="Lamp Diagram C" /></td>
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<tr>
<td>1</td>
<td><img src="image9.png" alt="Lamp Diagram 1" /></td>
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<td>2</td>
<td><img src="image10.png" alt="Lamp Diagram 2" /></td>
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<tr>
<td>3</td>
<td><img src="image11.png" alt="Lamp Diagram 3" /></td>
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<tr>
<td>4</td>
<td><img src="image12.png" alt="Lamp Diagram 4" /></td>
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</table>
Carling’s Sealed Rocker switches feature the V-Series Contura and L-Series families of illuminated and non-illuminated rocker switches, which set the industry standard for sealed switches. They offer complete protection against dust and prolonged effects of spray and immersion under pressure.

**SELECTOR GUIDE**

<table>
<thead>
<tr>
<th></th>
<th>HR-Series</th>
<th>V-Series</th>
<th>W-Series</th>
<th>L-Series</th>
</tr>
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<tbody>
<tr>
<td><strong>Poles</strong></td>
<td>1, 2</td>
<td>1, 2</td>
<td>1, 2</td>
<td>1, 2</td>
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<tr>
<td><strong>Ratings</strong></td>
<td>IP68; 20A 12V</td>
<td>IP66/68; up to 20/15A 12/24VDC 15A 125VAC 10A 250VAC</td>
<td>IP68 including connector; up to 10A 24VDC</td>
<td>IP67; up to 15A 125VAC 10A 250VAC 20A 18VDC</td>
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<tr>
<td><strong>Actuator</strong></td>
<td>Laser-Etched rocker, Paddle, Locking Rocker</td>
<td>Bezel-Less Rocker, Paddle &amp; Locking Rocker</td>
<td>Rocker, Paddle, Locking Rocker</td>
<td></td>
</tr>
<tr>
<td><strong>Mounting Hole Specifications</strong></td>
<td>.830” x 1.450” [21.08mm x 36.83mm] snap-in mount</td>
<td>.830” x 1.450” [21.08mm x 36.83mm] snap-in mount</td>
<td>.830” x 1.450” [21.08mm x 36.83mm] snap-in mount</td>
<td>.867” x 1.734” [22mm x 44mm] snap-in mount</td>
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<tr>
<td><strong>Termination</strong></td>
<td>.110 tabs</td>
<td>.250 tabs solder lug wire leads</td>
<td>.110 tabs</td>
<td>.187 tab .250 tabs</td>
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<td>LED</td>
<td>incandescent, LED</td>
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<td>UL, CSA</td>
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</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.*
The HR-Series is a perimeter illuminated, IP68 sealed rocker switch, featuring a stylish, low profile actuator that is available in either two or three positions. These rocker switches have a variety of dependent and independent illumination options; momentary and maintained circuits; and up to two customizable laser-etched legends.

The patented design supports the various illumination options and allows the switch to be rated up to 20 amps, eliminating the need for relays. Additionally, these low profile rocker switches fit the industry standard cutout.

**Product Highlights:**
- Dynamic Perimeter Illumination
- IP68 Above Panel Sealing Protection
- 20A 12VDC
- Maintained and Momentary Circuits
- Various Illumination Options
- Single and Double Pole

**Typical Applications:**
- Marine
- On/Off-Highway
- Lawn Equipment
- Golf Carts
- Outdoor Construction Signage
- Any Application Requiring Sealing Protection

**Resources:**
- Configure a Complete Part
- Download CAD & Sales Drawing
- Watch Product Video
HR-Series Switch
DESIGN FEATURES

20A 12VDC RATING
Robust construction to handle a multitude of electrical loads.

SNAP-IN MOUNTING
Fits into an industry standard mounting hole of 1.450 x .830 in. (Same as V-Series and W-Series)

PERIMETER ILLUMINATION
Choice of independent (full) or dependent (half) lighting, in a variety of colors.

IP68 ABOVE PANEL SEALING
Seals out dust and moisture.

.110 TERMINALS
With dedicated TE connector for ease of installation. Sold Separately. (See General Specs for TE Part Numbers).

MAINTAINED/ MOMENTARY
Circuits available in 2 or 3 positions.

LASER ETCHED LEGENDS
Rocker icons convey a clean, sleek OEM look, with independent or dependent illumination.
HR–Series - Halo Illuminated Sealed Rocker Switch - General Specifications

**Electrical**

- **Operating Voltage**: Designed for 12 Volt systems, 9-16 VDC operating
- **Contact Rating**: Maximum 20 amps at 12 VDC
- **Supply Voltage ratings**: The switch passes the following supply voltage testing: SAE J1455 section 4.13.1 for power up, operating voltage, over voltage, reverse polarity, and short circuit
- **Dielectric Strength**: Across open contacts: 500 V RMS AC for 1 minute
  - From pole to pole (on multi pole variants) 500 V RMS AC for 1 min.
- **Insulation Resistance**
  - Initial contact resistance: 50 Megaohms
  - Life: Up to 100,000 cycles, circuit and load dependent
- **Contacts Terminals**: Silver tin-oxide
- **Endurance**: Up to 10 external connector terminals
- **Illumination**: 0.110” wide silver-plated copper terminals
- **Switch mates with TE connector housing part number 1418994-1. Based on application wire size choose receptacle part number below (or equivalent):**
  - 1-968880-1 20-24 AWG wire
  - 1-968849-1 17-20 AWG wire
  - 1-968851-1 13.5-17 AWG wire
  - 1-968853-1 12 AWG wire

**Environmental**

- **Sealing**: IP68 per ISO 20653. This rating applies to front panel components of the actual switch only
  - Operating Temp.: The following codes were passed:
    - Cold Soak (IEC 60068-2-1)
    - Heat Soak (IEC 60068-2-2)
    - Cycling/Shock (IEC 60068-2-14)
  - **Vibration**
    - General: IEC 60068-2-6, Swept sine wave section 8.2, 5 - 500 Hz 20 cycles 10g acceleration
    - Resonance: IEC 60068-2-6, Vibration sinusoidal, section 8.1, 10 - 2000 Hz, 5g acceleration
    - Random: IEC 60068-2-64, Method 1, random excitation, 10 - 350 Hz, 5 hours in each axis
  - **Shock and Bump**
    - IEC 60068-2-27, Shock 500 m/s² 11 milliseconds, Bump 200 m/s² 6 milliseconds 600 cycles
  - **Salt Spray**
    - IEC 60068-2-52, Test Kb, Severity level 4 (test duration 336 hours)
  - **Moisture resistance**
    - MIL-STD-202 Method 103B, Test Condition A (240 hours)
  - **Solar Radiation**
    - IEC 60068-2-6, procedure B, 10 cycles, Total irradiation per cycle = 22.4 kWh/m²
  - **Chemical Resistance**
    - ISO 16750-5, spray or brush method. Gasoline, diesel fuel, motor oil, brake fluid, Armour all, Windex
  - **Weathering/Cracking Resistance**
    - ASTM D1171-99, method A, 72 hours
  - **Abrasion/Wear Resistance**
    - 40 cycles of ASTM F2357 testing with 0.25” paper at 175 grams of force

**Mounting Specifications**

- **Panel thickness range**: 0.062” to 0.187”
- **Panel cutout**: 0.830” x 1.450”
- **Seals Base**: Nylon, V-0 UL flammability rating
- **Actuator**: Polycarbonate, V-2 UL flammability rating, painted and laser marked
- **Perimeter lens**: Polycarbonate, V-2 UL flammability rating
- **Bracket/Bezel**: Polycarbonate polyester blend, V-0 UL flammability rating

**Connectors**

- **Mounting Specifications**
  - **Panel thickness range**: 0.062” to 0.187”
  - **Panel cutout**: 0.830” x 1.450”
- **Seals Base**: Nylon, V-0 UL flammability rating
- **Actuator**: Polycarbonate, V-2 UL flammability rating, painted and laser marked
- **Perimeter lens**: Polycarbonate, V-2 UL flammability rating
- **Bracket/Bezel**: Polycarbonate polyester blend, V-0 UL flammability rating

**Physical**

- **Illumination**: One or two LED backlit laser marked icons (configurable to be independent or dependent)
  - Uniform full or half perimeter illumination (configurable to be independent or dependent)
  - Dimmable illumination (icons and perimeter), controlled by supply voltage
  - LEDs rated for 50,000 hour life
- **Seals Base**: Nylon, V-0 UL flammability rating
- **Actuator**: Polycarbonate, V-2 UL flammability rating, painted and laser marked
- **Perimeter lens**: Polycarbonate, V-2 UL flammability rating
- **Bracket/Bezel**: Polycarbonate polyester blend, V-0 UL flammability rating

**Mechanical**

- **Endurance**: 200,000 cycles minimum, circuit dependent

**Connector**

- **Switch mates with TE connector housing part number 1418994-1. Based on application wire size choose receptacle part number below (or equivalent):**
  - 1-968880-1 20-24 AWG wire
  - 1-968849-1 17-20 AWG wire
  - 1-968851-1 13.5-17 AWG wire
  - 1-968853-1 12 AWG wire

**Actuator Travel (Angular Displacement)**

- **2 position**: 24°
- **3 positions**: 12° from center

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

GPS-0014 Rev: A

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### HR-Series - Halo Illuminated Sealed Rocker Switch - Ordering Scheme

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<th>3 Rating</th>
<th>4 Termin. / Base Style</th>
<th>5 Illum. Circuit</th>
<th>6 Perimeter Style</th>
<th>7 Perimeter Illumination Color</th>
<th>8 Rocker Illumination Color</th>
<th>9 Bracket Color</th>
<th>10 Rocker Color</th>
<th>11 Rocker Style</th>
<th>12 Legend</th>
<th>13 Legend</th>
<th>14 Legend Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### 1 Series
HR-Halo Series Halo Illuminated Rocker Switch

### 2 Circuit
Position:
- Single Pole Double Pole 5&7, 6&8 Connected Terminals 3&5, 4&6
- 11 21 ON NONE OFF
- 12 22 (ON) NONE OFF
- 14 24 ON NONE ON
- 15 25 ON NONE (ON)
- 16 26 ON OFF ON
- 18 28 (ON) OFF (ON)

### 3 Rating
D 20A 12V

### 4 Terminal / Base Style
1 .110 TAB (QC)

### 5 Illumination Circuit 1, 2, 3
Terminal Connections as viewed from back of switch:

#### Full Perimeter Illumination
Perimeter Illumination: Independent 9(+) 1(-) for codes A1 to A7

**Rockers Illumination:**
- 2 and 3 Position Switches
  - A1 Independent LED 1: 10(+) 1(-) LED 2: 2(+) 1(-)
  - A2 Independent LED 1: 10(+) 1(-) No Illumination
  - A3 No Illumination
- 2 Position Switch Position 1 Position 3
  - A4 Dependent LED 1: 5(+) 1(-) LED 2: 5(+) 1(-)
  - A5 Dependent LED 1: 10(+) 1(-) LED 2: 5(+) 1(-)
  - A6 Dependent LED 1: 5(+) 1(-) No Illumination

#### Half Perimeter Illumination
Perimeter Illumination: LED 1 and 2: 10(+) 1(-)

**Rockers Illumination:**
- 3 Position Switch Position 1 Position 2 Position 3
  - B1 Dependent Top Half On Full Illumination Bottom Half On
    - 10(+) 2(+) 1(-) 10(+) 1(-) 10(+) 9(+) 1(-)

Notes:
1. Code (A4) only available with 2 Position Circuits (14, 15, 24, 25)
2. Codes (A5, A6) only available with 2 Position Circuits (11, 12, 13, 14, 15, 21, 22, 23, 24, 25)
3. Codes (A7, B1) only available with 3 Position Circuits (16, 17, 18, 26, 27, 28)

### 6 Perimeter Style
1 Full Ring

### 7 Perimeter Illumination Color

<table>
<thead>
<tr>
<th>Code</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Blue</td>
</tr>
<tr>
<td>G</td>
<td>Green</td>
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### 8 Rocker Illumination Color

<table>
<thead>
<tr>
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<th>Color</th>
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<tr>
<td>Z</td>
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<tr>
<td>W</td>
<td>White</td>
</tr>
<tr>
<td>B</td>
<td>Blue</td>
</tr>
<tr>
<td>A</td>
<td>Amber</td>
</tr>
<tr>
<td>R</td>
<td>Red</td>
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### 9 Bracket Color

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<tr>
<td>1</td>
<td>Black</td>
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<tr>
<td>2</td>
<td>Silver</td>
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</table>

### 10 Rocker Color

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<tr>
<td>1</td>
<td>Black</td>
</tr>
<tr>
<td>2</td>
<td>Silver</td>
</tr>
</tbody>
</table>

### 11 Rocker Style
1 Laser Etch

### 12 Legend
00 No Legend
For standard legends, see “Standard Legend Codes” page.
For additional legends, please consult factory

### 13 Legend
00 No Legend
For standard legends, see “Standard Legend Codes” page.
For additional legends, please consult factory

### 10 Legend Orientation

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

Notes:
1. Code (A4) only available with 2 Position Circuits (14, 15, 24, 25)
2. Codes (A5, A6) only available with 2 Position Circuits (11, 12, 13, 14, 15, 21, 22, 23, 24, 25)
3. Codes (A7, B1) only available with 3 Position Circuits (16, 17, 18, 26, 27, 28)
### Independent Illumination:

<table>
<thead>
<tr>
<th>2 Position Switch</th>
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<tbody>
<tr>
<td>Position 1</td>
</tr>
<tr>
<td>A1</td>
</tr>
<tr>
<td>A2</td>
</tr>
<tr>
<td>A3</td>
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</table>

<table>
<thead>
<tr>
<th>3 Position Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position 1</td>
</tr>
<tr>
<td>A1</td>
</tr>
<tr>
<td>A2</td>
</tr>
<tr>
<td>A3</td>
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</table>

### Dependent Illumination:

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<td>Position 1</td>
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<tr>
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<td>A6</td>
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<table>
<thead>
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<th>3 Position Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position 1</td>
</tr>
<tr>
<td>A7</td>
</tr>
<tr>
<td>B1</td>
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**LEGEND:** Used for illumination representation only. Refer to legend code page for complete list of standard legends.
### Standard Legend Codes:

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<tr>
<td>TG</td>
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</table>

### Notes:
1. ISO compliant symbols. Consult factory for custom legends.
2. New legend codes recommended for new part setups. Previous codes still valid for existing customers.
Dimensional Specifications: in. [mm]

MATES WITH TE CONNECTOR 1418994-1
## Circuit Diagrams:

<table>
<thead>
<tr>
<th>Circuit Code</th>
<th>CIRCUIT DIAGRAM</th>
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</thead>
<tbody>
<tr>
<td>11</td>
<td><img src="image1" alt="Circuit Diagram 11" /></td>
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<tr>
<td>12</td>
<td><img src="image2" alt="Circuit Diagram 12" /></td>
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<tr>
<td>14</td>
<td><img src="image3" alt="Circuit Diagram 14" /></td>
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<tr>
<td>15</td>
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<td>26</td>
<td><img src="image11" alt="Circuit Diagram 26" /></td>
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<tr>
<td>28</td>
<td><img src="image12" alt="Circuit Diagram 28" /></td>
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## Illumination Circuit Diagrams:

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<th>Illumination Code</th>
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<td></td>
<td></td>
<td>B1</td>
<td><img src="image" alt="B1 Diagram" /></td>
</tr>
</tbody>
</table>

**Illumination Code**

- A1
- A2
- A3
- A4
- A5
- A6
- A7
- B1

**ILLUMINATION CIRCUIT DIAGRAM**

- A1: (-1) + (+9)
- A2: (-1) + (+9)
- A3: (-1) + (+9)
- A4: (-1) +3 +7 + (+9)
- A5: (-1) + (+9)
- A6: (-1) +7 (+)9
- A7: (-1) +3 +7 (+)9
- B1: (-1) +3 +7 (+)10

**Additional Notes**

- The diagrams illustrate the flow of illumination in the HR-Series Halo Illuminated Sealed Rocker Switch.
- Each diagram represents a specific illumination code as detailed in the table.

---

*Image placeholders have been used for illustrative purposes as the actual image cannot be displayed.*
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.

**Typical Applications:**
- Marine Panels
- Emergency Vehicles
- Trucks
- Buses
- Construction Equipment
- Motorcycles & ATVs
- Farm Equipment
- Commercial Appliances
- Military Vehicles
- Mining Equipment
- Golf Carts
- Floor Cleaning Equipment
- Utility Vehicles

**Resources:**
- Download 3D CAD Files
- Watch Product Video
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**
Helps prevent 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.

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

back to table of contents
**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, 14V
  - 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

**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.
    - Mixed Flowing Gas (MFG) Class III
    - 3 year accelerated exposure per ASTM B-827, B-845 Silver and gold contacts
  - Corrosion
    - -40°C to +85°C
  - Operating Temp.
    - 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 1
    - Resonance search 24-50 Hz 0.40 DA
    - 50-2000 Hz ± 10 G’s peak
    - 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 seconds chatter.
  - Vibration 2
    - 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.
    - Mili STD 810, Method 510.2 Air Velocity
    - 300 Ft/Min Duration 16Hr
  - Dust
    - Per Mil-Std 202F, Method 107F, Test Cond. A, -55°C to +85°C. Test criteria - pre and post test contact resistance
  - 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.

**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**
  - Internal
- **Base**
  - Polyester blend rated to 125°C with a UL flammability rating of 94V0.
  - Optional external gasket panel seal
- **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
- **Lens**
  - 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**

- **Panel Thickness Range**
  - **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

**Mechanical**

- **Endurance**
  - 150,000 cycles minimum circuit dependent
### V-Series - Contura® Sealed Rocker Switches - Contura II & III - Ordering Scheme

#### 1 SERIES

<table>
<thead>
<tr>
<th>V1DA BT0B-ARB00-00</th>
</tr>
</thead>
</table>

#### 2 CIRCUIT

Terminal Connections as viewed from bottom of switch:
- **8 terminal 10 terminal**
  - **8 - 7**
  - **6 - 5**
  - **4 - 3**
  - **2 - 1**
  - **10 - 9**
  - **10 - 8**
  - **9 - 8**
  - **7 - 6**
  - **5 - 4**
  - **3 - 2**
  - **1 - 10**

Position:
- **SP DP**
- **ON**
- **NONE**
- **OFF**

**SPECIAL CIRCUITS**
- **2 & 3, 5 & 6**
- **2 & 3, 5 & 4, 6 & 8**
- **2 & 3, 5 & 4, 6 & 8, 1 & 2**

**LED**
- ** superbright**

**2 TERMINATION / BASE STYLE**

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>DP</td>
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<tr>
<td>2</td>
<td>2 &amp; 3, 5 &amp; 6</td>
</tr>
<tr>
<td>3</td>
<td>Connected Terminals 1 &amp; 2, 4 &amp; 5</td>
</tr>
</tbody>
</table>

#### 3 RATING

- **1.4A @ 28VDC Resistive**
- **15A 24V**
- **10A 12V**
- **20A 12V**
- **10A 12V**
- **10A 14V**
- **6A 14V**
- **10A 14V**
- **10A 14VT**
- **5A 20V**
- **15A 15V**
- **4VA 20A 12V**
- **4VA 20A 15V**
- **4VA 20A 24V**

#### 4 TERMINATION / BASE STYLE

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>DP</td>
</tr>
<tr>
<td>2</td>
<td>2 &amp; 3, 5 &amp; 6</td>
</tr>
<tr>
<td>3</td>
<td>Connected Terminals 1 &amp; 2, 4 &amp; 5</td>
</tr>
</tbody>
</table>

#### 5 ILLUMINATION

Lamp #1: above terminals 1 & 4; Lamp #2: above terminals 3 & 6; End of Switch.

Lamp Type: LED
- **superbright**
- **superbright**
- **superbright**

### 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</th>
<th>Color</th>
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<tbody>
<tr>
<td>Red</td>
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</tr>
<tr>
<td>Amber</td>
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</tr>
<tr>
<td>Green</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td></td>
</tr>
</tbody>
</table>

### 8 FLUSH BRACKET COLOR 1, PANEL SEAL

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

### 9 ACTUATOR

- **A, B, Contura II**
- **C, D, Contura III**

#### 10 LENS

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

### 11 ACTUATOR COLOR 1 AND TEXTURE

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

### 12 ACTUATOR LENS OR BODY LEGENDS 2

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

### 13 LEGEND ORIENTATION

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

### 14 ACTUATOR LENS LEGEND

#### 00: No legend (used with codes 11-18 in selection 12)

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

Note: 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 white, red and gray actuators.**
- **Custom colors are available, consult factory.**
- **Additionals ratings available. See V-Series Switch Accessories page.**
- **Contura II available with two square lenses. Consult factory for details.**
### V-1DASW0B-AZEO00-0

**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.

**8 terminal 10 terminal**
- 8 - 7 8 - 7 8 - 7 8 - 7 8 - 7 8 - 7
- 1 - 4 1 - 4 1 - 4 1 - 4 1 - 4 1 - 4
- 2 - 5 2 - 5 2 - 5 2 - 5 2 - 5 2 - 5
- 3 - 6 3 - 6 3 - 6 3 - 6 3 - 6 3 - 6
- 10 - 9 10 - 9 10 - 9 10 - 9 10 - 9 10 - 9

**Position:**
- SP 2 & 3, 5 & 6 Connected Terminals 1 & 2 & 4 & 5
- DP 2 & 3, 5 & 6 Connected Terminals 1 & 2 & 4 & 5
- 1 A ON OFF ON
- 2 B ON OFF ON
- 3 C ON OFF ON
- 4 D ON OFF ON
- 5 E ON OFF ON
- 6 F ON OFF ON
- 7 G ON OFF ON
- 8 H ON OFF ON
- 9 I OFF OFF OFF

**SPECIAL CIRCUITS**
- H* 2 & 3 2 & 3 2 & 3
- G* 2 & 3 2 & 3 2 & 3
- F* 2 & 3 2 & 3 2 & 3
- E* 2 & 3 2 & 3 2 & 3

* 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**
- 1 .4VA @ 28VDC Resistive
- 2 20A 12V
- 3 10A 14V, 6A 14VT (circuit G only)
- 4 20A 14V, 10A 14VT (circuit 1, 4, A & D only)
- 5 .4VA/20A 12V
- 6 .4VA/15A 24V

**4 TERMINATION / BASE STYLE**
- 8 terminal 10 term
- 1 BA 250 TAB (QC) no barriers No
- 2 BA 250 TAB (QC) with barriers No
- 3 J 250 TAB (QC) no barriers Yes T2 to 5
- 4 K 250 TAB (QC) no barriers No
- 5 C Solder Lug no barriers No
- 6 D Solder Lug No
- 7 E Wire Leads no barriers No
- 8 F 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 & 4 end of switch.
- Positive (+) and negative (-) symbols apply to LED lamps only.
- Lamps illuminated Type
  - Sealed: Unsealed
  - Lamps: Lamps
  - Illumination: Illumination Type
  - Lamp wired to Terminals: Lamp wired to Terminals

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

**7 LAMP**
- Lamp above terminals 3 & 6 end of switch
- No lamp: 0
- Neon: 9
- Incandescent: 125VAC
  - 1 43V
  - 2 56V
  - 3 6V
  - 4 12V
  - 5 18V
  - 6 24V
- LED*: Red Amber Green Red
  - 1 superbright
  - 2 superbright
  - 3 Red
  - 4 LED* superbright
- 5 superbright
- 6 Incandescent
- 7 Neon
- 8 Lamp above terminals 3 & 6 end of switch.

**8 FLUSH BRACKET COLOR, PANEL SEAL**
- Black White Gray
- No Seal B W G
- One Seal C Y H

**9 HARD SURFACE ACTUATOR**
- Contura II Black Gray Red White
- Contura III C D E F

**10 LENS**
- Z - No Lens
- Clear White Amber Green Red Blue
- 3 8 D J P V
- Lens color for LEDs must be clear, white, or match color of LED. Green or blue lenses are not recommended with Neon lamps.

**11 ACTUATOR LOCK FUNCTION AND COLOR**
- Match Actuator A H R 1
- Black B J S 2
- White C K T 3
- Red D L V 4
- Safety Orange E M W 5

**12 ACTUATOR LENS OR BODY LEGEND**
- Lock Color Up Down Up & Down Center
- 1 Match Actuator A H R 1
- 2 Black B J S 2
- 3 White C K T 3
- 4 Red D L V 4
- 5 Safety Orange E M W 5

**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. Custom colors are available, consult factory.
- 3 Only available with 3 position circuits. Center OFF and special circuits only available with center position lock function.
- 4 Additional ratings available. See V-Series Switch Accessories page.

---

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

---

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 Only available with 3 position circuits. Center OFF and special circuits only available with center position lock function.
- 4 Additional ratings available. See V-Series Switch Accessories page.

---

V-1DASW0B-AZEO00-0 back to table of contents
### V-Series - Contura® Sealed Rocker Switches - Contura V - 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.
- DPJ - double pole - uses terminals 2, 3, 4, 5.
- 8 terminal 10 terminal DP - double pole uses terminals 1, 2, 3, 4, 5, 6.

#### Rating 4

- 0.4VA @ 28VDC Resistive
- 15A 12V
- 20A 12V
- 20A 14V, 10A 14VT (circuit 1, 4, A & D only)
- 10A 14V, 6A 14VT (circuit G only)
- .4VA/20A 12V
- .4VA/15A 24V

#### 3 TERMINATION / BASE STYLE

<table>
<thead>
<tr>
<th>Term</th>
<th>10 Term</th>
<th>Termination</th>
<th>Jumper</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>.250 TAB (QC) no barriers</td>
<td>No</td>
</tr>
<tr>
<td>J</td>
<td>K</td>
<td>.250 TAB (QC) with barriers</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Solder Lug no barriers</td>
<td>Yes T2 to 5</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>Wire Leads no barriers</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>6</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; Lamp #2 above terminals 3 & 6 end of switch. 

<table>
<thead>
<tr>
<th>Lamp</th>
<th>9 Actuator</th>
<th>10 Lens</th>
<th>11 Color</th>
<th>12 Legend</th>
<th>13 Legend Orientation</th>
<th>14 Actuator Lens Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Actuator 0</td>
<td>Black</td>
<td>C</td>
<td>Gray</td>
<td>Red</td>
<td>S</td>
</tr>
<tr>
<td>1</td>
<td>V</td>
<td>Y</td>
<td>Nickel</td>
<td>D</td>
<td>Pewter</td>
<td>E</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                 | 0                       |
| Incandescent            | 0.4VA/20A 12V           |
| 0.4VA/20A 250VAC        | 250VAC                  |
| 6V DC                   | 12V                     |
| 12V                     | 18V                     |
| Red                     | Amber                   |
| Superbright             | Green                   |
| Superbright             | Red                     |

#### 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

<table>
<thead>
<tr>
<th>Lens</th>
<th>0 - No Actuator</th>
<th>Z - No Lens</th>
<th>style &amp; location: #1 / #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear White</td>
<td>Amber</td>
<td>Green</td>
<td>Red</td>
</tr>
<tr>
<td>Black</td>
<td>White</td>
<td>Gray</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Lens Legend</th>
<th>Orientation 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No legend</td>
<td>(used with codes 11-18 in selection 12)</td>
</tr>
<tr>
<td>1 Orientation</td>
<td>1</td>
</tr>
<tr>
<td>2 Orientation</td>
<td>2</td>
</tr>
<tr>
<td>3 Orientation</td>
<td>3</td>
</tr>
<tr>
<td>4 Orientation</td>
<td>4</td>
</tr>
</tbody>
</table>

#### 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 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 requires two legends. For additional legend options & codes, visit us at www.carlingtech.com.

### Notes

- Custom colors are available. Consult factory.
- Laser Etched rocker only available with lens code Z & actuator colors black, white or pewter.
- Additional ratings available. See V-Series Switch Accessories page.
- Nickel and Pewter colors only available with laser etched actuator.
- Consult factory for laser etched lens callout.
V-Series - Contura® Sealed Rocker Switches - Contura IV & V Locking - Ordering Scheme

1 SERIES
V

2 CIRCUIT
3
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 & 6.
8 terminal 10 terminal
1 - - 7 6 - - 7 Terminals 7, 8, 9 & 10 for lamp circuit only.
2 - - 5 2 - - 5
3 - - 6 3 - - 6
10 - 9
Position:
1 2 3
SP DP 2 & 3, 5 & 6 Connected Terminals 1 & 2, 4 & 5
1 A ON NONE OFF
2 D ON OFF ON
3 J ON OFF ON
4 K ON OFF (ON)
5 L (ON) OFF (ON)
6 N OFF NONE ON

3 RATING
4
1 .4VA @ 28VDC Resistive
B 15A 24V
C 20A 18V
D 20A 12V
E 20A 14V, 10A 14VT (circuit 1, 4, A & D only)
F 10A 14V, 6A 14VT (circuit G only)
M .4VA/20A 12V
N .4VA/15A 24V

4 TERMINATION / BASE STYLE
6 term 10 Term Terminations Jumper
1 A B 250 TAB (QC) no barriers No
2 C D 250 TAB (QC) with barriers No
3 S T 250 TAB (QC) no barriers Yes T2 to 5
4 J K Solder Lug no barriers No
5 C D Solder Lug No
6 E F Wire Leads no barriers 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 & 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
S 0 NONE 3 (+) 7 (-)
C 3 2 UP 3 (+) 7 (-)
H Z 2 INDEPENDENT 3 (+) 7 (-)
DOUBLE POLE SWITCHES ONLY
M R 1 UP 3 (+) 6 (-)

6 LOCK
Lock above terminals 1 & 4 end of switch.
W low profile lock Y 6 high profile lock

7 LAMP
Lamp above terminals 3 & 6 end of switch
No lamp 0
Neon 1 125VAC 2 250VAC
Incandescent 4 3V 5 6V 6 12V 7 18V 8 24V
LED Red Amber Green Red
2VDC A B I F R
6VDC B I M G S T
12VDC C N H T
24VDC D P J V
Consult factory for “daylight bright” LED options. Typical current draw for LED is 20mA.

8 FLUSH BRACKET COLOR 1, PANEL SEAL
No Seal Black White Gray
One Seal C Y H

9 HARD SURFACE ACTUATOR
CONTURA IV:
Orientation Black Gray Red White
Left J K L M
Right N P R S
CONTURA V:
Orientation Black Gray Red White
U V W Y
Actuator orientation over terminals: 3.6 1.4

10 LENS
Z - No Lens
Clear White Amber Green Red Blue
A B C D E F bar lens
G H J K L M oval lens
Lens color for LEDs must be clear, white, or match color of LED. Green or blue lenses are not recommended with Neon lamps.

11 ACTUATOR LOCK FUNCTION AND COLOR
Lock Color Up Down Up & Down/Center 3
Match Actuator A B W H R 1
Black B J S 2
White C K T 3
Red D L V 4
Safety Orange E M W 5
Gray F G N 6

12 ACTUATOR LENS OR BODY LEGEND
00 - No Legend
OFF ON 0 1
25 O 26 O 27 O 28 I
F N F
For additional legend options & codes, visit us at www.carlingtech.com.

13 LEGEND ORIENTATION
Orientation 1 3 4 2
Orientation 2 1 4 3
Orientation 3 1 2 4
Orientation 4 1 2 3

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 Only available with 3 position circuits. Center OFF and special circuits only available with center position lock function.
4 Additional ratings available. See V-Series Switch Accessories page.
5 Located at T3-6 end of switch.
6 Contura V style only.

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1 SERIES
V

2 CIRCUIT
Terminal Connections as viewed ( ) - momentary
from bottom of switch:
8 terminal 10 terminal
8 - 7 8 - 7
1 - 4 1 - 4
2 - 5 2 - 5
3 - 6 3 - 6
10 - 9
Position: 1 2 3
SP DP 2 & 3, 5 & 6 Connected Terminals 1 & 2, 4 & 5
1 A ON NONE OFF
2 B ON NONE OFF
3 C ON NONE OFF
4 D ON NONE ON
5 F ON NONE ON
7 K ON OFF (ON)
8 L (ON) OFF (ON)

8 SPECIAL CIRCUITS
H* 2 & 3 2 & 3, 5 & 6
G* 2 & 3, 5 & 6 & 8 2 & 3
M* (2 & 3, 5 & 6) 2 & 3, 5 & 6
R* (2 & 3, 5 & 6) 2 & 3
E* 5 & 6 5 & 3 5 & 1

*Jumper between terminals 2 & 5 for circuits H, G, M, R & S are specified in
E*
M*
S*
G*
SPECIAL CIRCUITS
H*
M*
F
D
C
B
10 - 9 - 8 - 7 8 - 7 Terminals 7, 8, 9 & 10 for lamp circuit only.
from bottom of switch: SP - single pole - uses terminals 1, 2 & 3.
2 B 1 A
SP DP 2 & 3, 5 & 6 Connected Terminals 1 & 2, 4 & 5
2 & 3 2 & 1
(2 & 3, 5 & 6) 2 & 3 OFF
(2 & 3, 5 & 6) 2 & 3 ON
1 & 2
1 & 2
ON OFF ON
ON OFF ON
ON NONE ON
ON NONE OFF
ON NONE OFF
ON NONE OFF

3 RATING
1 .4VA @ 28VDC Resistive
B 15A 24V
C 20A 18V
D 20A 12V
E 20A 14V, 10A 14VT (circuit 1, 4, A & D only)
F 10A 14V, 6A 14VT (circuit G only)
M .4VA/20A 12V
N .4VA/15A 24V

4 TERMINATION / BASE STYLE
Term 10 Term Termination Jumper
1 2 250 TAB (QC) no barriers No
A B 250 TAB (QC) with barriers No
J K 250 TAB (QC) no barriers Yes T2 to 5
3 5 Solder lug no barriers No
C D Solder lug No
5 6 Wire Leads no barriers No
E F 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 & 4 end of switch; Lamp #2 above terminals
3 & 6 end of switch. Positive (+) and negative (-) symbols apply to LED
lamps only
Sealed Unscrewed Lamps Illumination Type Lamp wired to Terminals
S 0 NONE INDEPENDENT 8 (+) 7 (-)
A 1 1 INDEPENDENT 8 (+) 7 (-)
B 2 1 INDEPENDENT 8 (+) 7 (-)
C 3 2 UP 3 (+) 7 (-)
D 4 1 DOWN 3 (+) 7 (-)
E 5 1 UP 3 (+) 7 (-)
F 6 1 INDEPENDENT 8 (+) 7 (-)
G 7 2 UP 3 (+) 6 (-)
H 2 2 INDEPENDENT 8 (+) 7 (-)
I 2 2 INDEPENDENT 8 (+) 7 (-)
U 2 2 INDEPENDENT 8 (+) 7 (-)
H 2 2 INDEPENDENT 8 (+) 7 (-)
SINGLE POLE SWITCHES ONLY
J 1 1 DOWN 3 (+) 8 (-)
K 1 2 UP 3 (+) 7 (-)
W 2 1 INDEPENDENT 6 (+) 7 (-)
W 2 1 INDEPENDENT 6 (+) 7 (-)
DOUBLE POLE SWITCHES ONLY
L 1 1 DOWN 3 (+) 6 (-)
M 1 1 UP 3 (+) 6 (-)
N 1 1 UP 3 (+) 6 (-)
P 1 1 UP 3 (+) 6 (-)

6.7 LAMP
Lamp above terminals 3 & 6 end of switch
No lamp 0
Neon Incandescent 1 125VAC 3 4 3V
2 20VAC 5 6V 6 12V 7 18V 8 24V
LED* Red Amber Green Red
2VDC A L F R
6VDC B M G S
12VDC C N H T
24VDC D P J V
Consult factory for “daylight bright” LED options. Typical current draw for
LED is 20ma.

8 FLUSH BRACKET COLOR 1, PANEL SEAL
Black White Gray
No Seal B W G
One Seal C Y H

9 ACTUATOR COLOR
0 No Actuator H High Insert I L Low Insert

10.11 LENS
0 - No Actuator Clear White Z - No Lens
1 7 C H N U Bar Lens Translucent
3 – D J P V Bar Lens Transparent
4 – E K R W Oval Lens Translucent
8 – A F L S Y Oval Lens Translucent
Lens color for LEDs must be clear, white, or match color of LED.
Green or blue lenses are not recommended with Neon lamps.

12 ACTUATOR COLOR
C Black H Gray S Red Y White

13 INSERT COLOR
B Black S Satin Chrome Plated
C Bright Chrome Plated T Satin Nickel Plated
D Satin Chrome Painted W White

14 ACTUATOR LENS OR BODY LEGENDS 2
00 - No Legend this location/No actuator
11 ON 12 OFF 13 14 0 OFF ON I O
15 O O 16 O 17 O 18 I O F N N F P F
F For additional legend options & codes, visit us at www.carlingtech.com.

15 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

18 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.
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 Additional ratings available. See V-Series Switch Accessories page.

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

**V**

### 2 CIRCUIT

**Terminal Connections as viewed ( ) - momentary**
- **8 terminal 10 terminal**
  - DP - single pole uses terminals 1, 2 & 3.
  - DP - double pole uses terminals 1, 2, 3, 4, 5 & 6.
- **Selections**
  - A B C D E F G H I J K L M N
  - 1 & 2: SP OFF-ON-ON circuit.
  - 1 & 3: SP DP 2 & 3, 5 & 6 connected terminals.
  - 1 & 4: SP DP 1 & 2, 4 & 5.
  - 1 & 5: SP DP 1 & 2, 4 & 5.
  - 1 & 6: SP DP 1 & 2, 4 & 5.
  - 1 & 7: SP DP 1 & 2, 4 & 5.
  - 1 & 8: SP DP 1 & 2, 4 & 5.
  - 1 & 9: SP DP 1 & 2, 4 & 5.
  - 1 & 10: SP OFF-ON-ON circuit.
- **External jumper between terminals 2 & 4 for circuit E are**
- **Jumper between terminals 2 & 5 for circuits H, G, M, R & S are specified in**

### 3 RATING

**4.4VA @ 28VDC Resistive**
- **A**: 15A 24V
- **B**: 20A 18V
- **C**: 20A 18V
- **D**: 20A 18V, 10A 14VT (circuit 1, 4 & A & D only)
- **E**: 10A 14V, 6A 14VT (circuit G only)
- **F**: 10A 14V, 6A 14VT (circuit G only)
- **M**: .4VA/20A 12V
- **N**: .4VA/15A 24V

### 4 TERMINATION / BASE STYLE

**9 Term 10 Term**
- **Jumper**
- **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. Lamp #2 above terminals 3 & 6 end of switch. Positive (+) and negative (-) symbols apply to LED lamps only.**
- **Sealed Lamps**
- **Unsealed Lamps**
- **Ignition Type**
- **Lamp wired to Terminals**
- **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 dual grommet version only.

### 6, 7 LAMP (same coding for both selections)

- **Selection 6:** above terminals 1 & 4; **Selection 7:** above terminals 3 & 6
- **Neutral Inadissipable Incandescent**
  - 4V 3V 5V 6V 7V 8V 12V 18V 24V
  - **Red**
  - **Amber**
  - **Green**
  - **Red**
  - **2VDC**
  - **A**
  - **L**
  - **R**
  - **6VDC**
  - **B**
  - **M**
  - **S**
  - **12VDC**
  - **C**
  - **N**
  - **T**
  - **24VDC**
  - **D**
  - **P**
  - **V**

### 8 FLUSH BRACKET COLOR

**1 PANEL SEAL**
- No Seal
- Black
- White
- Gray
- Green

### 9 ACTUATOR

- **0 No Actuator**
- **2 Contura VII**
- **3 Actuator orientation over terminals:**
  - **A**
  - **B**
  - **C**
  - **D**

### 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**
- **Z - No Lens**
- **White Amber Green Red Blue**
- **Lens style & location**
- **6 B G M T**
- **7 C H N U**
- **8 D J P V**

### 11 ACTUATOR COLOR / THUMB PRINT COLOR

**1 N/A - No Actuator**
- **C Black/Black**
- **Y White/Black**

### 12 ACTUATOR LENS OR BODY LEGENDS

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

### 13 LEGEND ORIENTATION

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

### 14 ACTUATOR LENS LEGEND

**Legend**
- **00 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.
- 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.
- For legend options & codes, visit us at www.carlingtech.com.
## 1 SERIES

<table>
<thead>
<tr>
<th>V</th>
<th>1</th>
<th>D</th>
<th>A</th>
<th>B</th>
<th>6</th>
<th>0</th>
<th>1</th>
<th>- 6</th>
<th>P</th>
<th>Z</th>
<th>00 - 00</th>
</tr>
</thead>
</table>

### 2 CIRCUIT

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

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

**Position:**

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

**Special Circuits:**

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

*Jumper between terminals 2 & 5 for circuits H, G, M, R & S are specified in selection 14.

### 3 RATING

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

### 4 TERMINATION / BASE STYLE

#### 8 Term 10 Term

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jumper</td>
<td>.250 TAB (QC)</td>
<td>no barriers</td>
<td>0</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>2</td>
<td>.250 TAB (QC)</td>
<td>with barriers</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>J</td>
<td>.250 TAB (QC)</td>
<td>no barriers</td>
<td>Yes T2 to 5</td>
<td>0</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>5</td>
<td>Solder Lug no barriers</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>Wire Leads no barriers</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>E</td>
<td>F</td>
<td>Wire Leads no barriers</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</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; Lamp #2 above terminals 3 & 6 end of switch. Positive (+) and negative (-) symbols apply to LED lamps only.

<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>
</tr>
</thead>
<tbody>
<tr>
<td>Lamps</td>
<td>1</td>
<td>INDEPENDENT</td>
<td>2</td>
<td>DOWN</td>
<td>3</td>
<td>UP</td>
<td>4</td>
<td>DOWN</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>UP</td>
<td>6</td>
<td>INDEPENDENT</td>
<td>7</td>
<td>DOWN</td>
<td>8</td>
<td>INDEPENDENT</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>10</td>
<td>3</td>
<td>10</td>
<td>4</td>
<td>10</td>
<td>5</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>

**Single Pole Switches Only**

| J | 8 | 1 | INDEPENDENT | 2 | DOWN | 3 | UP | 4 | DOWN | 1 |
| K | 8 | 2 | INDEPENDENT | 6 | DOWN | 6 | UP | 2 | DOWN | 1 |

**Double Pole Switches Only**

| L | 8 | 1 | DOWN | 3 | UP | 4 | DOWN | 2 | UP | 1 |
| N | 8 | 2 | DOWN | 3 | UP | 2 | DOWN | 1 | UP | 1 |

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

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

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

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No lamp</td>
<td>1</td>
<td>125VAC</td>
</tr>
<tr>
<td>2</td>
<td>250VAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3V</td>
<td>5</td>
<td>6V</td>
</tr>
<tr>
<td>6</td>
<td>612V</td>
<td>7</td>
<td>18V</td>
</tr>
<tr>
<td>10</td>
<td>24V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LED**

| 2VDC | A | L | F |
| 6VDC | B | M | G |
| 12VDC | C | N | H |
| 24VDC | D | J | V |

### 8 BRACKET COLOR

<table>
<thead>
<tr>
<th>1</th>
<th>PANEL SEAL (EXTERNAL FOAM GASKET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X &amp; XI with Flush Bracket</td>
<td></td>
</tr>
<tr>
<td>X, XI, XII with Raised Bracket</td>
<td></td>
</tr>
<tr>
<td># of gaskets</td>
<td>1</td>
</tr>
<tr>
<td>Black</td>
<td>B</td>
</tr>
<tr>
<td>White</td>
<td>W</td>
</tr>
<tr>
<td>Gray</td>
<td>G</td>
</tr>
</tbody>
</table>

### 9 ACTUATOR

#### 0 - No Actuator

<table>
<thead>
<tr>
<th>No Actuator</th>
<th>Black</th>
<th>Gray</th>
<th>White</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contura X</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Contura XI</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Contura XII</td>
<td>J</td>
<td>K</td>
<td>N</td>
<td>M</td>
</tr>
</tbody>
</table>

**Actuator orientation over terminals:**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
</tbody>
</table>

### 10 LENS - ABOVE LAMP #1 TERMINALS

<table>
<thead>
<tr>
<th>1</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
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<td>7</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>23</td>
<td>24</td>
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<tr>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>27</td>
<td>28</td>
</tr>
</tbody>
</table>

**Lens Style:**

<table>
<thead>
<tr>
<th>Clear</th>
<th>White</th>
<th>Amber</th>
<th>Green</th>
<th>Red</th>
<th>Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lens</td>
<td>3</td>
<td>8</td>
<td>D</td>
<td>J</td>
<td>P</td>
</tr>
<tr>
<td>One piece</td>
<td>4</td>
<td>9</td>
<td>E</td>
<td>K</td>
<td>R</td>
</tr>
<tr>
<td>Two piece square</td>
<td>A</td>
<td>F</td>
<td>L</td>
<td>S</td>
<td>X</td>
</tr>
<tr>
<td>Two piece square*</td>
<td>With clear top protective lens</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two piece square*</td>
<td>With smoke top protective lens</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 12 ACTUATOR LENS OR BODY LEGEND

<table>
<thead>
<tr>
<th>0</th>
<th>No Legend this location / No actuator</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>ON</td>
</tr>
<tr>
<td>12</td>
<td>OFF</td>
</tr>
<tr>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>O</td>
<td>14</td>
</tr>
</tbody>
</table>

**Legend Orientation:**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>16</td>
<td>17</td>
<td>18</td>
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<td>20</td>
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<td>25</td>
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<td>27</td>
</tr>
<tr>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
</tr>
</tbody>
</table>

**Legend Options & Codes:**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
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<td>16</td>
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<td>20</td>
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<td>24</td>
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<tr>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
</tr>
</tbody>
</table>

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

### 14 ACTUATOR LENS LEGEND

<table>
<thead>
<tr>
<th>0</th>
<th>No legend this location / no actuator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Orientation 1</td>
</tr>
<tr>
<td>2</td>
<td>Orientation 2</td>
</tr>
<tr>
<td>3</td>
<td>Orientation 3</td>
</tr>
<tr>
<td>4</td>
<td>Orientation 4</td>
</tr>
</tbody>
</table>

**Legend Options & Codes:**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
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<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
</tr>
<tr>
<td>24</td>
<td>25</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
</tr>
</tbody>
</table>

**Notes:**

- Consult factory to verify horsepower rating for your particular circuit choice.
- Custom colors are available. Consult factory.
- White printing is standard on black actuators; Black printing is standard on white, red & gray actuators. Custom colors are available, consult factory.
- With 2 square lenses, use selection 12 for lens above lamp 1, & selection 14 for lens above lamp 2.
- Additional ratings available. See V-Series Switch Accessories page.
- Not available with Contura XI rockers.
V1DASW01-1PBO00-V

1 SERIES

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

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 7</td>
<td>SP</td>
<td>DP</td>
<td>2 &amp; 3</td>
<td>5 &amp; 6</td>
<td>Connected Terminals 1 &amp; 2, 4 &amp; 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 4</td>
<td>A</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 - 5</td>
<td>D</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 - 6</td>
<td>J</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 - 9</td>
<td></td>
<td>OFF</td>
<td></td>
<td></td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SPECIAL CIRCUITS

- 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
- 20A 14V, 10A 14VT (circuit 1, 4, A & D only)
- 10A 14V, 6A 14VT (circuit G only)
- .4VA/20A 12V
- .4VA/20A 12V

4 TERMINATION / BASE STYLE

<table>
<thead>
<tr>
<th>Term</th>
<th>10 Term</th>
<th>Jumper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>250 TAB (OC) no bars</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>250 TAB (OC) with bars</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>Solder Lug no bars</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>Solder Lug no bars</td>
</tr>
<tr>
<td>5</td>
<td>E</td>
<td>Wire Leads no bars</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>Wire Leads</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. Lamp #2 above terminals 3 & 6 end of switch. Positive (+) and negative (-) symbols apply to LED lamps only.

Sealed: None
Unsealed: Lamps
Illumination Type: Lamp wired to Terminals
- 3: 0 None
- 3: 2 UP
- 3: 7 (+) 7 (-)
- 3: (+) 6 (-)

6 LOCK

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

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
- Neon
- Incandescent
- LED
- 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

9 HARD SURFACE ACTUATOR

- Contura X Black Gray Red White

10 LENS - ABOVE LAMP #2 TERMINALS

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

- 1: B, J, S
- 2: C, H, N, U
- 3: D, J, P, V

Note: All bottom lenses are molded of opaque material. Consult factory for other lens colors. Lens color for LEDs must be clear, white, or match color of LED. Green or blue lenses are not recommended with Neon lamps.

11 ACTUATOR LOCK FUNCTION AND COLOR

- Lock Color: Up, Down
- Match Actuator
- A up Down
- B up Down
- Black
- White
- Red
- Gray
- Safety Orange

12 ACTUATOR LENS OR BODY LEGEND

- 0: No Legend
- 21: OFF ON
- 26: 27: 28: I

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

For additional legend options & codes, visit us at www.carlingtech.com.
### V-Series - Contura® Sealed Rocker Switches - Contura XIV - 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.
- Terminals 7, 8, 9 & 10 for lamp circuit only.

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

#### 4 Termination / Base Style
- 10 Term: Orientation
  - 1: No legend / no actuator
  - 2: Orientation 1
  - 3: Orientation 2
  - 4: Orientation 3
  - 5: Orientation 4

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

#### 6 & 7 Lamp
- No lamp
- Neon
  - 125VAC 4V**: superbright
  - 250VAC 5V**: superbright
- Incandescent
  - 3V**: superbright
  - 5V**: superbright

#### 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 Style
- 0: No Actuator - Furnished separately
- FA: Contura XIV
- FB: Contura XIV - Laser Etched

#### 10 Lens Color / Style
- Clear: White / Amber / Green
- Red: Blue

#### 11 Actuator Color
- 0: N/A - No Actuator
- C: Black
- S: Red
- Y: White

#### 12 Actuator Lens or Body Legend
- 00: No Legend this location / No actuator
  - 11: ON / 12: OFF
  - 13: I / 14: O
  - 15: OFF / 16: ON
  - 17: I / 18: O

#### 13 Legend Orientation
- 00: No legend this location / No actuator
  - 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 requirements 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 switch 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.
- 3: Additional ratings available. See V-Series Switch Accessories page.
### V-Series - Contura® Sealed Rocker Switches - Contura XIV Locking - Ordering Scheme

#### 1 Series

<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>Actuator Color</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

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**

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP DP</td>
<td>2 &amp; 3, 5 &amp; 6</td>
<td>Connected Terminals 1 &amp; 2, 4 &amp; 5</td>
<td></td>
</tr>
<tr>
<td>- A</td>
<td>ON</td>
<td>NONE</td>
<td>OFF</td>
</tr>
<tr>
<td>- B</td>
<td>(ON)</td>
<td>NONE</td>
<td>OFF</td>
</tr>
<tr>
<td>- D</td>
<td>ON</td>
<td>NONE</td>
<td>ON</td>
</tr>
<tr>
<td>- J</td>
<td>ON</td>
<td>OFF</td>
<td>(ON)</td>
</tr>
<tr>
<td>- K</td>
<td>ON</td>
<td>OFF</td>
<td>(ON)</td>
</tr>
<tr>
<td>- L</td>
<td>(ON)</td>
<td>OFF</td>
<td>(ON)</td>
</tr>
<tr>
<td>- N</td>
<td>OFF</td>
<td>NONE</td>
<td>ON</td>
</tr>
</tbody>
</table>

#### 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>20A 12V</td>
</tr>
<tr>
<td>E</td>
<td>20A 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>
</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>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>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>
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</thead>
<tbody>
<tr>
<td>S</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>3 (+) 7 (-)</td>
</tr>
<tr>
<td>H</td>
<td>2</td>
<td>8 (+) 7 (-)</td>
</tr>
</tbody>
</table>

**DOUBLE POLE SWITCHES ONLY**

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

#### 6 Lock Option

| W     | Low Profile Lock  |

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.
- Additional ratings available. See V-Series Switch Accessories page.

### Table of Contents

- V1DA BW 0B-FC ZB 00-0
- #1 SERIES
- #2 CIRCUIT
- #3 RATING
- #4 TERMINATION / BASE STYLE
- #5 ILLUMINATION
- #6 LOCK OPTION
- #7 LAMP
- #8 BRACKET COLOR & PANEL SEAL
- #9 ACTUATOR COLOR & STYLE
- #10 LENS COLOR & STYLE
- #11 ACTUATOR LOCK COLOR & FUNCTION
- #12 ACTUATOR LENS or BODY LEGEND
- #13 LEGEND ORIENTATION
Dimensional Specifications: in. [mm]

**CONTURA II**

- SHOWN WITH SQUARE LENS
- 8 TERMINAL BASE W/BARRIERS

**CONTURA III**

- SHOWN WITH BAR LENS
- 8 TERMINAL BASE W/O BARRIERS

**CONTURA IV**

- 10 TERMINAL BASE W/BARRIERS

---

**8 TERMINAL BASE W/BARRIERS**

- .940 [23.88]
- .505 [12.83]
- .250 [6.35] X
- .031 [.78]
- .390 [9.90]
- .960 [24.38]

**10 TERMINAL BASE W/BARRIERS**

- .940 [23.87]
- .505 [12.82]
- .250 [6.35] X
- .031 [.78]
- .820 [20.82]
- .960 [24.38]

**10 TERMINAL BASE W/O BARRIERS**

- 1.050 [26.67]
- .250 [6.35] X
- .031 [.78]
- .820 [20.82]
- .960 [24.38]

---

**SWITCH SHOWN WITH VCH CONNECTOR 8 TERMINAL**

- 8 1 2 3

**BOTTOM VIEW TERMINAL ARRANGEMENT 8 TERMINAL BASE**

- 7 4 5 6

**BOTTOM VIEW TERMINAL ARRANGEMENT 10 TERMINAL BASE**

- 7 4 5 6 10

**SWITCH SHOWN WITH VC1 CONNECTOR 10 TERMINAL**
## Dimensional Specifications: in. [mm]

### CONTURA V
**Shown with Bar Lens**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>1.922 [48.56]</td>
</tr>
<tr>
<td>Height</td>
<td>1.479 [37.57]</td>
</tr>
<tr>
<td>PCB Mount</td>
<td>.080 [2.03]</td>
</tr>
</tbody>
</table>

### CONTURA V
**Shown with Low Profile Lock**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
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</thead>
<tbody>
<tr>
<td>Width</td>
<td>1.922 [48.56]</td>
</tr>
<tr>
<td>Height</td>
<td>1.479 [37.57]</td>
</tr>
<tr>
<td>PCB Mount</td>
<td>.080 [2.03]</td>
</tr>
</tbody>
</table>

### CONTURA VI
**Shown with Oval Lens**

<table>
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<th>Measurement</th>
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<tr>
<td>Width</td>
<td>1.950 [49.53]</td>
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<tr>
<td>Height</td>
<td>1.126 [28.60]</td>
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### CONTURA VII
**Shown with Large Lens and Bar Lens**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
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</thead>
<tbody>
<tr>
<td>Width</td>
<td>1.922 [48.82]</td>
</tr>
</tbody>
</table>

### 8 TERMINAL BASE

- **W/BARRIERS**
  - 8 TERMINAL BASE
  - 8 TERMINAL BASE

- **W/O BARRIERS**
  - 8 TERMINAL BASE
  - 8 TERMINAL BASE

### 10 TERMINAL BASE

- **W/BARRIER AND LAMP TERMINAL**
- **W/O BARRIERS**

### SWITCH SHOWN WITH VCH CONNECTOR

- **8 TERMINAL BASE**
- **10 TERMINAL BASE**
Dimensional Specifications: in. [mm]
## Circuit Diagrams:

<table>
<thead>
<tr>
<th>CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>![Diagram A]</td>
</tr>
<tr>
<td>2</td>
<td>![Diagram B]</td>
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<tr>
<td>3</td>
<td>![Diagram C]</td>
</tr>
<tr>
<td>4</td>
<td>![Diagram D]</td>
</tr>
<tr>
<td>5</td>
<td>![Diagram E]</td>
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<tr>
<td>6</td>
<td>![Diagram F]</td>
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<tr>
<td>7</td>
<td>![Diagram G]</td>
</tr>
<tr>
<td>8</td>
<td>![Diagram H]</td>
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<table>
<thead>
<tr>
<th>CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>![Diagram I]</td>
</tr>
<tr>
<td>B</td>
<td>![Diagram J]</td>
</tr>
<tr>
<td>C</td>
<td>![Diagram K]</td>
</tr>
<tr>
<td>D</td>
<td>![Diagram L]</td>
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<tr>
<td>E</td>
<td>![Diagram M]</td>
</tr>
<tr>
<td>F</td>
<td>![Diagram N]</td>
</tr>
<tr>
<td>G</td>
<td>![Diagram O]</td>
</tr>
<tr>
<td>H</td>
<td>![Diagram P]</td>
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</table>

### SYMBOL LEGEND

<table>
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<tr>
<th>SYM.</th>
<th>DEFINITION</th>
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<tbody>
<tr>
<td>○</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>
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</table>
**Lamp Circuit Diagrams:**

<table>
<thead>
<tr>
<th>LAMP CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
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</thead>
<tbody>
<tr>
<td>A / 1</td>
<td><img src="image1" alt="Diagram" /></td>
</tr>
<tr>
<td>B / 2</td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td>C / 3</td>
<td><img src="image3" alt="Diagram" /></td>
</tr>
<tr>
<td>D / 4</td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td>E / 5</td>
<td><img src="image5" alt="Diagram" /></td>
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</table>

**J-Series Hazard Warning Circuit Diagrams:**

<table>
<thead>
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<th>CIRCUIT CODE</th>
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</thead>
<tbody>
<tr>
<td>J1</td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
<tr>
<td>J2</td>
<td><img src="image7" alt="Diagram" /></td>
</tr>
<tr>
<td>J3</td>
<td><img src="image8" alt="Diagram" /></td>
</tr>
<tr>
<td>J4</td>
<td><img src="image9" alt="Diagram" /></td>
</tr>
</tbody>
</table>

**Symbol Legend**

- **SYM.**
- **DEFINITION**
  - DESIGNATES TERMINALS AND CONTACTS
  - DESIGNATES LAMP LOCATION

---

**NOTE:**
J circuits are available for all non-locking V-Series styles. Consult factory for part number details.
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 II, III, IV, VII Actuator only: VV with code A, C, E, G, P or Z for selection 9 & with selections 10-14 in the ordering schemes.
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>
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<tbody>
<tr>
<td>1</td>
<td>Actuator Separately</td>
<td>2</td>
<td>Actuator Style/Color</td>
<td>3</td>
</tr>
<tr>
<td>VVR</td>
<td>J</td>
<td>Z</td>
<td>21</td>
<td>1</td>
</tr>
</tbody>
</table>

#### 2 ACTUATOR STYLE & COLOR

Contura X 1 Black, Gray, White, Red
Contura XI 6 Black, Gray, White, Red

#### 3 LENS OPENING FOR 1

1. One bar lens
2. One bar lenses
3. One square lens (Contura X only)
4. Two square lens

#### 4 ACTUATOR LENS OR BODY LEGEND

<table>
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<tr>
<th>00</th>
<th>No Legend this location</th>
<th>11</th>
<th>ON</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>O</th>
<th>15</th>
<th>O</th>
<th>16</th>
<th>O</th>
<th>17</th>
<th>O</th>
<th>18</th>
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<th>O</th>
<th>F</th>
<th>N</th>
<th>F</th>
<th>F</th>
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</thead>
<tbody>
<tr>
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<td>No legend</td>
<td>1</td>
<td>Orientation 1</td>
<td>2</td>
<td>Orientation 2</td>
<td>3</td>
<td>Orientation 3</td>
<td>4</td>
<td>Orientation 4</td>
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<td></td>
<td></td>
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</table>

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

#### 5 LEGEND ORIENTATION 1

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<thead>
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<th>3</th>
<th>Orientation 3</th>
<th>4</th>
<th>Orientation 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bar lens</td>
<td>2</td>
<td>One Piece Square lens</td>
<td>3</td>
<td>Bottom of Two-Piece Square lens</td>
<td></td>
<td></td>
<td></td>
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</table>

### Contura 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</td>
<td>Actuator Separately</td>
<td>2</td>
<td>Style &amp; Color</td>
<td>3</td>
<td>Lens Opening</td>
<td>4</td>
</tr>
<tr>
<td>VVP</td>
<td>V</td>
<td>J</td>
<td>Z</td>
<td>21</td>
<td>1</td>
<td>00</td>
</tr>
</tbody>
</table>

#### 3, 4 LENS OPENING FOR

1. No lens
2. Bar lens
3. Square lens

#### 5, 7 LENS OR BODY LEGEND 2

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<tr>
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<th>22</th>
<th>23</th>
<th>24</th>
<th>25</th>
<th>26</th>
<th>27</th>
<th>28</th>
<th>I</th>
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<tbody>
<tr>
<td>F</td>
<td>F</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>I</td>
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<td>F</td>
<td>F</td>
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For additional legend options & codes, visit us at www.carlingtech.com.

#### 6 LEGEND ORIENTATION 3

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<th>Orientation 1</th>
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<tbody>
<tr>
<td>1</td>
<td>Bar lens</td>
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### Contura X, XI & XII actuator lens assembly separately:

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<tbody>
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<td>Lens Separately</td>
<td>2</td>
<td>Lens Style</td>
<td>3</td>
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<tr>
<td>VVL</td>
<td>V</td>
<td>J</td>
<td>Z</td>
<td>21</td>
</tr>
</tbody>
</table>

#### 2 LENS STYLE 3

1. Bar lens
2. One Piece Square lens
3. Bottom of Two-Piece Square lens

#### 3 TRANSLUCENT LENS COLOR

1. Clear
2. White
3. Amber
4. Green

#### 4 LENS OR BODY LEGEND 2

<table>
<thead>
<tr>
<th>00</th>
<th>- No Legend</th>
<th>21</th>
<th>22</th>
<th>23</th>
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For additional legend options & codes, visit us at www.carlingtech.com.

#### 5 LEGEND ORIENTATION 3

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<th>Orientation 1</th>
<th>2</th>
<th>Orientation 2</th>
<th>3</th>
<th>Orientation 3</th>
<th>4</th>
<th>Orientation 4</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Bar lens</td>
<td>2</td>
<td>One Piece Square lens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. If actuator lens opening for 2 bar or 2 square lenses, lens 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.

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

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

Notes:
1. If actuator lens opening for 2 bar or 2 square lenses, lens 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.

Notes:
1. If actuator lens opening for 2 bar or 2 square lenses, lens 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>WIRE RANGE</th>
<th>ORIENTATION</th>
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<tbody>
<tr>
<td>PACKARD 58 SERIES</td>
<td>02965580</td>
<td>12 3.0</td>
<td>B</td>
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<td>02965471</td>
<td>(2)-16-14</td>
<td>(2)-1.0-2.0</td>
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<td>02965470</td>
<td>16-14 1.0-2.0</td>
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<tr>
<td></td>
<td>02965469</td>
<td>20-18 .5-.8</td>
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<tr>
<td>PACKARD METRI-PACK 630 SERIES</td>
<td>12084590</td>
<td>10 5.0</td>
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<tr>
<td>AMP 250 SERIES FASTIN-FASTON</td>
<td>60253-1</td>
<td>12-16 1.3</td>
<td>B</td>
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<td>(2)-16-18 (2)-1.3</td>
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<td>60295-2</td>
<td>22-18 .3-.9</td>
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</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

Additional V-Series Ratings

1 .4VA @ 28VDC Resistive
4 10A 250VAC 1/2 HP; 15A 125 VAC 1/2 HP, No Agency Listings
5 10A 250VAC 1/2 HP, 15A 125 VAC 1/2 HP, UL Recognized, CSA Certified
B 15A 24V
C 20A 16V
D 20A 12V
E 20A 14V, 10A 14VT (circuits 1, 4, A, & D only)
F 10A 14V, 6A, 14VT (circuit G only)
G 20A 6V
H 20A 3V
L 15A 125 VAC, 10A 250VAC, 1/2 HP 125-250 VAC; 6A 125 VAC
M .4VA/20A 12V (combi-contact)

(combination gold/silver contacts for borderline dry circuit applications)
N .4VA/15A 24V (combi-contact)
(combination gold/silver contacts for borderline dry circuit applications)

NOTES
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]

Contura Hole Plug
Dimensional Specifications: in. [mm]
VP-Series
CONTURA ILLUMINATED INDICATORS

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

Typical Applications:
• Transportation
Flush Housing:

<table>
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<th>2 TERMINATION</th>
<th>3 LAMP</th>
<th>4 LAMP</th>
<th>5 HOUSING COLOR</th>
<th>6 LENS STYLE</th>
<th>7 LENS STYLE</th>
<th>8 LENS COLOR</th>
<th>9 LENS COLOR</th>
<th>10 LENS LEGEND</th>
<th>11 LEGEND ORIENTATION</th>
<th>12 LENS LEGEND</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP</td>
<td>1 6 6 - B</td>
<td>1 1 6 6 - 00 0 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 1 SERIES
- **VP**: Illuminated plug for V and J Mounting Hole
- **H2**: Housing only
- **H3**: Lamp module only

### 2 TERMINATION
- **1 .250 TAB (QC)**

### 3, 4 LAMP
- **No lamp**
- **Neon**
  - 1 125VAC
  - 2 250VAC
- **Incandescent**
  - 4 3V
  - 5 6V
  - 6 12V
  - 7 18V
  - 8 24V
- **LED**
  - L Amber
  - F Green
  - R Red
- **2VDC**
  - M
  - G
  - S
- **6VDC**
  - N
  - H
  - T
- **12VDC**
  - P
  - J
  - V

*Typical current draw for LED is 20mA.

### 5 FLUSH HOUSING COLOR / STYLE
- **B**: Black / Rectangular
- **W**: White / Rectangular
- **R**: Red / Rectangular
- **G**: Gray / Rectangular
- **1**: Black / Oval (Contura V)

### 6, 7 LENS STYLE
- **Z**: No Lens
- **1**: Transparent Diamond Square
- **2**: Translucent Square
- **3**: Laser Etched 10
- **4**: Transparent Oval
- **5**: Translucent Oval
- **6**: Laser Etched Oval

### 8, 9 LENS COLOR
- **Z**: No Lens
- **Clear**: White
- **Amber**: Green
- **Red**: Blue
- **One piece lens**
- **Two piece lens** (with clear top protective lens)
- **Two piece lens** (with smoke top protective lens)
- **Two piece lens** (with white top protective lens)

*All bottom lenses are molded of opaque material. Consult factory for other lens colors.

### 10 LENS LEGEND OVER LAMP
- **00**: No legend
- **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 LENS LEGEND OVER LAMP
- **00**: No legend
- **For legend options, visit us at carlingtech.com**

Notes:
1. To order housing only, specify H2 followed by fields 5-11.
2. To order lamp module only, specify H3 followed by fields 2-3.
3. To order connector housing specify HP1-01 (black).
4. Field 3 specifies lamp 1 is located over terminals 1A & 1B.
5. Field 4 specifies lamp 2 is located over terminals 2A & 2B.
6. Field 5 specifies lens 1 is located over terminals 1A & 1B.
7. Field 7 specifies lens 2 is located over terminals 2A & 2B.
8. Field 9 specifies lens 2 is located over terminals 2A & 2B.
9. Field 10 specifies legend is over lens 1.
10. Field 12 specifies legend is over lens 2.
11. If only one lens is chosen, it will be located over terminals 1A & 1B.
12. Translucent lens is available with two piece lens option only.
13. Laser etched option is available with one piece lens.
14. Oval lens option is available as one piece lens.
### Raised Bracket:

<table>
<thead>
<tr>
<th>VP</th>
<th>Series</th>
<th>1</th>
<th>6</th>
<th>6 - 6</th>
<th>1</th>
<th>1</th>
<th>6</th>
<th>6 - 00</th>
<th>0</th>
<th>00</th>
</tr>
</thead>
</table>

#### 1 SERIES
- **VP**: Illuminated plug for V and J Mounting Hole

#### 2 TERMINATION
1. **.250 TAB (QC)**
2. **Solder Lug**

#### 3, 4 LAMP
- **No lamp**
- **Neon**: 125VAC, 2250VAC
- **Incandescent**: 4.3V, 5.6V, 6V, 12V, 18V, 24V
- **LED**: Amber, Green, Red
- **2VDC**: L, F, R
- **6VDC**: M, G, S
- **12VDC**: N, H, T
- **24VDC**: P, J, V

#### 5 RAISED BRACKET / INSERT COLOR
- **White / White**
- **Black / Black**
- **Black / White**

#### 6, 7 LENS STYLE
- **No Lens**
- **Transparent Diamond Square**
- **Laser Etched**

#### 8, 9 LENS COLOR
- **Clear**: White, Amber, Green, Red, Blue
- **One piece lens**
- **Two piece lens**
- **Smoke top**
- **White top**

#### 10 LENS LEGEND OVER LAMP 1
- **No legend**

#### 11 LEGEND ORIENTATION
- **No legend**

#### 12 LENS LEGEND OVER LAMP 2
- **No legend**

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

Notes:
Oval and flush bezel styles use terminals 1A, 1B, 2A, 2B. Raised bezel style uses terminals 7, 8, 9, 10.
W-Series
SEaled ROcker SWITCHES

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

Typical Applications:
• Marine equipment
• ON/OFF Highway equipment
W-Series Switch

DESIGN FEATURES

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

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

**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.

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

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Rating</td>
<td>0.4VA @ 24VDC</td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>1500 Volts RMS</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>50 Megohms</td>
</tr>
<tr>
<td>Initial Contact Resistance</td>
<td>100,000 cycles max. @ 4 VDC</td>
</tr>
<tr>
<td>Contacts</td>
<td>Silver tin-oxide, 88/12</td>
</tr>
<tr>
<td>Terminals</td>
<td>Copper with silver or gold plating</td>
</tr>
<tr>
<td>Quick</td>
<td>Connect terminations.</td>
</tr>
<tr>
<td>Voltage</td>
<td>3-24 VDC</td>
</tr>
<tr>
<td>Overcurrent</td>
<td>15A for 50 cycles</td>
</tr>
</tbody>
</table>

## Mechanical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endurance</td>
<td>250,000 cycles minimum</td>
</tr>
</tbody>
</table>

## Physical

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

### Seals
- 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

### IP68, Fully sealed
- Flowing Mixed Gas (FMG)
- Class III 3 year accelerated exposure per ASTM B-827, B-845 -40°C to +85°C, 22 cycles, 300 hours
- Per Mil-Std 202F, Method 204D
- Test Condition A 0.06 DA or 10G's 10-500 Hz.
- Resonance search
- 24-50 Hz 0.40 DA
- 50-2000 ±10 G's peak
- Results Horizontal Axis 3-5 G's max.

<table>
<thead>
<tr>
<th>Vibration 1</th>
<th>24 Hz</th>
<th>0.06 PSD-Gsq/Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60 Hz</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>100 Hz</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>200 Hz</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>2000 Hz</td>
<td>0.025</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vibration 2</th>
<th>Random</th>
<th>24 Hz</th>
<th>0.06 PSD-Gsq/Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60 Hz</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Hz</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 Hz</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2000 Hz</td>
<td>0.025</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Handling/Drop</th>
<th>24 Hz</th>
<th>0.06 PSD-Gsq/Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt Spray</td>
<td>60 Hz</td>
<td>0.50</td>
</tr>
<tr>
<td>Dust</td>
<td>100 Hz</td>
<td>0.50</td>
</tr>
<tr>
<td>Thermal Shock</td>
<td>200 Hz</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>2000 Hz</td>
<td>0.025</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Moisture Resistance/ Humidity</th>
<th>Random</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Mil-Std 202F, Method 107F</td>
<td>24 Hz</td>
</tr>
<tr>
<td>Test Condition A, -55°C to 85°C</td>
<td>0.06 PSD-Gsq/Hz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mounting Specifications</th>
<th>Panel Thickness Range .032 to .125</th>
</tr>
</thead>
<tbody>
<tr>
<td>For optimum panel fit, the following panel thicknesses are suggested: .032, .062, .093, .125</td>
<td></td>
</tr>
</tbody>
</table>

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

**W**

### 2 CIRCUIT ( ) - momentary

For terminal arrangement, see dimensional specifications

<table>
<thead>
<tr>
<th>Position:</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP DP</td>
<td>2 &amp; 3, 5 &amp; 6 Connected Terminals</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### 3 RATING

<table>
<thead>
<tr>
<th>10A 24V</th>
<th>D</th>
<th>10A 12V</th>
<th>G</th>
<th>10A 6V</th>
<th>H</th>
<th>10A 3V</th>
</tr>
</thead>
</table>

### 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

<table>
<thead>
<tr>
<th>Lamps</th>
<th>Actuator Lens Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>NONE</td>
</tr>
<tr>
<td>A</td>
<td>Independent 8+ - 7-</td>
</tr>
<tr>
<td>B</td>
<td>1 Down 3+ - 7-</td>
</tr>
<tr>
<td>C</td>
<td>2 Up 3+ - 7-</td>
</tr>
<tr>
<td>D</td>
<td>#1 Down 3+ - 7-</td>
</tr>
<tr>
<td>E</td>
<td>#&amp;2 Down 1+ - 7-</td>
</tr>
<tr>
<td>F</td>
<td>#1 Independent 8+ - 7-</td>
</tr>
<tr>
<td>G</td>
<td>#&amp;2 Up 3+ - 7-</td>
</tr>
<tr>
<td>H</td>
<td>#2 Independent 8+ - 7-</td>
</tr>
</tbody>
</table>

Selections for Single Pole Switches Only:

| J     | #1 Down 3+ - 8- |
| K     | #1 Independent 6+ - 7- |

Selections for Double Pole Switches Only:

| L     | #1 Down 3+ - 6- |
| M     | #2 Up 3+ - 6- |
| N     | #1 Down 3+ - 6- |
| P     | #&2 Down 1+ - 4- |
| R     | #1 Down 3+ - 7- |
| S     | #2 Down 6+ - 7- |
| U     | #2 Independent 8+ - 7- |
| V     | #2 Independent 10+ - 7- |
| W     | #2 Independent 8+ - 7- |

### 6,7 LAMP (SAME CODING FOR BOTH SELECTIONS)

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

No lamp

- 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 COLOR

3 Black with Laser Etched

### 10 LENS COLOR / STYLE - ABOVE LAMP #1 TERMINALS 1 AND 4

<table>
<thead>
<tr>
<th>Z</th>
<th>No Lens</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clear White Amber Green Red Blue</td>
</tr>
</tbody>
</table>

### 12 ACTUATOR LENS OR BODY LEGEND

0 - No Legend this location,No actuator

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

### 14 ACTUATOR LEGEND

0 - No Legend (used with codes 11-18 in selection 12)

1 Orientation 1

2 Orientation 2

3 Orientation 3

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 & gray actuators; Custom colors are available, consult factory.
3. 24VDC rating is available, consult factory for circuit compatibility.
### W-Series - Fully Sealed Rocker Switches - Locking - Ordering Scheme

<table>
<thead>
<tr>
<th>1 Series</th>
<th>2 Circuit</th>
<th>3 Rating</th>
<th>4 Termination</th>
<th>5 Illumination</th>
<th>6 Lock</th>
<th>7 Lamp</th>
<th>8 Bracket</th>
<th>9 Actuator</th>
<th>10 Lens</th>
<th>11 Lock Function</th>
<th>12 Legend</th>
<th>13 Legend Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</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>

#### 1 Series

- **W**

#### 2 Circuit

- \((\_\_\_\_)\) - momentary
- For terminal arrangement, see dimensional specifications

<table>
<thead>
<tr>
<th>Position:</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>DP</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 &amp; 3, 5 &amp; 6</td>
<td>Connected Terminals</td>
<td>1 &amp; 2, 4 &amp; 5</td>
</tr>
<tr>
<td>11</td>
<td>21</td>
<td>ON</td>
<td>NONE</td>
</tr>
<tr>
<td>14</td>
<td>24</td>
<td>ON</td>
<td>NONE</td>
</tr>
</tbody>
</table>

#### 3 Rating

- **B** 10A 24V
- **D** 10A 12V
- **G** 10A 6V
- **H** 10A 3V

#### 4 Termination / Base Style

- \(0.110\) 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

<table>
<thead>
<tr>
<th>Lamps</th>
<th>Actuator</th>
<th>Lens Position</th>
<th>Lamp Wired to Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>NONE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td># 2</td>
<td>Up</td>
<td>3+ 7-</td>
</tr>
<tr>
<td>H</td>
<td># 2</td>
<td>Independent</td>
<td>8+ 7-</td>
</tr>
</tbody>
</table>

#### 6 Lock

- **W** Lock Option

#### 7 Lamp #2

- 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

- **J** Black

#### 9 Actuator

- **P** Black
- **R** Red

#### 10 Lens

- **Z** - No Lens
- **1** - B G M T Large Transparent
- **2** - C H N U Large Translucent
- **3** - D J P V Bar Transparent
- **4** - E K R W Bar Translucent

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

#### 11 Lock Function

- **Up** Down Lock Color
- **B** J Black
- **C** K White
- **D** L Red
- **E** M Safety Orange

#### 12 Laser Etched, Lens or Body Legend

- **0** - No legend
- **00** - No legend this location / no actuator

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

#### 13 Legend Orientation

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

Notes:

1. White imprinting is standard on black actuators; Black imprinting is standard on white, red & gray actuators; 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.
Dimensional Specifications: in. [mm]

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 927796-3
For 16-20 awg wire, specify Tyco/Amp P/N 927777X-3
Tyco/Amp cable seal P/N 828904-1 (20-18 awg wire) or P/N 828905-1 (16-14 awg wire) is required for each individual wire lead, and Tyco/Amp cable plug, P/N 828922-1, is required to seal each unused connector opening. Consult Tyco/Amp for the cable seal recommended for your specific wire gauge and thickness.

Notes:
SWITCH SHOWN WITH CONNECTOR INSTALLED

TERMINAL ARRANGEMENT

KEYING FEATURE

WCH CONNECTOR
(190-31214-001)
## 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>
<th>CIRCUIT CODE</th>
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</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td><img src="image" alt="Diagram" /></td>
<td>23</td>
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### Lamp Circuit Diagrams:

<table>
<thead>
<tr>
<th>LAMP CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
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<tbody>
<tr>
<td>A</td>
<td><img src="image" alt="Diagram" /></td>
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<tr>
<td>Z</td>
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</tbody>
</table>
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

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

**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].
### 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**
- 10 millionohms 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.

### 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 & NFE 20.010.
- Mixed Flowing Gas MFG Class III per ASTM B-827 & B-845, Method H, with 3 years exposure.
- -40°C to + 85°C

**Corrosion**
- 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.

**Operating Temperature**
- Vibration 1
  - 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

**Shock**
- Per Mil-Std 202F, Method 213B, Test Condition K @ 30G’s. Tested with VCH connector. Test criteria - No loss of circuit during test, pre, and post test contact resistance.

**Salt Spray**
- Per Mil-Std 202F, Method 101D, Test Condition A, 48 Hrs.

**Thermal Shock**
- Per Mil-Std 202F, Method 107F, Test Condition A, -55°C to 85°C. Test criteria - pre and post test contact resistance.

**Moisture Resistance**
- Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance.

### Mechanical

**Endurance**
- 250,000 cycles minimum

### Physical

**Lighted**
- Incandescent - rated 10,000 hours
- LED - rated 100,000 hours 1/2 life

**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
AL-Series Sealed Rocker Switches – Ordering Scheme

### 1 SERIES

L

### 2 CIRCUIT

2

#### Terminal Orientation

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP DP</td>
<td>2 &amp; 4, 6 &amp; 8</td>
<td>Connected Terminals 1 &amp; 2, 5 &amp; 6</td>
<td></td>
</tr>
<tr>
<td>11 21</td>
<td>ON</td>
<td>NONE</td>
<td>OFF</td>
</tr>
<tr>
<td>12 22</td>
<td>(ON)</td>
<td>NONE</td>
<td>OFF</td>
</tr>
<tr>
<td>13 23</td>
<td>NONE</td>
<td>(OFF)</td>
<td></td>
</tr>
<tr>
<td>14 24</td>
<td>ON</td>
<td>NONE</td>
<td>ON</td>
</tr>
<tr>
<td>15 25</td>
<td>ON</td>
<td>NONE</td>
<td>(ON)</td>
</tr>
<tr>
<td>16 26</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>17 27</td>
<td>ON</td>
<td>OFF</td>
<td>(ON)</td>
</tr>
<tr>
<td>18 28</td>
<td>(ON)</td>
<td>OFF</td>
<td>(ON)</td>
</tr>
</tbody>
</table>

#### CIRCUITS WITH JUMPER TERMINALS

- 30*
- 31
- 51
- PROGRESSIVE CIRCUITS
- 52
- 53
- 54
- 55
- 56
- 57
- 58*
- 61
- 62
- 63
- 64
- 65
- 66
- 67
- 68
- 69*
- 70
- 71
- 72
- 73
- 80

#### HAZARD WARNING CIRCUITS

- A2
- A3

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

### 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

2

#### 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>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># 1 Independent</td>
<td>10+ 9-</td>
</tr>
<tr>
<td>B</td>
<td># 2 Independent</td>
<td>12+ 11-</td>
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<tr>
<td>C</td>
<td># 1 Independent</td>
<td>10+ 9-</td>
</tr>
<tr>
<td></td>
<td>&amp; # 2 Independent</td>
<td>12+ 9-</td>
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<tr>
<td>D</td>
<td># 1 Dependent</td>
<td>4+ 9-</td>
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<tr>
<td>E</td>
<td># 1 Independent</td>
<td>10+ 9-</td>
</tr>
<tr>
<td></td>
<td>&amp; # 2 Dependent</td>
<td>4+ 9-</td>
</tr>
<tr>
<td>F</td>
<td># 1 Independent</td>
<td>10+ 9-</td>
</tr>
<tr>
<td></td>
<td>&amp; # 2 Dependent</td>
<td>8+ 9-</td>
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<tr>
<td>G</td>
<td># 1 Dependent</td>
<td>4+ 9-</td>
</tr>
<tr>
<td></td>
<td>&amp; # 2 Dependent</td>
<td>8+ 9-</td>
</tr>
<tr>
<td>H</td>
<td># 1 Both Independent</td>
<td>10+ 9-</td>
</tr>
<tr>
<td></td>
<td>&amp; # 2 Independent</td>
<td>10+ 9-</td>
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<td>J</td>
<td># 1 Dependent</td>
<td>4+ 9-</td>
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<td>1+ 9-</td>
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<td>K</td>
<td># 1 Hazard</td>
<td>6+ 10- 12-</td>
</tr>
<tr>
<td>L</td>
<td># 1 Hazard</td>
<td>6+ 10- 12-</td>
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</table>

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

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

#### No lamp

<table>
<thead>
<tr>
<th>Incandescent</th>
<th>3V</th>
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<tr>
<td>6VDC</td>
<td>B</td>
<td>M</td>
<td>G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12VDC</td>
<td>C</td>
<td>N</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24VDC</td>
<td>D</td>
<td>P</td>
<td>J</td>
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</tr>
</tbody>
</table>

* Consult factory for “daylight bright”, blue/green and white LED options.

Typical current draw for LED is 20ma.

### 8 BRACKET COLOR

#### 1 Black White Gray Red

- No legend (used with codes 11-18 in selection 12)

- Standard Bracket

- Rockerguard at Lamp 1

- Rockerguard at Lamp 2

### 9 ACTUATOR STYLE AND COLOR

#### 1 Black White Gray Red Laser Etched

- No legend this location / no actuator

- Rocker

- Paddle

### 10 & 11 LENS STYLE AND COLOR

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

- No Actuator

- No Lens

#### Clear White Amber Green Red

- Laser Etched

### 12 LASER ETCHED, LENS OR BODY LEGEND

- No legend this location / no actuator

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

### 13 LEGEND ORIENTATION

#### No legend (used with codes 11-18 in selection 12)

#### Orientation 1 - vertical, lamp 1 on top

#### Orientation 2 - horizontal, lamp 1 on right

#### Orientation 3 - vertical, lamp 1 on bottom

#### Orientation 4 - vertical, lamp 1 on left

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

### 14 ACTUATOR LENS LEGEND

- No legend this location / no actuator

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

1 SERIES
L

2 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.

Lamps Illumination Type Lamp Wired to Terminals
S None
B # 2 Independent

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, G or H.
L-Series Sealed Rocker Switches - Dimensional Specifications

Dimensional Specifications: in. [mm]

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

Hole Plug
- L-SERIES HOLE PLUG
  - LH1: REMOVABLE HOLE PLUG WITH NON-SERRATED WINGS
  - LH2: HOLE PLUG WITH SERRATED WINGS
**Dimensional Specifications: in. [mm]**

### 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 directly.

**Dimensions:**
- LME: 2.02 [51.3mm] plus number of center bezels (LMM) × 1.034 [26.26mm]

**Panel Opening Thickness:**
- .062 [1.57]
- .093 [2.36]
- .125 [3.17]
- .156 [3.96]

---

**Panel Opening Sizes:**

- **LM6:** 1.90 × 6.15 [48.3mm × 156.2mm]
- **LM4:** 1.90 × 4.09 [48.3mm × 103.9mm]
- **LM3:** 1.90 × 3.06 [48.3mm × 77.7mm]
## Circuit Diagrams:

<table>
<thead>
<tr>
<th>CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
<th>CIRCUIT DIAGRAM</th>
<th>CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
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</thead>
<tbody>
<tr>
<td>11</td>
<td>![Circuit Diagram 11]</td>
<td>![Circuit Diagram 22]</td>
<td>51</td>
<td>![Circuit Diagram 51]</td>
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<tr>
<td>12</td>
<td>![Circuit Diagram 12]</td>
<td>![Circuit Diagram 23]</td>
<td>52</td>
<td>![Circuit Diagram 52]</td>
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<td>14</td>
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<td>![Circuit Diagram 26]</td>
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<td>16</td>
<td>![Circuit Diagram 16]</td>
<td>![Circuit Diagram 27]</td>
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<td>![Circuit Diagram 28]</td>
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<td>![Circuit Diagram 57]</td>
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<td>![Circuit Diagram 18]</td>
<td>![Circuit Diagram 30]</td>
<td>58</td>
<td>![Circuit Diagram 58]</td>
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<td>![Circuit Diagram 31]</td>
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<td>![Circuit Diagram 61]</td>
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<th>CIRCUIT DIAGRAM</th>
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<td>82</td>
<td><img src="image12" alt="Diagram" /></td>
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<td>68</td>
<td><img src="image13" alt="Diagram" /></td>
<td>A2</td>
<td><img src="image14" alt="Diagram" /></td>
</tr>
<tr>
<td>69</td>
<td><img src="image15" alt="Diagram" /></td>
<td>A3</td>
<td><img src="image16" alt="Diagram" /></td>
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<tr>
<td>70</td>
<td><img src="image17" alt="Diagram" /></td>
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</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>
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<tr>
<td>D</td>
<td>![Diagram D]</td>
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<td>E</td>
<td>![Diagram E]</td>
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<tr>
<td>F</td>
<td>![Diagram F]</td>
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<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>

**LEGEND**

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DEFINITION</th>
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<tbody>
<tr>
<td>.down</td>
<td>TERMINAL LOCATION</td>
</tr>
<tr>
<td>circle</td>
<td>LAMP LOCATION</td>
</tr>
<tr>
<td>line</td>
<td>MAINTAINED CIRCUIT</td>
</tr>
<tr>
<td>arrow</td>
<td>MOMENTARY CIRCUIT</td>
</tr>
<tr>
<td>line</td>
<td>INTERNAL CONNECTION (JUMPER TERMINAL)</td>
</tr>
<tr>
<td>V</td>
<td>2 POSITION CONNECTION</td>
</tr>
<tr>
<td>V</td>
<td>2 POSITION</td>
</tr>
<tr>
<td>V</td>
<td>3 POSITION</td>
</tr>
</tbody>
</table>
LP-Series
ILLUMINATED INDICATORS

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

Typical Applications:
• On/Off-Highway Equipment
• Agricultural Equipment
• Construction Equipment
**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  
-40°C to +85°C

Vibration 1  
Per Mil-Std 202F, Method 204D Test Condition A 0.06 DA or 10G’s 10-500 Hz. Tested with VCH connector.  
Test criteria - No loss of circuit during test and pre and post test contact resistance.

Vibration 2  
Resonance search  
24-50 Hz 0.40 DA  
50-2000 ±10 G’s peak  
Results Horizontal Axis 3-5 G’s max.  
Random  
24 Hz 0.06 PSD-Gsq/Hz  
60 Hz 0.50  
100 Hz 0.50  
200 Hz 0.025  
2000 Hz 0.025  
No loss of circuit during test; <10µ chatter.

Shock  
Per Mil-Std 202F, Method 213B, Test Condition K @ 30G’s. Tested with VCH connector.  
Test criteria - No loss of circuit during test, pre, and post test contact resistance.

Salt Spray  
Per Mil-Std 202F, Method 101D, Test Condition A, 48 Hrs.

Thermal Shock  
Per Mil-Std 202F, Method 107F, Test Condition A, -55°C to 85°C. Test criteria - pre and post test contact resistance.

Moisture Resistance  
Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance.

*Manufacturer reserves the right to change product specification without prior notice.*
**LP-Series - Illuminated Indicators - Ordering Scheme, Dimensional Specifications**

### 1 SERIES
- **LP** - L-Series Illumination Plug

### 2 TERMINATION
- **1** - .250 (8.35) x .032 (0.51) Quick Connect
- **2** - .187 (4.75) x .032 (0.51) Quick Connect

### 3 ILLUMINATION

<table>
<thead>
<tr>
<th>LAMPS</th>
<th>ILLUMINATION</th>
<th>LAMP WIRED TO TERMINALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1 – 10 (+) 9 (–)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>1 – 10 (+) 9 (–)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>1 – 10 (+) 9 (–)</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>1 &amp; 2 Parallel</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>1 &amp; 2 Series</td>
<td></td>
</tr>
</tbody>
</table>

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 (–).

<table>
<thead>
<tr>
<th>No lamp</th>
<th>0 (position 5 only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incandescent</td>
<td>4 6V 12V 18V 24V</td>
</tr>
<tr>
<td>LED</td>
<td>Amber Green Red</td>
</tr>
<tr>
<td>2VDC</td>
<td>L F R</td>
</tr>
<tr>
<td>6VDC</td>
<td>M G S</td>
</tr>
<tr>
<td>12VDC</td>
<td>N H T</td>
</tr>
<tr>
<td>24VDC</td>
<td>P J V</td>
</tr>
</tbody>
</table>

### 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
- **L** - 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
- **L** - 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).
Carling’s Full-sized Rocker Switches range from 3 to 20 amp illuminated and non-illuminated, one to four pole, with many styles of solid colored, translucent rockers. Illumination options include LED, neon, and incandescent lamps.

**SELECTOR GUIDE**

<table>
<thead>
<tr>
<th>TIG / LTIG / TIH / LTIH / TIL / LTIL / TII / LS</th>
<th>S-Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3, 4</td>
<td>1, 2</td>
</tr>
<tr>
<td>up to 15A 125VAC</td>
<td>up to 10A 28VDC</td>
</tr>
<tr>
<td>rocker, paddle</td>
<td>bezel-less rocker</td>
</tr>
<tr>
<td>.830” x 1.450” [21.08mm x 36.83mm] snap-in mount screw mount</td>
<td>.787” x 1.575” snap-in, keyed</td>
</tr>
<tr>
<td>.187 tab solder lug</td>
<td>.110 Tabs</td>
</tr>
<tr>
<td>incandescent, neon</td>
<td>LED</td>
</tr>
<tr>
<td>UL, CSA, VDE</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.*

*back to table of contents*
The Tippette Series is a traditionally styled rocker switch, available in sealed or unsealed versions. These switches are appropriate for use in general purpose applications which may or may not require a modicum of environmental protection. The Tippette Series is available in both illuminated and non-illuminated versions and features a wide variety of circuits, actuator styles and bracket options. This versatile offering includes international agency certifications and ratings to 26 amps for select circuits.

**Product Highlights:**
- Ratings Up to 26 Amps 250 VAC
- Illuminated or Non-Illuminated
- Multiple Termination, Mounting and Rocker Options

**Typical Applications:**
- General Purpose Applications
- Commercial Food Equipment
- Recreational Vehicles

**Electrical**
- Contact Rating: 15 amps, 125 VAC
  10 amps, 250 VAC
  3/4 HP 125-250 VAC
  15 amps, 12-30 VDC
- Life: 25,000 cycles circuit dependent
  50,000 cycles circuit dependent consult factory for applicable circuits.
- Contacts: Fine silver, silver cad-oxide
  Brass or copper/silver plate
- Terminals: 1/4” (6.3mm) Quick Connect terminations standard.
  Solder lug - Brass Tin Plated
  Wire Lead 16 gauge standard 105°C
  600VAC
  Screw Terminals - Brass

**Physical**
- Lighted: Incandescent - rated 10,000 hours
  Neon - rated 25,000 hours
- Seals: Bracket - Actuator WBL/MBL
  optional external gasket panel seal
  Phenolic (150°C)
- Base: Nylon 66 (105°C)

**Mechanical**
- Endurance: 100,000 cycles minimum

**Agency Certifications**
Select circuits and constructions with VDE/IEC approvals are available. Consult factory

*Manufacturer reserves the right to change product specification without prior notice.*
1 BASE PART NUMBER: SERIES/POLES / CIRCUITY 6,11 / RATING 7 / TERMINATION 10

10A 250VAC, 15A 125VAC, 3/4 HP 125-250VAC, 15A 5-28VDC

### Single Pole in Double Pole base

<table>
<thead>
<tr>
<th>LUG</th>
<th>TERMINAL</th>
<th>LEADS</th>
</tr>
</thead>
<tbody>
<tr>
<td>solder</td>
<td>.250</td>
<td>screw wire</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Base Part Number</th>
<th>Series/POLES</th>
<th>CIRCUITRY</th>
<th>RATING</th>
<th>TERMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIGA51</td>
<td>6M - BL - MBL</td>
<td>TIGA51</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
<tr>
<td>TIGA54</td>
<td>6M - BL - MBL</td>
<td>TIGA54</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
<tr>
<td>TIIK51</td>
<td>6M - BL - MBL</td>
<td>TIIK51</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
<tr>
<td>TIIK54</td>
<td>6M - BL - MBL</td>
<td>TIIK54</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
</tbody>
</table>

### Four Pole

<table>
<thead>
<tr>
<th>LUG</th>
<th>TERMINAL</th>
<th>LEADS</th>
</tr>
</thead>
<tbody>
<tr>
<td>solder</td>
<td>.250</td>
<td>screw wire</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Base Part Number</th>
<th>Series/POLES</th>
<th>CIRCUITRY</th>
<th>RATING</th>
<th>TERMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIIK51</td>
<td>6M - BL - MBL</td>
<td>TIIK51</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
<tr>
<td>TIIK54</td>
<td>6M - BL - MBL</td>
<td>TIIK54</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
<tr>
<td>TIIM51</td>
<td>6M - BL - MBL</td>
<td>TIIM51</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
<tr>
<td>TIIM54</td>
<td>6M - BL - MBL</td>
<td>TIIM54</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
</tbody>
</table>

### Three Pole

<table>
<thead>
<tr>
<th>LUG</th>
<th>TERMINAL</th>
<th>LEADS</th>
</tr>
</thead>
<tbody>
<tr>
<td>solder</td>
<td>.250</td>
<td>screw wire</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Base Part Number</th>
<th>Series/POLES</th>
<th>CIRCUITRY</th>
<th>RATING</th>
<th>TERMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIGA51</td>
<td>6M - BL - MBL</td>
<td>TIGA51</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
<tr>
<td>TIGA54</td>
<td>6M - BL - MBL</td>
<td>TIGA54</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
<tr>
<td>TIIL51</td>
<td>6M - BL - MBL</td>
<td>TIIL51</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
<tr>
<td>TIIL54</td>
<td>6M - BL - MBL</td>
<td>TIIL54</td>
<td>On-Off</td>
<td>6A</td>
<td>120V</td>
</tr>
</tbody>
</table>

### Notes:
- 1 NBL, FN, & FW brackets only.
- 2 LTIL-Series with NBL, FN, & FW brackets only.
- 3 NBL, WBL, & MBL brackets only. With 6M actuator, brackets also will be matte finish.
- 4 6M & 6S actuators only.
- 5 Not available with 6M & 6S actuators.
- 6 Consists of WBL bracket, neoprene seal, and dummy rivets at open holes. Consult factory for agency approval status.
- 7 All ratings are appropriate for usage in low voltage applications.
- 8 For additional special circuits, see catalog.
- 9 Custom colors are available, consult factory.
- 10 .187 tab and PC terminations are also available. Consult factory for catalog number callout.
- 11 ( ) momentary
- 12 Not available with WBL or MBL style brackets.
- 13 Available with bracket A, C or H only.
- 14 Not available with MBL, WBL or H brackets. Can be supplied as a double rocker to control separate poles of a TIG, TII or TIL switch. Consult factory for details.

### 2 ACTUATOR STYLE

<table>
<thead>
<tr>
<th>Code</th>
<th>Actuator Style</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1S</td>
<td>Angular/Smooth Face Gloss</td>
<td>BLK</td>
</tr>
<tr>
<td>1C</td>
<td>Angular/Cross Serrations Gloss</td>
<td>BLK</td>
</tr>
<tr>
<td>1L</td>
<td>Long Smooth/Narrow</td>
<td>BLK</td>
</tr>
<tr>
<td>1F</td>
<td>Flat/Curved Smooth Face Matte</td>
<td>BLK</td>
</tr>
</tbody>
</table>

### 3 ACTUATOR COLOR

<table>
<thead>
<tr>
<th>Code</th>
<th>Actuator Color</th>
<th>Lens Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL</td>
<td>Black</td>
<td>BLK</td>
</tr>
<tr>
<td>WH</td>
<td>White</td>
<td>WH</td>
</tr>
<tr>
<td>RD</td>
<td>Red</td>
<td>RD</td>
</tr>
</tbody>
</table>

### 4 BRACKET STYLE

<table>
<thead>
<tr>
<th>Code</th>
<th>Bracket Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Screw Mount</td>
</tr>
<tr>
<td>B</td>
<td>Screw Mount</td>
</tr>
<tr>
<td>C</td>
<td>Screw Mount</td>
</tr>
<tr>
<td>H</td>
<td>Screw Mount</td>
</tr>
</tbody>
</table>

### 5 BRACKET STYLE

<table>
<thead>
<tr>
<th>Code</th>
<th>Bracket Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBL</td>
<td>Nylon Black</td>
</tr>
<tr>
<td>WBL</td>
<td>Water shedding Black</td>
</tr>
<tr>
<td>MBL</td>
<td>Marine Style Black</td>
</tr>
<tr>
<td>FN</td>
<td>Metal Snap-In</td>
</tr>
<tr>
<td>FN BLK</td>
<td>Black Metal Snap-In</td>
</tr>
<tr>
<td>FN SS</td>
<td>Stainless Steel Snap-In</td>
</tr>
</tbody>
</table>

### 6 LAMP VOLTAGE

<table>
<thead>
<tr>
<th>Code</th>
<th>Lamp Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>12V</td>
</tr>
<tr>
<td>6V</td>
<td>6V</td>
</tr>
</tbody>
</table>

### Additional ratings up to 20A 257VAC, 1 1/2HP 125 VAC, 2HP 250VAC are available. Consult factory for specifics.
Dimensional Specifications: in. [mm]

1C  CROSS-LINE W/ONE LENS

1.700[43.18]  .960[24.39]

1.440[36.58]  .418[10.62]

1.069[27.15]  ±.020

1L  LONG-LINE W/ONE LENS

1.700[43.18]  .650[16.51]

1.440[36.58]  .312[7.92]

1.069[27.15]  ±.020

1S  SMOOTH W/ONE LENS

1.700[43.18]  .960[24.39]

1.700[43.18]  .418[10.62]

1.069[27.15]  ±.020

1C  CROSS-LINE W/ONE LENS

1.440[36.58]  .422[10.72]

1.069[27.15]  ±.020

1.356[8.94]

1.570[39.88]  .060[1.52]

1.440[36.58]  .422[10.72]

1.069[27.15]  ±.020

1F  FLATTED STYLE NO LENS

1.700[43.18]  .960[24.39]

1.700[43.18]  .418[10.62]

1.069[27.15]  ±.020

1.356[8.94]

1.570[39.88]  .060[1.52]

1.440[36.58]  .422[10.72]

1.069[27.15]  ±.020

6M, 6S  CURVED W/ONE LENS

1.700[43.18]  .960[24.39]

1.669[27.15]  .312[7.92]

1.440[36.58]  .422[10.72]

1.069[27.15]  ±.020

7S  TOGGLE-STYLE W/ONE LENS

1.570[39.88]  .828[21.03]

1.440[36.58]  .312[7.92]

1.069[27.15]  ±.020

1.440[36.58]  .422[10.72]

1.069[27.15]  ±.020

WITH 250 TAB TERMINALS AND NBL BRACKET

WITH SOLDER LUG TERMINAL AND NBL BRACKET

WITH 250 TAB TERMINALS AND NBL BRACKET

WITH 250 TAB TERMINALS AND FN BRACKET

WITH SOLDER LUG TERMINALS AND NBL BRACKET

### Special Circuits for Tippette Rocker Switches

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Position 1</th>
<th>Position 2</th>
<th>Position 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progressive Two Circuit</td>
<td>BOTH CIRCUITS ON</td>
<td>ONE CIRCUIT ON</td>
<td>OFF</td>
</tr>
<tr>
<td>SINGLE POLE</td>
<td>BOTH CIRCUITS ON</td>
<td>ONE CIRCUIT ON</td>
<td>OFF</td>
</tr>
<tr>
<td>G</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>Two Circuit</td>
<td>CIRCUIT 1 ON</td>
<td>BOTH CIRCUITS ON</td>
<td>CIRCUIT 2 ON</td>
</tr>
<tr>
<td>G</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Reversing Double Pole Double Throw</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>G</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>G</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

* Indicates momentary function.

### Circuit Specifications

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>.125</td>
<td>3.18</td>
</tr>
<tr>
<td>.075</td>
<td>19.11</td>
</tr>
<tr>
<td>.055</td>
<td>1.40</td>
</tr>
<tr>
<td>.075</td>
<td>19.11</td>
</tr>
<tr>
<td>.030</td>
<td>0.8</td>
</tr>
<tr>
<td>.01</td>
<td>0.25</td>
</tr>
<tr>
<td>.187</td>
<td>4.74</td>
</tr>
<tr>
<td>.187</td>
<td>4.74</td>
</tr>
<tr>
<td>.187</td>
<td>4.74</td>
</tr>
<tr>
<td>.187</td>
<td>4.74</td>
</tr>
</tbody>
</table>

### Mounting Hole

(Nylon Snap-in Brackets)
Panel Thickness: 0.030 to 0.250
Switch should be mounted at 90° for maximum water shedding (45° to 90° acceptable)

### Printed Circuit

IEC APPROVED CONSTRUCTION
(TIG ONLY)

### Terminal Type

<table>
<thead>
<tr>
<th>Screw (Assembled)</th>
<th>Wire Lead</th>
<th>Printed Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>.141</td>
<td>.500</td>
<td>.187</td>
</tr>
<tr>
<td>.187</td>
<td>.187</td>
<td></td>
</tr>
<tr>
<td>.187</td>
<td>.187</td>
<td></td>
</tr>
</tbody>
</table>

* Angled corners are suggested for optimum fit. Standard rectangular cutout is acceptable.
### Dimensional Specifications: in. [mm]

<table>
<thead>
<tr>
<th>TIL</th>
<th>TIG</th>
<th>TII</th>
<th>TIH</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Tapped Hole" /></td>
<td><img src="image2.png" alt="Clearance Hole" /></td>
<td><img src="image3.png" alt="Mounting Hole" /></td>
<td><em>(Nylon Snap-in Brackets)</em></td>
</tr>
</tbody>
</table>

- **Panel Thickness:** .030 min. - .250 max.
- *Angled corners are suggested for optimum fit. Standard rectangular cutout is acceptable.*

#### Table

<table>
<thead>
<tr>
<th>TIL</th>
<th>TIG</th>
<th>TII</th>
<th>TIH</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4.png" alt="Drawing" /></td>
<td><img src="image5.png" alt="Drawing" /></td>
<td><img src="image6.png" alt="Drawing" /></td>
<td><img src="image7.png" alt="Drawing" /></td>
</tr>
</tbody>
</table>

#### Footnotes:
- MBL, NBL, WBL
- Black Nylon, Snap-in
- *GCP GLOSS FINISH HOLE PLUG FOR TIL, TIG, TIH & TII
- GMP MATTE FINISH

#### Notes:
- Dimensional Specifications: in. [mm]
- Tapped Hole: Standard with A & B Brackets
- Clearance Hole: Standard with C Bracket
- Mounting Hole: (Nylon Snap-in Brackets)
- Back to Table of Contents
The LS-Series Softspot illuminated rocker switches feature a three-color high brightness light sequence, from a single lamp. These switches are designed with a standard nylon snap-in bracket and “Drip-Dry” construction that protects the front panel from dust and moisture.

**Product Highlights:**
- Water Resistant Construction
- Independent or Dependent Illumination
- Up to 3 Different Colors Under a Single Lens
- Multiple Termination Options

**Typical Applications:**
- Marine
- Transportation
## Dielectric Strength
1000V - live to dead metal parts

## Mechanical Life
100,000 cycles

## Operating Temperature
0°F to 150°F (-17.8°C to +65.6°C)

### LS-Series - Rocker Switches - General Specifications, Ordering Scheme, Dimensional Specifications

### BASE PART NUMBER: SERIES / POLES / ILLUMINATION / CIRCUITRY / RATING / TERMINATION

<table>
<thead>
<tr>
<th>Single Pole</th>
<th>Solder Lug</th>
<th>Screw Terms</th>
<th>Wire Leads</th>
<th>2 LIGHTING SEQUENCE 1,2</th>
<th>3 ACTUATOR COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-None-Off</td>
<td>LS1510</td>
<td>LS1511</td>
<td>LS1514</td>
<td>01 red red red</td>
<td>BL Black</td>
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<tr>
<td>On-None-Off</td>
<td>LS1520</td>
<td>LS1521</td>
<td>LS1524</td>
<td>02 amber amber amber</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1530</td>
<td>LS1531</td>
<td>LS1534</td>
<td>03 green green green</td>
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</tr>
<tr>
<td>On-None-Off</td>
<td>LS1540</td>
<td>LS1541</td>
<td>LS1544</td>
<td>04 red -- --</td>
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<tr>
<td>On-None-Off</td>
<td>LS1550</td>
<td>LS1551</td>
<td>LS1554</td>
<td>11 red clear red</td>
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<tr>
<td>On-None-Off</td>
<td>LS1560</td>
<td>LS1561</td>
<td>LS1564</td>
<td>12 red clear amber</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1570</td>
<td>LS1571</td>
<td>LS1574</td>
<td>13 red clear green</td>
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<tr>
<td>On-None-Off</td>
<td>LS1580</td>
<td>LS1581</td>
<td>LS1584</td>
<td>14 red clear blue</td>
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<tr>
<td>On-None-Off</td>
<td>LS1590</td>
<td>LS1591</td>
<td>LS1594</td>
<td>15 red clear clear</td>
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<tr>
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<td>LS1601</td>
<td>LS1604</td>
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<tr>
<td>On-None-Off</td>
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<td>LS1611</td>
<td>LS1614</td>
<td>21 amber clear red</td>
<td></td>
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<tr>
<td>On-None-Off</td>
<td>LS1620</td>
<td>LS1621</td>
<td>LS1624</td>
<td>22 amber clear amber</td>
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<tr>
<td>On-None-Off</td>
<td>LS1630</td>
<td>LS1631</td>
<td>LS1634</td>
<td>23 amber clear green</td>
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</tr>
<tr>
<td>On-None-Off</td>
<td>LS1640</td>
<td>LS1641</td>
<td>LS1644</td>
<td>24 amber clear blue</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1650</td>
<td>LS1651</td>
<td>LS1654</td>
<td>25 amber clear clear</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1660</td>
<td>LS1661</td>
<td>LS1664</td>
<td>30 green -- --</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1670</td>
<td>LS1671</td>
<td>LS1674</td>
<td>31 green clear red</td>
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</tr>
<tr>
<td>On-None-Off</td>
<td>LS1680</td>
<td>LS1681</td>
<td>LS1684</td>
<td>32 green clear amber</td>
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<td>On-None-Off</td>
<td>LS1690</td>
<td>LS1691</td>
<td>LS1694</td>
<td>33 green clear green</td>
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</tr>
<tr>
<td>On-None-Off</td>
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<td>LS1701</td>
<td>LS1704</td>
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<td></td>
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<tr>
<td>On-None-Off</td>
<td>LS1710</td>
<td>LS1711</td>
<td>LS1714</td>
<td>35 green clear clear</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1720</td>
<td>LS1721</td>
<td>LS1724</td>
<td>40 blue -- --</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1730</td>
<td>LS1731</td>
<td>LS1734</td>
<td>41 blue clear red</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1740</td>
<td>LS1741</td>
<td>LS1744</td>
<td>42 blue clear amber</td>
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<tr>
<td>On-None-Off</td>
<td>LS1750</td>
<td>LS1751</td>
<td>LS1754</td>
<td>43 blue clear green</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1760</td>
<td>LS1761</td>
<td>LS1764</td>
<td>44 blue clear blue</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1770</td>
<td>LS1771</td>
<td>LS1774</td>
<td>45 blue clear clear</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1780</td>
<td>LS1781</td>
<td>LS1784</td>
<td>50 clear -- --</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1790</td>
<td>LS1791</td>
<td>LS1794</td>
<td>51 clear clear red</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1800</td>
<td>LS1801</td>
<td>LS1804</td>
<td>52 clear clear amber</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1810</td>
<td>LS1811</td>
<td>LS1814</td>
<td>53 clear clear green</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1820</td>
<td>LS1821</td>
<td>LS1824</td>
<td>54 clear clear blue</td>
<td></td>
</tr>
<tr>
<td>On-None-Off</td>
<td>LS1830</td>
<td>LS1831</td>
<td>LS1834</td>
<td>55 clear clear clear</td>
<td></td>
</tr>
</tbody>
</table>

### Notes:
1. Independent lamp is standard. Dependent lamp with ON-OFF function (including momentary) is available with Lighting Sequences 10, 20, 30, 40 and 50. (No light in OFF position.)
2. Green and blue not recommended with 125 volt or 250 volt neon lamps.
3. Additional terminations available. Consult factory.
4. Custom colors available. Consult factory. () Indicates momentary function.

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

Typical Applications:
• On-Highway Transportation Equipment
• Agricultural Equipment
• Construction Equipment
## 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**: <20 milliseconds
- **Life**: 100,000 cycles maintained circuit, 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, 4 sides. Test criteria - No loss of circuit during test, pre & post test contact resistance.
- **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.

## 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

## Actuator Travel (Angular Displacement)
- 2 position (1/2 throw): 12°
- 3 position (full throw): 12° from center

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

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>5 &amp; 7, 6 &amp; 8 Connected Terminals</td>
<td>3 &amp; 5, 4 &amp; 6</td>
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</tr>
<tr>
<td>DP</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>SPECIAL CIRCUITS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>(6 &amp; 8)</td>
<td>4, 5, 6, 7</td>
<td>OFF</td>
</tr>
<tr>
<td>41</td>
<td>ON</td>
<td>OFF</td>
<td>NONE 1</td>
</tr>
<tr>
<td>42</td>
<td>ON</td>
<td>OFF</td>
<td>NONE 1</td>
</tr>
<tr>
<td>43</td>
<td>ON</td>
<td>3 &amp; 5</td>
<td>NONE 1</td>
</tr>
<tr>
<td>44</td>
<td>ON</td>
<td>3 &amp; 5</td>
<td>NONE 1</td>
</tr>
<tr>
<td>45</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>46</td>
<td>NONE</td>
<td>5 &amp; 7</td>
<td>ON</td>
</tr>
<tr>
<td>47</td>
<td>NONE</td>
<td>5 &amp; 7</td>
<td>(ON)</td>
</tr>
<tr>
<td>98</td>
<td>(5 &amp; 7, 3 &amp; 6)</td>
<td>5 &amp; 7, 4 &amp; 6</td>
<td>(3 &amp; 5, 4 &amp; 6)</td>
</tr>
</tbody>
</table>

### 2 CIRCUIT

Terminal Connections as viewed from bottom of switch:

1 - - 2    SP - single pole uses terminals 3, 5 & 7.
3 - - 4    DP - double pole uses terminals 3, 5, 7 & 4, 6, 8.
5 - - 6
7 - - 8
9 - - 10
Position:  1 2 3
SP DP  5 & 7, 6 & 8  Connected Terminals  3 & 5, 4 & 6

### 3 RATING

| 1 | 0.4VA 28VDC Resistive |
| 2 | 10.5mA 1.5A 28VDC, 5A 28VDC 50A Inrush Lamp Load |
| 3 | 3.5A 28VDC, 18A Inrush |
| 4 | 10mA 10A 28VDC |
| 5 | 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>1 (+) 2 (–)</td>
</tr>
<tr>
<td>C</td>
<td>INDEPENDENT</td>
<td>1 (+) 2 (–)</td>
</tr>
<tr>
<td>D</td>
<td>INDEPENDENT</td>
<td>1 (+) 2 (–)</td>
</tr>
<tr>
<td>E</td>
<td>INDEPENDENT</td>
<td>1 (+) 2 (–)</td>
</tr>
<tr>
<td>F</td>
<td>INDEPENDENT</td>
<td>1 (+) 2 (–)</td>
</tr>
<tr>
<td>G</td>
<td>INDEPENDENT</td>
<td>1 (+) 2 (–)</td>
</tr>
<tr>
<td>H</td>
<td>DEPENDENT</td>
<td>9 (+) 2 (–)</td>
</tr>
<tr>
<td>J</td>
<td>DEPENDENT</td>
<td>9 (+) 2 (–)</td>
</tr>
<tr>
<td>K</td>
<td>DEPENDENT</td>
<td>9 (+) 2 (–)</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
2. Dark Carbon

### 9 ACTUATOR

1. Black
2. Titan Gray
3. Dark Carbon

### 10, 11, 12 LEGEND COLOR

1. Clear
2. Orange
3. Yellow
4. Green

### 13 LEGEND 1

1. No Legend

### 14 LEGEND ORIENTATION

1. Orientation 1
2. Orientation 2
3. Orientation 3
4. Orientation 4

### 15, 16 LEGEND 2, 3

1. 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 10 only.
5. Located over T1-2.

Consult factory for specifics.
Dimensional Specifications: in. [mm]

MATES WITH TYCO/AMP MCP CONNECTOR 141894-1

PANEL KEY

SWING RADIUS

PANEL THICKNESS: 2.5±0.1mm
PANEL OPENING CLEARANCE: ±5°
SCALE 2.000

MATES WITH TYCO/AMP MCP CONNECTOR 141894-1
Carling’s Mid-sized Rocker Switches range from 5 to 20 amp illuminated and non-illuminated, one and two poles, with many styles of solid colored, translucent rockers. Illumination options include LED, neon, and incandescent lamps.

**SELECTOR GUIDE**

<table>
<thead>
<tr>
<th>T / LTA / TG / LTG / TLG / TTG</th>
<th>RR / LRR</th>
<th>R / LRA / RSC / RG / LRG</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>1</td>
<td>1, 2</td>
</tr>
<tr>
<td><strong>Poles</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 20A 125VAC</td>
<td>up to</td>
<td>up to</td>
</tr>
<tr>
<td>10A 250VAC</td>
<td>12A 125VAC</td>
<td>20A 125VAC</td>
</tr>
<tr>
<td><strong>Ratings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rocker, lever, paddle, plunger, toggle (bat)</td>
<td>rocker</td>
<td>rocker, paddle</td>
</tr>
<tr>
<td>.550” x 1.125”</td>
<td>.795”</td>
<td>.480” x 1.072”</td>
</tr>
<tr>
<td>[13.97mm x 28.57mm]</td>
<td>[20.2mm]</td>
<td>[12.19mm x 27.23mm]</td>
</tr>
<tr>
<td>1.00” x 1.125”</td>
<td>1.00”</td>
<td>.866” x 1.182”</td>
</tr>
<tr>
<td>[25.4mm x 28.57mm]</td>
<td>.866”</td>
<td>[22mm x 30mm]</td>
</tr>
<tr>
<td>snap-in mount</td>
<td>round snap-in mount</td>
<td>snap-in mount</td>
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<tr>
<td><strong>Actuator</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>.187 tab solder lug .250 tabs wire leads</td>
<td>.187 tab</td>
<td>solder lug .250 tabs wire leads</td>
</tr>
<tr>
<td>incandescent, neon</td>
<td>incandescent, neon</td>
<td>incandescent, neon</td>
</tr>
<tr>
<td>UL, CSA</td>
<td>UL, cUL</td>
<td>UL, CSA, VDE</td>
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<tr>
<td><strong>Termination</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Mounting Hole Specifications</strong></td>
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<tr>
<td><strong>Illumination</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td></td>
<td></td>
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</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.*
T-Serie
SINGLE POLE ROCKERS & PADDLE SWITCHES

The predecessor to the Curvette series whose versatility has allowed it to stand the test of time. Traditional styling coupled with self cleaning contacts, integrated wire leads, a multitude of circuits, ratings, and actuator choices has made the TA/LTA-Series appeal to a wide range of markets.

Product Highlights:
- Ratings Up To 20A
- Rocker, Paddle, Plunger or Door Interlock Actuators
- Integrated Wire Lead Construction
- Self-Cleaning Wiping Style Contacts

Typical Applications:
- Appliance
- HVAC
- Food Service
- Transportation
**Dielectric Strength**
UL/CSA: 1000V - live to dead metal parts

**Mechanical Life**
100,000 cycles

**Operating Temperature**
32°F to 185°F (0°C to 85°C)

---

### TA201 - T B B

<table>
<thead>
<tr>
<th>1 Base Part Number</th>
<th>2 Actuator Style</th>
<th>3 Actuator Color</th>
<th>4 Bezel Color/Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA201</td>
<td>T</td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>

#### 1 BASE PART NUMBER: SERIES / CIRCUITRY / RATING 4 / TERMINATION

<table>
<thead>
<tr>
<th>10A 250 VAC, 15A 125 VAC, 3/4 HP 125-250 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solder Lugs</td>
</tr>
</tbody>
</table>

#### Standard Base

- ON-NONE-OFF: TA200, TA201, TA205
- ON-NONE-ON: TB200, TB201, TB205
- ON-OFF-ON: TC200, TC201, TC205

#### 5A 250 VAC, 10A 125 VAC, 1/2 HP 125-250 VAC

- (ON)-NONE-OFF: TA10A, TA10B, TA10F
- ON-NONE-(OFF): TA10L, TA10M, TA10T
- ON-NONE-(ON): TB10A, TB10B, TB10F

#### T-SERIES WITH PLUNGER ACTUATOR 1,2

- 10A 250 VAC, 16A 125 VAC, 1/2 HP 125-250 VAC
- ON-NONE-(OFF): TA25T-PLB-B

#### T-SERIES WITH MOMENTARY ROCKER ACTUATOR

- 10A 250 VAC, 15A 125 VAC, 20A 125-250 VAC (ON)-NONE-OFF: TA22B-TLB-B
- ON-NONE-(OFF): TA22M-TLB-B

#### 2 ACTUATOR STYLE

<table>
<thead>
<tr>
<th>T</th>
<th>P</th>
<th>PS</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>P</td>
<td>Short Paddle</td>
</tr>
</tbody>
</table>

#### 3 ACTUATOR COLOR 5

<table>
<thead>
<tr>
<th>B</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>W</td>
</tr>
</tbody>
</table>

#### 4 BEZEL COLOR 5

<table>
<thead>
<tr>
<th>B</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>W</td>
</tr>
</tbody>
</table>

**Notes:**
1. Optional plunger support option is available for applications requiring extensive lateral travel, consult factory for details.
3. .187 tab terminals also available. Consult factory for catalog number callout.
4. Additional ratings are available. Consult factory.
5. Additional colors are available. Consult factory.

( ) Indicates momentary function.

---

#### Dielectric Strength
UL/CSA: 1000V - live to dead metal parts

#### Mechanical Life
100,000 cycles

#### Operating Temperature
32°F to 185°F (0°C to 85°C)

---

*Manufacturer reserves the right to change product specification without prior notice.*
LTA-Series
SINGLE POLE LIGHTED ROCKER SWITCHES

The illuminated predecessor to the Curvette series whose versatility has allowed it to stand the test of time. Traditional styling coupled with self-cleaning contacts, integrated wire leads, and various actuator choices has made the LTA-Series appeal to a wide range of markets.

Product Highlights:
- Neon or Incandescent Illumination
- Long Paddle, Short Paddle or Rocker Actuators
- Good for 125/250VAC or Low Voltage DC Applications
- Integrated Wire Lead Construction

Typical Applications:
- Appliance
- HVAC
- Food Service
- Transportation
**Dielectric Strength**
UL/CSA: 1000V - live to dead metal parts
750V - across open contacts

**Mechanical Life**
100,000 cycles

**Operating Temperature**
32°F to 185°F (0°C to 85°C)

**Electrical Life**
100,000 cycles
TG/LTG-Series
ROCKER SWITCHES

The TG-Series Mid-Sized Tippette rocker switches are single or double pole and feature an all nylon double-insulated construction. These switches are designed with snap-in mounting for fast, low cost assembly. The illuminated version (LTG) is available with either a paddle or rocker actuator. These AC rated switches are also suitable for low-voltage DC applications assuring compatibility for a wide range of markets.

Product Highlights:
- Single or Double Pole
- Gloss Finish Surfaces
- Illuminated or Non-Illuminated
- 20 Available Circuit Options

Typical Applications:
- Appliance
- HVAC
- Food Service
- Transportation
Dielectric Strength
UL/CSA:
1000V - live to dead metal parts

Electrical Life
50,000 cycles - maintained
25,000 cycles - momentary

Mechanical Life
100,000 cycles

Operating Temperature
32°F to 185°F (0°C to 85°C)

LTG G O 50 1 - T B - B - R / 125

1 BASE PART NUMBER: SERIES
TG Double Pole, Non-Lighted
LTG Double Pole with Indicator Lights

2 CIRCUIT
See Circuit Designation Chart

3 CENTER POSITION
C Center OFF, Three position
O No Center OFF, Two position

4 RATING
40 5A 250VAC, 10A 125VAC, 1/2HP 125-250VAC
41 5A 250VAC, 10A 125VAC
50 10A 250VAC, 15A 125VAC, 3/4HP 125-250VAC
51 10A 250VAC, 15A 125VAC

5 TERMINATION / FUNCTION
Solder Lug .250 Tab QC .187 Tab QC Wire Leads
On-None-Off 0 1 3 5
(On)-None-Off A B D F
On-None-On 0 1 3 5
On-None-(On) A B D F
On-Off-On 0 1 1 3 5

6 ACTUATOR STYLE
P Paddle
T Rocker

7 ACTUATOR COLOR
B Black
W White

8 BASE COLOR
B Black
W White

9 LENS COLOR
A Amber
C Clear
R Red

10 LAMP VOLTAGE
incandescent neon
6V 6 volt 125N 125 volt neon
12V 12 volt 250N 250 volt neon
24V 24 volt
28V 28 volt

Notes:
Imprinting is available. Consult factory.
Panel Cut-Out Recommendations: For sheet metal panels, switch must enter panel in same direction as the punch. (Burr on bottom.) Test cut hole in actual material.
2 Custom colors are available. Consult factory.
3 Specify lens color for LTG-Series only.
( ) Indicates momentary function.

*Manufacturer reserves the right to change product specification without prior notice.
TTG-Series
ROCKER SWITCHES

The TTG-Series Mid-Sized Tippette snap-in rocker switches consist of two single pole illuminated or non-illuminated switches in a common base. Each pole can have the same or different switch function. These switches are AC rated up to 20 amps and are also suitable for low-voltage DC applications, in a wide range of markets.

Product Highlights:
- Independent or Dependent Illumination
- Ratings up to 20 Amps
- Diamond or Long Line Lens Options
- Self-Cleaning Wiping Style Contacts

Typical Applications:
- Appliance
- HVAC
- Food Service
- Transportation
### Dielectric Strength
UL/CSA: 
1000V - live to dead metal parts

### Electrical Life
50,000 cycles - maintained
25,000 cycles - momentary

### Mechanical Life
100,000 cycles

### Operating Temperature
32°F to 185°F (0°C to 85°C)

#### TTG-Series Rocker Switches - General Specifications, Ordering Scheme, Dimensional Specifications

**1 BASE PART NUMBER: SERIES**
TTG Two Single Pole switches in one base

**2 CIRCUIT**
See Circuit Designation Chart

**3 BASIC SWITCH NUMBER**
<table>
<thead>
<tr>
<th>Circuit</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA</td>
<td>On-None-Off</td>
</tr>
<tr>
<td>TB</td>
<td>On-None-On</td>
</tr>
<tr>
<td>LTA</td>
<td>On-Off-On</td>
</tr>
</tbody>
</table>

**4 RATING**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>5A 250VAC, 10A 125VAC, 1/2HP 125-250VAC</td>
</tr>
<tr>
<td>11</td>
<td>5A 250VAC, 10A 125VAC, 5A 125VAC L</td>
</tr>
<tr>
<td>20</td>
<td>10A 250VAC, 15A 125VAC, 3/4HP 125-250VAC</td>
</tr>
<tr>
<td>21</td>
<td>10A 250VAC, 15A 125VAC</td>
</tr>
<tr>
<td>22</td>
<td>10A 250VAC, 15A 125VAC, 20A 125-250VAC H, 3/4HP 125-250VAC</td>
</tr>
</tbody>
</table>

**5 TERMINATION / FUNCTION**

<table>
<thead>
<tr>
<th>Function</th>
<th>Solder Lug</th>
<th>.250 Tab QC</th>
<th>.187 Tab QC</th>
<th>Wire Leads</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-None-Off</td>
<td>.50</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>(On) None-Off</td>
<td>A</td>
<td>B</td>
<td>D</td>
<td>F</td>
</tr>
<tr>
<td>On-None-Off</td>
<td>L</td>
<td>M</td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>On-None-On</td>
<td>.50</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>On-None-(On)</td>
<td>A</td>
<td>B</td>
<td>D</td>
<td>F</td>
</tr>
<tr>
<td>On-Off-On</td>
<td>.50</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

**6 ACTUATOR STYLE**

<table>
<thead>
<tr>
<th>Style</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Paddle</td>
</tr>
<tr>
<td>T</td>
<td>Rocker</td>
</tr>
</tbody>
</table>

**7 ACTUATOR COLOR**

<table>
<thead>
<tr>
<th>Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Black</td>
</tr>
<tr>
<td>W</td>
<td>White</td>
</tr>
</tbody>
</table>

**8 BASE COLOR**

<table>
<thead>
<tr>
<th>Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Black</td>
</tr>
<tr>
<td>W</td>
<td>White</td>
</tr>
</tbody>
</table>

**9 LENS COLOR**

<table>
<thead>
<tr>
<th>Color</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Amber</td>
</tr>
<tr>
<td>C</td>
<td>Clear</td>
</tr>
<tr>
<td>G</td>
<td>Green</td>
</tr>
<tr>
<td>LU</td>
<td>Blue</td>
</tr>
<tr>
<td>R</td>
<td>Red</td>
</tr>
</tbody>
</table>

**10 LAMP VOLTAGE**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V</td>
<td>6 volt</td>
</tr>
<tr>
<td>12V</td>
<td>12 volt</td>
</tr>
<tr>
<td>18V</td>
<td>18 volt</td>
</tr>
<tr>
<td>24V</td>
<td>24 volt</td>
</tr>
<tr>
<td>28V</td>
<td>28 volt</td>
</tr>
</tbody>
</table>

**Notes:**
- Imprinting is available. Consult factory.
- Panel Cut-Out Recommendations: For sheet metal panels, switch must enter panel in same direction as the punch. (Burr on bottom.) Test cut hole in actual material.

*Manufacturer reserves the right to change product specification without prior notice.*
The TLG-Series Mid-Sized Tippette snap-in rocker switches are single pole, rocker or paddle actuated with an adjacent indicator light. These single-actuator switches are AC rated to 20 amps and are also suitable for low voltage DC applications.

**Product Highlights:**
- Maintained or Momentary Circuitry
- Rocker Paddle or mixed Rocker/Paddle actuators
- Illuminated or Non-Illuminated
- Integrated wire lead construction

**Typical Applications:**
- Appliance
- HVAC
- Food Service
- Transportation
### TLG-Series Rocker Switches - General Specifications, Ordering Scheme, Dimensional Specifications

#### Dielectric Strength
- UL/CSA: 1000V - live to dead metal parts

#### Electrical Life
- 50,000 cycles - maintained
- 25,000 cycles - momentary

#### Mechanical Life
- 100,000 cycles

#### Operating Temperature
- 32°F to 185°F (0°C to 85°C)

### Table: TLG Series Rocker Switches

<table>
<thead>
<tr>
<th>1 Base Part Number</th>
<th>2 Circuit</th>
<th>3 Lens Design</th>
<th>4 Lens Color</th>
<th>5 Center Position</th>
<th>6 Rating</th>
<th>7 Termination</th>
<th>8 Actuator Style</th>
<th>9 Actuator Color</th>
<th>10 Base Color</th>
<th>11 Lens Color</th>
<th>12 Lamp Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLG</td>
<td>D</td>
<td>R</td>
<td>TA</td>
<td>20</td>
<td>1</td>
<td>T</td>
<td>B</td>
<td>B</td>
<td>/</td>
<td>125N</td>
<td></td>
</tr>
</tbody>
</table>

#### Notes:
- Imprinting is available. Consult factory.
- Panel Cut-Out Recommendations: For sheet metal panels, switch must enter panel in same direction as the punch. (Burr on bottom.) Test cut hole in actual material.
- Neon Lamps not recommended with green or blue actuators and lenses.
- Custom colors are available. Consult factory.
- Specify lens color only if actuator is lighted paddle.
- Available with circuits G, H, I, J, K only.
- () Indicates momentary function.

---

*Manufacturer reserves the right to change product specification without prior notice.*
# Circuit Designation Chart:

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
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</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<table>
<thead>
<tr>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

- **CONTACT TERMINAL**
  - Will make contact with switching lever
- **CONTACT TERMINAL AND SWITCH LEVER**
- **ISOLATED TERMINAL**
  - Does not make contact with switching lever
- **BULB**
Carling Technologies’ RR and LRR-Series round rocker switches feature a uniquely sculpted rocker design with electrical ratings of up to 12A 125VAC, 10A 250VAC and fit an industry standard cutout, making installation a snap. The lighted LRR-Series can be wired to accommodate dependent or independent, illumination, neon or incandescent lamps with red, green, amber or white translucent rockers. Standard or custom actuator legends are available.

**Product Highlights:**
- 125/250VAC or low voltage 12/24VDC
- Neon or Incandescent Illumination
- Industry Std. 20.2mm mounting hole
- Maintained or momentary circuitry

**Typical Applications:**
- Appliance
- Vacuum Cleaners
- Office Automation
- Food Service
- Audio Visual
- Test & Measurement
**Dielectric Strength**
UL/CUL: 1000V-live to dead metal parts & opposite polarity

**Electrical Life**
50,000 cycles

**Mechanical Life**
100,000 cycles

**Operating Temperature**
32°F to 185°F (0°C to 85°C)

---

**RR/LRR-Series Rounded Rocker Switches - General Specifications, Ordering Scheme, Dimensional Specifications**

### RR 1 1 2 - B B - N N

1. **SERIES**
   - RR: Rocker
   - LRR: Lighted Rocker

2. **CIRCUIT**
   - 1: On-None-Off
   - 2: (On)-None-Off
   - 3: On-None-(Off)
   - 4: On-None-On
   - 5: On-None-(On)
   - 6: On-Off-On

3. **RATING**
   - 1: 10A, 125-250VAC; 12A 125 VAC
   - 2: 1/4 HP 125-250 VAC
   - 3: 6A, 28 VDC
   - 4: 12A, 12 VDC
   - 5: 12A, 6 VDC

4. **TERMINATION**
   - 2: .187 Tab

5. **ACTUATOR COLOR**
   - RR-Series (Non-Illuminated) Solid Color
     - B: Black
     - W: White
     - R: Red
   - LRR-Series (Illuminated) Transparent Color
     - 1: Amber
     - 2: Red
     - 3: Blue
     - 4: Green
     - 5: Clear

6. **BASE COLOR**
   - B: Black
   - W: White
   - R: Red

7. **LAMP VOLTAGE**
   - C: 28V Incandescent
   - J: 125V Neon
   - K: 250V Neon

8. **ROCKER FACE LEGEND**
   - N: No imprinting
   - A: On-Off (vertical)
   - B: On-Off (horizontal)
   - D: I-O (horizontal)
   - E: I-O (vertical)
   - F: O (on rocker end)
   - G: II-O-I (vertical)
   - H: II-O-I (horizontal)
   - J: Off-On (vertical)
   - K: Off-On (horizontal)

### Notes:
1. Rating Code "1" has UL and cUL approval.
2. Neon Lamps (125 or 250 Volts) not recommended with green or blue actuators.

---

**TERMINAL TYPE**

**RECOMMENDED PANEL OPENING**

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

---

**back to table of contents**
Since its introduction, the Curvette switch has become the barometer for versatility and performance in the switch market. Self-cleaning contacts, international approvals, along with a wide variety of circuits, ratings, and actuator options make the Curvette the switch of choice for many markets.

**Product Highlights:**
- Two color visi rocker to indicate “on” function
- Ratings to 20A
- Oval or rectangular bezels
- Patented mounting wings accommodate a wide range of panel openings

**Typical Applications:**
- Appliance
- HVAC
- Food Service
- On Highway
Dielectric Strength
UL/CSA:
1000V - live to dead metal parts
VDE:
4000V - live to dead metal parts;
750V - across open contacts

Mechanical Life
100,000 cycles

Operating Temperature
32°F to 185°F (0°C to 85°C)

Electrical Life
100,000 cycles

Notes:
PC Terminals also available, consult factory for details.
1 For additional ratings, consult factory.
2 Rating is 8A 250 VAC, 12A 125 VAC, 1/2 HP 125-250 VAC, and must specify M actuator style.
3 Not rated at 3/4 HP 125-250 VAC
( ) indicates momentary function.

Image of table with part numbers, actuator styles, bezel colors, rocker legends, and terminal types.

*Manufacturer reserves the right to change product specification without prior notice.
Since its introduction, the Curvette switch has become the barometer for versatility and performance in the miniature switch market. This lighted version features the very same self cleaning contacts, international approvals, along with a wide variety of circuits, ratings, and actuator options that make the Curvette the switch of choice for various applications.

**Product Highlights:**
- Clear or translucent style rockers
- Neon or Incandescent illumination
- Self-cleaning wiping style contacts
- UL, CSA and VDE approved

**Typical Applications:**
- HVAC
- Office Lighting
- Transportation
- Commercial Food
- Lawn & Garden
- Power Strip
Dielectric Strength
UL/CSA: 1000V-live to dead metal parts
VDE: 4000V - live to dead metal parts; 750V - across open contacts

Mechanical Life
100,000 cycles

Operating Temperature
32°F to 185°F (0°C to 85°C)

Electrical Life
100,000 cycles

LRA911 - R S B / 250N

1 BASE PART NUMBER: SERIES / CIRCUITRY / RATING 2 / TERMINATION
125 neon lamp (use 125N in Selection 5 Lamp Voltage)
10A 250VAC; 16A 125V; 10(4)A 125VAC
OFF-NONE-ON LRA210 LRA211 LRA215
250 neon lamp (select 250N in selection 5 Lamp Voltage)
15A 250VAC; 10A 125VAC; 10(4)A 250 T85
OFF-NONE-ON Solder Lugs .250 Tabs Wire Leads
LRA910 LRA911 LRA915
Incandescent lamp (select 006V-024V in selection 5 Lamp Voltage)
10A 30V Solder Lugs .250 Tabs Wire Leads
LRA510 LRA511 LRA515

2 ACTUATOR STYLE
P Paddle
R Rocker translucent
C Rocker Clear

3 ACTUATOR COLOR
translucent A Amber
C Clear
P Yellow
S Red
W Pale Red

1 BASE PART NUMBER: SERIES / CIRCUITRY / RATING 2 / TERMINATION
125 neon lamp (use 125N in Selection 5 Lamp Voltage)
10A 250VAC; 16A 125V; 10(4)A 125VAC
OFF-NONE-ON LRA210 LRA211 LRA215
250 neon lamp (select 250N in selection 5 Lamp Voltage)
15A 250VAC; 10A 125VAC; 10(4)A 250 T85
OFF-NONE-ON Solder Lugs .250 Tabs Wire Leads
LRA910 LRA911 LRA915
Incandescent lamp (select 006V-024V in selection 5 Lamp Voltage)
10A 30V Solder Lugs .250 Tabs Wire Leads
LRA510 LRA511 LRA515

3 ACTUATOR COLOR
translucent A Amber
C Clear
P Yellow
S Red
W Pale Red

4 BEZEL COLOR/STYLE
STANDARD B Black (matte)
W White (matte)
OVAL 1 Black (gloss)
2 White (gloss)

5 LAMP VOLTAGE
006V 6 volts incandescent
012V 12 volts incandescent
018V 18 volts incandescent
024V 24 volts incandescent
125N 1 125 volts neon
250N 1 250 volts neon

Notes:
LED illumination, PC terminals, independent lamps, and additional color options are available. Consult factory.
1 Neon lamps not available with blue or green actuators.
2 Consult factory for additional ratings.

*Manufacturer reserves the right to change product specification without prior notice.
The double pole version of the R-Series incorporates the same sleek lines as the original Curvette, in a double pole envelope. Features include silver-plated butt-action contacts which afford ratings to 20A/125, 15A 250VAC and withstand peak inrush currents up to 100 amps. Paddle or rocker actuators and a choice of solder lug, .250 Tab and wire lead terminations enable this switch to adapt to high current applications.

**Product Highlights:**
- Ratings to 20A
- UL, CSA and VDE approved
- Rocker or Paddle actuators
- Fits Euro or American standard mounting holes

**Typical Applications:**
- Power Supply
- Appliance
- Exercise Equipment
- Music Equipment
Dielectric Strength
UL/CSA:
1000V - live to dead metal parts & opposite polarity
VDE:
4000V - live to dead metal parts;
1250V - opposite polarity & across open contacts

Electrical Life
50,000 cycles

Mechanical Life
100,000 cycles

Operating Temperature
-40°F to 185°F (-40°C to 85°C)

RGSCA901 - R - B - B - A
1 Base Part Number
2 Actuator Style
3 Actuator Color
4 Bezel Color
5 Rocker Legend

1 BASE PART NUMBER: SERIES / CIRCUITRY / RATING 1 / TERMINATION
15A 250 VAC, 20A 125 VAC, 3/4 HP 125-250 VAC, 14(6)A 250 VAC
Solder Lugs .250 Tabs Wire Leads

Standard Base
OFF-NONE-ON (Single Pole) RGSCA900 RGSCA901 RGSCA905
ON-NONE-ON (Single Pole) RGSCB900 RGSCB901 RGSCB905
OFF-NONE-ON (Double Pole) RGSCC900 RGSCC901 RGSCC905
ON-NONE-ON (Double Pole) RGSCD900 RGSCD901 RGSCD905

European Base (22 x 30 mm cutout)
OFF-NONE-ON (Single Pole) RGSEA900 RGSEA901 RGSEA905
ON-NONE-ON (Single Pole) RGSB900 RGSB901 RGSB905
OFF-NONE-ON (Double Pole) RGSCE900 RGSCE901 RGSCE905
ON-NONE-ON (Double Pole) RGSDF900 RGSDF901 RGSDF905

2 ACTUATOR STYLE
P Paddle
R Rocker

3 ACTUATOR COLOR 1
B Black
W White

4 BEZEL COLOR 1
B Black
W White

5 ROCKER LEGEND
A OFF-ON vertical
B OFF-ON horizontal
D O-I horizontal
E O-I vertical
H Dual OFF-ON, O-I vertical
J Dual OFF-ON, O-I horizontal

Notes:
1 Additional ratings, colors and clear style actuators are available. Consult factory.

*Manufacturer reserves the right to change product specification without prior notice.
LRG-Series
ILLUMINATED DOUBLE POLE ROCK & PADDLE SWITCHES

The double pole lighted version of the R-Series incorporates the same sleek lines as the original Curvette, in a double pole envelope. This illuminated version features silver-plated butt-action contacts with ratings to 20A/125, 15A 250VAC and withstand peak inrush currents up to 100 amps. Clear or translucent style rocker actuators and a choice of solder lug, .250 Tab and wire lead terminations enable this switch to adapt to high current applications.

Product Highlights:
- Ratings to 20A
- Neon or Incandescent Illumination
- Silver Plated Butt-contact mechanism
- Clear or translucent style rockers

Typical Applications:
- Power Supply
- Appliance
- Exercise Equipment
- Music Equipment
**Dielectric Strength**

UL/CSA: 1000V - live to dead metal parts & opposite polarity

**Mechanical Life**

100,000 cycles

**Operating Temperature**

-40°F to 185°F (-40°C to 85°C)

**Electrical Life**

50,000 cycles

---

**LRGSCK611 - R S - B - B / 250N**

1. **Base Part Number**
   - 15A 250 VAC, 20A 125 VAC, 3/4 HP 125-250 VAC

2. **Actuator Style**
   - R Rocker (translucent)
   - C Rocker (clear)

3. **Actuator Color**
   - A Amber
   - B Blue
   - C White/Clear
   - G Green
   - L Lime Green
   - P Yellow
   - R Red
   - S Red
   - W Pale Red

4. **Bezel Color**
   - B Black
   - W White

5. **Rocker Legend**
   - 0 NO LEGEND
   - A OFF-ON vertical
   - B OFF-ON horizontal
   - D O-I horizontal
   - E O-I vertical
   - H Dual OFF-ON, O-I vertical
   - J Dual OFF-ON, O-I horizontal

6. **Lamp Voltage**
   - 006V 6V incandescent
   - 012V 12V incandescent
   - 018V 18V incandescent
   - 024V 24V incandescent
   - 125V neon
   - 250V neon

---

**Notes:**
- Additional ratings, colors and clear style actuators are available. Consult factory.
- Incandescent lamps must specify 15A 24V rating only.
- Available with incandescent lamps only.
- Clear color provided where specified with clear style rocker.
- Available with clear style rocker only.

---

**TERMINAL TYPE**

- **.250 TAB (Q.C.)**
- **SOLDER LUG**
- **WIRE LEAD**

**Terminal Specifications**

- **.250 Tab (Q.C.)**
  - 250[5.35]
  - .866[22.00]

- **Solder Lug**
  - .145[3.68]
  - .784[19.41]

- **.250 Tab**
  - 1.210[30.71]

- **.080[2.03]**
  - .375[9.53]
  - .725[18.42]

- **.250 Tab**
  - 1.176[29.87]

- **.168[4.27]**
  - .725[18.42]

- **.180[4.57]**
  - .725[18.42]

- **.125[3.18]**
  - .725[18.42]

- **.115[2.92]**
  - .725[18.42]

**Mounting Hole**

- Panel Thickness: .025 min - .187 max.
- Specific cutout dimension range dependent on panel thickness and material.

---

*Manufacturer reserves the right to change product specification without prior notice."
Carling’s Small-Sized Rocker Switches range from .4VA to 12 amp illuminated and non-illuminated, single and double pole, with many styles of solid colored and two-color Visi-Rockers. Illumination options include LED, neon, and incandescent lamps.

### SELECTOR GUIDE

<table>
<thead>
<tr>
<th>610 / 620</th>
<th>611 / 621</th>
<th>622 / 632</th>
<th>651 / 652</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>1, 2</td>
<td>1, 2</td>
<td>1</td>
</tr>
</tbody>
</table>

**Poles**

<table>
<thead>
<tr>
<th>up to 8A 125VAC</th>
<th>up to 8A 125VAC</th>
<th>up to 12A 125VAC</th>
<th>up to 10A 125VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>4A 250VAC</td>
<td>8A 250VAC</td>
<td>8A 250VAC</td>
<td>10A 250VAC</td>
</tr>
</tbody>
</table>

**Ratings**

<table>
<thead>
<tr>
<th>rocker, paddle</th>
<th>rocker, paddle</th>
<th>rocker</th>
<th>rocker, paddle</th>
</tr>
</thead>
</table>

**Actuator**

<table>
<thead>
<tr>
<th>.508” x .756”</th>
<th>.508” x .756”</th>
<th>.508” x .756”</th>
<th>.508” x .756”</th>
</tr>
</thead>
<tbody>
<tr>
<td>[12.9mm x 19.2mm]</td>
<td>[12.9mm x 19.2mm]</td>
<td>[12.9mm x 19.2mm]</td>
<td>[12.9mm x 19.2mm]</td>
</tr>
<tr>
<td>snap-in mount</td>
<td>snap-in mount</td>
<td>snap-in mount</td>
<td>snap-in mount</td>
</tr>
</tbody>
</table>

**Mounting Hole Specifications**

<table>
<thead>
<tr>
<th>solder lug</th>
<th>solder lug</th>
<th>solder lug</th>
<th>solder lug</th>
</tr>
</thead>
<tbody>
<tr>
<td>wire leads</td>
<td>wire leads</td>
<td>wire leads</td>
<td>wire leads</td>
</tr>
<tr>
<td>PC terms</td>
<td>PC terms</td>
<td>PC terms</td>
<td>PC terms</td>
</tr>
</tbody>
</table>

**Termination**

<table>
<thead>
<tr>
<th>.187 tab</th>
<th>.187 tab</th>
<th>.187 tab</th>
</tr>
</thead>
<tbody>
<tr>
<td>solder lug</td>
<td>solder lug</td>
<td>solder lug</td>
</tr>
<tr>
<td>wire leads</td>
<td>wire leads</td>
<td>wire leads</td>
</tr>
<tr>
<td>PC terms</td>
<td>PC terms</td>
<td>PC terms</td>
</tr>
</tbody>
</table>

**Illumination**

<table>
<thead>
<tr>
<th>incandescent, LED, neon</th>
<th>n/a</th>
<th>n/a</th>
</tr>
</thead>
</table>

**Approvals**

<table>
<thead>
<tr>
<th>UL, CSA</th>
<th>UL, CSA, VDE</th>
<th>UL, CSA</th>
<th>UL, CSA</th>
</tr>
</thead>
</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.
The 610/620-Series switches are double insulated and available in single or double pole configurations. These snap-in mounted switches are offered with either a paddle or rocker actuator and with ratings up to 8 amps.

**Product Highlights:**
- Single or double pole
- Paddle rocker actuator options
- Snap-In mounting method

**Typical Applications:**
- Handheld Appliance
- Audio-Visual
- Power Supplies
- Computers
**Dielectric Strength**
UL/CSA:
1000V - live to dead metal parts & opposite polarity

**Electrical Life**
50,000 cycles - single pole
50,000 cycles - double pole

**Operating Temperature**
32°F to 185°F (0°C to 85°C)

---

### Terminal Type

<table>
<thead>
<tr>
<th>TERMINAL TYPE</th>
<th>Description</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC TERMINAL</td>
<td>.080 SOLDER LUG</td>
<td>250(6.35)</td>
</tr>
<tr>
<td>END CENTER</td>
<td>.080(2.03) X .047(1.19) SLOT</td>
<td></td>
</tr>
<tr>
<td>MOUNTING HOLE</td>
<td>Round</td>
<td>0.47(12.50)</td>
</tr>
<tr>
<td>Panel Thickness</td>
<td>.030(.762) min. to .060(1.53) max.</td>
<td></td>
</tr>
</tbody>
</table>

**Mechanical Life**
100,000 cycles

---

#### BASE PART NUMBER: SERIES / CIRCUITRY / RATING / TERMINATION

<table>
<thead>
<tr>
<th>Base Part Number</th>
<th>Terminal Sealing</th>
<th>Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>62012421 - 0 - 0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

--

#### Notes:

1. Base part number specifies black rocker and bezel. To specify paddle actuator, change 2nd digit of part number from 2 to 1 (ex. 61012421) for additional ratings and colors, consult factory.

---

*Manufacturer reserves the right to change product specification without prior notice.*
611/621-Series
SMALL-SIZED ROCKER SWITCHES

The 611/621-Series small-size, sleek styling, actuator and termination choices make this switch a cost effective solution to most any switching need. International approvals, single or double pole circuitry, and ratings to 11A 125VAC further the broad appeal of this product family.

Product Highlights:
- Single or double pole
- Paddle and single color or dual color visi-rocker options
- UL, CSA and VDE approvals for select circuits
- Choice of 7 termination options

Typical Applications:
- Appliance
- Audio-Visual
- Power Supplies
### 611/621-Series - Small-Sized Rocker Switches - General Specifications, Ordering Scheme, Dimensional Specifications

#### Dielectric Strength
- UL/CSA: 1000 V - live to dead metal parts & opposite polarity
- VDE: 4000 V - live to dead metal parts; 1250 V - opposite polarity & across open contacts

#### Electrical Life
- 50,000 cycles - single pole
- 50,000 cycles - double pole

#### Operating Temperature
- 32°F to 185°F (0°C to 85°C)

#### Mechanical Life
- 100,000 cycles

---

### 1 BASE PART NUMBER: SERIES / CIRCUITRY / RATING 2 / TERMINATION

<table>
<thead>
<tr>
<th>Single Pole</th>
<th>Double Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>4A 250VAC; 8A 125VAC; 6(4) A 250V</td>
<td>4A 250VAC; 8A 125VAC; 6(4) A 250V</td>
</tr>
</tbody>
</table>

#### 2 TERMINAL SEALING
- 0: None
- E: Epoxy sealed terminals

#### 3 ROCKER LEGEND
- NO LEGEND: O
- Off-On vertical: A
- Off-On horizontal: B
- I-O horizontal: D
- I-O vertical: E
- O on rocker radius: F (Indicates ON)

#### 4 VISI-ROCKER END COLOR
- N: n/a
- V: visi-red
- W: visi-white

---

### Manufacturer reserves the right to change product specification without prior notice.
A high powered offering packed into a small-sized envelope, the 622/632-Series is a staple of numerous markets. With its silver-alloy butt contacts, the 622/632 will handle inrush spikes up to 100 amps and steady state current to 12A 125VAC. The lighted 632-Series features a multitude of illumination circuit options available with LED, incandescent and neon style lamps.

**Product Highlights:**
- Illuminated or Non-Illuminated
- Silver Plated Butt contacts that handle high Inrush spikes
- Independent or Dependent lamp circuitry
- Industry standard size mounting hole

**Typical Applications:**
- Appliance
- Food Service
- Transportation
- General Purpose
Dielectric Strength
UL/CSA:
1000V-live to dead metal parts
& opposite polarity

Mechanical Life
100,000 cycles

Operating Temperature
32°F to 185°F (0°C to 85°C)

**632121** - 1 B K N

1 Base Part Number
2 Actuator Color
3 Base Color
4 Lamp
5 Legend

**BASE PART NUMBER: SERIES / CIRCUITY / RATING / TERMINATION**
8A 250VAC; 12A 125VAC; 1/2 HP 125-250VAC
622-SERIES NON-ILLUMINATED ROCKER
ON-none-OFF (Single Pole) schematic 1
ON-none-OFF (Single Pole, dependent lamp) schematic 3
ON-none-OFF (Single Pole, independent lamp) schematic 5
ON-none-OFF (Double Pole, dependent lamp with 5 terms) schematic 2
ON-none-OFF (Double Pole, dependent lamp with 4 terms) schematic 4

**2 ACTUATOR COLOR**
B Black
W White

**3 BASE COLOR**
B Black
W White

**4 LAMP VOLTAGE / STYLE**
A 6V incandescent
B 12V incandescent
C 18V incandescent
D 24V incandescent
E 125V neon
K 250V neon

**5 ROCKER LEGEND**
N NO Legend
A OFF-ON vertical
B OFF-ON horizontal
D I-O horizontal
E I-O vertical
F O on rocker radius

**Notes:**
1 For all incandescent or LED lamps specify 5 in 5th digit of part number.
Example 632151-1B-CN
2 Available with incandescent lamps only.
3 Additional colors available. Consult factory for details.

**Dielectric Strength**
**Mechanical Life**
**Operating Temperature**

**Dielectric Strength**
**Mechanical Life**
**Operating Temperature**

632 SCHEMATIC
UNBALLASTED

**Notes:**
1 For all incandescent or LED lamps specify 5 in 5th digit of part number.
Example 632151-1B-CN
2 Available with incandescent lamps only.
3 Additional colors available. Consult factory for details.

**Dielectric Strength**
**Mechanical Life**
**Operating Temperature**

632 SCHEMATIC
UNBALLASTED
651/652-Series
SMALL-SIZED ROCKER SWITCHES

This switch is ideal for applications with back panel size constraints. It fits in a standard rectangular cutout and is designed to provide ease of insertion along with superior panel retention qualities. A high profile rocker and butt-action contacts provide the user with a crisp positive-type feel and electrical ratings to 12A 125VAC 10A 250VAC. A variety of ratings, circuitry and termination choices will appeal to many market segments.

Product Highlights:
• Ratings to 12A 125VAC, 6A 250VAC
• Suitable for low voltage 12/24V DC
• Solid or 2 color visi-rocker options
• 5 choices of termination

Typical Applications:
• Handheld Appliance
• Audio-Visual
• Power Supplies
### Dielectric Strength
UL/CSA: 1000V-live to dead metal parts

### Electrical Life
100,000 cycles- maintained  
50,000 cycles- momentary  
50,000 cycles- T-rating

### Mechanical Life
100,000 cycles

### Operating Temperature
32°F to 185°F (0°C to 85°C)

---

#### 1 SERIES
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>B</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
</tr>
<tr>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>4</td>
<td>N</td>
</tr>
</tbody>
</table>

#### 2 CIRCUITRY / RATING / TERMINATION

<table>
<thead>
<tr>
<th>Circuit/Rating/Termination</th>
<th>Solder Lugs</th>
<th>Tabs</th>
<th>Terms</th>
<th>Rt. Angle</th>
<th>Leads</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON-NONE-OFF</td>
<td>.187</td>
<td>.187</td>
<td>PC</td>
<td>PC</td>
<td>Wire</td>
</tr>
<tr>
<td>(ON)-NONE-OFF</td>
<td>261</td>
<td>262</td>
<td>263</td>
<td>264</td>
<td>265</td>
</tr>
<tr>
<td>ON-NONE-(OFF)</td>
<td>361</td>
<td>362</td>
<td>363</td>
<td>364</td>
<td>365</td>
</tr>
<tr>
<td>ON-NONE-ON</td>
<td>421</td>
<td>422</td>
<td>423</td>
<td>424</td>
<td>425</td>
</tr>
<tr>
<td>ON-OFF-ON</td>
<td>681</td>
<td>682</td>
<td>683</td>
<td>684</td>
<td>685</td>
</tr>
<tr>
<td>(ON)-OFF-(ON)</td>
<td>881</td>
<td>882</td>
<td>883</td>
<td>884</td>
<td>885</td>
</tr>
</tbody>
</table>

#### 3 ACTUATOR COLOR
<table>
<thead>
<tr>
<th>Color</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Black</td>
</tr>
<tr>
<td>W</td>
<td>White</td>
</tr>
</tbody>
</table>

#### 4 BASE COLOR
<table>
<thead>
<tr>
<th>Color</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Black</td>
</tr>
<tr>
<td>W</td>
<td>White</td>
</tr>
</tbody>
</table>

#### 5 ROCKER LEGEND
<table>
<thead>
<tr>
<th>Legend</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NO LEGEND</td>
<td>0</td>
</tr>
<tr>
<td>Off-On vertical</td>
<td>1</td>
</tr>
<tr>
<td>Off-On horizontal</td>
<td>B</td>
</tr>
<tr>
<td>I-O horizontal</td>
<td>8</td>
</tr>
<tr>
<td>I-O vertical</td>
<td>9</td>
</tr>
<tr>
<td>O on rocker end</td>
<td>F</td>
</tr>
<tr>
<td>II-O-I vertical</td>
<td>G</td>
</tr>
<tr>
<td>II-O-I horizontal</td>
<td>H</td>
</tr>
</tbody>
</table>

#### 6 VISI-ROCKER END / LEGEND COLOR
<table>
<thead>
<tr>
<th>Color</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>N/A</td>
</tr>
<tr>
<td>B</td>
<td>Black</td>
</tr>
<tr>
<td>V</td>
<td>Visi-red</td>
</tr>
<tr>
<td>W</td>
<td>White</td>
</tr>
</tbody>
</table>

Notes:
1. Additional ratings (including 14V T) & color options are available; Consult factory.
2. Rated 12A 250VAC, 10A 125VAC, 1/4 HP 125-250VAC.
3. Additional colors available. Consult factory for details.
4. Available with Visi-Rocker option only.

---

*Manufacturer reserves the right to change product specification without prior notice.
Carling bushing mount toggle switches range from 1 to 4 poles, 1 to 20 amps. They offer a variety of nylon and metal toggle styles, as well as illuminated toggles. Several families of heavy-duty toggle switches are available, as well as a high-temperature snap-in toggle switch series.

### SELECTOR GUIDE

<table>
<thead>
<tr>
<th>ST-Series</th>
<th>LT-Series</th>
<th>F / G / H / I</th>
<th>C / D</th>
<th>110-Series</th>
<th>DK / EK</th>
<th>MAAOA / 215</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>1, 2</td>
<td>1, 2, 3, 4</td>
<td>1</td>
<td>1, 2</td>
<td>1, 2</td>
<td>1</td>
</tr>
<tr>
<td>10A 250VAC</td>
<td>up to</td>
<td>up to</td>
<td>up to</td>
<td>up to</td>
<td>up to</td>
<td>up to</td>
</tr>
<tr>
<td>15A 125VAC</td>
<td>15A 125VAC</td>
<td>20A 125VAC</td>
<td>20A 125VAC</td>
<td>10A 250VAC</td>
<td>10A 250VAC</td>
<td>10A 250VAC/</td>
</tr>
<tr>
<td>16A 12/24VDC</td>
<td>277VAC</td>
<td>10A 250VAC</td>
<td>up to</td>
<td>up to</td>
<td>DC</td>
<td>DC</td>
</tr>
<tr>
<td></td>
<td>10A 250VAC</td>
<td>3A 250VAC/DC</td>
<td></td>
<td>6A 125VAC/DC</td>
<td>10A 250VAC/DC</td>
<td>1/2HP 125-250VAC</td>
</tr>
<tr>
<td>IP68, bat, paddle</td>
<td>paddle, toggle (bat)</td>
<td>paddle, toggle (bat)</td>
<td>paddle, toggle (bat)</td>
<td>toggle (bat), toggle (ball)</td>
<td>toggle (bat), toggle (ball)</td>
<td>toggle (bat)</td>
</tr>
<tr>
<td>.500” dia [12.7mm] bushing mount</td>
<td>.500” dia [12.7mm] bushing mount</td>
<td>.500” dia [12.7mm] bushing mount</td>
<td>.500” dia [12.7mm] bushing mount</td>
<td>.500” dia [12.7mm] bushing mount</td>
<td>.500” dia [12.7mm] bushing mount</td>
<td>.656” x 1.218” [16.66mm x 30.54mm] snap-in mount</td>
</tr>
<tr>
<td>.250 tabs Screw Terminals with cage clamps</td>
<td>.187 tabs solder lug .250 tabs screw terms wire leads PC terms</td>
<td>.187 tabs solder lug .250 tabs screw terms wire leads PC terms</td>
<td>solder lug .250 tabs screw terms wire leads</td>
<td>solder lug .250 tabs screw terms wire leads</td>
<td>screw terms .250 tabs screw terms wire leads</td>
<td></td>
</tr>
<tr>
<td>n/a</td>
<td>incandescent, neon</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>UL60079-15, cUL</td>
<td>n/a</td>
<td>UL, CSA, VDE</td>
<td>UL, CSA</td>
<td>UL, CSA</td>
<td>UL, CSA</td>
<td>UL, CSA</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.*
ST-Series
SEALED TOGGLE SWITCHES

Designed to conform to MIL-DTL-3950G requirements for environmentally sealed toggle switches, and compliant to UL 60079-15 standard for use in explosive gas atmospheres, 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:
• Complies with UL 60079-15
• IEC 60529 IP68 sealing performance
• Toggle seal bonds to toggle, pin and bushing
• UL 61058-1 and cUL recognized

Typical Applications:
• Off-Highway Vehicles
• Armored / Law Enforcement Vehicles
• Commercial Food & Refrigeration Equipment
• Military Equipment
• Applications requiring stringent sealing in explosive environments

Resources:
Configure a Complete Part
Download CAD & Sales Drawing
Watch Product Video
ST-Series Switch
DESIGN FEATURES

**PINNED ACTUATOR / BUSHING**
Keeps toggle or paddle 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
## Electrical
- **Contact Rating**: 10A 250VAC, 15A 125VAC, 16A 12/24VDC
- **Dielectric Strength**: MIL-STD-202G, Method 301 (1500 Volts RMS)
- **Insulation Resistance**: MIL-STD-202G, Method 302 (50 MegOhms, 500 VDC)
- **Initial Contact Resistance**: MIL-STD-202G, Method 307 (10 milliOhms max.)
- **Electrical Life**: Overload: MIL-DTL-3950G, Section 4.8.11.1
  - Momentary circuits: 25,000 operations, minimum.
  - Maintained circuits: 50,000 operations, minimum.
- **Ignition Protection**: UL-1500 Ignition-Protection Test for Marine Products
- **Explosion Protection**: UL 60079-15 Electrical Apparatus for Explosive Gas Atmospheres
- **Contacts and Terminals**: Silver / Nickel Alloy for Brass or Copper / silver plated.
  - Tab Terminal: ¼” quick-connect screw and cage clamp
  - Screw Terminal: #6-32 brass or cage clamp
- **Mechanism Actuator**: Polyester PBT, UL94-V0 and fungus resistant per MIL-STD-810G, Section 508.6
- **Internal Seals**: Silicone per A-A-59588-1A
- **Mounting, Hardware**: 15/32”-32 UNS-2A threaded bushing with a keyway. A single nut and lock washer are supplied unassembled.
- **Bushing/Top Plate**: Zinc/aluminum die cast, with tin plating.
- **Base**: Polyester PBT, UL94-V0 and fungus resistant per MIL-STD-810G, Section 508.6
- **Actuation Force**: Initial Actuation Forces ± 0.3 lb (for 2-Pole circuits, short bat)
- **Angular Movement**: 14.5 degrees, each side of center

## Environmental
- **Temperature**: Operating: -40°C to +85°C
  - Storage: -65°C to +85°C
- **Vibration**: MIL-STD-202G: Method 204D, Test Condition A (10 G peak, Harmonic, 10Hz to 500Hz sweeps, 9 hours total).
- **Sealing**: MIL-STD-202G, Method 110 (sand and dust)
  - IEC 60529, IP68 (dust-tight, 1 meter immersion in water for 1 hour)
- **Salt Atmosphere**: MIL-STD-202G, Method 101, Test Condition A (96 hrs)
- **Moisture Resistance**: MIL-STD-202G, Method 106 (ten 24-hour stepped cycles)
- **Humidity**: 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.
- **Chemical Resistance**: Relevant chemical compatibility documentation may be used in place of testing.

## Agency Approvals
- UL and cUL
- Certificate number 20181012-E7560.
- UL-1500 Ignition-Protection.
- UL 60079-15 Electrical Apparatus for Explosive Gas Atmospheres.
### ST-Serie Sealed Toggle Switch - Ordering Scheme

#### 1 SERIES 1

| ST | Sealed Toggle |

#### 2 CIRCUIT

2 & 3, 5 & 6 Connected Terminals 1 & 2, 4 & 5

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>ON</td>
<td>NONE</td>
<td>OFF</td>
</tr>
<tr>
<td>B</td>
<td>(ON)</td>
<td>NONE</td>
<td>OFF</td>
</tr>
<tr>
<td>C</td>
<td>ON</td>
<td>NONE</td>
<td>(OFF)</td>
</tr>
<tr>
<td>D</td>
<td>ON</td>
<td>NONE</td>
<td>OFF</td>
</tr>
<tr>
<td>F</td>
<td>ON</td>
<td>NONE</td>
<td>(ON)</td>
</tr>
<tr>
<td>J</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>K</td>
<td>ON</td>
<td>OFF</td>
<td>(ON)</td>
</tr>
<tr>
<td>L</td>
<td>(ON)</td>
<td>OFF</td>
<td>(ON)</td>
</tr>
</tbody>
</table>

Special Circuits 6

| E | 2,3 | 5 & 6 |
| G | 2,4 | 2 & 3, 5 & 6 |
| M | 2,4 | (2 & 3, 5 & 6) |

#### 3 POLES

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

#### 4 RATING

| 4 | 10A 250VAC; 15A 125VAC |
| 5 | 10A 250VAC; 15A 125VAC (UL, cUL Recognized) |
| E | 16A, 12/24VDC |

#### 5 TERMINATION

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

#### 6 ACTUATOR STYLE

**TOGGLE (SEALED METAL)**

<table>
<thead>
<tr>
<th>Without Panel Seal</th>
<th>With Panel Seal (Bulk)</th>
<th>Toggle Color</th>
<th>Toggle Length</th>
<th>Bushing Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>53</td>
<td>.561</td>
<td>Dull Nickel</td>
<td>.385</td>
<td></td>
</tr>
<tr>
<td>73</td>
<td>.687</td>
<td>Dull Nickel</td>
<td>.385</td>
<td></td>
</tr>
</tbody>
</table>

**PADDLE (SEALED PLASTIC)**

<table>
<thead>
<tr>
<th>Without Panel Seal</th>
<th>With Panel Seal (Bulk)</th>
<th>Paddle Color</th>
<th>Paddle Length</th>
<th>Bushing Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>B3</td>
<td>B8</td>
<td>Black</td>
<td>.880</td>
<td>.385</td>
</tr>
<tr>
<td>W3</td>
<td>W8</td>
<td>White</td>
<td>.880</td>
<td>.385</td>
</tr>
<tr>
<td>R3</td>
<td>R8</td>
<td>Red</td>
<td>.880</td>
<td>.385</td>
</tr>
<tr>
<td>Y3</td>
<td>Y8</td>
<td>Yellow</td>
<td>.880</td>
<td>.385</td>
</tr>
</tbody>
</table>

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.
6. Not available with rating 5.
7. Available with termination 1 and 4 only.
**Dimensional Specifications: in. [mm]**

**BAT TOGGLE**

- Dimensional Specifications: in. [mm]
  - 0.561 [14.25]
  - 0.385 [9.78]
  - 1.084 [27.53]
  - 0.408 [10.36]

**TALL BAT TOGGLE**

- Dimensional Specifications: in. [mm]
  - 0.687 [17.45]

**PADDLE TOGGLE**

- Dimensional Specifications: in. [mm]
  - 0.880 [22.35]
  - 1.340 [34.04]

**TERMINALS**

- **SCREW (AND CAGE) TERMINAL**
  - M6-32 UNC-2A
  - 0.310 MIN [7.87]
  - 0.430 [11.15]
- **.250 TAB (O.C.) TERMINAL**
  - 0.046 [1.17]
  - 0.070 [1.78]
  - 0.459 [11.65]
  - 0.200 ± 0.008 [5.08 ± 0.20] TOP OF KEYWAY
  - 0.072 [1.83]

**PANEL CUTOUTS**

- **MOUNTING HOLE**
  - Ø 0.500 [12.70]
  - 0.062 [1.57]
- **WITH KEYWAY**
  - Ø 0.500 [12.70]
- **WITH FLAT**
  - Ø 0.500 [12.70]
  - 0.469 [11.91]
- **WITH KEYWAY, FLAT**
  - Ø 0.500 [12.70]
  - 0.469 [11.91]
The LT-Series illuminated toggle switches feature up to a three-color lighting sequence from a single lamp. These lighted toggles contain neoprene bushing seals for dust and moisture protection. A variety of circuits and terminations are available.

**Product Highlights:**
- 1 or 2 Pole
- Independent or Dependent Illumination
- Choice of 5 Actuator Styles
- Up to 3 different colors under a single lens

**Typical Applications:**
- Marine
- Transportation
Dielectric Strength
1000V - live to dead metal parts

Electrical Life
50,000 cycles - maintained
25,000 cycles - momentary

Mechanical Life
100,000 cycles

Operating Temperature
32°F to 185°F (0°C to 85°C)

1 BASE PART NUMBER: SERIES / POLES / ILLUMINATION / CIRCUITY / RATING / TERMINATION 5
10A 250VAC, 15A 125VAC, 3/4 HP 125-250VAC, 15A 12-28VDC

Single Pole
- Solder Lug
- .250 Tab QC
- Screw Terms
- Wire Leads
- LT-1510
- LT-1511
- LT-1514
- LT-1515
- LT-1520
- LT-1521
- LT-1524
- LT-1525
- LT-1530
- LT-1531
- LT-1534
- LT-1535
- LT-1540
- LT-1541
- LT-1544
- LT-1545
- LT-1550
- LT-1551
- LT-1554
- LT-1555
- LT-1560
- LT-1561
- LT-1564
- LT-1565
- LT-1570
- LT-1571
- LT-1574
- LT-1575
- LT-1580
- LT-1581
- LT-1584
- LT-1585

Double Pole
- Solder Lug
- .250 Tab QC
- Screw Terms
- Wire Leads
- LT-2510
- LT-2511
- LT-2514
- LT-2515
- LT-2520
- LT-2521
- LT-2524
- LT-2525
- LT-2530
- LT-2531
- LT-2534
- LT-2535
- LT-2540
- LT-2541
- LT-2544
- LT-2545
- LT-2550
- LT-2551
- LT-2554
- LT-2555
- LT-2560
- LT-2561
- LT-2564
- LT-2565
- LT-2570
- LT-2571
- LT-2574
- LT-2575
- LT-2580
- LT-2581
- LT-2584
- LT-2585

2 ACTUATOR STYLE
1 Clear Paddle
2 Snapkap Style
3 Solid Color Paddle

3 LIGHTING SEQUENCE 3,4
position 1 position 2 position 3
01 red red red
02 red amber amber
03 red green green
04 red clear amber
05 red clear clear
06amber amber amber
07amber amber clear
08amber clear clear
09 green green green
10 green clear clear
11 green clear amber
12 green clear blue
13 green clear none
14 blue blue blue
15 blue clear clear
16 blue clear amber
17 blue clear green
18 blue blue clear
19 blue clear blue
20 blue clear none
21 red clear red
22 amber clear amber
23 amber clear green
24 amber clear blue
25 amber clear none
26 green clear red
27 green clear green
28 green clear blue
29 green clear none
30 blue blue blue
31 blue clear red
32 blue clear amber
33 blue clear green
34 blue blue clear
35 blue clear blue
36 blue clear none
37 clear clear red
38 clear clear green
39 clear clear blue
40 clear clear clear
41 blue blue none
42 blue clear none
43 blue clear none
44 blue blue none
45 blue blue none
46 blue blue none
47 blue blue none
48 clear clear none
49 clear clear none
50 clear clear none
51 clear clear none
52 clear clear none
53 clear clear none
54 clear clear none
55 clear clear none

4 LAMP VOLTAGE 4
incandescent
006 6 volt
012 12 volt
018 18 volt
024 24 volt
125N 125 volt neon
250N 250 volt neon

Notes:
1 Solid color paddle available with lighting sequence 01, 02, 10 or 20.
2 SnapKap Toggle Lenses are available separately. Consult factory.
3 Independent lamp is standard. Dependent lamp with ON-OFF function (including momentary) is available with Lighting Sequences 10, 20, 30, 40 and 50. (No light in OFF position.)
4 Green and blue not recommended with 125 volt or 250 volt neon lamps.
5 Additional terminations available. Consult factory for details.
6 Ignition protected (UL 1500) construction is available. Consult factory for details.
( ) Indicates momentary function.

*Manufacturer reserves the right to change product specification without prior notice.
F-Series
SINGLE POLE TOGGLE SWITCHES

General purpose workhorses with options tailored to meet most any need. Ratings to 20A 277VAC, various actuator, bushing, termination, and circuit choices allow this versatile switch to easily integrate into a variety of different applications. The F-Series is appropriate for usage in low voltage DC applications.

**Product Highlights:**
- Ratings to 20A
- Suitable for low voltage 12/24V DC
- Variety of termination options
- Consult factory for large choice of bushing/toggle length combinations

**Typical Applications:**
- Marine
- Food Service
- Generator
- Industrial Control
- Office Automation

Resources:
Download 3D CAD Files

[IGS](#)  [STP](#)
### Dielectric Strength
1000V - live to dead metal parts

### Electrical Life
50,000 cycles - maintained  
25,000 cycles - momentary

### Mechanical Life
100,000 cycles

### Operating Temperature
0°F to 150°F (-17.8°C to +65.6°C)

---

**2FA54 - 73 / TABS**

<table>
<thead>
<tr>
<th>Base Part Number</th>
<th>Actuator Style</th>
<th>Tab Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

### 1 BASE PART NUMBER: SERIES / CIRCUITRY / RATING / TERMINATION
10A 250VAC; 15A 125VAC; 3/4 HP 125-250VAC

<table>
<thead>
<tr>
<th>Solder Lug</th>
<th>Screw Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-None-Off</td>
<td>2FA53 / TABS</td>
</tr>
<tr>
<td>(On)-None-Off</td>
<td>6FA53 / TABS</td>
</tr>
<tr>
<td>On-None-Off</td>
<td>6FA57 / TABS</td>
</tr>
<tr>
<td>On-None-On</td>
<td>2FB53 / TABS</td>
</tr>
<tr>
<td>On-Off-On</td>
<td>2FC53 / TABS</td>
</tr>
<tr>
<td>On-Off-(On)</td>
<td>6FC57 / TABS</td>
</tr>
</tbody>
</table>

**Notes:**
1. Consult factory for .187 tab, wire lead and combination screw/tab/solder lug termination callouts.
2. Additional toggle options are available. Consult factory.
3. () indicates momentary function.

---

**2 ACTUATOR STYLE**

<table>
<thead>
<tr>
<th>BAT STYLE TOGGLE</th>
<th>Unsealed</th>
<th>Sealed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toggle length</td>
<td>bushing length</td>
<td></td>
</tr>
<tr>
<td>73</td>
<td>0.687</td>
<td>0.465</td>
</tr>
<tr>
<td>E3</td>
<td>2.000</td>
<td>0.465</td>
</tr>
</tbody>
</table>

**3 TAB TERMINALS**

<table>
<thead>
<tr>
<th>Tab Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABS</td>
</tr>
</tbody>
</table>

(blank) Leave blank if tab terminals not required.

---

**TERMINAL TYPE**

<table>
<thead>
<tr>
<th>Screw (Assembled)</th>
<th>Wire Lead</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOUNTING HOLE</td>
<td>.052 [1.37]</td>
</tr>
<tr>
<td>WITH KEYWAY</td>
<td>.038 [0.96]</td>
</tr>
<tr>
<td>WITH LOCKING RING</td>
<td>.500 [12.70]</td>
</tr>
</tbody>
</table>

---

*Manufacturer reserves the right to change product specification without prior notice.*
G-Series
TOGGLE SWITCHES

General purpose workhorses with options tailored to meet most any need. Ratings to 20A 277VAC, international approvals, various actuator, bushing, termination, and circuit choices allow this toggle switch to easily integrate into a variety of different applications. The G-Series is appropriate for usage in low voltage DC applications.

Product Highlights:
• Ratings to 20A 277VAC available
• Metal bat or nylon bat/paddle actuator styles
• UL, CSA and VDE approvals for select circuits
• Suitable for low voltage 12/24V DC

Typical Applications:
• Marine
• Food Service
• Generator
• Industrial Control
• Office Automation

Resources:
Download 3D CAD Files
IGS  STP  

download 3d cad files
### Dielectric Strength
UL/CSA: 1000V - live to dead metal parts & opposite polarity

VDE: 4000V - live to dead metal parts; 1250V - opposite polarity & across open contacts

---

### Electrical Life
50,000 cycles - maintained
25,000 cycles - momentary

### Mechanical Life
100,000 cycles

### Operating Temperature
32°F to 185°F (0° to 85°C)

---

**2GM51 - 73**

<table>
<thead>
<tr>
<th>BASE PART NUMBER: SERIES / CIRCUITRY / RATING / TERMINATION</th>
<th>ACTUATOR STYLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10A 250VAC, 15A 125VAC, 3/4 HP 125-250VAC</td>
<td>73</td>
</tr>
<tr>
<td>solder lug .250 tab screw term.</td>
<td>78</td>
</tr>
</tbody>
</table>

---

**Notes:**
1. Not available with 73 or NBL3 style toggles, T55 with 78 and NBL8 style toggles.
2. All nylon bushing and toggle.
3. Consult factory for .187 tab, wire lead and combination screw/tab/solder lug termination callouts.
5. Nylon toggle with black ebonol plated bushing.

---

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

---

Click here to return to the table of contents.
H/I-Series TOGGLE SWITCHES

General purpose workhorses with options tailored to meet most any need. Ratings to 17A 125VAC, various actuator, bushing, termination, and circuit choices allow this toggle to easily integrate into a variety of different applications. The H/I-Series is appropriate for usage in low voltage DC applications.

Product Highlights:
- Ratings up to 600VAC
- Available reversing and progressive switch circuits
- Variety of termination options
- Consult factory for large choice of bushing/toggle length combinations

Typical Applications:
- Food Service
- Generator
- Industrial Control
- Office Automation
**Dielectric Strength**
UL/CSA: 1000V - live to dead metal parts

**Electrical Life**
50,000 cycles - maintained
25,000 cycles - momentary

**Mechanical Life**
100,000 cycles

**Operating Temperature**
32°F to 185°F (0° to 85°C)

---

**HK251 - 73**

1. Base Part Number
2. Actuator Style

1 BASE PART NUMBER: SERIES / CIRCUITRY / RATING / TERMINATION

Three Pole

- solder .250 tab screw wire
- lug tab term. leads

HK250 HK251 HK254 HK255 Off-None-On IK250 IK251 IK254 IK255


HL250 HL251 HL254 HL255 On-None-(On) IL250 IL251 IL254 IL255


HM250 HM251 HM254 HM255 On-Off-(On) IM250 IM251 IM254 IM255


Additional ratings up to 20A 125VAC, 12A 250VAC, 1HP 120-240 VAC available. Consult factory for specifics.

2 ACTUATOR STYLE

- BAT 73 78 0.687 0.465
- PADDLE NBL3 NBL8 0.687 0.465

Notes:
1. Additional actuator options available. Consult factory for details.
2. Consult factory for .187 tab and combination screw/tab/solder lug termination callouts.
3. Nylon toggle with black ebonol plated bushing.
   - () Indicates momentary function.

---

*Manufacturer reserves the right to change product specification without prior notice.*
C-Series
SINGLE POLE TOGGLE SWITCHES

The C-Series single pole compact high current toggle switches are ideal for applications with back panel size constraints. These switches feature self-cleaning contacts and ratings up to 20A 125VAC, 10A 250VAC, 1 1/2 HP 125-250VAC. With a rugged metal construction, these switches figure prominently in markets with stringent current carrying requirements.

Product Highlights:
• Ratings to 20A 125VAC and 1.5HP 125-250VAC
• Compact size
• Self-cleaning wiping style contacts
• 4 termination choices

Typical Applications:
• Environmental Controls
• Marine
• Food Service
• Vacuum Cleaners
Dielectric Strength
1000V - live to dead metal parts and opposite polarity.

Electrical Life
25,000 cycles

CA201 - 73

1 BASE PART NUMBER: SERIES / POLES / CIRCUITRY / RATING / TERMINATION
10A 250VAC, 20A 125VAC, 1 1/2 HP 125-250VAC
Single Pole Solder Lug .250 Tab Screw Term. Wire Leads
On-None-Off CA200 CA201 CA204 CA205
On-None-On CA200 CA201 CA204 CA205

2 ACTUATOR STYLE 1
unsealed sealed toggle length bushing length
BAT 73 78 0.687 0.465

Notes:
1 Additional toggle styles available. Consult factory.

Dielectric Strength
1000V - live to dead metal parts and opposite polarity.

Electrical Life
25,000 cycles

Mechanical Life
100,000 cycles

Operating Temperature
32°F to 185°F (0°C to 85°C)

*Manufacturer reserves the right to change product specification without prior notice.
The D-Series single pole compact high current toggle switches are ideal for applications with back panel size constraints. These switches feature self-cleaning contacts and ratings up to 20A 125VAC, 10A 250VAC, 1 1/2 HP 125-250VAC. With an economical double insulated all nylon construction, these switches figure prominently in markets with stringent current carrying requirements.

**Product Highlights:**
- Compact all nylon double insulated construction
- Ratings to 20A 125VAC, 1.5 HP 125-250VAC
- Integrated wire lead construction
- Paddle of Bat style actuators

**Typical Applications:**
- Environmental Controls
- Marine
- Food Service
- Vacuum Cleaners
**Dielectric Strength**
UL/CSA: 1000V - live to dead metal parts & opposite polarity
TUV: 4000V - live to dead metal parts; 750V - across open contacts

**Electrical Life**
50,000 cycles

**Mechanical Life**
100,000 cycles

**Operating Temperature**
32°F to 185°F (0° to 85°C)

---

**Terminal Type**

<table>
<thead>
<tr>
<th>SOLDER LUG</th>
<th>.250 TAB (Q.C.)</th>
<th>INTEGRATED WIRE LEAD (no exposed conductors)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Notes:**
1. DA945 available with wire leads and ON-OFF circuit only.
2. Additional colors available. Please consult factory.

---

*Manufacturer reserves the right to change product specification without prior notice.*
The 110/216-Series is a compactly designed, versatile metal construction toggle switch which is appropriate for a variety of uses. Features include single or double pole options, maintained or momentary construction with termination choices including solder lug end or bottom, wire leads and .250 tab terminals. The quick make/quick break contact mechanism makes the switch suitable for high voltage (125-250 volt) applications.

Product Highlights:
- 125/250V AC or DC rated
- Compact space saving envelope
- Single or double pole
- 2 position Maintained or Momentary circuits

Typical Applications:
- Small Appliance
- Floor Maintenance
- Lighting
Dielectric Strength
UL/CSA: 1000V - live to dead metal parts & opposite polarity

110-S - 73

Base Part Number
Actuator Style

1 BASE PART NUMBER: SERIES / CIRCUITRY 1 / RATING / TERMINATION 2
3A 250V, 6A 125V, AC/DC
Solder Lug Solder Lug Screw Wire
(end) (bottom) Terminals Leads

Single Pole
On-None-Off 110
On-None-(On) 110-M-NO
Double Pole
On-None-Off 2BK62
On-None-On 2BL62

1A 250V, 3A 125V, AC/DC
Single Pole
On-None-On 112
On-None-(On) 112-M
Double Pole
On-None-Off 216
On-None-(On) 216-M-NO
On-None-(Off) 216-M-NC
On-None-On 316
On-None-(On) 316-M
2 circuit
1 On - 1 Off 516
1 (On) - 1 (Off) 516-M

6A 120VAC
Single Pole
On-None-On 2BB62

5A 250V, 10A 125V, 1/4HP, 125V
Single Pole
On-None-Off 160H

Notes:
1 Momentary function only available with 73 toggles.
2 160H and 110-Series are available with .250 tab terminals. Add suffix /TABS to end of part number. ex. 110-73/TABS

2 ACTUATOR STYLE

BATTERY TOGGLE
unsealed sealed toggle length bushing length
52 58 0.375 0.343
63 68 0.500 0.465
73 78 0.687 0.46555

BALL STYLE TOGGLE
unsealed sealed toggle length bushing length
21 - 0.375 0.250
22 - 0.375 0.343
25 - 0.375 0.875

Notes:
1 Momentary function only available with 73 toggles.
2 Indicates momentary function.

Mechanical Life
100,000 cycles

Operating Temperature
0°F to 150°F (-17.8°C to +65.6°C)

Electrical Life
25,000 cycles

2 ACTUATOR STYLE

BATTERY TOGGLE
unsealed sealed toggle length bushing length
52 58 0.375 0.343
63 68 0.500 0.465
73 78 0.687 0.46555

BALL STYLE TOGGLE
unsealed sealed toggle length bushing length
21 - 0.375 0.250
22 - 0.375 0.343
25 - 0.375 0.875

Notes:
1 Momentary function only available with 73 toggles.
2 160H and 110-Series are available with .250 tab terminals. Add suffix /TABS to end of part number. ex. 110-73/TABS

( ) Indicates momentary function.

*Manufacturer reserves the right to change product specification without prior notice.
The switch that can handle your heavy duty requirements. Single or double pole with wire lead or screw terminations, and ratings to 20A 125V 10A 250V, the ac/dc DK/EK-Series is the most heavy duty toggle switch in the Carling line. Its sturdy metal construction and stiff actuation force will withstand the abuses of virtually any stringent application. The quick make/quick break contact mechanism is ideal for high voltage DC applications.

**Product Highlights:**
- Ratings up to 20A 125V AC or DC
- Screw Term or Wire Lead terminations
- Quick Make / Quick Break contact mechanism
- Bat or Ball style toggle options

**Typical Applications:**
- Industrial Motor Control
- General Purpose
# Dielectric Strength
UL/CSA: 1000V - live to dead metal parts & opposite polarity

**Electrical Life**
25,000 cycles

**Mechanical Life**
100,000 cycles

**Operating Temperature**
0°F to 150°F (-17.8°C to +65.6°C)

---

## DK284 - 73

<table>
<thead>
<tr>
<th>Base Part Number</th>
<th>Actuator Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

### 1 BASE PART NUMBER: SERIES / POLES / CIRCUITRY / RATING / TERMINATION

<table>
<thead>
<tr>
<th>Series</th>
<th>Poles</th>
<th>Circuitry</th>
<th>Rating</th>
<th>Termination</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DK</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EK</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 8A 250V, 16A 125V, 1 HP 125-250V
- Single Pole On-None-Off: DA284, DA285
- Double Pole On-None-Off: DK284, DK285

#### 10A 250V, 20A 125V, 1 1/2 HP 125-250V
- Single Pole On-None-Off: EA204, EA205
- Double Pole On-None-Off: EK204, EK205

### 2 ACTUATOR STYLE

<table>
<thead>
<tr>
<th>Style</th>
<th>Toggle Length</th>
<th>Bushing Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT STYLE TOGGLE</td>
<td>0.687</td>
<td>0.465</td>
</tr>
<tr>
<td>BALL STYLE TOGGLE</td>
<td>0.500</td>
<td>0.343</td>
</tr>
</tbody>
</table>

**Notes:**
1. Additional toggle lengths available. Consult factory for details.

---

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

---

![DK284 - 73 Diagram](image)

**TERMINAL TYPE**

**WIRE LEAD**

**SCREW (ASSEMBLED)**

**MOUNTING HOLE**

**WITH KEYWAY**

**WITH LOCKING RING**

---

*back to table of contents*
MAAOA/215-Series
TOGGLE SWITCHES

The MAAOA/215-Series toggle switches are single pole, AC rated at 20 amps and 125 VAC. These switches are snap-in mounted, with a phenolic toggle and base, and are suitable for high ambient temperature applications.

Product Highlights:
- High temperature Phenolic base and toggle
- Ratings to 125VAC
- Optional embossed On-Off legend
- Choice of screw, .250 Tab or integrated wire lead connections

Typical Applications:
- Coffee Makers
- Food Warmers
Dielectric Strength
UL/CSA: 1000V - live to dead metal parts & opposite polarity

Electrical Life
25,000 cycles

Mechanical Life
100,000 cycles

Operating Temperature
32°F to 185°F (0°C to 85°C)

1 BASE PART NUMBER: SERIES / CIRCUITRY / RATING / TERMINATION
10A 250 VAC, 20A 125 VAC, 1/2 HP 125-250 VAC

.250 Tabs Screw Terms. Wire Leads

Single Pole On-Off
MAAOA MM-021 - -

MM-021 - -

1 BASE PART NUMBER: SERIES / CIRCUITRY / RATING / TERMINATION

2 BASE & ACTUATOR COLOR
BL Black
BN Brown

3 LEGEND
On-Off

Notes:
Panel Cut-Out recommendations: For sheet metal panels, switch must enter panel in same direction as the punch. (Burr on bottom.) Test cut hole in actual material.

1 Imprinting is available. ON-OFF legend is not standard and must be specified after color. If not specified, switch will be manufactured with no legend.

( ) Indicates momentary function.

*Manufacturer reserves the right to change product specification without prior notice.
Carling Technologies full or half hexboot is the perfect complement to Carling’s line of toggle switches. The boot is compatible with 15/32” threaded bushings and will provide extra protection against the elements in harsh environments.

**Product Highlights:**
- Flexible tear-resistant silicone rubber overmolded onto a 15/32” brass hexnut
- Full hexboot completely covers toggle actuator and bushing
- Meets ROHS 2011/65/EU directive
- Inhibits the rotation of switches subjected to low frequency vibration
- Complementary, cost effective addition to Carling’s toggle switches
- Suitable for toggle models: F-Series, G-Series, 110-Series, C-Series, D-Series, DK/EK-Series, H/I-Series, LT-Series

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

**Full Hexboot**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer Diameter</td>
<td>0.551</td>
</tr>
<tr>
<td>Inner Diameter</td>
<td>0.433</td>
</tr>
<tr>
<td>Length</td>
<td>1.118</td>
</tr>
<tr>
<td>Width</td>
<td>0.65</td>
</tr>
</tbody>
</table>

**Half Hexboot**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer Diameter</td>
<td>0.43</td>
</tr>
<tr>
<td>Inner Diameter</td>
<td>0.33</td>
</tr>
<tr>
<td>Length</td>
<td>0.75</td>
</tr>
<tr>
<td>Width</td>
<td>0.65</td>
</tr>
</tbody>
</table>

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

The hardware options and accessories listed below were specifically designed to be used with toggle and pushbutton switches. The drawings are representative of the actual products. When other hardware options are required, please consult factory.

**STANDARD HEXNUT**
.562 in. [14.27 mm] X .076 in. [1.93 mm]
NICKEL: 380-08602
BLACK: 380-08606

**STANDARD FACENUT**
.570 in. [14.47 mm] X .078 in. [1.98 mm]
NICKEL: 380-08693
BLACK: 380-08694

**PLASTIC FACENUT**
(Wrench Supplied N/C)
.625 in. [15.87 mm] X .120 in. [3.04 mm]
BLACK: 384-17126-001
RED: 384-17126-002
WHITE: 384-17126-003

**DRESS FACENUT**
.636 in. [16.15 mm] X .155 in. [3.93 mm]
NICKEL: 380-08810
BLACK: 380-08811

**LOCKWASHER**
NICKEL-PLATED: 728-15907

**LOCKING RING**
ZINC: 728-15946
BLACK:728-15947

All indicator plates are nickel-plated steel. Odd keyway locations, alternate imprints and plating available on special order. Contact factory for minimum quantities and specifications.

*Manufacturer reserves the right to change product specification without prior notice.
Carling bushing mount, single and double pole push button switches range from 1 to 20 amps. They offer a variety of nylon and metal push button styles with actuation force ranging from light action 0.4 oz to heavy-duty 8 lbs. UL & CSA certified.

### SELECTOR GUIDE

<table>
<thead>
<tr>
<th>16-3P</th>
<th>170 / 172</th>
<th>P26 / P27</th>
<th>641 / 110</th>
<th>P / PP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1, 2, 3</td>
<td>1</td>
</tr>
<tr>
<td>up to 3A 125VAC</td>
<td>up to 15A 125VAC 10A 250VAC</td>
<td>up to 6A 125VAC 3A 277VAC</td>
<td>up to 5A 125VAC 2A 250VAC</td>
<td>up to 20A 125VAC 10A 250VAC</td>
</tr>
<tr>
<td>.500&quot; dia [12.7mm] bushing mount</td>
<td>.500&quot; dia [12.7mm] bushing mount</td>
<td>.500&quot; dia [12.7mm] bushing mount</td>
<td>.500&quot; dia [12.7mm] bushing mount</td>
<td>.500&quot; dia [12.7mm] bushing mount</td>
</tr>
<tr>
<td>solder lug wire leads</td>
<td>solder lug screw terms wire leads</td>
<td>.250 tabs solder lug wire leads</td>
<td>solder lug wire leads PC terms</td>
<td>.250 tabs screw terms wire leads</td>
</tr>
<tr>
<td>UL, CSA</td>
<td>UL, CSA</td>
<td>UL, CSA</td>
<td>UL, CSA</td>
<td>UL, CSA, TUV</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.
The 16-3P-Series pushbutton switches are single pole and AC rated up to 3 amps. These momentary action switches have a slow-make, slow-break contact mechanism and require only light actuation force (4 oz. - 1 lb.). These switches are typically used in general purpose applications requiring finger actuation.

**Product Highlights:**
- Maintained, Momentary and 2 circuit function choices
- Available with optional overtravel plunger action
- Light 4 oz – 1 lb actuation force
- Metal plunger available with optional colored plastic cap

**Typical Applications:**
- Test & Measurement
- Audio Visual
Dielectric Strength
UL/CSA: 1000V - live to dead metal parts

Mechanical Life
100,000 cycles

Electrical Life
25,000 cycles

**16-3POFF** - 4 - **CBL**

1 BASE PART NUMBER: SERIES / POLES / CIRCUITRY / RATING / TERMINATION

<table>
<thead>
<tr>
<th>Single Pole</th>
<th>Solder Lug</th>
<th>Wire Leads</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A 125VAC</td>
<td>16-3P Off</td>
<td>16-3AP Off</td>
</tr>
<tr>
<td>Off-(On)</td>
<td>16-3P Off-Ov</td>
<td>16-3AP Off-Ov</td>
</tr>
<tr>
<td>On-(Off)</td>
<td>16-3P On</td>
<td>16-3AP On</td>
</tr>
<tr>
<td>1A 125VAC</td>
<td>116-P</td>
<td>116-AP</td>
</tr>
<tr>
<td>On-On</td>
<td>116-P-OV</td>
<td>116-AP-OV</td>
</tr>
<tr>
<td>1 On-1 Off (2 circuit)</td>
<td>516-P</td>
<td>516-AP</td>
</tr>
<tr>
<td>1 On-1 Off with overtravel 1 (2 circuit)</td>
<td>516-P-OV</td>
<td>516-AP-OV</td>
</tr>
</tbody>
</table>

2 BUSHING STYLE

2 .312 length
4 .562 length

3 ACTUATOR STYLE

CBL black plastic color cap
CRD red plastic color cap

Notes:
1 Overtravel only available with #4 bushing.
2 When selection 3 is left blank, a standard nickel plated plunger is supplied.
( ) Indicates momentary function.

Dielectric Strength
UL/CSA: 1000V - live to dead metal parts

Operating Temperature
32°F to 185°F (0°C to 85°C)

*Manufacturer reserves the right to change product specification without prior notice.*
The 170/172-Series pushbutton switches are single pole, high amperage switches suitable for shallow back panel applications. These switches are momentary action and require an actuation force of 2.5 lbs. The 170/172-Series switches are equipped with a slow-make, slow-break contact mechanism and are rated at 15 amps at 125VAC.

**Product Highlights:**
- Rated to 15A 125VAC
- Sturdy metal clad construction
- Metal plunger available with optional colored plastic cap
- Momentary On or Momentary Off circuitry

**Typical Applications:**
- Test & Measurement
- Meters
- Horns
**Dielectric Strength**
UL/CSA: 1000V - live to dead metal parts

**Electrical Life**
25,000 cycles - Momentary

**Mechanical Life**
100,000 cycles

**Operating Temperature**
32°F to 185°F (0°C to 85°C)

---

**1 BASE PART NUMBER: SERIES / POLES / CIRCUITRY / RATING / TERMINATION**
10A 250VAC; 15A 125VAC
Single Pole
On-(Off) 170-B 170-A 170
Off-(On) 172-B 172-A 172

**2 CAP STYLE / COLOR**
- CBL Black Plastic
- CGN Green Plastic
- CRD Red Plastic
- CWH White Plastic

---

Notes:
1. When selection 2 is left blank, a standard nickel plated plunger is supplied.
2. () Indicates momentary function.

*Manufacturer reserves the right to change product specification without prior notice.*
P26-Series
PUSHBUTTON SWITCHES

The P26-Series pushbutton switches are single pole, AC rated for 6 amps at 125 VAC and suitable for shallow back panel applications. These switches are momentary action with a medium actuation force (13 oz. typical). The P26-Series switch is equipped with a slow-make, slow-break contact mechanism.

Product Highlights:

- 6A 125VAC, 3A 277VAC rated
- Momentary On or Momentary Off circuitry
- 4 bushing size combinations
- Round Metal, Concave Metal and Nylon Style Actuators

Typical Applications:

- Intercoms
- Security System
- Electronic Signs
- Marine
- Lighting
### Dielectric Strength
UL/CSA: 1000V - live to dead metal parts

### Mechanical Life
100,000 cycles

### Electrical Life
25,000 cycles

---

**P26-Series - Pushbutton Switches - General Specifications, Ordering Scheme, Dimensional Specifications**

#### Dielectric Strength
UL/CSA: 1000V - live to dead metal parts

#### Mechanical Life
100,000 cycles

#### Electrical Life
25,000 cycles

---

**1 BASE PART NUMBER: SERIES / POLES / CIRCUITRY / RATING / TERMINATION**

<table>
<thead>
<tr>
<th>Single Pole</th>
<th>Solder Lug</th>
<th>.250 Tab</th>
<th>Wire Leads</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A 250VAC, 6A 125 VAC, 3/4A 125V</td>
<td>P26A</td>
<td>P26B</td>
<td>P26F</td>
</tr>
<tr>
<td>On - (Off)</td>
<td>P26L</td>
<td>-</td>
<td>P26T</td>
</tr>
</tbody>
</table>

| 3A 277VAC, 6A 125 VAC | P267A | P267B | P267F |
| On - (Off) | P267L | - | P267T |

#### Notes:
1. Additional ratings available. Consult factory for details
2. Only available with 1D bushing in .562 length
3. Length is .562 for RND MTL and CON MTL buttons

( ) Indicates momentary function.

---

**1 BASE PART NUMBER: SERIES / POLES / CIRCUITRY / RATING / TERMINATION**

<table>
<thead>
<tr>
<th>Base Part Number</th>
<th>1D</th>
<th>BL</th>
</tr>
</thead>
</table>

#### 2 BUSHING STYLE

<table>
<thead>
<tr>
<th>length</th>
<th>diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>.408</td>
</tr>
<tr>
<td>1B</td>
<td>.406</td>
</tr>
<tr>
<td>1C</td>
<td>.465</td>
</tr>
<tr>
<td>1D 3</td>
<td>.465</td>
</tr>
</tbody>
</table>

#### 3 BUTTON STYLE / COLOR

<table>
<thead>
<tr>
<th>BL</th>
<th>Black Nylon</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD</td>
<td>Red Nylon</td>
</tr>
<tr>
<td>RND MTL</td>
<td>Round Metal</td>
</tr>
<tr>
<td>CON MTL</td>
<td>Concave Metal</td>
</tr>
</tbody>
</table>

---

**TERMINAL TYPE**

- **SOLDER LUG**
  - Ø(.039[.99]) [.039[.99]] DP
  - Ø(.062[1.57]) [Momentary ON only]

- **INTEGRATED WIRE LEAD**
  (no exposed conductors)

- **MOUNTING HOLE**
  - Ø(.050[1.27])

- **KEYWAY**
  - Ø(.038[.95])

---

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

**15/32-32UNS-2A THREAD**

- Ø(.468[11.89]) DIA
- Ø(.250[6.35])

- Ø(.465[11.81])

- Ø(.542[13.76])

- Ø(.524[13.30])

- Ø(.118[3.04])

- Ø(.248[6.29]) DIA

- Ø(.093[2.36]) [.093[2.36]]

- Ø(.075[1.90]) DIA

- Ø(.050[1.27])

- Ø(.062[1.57]) [Momentary ON only]

- Ø(.038[.95])

---

* back to table of contents
The P27-Series pushbutton switches are single pole, AC rated switches suitable for general purpose applications with a shallow back panel. These switches are momentary action with a medium actuation force (26 oz. typical). The P27-Series switch is equipped with a slow-make, slow-break contact mechanism, rated at 6 amps with a nylon concave pushbutton.

**Product Highlights:**
- Ratings to 6A 125VAC 3A 250VAC
- Momentary On or Momentary Off circuitry
- .250 Tab, Solder Lug or Wire Lead terminations
- Shallow space saving envelope

**Typical Applications:**
- Intercoms
- Security System
- Electronic Signs
- Marine

back to table of contents
### Dielectric Strength
UL/CSA: 1000V - live to dead metal parts

### Electrical Life
25,000 cycles

### Mechanical Life
100,000 cycles

### Operating Temperature
32°F to 185°F (0°C to 85°C)

---

**P27A** - BL

1. **Base Part Number**
2. **Button Color**

#### 1 BASE PART NUMBER: SERIES / POLES / CIRCUITRY / RATING / TERMINATION
- **Single Pole**
- **Off - (On)**
- **3A 250VAC, 6A 125 VAC, 3/4A 125V**
- **Solder Lug**
- **.250 Tab**
- **Wire Leads**

#### 3 BUTTON STYLE / COLOR
- **BL**: Black
- **RD**: Red
- **WH**: White

### Notes:
- () Indicates momentary function.

---

#### TERMINAL TYPE

- **SOLDER LUG**
- **.093 [2.36] DIA**
- **.075 [1.90] DIA**
- **.293 [7.44]**
- **.351 [8.92]**
- **.500 [12.70]**

- **.250 TAB (O.C.)**
- **.500 [12.70] DIA**

- **MOUNTING HOLE**
- **15/32-32UNS-2A THREAD**
- **.468 [11.89] DIA**
- **.420 [10.67] DIA**
- **.250 [6.35]**
- **.562 [14.27]**
- **.542 [13.76]**
- **1.183 [30.04]**
- **1.82 [46.2]**
- **.038 [0.95]**

---

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

PUSHBUTTON SWITCHES

The single, double and triple pole 641-Series represents the most compact offerings of the Carling’s pushbutton switch line. These switches are UL approved and meet ENEC spacing requirements. Additionally, the new 3-pole switch affords the versatility to control an extra function or indicator light. Rugged metal construction, self-cleaning contacts and stiff actuation force (3-3 1/2 lbs. typical) have made these switches ideal for most “foot pedal” type applications. These alternate action switches fit a standard .500” mounting hole with options of solder lug, wire lead and PC terminals.

Product Highlights:
- Available in 1-3 poles
- 3+ lbs. actuation force ideal for Foot pedal applications
- Solder Lug, Wire Lead or PC Terminal options
- Self-cleaning wiping style contacts

Typical Applications:
- Music Equipment
- Test & Measurement Devices
- Audio-Visual Equipment
- Appliances

Resources:
Download 3D CAD Files
IGS ➤ STP ➤
### Electrical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>5A 125VAC, 2A 250VAC</td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>1500V RMS</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>50 Megohms</td>
</tr>
<tr>
<td>Initial Contact Resistance</td>
<td>10 Milli Ohm max @ 4Vdc</td>
</tr>
<tr>
<td>Electrical Life</td>
<td>50,000 Cycles</td>
</tr>
<tr>
<td>Terminals</td>
<td>Solder Lug, Wire Leads and PC</td>
</tr>
</tbody>
</table>

### Mechanical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Life</td>
<td>100,000 Cycles</td>
</tr>
</tbody>
</table>

### Environmental

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibration Sinusoidal</td>
<td>Mil STD 202G, Method 204D, Test Condition A 0.06DA or 10G’s 10-500Hz</td>
</tr>
<tr>
<td>Handling Shock</td>
<td>1 Meter Drop onto Hard Surface, all surfaces and planes</td>
</tr>
<tr>
<td>Thermal Cycling</td>
<td>25 Cycles -40 C to 85 C</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>32°F to 185°F (0°C to +85°C)</td>
</tr>
</tbody>
</table>

### Physical

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function Circuits</td>
<td>Three Pole Single Throw, TPST</td>
</tr>
<tr>
<td>Operation</td>
<td>Alternate Action, Push ON, Push OFF</td>
</tr>
<tr>
<td>Button Travel</td>
<td>0.19 (4.83mm)</td>
</tr>
<tr>
<td>Actuation Force</td>
<td>3 to 5 LB, 1360 to 2268 g</td>
</tr>
<tr>
<td>Base</td>
<td>Polyester, PBT Glass Filled</td>
</tr>
<tr>
<td>Button</td>
<td>Brass, Nickel Plated</td>
</tr>
<tr>
<td>Bushing</td>
<td>Brass, Nickel Plated</td>
</tr>
<tr>
<td>Plunger</td>
<td>Brass, Nickel Plated</td>
</tr>
<tr>
<td>Top Plate</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Actuator (Internal)</td>
<td>Nylon 6/6</td>
</tr>
<tr>
<td>Pin (Internal)</td>
<td>Nylon 6/6</td>
</tr>
<tr>
<td>Driver</td>
<td>Cold Rolled Steel</td>
</tr>
<tr>
<td>Springs</td>
<td>Music Wire</td>
</tr>
<tr>
<td>Movable Contact</td>
<td>Copper</td>
</tr>
<tr>
<td>Terminals</td>
<td>Brass (tin plated)</td>
</tr>
<tr>
<td>Mounting</td>
<td>½” Dia. Hole, with and without keyway, or with locking ring</td>
</tr>
</tbody>
</table>

### Safety & Regulation

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency</td>
<td>UL 61058, EN 61058 (3 Pole Version)</td>
</tr>
<tr>
<td></td>
<td>UL 1054 (1 &amp; 2 Pole Version)</td>
</tr>
<tr>
<td>Materials</td>
<td>RoHS, REACH</td>
</tr>
</tbody>
</table>

*Manufacturer reserves the right to change product specification without prior notice.
641-Series - Pushbutton Switches - Ordering Scheme, Dimensional Specifications

1 PART NUMBER: SERIES / POLES / CIRCUITRY / RATING / TERMINATION

One Pole
2A 250VAC, 5A 125VAC
solder lug PC term. wire leads.
64111210 64111212 64112210 64112212 64111220 64111222

Two Pole
ON-OFF ON-ON
64112220 64112222

Three Pole
64113210 64113212 64113215

Notes:
1. KEYWAY TOWARD T3 AND 6 FOR ONE AND TWO POLE SWITCHES
2. KEYWAY TOWARD T4 FOR THREE POLE SWITCHES.

Part Number

64111210

1 OR 2 POLE SHOWN WITH SOLDER LUG

3 POLE SHOWN WITH SOLDER LUG

3 POLE SHOWN WITH PC TERMINAL

1 AND 2 POLE PC TERMINAL MOUNTING HOLES

3 POLE PC TERMINAL MOUNTING HOLES

TERMINAL TYPE
The 110/316P-Series provides a compact yet rugged solution to general purpose switch needs. Alternate action, metal construction and stiff (6-8 lb) actuation force have combined to make this switch a pillar in a variety of markets. This versatile switch is available in maintained and momentary circuits with a variety of termination and rating options.

Product Highlights:
- Ratings to 5A 250V, 10A 125V AC or DC
- Maintained or momentary circuitry
- On-Off, On-On and 2 circuit function options
- Choice of 4 different termination options

Typical Applications:
- Music Industry
- Audio/Visual
- Electronic Road Signs
**Dielectric Strength**
UL/CSA: 1000V - live to dead
metal parts & opposite polarity

**Mechanical Life**
100,000 cycles

**Operating Temperature**
32°F to 185°F (0°C to 85°C)

---

**110-P**

### 1 PART NUMBER: SERIES / ACTUATOR / CIRCUITRY / RATING / TERMINATION

<table>
<thead>
<tr>
<th>Series</th>
<th>Actuator</th>
<th>Circuitry</th>
<th>Rating</th>
<th>Termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Pole</td>
<td>3A 250V, 6A 125V</td>
<td>OFF-ON</td>
<td>solder lug (end)</td>
<td>110-P</td>
</tr>
<tr>
<td></td>
<td>OFF-(ON)</td>
<td>110-P-OFF</td>
<td>solder lug (bottom)</td>
<td>110-BP</td>
</tr>
<tr>
<td></td>
<td>ON-(OFF)</td>
<td>110-PM-ON</td>
<td>screw terminals</td>
<td>110-SP</td>
</tr>
<tr>
<td></td>
<td>5A 250V, 10A 125V, 1/4 HP 125V</td>
<td>160H-P</td>
<td>wire leads</td>
<td>111-16-P</td>
</tr>
<tr>
<td></td>
<td>OFF-ON</td>
<td>160H-BP</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ON-ON</td>
<td>112-P</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ON-(ON)</td>
<td>112-PM</td>
<td></td>
<td></td>
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<tr>
<td>Double Pole</td>
<td>1A 250V, 3A 125V</td>
<td>OFF-ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OFF-(ON)</td>
<td>216-PP</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ON-(OFF)</td>
<td>216-PM-ON</td>
<td></td>
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<td></td>
<td>ON-(ON)</td>
<td>316-PP</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 ON - 1 OFF (2 circuit)</td>
<td>516-PP</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 (ON) - 1 (OFF) (2 circuit)</td>
<td>516-PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part Number</td>
<td>110-P</td>
<td>110-BP</td>
<td>110-SP</td>
<td>111-16-P</td>
</tr>
</tbody>
</table>

Notes:
( ) Indicates momentary function.

---

**NOTES:**

- Dielectric Strength: UL/CSA: 1000V - live to dead metal parts & opposite polarity.
- Mechanical Life: 100,000 cycles.
- Operating Temperature: 32°F to 185°F (0°C to 85°C).

---

**110/316P-Series - Pushbutton Switches - General Specifications, Ordering Scheme, Dimensional Specifications**

---

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

---

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P-Serie

PUSHBUTTON SWITCHES

These rugged pushbutton-type switches feature international approvals, ratings to 20A 125VAC and a heavy actuation force (3-5 lbs. typical) which makes this switch ideal for use as a “foot-pedal” switch. The metal bushing and plunger construction enables this alternate action switch to withstand the rigors of most any stringent pushbutton application.

Product Highlights:
• Rugged metal clad construction ideal for foot pedal applications
• Ratings to 20A 125VAC
• UL, CSA and TUV approvals
• Maintained On-Off or On-ON circuitry

Typical Applications:
• Vacuum Cleaners
Dielectric Strength
UL/CSA: 1000 - live to dead metal parts & opposite polarity
TUV: 4000V - live to dead metal parts; 1250V - opposite polarity across open contacts

Electrical Life
50,000 cycles

Mechanical Life
100,000 cycles

Operating Temperature
0°F to 85°F (32°C to 85°C)

P-Series - Pushbutton Switches - General Specifications, Ordering Scheme, Dimensional Specifications

PA341

1 PART NUMBER: SERIES / ACTUATOR / CIRCUITRY / RATING / TERMINATION

<table>
<thead>
<tr>
<th>Part Number</th>
<th>.250 Tab Screw Terms.</th>
<th>Wire Leads</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA341</td>
<td>PA344</td>
<td>PA345</td>
</tr>
<tr>
<td>PB341</td>
<td>PB344</td>
<td>PB345</td>
</tr>
<tr>
<td>PA301</td>
<td>PA304</td>
<td>PA305</td>
</tr>
<tr>
<td>PB301</td>
<td>PB304</td>
<td>PB305</td>
</tr>
<tr>
<td>PA951</td>
<td>PA954</td>
<td>PA955</td>
</tr>
</tbody>
</table>

Notes:
1 Additional ratings available. Consult factory.
2 UL, CSA & TUV approved.

*Manufacturer reserves the right to change product specification without prior notice.
The PP-Series plastic pushbutton switches are heavy duty, single pole switches with wire leads. They are alternate action, available in single throw construction, with AC ratings up to 15 amps. Both bushing and bracket are made out of nylon. These high current switches are popular within the Appliance market.

**Product Highlights:**
- Ratings to 15A 125VAC
- All nylon construction
- Stiff actuation force suitable for foot pedal applications
- Integrated wire lead termination

**Typical Applications:**
- Vacuum Cleaners
Dielectric Strength
UL/CSA: 1000V - live to dead metal parts & opposite polarity

Electrical Life
50,000 cycles

PPA525-AC

1 PART NUMBER: SERIES / ACTUATOR / CIRCUITRY / RATING / TERMINATION
10A 250VAC, 15A 125VAC, 3/4HP 125-250VAC
On-Off
10A 250VAC, 15A 125VAC
On-Off

Wire Leads
PPA525-AC
PAA515-AC

Mechanical Life
100,000 cycles

Operating Temperature
32°F to 185°F (0°C to 85°C)

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

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Bushing Accessories

The hardware options and accessories listed below were specifically designed to be used with toggle and pushbutton switches. The drawings are representative of the actual products. When other hardware options are required, please consult factory.

STANDARD HEXNUT
.562 in. [14.27 mm] X .076 in. [1.93 mm]
NICKEL: 380-08602
BLACK: 380-08606

STANDARD FACENUT
.570 in. [14.47 mm] X .078 in. [1.98 mm]
NICKEL: 380-08693
BLACK: 380-08694

PLASTIC FACENUT
(Wrench Supplied N/C)
.625 in. [15.87 mm] X .120 in. [3.04 mm]
BLACK: 384-17126-001
RED: 384-17126-002
WHITE: 384-17126-003

DRESS FACENUT
.636 in. [16.15 mm] X .155 in. [3.93 mm]
NICKEL: 380-08810
BLACK: 380-08811

LOCK WASHER
.029 [0.73] min.
.593 - .607
[15.06 - 15.41]

LOCKING RING
.722 [18.33]
.031 [0.78]

All indicator plates are nickel-plated steel. Odd keyway locations, alternate imprints and plating available on special order. Contact factory for minimum quantities and specifications.

Y01 272-06747
Y02 272-06764
Y51 272-06842
Y101 272-06935
Y311 272-07258
Y500 272-07293

ALL PLATES SHOWN FIT 15/32" [11.81] BUSHINGS

*Manufacturer reserves the right to change product specification without prior notice.
Carling offers four-position, eight-position, and repeating action single pole rotary switches ranging from 1 to 20 amps. UL & CSA certified.

### SELECTOR GUIDE

<table>
<thead>
<tr>
<th>V-Rotary</th>
<th>R135</th>
<th>700 / 800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poles</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ratings</td>
<td>up to 15A 24VDC 3A 125VAC 5A 12VDC</td>
<td>up to 3A 250VAC 6A 125VAC</td>
</tr>
<tr>
<td>Sealing / Actuator</td>
<td>IP67, ergonomic knob round</td>
<td>asymmetrical</td>
</tr>
<tr>
<td>Mounting Hole Specifications</td>
<td>.830” x 1.450” [21.08mm x 36.83mm] snap-in mount</td>
<td>.375” dia [9.52mm] bushing mount .500” dia [12.7mm] snap-in mount</td>
</tr>
<tr>
<td>Termination</td>
<td>solder lug .250 tabs wire leads</td>
<td>wire leads</td>
</tr>
<tr>
<td>Illumination</td>
<td>incandescent, LED n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Approvals</td>
<td>UL, CSA</td>
<td>UL, CSA</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.
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

**Typical Applications:**
- On/Off Highway Equipment
- Marine
- Test & Measurement
- Instrumentation
- Speed Control

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

**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
### Electrical

#### Rating

<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>24</td>
<td>15</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
- 50,000 Cycles Two Position
- 25,000 Cycles Two Position
- Momentary and All Three position
- 0.250" (6.3mm) Quick Connect

### Mechanical

#### Mechanical Life
- 100,000 Cycles Maintained Circuits
- 50,000 Cycles Momentary 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
- 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
- 25 Cycles -40 C to 85 C

#### Ignition Protection

#### UV Protection
- 300 hr Xenon Arc, 1.4W/m2 wavelength 420 nm

#### ESD
- Human Static Discharge, +/- 15KV applied during normal operation
- Shipping/Handling, frequency range 200-2000 MHz applied voltage is +8KV to +15KV and -8KV to -15KV 3 discharge cycles

*Manufacturer reserves the right to change product specification without prior notice.*
1 SERIES
RV Rotary Contura

2 CIRCUIT 1
Terminal Connections as viewed ( ) - momentarily
from bottom of switch:
- 8 - 7 DP - double pole uses 1, 2, 3 and 4, 5, 6.
- 1 - 4
- 2 - 5
- 3 - 6
- 10 - 9

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

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

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

4 TERMINATION / BASE STYLE
- 6 Term 10 Term Termination Jumper
- 1 - 2 .250 TAB (QC) - no barriers No
- A J - 2.5 .250 TAB (QC) - with barriers No
- B K - .250 TAB (QC) - no barriers Yes (T2 to T5)

Notes:
1. Switch circuit uses terminals 1,2,3,4,5 & 6. Terminals 7,8,9 & 10 are for lamp
   circuit only.
2. Jumper between terminals 2 & 5 for Circuits 61, 62, & 64 to be specified in the
   Termination & Jumper selection.
3. Circuit 61 may be used for SP, OFF-ON-ON circuit.
4. Base will not have terminal insulating barriers when connector and/or jumpers
   are used.
5. Code J,K are optional for circuits 62 and 64. Customer may provide externally
   wired jumper to connect terminals 2 and 5.
6. Lamp #1 located at top end of switch, above terminal 4.
   Lamp #2 located at top end of switch between terminals 1 & 4.
   Lamp #3 located at top end of switch, above terminal
   Positive (+) and negative (-) symbols apply to L.E.D. lamps only.
7. Mounting hole size is 1.450” (36.83mm) by 0.830” (21.08mm). To mount multiple
   switches in single panel cut-out order optional interlocking mounting panels.
8. Lamp color for L.E.D.s must be clear, white, or match color of L.E.D.

5 ILLUMINATION 6, 8
Sealed Lamps when illuminated Terminals
- S NONE
- A # 1 Independent 8+ 7-
- B # 1 Dependent 3+ 7-
- C # 1 Independent 8+ 7-
- & # 3 Dependent 10+ 7-
- D # 1 Dependent 3+ 7-
- & # 2 Independent 9+ 7-
- E # 1 Independent 8+ 7-
- & # 3 Dependent 10+ 7-
- F # 1 Dependent 3+ 7-
- & # 2 Independent 9+ 7-
- G # 1 Dependent 3+ 7-
- # 3 Independent 8+ 7-
- H # 2 Dependent 3+ 7-
- # 2 Independent 8+ 7-
- J # 1 Independent 8+ 7-
- & # 3 Dependent 10+ 7-
- K # 1 Dependent 3+ 7-
- & # 2 Independent 10+ 7-
- L # 1 Dependent 3+ 7-
- # 2 Independent 8+ 7-
- M # 2 Independent 8+ 7-
- # 3 Independent 10+ 7-
- N # 2 Dependent 3+ 7-
- # 3 Dependent 1+ 7-
- P # 2 Independent 10+ 7-
- # 3 Dependent 1+ 7-
- R # 3 Independent 8+ 7-
- T # 3 Dependent 1+ 7-

6, 7, 8 LAMP #1, 2 AND OR LAMP #3 6, 8
Selection 6: above terminal 7; Selection 8: above terminal 8
No lamp 0
LED Red Amber Green Blue White
12VDC C N H E 6
24VDC D P J K 8

9 BRACKET COLOR & PANEL SEAL
Color No Gasket 1 Gasket 2 Gasket
- Black B C D
- Gray G H Y 2
- White W Y Z

10 ACTUATOR STYLE
- K Rotary Knob (Standard)

ACTUATOR ORIENTATION
ABOVE TERMINALS
4 1

11 LENS COLOR
- No Lens Clear 2 White 9 Amber K R

12 KNOB COLOR
- Black C Gray H Red Y

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Dimensional Specifications: in. [mm]

10 TERMINAL BASE
W/ BARRIERS

10 TERMINAL BASE
W/O BARRIERS

BOTTOM VIEW
TERMINAL ARRANGEMENT
10 TERMINAL BASE

SWITCH SHOWN WITH VC1 CONNECTOR 10 TERMINAL

Dimensional Specifications: in. [mm]
## Circuits Diagrams:

<table>
<thead>
<tr>
<th>CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
<th>KNOB POSITION</th>
</tr>
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<tbody>
<tr>
<td>21</td>
<td><img src="image21" alt="Circuit Diagram 21" /></td>
<td>1 3</td>
</tr>
<tr>
<td>22</td>
<td><img src="image22" alt="Circuit Diagram 22" /></td>
<td>1 3</td>
</tr>
<tr>
<td>23</td>
<td><img src="image23" alt="Circuit Diagram 23" /></td>
<td>1 3</td>
</tr>
<tr>
<td>24</td>
<td><img src="image24" alt="Circuit Diagram 24" /></td>
<td>1 3</td>
</tr>
<tr>
<td>26</td>
<td><img src="image26" alt="Circuit Diagram 26" /></td>
<td>1 3</td>
</tr>
<tr>
<td>28</td>
<td><img src="image28" alt="Circuit Diagram 28" /></td>
<td>1 3</td>
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<table>
<thead>
<tr>
<th>CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
<th>KNOB POSITION</th>
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<tbody>
<tr>
<td>55</td>
<td><img src="image55" alt="Circuit Diagram 55" /></td>
<td>1 2 3</td>
</tr>
<tr>
<td>61</td>
<td><img src="image61" alt="Circuit Diagram 61" /></td>
<td>1 2 3</td>
</tr>
<tr>
<td>62</td>
<td><img src="image62" alt="Circuit Diagram 62" /></td>
<td>1 2 3</td>
</tr>
<tr>
<td>64</td>
<td><img src="image64" alt="Circuit Diagram 64" /></td>
<td>1 2 3</td>
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### LEGEND

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DEFINITION</th>
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</thead>
<tbody>
<tr>
<td>δ</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>P1 P3</td>
<td>2 POSITION</td>
</tr>
<tr>
<td>P1 P2 P3</td>
<td>3 POSITION</td>
</tr>
</tbody>
</table>
# Lamp Circuit Diagrams:

<table>
<thead>
<tr>
<th>LAMP CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
<th>LAMP CIRCUIT CODE</th>
<th>CIRCUIT DIAGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td><img src="image1" alt="A Circuit Diagram" /></td>
<td>L</td>
<td><img src="image2" alt="L Circuit Diagram" /></td>
</tr>
<tr>
<td>B</td>
<td><img src="image3" alt="B Circuit Diagram" /></td>
<td>M</td>
<td><img src="image4" alt="M Circuit Diagram" /></td>
</tr>
<tr>
<td>C</td>
<td><img src="image5" alt="C Circuit Diagram" /></td>
<td>N</td>
<td><img src="image6" alt="N Circuit Diagram" /></td>
</tr>
<tr>
<td>D</td>
<td><img src="image7" alt="D Circuit Diagram" /></td>
<td>P</td>
<td><img src="image8" alt="P Circuit Diagram" /></td>
</tr>
<tr>
<td>E</td>
<td><img src="image9" alt="E Circuit Diagram" /></td>
<td>R</td>
<td><img src="image10" alt="R Circuit Diagram" /></td>
</tr>
<tr>
<td>F</td>
<td><img src="image11" alt="F Circuit Diagram" /></td>
<td>T</td>
<td><img src="image12" alt="T Circuit Diagram" /></td>
</tr>
<tr>
<td>G</td>
<td><img src="image13" alt="G Circuit Diagram" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td><img src="image14" alt="H Circuit Diagram" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td><img src="image15" alt="J Circuit Diagram" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td><img src="image16" alt="K Circuit Diagram" /></td>
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</tr>
</tbody>
</table>
R135-Series
ROTARY SWITCHES

The R135 and R135A-Series rotary switches are single pole, single throw “L” rated up to 3A, feature an ON-OFF repeating action, and are available with a nylon actuating knob; nylon snap-in bracket or nickel-plated brass bushing. These switches are typically used to control lighting functions.

Product Highlights:
• 3A 125VAC “L” rating to control lighting
• Off-On repeating action circuitry
• Integrated wire lead termination
• Bushing or snap in mounting styles

Typical Applications:
• Appliance
• HVAC
Dielectric Strength
UL/CSA: 1000V - live to dead metal parts

Mechanical Life
100,000 cycles

Electrical Life
100,000 cycles

Operating Temperature
32°F to 185°F (0°C to 85°C)

---

**R135-A** - **BL**

1. **Base Part Number**
2. **Knob Color**

**1 BASE PART NUMBER:** SERIES / CIRCUITRY / RATING / TERMINATION

<table>
<thead>
<tr>
<th>Wire Leads</th>
<th>Base Part Number</th>
<th>Knob Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF-ON repeating 1.5A 250 VAC; 3A 125 VAC L; 5A 12 VDC nylon snap-in bezel</td>
<td>R135</td>
<td>BL</td>
</tr>
<tr>
<td>OFF-ON repeating 3.75 threaded bushing</td>
<td>R135-A</td>
<td>WH</td>
</tr>
</tbody>
</table>

**Notes:**
- Standard Wire Leads are 6" long, stripped 1/2" black. If different length required, please specify at the end of the part number. ex. R135-A-BL/20".
- Panel Cut-Out Recommendations: For sheet metal panels, switch must enter panel in same direction as the punch. Burr on bottom. Test cut hole in actual material.
- 1 Custom colors available. Consult factory.

---

**Dielectric Strength Diagram**

- **NYLON BEZEL MOUNTING HOLE**
  - Snaps into .500[12.70] Dia. hole
  - Panel Thickness: .020[.508] to .078[1.98]

- **THREADED BUSHING MOUNTING HOLE**
  - Fits into .375[9.52] Dia. hole
  - Bushing Length: .312[7.92]

---

*Manufacturer reserves the right to change product specification without prior notice.*
The 700 and 800-Series are single pole multi-position, general purpose rotary switches. These switches feature a nylon actuator in a metal clad construction along with a self-cleaning silver plated contact design. The 700 and 800-Series are typically used in applications requiring multi-position speed controls, such as electric fans.

**Product Highlights:**
- Ratings to 3A 250VAC, 6A 125VAC
- Up to 8 available detent positions
- Double “D” bushing mount
- Sturdy metal clad construction

**Typical Applications:**
- Small Appliance
- Industrial Control
- Marine
### Dielectric Strength
UL/CSA: 1000V (minimum)

### Insulation Resistance
100 Megohms (minimum)

### Base Material
Steel/Zinc Plate

### Actuator Material
Brass/Nickel Plate

---

#### 700-1A - BL

<table>
<thead>
<tr>
<th>Base Part Number</th>
<th>Knob Color</th>
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<tbody>
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---

#### 1 BASE PART NUMBER: SERIES / POLES / CIRCUITRY 1 / RATING / TERMINATION 2

<table>
<thead>
<tr>
<th>2A 250VAC; 4A 125VAC; 1A 125V</th>
<th>250 Tabs</th>
<th>Position 1</th>
<th>Position 2</th>
<th>Position 3</th>
<th>Position 4</th>
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<tbody>
<tr>
<td>700-1</td>
<td>OFF</td>
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<tr>
<td>700-2</td>
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<td>700-4</td>
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<td>700-7</td>
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3A 250VAC; 6A 125VAC: 8 positions

<table>
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<tr>
<th>Switch Positions</th>
<th>OFF Position</th>
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<tr>
<td>800-2</td>
<td>2 positions</td>
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<tr>
<td>800-3</td>
<td>3 positions</td>
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<tr>
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<td>4 positions</td>
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<td>800-5</td>
<td>5 positions</td>
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<td>7 positions</td>
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<tr>
<td>800-8</td>
<td>8 positions</td>
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</table>

800-2 2 positions

800-3 3 positions

800-4 4 positions

800-5 5 positions

800-6 6 positions

800-7 7 positions

800-8 8 positions

---

#### Notes:
1. Terminal is combination solder lug and quick connect.

---

*Manufacturer reserves the right to change product specification without prior notice.*
Carling Technologies battery disconnect switches are designed to minimize battery drain, ensure maintenance personnel safety, and when used in conjunction with a padlock, provide vehicle theft protection.

## SELECTOR GUIDE

<table>
<thead>
<tr>
<th></th>
<th>BD-Series</th>
<th>BD1-Series</th>
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<tbody>
<tr>
<td><strong>Poles</strong></td>
<td>1</td>
<td>1</td>
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<tr>
<td><strong>Ratings</strong></td>
<td>100-300 Amps 12VDC/24VDC</td>
<td>250 Amps 12VDC/24VDC</td>
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<tr>
<td><strong>Actuator</strong></td>
<td>ergonomic knob; removable option available</td>
<td>ergonomic knob; removable option available</td>
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<tr>
<td><strong>Mounting Hole Specifications</strong></td>
<td>M10 Stud; M14 Stud</td>
<td>M6/M7 Bolt and Nut</td>
</tr>
<tr>
<td><strong>Termination</strong></td>
<td>M10 Stud; 19 and 27mm length</td>
<td>M10 Stud; 19 and 27mm length</td>
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</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.*

[back to table of contents]
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:**
- Single Pole, 100-300 Amps
- 12VDC/24VDC
- IP67 Sealing Protection
- Red, Yellow or Black Ergonomic Knob
- Lock Compatible

**Typical Applications:**
- On/Off-Highway Equipment
- Military
- Marine

**Resources:**
- Configure a Complete Part
- **Download CAD & Sales Drawing**
- Watch Product Video
BD-Series
DESIGN FEATURES

- STUD
- SLIDING CONTACT
- ROTARY KNOB
- SHAFT SEALS
- BODY SEAL
- LOCK COMPATIBLE
**Electrical**

- **Application Voltage**: DC
  - Rated voltage: 12VDC / 24VDC
  - Range of operating voltage:
    - 12VDC: min 9VDC, max 16VDC;
    - 24VDC: min 18VDC, max 32VDC
- **Current Ratings**
  - 12VDC / 24VDC: rated 100A, max 300A (M10 Studs);
  - 12VDC / 24VDC: rated 300A (M14 Studs)
- **Intermittent Current**
  - 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 between terminals of main circuit, knob and enclosure.
- **Dielectric Strength**: 50HZ, 550VAC for 1 minute between electrically / isolated terminals in main circuit; between terminals of main circuit, knob and enclosure.
- **Insulation Resistance**: Minimum of 100 Megohms 1 min @ 500VDC
- **Temperature Rise**: Terminal should not exceed 60°C above ambient.
- **Endurance**
  - **For M10 Studs**: 2 seconds ON and 2 seconds OFF per operation, load with rated current & 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
  - 2 seconds ON and 6 seconds OFF per operation, load with rated current & voltage. 12V test @14V±0.1V; 24V test @28V±0.2V.
    - 3,000 cycles: 300A current
  - **For M14 Studs**: 2 seconds ON and 6 seconds OFF per operation, load with rated current & voltage. 12V test @14V±0.1V; 24V test @28V±0.2V.
    - 3,000 cycles: 300A current

**Mechanical**

- **Handling Shock**: Fully functional after 3 drops from 1000 mm height. Surface damage may occur.
- **Endurance**: More than 100,000 cycles without load

**Environmental**

- **Operating Temp.**: -40 °C to +85 °C
- **Moisture Resistance**: 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.
- **Thermal Cycling**: IEC 60068-2-14 or GB/T 2423.22, Test Nb, 25 Cycles -40°C to +85°C
- **Thermal Shock**: IEC 60068-2-14 or GB/T 2423.22, Test Na (5 cycles @ -55°C to +25°C to +85°C to +25°C)
- **Thermal Resistance**: IEC 60068-2-1 or GB/T 2423.1
  - Cold: Test A, operate 8 hours @ -40°C
  - Heat: Test B, operate 8 hours @ +85°C
- **Vibration**: IEC 60068-2-34 or GB/T 2423.11, 10-500 Hz, Random vibration test for 8 hours in each of the 3 mutually perpendicular axes. 25Gs @ Z axes, 12.5Gs @ X / Y axes. Powered.
- **Salt Spray**: IEC 60068-2-11 or GB/T 2423.17, 48 hours
- **Fire and Smoke**: IEC 60695-11-10 or GB/T 2408, HB
- **Dust / Waterproof**: IEC 60529 or GB4208, IP67
- **Chemical Splash**: Gasoline, Diesel, Motor Oil, Brake Fluid, Ammonia, Armor All
- **UV Protection**: ASTM G155-05a, cycle 11, 300 hr Xenon Arc, 1.4W / (m2 Nm), wavelength 420 Nm

**Physical**

- **Number of Poles**: 1 pole
- **Wiring Terminals**: Line / Load terminal: M10 brass nuts
  - Torque value: M10 (6-8 Nm);
  - M14 (10-14 Nm)
- **Mounting**: M8 Iron nut, torque value: (10-15 Nm)
- **Torque Operation**: 1.0-3.0 Nm
- **Body Color**: Black
- **Actuator Color**: Handle color optional, with white color “Arrow” legends.
- **Weight**
  - (M10 Studs): 340±10 g / set;
  - (M14 Studs): 385±10 g / set
- **Material**
  - Base (PBT glass filled), Bracket & Knob (nylon glass filled),
  - Studs (Copper + Tin plating),
  - Nuts (Brass)

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

GPS-0001 Rev. D
### BD-Series - Battery Disconnect - Ordering Scheme & Dimensional Specifications

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

#### 2 RATING / CYCLES
<table>
<thead>
<tr>
<th>A</th>
<th>100A @ 24VDC: 50,000 Cycles</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>200A @ 24VDC: 20,000 Cycles</td>
</tr>
<tr>
<td>B</td>
<td>250A @ 24VDC: 3,000 Cycles</td>
</tr>
<tr>
<td>B</td>
<td>300A @ 24VDC: 3,000 Cycles</td>
</tr>
</tbody>
</table>

Note: Refer to General Specifications for test parameters.

#### 3 TERMINATION
<table>
<thead>
<tr>
<th>10</th>
<th>M10 Stud</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>M14 Stud</td>
</tr>
</tbody>
</table>

#### 4 KNOB COLOR
<table>
<thead>
<tr>
<th>R</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Yellow</td>
</tr>
<tr>
<td>B</td>
<td>Black</td>
</tr>
</tbody>
</table>

#### 5 LEGEND
| A   | Arrow Legend, White Color |

---

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

![Dimensional Diagram]

- "ON/OFF" Single Pole Single Throw Switch Circuit Diagram
- T1 and T2 marks
- Laser marks and date code and rating options
- See COS-0085

---

COS-0085 Rev: E
CLA-0141 Rev: C

back to table of contents
**Mounting Method 1: in. [mm]**

**Notes:**
1. Switch can be mounted horizontally or vertically.

---

**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 2pcs M8 nuts (sec. torque: 10-15N\(\text{mm}\)).
Mounting Method 2: in. [mm]

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

Wiring 1: Disconnect washers and nuts.

Wiring 2: Attach two #8 "O" ring terminals as shown, then re-fasten washers and nuts.

Wiring 3: Tighten 2pcs brass M10 nuts (red torque 8-8mm).

When used in conjunction with a pad lock, switch can be locked in the "off" position as a safety measure.
Carling Technologies BD1-Series battery disconnect switch is designed to minimize battery drain, ensure maintenance personnel safety. Additionally, the optional, removable key adds an extra layer of security to protect against vehicle theft.

**Product Highlights:**
- 250 Amps
- 12 or 24VDC
- Permanent or Removable Key Options
- IP67 Sealing Protection (when key is assembled)
- Choice of 19mm or 27 mm Length Studs

**Typical Applications:**
- On/Off-Highway Equipment
- Military
- Marine

**Resources:**
- Configure a Complete Part
- Download CAD & Sales Drawing
- Watch Product Video

\[back to table of contents\]
**BD1-Series**

**DESIGN FEATURES**

**OFF POSITION**

**ON POSITION**

**OFF POSITION WITH KEY REMOVED**

- **STUD TERMINAL**
- **BASE**
- **SEAL**
  - IP67 Sealing Protection (when key is assembled)
- **KEY**
  - Removable option available to provide vehicle theft protection
**Electrical**

<table>
<thead>
<tr>
<th>Specification</th>
<th>DC</th>
<th>12VDC / 24VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application Voltage</strong></td>
<td>DC</td>
<td>Rated voltage: 12VDC / 24VDC</td>
</tr>
<tr>
<td><strong>Rated Voltage</strong></td>
<td>12VDC: min 9VDC, max 16VDC; 24VDC: min 18VDC, max 32VDC</td>
<td></td>
</tr>
<tr>
<td><strong>Current Ratings</strong></td>
<td>250A @ 12VDC/24VDC</td>
<td></td>
</tr>
<tr>
<td><strong>Contact Voltage Drop</strong></td>
<td>Voltage drop ≤ 100mV after 300 sec. ON at 200% rated current prior to endurance test; Voltage drop ≤ 500mV after 5 msec. ON at 1600A max. current prior to endurance test.</td>
<td></td>
</tr>
<tr>
<td><strong>Dielectric Strength</strong></td>
<td>50HZ, 1200VAC for 1 minute between electrically / isolated terminals in main circuit; between terminals of main circuit, knob and enclosure.</td>
<td></td>
</tr>
<tr>
<td><strong>Insulation Resistance</strong></td>
<td>Minimum of 100 Megohms 1 min @ 500VDC.</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature Rise</strong></td>
<td>Terminal should not exceed 90°C above ambient at rated current after endurance test.</td>
<td></td>
</tr>
<tr>
<td><strong>Endurance</strong></td>
<td>2 seconds ON and 3 seconds OFF per operation, load with rated current &amp; voltage. 12V test @ 14V; 24V test @ 28V. Total 20,000 cycles: 250A current ratings, including 4,000 cycles respectively at -40 °C±2 and +85 °C±2; 12,000 cycles at 23 °C±2.</td>
<td></td>
</tr>
<tr>
<td><strong>Overload</strong></td>
<td>500A: 300 seconds ON; 1600A: 30 seconds ON.</td>
<td></td>
</tr>
</tbody>
</table>

**Environmental**

- **Operating Temp.** -40 °C to +85 °C.
- **Moisture Resistance** 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.
- **Thermal Cycling** IEC 60068-2-14 or GB/T 2423.22, Test Nb, 25 Cycles -40°C to +85°C.
- **Thermal Shock** GB/T 28046.4-2011, 5.3.2, Test Na (100 cycles@ -40°C to +25°C to +85°C to +25°C).
- **Thermal Resistance** ISO 16750-4 or GB/T 28046.4 Cold: Test A, work 24 hours @ -40°C ISO 16750-4 or GB/T 28046.4 Heat: Test B, work 48 hours @ +85°C.
- **Vibration** IEC 60068-2-34 or GB/ T 2423.11, 10-500 Hz, Random vibration test for 8 hours in each of the 3 mutually perpendicular axes. 25Gs @ Z axes, 12.5Gs @ X/Y axes, powered.
- **Salt Spray** IEC 60068-2-11 or GB/T 2423.17, 48 hours.
- **Fire and Smoke** IEC 60695-11-10 or GB/T 2408, HB (horizontal burning) and V0 (vertical burning).
- **Sealing** IEC 60529 or GB4208, IP 67
- **Chemical Splash** Gasoline, Diesel, Motor Oil, Brake Fluid, Ammonia, Mixture of previous five chemicals.
- **UV Protection** ASTM G155-05a, cycle 11, 300 hr Xenon Arc, 1.4W / (m2 Nm), wavelength 420 Nm.

**Mechanical**

- **Handling Shock** Fully functional after 3 drops from 1000 mm height. Surface damage may occur.
- **Endurance** Minimum 50,000 cycles without load.

**Physical**

- **Number of Poles** 1 pole
- **Wiring Terminals** Line / Load terminal: brass nuts Torque value: M10 (10-15 Nm).
- **Mounting** M6/M7 bolt and nut, torque value: 4-5 Nm.
- **Torque Operation** 0.5-1.0 Nm.
- **Body Color** Black
- **Actuator Color** Red
- **Weight** Approximately 165g
- **Material** Base & Bracket & Key (glass filled nylon), Studs (Tin plated brass), Nuts (Brass) Locking Washers (SUS304).
**BD1-Series - Battery Disconnect - Ordering Scheme & Dimensional Specifications**

<table>
<thead>
<tr>
<th>1 SERIES</th>
<th>BD1</th>
<th>Battery Disconnect Power Switch (1 Pole)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 RATING / CYCLES</td>
<td>1</td>
<td>250A @ 12/24VDC</td>
</tr>
</tbody>
</table>

**Notes:**
1. Individual Keys separately available, reference part number 308-39943-001.

**3 KEY STYLE**
A | Removable
B | Non-Removable

**4 TERMINATION**
1 | M10 Stud 19 mm length
2 | M10 Stud 27 mm length

---

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

- **Mounting Hole:**
  - Ø 0.04
  - Ø 0.04

- **Switch Off:**
  - 4.35
  - 4.35

- **Switch On:**
  - 0.15
  - 0.15

- **M10 Stud and Washer:**
  - 1.72
  - 1.68

- **Notes:**
  1. Torque for mounting nut: M6 or M7 (4-5 nm)
  2. Torque for wiring nut: M10 (10-15 nm)
  3. Switch can be mounted vertically or horizontally

---

COS-0099 Rev: A
CLA-0154 Rev: A
Terminology

Agency data
UL File #E7560
CSA File #LR9280

Single Pole (SP) A switch device that opens, closes or changes connection of a single conductor in an electrical circuit.

Double Pole (DP) A switch device that opens, closes or changes connection of two conductors in an electrical circuit.

Single Throw (ST) A switch that opens, closes or completes a circuit at only one of the extreme positions of its actuator.

Double Throw (DT) A switch that opens, closes or completes a circuit at both extreme positions of its actuator.

Normally Open (NO) A momentary switch where one or more circuits are open when the switch actuator is at rest (the normal position.)

Normally Closed (NC) A momentary switch where one or more circuits are closed when the switch actuator is at rest (the normal position.)

Power Rating A switch’s current handling capability measured in amperes, horsepower, lamp loads or combinations thereof, in conjunction with applicable voltage levels.

L Rating Denotes the ability of a switch to handle the initial high inrush of a Tungsten Filament Lamp on AC voltage only.

T Rating Denotes the ability of a switch to handle the initial high inrush of a tungsten filament lamp on AC or DC voltage.

Typical European Rating
16 (4) amperage
(16) motor load amperage
A amperage
250V voltage
~ AC
T85 max. operating temp. in centigrade
μ micro-gap (<3mm) approved

Microgap (μ) European marking required for contact separation of less than 3mm. Switches with microgap (μ) approval are not acceptable as the safety disconnect of equipment from the main power source. The equipment requires an additional means for safe disconnection from the main power source such as a cord and plug.

Bulb Life
Neon 25,000 hours
Incandescent 25,000+ hours
LED 100,000 hours

Lamp Characteristics
Neon (120-240V)
Incandescent 6V .002A Current Draw
12-14V .08A Current Draw
18V .04A Current Draw
24-28V .04A Current Draw

Agency Approvals
These marks are granted by national certification bodies for use on products which comply with their specifications.

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<th>Country</th>
<th>Mark</th>
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**Notes:**
1. ISO compliant symbols. Consult factory for custom icons.
2. New legend codes recommended for new part set ups. Previous codes still valid for existing customers.
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, Configurit, 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

**MARINE**
Circuit Protection and Switches

**RENEWABLE ENERGY**
Circuit Breakers and Disconnect products

**MILITARY**
COTS Switches and Circuits Breakers

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

**INDUSTRIAL AUTOMATION**
Switches and Circuit Breakers
Authorized Sales Representatives and Distributors

Click on a region of the map below to find your local representatives and distributors or visit [www.carlingtech.com/findarep](http://www.carlingtech.com/findarep).

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To view all of Carling’s environmental, quality, health & safety certifications please visit [www.carlingtech.com/environmental-certifications](http://www.carlingtech.com/environmental-certifications)