



**Carling Technologies®**  
Innovative Designs. Powerful Solutions.

# ON/OFF HIGHWAY

Switches and Controls



CATALOG

# FOUNDED IN 1920

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.



## SWITCHES & CONTROLS

- Rocker
- Toggle
- Pushbutton
- Rotary

## CIRCUIT PROTECTION

- Hydraulic-Magnetic
- Thermal
- GFCI / ELCI

## CUSTOM SOLUTIONS

- PDU's
- Keypads
- Control Modules

## MULTIPLEXED POWER SYSTEMS

- HMI Devices & I/O Modules
- Programmable Displays
- Data Communication Interfaces
- Electrical Systems Monitoring

## STRATEGIC MARKETS SERVED:



On/Off Highway



Marine



Telecom/Datacom



Military



Renewable Energy

## GLOBAL LOCATIONS:

Carling Technologies  
World Headquarters  
Plainville, CT, USA  
ISO 9001:2008  
ISO/TS16949:2009

Maretron  
Phoenix, AZ, USA

Carling Technologies  
Brownsville, TX, USA  
ISO 14001:2004  
ISO 9001:2008  
ISO/TS16949:2009

Carling Technologies  
Matehuala, Mexico  
ISO 14001:2004  
ISO 9001:2008  
ISO/TS16949:2009

Carling Technologies  
Jupiter, FL, USA

Carling Technologies  
European Headquarters  
Exeter, UK  
ISO 9001:2008  
ISO/TS16949:2009

Carling Technologies  
Kowloon, Hong Kong  
ISO 9001:2008  
ISO/TS16949:2009

Carling Technologies  
Zhongshan, China  
ISO 14001:2004  
ISO 9001:2008  
ISO/TS16949:2009

## OTHER SERVED INDUSTRIES:



Medical



Industrial Control



Audio / Visual



Commercial Food



HVAC



Floor Care



Generators



Small Appliances



Security Systems



Test & Measurement

## WORLDWIDE NUMBERS:



2000+  
EMPLOYEES



150+  
ENGINEERS

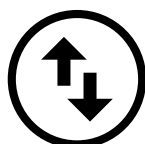


70+  
DISTRIBUTORS



50+  
REP FIRMS

## COMPETITIVE ADVANTAGES<sup>+</sup>



Vertical  
Integration



Reliable &  
On-Time Delivery



Excellent  
Customer Service



Innovative &  
Eco-Friendly Products

# On/Off Highway

## Switches and Controls

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

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

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

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

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

## Other Circuit Protection Products

such as thermal protection and ground fault circuit protection are also available. Please refer to **www.carlingtech.com** for a complete list of product offering.

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	SEALED TOGGLE	SEALED ROCKERS				
	 <i>ST-Series</i>	 <i>V-Series</i>	 <i>V-Series Rotary</i>	 <i>V-Charger</i>	 <i>W-Series</i>	 <i>L-Series</i>
<b>Poles</b>	1, 2	1, 2	1, 2	1	1, 2	1, 2
<b>Ratings</b>	16A 12V 16A 18V 14A 24V 15A 125VAC 10A 250VAC	up to 15A 24VDC 15A 125VAC 10A 250VAC	up to 15A 24VDC 20A 12VDC	12V/24V DC	up to 10A 24VDC	up to 15A 125VAC 10A 250VAC 20A 18VDC
<b>Actuator</b>	toggle (bat)	rocker, paddle, locking rocker	ergonomic knob	sealed spring- loaded access doors	bezel-less rocker, paddle & locking rocker	IP67, rocker, paddle, locking rocker
<b>Mounting Hole Specifications</b>	.500" dia [12.7mm] bushing mount	.830" x 1.450" [21.08mm x 36.83mm] snap-in mount	.830" x 1.450" [21.08mm x 36.83mm] snap-in mount	.830" x 1.450" [21.08mm x 36.83mm] snap-in mount	.830" x 1.450" [21.08mm x 36.83mm] snap-in mount	.867" x 1.734" [22mm x 44mm] snap-in mount
<b>Termination</b>	.250 tabs screw terminals	.250 tabs solder lug wire leads	solder lugs .250 tabs wire leads	.250 tabs	.110 tabs	.187 tab .250 tabs
<b>Sealing</b>	IP68	IP66 above panel	IP67 above panel	IP64 above panel	IP68 above and below panel, fully submersible	IP67 above panel
<b>Illumination</b>	n/a	incandescent, LED, neon	incandescent, LED	LED	LED	incandescent, LED
<b>Approvals</b>	UL, cUL pending	UL, CSA, VDE	pending	n/a	n/a	n/a

	ROCKER	CONTROL	L-SERIES CONTROLS			BATTERY DISCONNECT
	 <i>S-Series</i>	 <i>N-Series</i>	 <i>LD Dimmer</i>	 <i>LMR Mirror</i>	 <i>LW Wiper</i>	 <i>BD-Series</i>
<b>Poles</b>	1, 2	1	multi-function	multi-function	multi-function	1
<b>Ratings</b>	up to 10A 28VDC	.4VA 28VDC	up to 10A 12VDC 5A 24VDC	up to 1A 14VDC .5A 28VDC	up to 8A 14VDC 4A 28VDC	100-250 Amps 12VDC/24VDC
<b>Actuator</b>	bezel-less rocker	rocker, paddle	rocker, paddle	joystick	rocker, paddle	ergonomic knob
<b>Mounting Hole Specifications</b>	.787" x 1.575" snap-in, keyed	.867" x 1.734" [22mm x 44mm] snap-in mount	.867" x 1.734" [22mm x 44mm] snap-in mount	.867" x 1.734" [22mm x 44mm] snap-in mount	.867" x 1.734" [22mm x 44mm] snap-in mount	2.75" diameter; 70.1 mm diameter
<b>Termination</b>	.110 Tabs	.187 tabs	.250 tabs	wire leads with connector	.187 tabs	M10 Stud
<b>Sealing</b>	n/a	IP67 above panel	IP67 above panel	Water Resistant	n/a	IP67
<b>Illumination</b>	LED	LED	LED	n/a	LED	n/a
<b>Approvals</b>	n/a	n/a	n/a	n/a	n/a	n/a



\*Options and approvals shown may apply to specific construction combinations only, consult factory for clarification.

Manufacturer reserves the right to change product specifications without prior notice.



THERMAL CIRCUIT PROTECTION			
	 CMB-Series	 CLB-Series	 CLBA/CMBA-Series
Number of Poles	1	1	1
Actuator	pushbutton	pushbutton	n/a
Leakage Current Trip Level	n/a	n/a	n/a
Leakage Current Trip Time	n/a	n/a	n/a
Max Current & Voltage Ratings	3 to 20A, 125-250VAC, 32VDC	3 to 60A, 125-250VAC, 32VDC	3 to 40A, 125-250VAC, 32VDC
Max Interrupting Capacity	2500A@32 VDC	2500A@32 VDC	2500A@32 VDC
Available Circuits	series trip manual reset	series trip manual reset	series trip auto reset
Termination	.250 tab .250 tab with 90° bend screw terminal screw term with 90° bend	.250 tab .250 tab with 90° bend screw terminal screw term with 90° bend	.250" tab, .250" tab with 90° bend
Mounting Method	threaded bushing, front panel snap-in	threaded bushing, front panel snap-in	plug-in
Approvals	UL, CUL, CSA, TUV, CE, UL 1500 / ISO 8846 for ignition protection / marine	UL, CUL, CSA, TUV, CE, UL 1500 / ISO 8846 for ignition protection / marine	UL, CUL, TUV, UL 1500 / ISO 8846 for ignition protection / marine

CUSTOM ELECTRONIC CONTROLS & POWER MANAGEMENT MODULES					
					
TOTAL VEHICLE CONTROL	Cruise Control	Light Control Module	Horn Control	HVAC Motor Controller	Solid State Power Control

CUSTOM OPERATOR CONTROL MODULES & DISPLAYS				
				
TOTAL VEHICLE CONTROL	Keypads	Multiplexed V-Series Rocker Modules	Control Interface	Multi-function Displays

\*Options and approvals shown may apply to specific construction combinations only, consult factory for clarification.

# V-Series

## V-Series

### CONTURA SWITCHES

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



#### Resources:

[Download 3D CAD Files](#)

[IGS >](#) [STP >](#)

[Watch Product Video](#)



#### Product Highlights:

- ♦ Certified to IP66 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.

# V-Series Switch

## DESIGN FEATURES

### INTERCHANGEABLE ACTUATORS

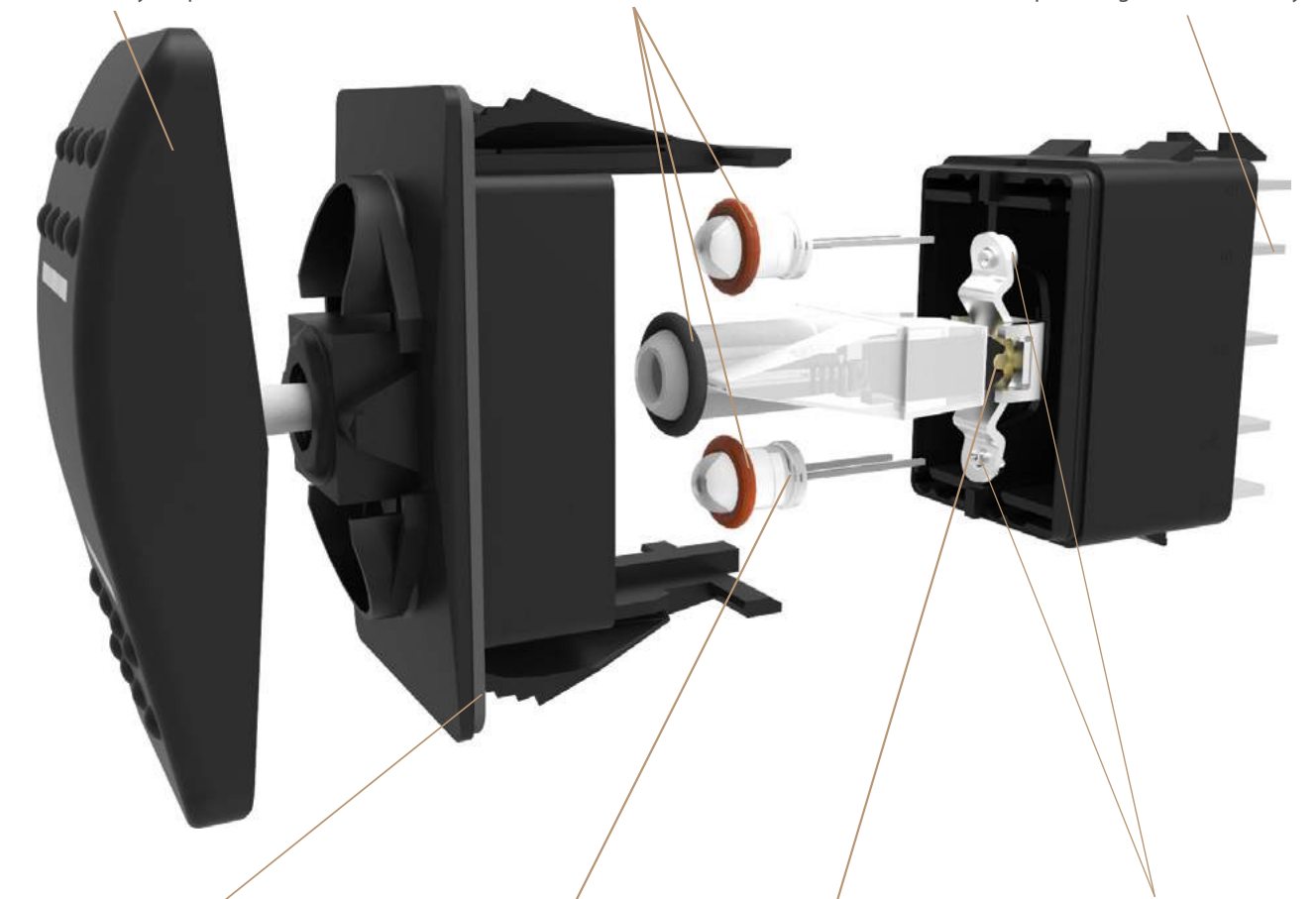
Panel redesign is a snap with our wide range of rocker styles. Achieve maximum design variety with minimum inventory. Simply swap rockers to create an entirely new look for your panel.

### DUAL SEAL PROTECTION

Seals out water, dust, debris, and enables switch certification to IP66 for front panel components.

### CLEAN CONNECTIONS

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



### OPTIONAL PANEL SEAL

Prevents water/dust ingress behind panel.

### MULTIPLE LIGHTING OPTIONS

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

### BRASS ROLLER PIN

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

### SILVER PLATED BUTT CONTACT MECHANISM

Providing 50k to 100k electrical cycles and a variety of different electrical ratings.

## Contura II & III

The Contura II & III actuators are constructed of thermoplastic polycarbonate and are offered with a hard nylon overlay or a "soft-touch" elastomer overlay. These models incorporate aesthetic designs on the top and bottom of the rocker featuring two rows of raised "bumps" on the Contura II and three "indented" lines on the Contura III.



## Contura 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 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 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 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 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 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 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.



## 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.



## 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



## Electrical

Contact Rating	.4VA @ 24VDC (MAX) resistive 15 amps, 125VAC 10 amps, 250VAC 1/2 HP 125-250VAC 20 amps, 4-14VDC 15 amps, 15-28VDC 10A, 14VT 6A, 125VAC L
Dielectric Strength	1500 Volts RMS
Insulation Resistance	50 Megohms
Initial Contact Resistance	10 milliohms max. @ 4VDC
Life	50,000 - 100,000 cycles circuit dependent
Contacts	Silver alloy, silver tin-oxide, fine silver
Terminals	Brass or copper/silver plate 1/4" (6.3mm) Quick Connect terminations standard. Solder lug, Wire Lead

## Mechanical

Endurance	150,000 cycles minimum circuit dependent
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## 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	Optional external gasket panel seal Polyester blend rated to 125°C with a UL flammability rating of 94V0.
Contura II,III,IV,V, VI, VII Actuator	<b>Hard Surface:</b> Basic actuator structure molded of thermoplastic polycarbonate with a hard Nylon 66 thermoplastic surface overlay. <b>Soft Surface:</b> Basic actuator structure molded of thermoplastic polycarbonate with an elastomer overlay.
Contura X,XI,XII Actuator,VP Lens	Nylon 66 Reinforced rated to 105°C Polycarbonate rated at 100°C
Contura XIV	Polycarbonate lens/sub-rocker with ABS shell

## Actuator Travel (Angular Displacement)

2 position	18°
3 positions	9° from center

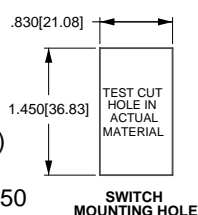
## Mounting Specifications

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



## Agency Certifications



## Environmental

Sealing	Sealed version: IP66, this rating applies to front panel components of the actual switch only, and signifies complete protection against dust as well as powerful jets of water.
Corrosion	Mixed Flowing Gas (MFG) Class III 3 year accelerated exposure per ASTM B-827, B-845 Silver and gold contacts
Operating Temp.	-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, pre and post test contact resistance.
Vibration 2	Resonance search 24-50 Hz 0.40 DA 50-2000 Hz ±10 G's peak Horizontal Axis 3-5 G's max. 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 seconds 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, 96 Hrs. Sealed version only.
Dust	Per Mil-Std 510.1, Method 510.2 Air Velocity 300 ±200 Feet/Min, Test Duration 16 Hrs.
Thermal Shock	Per Mil-Std 202F, Method 107F, Test Cond. A, -55°C to +85°C. Test criteria - pre and post test contact resistance
Moisture Resistance	Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance
Ignition Protection	All Contura switches with sealed construction meet the requirements of UL1500/ISO8846 for ignition protection, in addition to conformance with EC directive 94/25/EC for marine products.

V	1	D	A	B	T	O	B	-	A	R	B	00	-	0	00
1	2	3	4	5	6	7	8		9	10	11	12		13	14
Series	Circuit	Rating	Termination	Illumination	Lamp	Lamp	Bracket		Actuator	Lens	Color	Legend		Legend Orientation	Actuator Lens Legend

**1 SERIES**  
V**2 CIRCUIT**

Terminal Connections as viewed ( ) - momentary from bottom of switch: SP - single pole - uses terminals 1, 2 & 3. 8 terminal 10 terminal DP - double pole uses terminals 1, 2, 3, 4, 5 & 6. Terminals 7, 8, 9 & 10 for lamp circuit only.

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)
6 J	ON	OFF	(ON)
7 K	ON	OFF	(ON)
8 L	(ON)	OFF	(ON)

**SPECIAL CIRCUITS**

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

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

**3 RATING**

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**

8 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.

**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

Sealed	Unsealed	Lamps	Illumination Type	Lamp wired to Terminals
S	0	NONE		
A	1	1	INDEPENDENT	8 (+) 7 (-)
B	2	1	DOWN	3 (+) 7 (-)
C	3	2	UP	3 (+) 7 (-)
D	4	1	DOWN	3 (+) 7 (-)
		2	DOWN	1 (+) 7 (-)
E	5	1	UP	1 (+) 7 (-)
		2	UP	3 (+) 7 (-)
F	6	1	INDEPENDENT	8 (+) 7 (-)
		2	UP	3 (+) 6 (-)
G	7	1	INDEPENDENT	8 (+) 7 (-)
		2	UP	3 (+) 7 (-)
H	Z	2	INDEPENDENT	8 (+) 7 (-)
U	Y	2	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	10 (+) 9 (-)
<b>SINGLE POLE SWITCHES ONLY</b>				
J	8	1	DOWN	3 (+) 8 (-)
		2	INDEPENDENT	6 (+) 7 (-)
K	W	1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)
<b>DOUBLE POLE SWITCHES ONLY</b>				
L	9	1	DOWN	3 (+) 6 (-)
M	R	1	UP	3 (+) 6 (-)
N	T	1	DOWN	3 (+) 6 (-)
		2	DOWN	1 (+) 4 (-)
P	V	1	UP	1 (+) 4 (-)
		2	UP	3 (+) 6 (-)

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

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

No lamp	0	2 250VAC	6 12V	7 18V	8 24V
Neon	1 125VAC	5 6V	superbright	superbright	
Incandescent	4 3V		Green	Red	
LED*					
	Red	Amber			
2VDC	A	L	F	R	
6VDC	B	M	G	S	
12VDC	C	N	H	T	
24VDC	D	P	J	V	

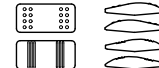
\*Consult factory for "daylight bright" LED options. Typical current draw for LED is 20ma.

**8 FLUSH BRACKET COLOR<sup>1</sup>, PANEL SEAL**

No Seal	Black	White	Gray
One Seal	B	W	G
	C	Y	H







**9 ACTUATOR**

0	No Actuator
A, B	Contura II
C, D	Contura III



Actuator orientation above terminals: 3.6 1.4

**10 LENS**

0 - No Actuator			Z - No Lens			
Clear	White	Amber	Green	Red	Blue	
1	6	8	G	M	T	
2	7	C	H	N	U	
3	8	D	J	P	V	
4	9	E	K	R	W	
5	A	F	L	S	Y	

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 COLOR<sup>1</sup> AND TEXTURE**

0 - No Actuator	Black	Gray	Red	White
Soft Surface	B	G	R	W
Hard Surface	C	H	S	Y

**12 ACTUATOR LENS OR BODY LEGENDS<sup>2</sup>**

11 ON	12 OFF	13 I	14 O
OFF	ON	O	I
15 O O	16 O O	17 O I	18 I O
F N	N F	F	

For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

**13 LEGEND ORIENTATION**

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

**14 ACTUATOR LENS LEGEND**

00 No legend this location / no actuator (used with codes 11-18 in selection 12) Selection 14 required when switch requires two legends. If the two legends consist of one lens and one body legend, lens legend must be specified in selection 12; body legend specified in selection 14. For legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

**Notes:**

Consult factory to verify horsepower rating for your particular circuit choice.

1 Custom colors are available. Consult factory.

2 Body legends not available on Soft surface actuators; White imprinting is standard on black actuators; Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.

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

4 Contura II available with two square lenses. Consult factory for details.



V	1	D	A	S	W	0	B	-	A	Z	E	00	-	0
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lock	7 Lamp	8 Bracket	9 Actuator	10 Lens	11 Function	12 Legend	13 Legend Orientation		

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

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
4 D	ON	NONE	ON
6 J	ON	OFF	ON
7 K	(ON)	OFF	(ON)
8 L	(ON)	OFF	(ON)
9 N	OFF	NONE	ON

**SPECIAL CIRCUITS**

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

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

**3 RATING 4**

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**

8 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.

**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	-	-
C	3	2	UP	3 (+) 7 (-)
H	Z	2	INDEPENDENT	8 (+) 7 (-)
<b>DOUBLE POLE SWITCHES ONLY</b>				
M	R	1	UP	3 (+) 6 (-)

**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	1 125VAC
Incandescent	4 3V
LED*	2 250VAC 5 6V
	6 12V superbright Green
	7 18V superbright Red
	8 24V
2VDC	Red A
6VDC	Amber B
12VDC	Green C
24VDC	Blue D

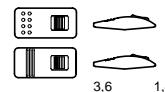
\* Consult factory for "daylight bright" LED options. Typical current draw for LED is 20ma.

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

No Seal	Black B	White W	Gray G
One Seal	C	Y	H

**9 HARD SURFACE ACTUATOR 1**

	Black A	Gray B	Red G	White H
Contura II				
Contura III	C	D	E	F



Actuator orientation above terminals:

**10 LENS**

Z - No Lens	
Clear White	Amber D
3 8	Green J
	Red P
	Blue 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 1**

Lock Color	Up	Down	Up & Down	Center 3
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 2**

00 - No Legend

21	22	23	24
OFF	ON	O	I
25	26	27	28
O	O	O	I
F	N		

For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

**13 LEGEND ORIENTATION**

0	No legend (used with codes 21-28 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.
- Only available with 3 position circuits. Center OFF and special circuits only available with center position lock function.
- Additional ratings available. See V-Series Switch Accessories page.

V	1	D	A	B	T	0	B	-	E	P	C	00	-	0	00
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lamp	7 Lamp	8 Bracket	9 Actuator	10 Lens	11 Color	12 Legend	13 Legend Orientation	14 Actuator Lens Legend		

### 1 SERIES

V

### 2 CIRCUIT

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

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.

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)
6 J	ON	OFF	ON
7 K	ON	OFF	(ON)
8 L	(ON)	OFF	(ON)

SPECIAL CIRCUITS	2 & 3	2 & 3, 5 & 4	5 & 4
H*	2 & 3	2 & 3	OFF
G*	2 & 3, 5 & 6	2 & 3	1 & 2
M*	(2 & 3, 5 & 6)	2 & 3	OFF
R*	(2 & 3, 5 & 6)	2 & 3	2 & 1
E*	5 & 6	5 & 3	5 & 1

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

### 3 RATING 4

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

8 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.

### 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	-	-
A	1	1	INDEPENDENT	8 (+) 7 (-)
B	2	1	DOWN	3 (+) 7 (-)
C	3	2	UP	3 (+) 7 (-)
D	4	1	DOWN	3 (+) 7 (-)
E	5	2	DOWN	1 (+) 7 (-)
F	6	1	UP	3 (+) 7 (-)
G	7	2	UP	8 (+) 7 (-)
H	Z	2	UP	3 (+) 7 (-)
U	Y	2	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	10 (+) 9 (-)
<b>SINGLE POLE SWITCHES ONLY</b>				
J	8	1	DOWN	3 (+) 8 (-)
K	W	2	INDEPENDENT	6 (+) 7 (-)
		1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)
<b>DOUBLE POLE SWITCHES ONLY</b>				
L	9	1	DOWN	3 (+) 6 (-)
M	R	1	UP	3 (+) 6 (-)
N	T	1	DOWN	3 (+) 6 (-)
		2	DOWN	1 (+) 4 (-)
P	V	1	UP	1 (+) 4 (-)
		2	UP	3 (+) 6 (-)

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

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



No lamp	0	1 125VAC	2 250VAC	6 12V superbright Green	7 18V superbright Red	8 24V
Neon	1	125VAC	2 250VAC			
Incandescent LED*	4 3V		5 6V			
	Red	Amber	Green			
2VDC	A	L	F			
6VDC	B	M	G			
12VDC	C	N	H			
24VDC	D	P	JV			

\* 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

0	No Actuator	1,4
E	Contura IV, left orientation	
T	Contura IV, left orientation, laser etched	
F	Contura IV, right orientation	
R	Contura IV, right orientation, laser etched	
	Actuator orientation above terminals:	3,6

### 10 LENS

0 - No Actuator			Z - No Lens		
Clear	White	Amber	Green	Red	Blue
1	6	8	G	M	T
2	7	C	H	N	U
3	8	D	J	P	V
4	9	E	K	R	W
5	A	F	L	S	Y

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 COLOR 1,5,6

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

### 12 ACTUATOR LENS OR BODY LEGENDS 2

11 ON	12 OFF	13 I	14 O
OFF	ON	O	I
15 O O	16 O O	17 O I	18 I O
F N	N F		
F	F		

For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

### 13 LEGEND ORIENTATION

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



### 14 ACTUATOR LENS LEGEND

00 No legend this location / no actuator (used with codes 11-18 in selection 12) Selection 14 required when switch requires two legends. If the two legends consist of one lens and one body legend, lens legend must be specified in selection 12; body legend specified in selection 14. For legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

#### Notes:

Consult factory to verify horsepower rating for your particular circuit choice.

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

V	1	D	A	B	T	O	B	-	G	P	C	00	-	0	00
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lamp	7 Lamp	8 Bracket		9 Actuator	10 Lens	11 Color	12 Legend		13 Legend Orientation	14 Actuator Lens Legend

**1 SERIES**

V

**2 CIRCUIT**

Terminal Connections as viewed ( ) - momentary from bottom of switch: SP - single pole - uses terminals 1, 2 & 3. 8 terminal 10 terminal DP - double pole uses terminals 1, 2, 3, 4, 5 & 6. 8 - -7 8 - -7 Terminals 7, 8, 9 & 10 for lamp circuit only.

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)
6 J	ON	OFF	ON
7 K	ON	OFF	(ON)
8 L	(ON)	OFF	(ON)

**SPECIAL CIRCUITS**

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

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

**3 RATING 4**

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**

8 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 &amp; K for circuits H, G &amp; M.

**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	-	-
A	1	1	INDEPENDENT	8 (+) 7 (-)
B	2	1	DOWN	3 (+) 7 (-)
C	3	2	UP	3 (+) 7 (-)
D	4	1	DOWN	3 (+) 7 (-)
		2	DOWN	1 (+) 7 (-)
E	5	1	UP	1 (+) 7 (-)
		2	UP	3 (+) 7 (-)
F	6	1	INDEPENDENT	8 (+) 7 (-)
		2	UP	3 (+) 6 (-)
G	7	1	INDEPENDENT	8 (+) 7 (-)
		2	UP	3 (+) 7 (-)
H	Z	2	INDEPENDENT	8 (+) 7 (-)
U	Y	1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	10 (+) 9 (-)
<b>SINGLE POLE SWITCHES ONLY</b>				
J	8	1	DOWN	3 (+) 8 (-)
		2	INDEPENDENT	6 (+) 7 (-)
K	W	1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)
<b>DOUBLE POLE SWITCHES ONLY</b>				
L	9	1	DOWN	3 (+) 6 (-)
M	R	1	UP	3 (+) 6 (-)
N	T	1	DOWN	3 (+) 6 (-)
		2	DOWN	1 (+) 4 (-)
P	V	1	UP	1 (+) 4 (-)
		2	UP	3 (+) 6 (-)

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

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

No lamp	0				
Neon	1 125VAC	2 250VAC			
Incandescent LED*	4 3V	5 6V	6 12V superbright	7 18V superbright	8 24V superbright
	Red	Amber	Green	Red	
	A	L	F	R	
	B	M	G	S	
	C	N	H	T	
	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**

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

**10 Lens**

0 - No Actuator		Z - No Lens		style & location: #1 / #2	
Clear	White	Amber	Green	Red	Blue
1	6	8	G	M	T
2	7	C	H	N	U
3	8	D	J	P	V
4	9	E	K	R	W
5	A	F	L	S	Y

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

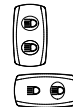
Lens color for LEDs must be clear, white, or match color of LED. Green or blue lenses are not recommended with Neon lamps.

**11 ACTUATOR COLOR 1,3,5**

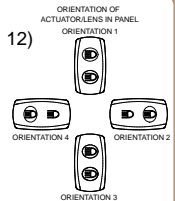
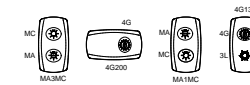
No Actuator	0	Black	C	Gray	H	Red	S
White	Y	Nickel	D	Pewter	E		

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

11 ON	12 OFF	13 I	14 O
OFF	ON	O	I
15 O O	16 O O	17 O I	18 I O
F N	N F		
F	F		

For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).**13 LEGEND ORIENTATION**

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

**14 ACTUATOR LENS LEGEND**

00 No legend this location / no actuator (used with codes 11-18 in selection 12) Selection 14 required when switch requires two legends. If the two legends consist of one lens and one body legend, lens legend must be specified in selection 12; body legend specified in selection 14. For legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

**Notes:**

- Consult factory to verify horsepower rating for your particular circuit choice.
- Custom colors are available. Consult factory.
- White imprinting is standard on black actuators; Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
- Laser Etched rocker only available with lens code Z & actuator colors black, nickel 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	1	D	A	S	W	O	B	-	J	Z	E	00	-	0
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lock	7 Lamp	8 Bracket	9 Actuator	10 Lens	11 Function	12 Legend	13 Legend Orientation		

### 1 SERIES

V

### 2 CIRCUIT<sup>3</sup>

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

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

Position:	1	2	3
SP DP	2 & 3, 5 & 6	Connected Terminals	1 & 2, 4 & 5
1 A	ON	NONE	OFF
4 D	ON	NONE	ON
6 J	ON	OFF	ON
7 K	ON	OFF	(ON)
8 L	(ON)	OFF	(ON)
9 N	OFF	NONE	ON

### 3 RATING<sup>4</sup>

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

8 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.

### 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	-	-
C	3	2	UP	3 (+) 7 (-)
H	Z	2	INDEPENDENT	8 (+) 7 (-)
<b>DOUBLE POLE SWITCHES ONLY</b>				
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

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

### 7 LAMP

Lamp above terminals 3 & 6 end of switch

No lamp	0	1 125VAC	2 250VAC	6 12V	7 18V	8 24V
Neon	4 3V	5 6V	superbright	superbright		
Incandescent			Green	Red		
LED*	Red	Amber				
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<sup>1</sup>, PANEL SEAL

No Seal	Black	White	Gray
One Seal	B	W	G
	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 above terminals: 3, 6, 1, 4

### 10 LENS<sup>5</sup>

Z - No Lens

Clear	White	Amber	Green	Red	Blue
A	B	C	D	E	F
G	H	J	K	L	M

bar lens  
 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<sup>1</sup>

Lock Color	Up	Down	Up & Down	Center <sup>3</sup>
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
Gray	F	G	N	6

### 12 ACTUATOR LENS OR BODY LEGEND<sup>2</sup>

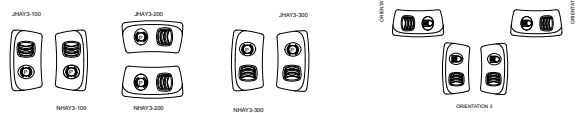
00 - No Legend

21	22	23	24
OFF	ON	O	I
25	26	27	28
O	O	O	I
F	N		

For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

### 13 LEGEND ORIENTATION

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



V	1	D	B	G	N	T	B	-	H	A	7	C	B	AC	-	1	00
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lamp	7 Lamp	8 Bracket		9 Actuator	10 Lens	11 Lens	12 Color	13 Insert Color	14 Actuator Lens		15 Legend Orientation	16 Actuator Lens Legend

**1 SERIES**

V

**2 CIRCUIT**

Terminal Connections as viewed from bottom of switch: ( ) - momentary  
 SP - single pole - uses terminals 1, 2 & 3.  
 DP - double pole uses terminals 1, 2, 3, 4, 5 & 6.  
 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)
6 J	ON	OFF	ON
7 K	ON	OFF	(ON)
8 L	(ON)	OFF	(ON)

**SPECIAL CIRCUITS**

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

\*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<sup>3</sup>**

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**

8 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.

**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	-	-
A	1	1	INDEPENDENT	8 (+) 7 (-)
B	2	1	DOWN	3 (+) 7 (-)
C	3	2	UP	3 (+) 7 (-)
D	4	1	DOWN	1 (+) 7 (-)
E	5	2	UP	1 (+) 7 (-)
F	6	1	INDEPENDENT	8 (+) 7 (-)
G	7	2	UP	3 (+) 7 (-)
H	Z	2	INDEPENDENT	8 (+) 7 (-)
U	Y	1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	10 (+) 9 (-)
<b>SINGLE POLE SWITCHES ONLY</b>				
J	8	1	DOWN	3 (+) 8 (-)
K	W	2	INDEPENDENT	6 (+) 7 (-)
		1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)
<b>DOUBLE POLE SWITCHES ONLY</b>				
L	9	1	DOWN	3 (+) 6 (-)
M	R	1	UP	3 (+) 6 (-)
N	T	1	DOWN	3 (+) 6 (-)
P	V	2	DOWN	1 (+) 4 (-)
		1	UP	1 (+) 4 (-)
		2	UP	3 (+) 6 (-)

**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*			superbright	superbright	
	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<sup>1</sup>, PANEL SEAL**

No Seal	Black	White	Gray
One Seal	B	W	H

**9 ACTUATOR**

0 No Actuator H High Insert L Low Insert

**10,11 LENS<sup>4</sup>**

0 - No Actuator	Z - No Lens				
Clear	White	Amber	Green	Red	Blue
- 7	C	H	N	U	
3 -	D	J	P	V	Bar Lens Translucent
4 -	E	K	R	W	Bar Lens Transparent
- 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	N	Bright Nickel Plated
C	Bright Chrome Plated	S	Satin Chrome Plated
D	Satin Chrome Painted	T	Satin Nickel Plated
		W	White

**14 ACTUATOR LENS OR BODY LEGENDS<sup>2</sup>**

00 - No Legend this location / No actuator

11 ON	12 OFF	13 I	14 O
OFF	ON	O	I
15 O O	16 O O	17 O I	18 I O
F N	N F	F	

For additional legend options & codes, visit us at [www.carlingtech.com](http://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

**16 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](http://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.



V	1	D	A	B	T	0	B	-	Z	R	C	00	-	0	00
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lamp	7 Lamp	8 Bracket	9 Actuator	10 Lens	11 Color	12 Legend	13 Legend Orientation	14 Actuator Lens Legend		

**1 SERIES**

V

**2 CIRCUIT**

Terminal Connections as viewed from bottom of switch: ( ) - momentary  
 SP - single pole - uses terminals 1, 2 & 3.  
 DP - double pole uses terminals 1, 2, 3, 4, 5 & 6.  
 Terminals 7, 8, 9 & 10 for lamp circuit only.

Position:	1	2	3
SP	2 & 3, 5 & 6	Connected Terminals	1 & 2, 4 & 5
1	ON	NONE	OFF
2	(ON)	NONE	OFF
3	ON	NONE	(OFF)
4	ON	NONE	ON
5	ON	NONE	(ON)
6	ON	OFF	ON
7	ON	OFF	(ON)
8	(ON)	OFF	(ON)

**SPECIAL CIRCUITS**

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

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

**3 RATING 4**

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**

8 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 &amp; K for circuits H, G &amp; M.

**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
A	0	NONE	INDEPENDENT	8 (+) 7 (-)
B	1	1	DOWN	3 (+) 7 (-)
C	3	2	UP	3 (+) 7 (-)
D	4	1	DOWN	3 (+) 7 (-)
E	5	2	DOWN	1 (+) 7 (-)
F	6	1	UP	1 (+) 7 (-)
G	7	2	UP	3 (+) 7 (-)
H	Z	2	INDEPENDENT	8 (+) 7 (-)
U	Y	1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	10 (+) 9 (-)
<b>SINGLE POLE SWITCHES ONLY</b>				
J	8	1	DOWN	3 (+) 8 (-)
K	W	2	INDEPENDENT	6 (+) 7 (-)
		1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)
<b>DOUBLE POLE SWITCHES ONLY</b>				
L	9	1	DOWN	3 (+) 6 (-)
M	R	1	UP	3 (+) 6 (-)
N	T	1	DOWN	3 (+) 6 (-)
		2	DOWN	1 (+) 4 (-)
P	V	1	UP	1 (+) 4 (-)
		2	UP	3 (+) 6 (-)

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

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

No lamp	0	1 125VAC	2 250VAC	6 12V superbright	7 18V superbright	8 24V superbright
Neon	1	3V	5V	Green	Red	Red
Incandescent	4					
LED*		Red	Amber			
2VDC	A	L	F		R	
6VDC	B	M	G		S	
12VDC	C	N	H		T	
24VDC	D	P	J		V	

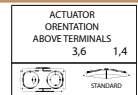
\* Consult factory for "daylight bright" LED options. Typical current draw for LED is 20ma.

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

No Seal	Black	White	Gray
One Seal	B	W	G
	C	Y	H

**9 ACTUATOR**

0	No Actuator
Z	Contura VII

**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.

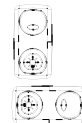
0 - No Actuator	Z - No Lens	Blue	Lens style & location
White	Amber	Green	Red
6	B	G	M
7	C	H	N
8	D	J	P
9	E	K	R
A	F	L	S
1	2	3	4
			5

**11 ACTUATOR COLOR/THUMB PRINT COLOR 1**

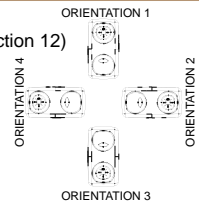
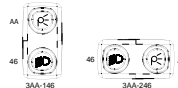
O	N/A - No Actuator	C	Black/Black
H	Grey/Black	S	Red/Black
Y	White/Black		

**14 ACTUATOR LENS OR BODY LEGENDS 2**

11 ON	12 OFF	13 I	14 O
OFF	ON	O	I
15 O O	16 O O	17 O I	18 I O
F N	N F	F	

For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).**13 LEGEND ORIENTATION**

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

**14 ACTUATOR LENS LEGEND**

00 No legend this location / no actuator (used with codes 11-18 in selection 12) Selection 14 required when switch requires two legends. If the two legends consist of one lens and one body legend, lens legend must be specified in selection 12; body legend specified in selection 14. For legend options & codes, visit us at [www.carlingtech.com](http://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.

4 Legends available for lighted oval lens version only



V	1	D	A	B	6	0	1	-	6	P	Z	00	-	0	00
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lamp	7 Lamp	8 Bracket	9 Actuator	10 Lens	11 Lens	12 Legend	13 Legend	14 Actuator	Orientation	Lens Legend

**1 SERIES**

V

**2 CIRCUIT**

Terminal Connections as viewed from bottom of switch: ( ) - momentary  
 SP - single pole - uses terminals 1, 2 & 3.  
 DP - double pole uses terminals 1, 2, 3, 4, 5 & 6.  
 Terminals 7, 8, 9 & 10 for lamp circuit only.

Position:	1	2	3
SP DP	2 & 3, 5 & 6	Connected Terminals	1 & 2, 4 & 5
1	(ON)	NONE	OFF
2	(ON)	NONE	OFF
3	(ON)	NONE	OFF
4	(ON)	NONE	OFF
5	(ON)	NONE	OFF
6	(ON)	NONE	OFF
7	(ON)	OFF	(ON)
8	(ON)	OFF	(ON)
9	(ON)	OFF	(ON)
10	(ON)	OFF	(ON)

**SPECIAL CIRCUITS**

	2 & 3	2 & 3, 5 & 4	5 & 4
H*	2 & 3, 5 & 6	2 & 3, 5 & 4	5 & 4
G*	(2 & 3, 5 & 6)	2 & 3, 5 & 4	1 & 2
M*	(2 & 3, 5 & 6)	2 & 3, 5 & 4	OFF
R*	(2 & 3, 5 & 6)	2 & 3, 5 & 4	2 & 1
E*	5 & 6	5 & 4	5 & 1

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

**3 RATING 4**

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

**4 TERMINATION / BASE STYLE**

8 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 &amp; K for circuits H, G &amp; M.

**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	-	-
A	1	1	INDEPENDENT	8 (+) 7 (-)
B	2	1	DOWN	3 (+) 7 (-)
C	3	2	UP	3 (+) 7 (-)
D	4	1	DOWN	3 (+) 7 (-)
E	5	2	DOWN	1 (+) 7 (-)
F	6	1	UP	1 (+) 7 (-)
G	7	2	UP	3 (+) 6 (-)
H	Z	1	INDEPENDENT	8 (+) 7 (-)
U	Y	2	UP	3 (+) 7 (-)
		2	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	10 (+) 9 (-)
<b>SINGLE POLE SWITCHES ONLY</b>				
J	8	1	DOWN	3 (+) 8 (-)
K	W	2	INDEPENDENT	6 (+) 7 (-)
		1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)
<b>DOUBLE POLE SWITCHES ONLY</b>				
L	9	1	DOWN	3 (+) 6 (-)
M	R	1	UP	3 (+) 6 (-)
N	T	1	DOWN	3 (+) 6 (-)
		2	DOWN	1 (+) 4 (-)
P	V	1	UP	1 (+) 4 (-)
		2	UP	3 (+) 6 (-)

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

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

No lamp	0	1 125VAC	2 250VAC	6 12V	7 18V	8 24V
Neon	1	4 3V	5 6V	superbright	superbright	
Incandescent	1			Green	Red	
LED*		Red	Amber			
	A	L	F			
2VDC	B	M	G			
6VDC	C	N	H			
12VDC	D	P	J			
24VDC						

\* Consult factory for "daylight bright" LED options. Typical current draw for LED is 20ma.

**8 BRACKET COLOR 1, PANEL SEAL (EXTERNAL FOAM GASKET)**

X &amp; XI with Flush Bracket X, XI, XII with Raised Bracket

# of gaskets	1	2	0	1
Black	B	C	D	1
White	W	Y	Z	2
Gray	G	H	J	3
				4
				5
				6

**9 ACTUATOR**

No Actuator	0	Black	Gray	White	Red
Contura X	1	2	3	4	
Contura XI	6	7	8	9	
Contura XII	J	K	N	M	

Actuator orientation above terminals:

**10 LENS - ABOVE LAMP #1 TERMINALS 1,4****11 LENS - ABOVE LAMP #2 TERMINALS 3,6**

0 - No Actuator	Z - No Lens	Clear	White	Amber	Green	Red	Blue	Lens Style
3	8	D	J	P	V	Bar		
4	9	E	K	R	W	One piece Square		
5	A	F	L	S	Y	Two piece Square*		
						(With clear top protective lens)		
2	7	C	H	N	U	Two piece Square*		
						(With smoke top protective lens)		
1	6	B	G	M	T	Two piece Square*		
						(With white top protective lens)		

\* 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.

**12 ACTUATOR LENS OR BODY LEGEND 2**

00 - No Legend this location/No actuator

11 ON	12 OFF	13 I	14 O
OFF	ON	O	I
15 O O	16 O O	17 O I	18 I O
F N	N F	F	
21 OFF	22 ON	23 O	24 I
25 O	26 O	27 O	28 I
F	N		

For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).**13 LEGEND ORIENTATION 3**

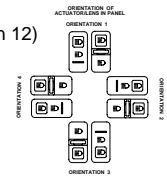
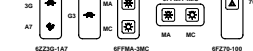
0 No legend (used with codes 11-18 in selection 12)

1 Orientation 1

2 Orientation 2

3 Orientation 3

4 Orientation 4

**14 ACTUATOR LENS LEGEND**

00 No legend this location / no actuator

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

For legend options & codes, visit us at [www.carlingtech.com](http://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 &amp; gray actuators. Custom colors are available, consult factory.

3 With 2 square lenses, use selection 12 for lens above lamp 1, &amp; selection 14 for lens above lamp 2.

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

5 Not available with Contura XI rockers.

V	1	D	A	S	W	0	1	-	1	P	B	00	-	0
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lock	7 Lamp	8 Bracket	9 Actuator	10 Lens	11 Function	12 Legend	13 Legend Orientation		

**1 SERIES**  
**V****2 CIRCUIT**

Terminal Connections as viewed ( ) - momentary from bottom of switch: SP - single pole - uses terminals 1, 2 & 3. 8 terminal 10 terminal DP - double pole uses terminals 1, 2, 3, 4, 5 & 6. Terminals 7, 8, 9 & 10 for lamp circuit only.

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
4 D	ON	NONE	ON
6 J	ON	OFF	ON
9 N	OFF	NONE	ON

**SPECIAL CIRCUITS**

	2 & 3	2 & 3, 5 & 4	5 & 4
H*	2 & 3, 5 & 6	2 & 3	OFF
G*	2 & 3, 5 & 6	2 & 3	1 & 2
S*	5 & 6	5 & 3	5 & 1

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

**3 RATING 4**

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**

8 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
C	5	Solder Lug no barriers	No
D	6	Solder Lug	No
E	F	Wire Leads no barriers	No
		Wire Leads	No

Note: Codes J & K for circuits H, G & M.

**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	-	-
C	3	2	UP	3 (+) 7 (-)
H	Z	2	INDEPENDENT	8 (+) 7 (-)
<b>DOUBLE POLE SWITCHES ONLY</b>				
M	R	1	UP	3 (+) 6 (-)

**6 LOCK**

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

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

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

No lamp	0	1 125VAC	2 250VAC	6 12V superbright	7 18V superbright	8 24V
Neon	4 3V	5 6V		Green	Red	
Incandescent LED*				F	G	H
	Red	Amber		J		
2VDC	A	L				
6VDC	B	M				
12VDC	C	N				
24VDC	D	P				

\*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 Gasket	1	2	3
One Gasket	4	5	6

**9 HARD SURFACE ACTUATOR**

Contura X	Black	Grey	Red	White
	1	2	3	4



Actuator orientation above terminals: 3,6 1,4

**10 LENS - ABOVE LAMP #2 TERMINALS 5**

Z - No Lens							
Clear	White	Amber	Green	Red	Blue	Lens Style	
3	8	D	J	P	V	Bar	
4	9	E	K	R	W	One piece Square	
5	A	F	L	S	Y	Two piece Square*	
						(with clear top protective lens)	
2	7	C	H	N	U	Two piece Square*	
						(with smoke top protective lens)	
1	6	B	G	M	T	Two piece Square*	
						(with white top protective lens)	

\* 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 3**

Lock Color	Up	Down	Up & Down
Match Actuator	A	H	
Black	B	J	S
White	C	K	T
Red	D	L	V
Gray	E	M	W
Safety Orange	F	N	Y

**12 ACTUATOR LENS OR BODY LEGEND 2**

00 - No Legend

21	22	23	24
OFF	ON	O	I
25	26	27	28
O	O	O	I
F	N		

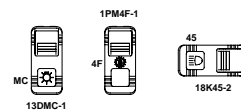


For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

**13 LEGEND ORIENTATION 3**

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

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

**Notes:**

Consult factory to verify horsepower rating for your particular circuit choice.

- 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.

V	1	D	B	B	C	0	B	-	FA	P	C	AB	-	1	00
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lamp	7 Lamp	8 Bracket	9 Actuator	10 Lens	11 Actuator Color	12 Legend	13 Legend Orientation	14 Actuator, Lens Legends		

### 1 SERIES

V

### 2 CIRCUIT

Terminal Connections as viewed ( ) - momentary from bottom of switch: SP - single pole - uses terminals 1, 2 & 3. 8 terminal 10 terminal DP - double pole uses terminals 1, 2, 3, 4, 5 & 6. Terminals 7, 8, 9 & 10 for lamp circuit only.

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)
6 J	ON	OFF	ON
7 K	ON	OFF	(ON)
8 L	(ON)	OFF	(ON)

### SPECIAL CIRCUITS

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

\*Jumper between terminals 2 & 5 for circuits H, G, M, R & S are specified in selection 4. 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 <sup>3</sup>

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)

### 4 TERMINATION / BASE STYLE

8 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	4	Solder Lug no barriers	No
C	D	Solder Lug	No
5	F	Wire Leads no barriers	No
E	F	Wire Leads	No

Note: Codes J & K for circuits H, G & M.

### 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

	Lamps	Illumination Type	Lamp wired to Terminals
S	NONE	-	-
A	1	INDEPENDENT	8 (+) 7 (-)
B	1	DOWN	3 (+) 7 (-)
C	2	UP	3 (+) 7 (-)
D	1	DOWN	3 (+) 7 (-)
E	2	DOWN	1 (+) 7 (-)
F	1	UP	1 (+) 7 (-)
G	2	UP	3 (+) 7 (-)
H	1	INDEPENDENT	8 (+) 7 (-)
I	2	UP	3 (+) 6 (-)
J	1	INDEPENDENT	8 (+) 7 (-)
K	2	UP	3 (+) 6 (-)
L	1	DOWN	3 (+) 6 (-)
M	1	UP	3 (+) 6 (-)
N	1	DOWN	3 (+) 6 (-)
P	2	DOWN	1 (+) 4 (-)
U	1	UP	1 (+) 4 (-)
V	2	UP	3 (+) 6 (-)
W	1	INDEPENDENT	8 (+) 7 (-)
X	2	INDEPENDENT	10 (+) 9 (-)

### 6 & 7 LAMP

No lamp	0	1 125VAC	2 250VAC	6 12V superbright Green	7 18V superbright Red	8 24V
Neon	1	4 3V	5 6V			
Incandescent LED*		Red	Amber			
		A	L	F	R	
		B	M	G	S	
		C	N	H	T	
		D	P	J	V	

\* Consult factory for "daylight bright" LED options. Typical current draw for LED is 20ma.

### 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

0 - No Actuator			Z - No Lens		
Clear	White	Amber	Green	Red	Blue
1	6	B	G	M	T
2	7	C	H	N	U
3	8	D	J	P	V
4	9	E	K	R	W
5	A	F	L	S	Y
5	A	N/A	N/A	N/A	N/A

</



PAD Printed  
Laser-Etched

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 COLOR <sup>1</sup>

O	N/A - No Actuator
C	Black
S	Red
Y	White

### 12 ACTUATOR LENS or BODY LEGEND <sup>2</sup>

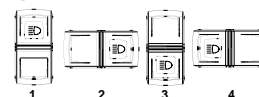
00 - No Legend this location/No actuator

11 ON	12 OFF	13 I	14 O
OFF	ON	O	I
15 O O	16 O O	17 O I	18 I O
F N	N F	F	F



### 13 LEGEND ORIENTATION

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



### 14 ACTUATOR / LENS LEGEND

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

For legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

#### Notes:

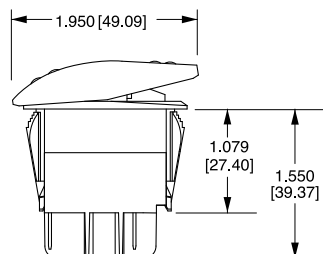
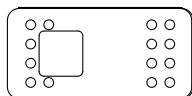
Consult factory to verify horsepower rating for your particular circuit choice.

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

## Dimensional Specifications: in. [mm]

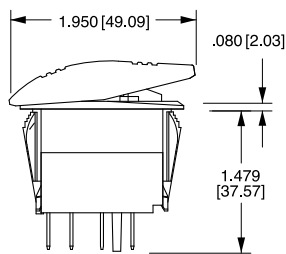
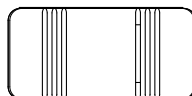
### CONTURA II

SHOWN WITH  
SQUARE LENS



8 TERMINAL BASE  
W/BARRIERS

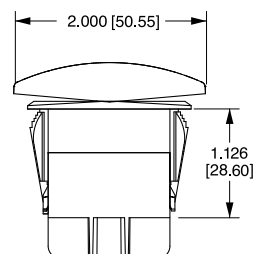
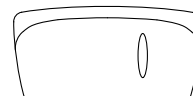
### CONTURA III



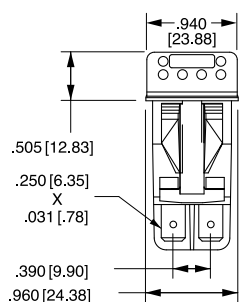
8 TERMINAL BASE  
W/O BARRIERS

### CONTURA IV

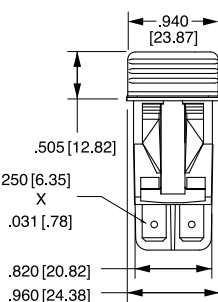
SHOWN WITH  
BAR LENS



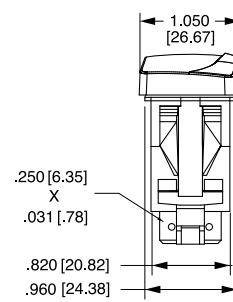
10 TERMINAL BASE  
W/BARRIERS



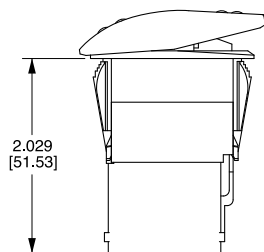
8 TERMINAL BASE  
W/BARRIERS



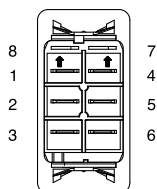
10 TERMINAL BASE  
W/BARRIERS



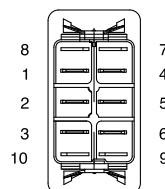
10 TERMINAL BASE  
W/O BARRIERS



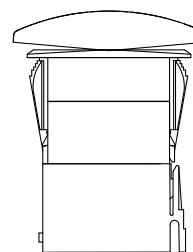
SWITCH SHOWN WITH  
VCH CONNECTOR 8  
TERMINAL



BOTTOM VIEW  
TERMINAL  
ARRANGEMENT  
8 TERMINAL BASE



BOTTOM VIEW  
TERMINAL  
ARRANGEMENT  
10 TERMINAL BASE

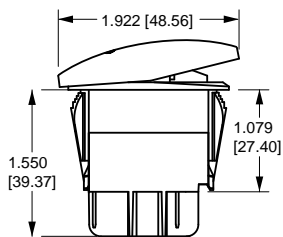
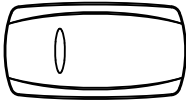


SWITCH SHOWN WITH  
VC1 CONNECTOR 10  
TERMINAL

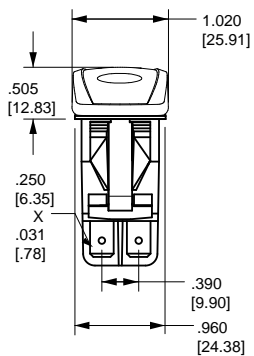
## Dimensional Specifications: in. [mm]

### CONTURA V

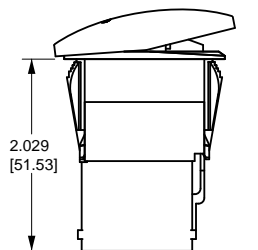
SHOWN WITH  
BAR LENS



8 TERMINAL BASE  
W/BARRIERS



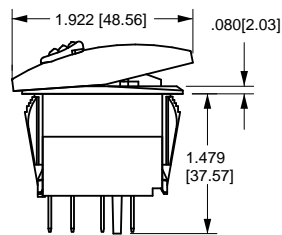
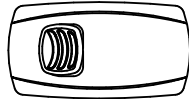
8 TERMINAL BASE  
W/BARRIERS



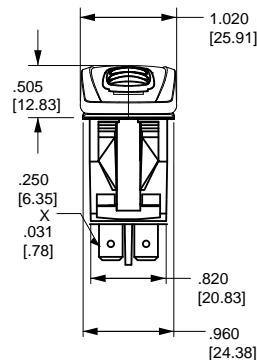
SWITCH SHOWN WITH  
VCH CONNECTOR 8  
TERMINAL

### CONTURA V

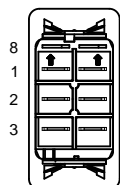
SHOWN WITH  
LOW PROFILE LOCK



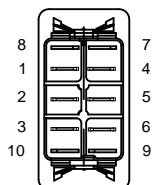
8 TERMINAL BASE  
W/O BARRIERS



8 TERMINAL BASE  
W/O BARRIERS



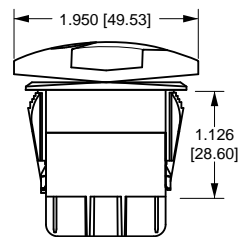
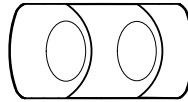
BOTTOM VIEW  
TERMINAL  
ARRANGEMENT  
8 TERMINAL BASE



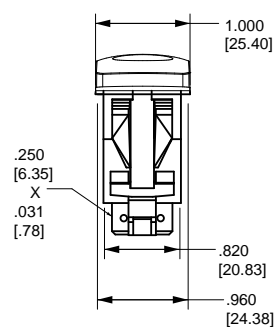
BOTTOM VIEW  
TERMINAL  
ARRANGEMENT  
10 TERMINAL BASE

### CONTURA VI

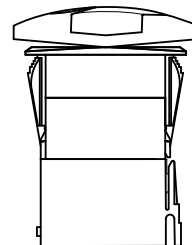
SHOWN WITH OVAL  
LENS



10 TERMINAL BASE  
W/BARRIER AND  
LAMP TERMINAL



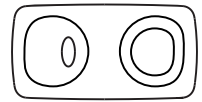
10 TERMINAL BASE  
W/O BARRIERS



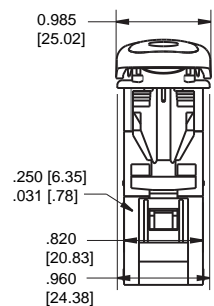
SWITCH SHOWN WITH  
VC1 CONNECTOR 10  
TERMINAL

### CONTURA VII

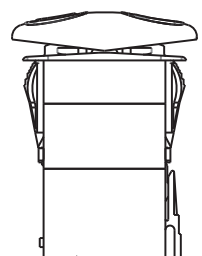
SHOWN WITH LARGE LENS  
AND BAR LENS



10 TERMINAL BASE  
W/O BARRIERS



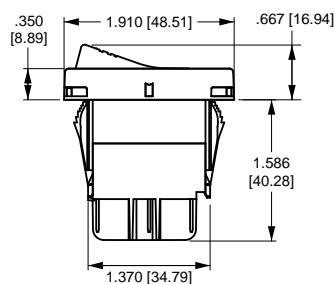
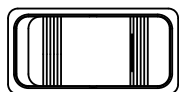
10 TERMINAL BASE  
W/O BARRIERS



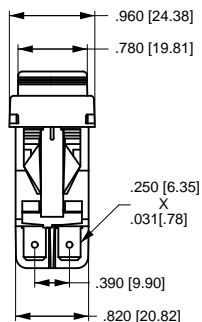
SWITCH SHOWN  
WITH VC1  
CONNECTOR 10  
TERMINAL

## Dimensional Specifications: in. [mm]

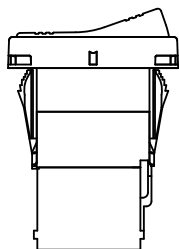
**CONTURA X**  
SHOWN WITH RAISED BRACKET



8 TERMINAL BASE  
W/BARRIERS

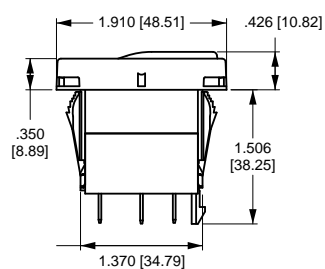
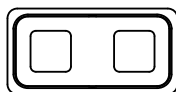


8 TERMINAL BASE  
W/BARRIERS

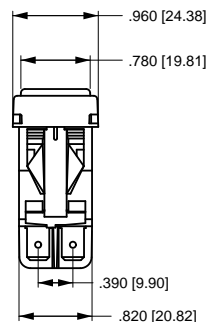


SWITCH SHOWN WITH  
VCH CONNECTOR  
8 TERMINAL

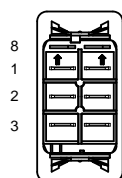
**CONTURA XI**  
SHOWN WITH RAISED  
BRACKET AND TWO SQUARE  
LENSES



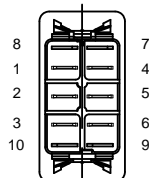
10 TERMINAL BASE  
W/O BARRIERS



10 TERMINAL BASE  
W/BARRIERS

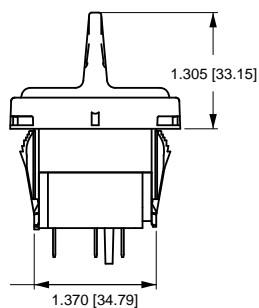
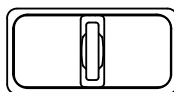


BOTTOM VIEW  
TERMINAL  
ARRANGEMENT  
8 TERMINAL BASE

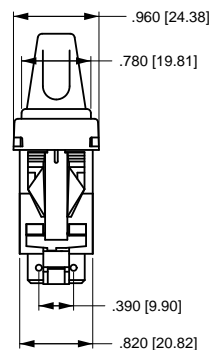


BOTTOM VIEW  
TERMINAL  
ARRANGEMENT  
10 TERMINAL BASE

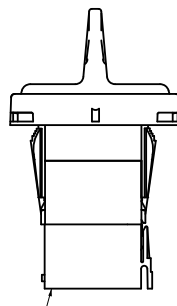
**CONTURA XII**  
SHOWN WITH PADDLE  
ACTUATOR



8 TERMINAL BASE  
W/O BARRIERS

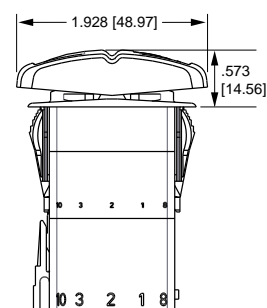
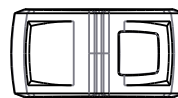


10 TERMINAL  
BASE  
W/O BARRIERS

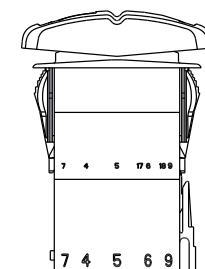
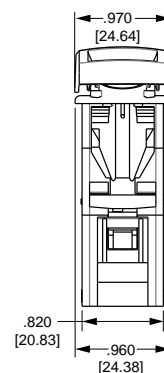


SWITCHES SHOWN WITH  
VC1 CONNECTOR  
10 TERMINAL

**CONTURA XIV**  
SHOWN WITH LARGE LENS



10 TERMINAL BASE  
W/O BARRIERS



SWITCHES SHOWN WITH  
VC1 CONNECTOR  
10 TERMINAL



## Circuit Diagrams:

CIRCUIT CODE	CIRCUIT DIAGRAM
1	
2	
3	
4	
5	
6	
7	
8	

CIRCUIT CODE	CIRCUIT DIAGRAM
A	
B	
C	
D	
E	
F	
G	
H	

CIRCUIT CODE	CIRCUIT DIAGRAM
J	
K	
L	
M	
R	
S	

SYMBOL LEGEND	
SYM.	DEFINITION
○	DESIGNATES TERMINALS AND CONTACTS
—○—	DESIGNATES MAINTAINED CIRCUITS
- - -	DESIGNATES OTHER POSITION
—○—	DESIGNATES MOMENTARY CIRCUITS
—○—	DESIGNATES TWO POSITION CONNECTION
—	DESIGNATES EXTERNAL JUMPER PROVIDED BY CUSTOMER

## Lamp Circuit Diagrams:

LAMP CIRCUIT CODE	CIRCUIT DIAGRAM	LAMP CIRCUIT CODE	CIRCUIT DIAGRAM	LAMP CIRCUIT CODE	CIRCUIT DIAGRAM	LAMP CIRCUIT CODE	CIRCUIT DIAGRAM
A / 1		F / 6		L / 9		SPECIAL #1	
B / 2		G / 7		M / R		SPECIAL #3	
C / 3		H / Z		N / T		SPECIAL #4	
D / 4		J / 8		P / V			
E / 5		K / W		U / Y			

## J-Series Hazard Warning Circuit Diagrams:

CIRCUIT CODE	CIRCUIT DIAGRAM	CIRCUIT CODE	CIRCUIT DIAGRAM
J1		J5	
J2		JA	
J3		JJ	
J4		JK	

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

SYMBOL LEGEND	
SYM.	DEFINITION
	DESIGNATES TERMINALS AND CONTACTS
	DESIGNATES LAMP LOCATION

# Rotary

## V-Series

### CONTURA ROTARY SWITCHES

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.



#### Resources:

*Download 3D CAD Files*

[IGS >](#) [STP >](#)

*Watch Product Video*



#### 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

# V-Series Rotary Switch

## DESIGN FEATURES

### OPTIONAL PANEL SEAL

Prevents water/dust ingress behind panel

### SEALS

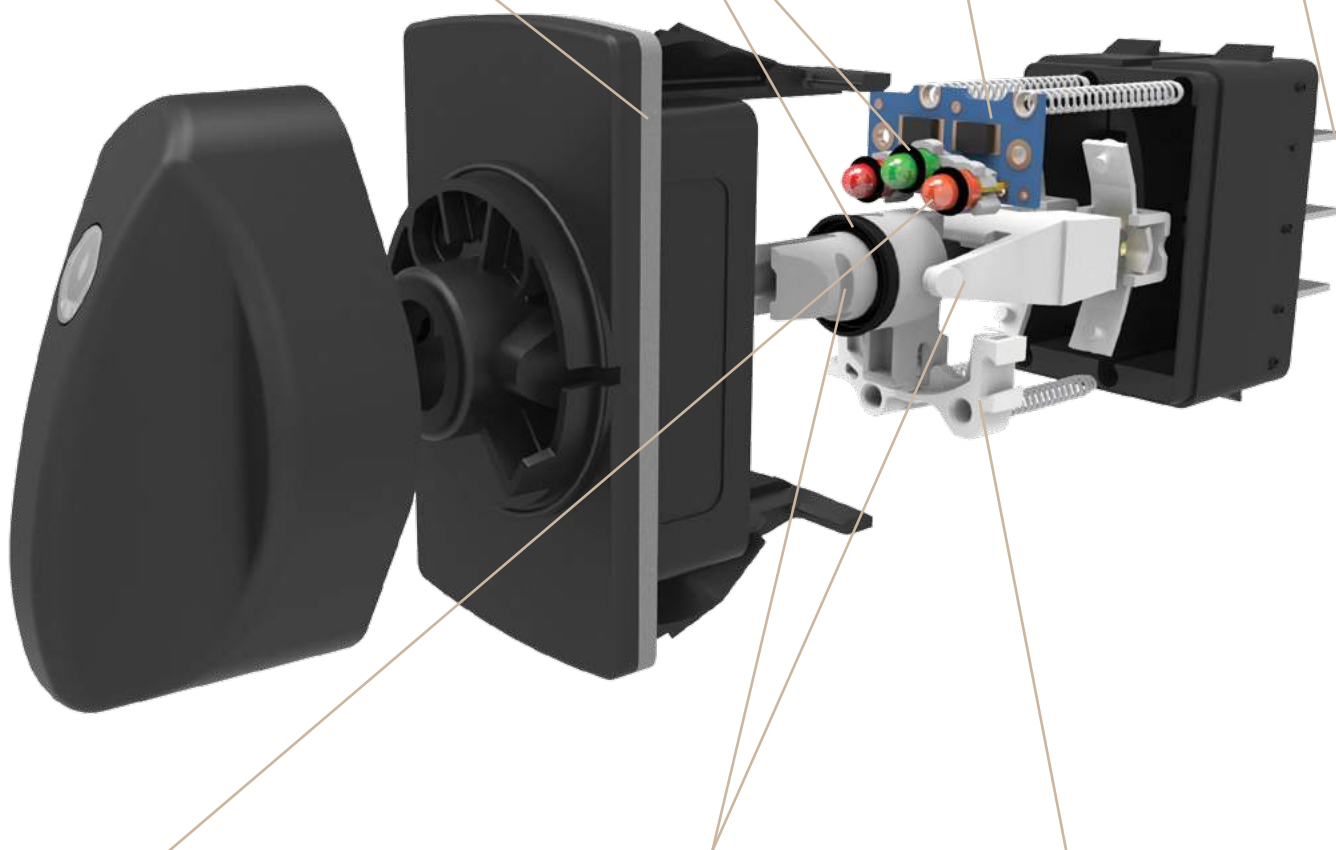
LED and stem seals provide IP67 protection above panel

### 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

Circuit	Voltage	Max Current Resistive
2 Position Maintain	12	20
2 Position Momentary	12	20
3 Position All	12	20
2 Position Maintain	24	15
2 Position Momentary	24	15
3 Position All	24	15

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
Terminals	0.250" (6.3mm) Quick Connect

## Physical

Function Circuits	Double Pole Single Throw, DPST Double Pole Double Throw, DPDT
Operation	Two and Three Position Maintained and Momentary
Knob Rotation	Two Position 60 Degrees Three Position 30 Degrees from Center
Illumination	LED; Red, Green, Amber, Yellow, White, Blue
Seals	LED O-ring(s) – Silicone, Bezel gasket – Neoprene, Knob seal - NBR
Flammability	Exceeds FVMSS 302 Requirements, Exterior Components, UL 94 V-2 or Better Interior Components, UL 94 HB or Better
Base	Polyester, PBT
Bracket	Nylon 66, PA
Knob	Polybutylene Terephthalate, PBT 6.5%GF
Lens	Polycarbonate, PC
Connector	Nylon 66, PA
Mounting	Front Panel Snap In, 1.450" (36.83mm) X 0.830" (21.08mm) Panel Thickness, 0.030" – 0.187" (0.76 – 4.75mm)

## 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
Shock	MIL-STD 202G, Method 213B Test Condition K, 30G's
Handling Shock	1 Meter Drop onto Hard Surface
Thermal Shock	MIL-STD 202G, Method 107G Test Condition A -55 C to 85 C
Moisture Resistance	MIL-STD 202G, Method 106F 10, 25 C to 65 C Cycles 95% RH
Thermal Cycling	25 Cycles -40 C to 85 C
Ignition Protection	ISO 8846 with EC Directive 94/25/EC for Marine Products
UV Protection	300 hr Xenon Arc, 1.4W/m2 wavelength 420 nm
ESD	Human Static Discharge, +/- 15KV applied during normal operation Shipping/Handling, frequency range 200-2000 MHz applied voltage is +8KV to +15KV and -8KV to -15KV 3 discharge cycles

RV	21	D	2	B	6	0	0	B	-	K	R	C
1	2	3	4	5	6	7	8	9		10	11	12
Series	Circuit	Rating	Termination	Illumination	Lamp 1	Lamp 2	Lamp 3	Bracket		Actuator	Lens	Knob Color

#### 1 SERIES

RV Rotary Contura

#### 2 CIRCUIT 1

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

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

8 Term	10 Term	Termination	Jumper
1	2	.250 TAB (QC) - no barriers	No
A	B	.250 TAB (QC) - with barriers	No
J 4, 5	K 4, 5	.250 TAB (QC) - no barriers	Yes (T2 to T5)

#### Notes:

- Switch circuit uses terminals 1,2,3,4,5 & 6. Terminals 7,8,9 & 10 are for lamp circuit only.
- Jumper between terminals 2 & 5 for Circuits 61, 62, & 64 to be specified in the Termination & Jumper selection.
- Circuit 61 may be used for SP, OFF-ON-ON circuit.
- Base will not have terminal insulating barriers when connector and/or jumpers are used.
- Code J,K are optional for circuits 62 and 64. Customer may provide externally wired jumper to connect terminals 2 and 5.
- 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.
- 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.
- Lens 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-
D	& # 3	Independent	10+ 7-
E	# 1	Dependent	3+ 7-
F	& # 3	Dependent	1+ 7-
G	# 1	Independent	8+ 7-
H	# 2	Independent	9+ 7-
J	# 3	Independent	10+ 7-
K	# 1	Dependent	3+ 7-
L	# 2	Dependent	1+ 7-
M	# 1	Dependent	3+ 7-
N	# 2	Independent	8+ 7-
P	# 3	Independent	10+ 7-
R	# 2	Dependent	3+ 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	Amber	Green	Blue	White
LED	Red				
12VDC	C	N	H	E	6
24VDC	D	P	J	K	8

#### 9 BRACKET COLOR & PANEL SEAL 7

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

#### 10 ACTUATOR STYLE

K Rotary Knob (Standard)

ACTUATOR ORIENTATION  
ABOVE TERMINALS



#### 11 LENS COLOR 8

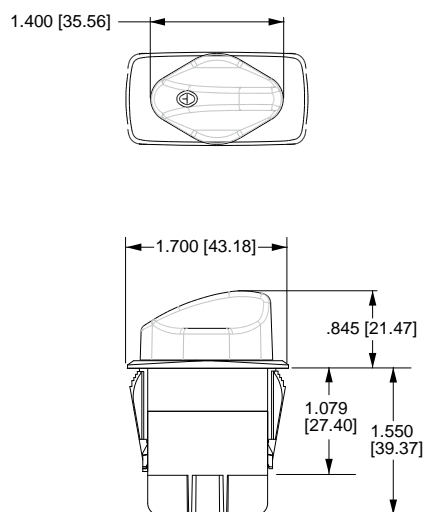
No Lens	Z	Amber	Green	Red	Blue
Clear	White				
4	9	E	K	R	W

#### 12 KNOB COLOR

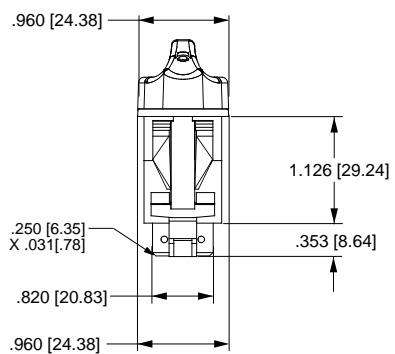
Black	Gray	Red	White
C	H	S	Y



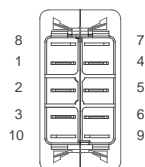
## Dimensional Specifications: in. [mm]



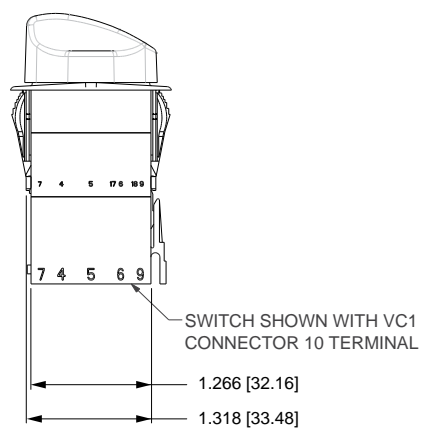
**10 TERMINAL BASE  
W/ BARRIERS**



**10 TERMINAL BASE  
W/O BARRIERS**



**BOTTOM VIEW  
TERMINAL ARRANGEMENT  
10 TERMINAL BASE**



## Circuits Diagrams:

CIRCUIT CODE	CIRCUIT DIAGRAM	KNOB POSITION
21		
22		
23		
24		
26		
28		

CIRCUIT CODE	CIRCUIT DIAGRAM	KNOB POSITION
55		
61		
62		
64		

LEGEND	
SYMBOL	DEFINITION
	TERMINAL LOCATION
	MAINTAINED CIRCUIT
	MOMENTARY CIRCUIT
	INTERNAL CONNECTION (JUMPER TERMINAL)
	2 POSITION CONNECTION
	2 POSITION CONNECTION
	2 POSITION
	3 POSITION

## Lamp Circuit Diagrams:

LAMP CIRCUIT CODE	CIRCUIT DIAGRAM
<b>A</b>	
<b>B</b>	
<b>C</b>	
<b>D</b>	
<b>E</b>	
<b>F</b>	
<b>G</b>	
<b>H</b>	
<b>J</b>	
<b>K</b>	

LAMP CIRCUIT CODE	CIRCUIT DIAGRAM
<b>L</b>	
<b>M</b>	
<b>N</b>	
<b>P</b>	
<b>R</b>	
<b>T</b>	

# V-Charger

## V-SERIES DUAL PORT USB 2.0 CHARGERS

Carling Technologies USB V-Charger is designed to charge tablets, e-readers, mobile and gaming devices, digital cameras, as well as other compatible electronic devices.

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

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



### Resources:

*Download 3D CAD Files*



*Watch Product Video*



### Product Highlights:

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

# V-Charger

## DESIGN FEATURES

### DUAL USB 2.0 PORTS

Total current of 3.15 amps, facilitating faster charges

### SPRING LOADED DOORS

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

### LED

Green LED brightens to indicate charging is in progress



### SEALING PROTECTION

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

### PANEL SEAL

Prevents water ingress beneath panel to protect critical connections

### MOUNTING

Fits industry standard panel opening size of 1.450" x .830"

## Electrical

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

## Physical

Panel Opening	1.450" x .830"
Panel Thickness	.030 - .156 inches
Panel Mounting Method	Front Panel Insertion
Seals	Silicone and Poron
Depth Behind Panel	See Figures 1 and 2
Connection	VC1, VC2
Weight	55g (0.12 lbs)
Styling	Curved USB port doors
Port Protection	Twin, self-closing doors

## Environmental

Sealing	IP64 for front panel components when USB Ports are covered
Operating Temperature	-40° to +60°C at 3.15A -40° to +70°C at 2.4A -40° to +80°C at 2.1A
Vibration 1 Test	Mil-Std 202G, Method 204D, Condition A. 0.06DA or 10G, 10-500 Hz
Shock Test	Mil-Std 202G, Method 213B, Condition K @ 30-G. No loss of circuit during test.
Chemical Splash	Brush method with USB doors closed: diesel, gasoline, brake fluid, Windex, Armor All
Thermal Shock	MIL-Std 202F, Method 107D, Test Condition A, -55° to +85°C. Test Criteria: Remains functional without damage
Moisture Resistance	Mil-Std 202G, Method 106G. Test Criteria: Remains functional without damage
Thermal Cycling	25 Cycles -40° to +85°C, 2 hours for each temperature every cycle
Salt Spray	Mil-Std 202G, Method 101E, Test Condition A
Dust	Mil-Std 841C Method 510.2 Air Velocity 300 $\pm$ 200 Ft/min, test duration: 16 Hr

## Mechanical

Endurance	10,000 door cycles minimum
-----------	----------------------------



## Ordering Scheme

<b>V</b>	<b>-</b>	<b>USB</b>	<b>-</b>	<b>24</b>	<b>-</b>	<b>G</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>1</b>	<b>B</b>	<b>B</b>	<b>1</b>
1 Series		2 Product Type		3 Source Voltage		4 LED Indicator	5 Circuit Protection	6 Termination		7 Door Style	8 Door Color	9 Base Color	10 Panel Seal

**1 SERIES**  
**V**

**2 PRODUCT TYPE**  
**USB** Charger

**3 SOURCE VOLTAGE**  
**24** 24 / 12 Volts DC

**4 LED INDICATOR (VOLTAGE MATCHES SOURCE)**  
**G** Green

**5 CIRCUIT PROTECTION**  
**1** Reverse Polarity, Thermal Overload & Overcurrent

**6 TERMINATION**  
**1** .250 Tab

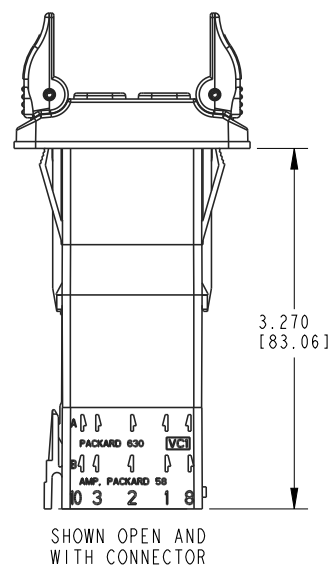
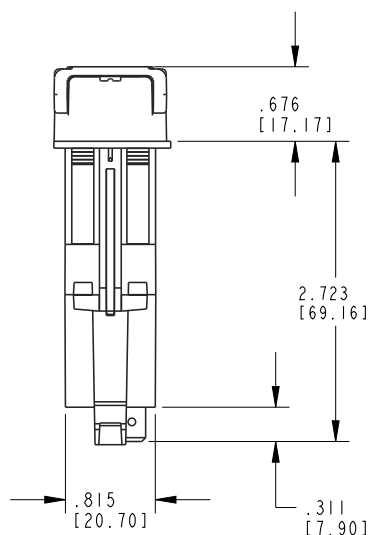
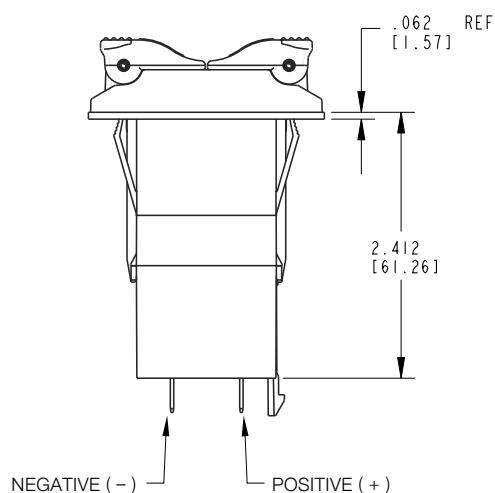
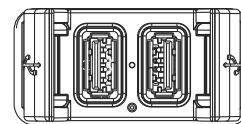
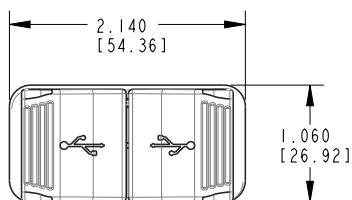
**7 DOOR STYLE**  
**1** Curved

**8 DOOR COLOR**  
**B** Black

**9 FRAME COLOR**  
**B** Black

**10 PANEL SEAL**  
**1** Yes

## Dimensional Specifications: in. [mm]



## Notes:

- 1 Charger to install into 1.450" X 0.830" panel opening

**Reduce inventory levels and cost by stocking actuators and base switches separately.**

**Contura II, III, IV, V, VI, VII, X, XI, XII, XIV Base switches separately:** specify **V** with code selections 2-8 in the ordering schemes.

**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, V, 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:**

**VVR 6 1 00 1**

1 Actuator Separately 2 Actuator Style/Color 3 Lens Opening 4 Actuator Legend 5 Legend Orientation

**1 CONTURA X & XI ACTUATOR SEPARATELY**  
**VVR****2 ACTUATOR STYLE & COLOR**

	Black	Gray	White	Red
Contura X	1	2	3	4
Contura XI	6	7	8	9

**3 LENS OPENING FOR 1**

1 One bar lens	5 square lens on top/ bar lens on bottom (Contura X only)
2 One bar lenses	
3 One square lens	
4 two square lens	

**4 ACTUATOR LENS OR BODY LEGEND**

**00** - No Legend this location

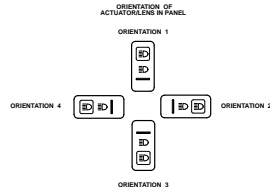
**11** ON **12** OFF **13** I **14** O  
OFF ON O I

**15** O O **16** O O **17** O I **18** I O  
F N N F F F

For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

**5 LEGEND ORIENTATION 1**

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

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

**VVT 1**

1 Lens Separately 2 Color

**1 TOP OF LENS SEPARATELY**  
**VVT**

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

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

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

**Notes:**

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

**Contura XII actuators without lenses separately:**

**VVP J 1 Z 21 1 00**

1 Actuator 2 Style & Color 3 Lens Opening 4 Lens Opening 5 Legend 6 Legend Orientation 7 Legend Orientation

**1 CONTURA XII ACTUATOR SEPARATELY**  
**VVP****2 ACTUATOR STYLE & COLOR**

**J** Black **K** Gray **N** White **M** Red

**3,4 LENS OPENING FOR**

**Z** No lens **1** Bar lens **2** Square lens

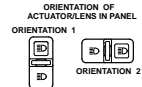
**5, 7 LENS OR BODY LEGEND 2**

**00** - No Legend **21** OFF **22** ON **23** O **24** I  
**25** O **26** O **27** O **28** I  
F F N N

For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

**6 LEGEND ORIENTATION 3**

**0** No legend  
**1** Orientation 1  
**2** Orientation 2

**Contura X, XI & XII actuator lens assembly separately:**

**VVL 2 1 00 0**

1 Lens Separately 2 Lens Style 3 Lens Color 4 Legend 5 Legend Orientation

**1 CONTURA X, XI & XII LENS SEPARATELY**  
**VVL****2 LENS STYLE 3**

**1** Bar lens  
**2** One Piece Square lens  
**3** Bottom of Two-Piece Square lens 5

**3 TRANSLUCENT LENS COLOR**

**1** Clear **2** White **3** Amber **4** Green 4 **5** Red **6** Blue 4

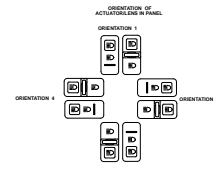
**4 LENS OR BODY LEGEND 2**

**00** - No Legend **21** OFF **22** ON **23** O **24** I  
**25** O **26** O **27** O **28** I  
F F N N

For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

**5 LEGEND ORIENTATION 3**

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

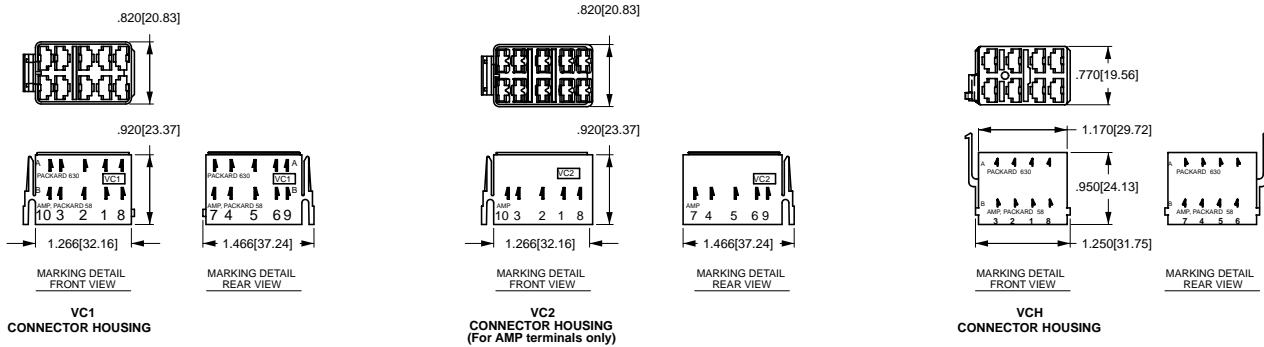
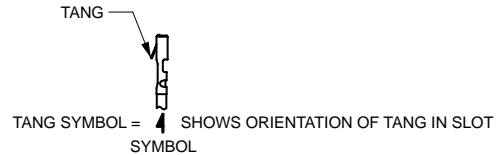


## Easily integrate Contura products into your system, with Contura Accessories

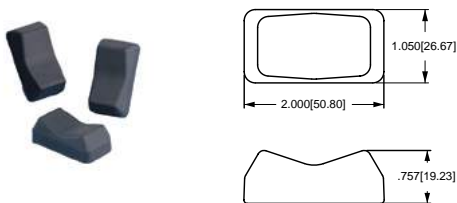
### Contura Connectors

Q.C. SELECTION GUIDE					
COMPANY SERIES	PART NO		WIRE RANGE		ORIENTATION
	PLAIN BRASS	TIN PLATED BRASS	AWG	MM <sup>2</sup> (REF)	
PACKARD 58 SERIES	02965580		12	3.0	B
	02965471	12010601	(2)16-14	(2)1.0-2.0	
	02965470		16-14	1.0-2.0	
	02965469	06288318	20-18	.5-.8	
PACKARD METRI-PACK 630 SERIES		12084590	10	5.0	A
		12052224	12	3.0	
		12015870	16-14	1.0-2.0	
		12020035	(2)22-18	(2).5-.8	
	12015832	12015869	20-18	.5-.8	
		12052222	20-22	.35-.5	
AMP 250 SERIES FASTIN-FASTON	60253-1	60253-2	16-12	1.3-3	B
	42100-1	42100-2	(2) 16	(2) 1.3	
			18-14	.8-2	
	60295-1	60295-2	22-18	.3-.9	

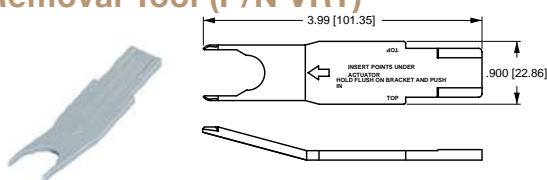
**NOTE:** Consult Delphi Packard and/or Amp on actual part numbers and availability.  
AMP is a registered trademark of AMP Inc. Harrisburg, PA  
Delphi Packard is a registered trademark of Delphi-Packard Electrical Systems Warren, Ohio



### Contura X Boot (P/N VB1-01)



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



### Additional V-Series Ratings

- |                |  |
|----------------|--|
| 1              | .4VA @ 28VDC Resistive   |
| 4              | 10A 250VAC 1/2 HP, 15A 125 VAC 1/2 HP, No Agency Listings                  |
| 5 <sup>1</sup> | 10A 250VAC 1/2 HP, 15A 125 VAC 1/2 HP, UL Recognized, CSA Certified        |
| 6 <sup>2</sup> | 15A 125VAC 1/2 HP, 12(2)A 125 VAC $\mu$ T85                                |
| 7 <sup>2</sup> | 15A 125VAC 1/2 HP, 12(6)A 125 VAC T85                                      |
| 8 <sup>2</sup> | 10A 250VAC, 15A 125VAC, 1/2 HP 125-250VAC, 12(2)A 250 VAC $\mu$ T85        |
| 9 <sup>2</sup> | 10A 250VAC, 15A 125VAC, 1/2 HP 125-250VAC, 12(6)A 250 VAC T85              |
| B              | 15A 24V  |
| C              | 20A 18V  |
| 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 L                  |
| 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

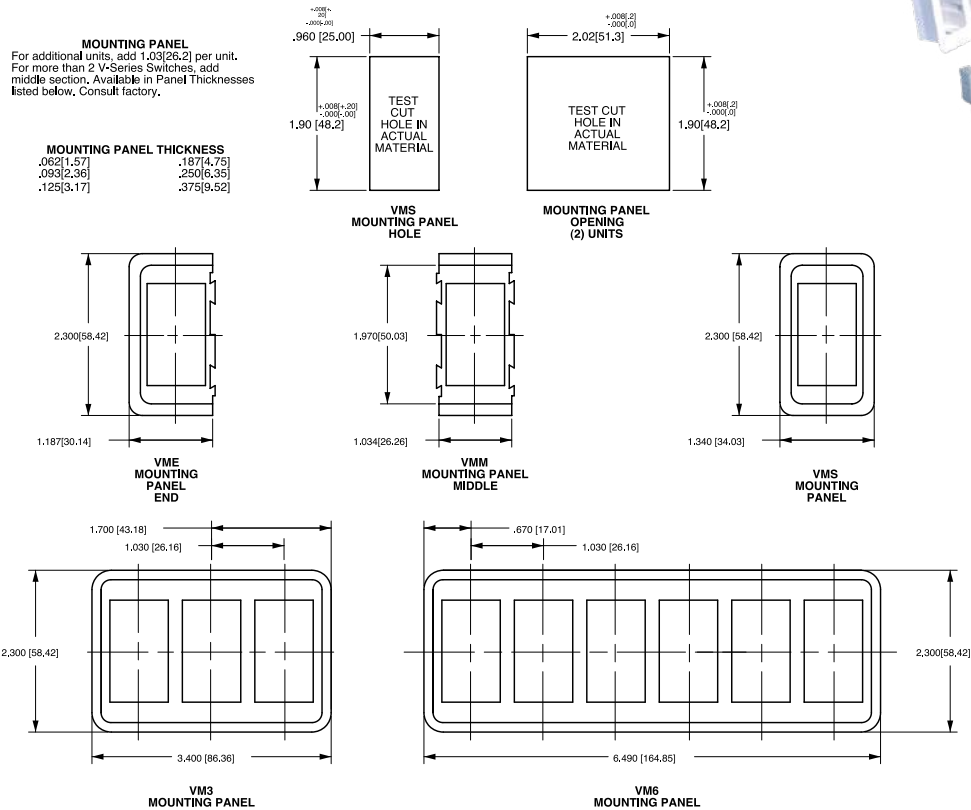
Consult factory to determine availability for individual circuits and their HP rating.

- Not available with Contura 7 or 14 rocker styles.
- Ratings 6 - 9 are UL, CSA & VDE certified, require terminations A or B for double pole circuits, & are not available with illumination circuits 4, 8, D, J, N, & T or with wire lead or solder lug terminations.

Circuits 1, 4, A, D, H, M & E are not available with rating 6 & 8. Rating 7 & 9 only available with circuits 1, 4, A & D. Circuits 2, 3, 5, 7, 8, K, L are 1/2 HP 250VAC only with rating 8. Ratings 6 & 7 must specify lamp code 1 (125VAC neon). Ratings 8 & 9 must specify lamp code 2 (250VAC neon). Rating L available with circuits 1, 4, A & D only.

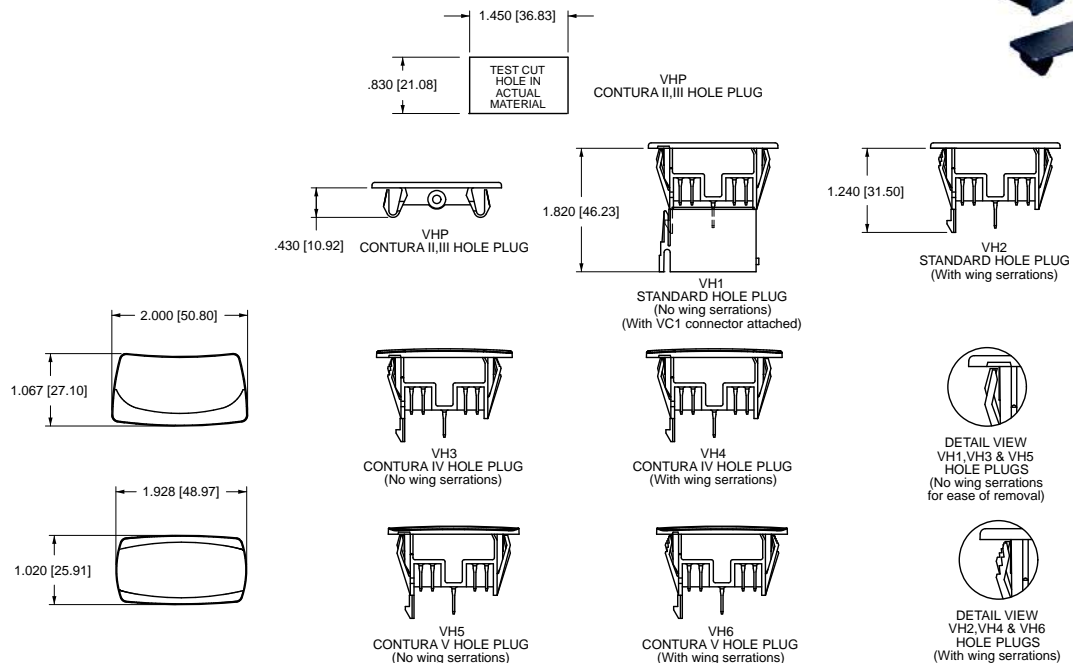
## Contura Mounting Panels

### Dimensional Specifications: in. [mm]



## Contura Hole Plug

### Dimensional Specifications: in. [mm]



# VP-Series

## CONTURA ILLUMINATED INDICATORS

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



### Product Highlights:

- ♦ 3 Styles to choose from
- ♦ Single or double window Illumination
- ♦ 25 lens colors and configurations
- ♦ Available connector for easily installation

VP	1	6	6	-	B	1	1	K	K	-	00	0	00
1 Series	2 Termination	3 Lamp	4 Lamp		5 Housing Color	6 Lens Design	7 Lens Design	8 Lens Color	9 Lens Color		10 Legend	11 Legend Orientation	12 Actuator Legend

#### 1 SERIES

**VP** Illuminated plug  
**H2 1** Housing only  
**H3 2** Lamp module only  
**HP1-01** VP connector for oval and flush bezel only  
**VC1-01** VP connector for raised bezel only

#### 2 TERMINATION

**1** .250 TAB

#### 3,4 LAMP (same coding for both selections) 4,5,6,8,9,12

No lamp **0**  
 Neon **1** 125VAC **2** 250VAC  
 Incandescent **8** 24V  
 LED\* **L** Amber **F** Green **R** Red  
 2VDC **M** **G** **S**  
 6VDC **N** **H** **T**  
 12VDC **P** **J** **V**  
 24VDC  
 \*Typical current draw for LED is 20ma.

#### 5 HOUSING COLOR

	flush bracket	raised bracket 13	oval bezel (Contura V)
Black	<b>B</b>	<b>6</b>	<b>1</b>
Gray	<b>W</b>	<b>-</b>	<b>2</b>
White	<b>R</b>	<b>5</b>	<b>3</b>
Red	<b>G</b>	<b>-</b>	<b>4</b>

#### 6,7 SQUARE LENS DESIGN (same coding for both selections) 4,5,6,11,12

**Z** no lens  
**1** transparent diamond square 10  
**2** translucent square 7  
**3** laser etched 10  
**4** transparent oval  
**5** translucent oval

#### 8, 9 LENS (same coding for both selections) 3,4,5,6,9

	No Lens	White	Amber	Green	Red	Blue	Lens Style
<b>Z</b>	<b>0</b>	<b>9</b>	<b>E</b>	<b>K</b>	<b>R</b>	<b>W</b>	One piece Square/Oval 11
<b>4</b>	<b>5</b>	<b>A</b>	<b>F</b>	<b>L</b>	<b>S</b>	<b>Y</b>	Two piece Square* (with clear top protective lens)
<b>2</b>	<b>7</b>	<b>C</b>	<b>H</b>	<b>N</b>	<b>U</b>		Two piece Square* (with smoke top protective lens)
<b>1</b>	<b>6</b>	<b>B</b>	<b>G</b>	<b>M</b>	<b>T</b>		Two piece Square* (with white top protective lens)

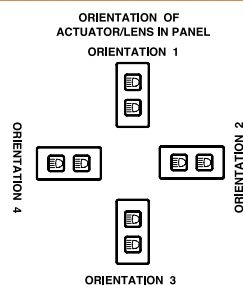
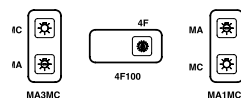
\*All bottom lenses are molded of opaque material. Consult factory for other lens colors.

#### 10 LAMP #1 LENS OR BODY LEGEND 5

**00** No legend  
 For legend options, visit us at [carlingtech.com](http://carlingtech.com)

#### 11 LEGEND ORIENTATION

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



#### 12 LAMP #2 LENS OR BODY LEGEND 5

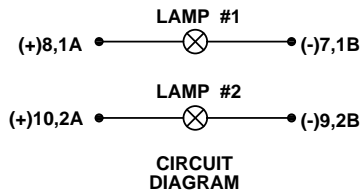
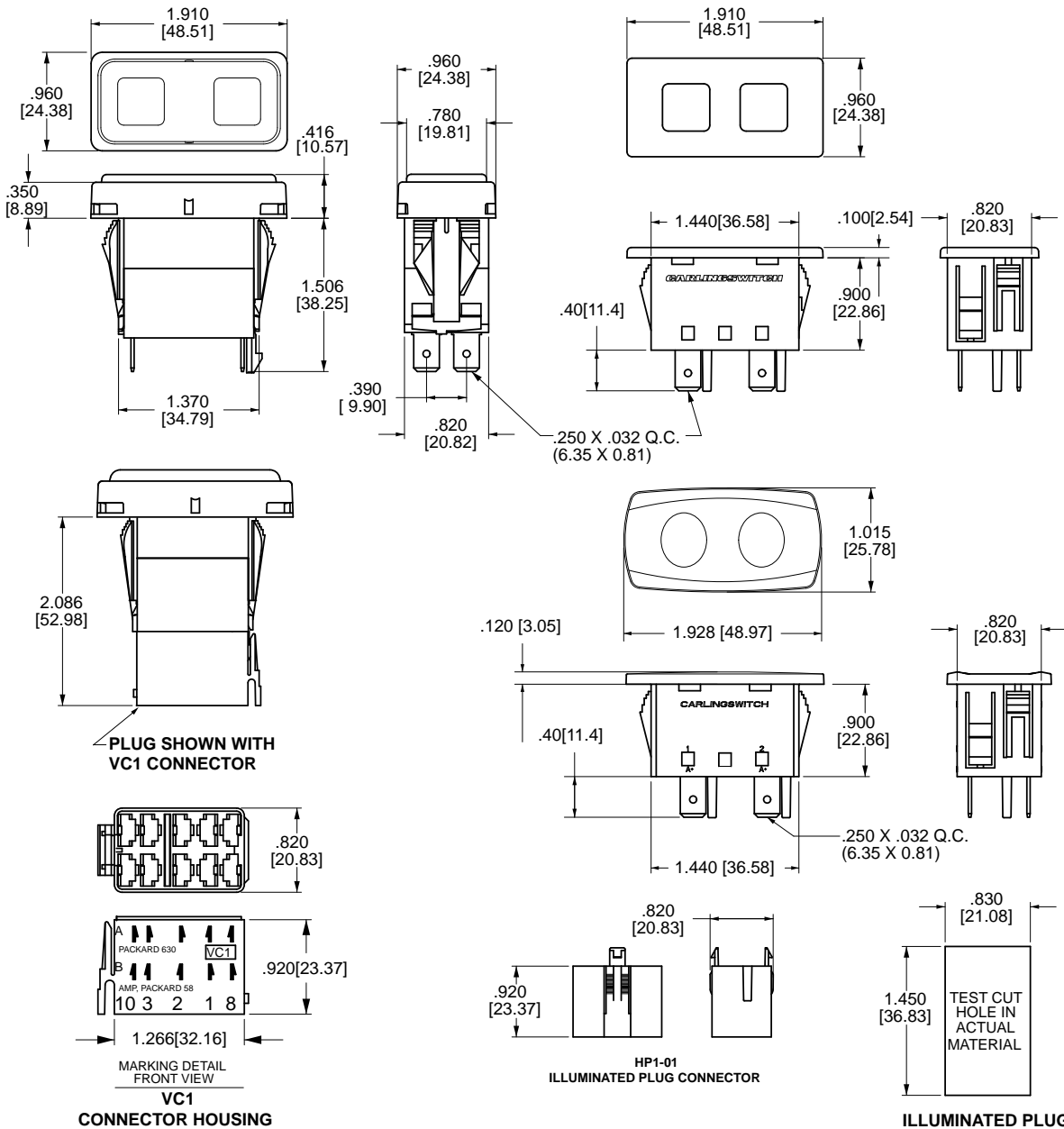
**00** No legend  
 For legend options, visit us at [carlingtech.com](http://carlingtech.com)

#### Notes:

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



## Dimensional Specifications: in. [mm]



**ILLUMINATED PLUG MOUNTING HOLE (OVAL, FLUSH AND RAISED BEZELS)**

**(OVAL, FLUSH AND RAISED BEZELS) MOUNTING PANEL THICKNESSES:**

.062[1.57]	.250[6.35]
.093[2.36]	.375[9.52]
.125[3.17]	.500[12.70]
.187[4.75]	

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

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Carling Technologies set the standard for performance and aesthetics with the widely successful, often imitated, but never duplicated, V-Series rocker switches. Building further upon that platform, Carling has once again raised the bar with the fully sealed W-Series. The W-Series' traditional appearance features complete IP68 protection, including below the panel, where the critical connection is made from the wiring harness. When used in conjunction with the integrated connector, the totally submersible W-Series provides a seal for up to ten individual wires, assuring compatibility with even the most complex circuitry.

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



### Product Highlights:

- ♦ Fully sealed and submersible
- ♦ IP68 protection, including below the panel
- ♦ Tri-seal design
- ♦ Connector with twin locking tabs

# W-Series Switch

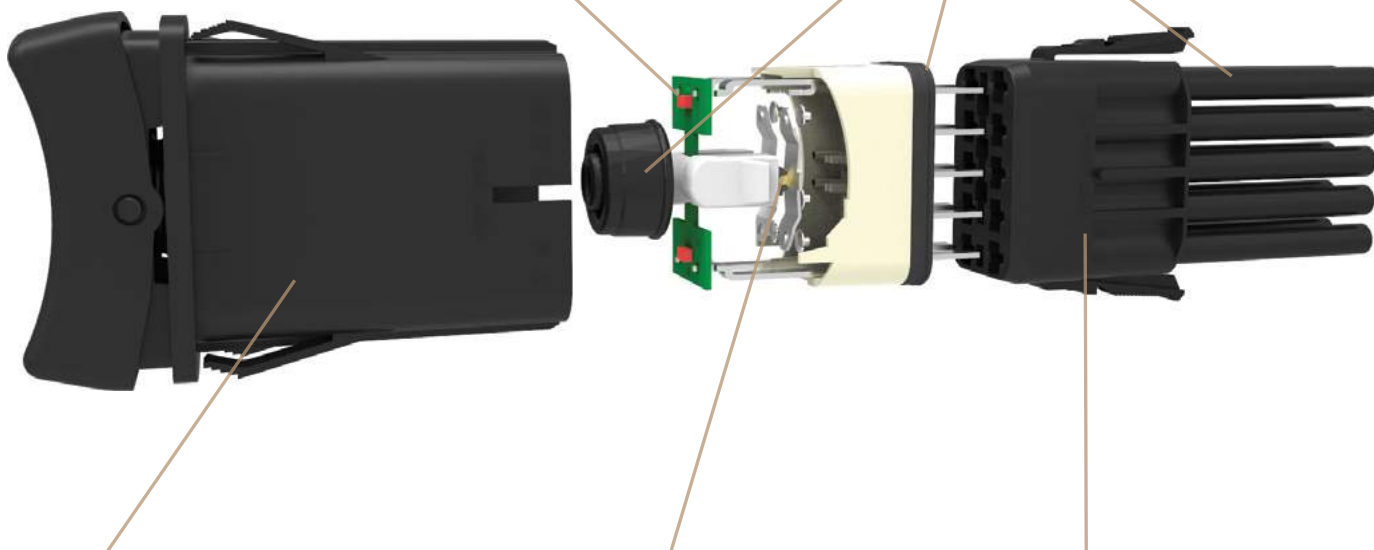
## DESIGN FEATURES

### ILLUMINATION

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

### TRI-SEAL DESIGN

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



### BODY

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

### ROLLER PIN

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

### INTEGRATED CONNECTOR

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

## Electrical

Contact Rating	.4VA @ 24VDC 10 amps, 3-24VDC
Dielectric Strength	1500 Volts RMS
Insulation Resistance	50 Megaohms
Initial Contact Resistance	10 milliohms max. @ 4 VDC
Life	100,000 cycles
Contacts	Silver tin-oxide, 88/12
Terminals	Copper with silver or gold plating
Quick Connect	terminations.
Voltage	3-24 VDC
Overcurrent	15A for 50 cycles

## Mechanical

Endurance	250,000 cycles minimum
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## Physical

Lighted	LED - rated 100,000 hours 1/2 life (LED is internally ballasted for voltages to 24 VDC)
Seals	Neoprene
Base	Polyester blend rated to 125C 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

## Actuator Travel (Angular Displacement)

24° full throw

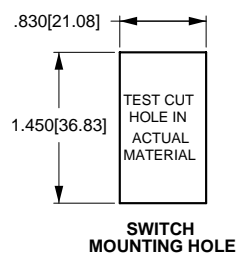
## Environmental

Environmental	IP68, Fully sealed
Corrosion/ Chemical Splash	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
Operating Temperature	Per Mil-Std 202F, Method 204D Test Condition A 0.06 DA or 10G's 10-500 Hz.
Vibration 1	Resonance search 24-50 Hz 0.40 DA 50-2000 ±10 G's peak Results Horizontal Axis 3-5 G's max.
Vibration 2	Random 24 Hz 0.06 PSD-Gsq/Hz 60 Hz 0.50 100 Hz 0.50 200 Hz 0.025 2000 Hz 0.025 One meter onto concrete floor Per Mil-Std 202F, Method 101D, Test Condition A, 48 Hrs.
Handling/Drop Salt Spray	IP6X Per Mil-Std 202F, Method 107F, Test Condition A, -55°C to 85°C Test criteria - pre and post test contact resistance
Dust Thermal Shock	Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance
Moisture Resistance/ Humidity	

## Mounting Specifications

Panel Thickness Range .032 to .125

For optimum panel fit, the following panel thicknesses are suggested: .032, .062, .093, .125



W	11	D	2	B	C	0	1	-	A	7	Z	00	-	0	00
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lamp	7 Lamp	8 Bracket		9 Actuator	10 Lens	11 Lens	12 Legend		13 Legend Orientation	14 Actuator Lens Legend

**1 SERIES****W****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. Terminals 7, 8, 9 & 10 for lamp circuit only.

8 - 7	8 - 7		
1 - 4	1 - 4		
2 - 5	2 - 5		
3 - 6	3 - 6		
	10 - 9		
<b>Position:</b>	<b>1</b>	<b>2</b>	<b>3</b>
SP DP	2 & 3, 5 & 6	Connected Terminals	1 & 2, 4 & 5
11 21	ON	NONE	OFF
12 22	(ON)	NONE	OFF
13 23	ON	NONE	(OFF)
14 24	ON	NONE	ON
15 25	ON	NONE	(ON)
16 26	ON	OFF	ON
17 27	ON	OFF	(ON)
18 28	(ON)	OFF	(ON)
- 49	ON	ON	ON

**3 RATING**

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

**4 TERMINATION / BASE STYLE****2** .110 TAB (QC)**5 ILLUMINATION**

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

	Lamps	Actuator Lens Position	Lamp Wired to Terminals	
		Illumination Type		
O	NONE			
A	# 1	Independent	8+	7-
B	# 1	Down	3+	7-
C	# 2	Up	3+	7-
D	# 1	Down	3+	7-
	& # 2	Down	1+	7-
E	# 1	Up	1+	7-
	& # 2	Up	3+	7-
F	# 1	Independent	8+	7-
	& # 2	Up	3+	6-
G	# 1	Independent	8+	7-
	& # 2	Up	3+	7-
H	# 2	Independent	8+	7-
Selections for Single Pole Switches Only:				
J	# 1	Down	3+	8-
	& # 2	Independent	6+	7-
K	# 1	Independent	8+	7-
	& # 2	Independent	6+	7-
Selections for Double Pole Switches Only:				
L	# 1	Down	3+	6-
M	# 2	Up	3+	6-
N	# 1	Down	3+	6-
	& # 2	Down	1+	4-
P	# 1	Up	1+	4-
	& # 2	Up	3+	6-
R	# 1	Down	3+	7-
	& # 2	Up	6+	7-
S	# 1	Down	6+	7-
	& # 2	Independent	8+	7-
U	# 1	Independent	8+	7-
	& # 2	Independent	10+	9-
V	# 2	Independent	10+	9-
W	# 1	Independent	8+	7-
	& # 2	Independent	10+	7-
Y	# 1 & # 2	Independent in Series	8+	7-
Z	# 1 & # 2	Independent in Parallel	8+	7-

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

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

No lamp	0				
LED*		Red	Amber	superbright 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 <sup>1</sup>****1** Black**9 ACTUATOR <sup>1,3</sup>**

**3** Black with Laser Etched  
**A** Black

**10 LENS - ABOVE LAMP #1 TERMINALS <sup>1,4</sup>****11 LENS - ABOVE LAMP #2 TERMINALS <sup>3,6</sup>****Z** - No Lens

	Clear	White	Amber	Green	Red	Blue	
1	-	B	G	M	T		Large Transparent
- 7	C	H	N	U			Large Translucent
3	-	D	J	P	V		Bar Transparent
- 9	E	K	R	W			Bar Translucent
5	A	-	-	-	-		Laser-Etched

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

**12 ACTUATOR LENS OR BODY LEGEND <sup>2</sup>****00** - No Legend this location/No actuator**11** ON **12** OFF **13** I **14** O

OFF ON O I

**15** O O **16** O O **17** O I **18** I O

F N N F F

**21** OFF **22** ON **23** O **24** I

OFF ON O I

**25** O **26** O **27** O **28** I

F N F

F

F

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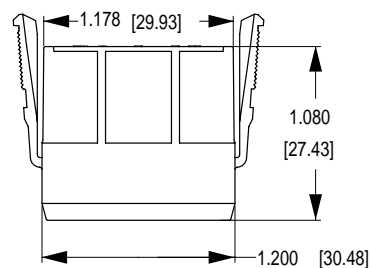
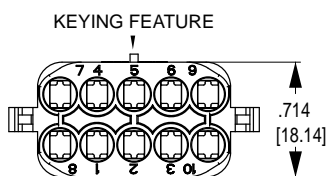
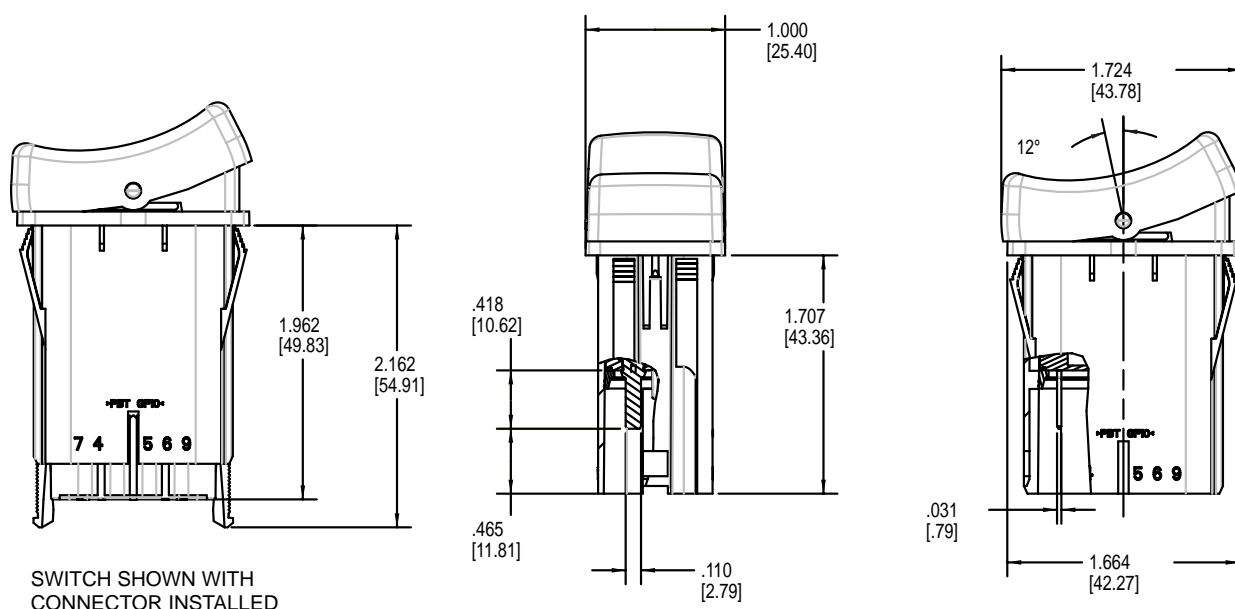
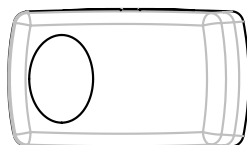
Notes:

1 Custom colors are available. Consult factory.

2 White imprinting is standard on black actuators; Black imprinting is standard on white, red &amp; gray actuators; Custom colors are available, consult factory.

3 Locking rocker version is also available, consult factory for details.

### Dimensional Specifications: in. [mm]



WCH CONNECTOR  
(190-31214-001)

Notes:

Notes:  
WCH connector is intended for use with Tyco/Amp .110 Junior Power Timer, female contacts, and wire seals.

For 14-16 awg wire, specify Tyco/Amp P/N 927766-3

For 16-20 awg wire, specify Tyco/Amp P/N 927770-3

Tyco/Amp cable seal P/N 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.



# L-Series

## SEALED ROCKER SWITCHES

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.



### Resources:

*Download 3D CAD Files*

[IGS >](#) [STP >](#)

*Watch Product Video*



### Product Highlights:

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

# L-Series Switch

## DESIGN FEATURES

## LED LIGHTING

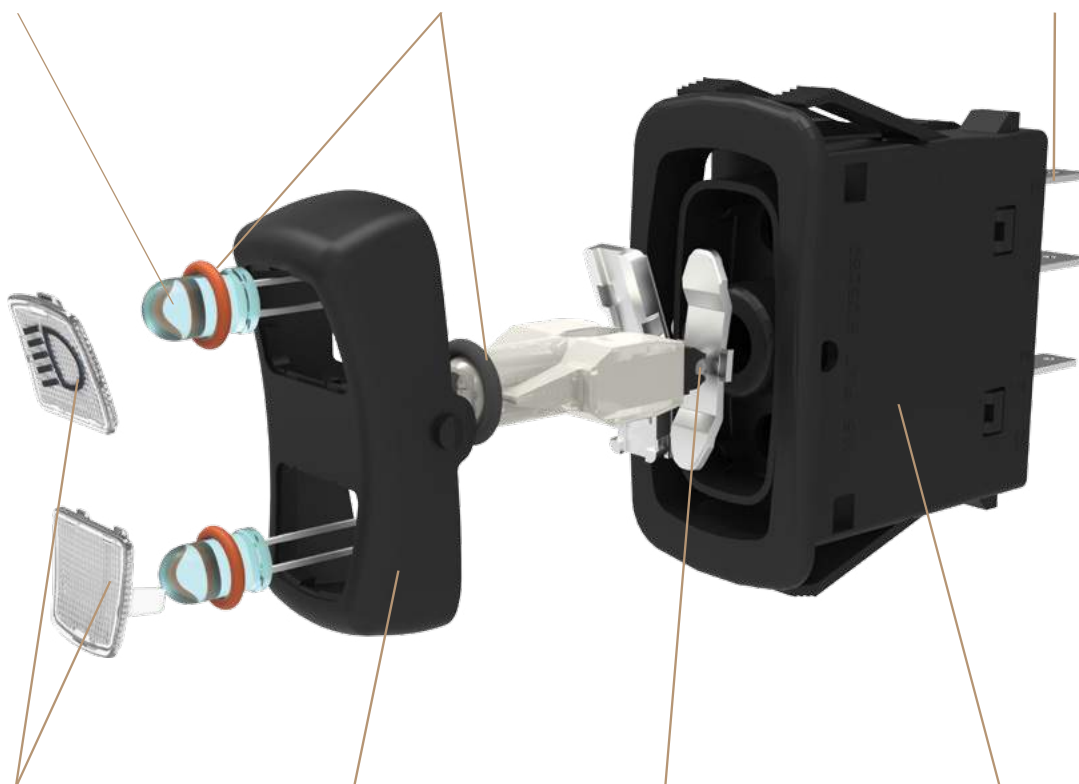
Utilize less current and are not affected by vibration, providing long lasting illumination.  
Available in 3 standard colors.

## SEAL PROTECTION

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

## TERMINALS

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



## LENS & LEGENDS

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

## ACTUATOR

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

## ROLLER PIN

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

**BASE**

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

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

## 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 Megaohms
Initial Contact Resistance	10 milliohms max. @ 4 VDC
Life	100,000 cycles maintained, 50,000 cycles momentary at rated voltage and current
Contacts	90/10 silver-nickel, silver tin-gold
Terminals	Brass or copper/silver plate 3/16" (4.76mm) & 1/4" (6.3mm) Quick Connect terminations standard.

## Mechanical

Endurance	250,000 cycles minimum
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## Physical

Lighted	Incandescent - rated 10,000 hours LED - rated 100,000 hours 1/2 life (LED is internally ballasted for voltages to 24 VDC)
Seals	Rocker, base & bracket are sealed.
Base	Nylon 66 GF rated to 85°C with a flammability rating of 94V0.
Actuator	Basic actuator structure molded of thermoplastic polycarbonate with a hard Nylon 66 thermoplastic surface overlay.
Lock	Acetal
Lens	Polycarbonate rated at 100°C
Function	2 & 3 Position Rocker Style
Bracket	Nylon Zytel
Connector	Nylon 66 rated at 85°C. Polarized.

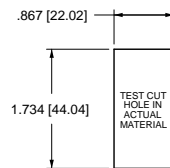
## Actuator Travel (Angular Displacement)

2 position	26°
3 positions	13° from center

## Environmental

Environmental	IP67 for above panel components of the actual switch, representing an index of protection as applied to electrical equipment in accordance with IEC 529, BS 5490, DIN 400 50 & NFC 20 010.
Corrosion	Mixed Flowing Gas MFG Class III per ASTM B-827 & B-845, Method H, with 3 years exposure.
Operating Temperature	-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 connector. Test criteria - No loss of circuit during test and pre and post test contact resistance.
VCH	Resonance search 24-50 Hz 0.40 DA 50-2000 ±10 G's peak Results Horizontal Axis 3-5 G's max.
Vibration 2	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. 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.
Shock	Per Mil-Std 202F, Method 101D, Test Condition A, 48 Hrs.
Salt Spray	Per Mil-Std 202F, Method 107F, Test Condition A, -55°C to 85°C. Test criteria - pre and post test contact resistance.
Thermal Shock	Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance.
Moisture Resistance	Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance.

## Mounting Specifications



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

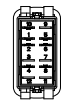
<b>L</b>	<b>11</b>	<b>E</b>	<b>3</b>	<b>C</b>	<b>H</b>	<b>N</b>	<b>1</b>	-	<b>3</b>	<b>A</b>	<b>A</b>	<b>45</b>	-	<b>1</b>	<b>48</b>
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lamp	7 Lamp	8 Bracket		9 Actuator	10 Lens Style & Color	11 Lens Style & Color	12 Legend		13 Legend Orientation	14 Actuator Lens Legend

### 1 SERIES

L

### 2 CIRCUIT <sup>2</sup>

Terminal Orientation



( ) - momentary

SP - single pole - uses terminals 1, 2 & 4.

DP - double pole uses terminals 5, 6 & 8.

Terminals 9, 10 & 11 for lamp circuit only.

Position:	1	2	3
SP	DP	2 & 4, 6 & 8	Connected Terminals
11	21	ON	NONE
12	22	(ON)	NONE
13	23	ON	NONE
14	24	ON	NONE
15	25	ON	NONE
16	26	ON	OFF
17	27	ON	OFF
18	28	(ON)	OFF

### CIRCUITS WITH JUMPER TERMINALS

30*	(2,4&5), (1,6&8)	OFF, OFF	(1,2&8), (4,5&6)
31	1, 2 & 5	2, 3 & 7	2, 4 & 8

### PROGRESSIVE CIRCUITS

51	3 & 4	2, 3	1 & 2
52	3 & 4	2, 3	OFF
53	(3 & 4)	2, 3	1 & 2
54	(3 & 4)	2, 3	(OFF)
55	(3 & 4)	2, 3	(1 & 2)
56	(3 & 4)	2, 3	(OFF)
57	3 & 4	2, 3	(OFF)
58*	2 & 4	2, 3	1 & 2
61	3 & 4, 7 & 8	2 & 3, 6 & 7	1 & 2, 5 & 6
62	3 & 4, 7 & 8	2 & 3, 6 & 7	OFF, OFF
63	(3 & 4), (7 & 8)	2 & 3, 6 & 7	1 & 2, 5 & 6
64	(3 & 4), (7 & 8)	2 & 3, 6 & 7	OFF, OFF
65	(3 & 4), (7 & 8)	2 & 3, 6 & 7	(1 & 2), (5 & 6)
66	(3 & 4), (7 & 8)	2 & 3, 6 & 7	(OFF, OFF)
67	3 & 4, 7 & 8	2 & 3, 6 & 7	(OFF, OFF)
68	2 & 4, 7 & 8	2 & 4, OFF	OFF, OFF
69*	2 & 4, 1, 7 & 8	2 & 4, OFF	OFF, OFF
70	(2 & 4), (7 & 8)	2 & 4, 5 & 7	(1 & 2), (5 & 7)
71	(2&4), (7 & 8)	2 & 4, 5 & 7	1 & 2, 5 & 7
72	2 & 4, 7 & 8	2 & 4, 5 & 7	1 & 2, 5 & 7
73	(2 & 4), (7 & 8)	2 & 4, OFF	OFF, OFF
80	2 & 4, 6 & 8	2 & 4, OFF	OFF, 5 & 6

### HAZARD WARNING CIRCUITS

A2	6,7 & 8, 3 & 4	NONE	OFF, 1 & 2
A3	6,7 & 8, 2 & 4	NONE	OFF, 1 & 2

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

### 3 RATING <sup>2</sup>

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 <sup>2,3</sup>

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

Notes:

Consult factory to verify horsepower rating for your particular circuit choice.

1 Custom colors are available. Consult factory.

2 Circuits 30, 31, 58, 69 are not available with rating codes 4, C, D, G or H.

3 Termination 3 only available with rating codes 1, B, and E.

4 Not available with circuits 11-18, 51-57 and 69.

### 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	
A	# 1	Independent 10+ 9-
B	# 2	Independent 12+ 11-
C	# 1	Independent 10+ 9-
D	& # 2	Independent 12+ 9-
E	# 1	Dependent 4+ 9-
F	# 1	Independent 10+ 9-
F <sup>4</sup>	& # 2	Dependent 4+ 9-
G	# 1	Dependent 8+ 9-
H	& # 2	Dependent 4+ 9-
J	# 1	Independent 10+ 9-
	& # 2	Dependent 4+ 9-
1	# 2	Hazard 6+ 10- 12-
2	# 1	Hazard 6+ 10- 12-

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

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

No lamp	0				
Incandescent	4 3V	5 6V	6 12V	7 18V	8 24V
LED*	Red	Amber	Green		
2VDC	A	L	F		
6VDC	B	M	G		
12VDC	C	N	H		
24VDC	D	P	J		

\* Consult factory for "daylight bright", blue/green and white LED options.

Typical current draw for LED is 20ma.

### 8 BRACKET COLOR <sup>1</sup>

	Black	White	Gray	Red
Standard Bracket	1	2	3	4
Rockerguard at Lamp 1	A	B	C	D
Rockerguard at Lamp 2	E	F	G	H

### 9 ACTUATOR STYLE AND COLOR <sup>1</sup>

	Black	White	Gray	Red	Laser Etched
Rocker	A	B	C	D	3
Paddle	J	N	K	M	4

### 10 & 11 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
3	7	C	H	N	U
-	-	D	J	P	V
-	9	E	K	R	W
5	A	-	-	-	-

Laser Etched background color

### 12 LASER ETCHED, LENS OR BODY LEGEND

00 No legend this location / no actuator

For legend options & codes, visit us at [carlingtech.com](http://carlingtech.com)

### 13 LEGEND ORIENTATION

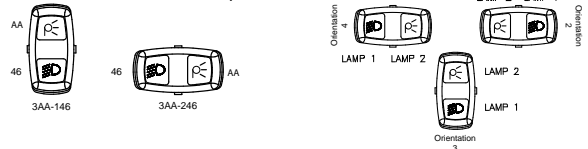
0 No legend (used with codes 11-18 in selection 12)

1 Orientation 1 - vertical, lamp 1 on top

2 Orientation 2 - horizontal, lamp 1 on right

3 Orientation 3 - vertical, lamp 1 on bottom

4 Orientation 4 - vertical, lamp 1 on left



### 14 ACTUATOR LENS LEGEND

00 No legend this location / no actuator

For legend options & codes, visit us at [carlingtech.com](http://carlingtech.com)

<b>L</b>	<b>11</b>	<b>D</b>	<b>1</b>	<b>S</b>	<b>W</b>	<b>C</b>	<b>J</b>	<b>-</b>	<b>P</b>	<b>M</b>	<b>H</b>	<b>00</b>	<b>-</b>	<b>0</b>
1 Series	2 Circuit	3 Rating	4 Termination	5 Illumination	6 Lock	7 Lamp	8 Bracket	9 Actuator	10 Lens	11 Lock	12 Legend	13 Legend Orientation		

### 1 SERIES L

### 2 CIRCUIT <sup>5</sup>

Terminal Orientation



( ) - momentary

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

Position:	1	2	3
SP DP	2 & 4, 6 & 8	Connected Terminals	1 & 2, 5 & 6
11 21	ON	NONE	OFF
14 24	ON	NONE	ON
16 26	ON	OFF	ON
17 27	ON	OFF	(ON)
18 28	(ON)	OFF	(ON)
CIRCUITS WITH JUMPER TERMINALS			
30 <sup>2</sup>	(2,4&5), (1,6&8)	OFF, OFF	(1,2&8), (4,5&6)
31 <sup>2</sup>	1, 2 & 5	2, 3 & 7	2, 4 & 8
PROGRESSIVE CIRCUITS			
51	3 & 4	2, 3	1 & 2
52	3 & 4	2, 3	OFF
53	(3 & 4)	2, 3	1 & 2
54	(3 & 4)	2, 3	(OFF)
55	(3 & 4)	2, 3	(1 & 2)
56	(3 & 4)	2, 3	(OFF)
57	3 & 4	2, 3	(OFF)
58	2 & 4	2, 3	1 & 2
61	3 & 4, 7 & 8	2 & 3, 6 & 7	1 & 2, 5 & 6
62	3 & 4, 7 & 8	2 & 3, 6 & 7	OFF, OFF
63	(3 & 4), (7 & 8)	2 & 3, 6 & 7	1 & 2, 5 & 6
64	(3 & 4), (7 & 8)	2 & 3, 6 & 7	OFF, OFF
65	(3 & 4), (7 & 8)	2 & 3, 6 & 7	(1 & 2), (5 & 6)
66	(3 & 4), (7 & 8)	2 & 3, 6 & 7	(OFF, OFF)
67	3 & 4, 7 & 8	2 & 3, 6 & 7	(OFF, OFF)
68	2 & 4, 7 & 8	2 & 4, OFF	OFF, OFF
69	2 & 4, 1, 7 & 8	2 & 4, OFF	OFF, OFF
70	(2 & 4), (7 & 8)	2 & 4, 5 & 7	(1 & 2), (5 & 7)
71	(2&4), (7 & 8)	2 & 4, 5 & 7	1 & 2, 5 & 7
72	2 & 4, 7 & 8	2 & 4, 5 & 7	1 & 2, 5 & 7
73	(2 & 4), (7 & 8)	2 & 4, OFF	OFF, OFF
80	2 & 4, 6 & 8	2 & 4, OFF	OFF, 5 & 6

### 3 RATING <sup>2</sup>

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 <sup>4</sup>

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

### 5 ILLUMINATION

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

Lamps	Illumination Type	Lamp Wired to Terminals
S	None	
B	# 2	Independent 12+ 11-

Notes:

Consult factory to verify horsepower rating for your particular circuit choice.

- Custom colors are available. Consult factory.
- Additional lamp circuits available. Consult factory.
- Available only with 3 position circuits.
- Termination 3 only available with ratings 1, B and E.
- Circuits 30, 31, 58 and 69, are not available with rating codes 4, C, D, G or H.

### 6 LOCK W

Lock above terminals 10 &amp; 9.

### 7 LAMP

Above terminals 12 &amp; 11

No lamp	0				
Incandescent	4 3V	5 6V	6 12V	7 18V	8 24V
LED*	Red	Amber	Green		
2VDC	A	L	F		
6VDC	B	M	G		
12VDC	C	N	H		
24VDC	D	P	J		

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

### 8 BRACKET COLOR <sup>1</sup>

J Black

### 9 ACTUATOR STYLE AND COLOR <sup>1</sup>

	Black	Red
Locking Rocker	P	R

### 10 & 11 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
-	7	C	H	N	U
3	-	D	J	P	V
-	9	E	K	R	W

### 11 LOCK FUNCTION AND COLOR

Locking Position

Up	Down	Up & Down	Center <sup>3</sup>	Lock Color
A	H	R	1	Match Actuator
B	J	S	2	Black
C	K	T	3	White
D	L	V	4	Red
E	M	W	5	Safety Orange

### 12 LASER ETCHED, LENS OR BODY LEGEND

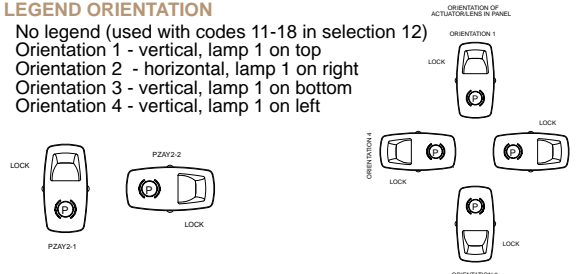
00 No legend this location / no actuator

For legend options & codes, visit us at [carlingtech.com](http://carlingtech.com)

### 13 LEGEND ORIENTATION

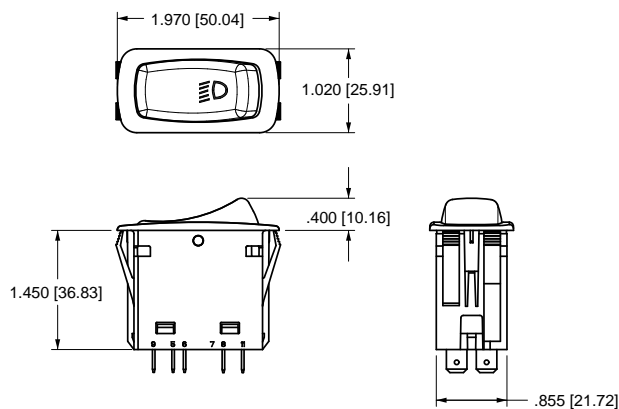
0 No legend (used with codes 11-18 in selection 12)

- 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

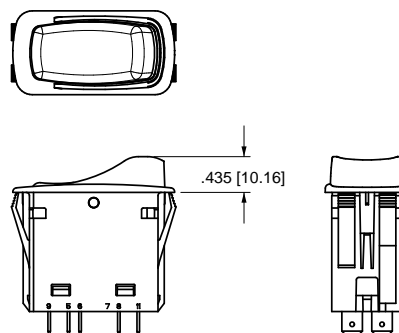


## Dimensional Specifications: in. [mm]

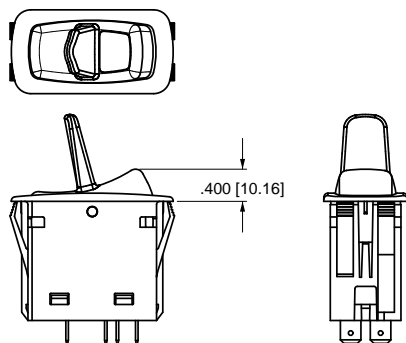
**L-SERIES**  
SHOWN WITH LASER ETCHED  
ACTUATOR



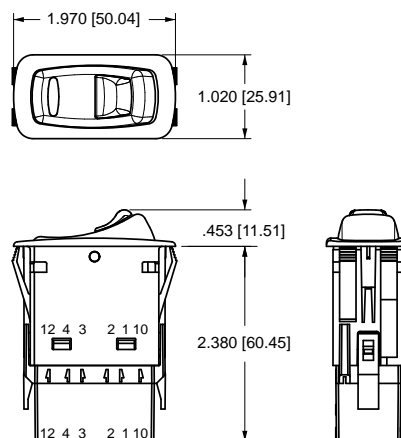
**L-SERIES**  
SHOWN WITH ROCKER GUARD



**L-SERIES**  
SHOWN WITH LARGE LENS  
AND PADDLE ACTUATOR



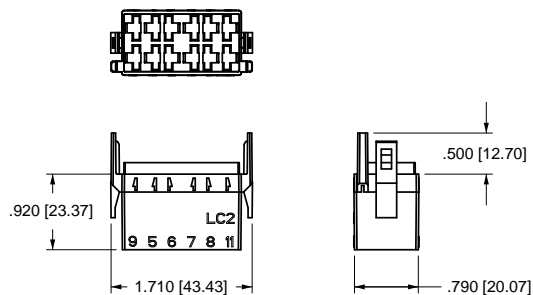
**L-SERIES**  
SHOWN WITH BAR LENS, LOCK  
AND CONNECTOR



## Connector

**L-SERIES**  
CONNECTOR

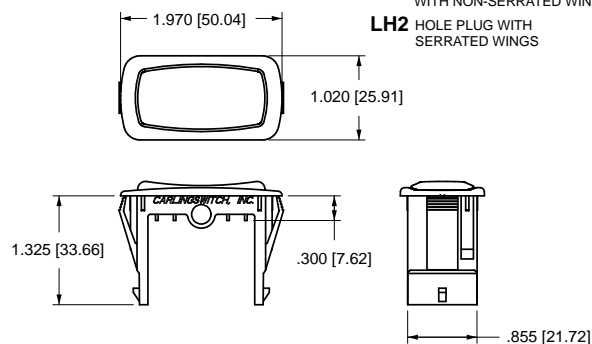
- LC1-01** BLACK .250 TAB CONNECTOR (PACKARD 630 SERIES)
- LC2-01** BLACK .187 TAB CONNECTOR (PACKARD 480 SERIES)
- LC3-01** BLACK .250 TAB CONNECTOR (AMP ONLY)



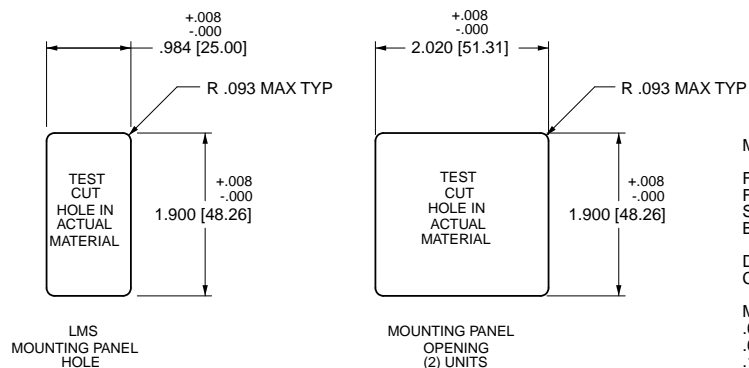
## Hole Plug

**L-SERIES**  
HOLE PLUG

- LH1** REMOVABLE HOLE PLUG  
WITH NON-SERRATED WINGS
- LH2** HOLE PLUG WITH  
SERRATED WINGS



## Dimensional Specifications: in. [mm]



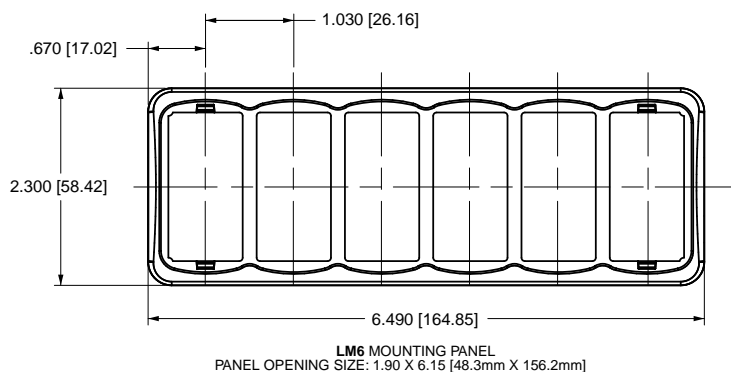
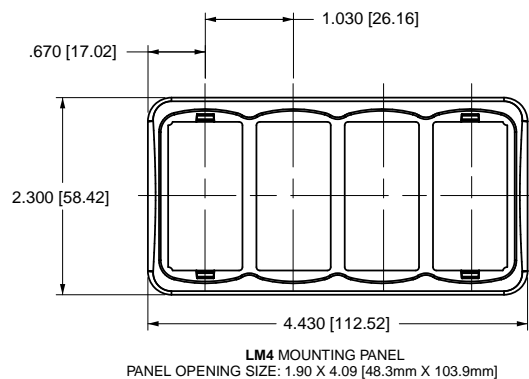
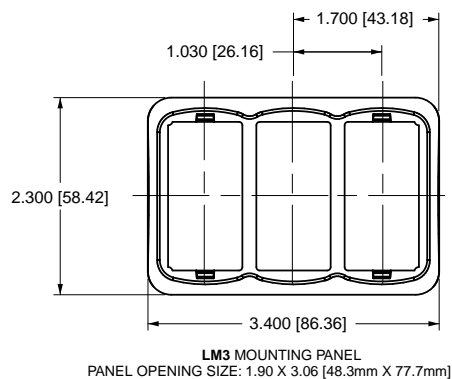
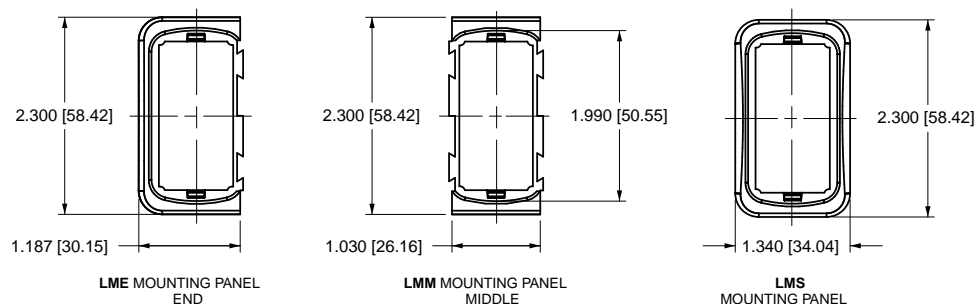
### MOUNTING PANEL

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

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

### MOUNTING PANEL THICKNESS

.062 [1.57]  
.093 [2.36]  
.125 [3.17]  
.156 [3.96]





## Circuit Diagrams:

CIRCUIT CODE	CIRCUIT DIAGRAM	CIRCUIT CODE	CIRCUIT DIAGRAM	CIRCUIT CODE	CIRCUIT DIAGRAM
11		22		51	
12		23		52	
13		24		53	
14		25		54	
15		26		55	
16		27		56	
17		28		57	
18		30		58	
21		31		61	

## Circuit Diagrams:

CIRCUIT CODE	CIRCUIT DIAGRAM	CIRCUIT CODE	CIRCUIT DIAGRAM
62		71	
63		72	
64		73	
65		80	
66		81	
67		82	
68		A2	
69		A3	
70			

## Lamp Circuit Diagrams:

LAMP CIRCUIT CODE	CIRCUIT DIAGRAM
<b>A</b>	
<b>B</b>	
<b>C</b>	
<b>D</b>	
<b>E</b>	
<b>F</b>	
<b>G</b>	
<b>H</b>	

LAMP CIRCUIT CODE	CIRCUIT DIAGRAM
<b>J</b>	
<b>1</b>	
<b>2</b>	
<b>K</b>	

LEGEND	
SYMBOL	DEFINITION
	TERMINAL LOCATION
	LAMP LOCATION
	MAINTAINED CIRCUIT
	MOMENTARY CIRCUIT
	INTERNAL CONNECTION (JUMPER TERMINAL)
	2 POSITION CONNECTION
	2 POSITION
	3 POSITION

# LP-Series

## ILLUMINATED INDICATORS

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The LP-Series Illuminated Indicators are the perfect complement to the aesthetics, reliability and performance of our L-Series rocker switches. As a critical safety feature, the illumination alerts the operator of essential system functions or malfunctions, such as: Oil Pressure, High Temperature, Transmission or other fluid levels, Parking Brake or General System confirmations. The L-Series styling assures seamless integration into most any dashboard panel.



### Product Highlights:

- Vibration, Shock, and Thermoshock Resistant
- 12 or 24 Volts
- Laser Etched or Lens Illumination
- IP67 Sealing

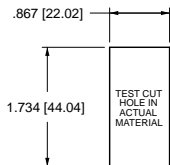
Electrical

Terminals	Brass or copper/silver plate 3/16" (4.76mm) & 1/4" (6.3mm) Quick Connect terminations standard.
Lighted	Incandescent - rated 10,000 hours LED - rated 100,000 hours 1/2 life (LED is internally ballasted for voltages to 24VDC)

Physical

Seals	Insert, base & bracket are sealed.
Base	Nylon 66 GF rated to 85°C with a flammability rating of 94VO.
Insert	Polycarbonate rated at 100°C.
Connector	Nylon 66 rated at 85°C. Polarized
Markings	Over 1000 pad printed or laser etched legends available
Bracket	Nylon 66 GF rated to 85°C

Mounting Specifications



MOUNTING HOLE

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

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	1	H	R	R	5	-	9	A	A	Y2	-	1	DU
1 Series	2 Termination	3 Illumination	4 Lamp	5 Lamp	6 Bracket Color		7 Insert Color	8 Style	9 Style	10 Legend 1		11 Legend Orientation	12 Legend 2

#### 1 SERIES

LP L-Series Illumination Plug

#### 2 TERMINATION <sup>3</sup>

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

#### 3 ILLUMINATION

	LAMPS	ILLUMINATION	LAMP WIRED TO TERMINALS
A	1	—	10 (+) 8 (-)
B	1	—	10 (+) 8 (-)
	2	—	12 (+) 11 (-)
C	1	—	10 (+) 8 (-)
	2	—	12 (+) 8 (-)
E	1 & 2	Parallel	10 (+) 8 (-)
H	1 & 2	Series	10 (+) 8 (-)

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) <sup>2</sup>

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

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

#### 6 BRACKET COLOR

5 Black

#### 7 INSERT COLOR <sup>1,2</sup>

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)

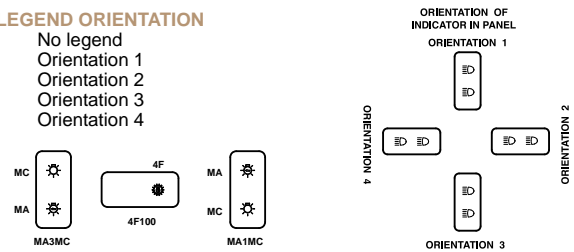
Z Not Painted (used with Insert Colors A-F)  
5 Clear Laser Etch Background Color (used with Insert Color 9)  
A White Laser Etch Background Color (used with Insert Color 9)

#### 10 LEGEND OVER LAMP <sup>1</sup>

00 No legend  
— Laser Etched or Body Legends  
For legend options, visit us at [carlingtech.com](http://carlingtech.com)

#### 11 LEGEND ORIENTATION

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

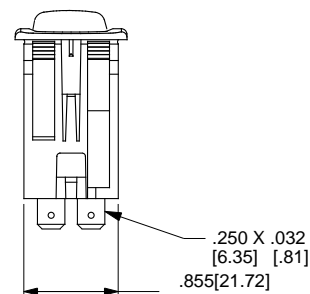
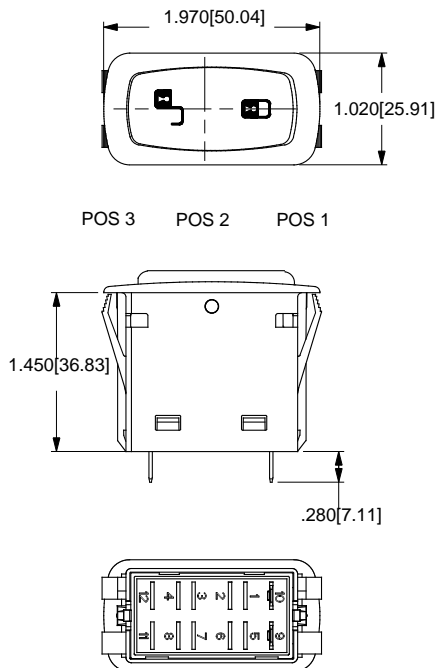


#### 12 LEGEND OVER LAMP <sup>2</sup>

00 No legend  
— Laser Etched or Body Legends  
For legend options, visit us at [carlingtech.com](http://carlingtech.com)

#### Notes:

- To order separately, specify LPC and selection 7 code. Ex LPC-9
- For LEDs, insert color must be clear, white or match color of LED.
- For connector, specify part number LC2-01 (.187 tabs), LC3-01 (.250 tabs).

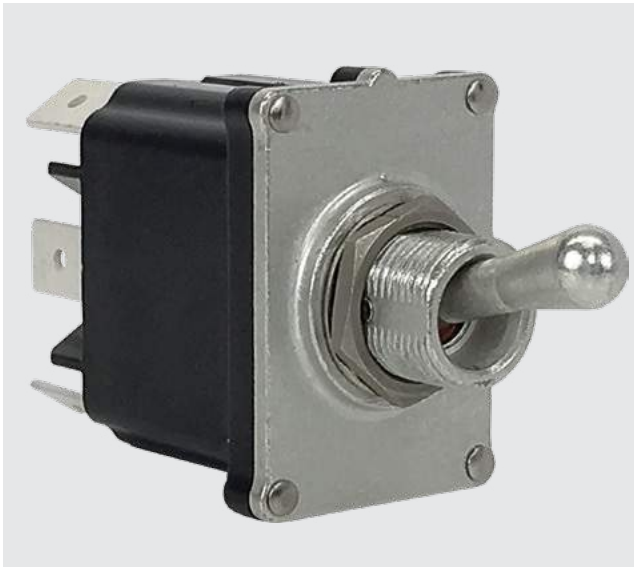


# ST-Series

## SEALED TOGGLE SWITCHES

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

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



### Resources:

*Download 3D CAD Files*

[IGS >](#) [STP >](#)

*Watch Product Video*



### Product Highlights:

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

### Typical Applications:

- Military Equipment
- Armored Vehicles
- Law Enforcement Vehicles
- Off-Highway Vehicles
- Applications requiring stringent sealing and performance capabilities



# ST-Series Switch

## DESIGN FEATURES

### **PINNED TOGGLE / BUSHING**

Keeps metal toggle firmly in place and prevents rotation

### **BRASS ROLLER PIN**

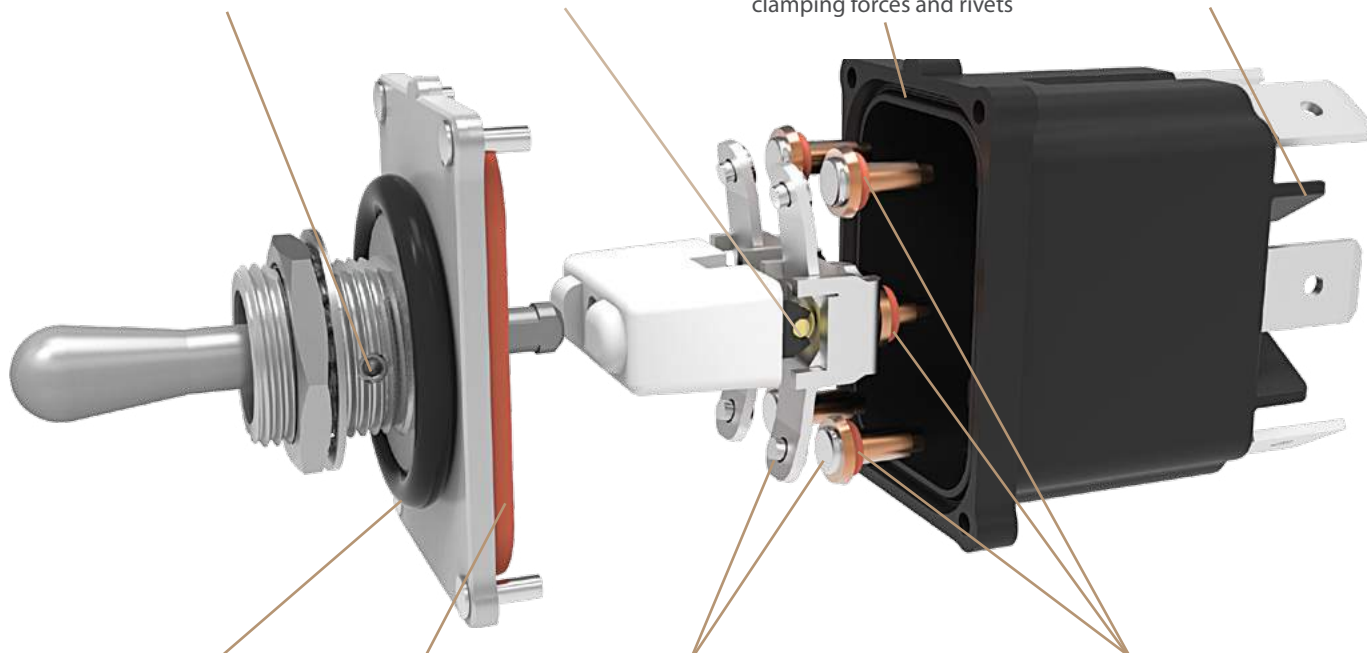
Provides rolling metal on metal actuation for maximum endurance

### **BASE SEAL CHANNEL**

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

### **TERMINAL BARRIERS**

Comply with UL-61058-1 electrical spacing requirements



### **OPTIONAL O-RING**

Assures additional under panel sealing protection

### **BUSHING/TOGGLE SEAL**

Composed of dynamic silicone material that bonds to the metal toggle, pin and bushing

### **RIVETS**

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

### **TERMINAL SEALS**

Assure a secure seal at extreme temperatures. Eliminates potential for separated joints associated with insert molded constructions

## Electrical

Contact Rating	16A 12V/24V
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.)
Life	Overload: MIL-DTL-3950G, Section 4.8.11.1 Electrical Endurance and Temperature: UL 61058-1 Momentary circuits: 25,000 operations, minimum. Maintained circuits: 50,000 operations, minimum. Testing ongoing to determine maximum values.
Contacts	Silver Alloy
Terminals	Brass or Copper / silver plated. Tab Terminal: ¼" quick-connect Screw Terminal: #6-32 brass screw and cage clamp MIL-STD-202G, Method 211 Test Condition A, and B: 25 lb. pull test, two terminal bends.

## Physical

Function	Single/Double Pole with Single/Double Throw functions
Operation	Two/ Three position, Maintained/ Momentary circuits
Toggle	Tin plated brass
Actuator	Polyester PBT, UL94-V0 and fungus resistant per ASTM G- 21
Internal Seals	All internal seals are silicone per A-A-59588-1A.
Mounting	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 ASTM G-21
Actuation Force	Initial Actuation Forces $\pm$ 0.3 lb (2-Pole circuits)
Angular Movement	14.5 degrees, each side of center

## Mechanical

Life	Mechanical Endurance: 150,000 cycles total (at 25°C)
------	--

## 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).
Shock	MIL-STD-202G: Method 213B, Test Condition K (30 G, half sine)
Handling Drop	SAE J1455, Section 4.11.3.1, 1 meter drop in each of three planes
Sealing	MIL-STD-202G, Method 110 (sand and dust) IEC 60529, IP68 (dust-tight and continuous immersion in water)
Salt Atmosphere	MIL-STD-202G, Method 101, Test Condition A (96 hrs)
Thermal Shock	MIL-STD-202G, Method 107, Test Condition A (five cycles in air: -55°C, +25°C, +125°C, +25°C)
Moisture Resistance, Humidity	MIL-STD-202G, Method 106 (ten 24-hour stepped cycles)
Chemical Resistance	No permanent loss of function, obvious loss of sealing, distortion, softening, embrittlement, discoloration or corrosion after being brushed for 10 minutes, wetting all exposed surfaces. Relevant chemical compatibility documentation may be used in place of testing.
<b>Chemical</b>	<b>Concentration</b>
Gasoline	100%
Ethylene Glycol	50% in water
Ethanol/Methanol	10% in water
Diesel Fuel	100%

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

ST	A	2	E	1	-	53
1 Series	2 Circuit	3 Poles	4 Rating	5 Termination		6 Toggle Style

**1 SERIES<sup>1</sup>****ST** Sealed Toggle**4 RATING****E** 16A, 12/24V**2 CIRCUIT**

	2 & 3, 5 & 6	Connected Terminals	1 & 2, 4 & 5
<b>Position:</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>A</b>	ON	NONE	OFF
<b>B</b>	(ON)	NONE	OFF
<b>C</b>	ON	NONE	(OFF)
<b>D</b>	ON	NONE	ON
<b>F</b>	ON	NONE	(ON)
<b>J</b>	ON	OFF	ON
<b>K</b>	ON	OFF	(ON)
<b>L</b>	(ON)	OFF	(ON)
Special Circuits			
<b>E</b> <sup>2,3</sup>	5 & 6	5 & 3	5 & 1
<b>G</b> <sup>2,4</sup>	2 & 3, 5 & 6	2 & 3	OFF
<b>M</b> <sup>2,4</sup>	(2 & 3, 5 & 6)	2 & 3	OFF

**5 TERMINATION**

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

**6 TOGGLE STYLE**

	Toggle Length	Bushing Length
Without Panel Seal		
<b>53</b>	.561	.385
With Panel Seal (Bulk)		
<b>58</b>	.561	.385

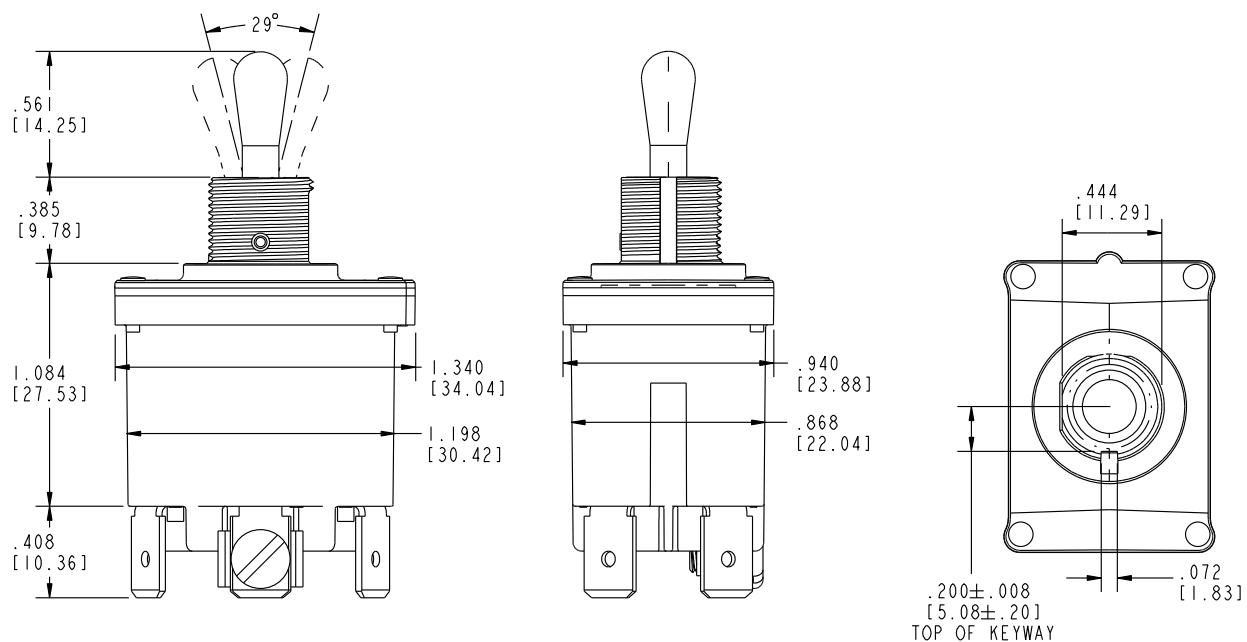
**3 POLES**

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

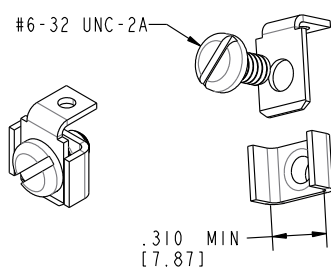
**Notes:**

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

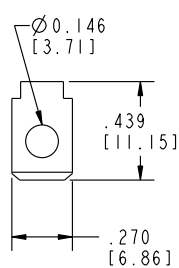
## Dimensional Specifications: in. [mm]



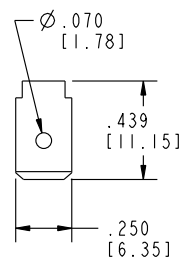
## TERMINALS



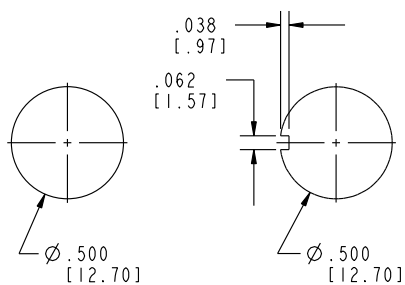
SCREW (AND CAGE) TERMINAL



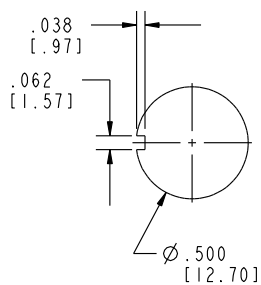
.250 TAB (Q.C.) TERMINAL



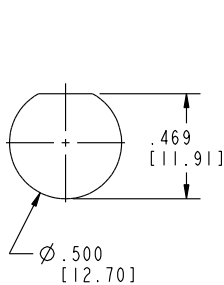
## PANEL CUTOUTS



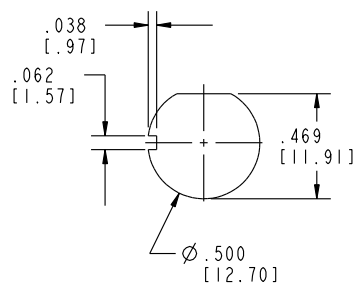
MOUNTING HOLE



WITH KEYWAY



WITH FLAT



WITH KEYWAY, FLAT

# 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  $\frac{1}{2}$  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, 24VDC 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  $\frac{1}{2}$  throw actuation
- ♦ Ergonomic rockers
- ♦ Recognizable and simple to operate controls
- ♦ Compact Design

### Electrical

Contact Rating	10A@ 24VDC
Dielectric Strength	1500 Volts RMS between pole to pole
Insulation Resistance	50 Megaohms
Contact Resistance	10 milliohms max. @ 4VDC
Contact Bounce Life	<20 milliseconds 100,000 cycles maintained 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

### 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

### 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 times,	Drop from height of 1 meter, 3
Thermal Shock	4 sides. Test criteria - No loss of circuit during test, pre & post test contact resistance. Per IEC 68-2-14, -40°C to +85°C. Test criteria - pre & post test contact resistance.

### Mounting Specifications

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

<b>S</b>	<b>18</b>	<b>A</b>	<b>A</b>	<b>R</b>	<b>F</b>	<b>0</b>	<b>4</b>	<b>-</b>	<b>M</b>	<b>Z</b>	<b>Z</b>	<b>Z</b>	<b>00</b>	<b>-</b>	<b>1</b>	<b>00</b>	<b>00</b>
1 Series	2 Circuit	3 Rating	4 Illumination	5 Lamp 1	6 Lamp 2	7 Lamp 3	8 Bracket Color		9 Actuator Color	10 Legend Color 1	11 Legend Color 2	12 Legend Color 3	13 Legend 1		14 Legend Orientation	15 Legend 2	16 Legend 3

### 1 SERIES S

### 2 CIRCUIT

Terminal Connections as viewed from bottom of switch:

1 -- 2

3, 5 & 7.

3 -- 4

3, 5, 7 & 4, 6, 8.

5 -- 6

7 -- 8

9 -- 10

**Position:**

SP DP

16 26

18 28

**SPECIAL CIRCUITS**

31

41 51

42 52

43 53

44 54

45 55

46 56

47 57

75

98<sup>2</sup>

5 & 7, 6 & 8

ON

(ON)

(6 & 8)

ON

(ON)

ON

(ON)

NONE

NONE

(5 & 7, 3 & 6)

(5 & 7, 2 & 6)

( ) - momentary

SP - single pole uses terminals

DP - double pole uses terminals

2 Connected Terminals

OFF

OFF

4, 5, 6, 7

OFF

OFF

3 & 5

3 & 5

OFF

5 & 7

5 & 7

5 & 7, 4 & 6

5 & 7, 4 & 6

3

3 & 5, 4 & 6

ON

(ON)

OFF

NONE<sup>1</sup>

NONE<sup>1</sup>

NONE<sup>1</sup>

NONE<sup>1</sup>

ON

ON

(ON)

(3 & 5, 4 & 6)

(5 & 9, 4 & 6)

### 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 (-).

No lamp

LED

12VDC

24VDC

0

Red

A

B

Orange

C

D

Yellow

E

F

Green

H

J

### 8 BRACKET COLOR

1

Black

4

Dark Carbon

### 9 ACTUATOR

Standard Rocker, Laser Etched

Black

M

Titan Gray

N

Dark Carbon

R

### 10, 11, 12 LEGEND COLOR

Z

No Legend

1

Clear

### 13 LEGEND 1<sup>5</sup>

00 No Legend

### 14 LEGEND ORIENTATION

0

No legend

1

Orientation 1

2

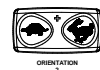
Orientation 2

3

Orientation 3

4

Orientation 4



### 3 RATING

1 0.4VA 28VDC Resistive

A<sup>3</sup> 10.5mA 1.5A 28VDC,

5A 28V 50A Inrush Lamp Load

B<sup>4</sup> 3.5A 28VDC, 18A Inrush

C<sup>3</sup> 10mA 10A 28VDC

D<sup>3</sup> 20mA 10A 14VDC

### 4 ILLUMINATION

	Lamps	Illumination Type	Lamp wired to Terminals
S	NONE	INDEPENDENT	-
A	1	INDEPENDENT	1 (+) 2 (-)
C	1	INDEPENDENT	1 (+) 2 (-)
	2	INDEPENDENT	9 (+) 2 (-)
D	1	INDEPENDENT	1 (+) 2 (-)
	2	INDEPENDENT	9 (+) 10 (-)
E	1 & 3	INDEPENDENT	1 (+) 2 (-)
		PARALLEL	
F	1	INDEPENDENT	1 (+) 10 (-)
		SNAP	
G	1 & 2	INDEPENDENT	1 (+) 10 (-)
		DEPENDENT	9 (+) 2 (-)
H	1 & 2	INDEPENDENT	1 (+) 2 (-)
		DEPENDENT	9 (+) 10 (-)
J	1, 2 & 3	INDEPENDENT	1 (+) 2 (-)
		DEPENDENT	5 (+) 10 (-)
		INDEPENDENT	1 (+) 2 (-)
K	1 & 2	INDEPENDENT	1 (+) 2 (-)
		INDEPENDENT	9 (+) 10 (-)
		3.3K RESISTOR IN PARALLEL	

### 15,16 LEGEND 2,3<sup>6</sup>

00 No legend

Notes:

1 Indicates 1/2 travel for actuator.

2 Snap-Action Contact Mechanism

3 Not available with circuit 98.

4 Available with circuit 98 only.

5 Located over T1-2.

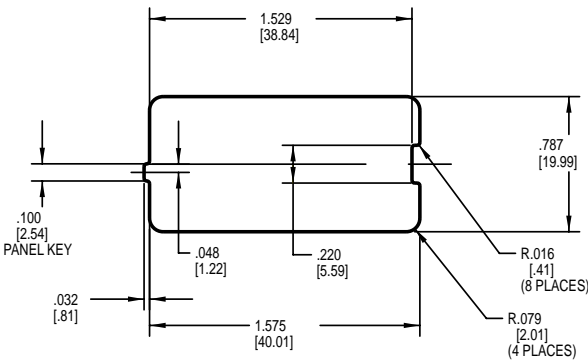
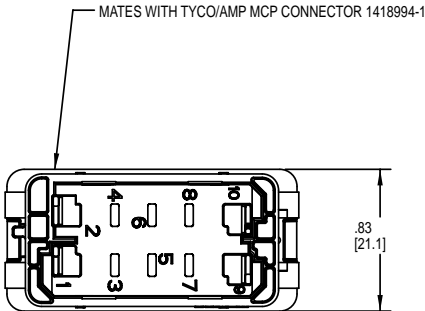
6 Legend 2 located in center of rocker, Legend 3 located over T9-10.

Legend 2 options are limited due to a very small marking area.

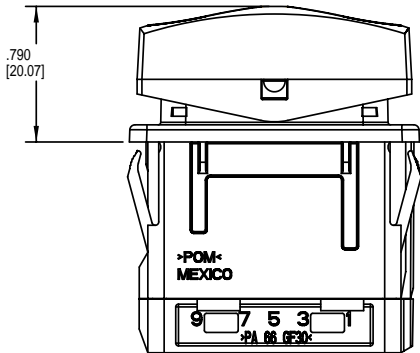
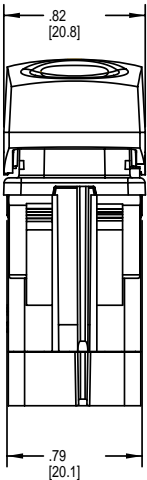
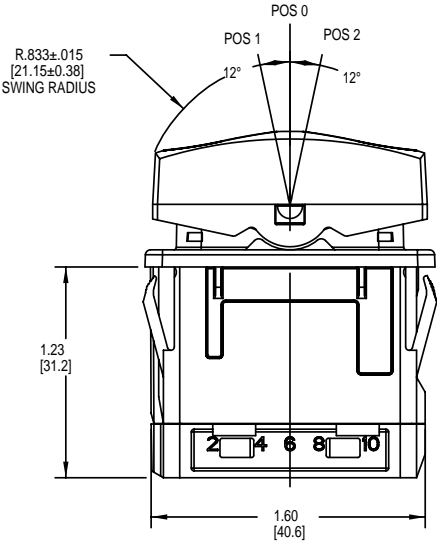
Consult factory for specifics.



Dimensional Specifications: in. [mm]



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



# N-Series

## ADDRESSABLE ROCKER SWITCHES

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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.



### Resources:

*Download 3D CAD Files*

[IGS >](#)

[STP >](#)

### 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

## 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 Megaohms
Contact Bounce	20 milliseconds max.
Contacts	gold plated
Terminals	Brass or copper/silver plate 3/16" (4.76mm) Quick Connect terminations standard.

## Mechanical

Endurance	250,000 cycles minimum
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## 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. Polycarbonate rated at 100°C. Front snap-in.
Connector Bracket	Nylon 66 rated at 85°C. Polarized. Nylon Zytel

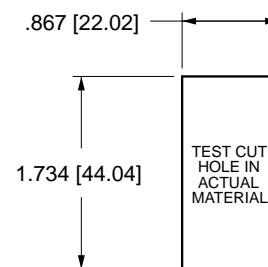
## Actuator Travel (Angular Displacement)

2 position	26°
3 position	13° from center

## Environmental

Environmental	IP67 for above the panel components of the actual switch, representing an index of protection as applied to electrical equipment in accordance with IEC 529, BS 5490, DIN 400 50 & NFC 20 010.
Operating Temperature	-40°C to +85°C
Vibration	Per SAE J1399 "electronic Tachometer Specification" for Class II truck and bus applications. Test Criteria: No change in resistance and no evidence of physical damage.
Salt Spray	Exposure to 95% water, 5% NCl 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.

## Mounting Specifications



MOUNTING HOLE

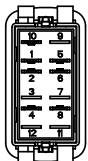
### Panel Thickness Range

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

N	4	1	2	1	A	N	H	1	-	1	1	2	46	-	1	EK
1 Series	2 Actuator	3 R1 Resistive ID	4 R2 Resistive ID	5 Resistor Constants	6 Illumination Lamp	7 Lamp	8 Lamp	9 Bracket	10 Actuator	11 Lens Style & Color Lamp 1	12 Lens Style & Color Lamp 2	13 Legend	14 Legend Orientation	15 Actuator Lens Legend		

## 1 SERIES N

## 2 CIRCUIT<sup>2</sup> Terminal Orientation



( ) - momentary

Position:	1	2	3
STANDARD	2 & 4	Connected Terminals	1 & 2
4	On	NONE	ON
5	(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)

	R3	R4	R5
1	1300	10000	5320
2	825	6650	3830

## 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.

	Lamps	Illumination Type	Lamp wired to Terminals
S	None		
A	# 1	Standard	10+ 12-
	# 2	Standard	11+ 9-
B	# 1 & 2	Special Parallel	11+ 9-
C	# 1 & 2	Special Parallel	10+ 9-
1	# 1	Independent	10+ 9-
2	# 2	Independent	12+ 11-
3	# 1	Independent	10+ 9-
	# 2	Independent	12+ 9-
4	# 1	Independent	10+ 9-
	# 2	Independent	12+ 11-

## 7,8 LAMP (SAME CODING FOR BOTH SELECTIONS)

Selection 7: above terminals 10 & 9; Selection 8: above terminals 12 & 11  
No lamp 0

LED\* 12VDC Red C Amber N Green H

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

## 9 BRACKET COLOR<sup>1</sup>

	Black	White	Gray	Red
Standard Bracket	6	7	8	9
Rockerguard at Lamp 1	L	B	C	D
Rockerguard at Lamp 2	E	F	G	H

## 10 ACTUATOR STYLE AND COLOR<sup>1</sup>

	Black	White	Gray	Red	Laser Etched
Rocker	A	B	C	D	1
Paddle	J	N	K	M	

## 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

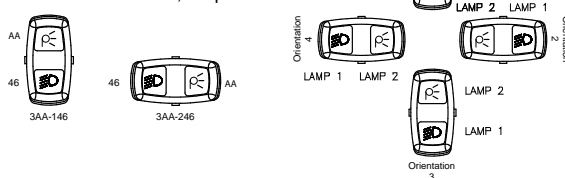
	Clear	White	Amber	Green	Red	Blue
1	-	B	G	M	T	U
-	7	C	H	N	V	W
3	-	D	J	P	-	-
-	9	E	K	R	-	-
5	A	-	-	-	-	-

## 13 LEGEND ORIENTATION

00 No legend this location / no actuator  
For legend options & codes, see pages 54-65 of this catalog.

## 14 LEGEND ORIENTATION

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



## 15 ACTUATOR LENS LEGEND

00 No legend this location / no actuator  
For legend options & codes, see pages 54-65 of this catalog.

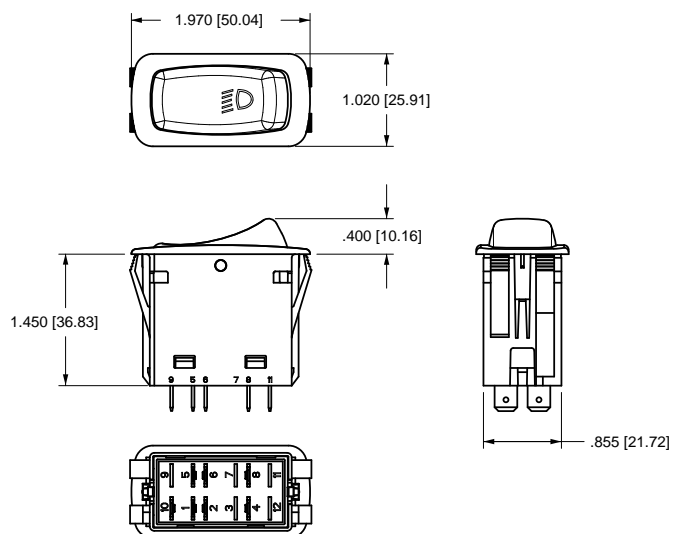
Notes:

- Custom colors are available. Consult factory.
- Switch supplied with .187 tab terminals.

## Dimensional Specifications: in. [mm]

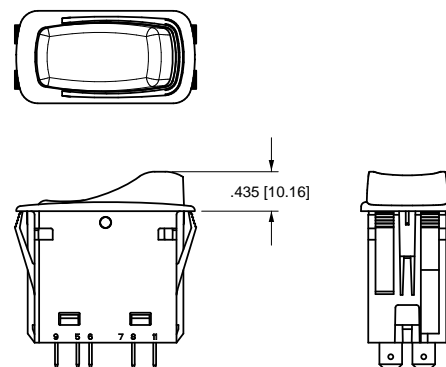
### N-SERIES

SHOWN WITH LASER ETCHED ACTUATOR



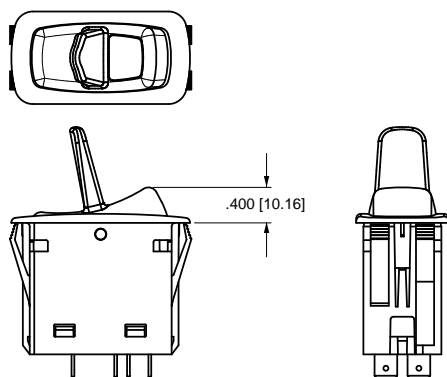
### N-SERIES

SHOWN WITH ROCKER GUARD



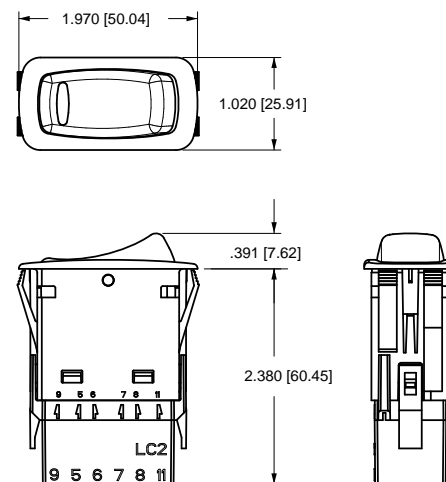
### N-SERIES

SHOWN WITH LARGE LENS  
AND PADDLE ACTUATOR



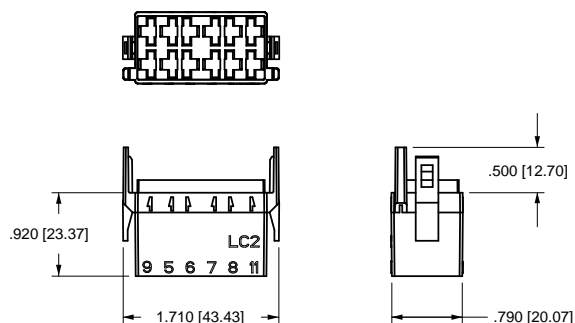
### N-SERIES

SHOWN WITH BARS LENS  
AND CONNECTOR



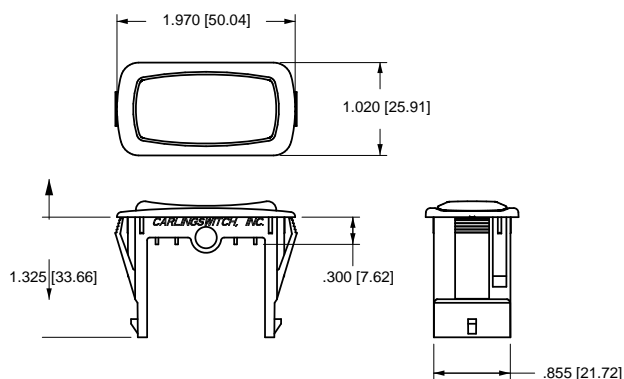
### N-SERIES

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



### N-SERIES

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



## Circuit Diagrams:

CIRCUIT CODE	SCHEMATIC
4	<p>INTERNAL CIRCUIT BOARD (TYPICAL)</p>
5	
6	
7	
8	

## Lamp Circuit Diagrams:

ILLUM. CODE	SCHEMATIC
A	
B	
C	
1	
2	
3	
4	

# LD-Series

## ELECTRONIC DIMMER CONTROLS

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, providing cost-savings as well; 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



## 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 Megaohms
Initial Contact Resistance	10 milliohms max. @ 4VDC
Life	100,000 cycles maintained, 50,000 cycles momentary at rated voltage and current
Contacts	90/10 silver-nickel, silver tin-oxide, gold
Terminals	Brass or copper/silver plate .230 (5.84 mm) Quick Connect terminations standard.

## Mechanical

Endurance	.250,000 cycles minimum
-----------	-------------------------

## Physical

Lighted	Incandescent - rated 10,000 hours LED - rated 100,000 hours 1/2 life (LED is internally ballasted for voltages to 24 VDC)
Seals	Rocker, base & bracket are sealed
Base	Nylon 66 GF rated to 85°C with a flammability rating of 94V0
Rocker	Nylon 66 Reinforced, rated to 105°C (modular lens). Locking rocker, standard rocker & paddle. Laser etching with a polycarbonate actuator
Lock	Acetal
Lens	Polycarbonate rated at 100°C
Bracket	Nylon Zytel
Connector	Nylon 66 rated at 85°C. Polarized

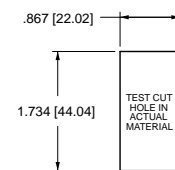
## Actuator Travel (Angular Displacement)

2 position	26°
3 positions	13° from center

## Environmental

Environmental	IP67 for above panel components of the actual switch, representing an index of protection as applied to electrical equipment in accordance with IEC 529, BS 5490, DIN 400 50 & NFC 20 010.
Corrosion	Mixed Flowing Gas MFG Class III per ASTM B-827 & B-845, Method H, with 3 years exposure
Operating Temperature	-40°C to + 85°C
Vibration 1	Per Mil-Std 202F, Method 204D Test Condition A 0.06 DA or 10G's 10-500 Hz. Tested with VCH connector. Test criteria - No loss of circuit during test and pre and post test contact resistance
Vibration 2	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

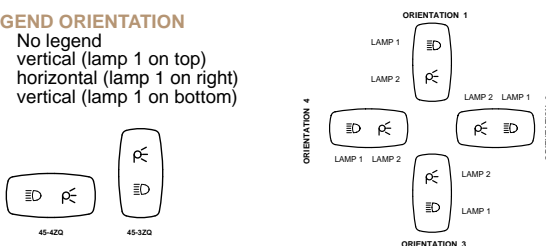
## Mounting Specifications



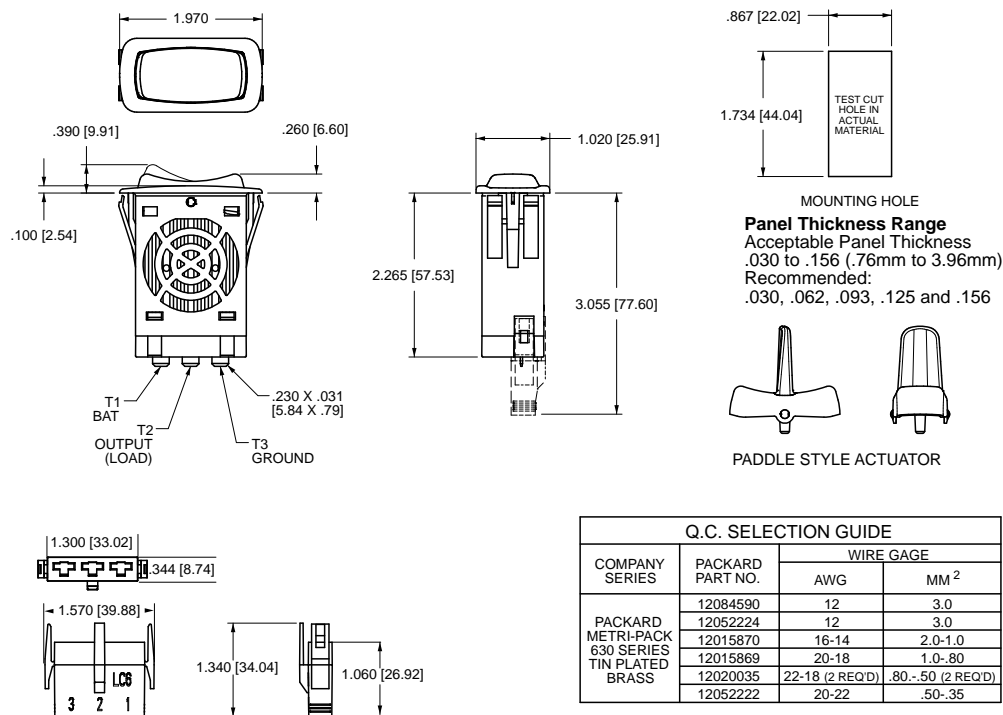
MOUNTING HOLE

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

www.carlingtech.com

<b>1 SERIES</b>		<b>9 &amp; 10 LENS COLOR</b>	
<b>LD</b>	Electronic Dimmer Control	<b>Z</b>	No Lens
		Clear	White
		<b>1</b>	-
		-	<b>B</b>
		<b>3</b>	-
		-	<b>C</b>
		<b>5</b>	<b>A</b>
			Amber
			Green
			Red
			Blue
			Lens Style
			Large Transparent
			Large Translucent
			Bar Transparent
			Bar Translucent
			Laser Etch
<b>2 RATING</b>		<b>11 LEGEND #1</b>	
<b>1</b>	4A, 12 volts	<b>00</b>	No legend
<b>2</b>	10A, 12 volts	<b>FC</b>	Dim
		<b>FE</b>	Bright
		For legend options, visit us at <a href="http://carlingtech.com">carlingtech.com</a>	
<b>3 DIMMING RATE</b>		<b>12 LEGEND ORIENTATION</b>	
<b>1</b>	30 - 100% 8 positions	<b>0</b>	No legend
<b>5</b>	10 - 100% 10 positions	<b>1</b>	vertical (lamp 1 on top)
		<b>2</b>	horizontal (lamp 1 on right)
		<b>3</b>	vertical (lamp 1 on bottom)
<b>4 TERMINATION</b>			
<b>1</b>	.230 TABS (5.84 mm)		
<b>5 &amp; 6 ILLUMINATION</b>		<b>13 LEGEND #2</b>	
No lamp	<b>S</b>	<b>00</b>	No legend
12V LED	<b>C</b>	<b>FC</b>	Dim
24V LED	<b>D</b>	<b>FE</b>	Bright
	Red	For legend options, visit us at <a href="http://carlingtech.com">carlingtech.com</a>	
	Amber		
	Green		
	<b>N</b>		
	<b>P</b>		
	<b>H</b>		
	<b>J</b>		
<b>7 BRACKET COLOR <sup>1</sup></b>			
<b>1</b>	Black	<b>2</b>	White
<b>3</b>	Gray		
<b>8 ACTUATOR STYLE / COLOR <sup>1</sup></b>			
Rocker	Laser Etched	Black	White
Paddle	<b>3</b>	<b>A</b>	<b>B</b>
	<b>4</b>	<b>J</b>	<b>K</b>
		<b>C</b>	<b>M</b>
		<b>D</b>	<b>N</b>
			Red

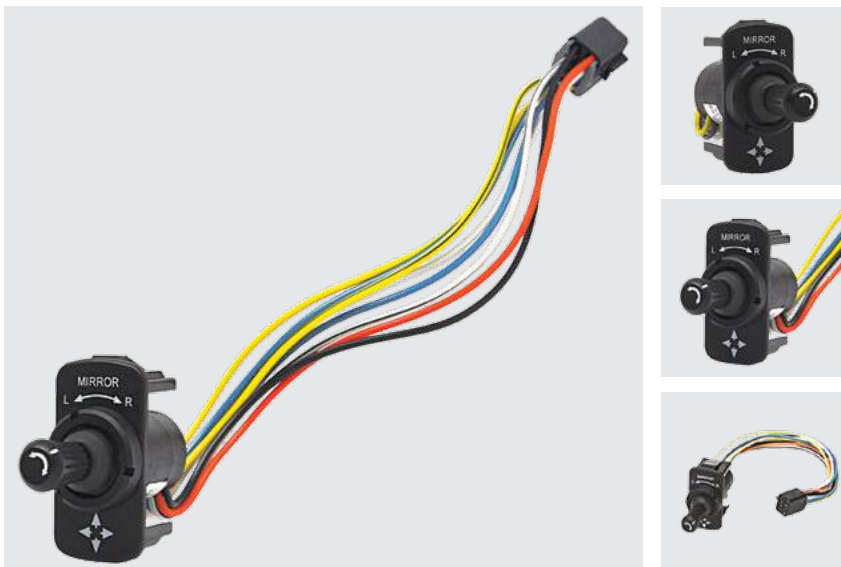
Notes:  
1 Custom colors are available. Consult factory.



# LMR-Series

## MIRROR ROTATE CONTROLS

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



### Product Highlights:

- ♦ Two or four axis
- ♦ Controls up to four separate motors
- ♦ Industry standard 44 x 22mm mounting hole
- ♦ Includes Delphi-Packard 8 pin connector

Actuator

4 axis joy stick style

Electrical

1A 14V; .5A 28V

Sealing

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

Termination <sup>1</sup>

9" wire leads with Delphi-Packard connector #12047886 <sup>3</sup>

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 <sup>2</sup>

Z no legend

1 2 arrows symbol (left, right)

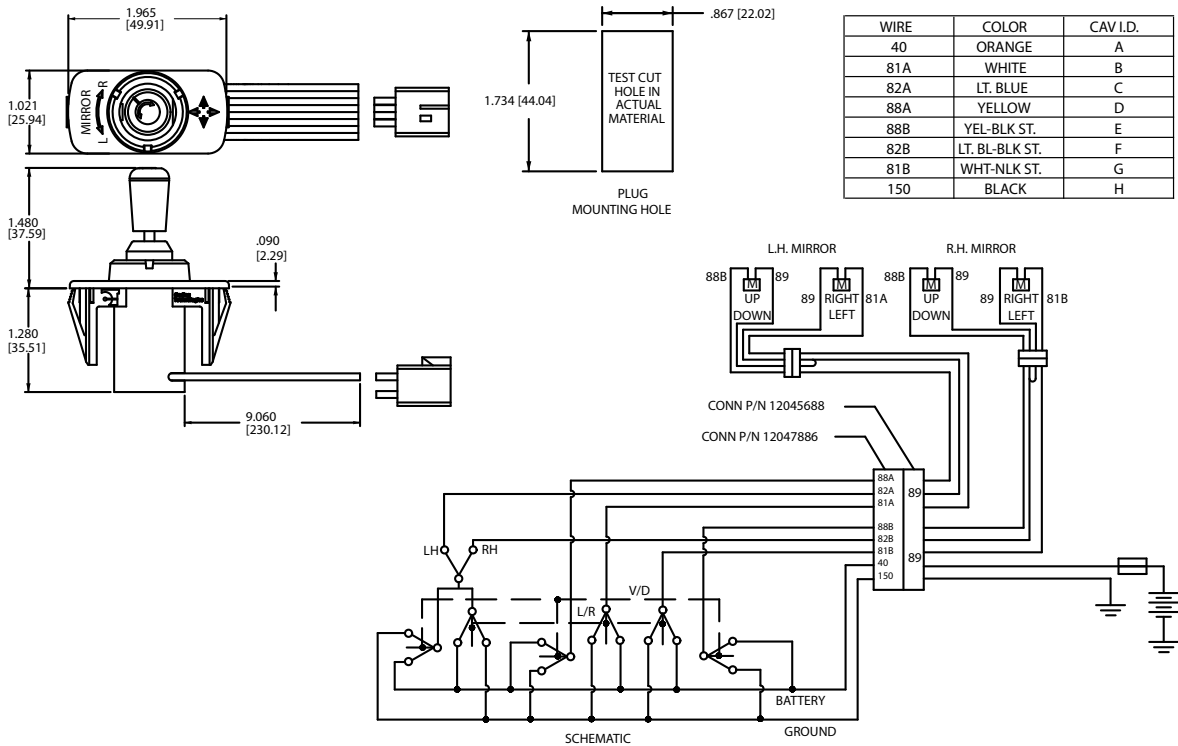
2 4 arrows symbol (front, back and left, right)

- 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.



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

# LW-Series

## WIPER/WASHER CONTROLS

---

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



### Product Highlights:

- ♦ Controls both wash and wipe functions of vehicles
- ♦ 14 or 28 Volts
- ♦ Illuminated or Non-illuminated options
- ♦ Laser etched legends available

## Electrical

Contact Rating	1 relay
	8 amps, 14VDC 4 amps, 28VDC
Terminals	2 relays
	1 amps, 14VDC 1 amps, 28VDC
Protection	.187 (7.4mm) Quick Connect terminations standard.
	Reverse polarity protection Over voltage protection Cold cranking protection according to SAE J1455, Sections. 4.11.1.1.1 and 4.11.1.2.1 Transient voltage protection which includes load dump and inductive switching according to SAE J1455, sec. 4.11.2.2 Electrostatic discharge protection according to SAE J1455 Sec. 4.11.2.2.5.1 (Discharge a 150 pf capacitor that has been charged to a potential of 15kV through 150 Ohm resistor.) Meets all other EMI/EMC requirements for class C trucks.

## Mechanical

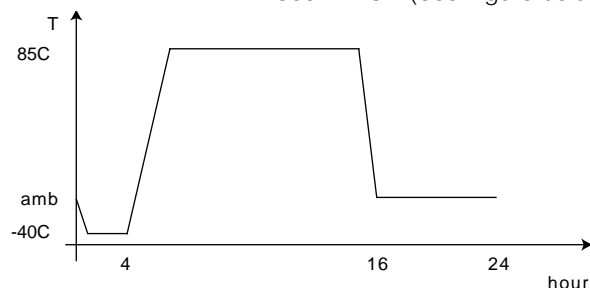
Mechanical Vibration	Sinusoidal Vibration: 10-55-10 Hz, 0.06" DA, one minute-cycle, three hours/axis	
	Random Vibration: Three hours/axis, three mutually perpendicular axes with a test level 4G's.	
	<b><u>Frequency</u></b>	<b><u>Amplitude</u></b>
	5Hz	0.16 G2/Hz
	100Hz	0.16 G2/Hz
	500Hz	-3dB/octave roll-off
	Tests were conducted according to SAE J1455, Sec 5.7 and Sec. 4.9.4.	
	Shock: MIL-STD-202G Method 213B, Test Condition K, 30G's, 11 ms.	
Endurance	According to SAE J2349, March 97 for windshield washer switch for Trucks, Buses and Multipurpose Vehicles (20,000 cycle minimum).	

## Physical Characteristics

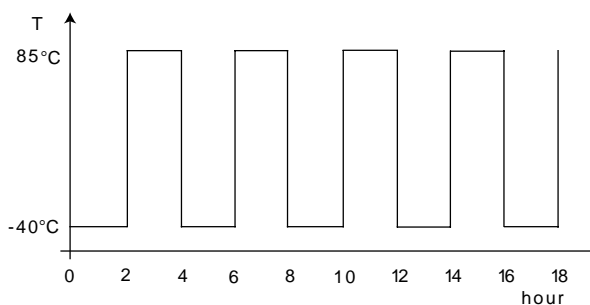
Illumination	LED, rated 100,000 hours 1/2 life
Cover	Acetate
Washer Actuator	Silicone
Toggle Actuator	Nylon 6/6 glass filled
Bracket	Nylon 6/6
Connector	Nylon 6/6 rated 85°C polarized
Washer Function	Momentary
Toggle Function	Maintained Intermittent
Operation	Momentary
Weight	44 grams

## Environmental

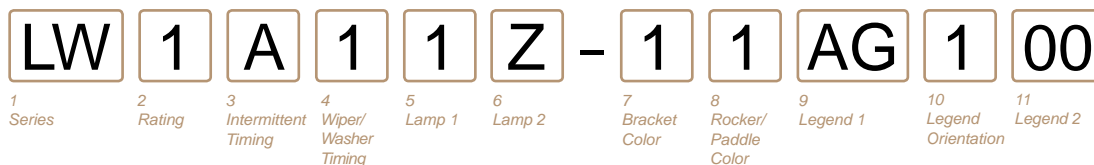
Operating Temperature	-25°C to +85°C
Temperature Cycle	According to SAE J1455, Sec. 4.1.3.1 (See Figure below)



Thermal Shock	According to SAE J1455, Sec. 4.1.3.2 (See Figure below)
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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	MIL-STD-202G, Method 101D for 96 hours.



## 1 SERIES

**LW** Wiper/Washer Control with six intermittent positions:  
low, high, wash/wipe

## 2 RATING 1

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)

<b>Z</b>	No Lamp	2	Red LED
<b>1</b>	Green LED	3	Amber LED

## 6 LAMP #2 (ABOVE WIPE)

<b>Z</b>	No Lamp	2	Red LED
<b>1</b>	Green LED	3	Amber LED

## 7 BRACKET COLOR

**1** Black

## 8 ROCKER / PADDLE COLOR

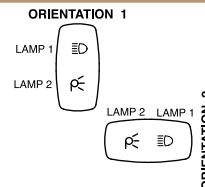
**1** Black

## 9 LEGEND #1

**00** No legend  
For legend options, visit us at [carlingtech.com](http://carlingtech.com)

## 10 LEGEND ORIENTATION

**0** No legend  
**1** Vertical (lamp 1 on top)  
**2** Horizontal (lamp 1 on right)

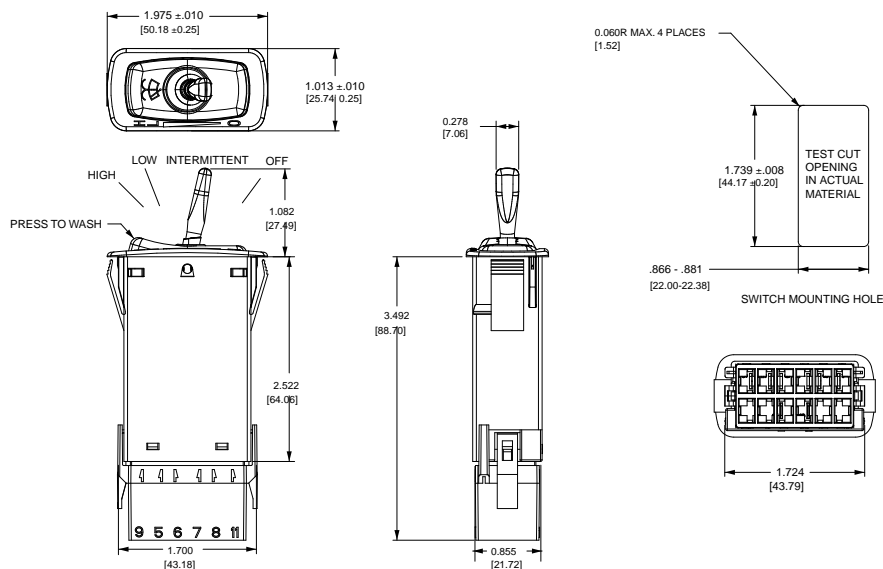


## 11 LEGEND #2

**00** No legend  
For legend options, visit us at [carlingtech.com](http://carlingtech.com)

## Notes:

- 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)

# BD-Series

## BATTERY DISCONNECT POWER SWITCH

Carling Technologies BD-Series battery disconnect switch is designed to minimize battery drain, ensure maintenance personnel safety, and when used in conjunction with a padlock, provide vehicle theft protection.



### Product Highlights:

- ♦ 100-250 Amps
- ♦ 12VDC/24VDC
- ♦ IP67 Sealing Protection
- ♦ Lock Compatible



### Resources:

*Download 3D CAD Files*

[IGS >](#) [STP >](#)

*Watch Product Video*



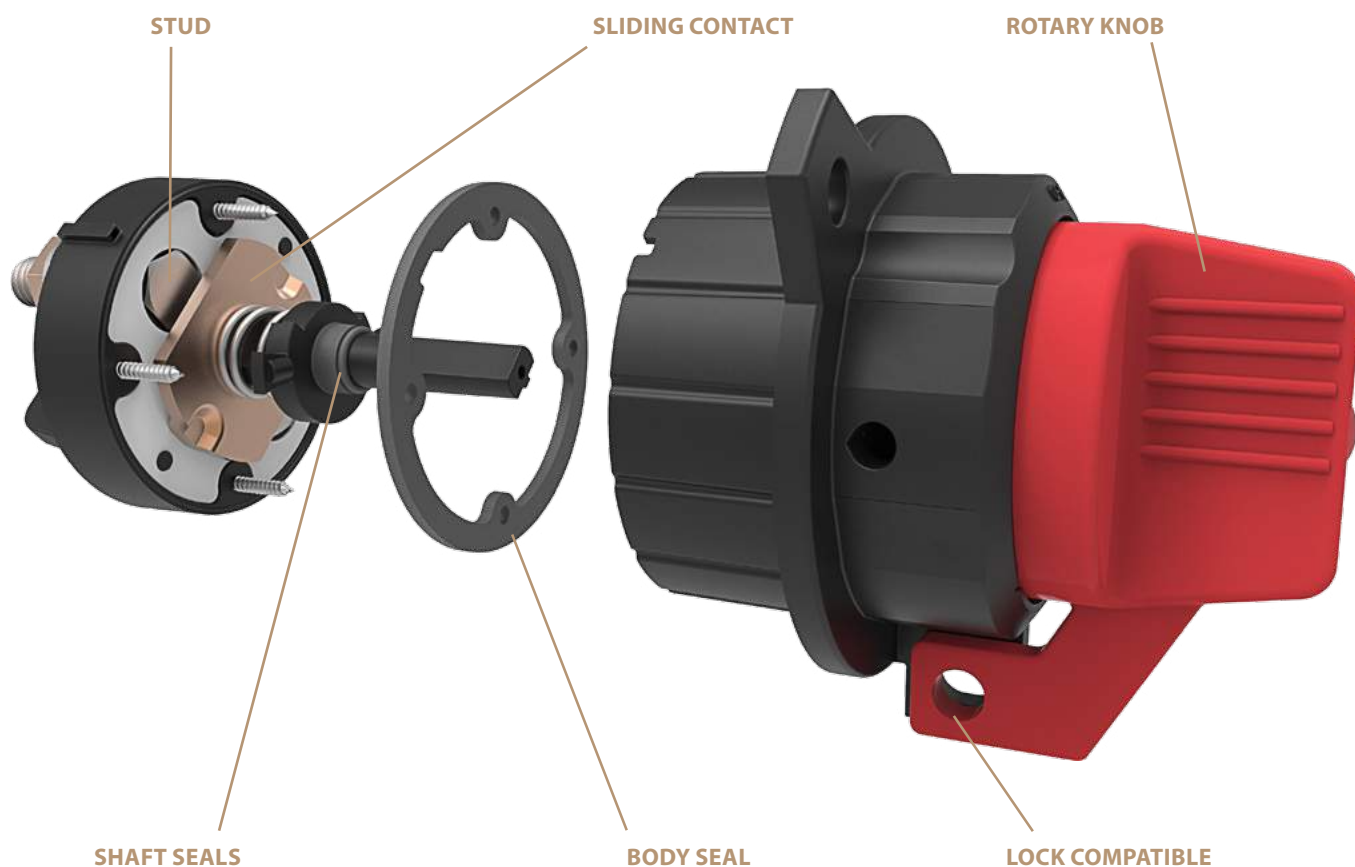
### Typical Applications:

- ♦ On/Off-Highway Equipment
- ♦ Military
- ♦ Marine



# BD-Series

## DESIGN FEATURES



**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 250A
Intermittent Current	1500A: 3 seconds on, 60 seconds off @24VDC, 1500A, repeated 10 times, voltage drop should not be more than 400mV between main terminals.
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	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.

**Physical**

Number of Poles	1 pole
Wiring Terminals	Line/Load terminal: M10 brass nuts Torque value: (6~8 Nm)
Mounting	M8 Iron nut, torque value: 10-15 Nm.
Torque Operation	1.0~3.0 Nm
Body Color	Black
Actuator Color	Red handle, with white color "Arrow" legends.
Weight	340g
Material	Base (PBT glass enforced), Bracket & Knob (nylon glass enforced), Studs (Copper + Tin plating), Nuts (Brass)

**Mechanical**

Free drop	No damage after 3 drops from 1000 mm height
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 cyclic 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 (Five cycles @ -55°C to +25°C to +85°C to +25°C)
Cold/Heat Resistance	IEC 60068-2-1 or GB/T 2423.1 Cold: Test A, work 8 hours @ -40°C IEC 60068-2-2 or GB/T 2423.2 Heat: Test B, work 8 hours @ +85°C
Vibration	IEC 60068-2-34 or GB/ T2423.11, 10~500Hz, Random vibration test for 8 hours in each of the 3 mutually perpendicular axes. 25Gs @ Z axes, 12.5Gs @ X/Y axes. powered.
Salt Spray	IEC 60068-2-11 or GB/T 2423.17, 48 hrs.
Fire and Smoke	IEC 60695-11-10 or GB/T 2408, HB
Dust/Waterproof	IEC 60529 or GB4208, IP 67
Chemical Splash	Gasoline, Diesel, Motor Oil, Brake Fluid, Ammonia, Armor All
UV Protection	ASTM G155-05a, cycle 11, 300 hr Xenon Arc, 1.4W/(m <sup>2</sup> ·nm), wavelength 420 nm.

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

**BD** **A** **10** - **R** **A**  
 1 Series 2 Rating 3 Termination 4 Knob Color 5 Legend

## 1 SERIES

**BD** Battery Disconnect Power Switch

## 2 RATING / OPERATION CYCLE

**A** 100A @ 24VDC: 50,000 Operation  
 200A @ 24VDC: 20,000 Operation  
 250A @ 24VDC: 3,000 Operation

Note: Refer to Endurance Specifications for test parameters.

## 3 TERMINATION

**10** M10 Stud

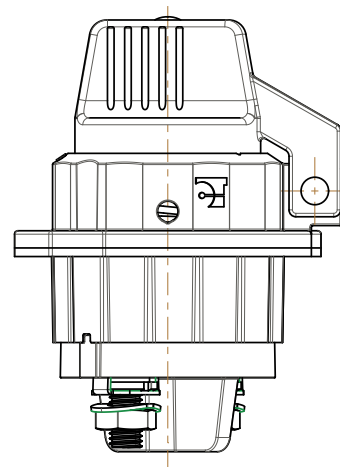
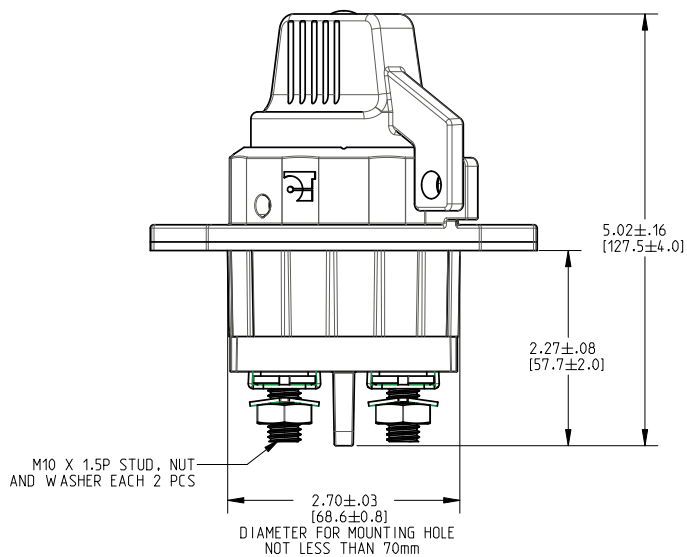
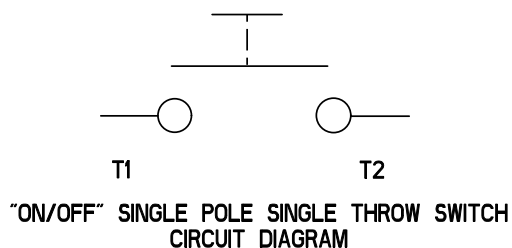
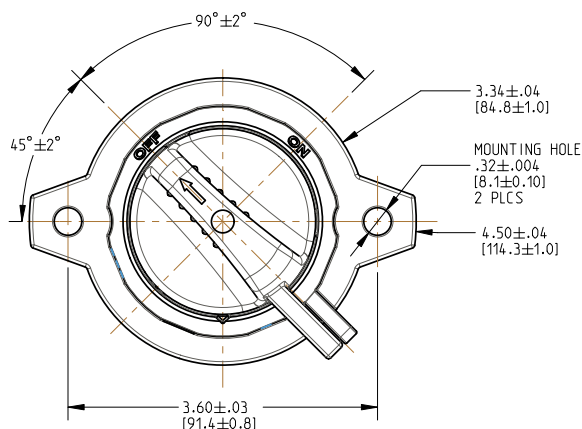
## 4 KNOB COLOR

**R** Red

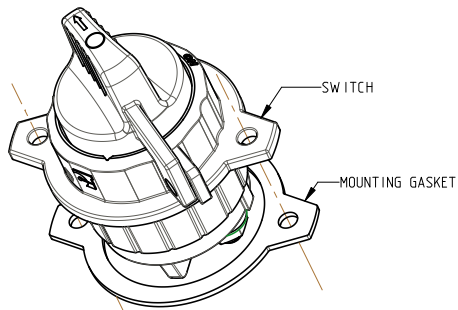
## 5 LEGEND

**A** Arrow Legend, White Color

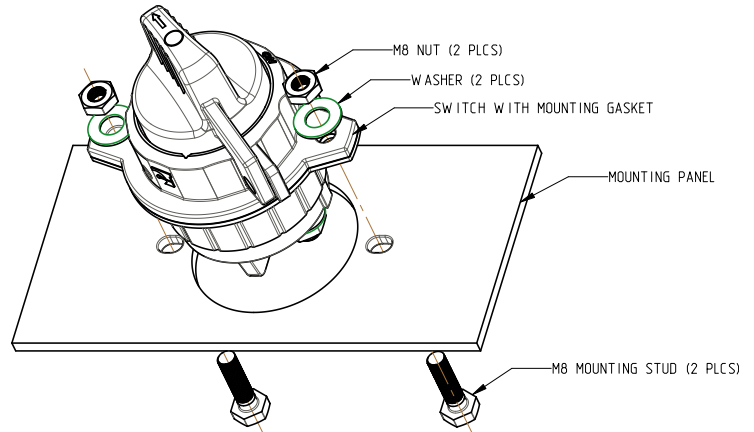
## Dimensional Specifications: in. [mm]



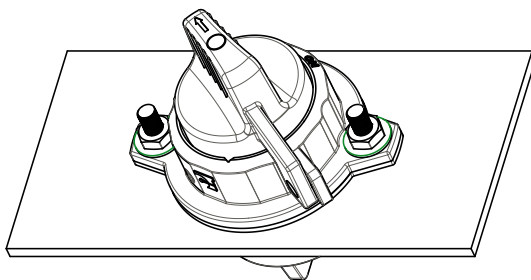
## Mounting Method 1: in. [mm]



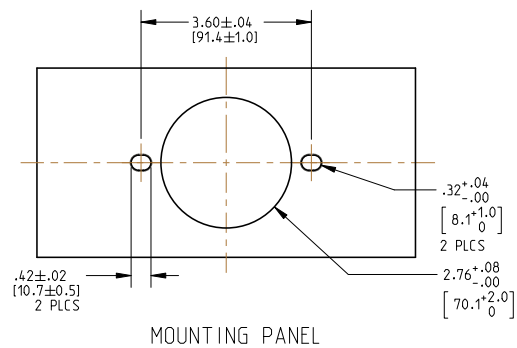
MOUNTING STEP 1: PUT THE MOUNTING GASKET WITH THE SWITCH ORIENTATION AS SHOWN



MOUNTING STEP 2: ORIENT AS SHOWN AND INSTALL THE SWITCH IN MOUNTING PANEL HOLE; THEN INSERT STUDS AND WASHERS AS SHOWN.



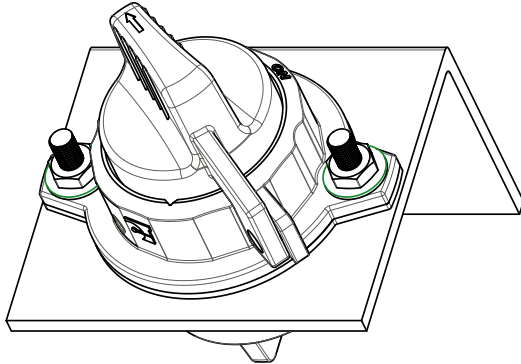
MOUNTING STEP 3: TIGHTEN 2PCS M8 NUTS (USE TORQUE [10-15Nm])



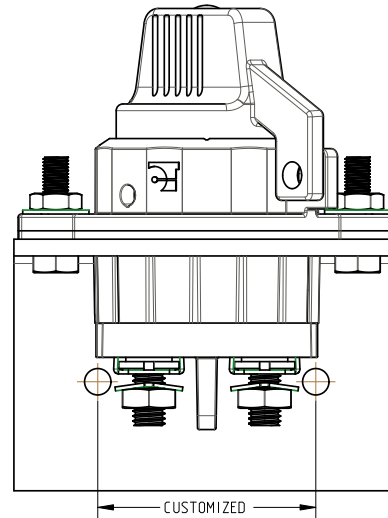
Notes:

1 Switch can be mounted horizontally or vertically.

## Mounting Method 2: in. [mm]

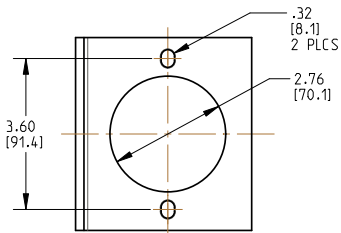
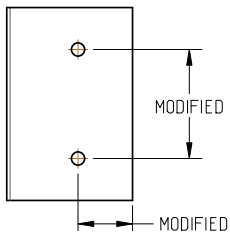
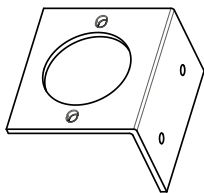


MOUNTING STEP 1: INSTALLING SWITCH WITH MOUNTING BRACKET ORIENTATION AS SHOWN

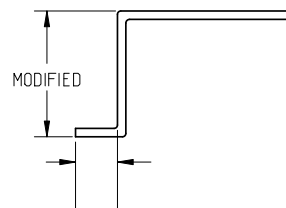


MOUNTING STEP 2: ORIENTAT AS SHOWN AND INSTALL THE SWITCH ASSY IN CUSTOMER PANEL.

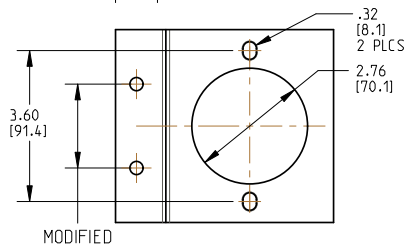
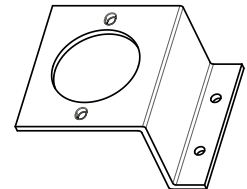
### "L" SHAPE MOUNTING BRACKET



### "Z" SHAPE MOUNTING BRACKET



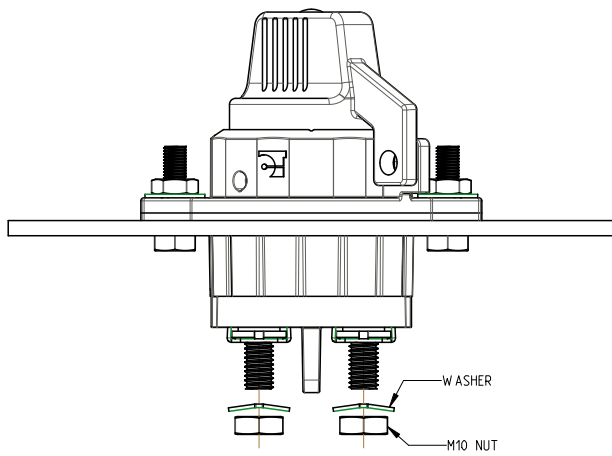
MODIFIED



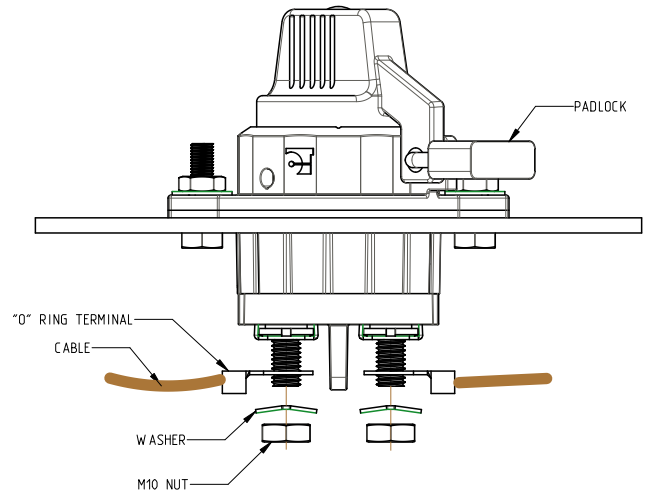
Notes:

- 1 Switch can be mounted horizontally or vertically.

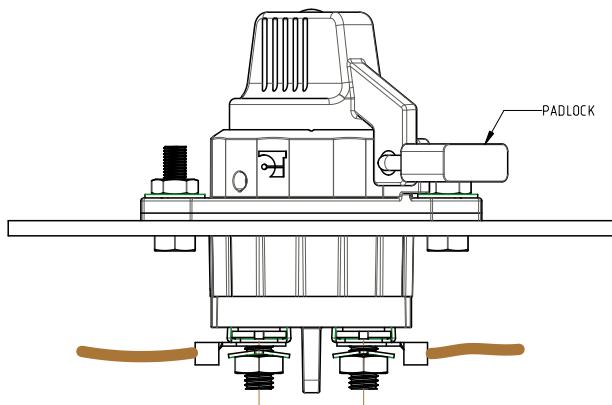
## Wiring: in. [mm]



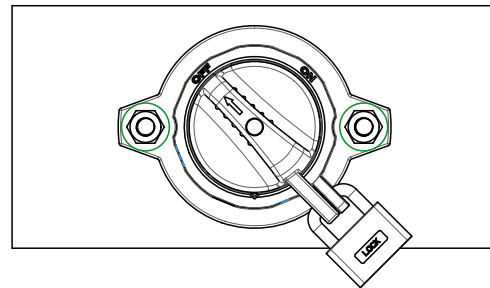
WIRING 1: DISCONNECT WASHERS AND NUTS



WIRING 2: ATTACH 2PCS M10 "O" RING TERMINALS AS SHOWN, THEN RE-FASTEN WASHERS AND NUTS;



WIRING 3: TIGHTEN 2PCS BRASS M10 NUTS (USE TORQUE (6-8Nm))



WHEN USED IN CONJUNCTION WITH A PAD LOCK, SWITCH CAN BE LOCKED IN THE "OFF" POSITION TO PROVIDE SECURITY AND SAFETY

# CMB-Series

## THERMAL CIRCUIT PROTECTORS

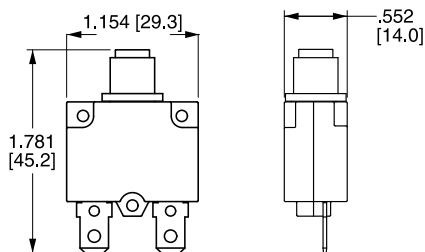
The CMB-Series is a compact, single pole, push-to-reset family of thermal circuit breakers designed to protect equipment. Utilizing simple, precision design with few moving parts, these breakers offer cost effective, extremely reliable circuit protection with high resistance against shock and vibration.



### Product Highlights:

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

### Dimensional Specifications: in. [mm]



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

1 Series      2 Rating      3 Voltage      4 Mounting Hole      5 Bushing Type      6 Mounting Nut      7 Indicator Plate      8 Button      9 Terminal      10 Button Marking

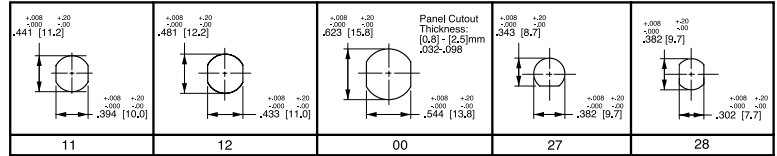
### 1 SERIES CMB

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

2 RATING		10	10 amps
03	3 amps	12	12 amps
04	4 amps	13	13 amps
05	5 amps	14	14 amps
06	6 amps	15	15 amps
07	7 amps	16	16 amps
08	8 amps	20	20 amps

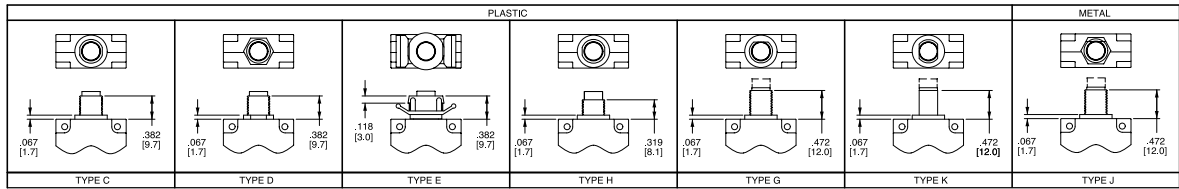
### 4 MOUNTING HOLE

11 1 M11  
12 2 M12  
00 3 Snap In Style  
27 15 3/8" 27 UNS  
28 12 3/8" 27 UNS (double flatted)



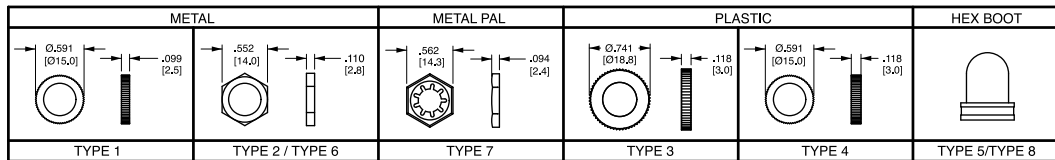
### 5 BUSHING

**PLASTIC**  
C 4 Type C  
D 4 Type D  
E 5 Type E  
G 8 Type G  
H 6 Type H  
K 13 Type K  
**METAL**  
J 8 Type J



### 6 MOUNTING NUT 7

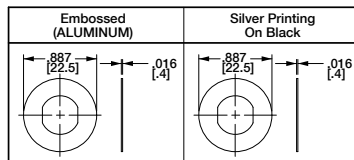
N None  
1 Type 1  
2 Type 2  
3 11 Type 3  
4 Type 4  
5 Type 5  
6 14 Type 6  
7 9 Type 7  
8 9 Type 8



NOTE: Type 5 is clear hex boot. Type 8 is black hex boot (available for bushings G, J & K only); Type 3 nut includes molded in "PRESS TO RESET" marking.

### 7 INDICATOR PLATE 7

N None  
A Embossed Legend  
B Silver Printing on Black



All indicator plates are marked "Suppl. Prot. press to reset".

Notes: All dimensions are in [mm]. Tolerance  $\pm 0.005$  [0.127] unless otherwise specified.

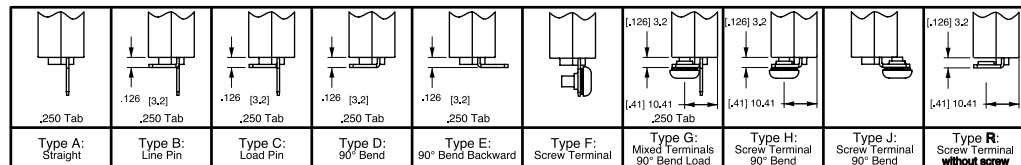
- Used with bushing C or D only.
- Used with H bushing only.
- Used with bushing E only.
- Used with M11 mounting hole only.
- Used with mounting hole 00 only.
- Used with M12 mounting hole only.
- All hardware available separately. Consult factory.
- Available with mounting hole 27 only.
- Available with G, J or K bushing only.
- Amp rating must match button marking (ex: 20 will be marked on the button of CMB-203-27G3N-W-A/20)
- Includes molded in "PRESS TO RESET" marking.
- Available with K bushing only.
- Available with mounting hole 28 only.
- Thickness is 3.0 mm, .118 in.
- Available with G or J bushing only.

### 8 BUTTON

B Black      R Red      W White

### 9 TERMINAL

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



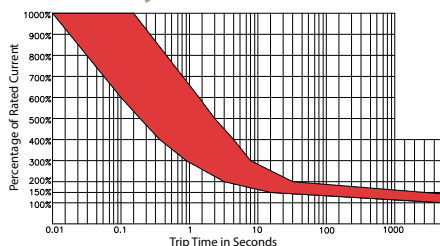
F,G,H,J TERMINALS ARE 8-32 UNC

### 10 BUTTON MARKING (IF BLANK, NO MARKING)<sup>10</sup>

Button Marking Orientation: line  load

03	3 amp	05	5 amp	07	7 amp	10	10 amp	13	13 amp	15	15 amp	20	20 amp
04	4 amp	06	6 amp	08	8 amp	12	12 amp	14	14 amp	16	16 amp		

### Time Delay



Overload	Trip Time
100%	No Trip
150%	Trip in 1 hr
200%	4.0 ~ 40 sec.
300%	0.9 ~ 8.0 sec.
400%	0.42 ~ 5.0 sec.
500%	0.25 ~ 3.0 sec.
600%	0.01 ~ 1.8 sec.

Time Trip Factor <sup>1</sup>
-10 °C x 1.70
-5 °C x 1.60
0 °C x 1.50
5 °C x 1.40
10 °C x 1.30
15 °C x 1.20
20 °C x 1.10
25 °C x 1.00

Time Trip Factor <sup>1</sup>
30 °C x 0.90
35 °C x 0.85
40 °C x 0.80
45 °C x 0.75
50 °C x 0.70
55 °C x 0.65
60 °C x 0.60

Notes:

- Trip Time factor is a guideline that indicates ambient temperature effect on trip times at various overload values.

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



# CLB-Series

## THERMAL CIRCUIT PROTECTORS

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

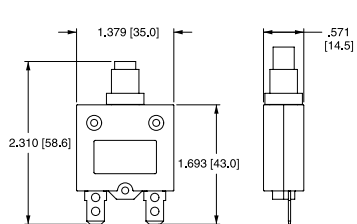


### Product Highlights:

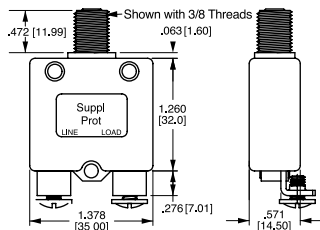
- Ratings from 3-60A, 125, 250VAC, 32VDC
- 2500 VAC/1 minute
- 60°C Max Operating Temperature
- 2500A @ 32VDC Interrupting Capacity
- 100M ohms Insulation Resistance
- Voltage drop <0.25 V
- UL, cUL, CSA, TUV, CE
- UL1500/ISO8846 for ignition protection/marine

### Dimensional Specifications: in. [mm]

#### 3-40A Construction



#### 50 & 60A Construction



**CLB - 10 3 - 12 C 3 B - B - A / 10**

1  
Series

2  
Rating

3  
Voltage

4  
Mounting  
Hole

5  
Bushing  
Type

6  
Mounting  
Nut

7  
Indicator  
Plate

8  
Button

9  
Terminal

10  
Button  
Marking

### 1 SERIES CLB

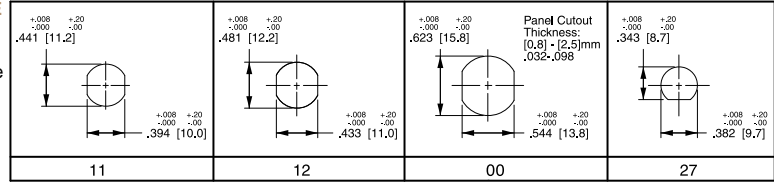
**3 VOLTAGE**  
3 125-250VAC/ 32 VDC

### 2 RATING

03	3 amps	15	15 amps
04	4 amps	18	18 amps
05	5 amps	20	20 amps
06	6 amps	25	25 amps
07	7 amps	30	30 amps
08	8 amps	35	35 amps
10	10 amps	40	40 amps
12	12 amps	50	50 amps
13	13 amps	60	60 amps

### 4 MOUNTING HOLE

11 1 M11  
12 2 M12  
00 3 Snap In Style  
27 4 3/8" 27 UNS



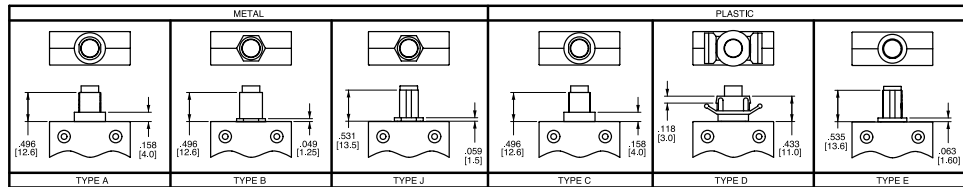
### 5 BUSHING

#### METAL

A 6 Type A  
B 8 Type B  
J 8 Type J

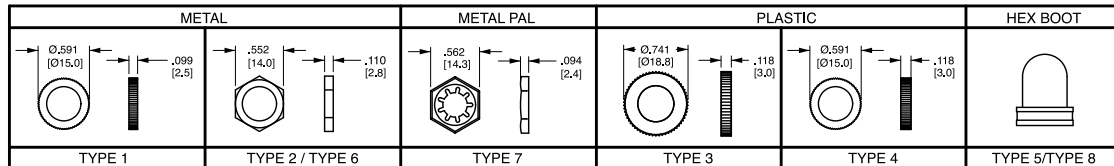
#### PLASTIC

C 5 Type C  
D 7 Type D  
E 8 Type E



### 6 MOUNTING NUT 9

N None  
1 Type 1  
2 Type 2  
3 17 Type 3  
4 Type 4  
5 Type 5  
6 4, 14 Type 6  
7 4 Type 7  
8 4 Type 8

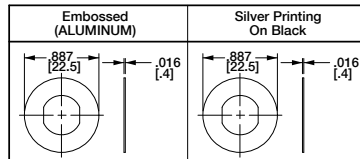


NOTE: Type 5 is clear hex boot. Type 8 is black hex boot (available for bushings E & J only); Type 3 nut includes molded in "PRESS TO RESET" marking.

### 7 INDICATOR PLATE 9

N None  
A Embossed  
B Silver Printing  
on Black

All indicator plates are marked  
"Suppl. Prot. press to reset".



Notes: All dimensions are in [mm]. Tolerance  $\pm .005$  [ .127] unless otherwise specified.

- Used with bushing A or B only.
- Used with bushing A or C only.
- Used with bushing D only.
- Used with bushing E & J only.
- Used with M12 mounting hole only.
- Used with M11 and M12 mounting hole only.
- Used with mounting hole 00 only.
- Used with 27 mounting hole only.
- All hardware available separately.
- Greater than 35 amp rating must use solder joint to connect wire to non-screw type terminals.
- Terminals are .040 [1.0] thickness for ratings greater than 35 amps. Terminals are .315 [8.0] thickness for ratings less than 35 amps.
- Available only with 10-24 unc. screw terminals. (select type F, G, H, J only.) UL, CUL only.
- Amp rating must match button marking (ex: "20" will be marked on the button of the breaker)
- Thickness is 3.0 mm, .118 in.
- Screw terminals are 8-32 UNC
- Used with M11 mounting hole only.
- Includes molded in "PRESS TO RESET" marking.

### 8 BUTTON

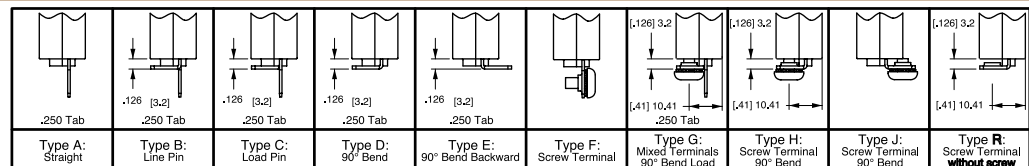
B Black

R Red

W White

### 9 TERMINAL 10,11,15

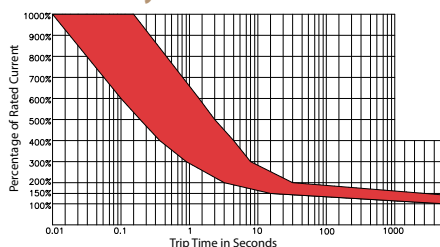
A Type A  
B Type B  
C Type C  
D Type D  
E Type E  
F Type F  
G Type G  
H Type H  
J Type J  
R Type R



### 10 BUTTON MARKING (IF BLANK, NO MARKING)<sup>13</sup> Button Marking Orientation: line (20) load

03	3 amp	06	6 amp	10	10 amp	15	15 amp	25	25 amp	40	40 amp
04	4 amp	07	7 amp	12	12 amp	18	18 amp	30	30 amp	50	50 amp
05	5 amp	08	8 amp	13	13 amp	20	20 amp	35	35 amp	60	60 amp

### Time Delay



Overload	Trip Time
100%	No Trip
150%	Trip in 1 hr
200%	4.0 ~ 40 sec.
300%	0.9 ~ 8.0 sec.
400%	0.42 ~ 5.0 sec.
500%	0.25 ~ 3.0 sec.
600%	0.01 ~ 1.8 sec.

Time Trip Factor <sup>1</sup>
-10 °C x 1.70
-5 °C x 1.60
0 °C x 1.50
5 °C x 1.40
10 °C x 1.30
15 °C x 1.20
20 °C x 1.10
25 °C x 1.00

Time Trip Factor <sup>1</sup>
30 °C x 0.90
35 °C x 0.85
40 °C x 0.80
45 °C x 0.75
50 °C x 0.70
55 °C x 0.65
60 °C x 0.60

Notes:

1. Trip Time factor is a guideline that indicates ambient temperature effect on trip times at various overload values.

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

# CMBA/CLBA-Series

## THERMAL CIRCUIT PROTECTORS

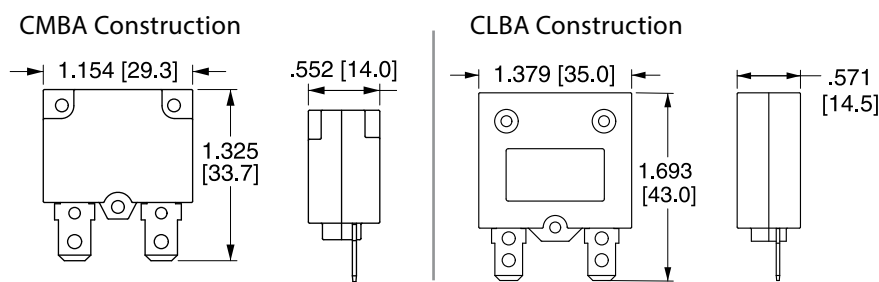
The CMBA/CLBA-Series features automatic cycling and resetting thermal protection capabilities with the same performance as its traditional push-to-reset counterparts.



### Product Highlights:

- ♦ CMBA: 3-20A, 125, 250VAC, 32VDC
- ♦ CLBA: 3-40A, 125, 250VAC, 32VDC
- ♦ 2500 VAC/1 minute
- ♦ 60°C Max Operating Temperature
- ♦ 2500A @ 32VDC Interrupting Capacity
- ♦ 100M ohms Insulation Resistance
- ♦ Voltage drop <0.25 V
- ♦ UL, cUL, TUV

### Dimensional Specifications: in. [mm]



**CMBA** - **10** **3** - **NN** **F** **N** **N** - **B** - **A**

1 Series      2 Rating      3 Voltage      4 Mounting      5 Bushing      6 Mounting Nut      7 Indicator Plate      8 Button Color      9 Terminal

**1 SERIES**  
**CMBA**
**2 RATING**

<b>03</b>	3 amps	<b>10</b>	10 amps
<b>04</b>	4 amps	<b>12</b>	12 amps
<b>05</b>	5 amps	<b>13</b>	13 amps
<b>06</b>	6 amps	<b>15</b>	15 amps
<b>07</b>	7 amps	<b>18</b>	18 amps
<b>08</b>	8 amps	<b>20</b>	20 amps

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

**4 MOUNTING**
**NN** Plug In

**5 BUSHING**
**F** None

**6 MOUNTING NUT**
**N** N/A

**7 INDICATOR PLATE**
**N** N/A

**8 BUTTON COLOR**
**B** Flush Black

**9 TERMINAL**
**A** Type A


.250 Tab

**CLBA** - **10** **3** - **NN** **F** **N** **N** - **B** - **A**

1 Series      2 Rating      3 Voltage      4 Mounting      5 Bushing      6 Mounting Nut      7 Indicator Plate      8 Button Color      9 Terminal

**1 SERIES**  
**CLBA**
**2 RATING**

<b>03</b>	3 amps	<b>13</b>	13 amps
<b>04</b>	4 amps	<b>15</b>	15 amps
<b>05</b>	5 amps	<b>18</b>	18 amps
<b>06</b>	6 amps	<b>20</b>	20 amps
<b>07</b>	7 amps	<b>25</b>	25 amps
<b>08</b>	8 amps	<b>30</b>	30 amps
<b>10</b>	10 amps	<b>35</b>	35 amps
<b>12</b>	12 amps	<b>40</b>	40 amps

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

**4 MOUNTING**
**NN** Plug In

**5 BUSHING**
**F** None

**6 MOUNTING NUT**
**N** N/A

**7 INDICATOR PLATE**
**N** N/A

**8 BUTTON COLOR**
**B** Flush Black

**9 TERMINAL**
**A** Type A


.250 Tab



## Cruise Control

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



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



## Horn Control

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



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



## Light Control Module

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

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



## HVAC Motor Controller

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

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



## Keypads

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

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



## Solid State Power Control


















Module Features:


















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



## VOCM





Multiplexed V-Series rocker modules use industry standard SAE J1939, LIN, and NMEA communications protocols. The rocker module provides the look and feel of a traditional electromechanical switch with the connection benefits of a multiplexed module. Using one cut-out for six switch functions, the multiplexed V-Series rocker modules save assembly time, and greatly simplify wiring and harness requirements, providing a high-tech yet cost-effective solution.






LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	RUNNING LIGHTS (UNDER POWER)	AA	NA	MA
	LIGHT	AB	NB	MB
	MASTER LIGHT SWITCH	AC	NC	MC
	HORN	AD	ND	MD
	PROPULSION SYSTEM TRIM TRIMMING OPERATION	AE	NE	ME
	VENTILATION FAN OR BLOWER	AF	NF	MF
	WINDSHIELD WASHER	AG	NG	MG
	WINDSHIELD WIPER	AH	NH	MH
	BILGE PUMP	AJ	NJ	MJ
	BILGE BLOWER	AK	NK	MK
	POTABLE WATER PRESSURE	AL	NL	ML
	ENGINE START	AM	ED	MM
	ENGINE STOP	AN	EE	MN
	DRIVE TILT TILT OPERATION	30		31
	EMERGENCY START	32		33
	UP/DOWN LIFT	34		
	TRIM TAB TRIMMING OPERATION	35		36

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	ANCHOR LIGHT	37		38
	ANCHOR	39		40
	WATER FLUSHING TAP FOR OUTBOARDS	41		42
	HIGH BEAM	43	44	45
	LOW / DIPPED BEAM	46	47	48
	SIDE MARKER LIGHT	DG	49	DF
	INTERIOR LIGHT	50	51	52
	WORK LIGHT	53	54	55
	WORK LAMP	56	57	58
	LOADING FLOOR LAMP	CW	59	CY
	ON -WIPER- INT DELAY	60		
	ROTARY BEACON	61	62	63
	LAMP TEST	DK	64	DL
	WINDSHIELD WIPER/WASHER	65	66	67
	HAZARD WARNING	68	69	70
	WARM AIR BLOWER	71	72	73
	HORN REAR	AX	74	Y4

## Notes:

- Negative legends not available on L, LD, LW, and N-Series.
- Many symbols are SAE (J1362), ANSI and ISO approved symbols. Consult factory for custom symbols/icons.
- Use "body" legend codes for laser etched image identification.

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	REAR FOG LAMP	75	76	77
	DIFFERENTIAL LOCK	78	79	80
	ALL WHEEL DRIVE	81	82	83
	DIRECTION INDICATOR	84	85	86
ENG HATCH		87		88
HORN		89		90
BLOWER		91		92
DEPTH		93		94
BILGE PUMP		95		96
NAV LTS		97		98
COURT LTS		99		1A
PANEL LTS		1B		1C
ANCH LTS		1D		1E
TRIM TAB		1F		1G
WATER PUMP		1H		1J
WIPER		1K		1L
BILGE		1M		

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
ENG COMP		1N		1P
ACC		1R	1S	1T
NAV ANC		1U		1V
WNDLS UP/DN		1W		1Y
NAV ANCH LTS		1Z		2A
WNDLS ON/OFF		2B		2C
DOCKING LTS		2D		2E
	MUSIC	2F		2G
	BATTERY	2H	FM	2J
	LEVER UP/DOWN	2K		
	ENG PREHEAT	2M	EA	2N
UP		2P		2R
ANTENNA		2S		
DOWN		2T		
PRESS		2U		
AUX START		2V		2W
	GAS	2Y	EB	2Z

## Notes:

- <sup>1</sup> Negative legends not available on L, LD, LW, and N-Series.
- <sup>2</sup> Many symbols are SAE (J1362), ANSI and ISO approved symbols. Consult factory for custom symbols/icons.
- <sup>3</sup> Use "body" legend codes for laser etched image identification.















LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	RIDE CONTROL	3A	EN	3B
	KICK OUT	3C		3D
	BEACON	3E	EP	3F
	SLOW	3G		3H
	CHECK	3J	DJ	3K
	A/C	3L		3M
	REAR DEFOGGER	3N	3P	3R
	FORK LIFT	3S	ER	3T
	ENG PREHEAT	3U		3V
	REAR WINDOW WIPER	AY	3Y	Y5
REAR				EC
	EXCAVATOR BACKHOE BOOM SHIFT	4B		4C
	UNLOCK	4D		4E
	TRANSMISSION LOCK	4F		4G
	FORK LIFT DOWN / UP	4H		

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	DRIVER SEAT LIGHTING	4J		4K
	SIDE MARKER LAMPS	4L	4M	4N
	FOG LAMP	4P	4R	4S
	TRUNK LIGHT	4T		4U
RED		4V		4W
AMBER		4Y		
	LINE INDICATOR	5B		5C
	HANDICAP	5D	BX	5E
	STOP REQUEST	5F		5G
	WINDSCREEN HEATING & VENTILATION	5H	FP	5J
	EXTERIOR MIRROR DEFROSTER	5K		5L
	MOMENTARY LEVER	5M		5N
	SLOW	5P		5R
HIGH		5T	Y6	5U
LOW		5V	Y7	5W
PARK		5Y		5Z

## Notes:


















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- Use "body" legend codes for laser etched image identification.


















LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
WASHER		6C		
	SUPPLEMENTAL STEERING	6D		6E
BATT PARL		6F		6G
	DEPTH SOUNDER	6H		6J
	MUTE	6K		6L
T I M E R		6M		
M A N		6N		
LIVEWELL		6R		
	WATER TANK		6S	
	REAR WASHER/WIPER	6T	BY	6U
	FRONT DIFFERENTIAL LOCK	6V		6W
	LEVER UP/DOWN	6Y		
	BILGE PUMP#1	6Z		7A
	BILGE PUMP#2	7B		7C
	BILGE PUMP#3	7D		7E
	RIGHT STABILIZER	7F		7G
	LEFT STABILIZER	7H		7J

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
HEAD LIGHTS		7K		EJ
CL / ID LIGHTS		7L		
CRUISE CONTROL		7M		
SET/DECEL RES/ACCEL		7N		
ENGINE BRAKE		7P		
HIGH MED LOW		7R		
POWER WINDOW		7S		
ENGINE FAN		7T		
DRIVING LIGHTS		7U		
FOG LIGHTS		7V		
TRAILER CL / ID LIGHTS		7W		
ENGINE DIAGN		7Y		
LH/RH TANK		7Z		
MIRROR DEFOG		8A		
BACKUP LIGHTS		8B		
DASH LIGHTS		8C		
CAB SLEEPER		8D		

## Notes:













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LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	SLEEPER START	8E		
	HIGH LOW	8F		
	CRUISE CONTROL	8G	8H	8J
	CRUISE CONTROL ADJUST	8K	8L	8M
	ENGINE BRAKE	8N	8P	8R
	HIGH/MED/LOW	8S	8T	8U
	POWER WINDOW	8V	8W	8Y
	ENGINE FAN	8Z	9A	9B
	DIAGNOSTICS	9C	9D	9E
	LH/RH TANK	9F	9G	9H
	LENS BLACKOUT		9J	
	VARIABLE	9L	9M	9N
	MIRROR ADJUST	9P	9R	9S
	SPEAKER	9T		9U
	SLEEPER START	9V	9W	9Y
	HIGH / LOW	9Z	A1	A2
	BEACON	A3		

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	MIRROR	A4		
	MASTER SWITCH	A5		A6
	RABBIT (FAST)	A7		A8
	RETARDER	A9		B1
	EXHAUST BRAKE	B2	BZ	B3
	TANDEM AXLE	B4		B5
	AIR TANK	B6		B7
	DRAIN	B8		
	AUTOMATIC TRANSMISSION	B9	EX	C1
	LOADER BUCKET DOWN	C2		C3
	LOADER BUCKET	C4		C5
	AUTO	C6		
	NEUTRAL LOCK	C7	EF	C8
	TRANSMISSION NEUTRALIZER	C9		D1
	RUNNING / ANCHOR LIGHTS	D2		
	TRIM TAB TRIMMING OPERATION	D3		D5
	TRACTOR FORWARD	D6		D7

## Notes:


















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




LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	STEERING	D8	FN	D9
BATTERY PARALLEL		E1		
	MIRROR DEFROST	DD	E2	DE
	SLEEPER LIGHTS		E3	
	IDLE SPEED	FB	E4	FAFN
SLEEPER LIGHTS		E5		
IDLE SPEED		E6		
	MOWER DECK UP/DN	E7		E8
	4 / 2 WD LOCK	E9		F1
	STEERING CONTROL	F2		F3
	DRIVE TILT UP	F4		F5
	MILL MAIN	F6		F7
	MILL REVERSAL	F8		F9
	HEAD LIGHTS	G1		G2
	WORK LIGHT	G3		G4
RAISE		G5	EY	G6
LOWER		G7	Ez	G8

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
FWD		G9		H1
REV		H2		H3
	BROOM	H4		H5
	SANDER	H6		H7
KNEEL		H8		
	CHIME MUTE	DY	H9	DZ
R. DOOR		J1		J2
F. DOOR		J3		J4
AUX BATT		J5		J6
	SWING MAIN	J7		J8
	ACTIVE SWING	J9		K1
	CENTERING	K2		K3
	REAR OPERATION AUTO-LIFT RELEASE	K4		K5
		K6		K7
	ARROW		K8	
	FRONT WINDOW DEFROST	K9		L1
	REAR WINDOW DEFROST	L2		L3

## Notes:


















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














LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	SIDE WINDOW DEFROST	L4		L5
		L6		L7
	CRAWLER STRETCHING	L8		L9
	CRAWLER LOOSENING	M1		M2
	SEARCH LIGHT	M3		M4
	SIDE MIRROR DEFROST	M5		M6
		M7	CA	M8
	UNLOADER AUGER	M9		N1
	REVERSING	N2		N3
	DRIVING LIGHT	N4		N5
	HAZARD	N6		N7
	EXTRA PLUG	N8		N9
	GRAIN TANK LIGHT	P1		P2
	ROTOR LIGHT	P3		P4
	CHAFF SPREADER	P5		P6
	HANDLE	P7	EM	P8
	LEFT / RIGHT TABLE	P9		R1

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	LEFT SIDE KNIFE	R2		R3
	ALL MECHANISMS	R4		R5
	MONITOR MENU	R6		R7
	VERTICAL BAR	S1		S2
	THRESHING SYSTEM	S3		S4
	TABLE MOVEMENT	S5		S6
	CYLINDER SPEED	S7		S8
	COVER PLATE	S9		T1
	ENGINE STARTING AID	T2		T3
	TRACTION CONTROL SYSTEM	T4		T5
	HYDRAULIC DIVERTER VALVE	T6		T7
	LAMP TEST	T8	T9	U1
	DOCKING LIGHT	U2		U3
	ROCKSHAFT	U4		U5
AUX		U6	EG	U7
DOCK LIGHTS		U8		
CTSY LIGHTS		U9		

## Notes:











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









LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	TRIM	V1		
	AIR TEMP SEA	V2		
	ENGINE LIGHTS	V3		
	TRANS LIGHTS	V4		
	DEFOG	V5		
	SEAT	V6		
	UP TRAILER	V7		EH
	DEPTH FINDER	V8		
	EXHAUST	V9		
	SINK PUMP	W1		W2
	STORAGE LIGHTS	W3		
	UP HATCH DOWN	W4		
	TRAILER 3rd AXLE LIFT	W5	W6	W7
	TRAILER 3rd AXLE LIFT	W8		
	HANDLE BAR HEATER	W9		Y1
	PARKING BRAKE	Y2	DH	Y3
	ARROW (UP)	Y8	ES	Y9

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	ARROW (DOWN)	Z1		Z2
	RIGHT SIDE KNIFE	Z3		Z4
	HYDRAULIC HAMMER	Z5		Z6
	HYDRA-CLAMP	Z7		Z8
	SHOVEL FLOAT	Z9		AP
	SHOVEL HORIZONTALLY	AR		AS
	HYDRAULIC HITCH	AT		AU
	LOCK	AV	BW	AW
	LIGHT	AZ		BA
	BLOWER FAST	BB		BC
	ARROW (LEFT)	BD	EU	BE
	ARROW (RIGHT)	BF	EV	BG
	HYDRAULIC FLUID	BH		BJ
	WORK LIGHTS	BK		BL
	TRACTOR WITH REAR PTO	BM		BN
	READING LIGHTS	BP		BR
	5 <sup>TH</sup> GEAR LOCKOUT	BS		BT

## Notes:



















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LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	FAILURE/ MALFUNCTION	BU		BV
COCKPIT LTS	COCKPIT LIGHTS	CB		CC
STOR LTS	STORAGE LIGHTS	CD		CE
SEAT		CF		CG
LIGHT		CH		CK
ANCHOR		CJ		CL
	POWER TAKE OFF	CR	EW	CS
STBD		CM		CN
FUEL		CP		CT
PORT		CU		CV
	SEAT BELT	CZ		DA
	ENGINE DIAGNOSTIC	DB		DC
	TRANS. OIL TEMP	DM	FG	DN
	TRANS. OIL PRESSURE	DP	FH	DR
	AIR FILTER	DS	FJ	DT
	WATER TEMP.	DU	FK	DV
	ENG.. OIL PRESSURE	DW	FL	DX
	* BAR LENS LASER ETCHED	EK		

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	* BAR LENS LASER ETCHED	EL		
DIM		FC		FD
BRIGHT		FE		FF
	REAR INTERAXLE WHEEL DIFF LOCK	FS		
	FRONT WHEEL DIFF LOCK	FT		
	CRAWLING	FU		
	HI/LO GEAR XFER BOX	FV		
	REAR INTERAXLE DIFF LOCK	FW		
	XFER BOX NEUTRAL	FX		
	SUNROOF CLOSE	FY		
	SUNROOF OPEN	FZ		
	BOGGIE LIFT SELECTOR/UP	GA		
	BOGGIE LIFT SELECTOR/DN	GB		
	REAR BUZZER INHIBIT	GC		
	EXTRA HIGH BEAM LAMP	GD		
	MIRROR HEAT	GE		
	ASR OFF ROAD	GF		
	REAR WHEEL DIFF LOCK	GG		

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LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	ADR SWITCH	GH		
	EQUIP LIGHT	GJ		
	PANIC ALARM	GK		
	BEACON WARNING LIGHT	GL		
	MAIN DOOR UNLOCK	GM		
	BOGGIE RATIO CTRL	GN		
	WATER IN FUEL	GP		
	REDUCED SET BURGLAR ALARM	GR		
	PTO ADD GEAR BOX	GS		
	EBS TRAILER BRAKE	GT		
	MUDDY SITE	GU		
	PTO GEAR BOX	GV		
	MAIN DOOR LOCK	GW		
	HAZARD WARNING	GX		
	HILL START AID	GY		
	DRIVING LEVEL CTRL	GZ		
	DRIVING LEVEL CTRL/2	HA		
	REAR WORK PROJ LAMP	HB		

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
OFF	OFF ENG CTRL RATING/PTO	HC		
	ON/OFF PARKING HEATER	HD		
	RED INTERIOR LIGHTING	HE		
	BYPASS/PARKING HEATER	HG		
	AIR SUSPENSION DN	HJ		
	AIR SUSPENSION UP	HK		
—	ENGINE RATING CTRL-	HL		
	AUTO/MANUAL	HM		
	MEM/RECALL	HN		
AUTO	DRIVING LEVEL CTRL/AUTO	HP		
	PERM XFER BOX DIFF LOCK	HR		
	FUNCTION LAMP	HT		
	ENGINE/XFER BOX PTO	HU		
	WINDOW LIFT	HV		
	ABS INHIBIT	HW		

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LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	* CONTURA IV & V BAR LENS LASER ETCHED	HX		
	* * CONTURA IV & V BAR LENS LASER ETCHED	HY		
	ENGINE RATING CTRL	HZ		
ON	ON ENG CTRL RATING/PTO	JA		
+	ENGINE RATING CTRL+	JB		
	HAZARD WARNING LAMP	JC		
	ADR SWITCH	JD		
	DRIVING LEVEL CONTROL	JE		
	DRIVING LEVEL CONTROL	JF		
-	FUNCTION INDICATOR	JG		
	AUTO/MANUAL	JH		
	MIRROR HEAT LEFT DRIVING	JJ		
	PTO GEAR BOX	JK		
	ASR OFF ROAD/ TRACTION CTRL	JL		
	REAR WHEEL DIFF LOCK	JM		
	HSA/BSRA SWITCH	JN		
	EQUIPMENT LIGHTING	JP		
	MACHINE ON	JR		

LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	PANIC ALARM	JS		
	BEACON WARNING LIGHT	JT		
	MV SUNROOF HATCH	JU		
	BOGGIE LIFT SELECTOR	JV		
	BOGGIE LIFT SELECTOR	JW		
	ACOUSTIC REVERSE LIGHT	JX		
	REAR WORK PROJECTOR LAMP	JY		
	PTO ON REAR ENGINE NMV	JZ		
	REAR INTER AXLE/ WHEEL DIFF LOCK	KA		
	WINDOW LIFT	KB		
	AIR SUSPENSION DOWN	KC		
	AIR SUSPENSION UP	KD		
	MAIN DOOR UNLOCK	KE		
	MAIN DOOR LOCK	KF		
MEM 	MEMORIZE/ RECALL SWITCH	KG		
2s recall 5s store 	MEMORIZE/ RECALL SWITCH	KH		
ON 	ON/OFF ENGINE RATING CTRL	KJ		
	REDUCED SET BURGLAR ALARM	KK		

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LEGEND		LEGEND CODE		
SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	PARKING HEATER	KL		
	PTO ADD GEAR BOX	KM		
	MUDDY SITE SWITCH	KN		
	EBS TRAILER BRAKE	KP		
	+/- POUR PMT	KR		
	+/- POUR PMT	KS		
	ADR SWITCH	KT		
	ADR SWITCH	KV		
	WINCH UP	KW		
	WINCH DOWN	KX		
	CRUISE SPEED	KY		
	CRUISE RESUME	KZ		
	CRUISE SET	LA		
	MAIN SWITCH CONTROL	LB		
	ADDITIONAL WARNING	LC		
	REAR SEARCH SPOTLIGHT	LD		
	FRONT SEARCH SPOTLIGHT	LE		
	2 TONES SIREN	LF		

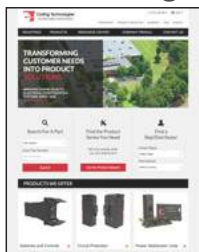
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SYMBOL	NAME (SYMBOL MEANING)	BODY	LENS	
			NEGATIVE <sup>1</sup>	POSITIVE
	DAY/NIGHT MODE	LG		
	OFF ROAD MODE	LH		
	ROAD MODE	LJ		
	WINDOW LIFT	LK		
	AUTO NEUTRAL MV/DV	LL		
	SUNROOF CONTROL	LM		
	BEACONS WARNING LIGHTS	LN		
	REDUCE SET ALARM	LP		
	NIGHT HEATER	LR		
	WHITE DISC	LS		
	AUTO NEUTRAL RENAULT	LT		
	OFF ROAD	LU		
	FUNCTION LIGHT	LV		
ON OFF			11	
OFF ON			12	
 O O 			13	
O O 			14	
O F F O N			15	

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There are several catalogs available featuring complete details on all Carling Technologies products. Below is a list of useful information such as catalogs, brochures and videos. Please visit our website at **carlingtech.com** or scan the QR codes below for complete details.

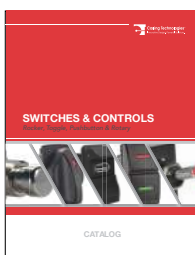
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### Watch Company Profile Video



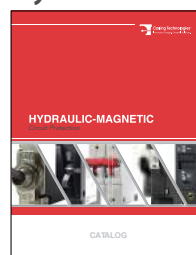
### Switches & Controls



*catalog*

Complete line and ordering details for Switches & Control products including Rocker, Toggle, Pushbutton, and Rotary style switches.

### Hydraulic-Magnetic



*catalog*

Complete line and ordering details for all hydraulic-magnetic circuit breakers.

### Thermal



*catalog*

Complete line and ordering details for all thermal circuit breakers.

### GFCI / ELCI



*catalog*

Complete line and ordering details for all GFCIs/ELCIs.

## Marine



catalog



brochure

Complete line of ELCIs, thermal and hydraulic-magnetic circuit breakers specific for marine applications.

## On-Off Highway



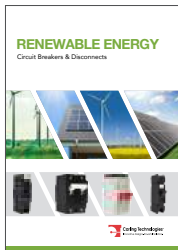
catalog



brochure

Complete line of switches, controls and custom solutions specific for on-off highway applications.

## Renewable Energy



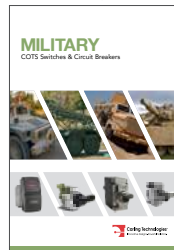
catalog



brochure

Complete line of circuit breakers and disconnect products specific for renewable energy applications.

## Military



catalog



brochure

Complete line of COTS (*Commercial-Off-The-Shelf*) switches and circuit breakers specific for military applications.

## Telecom/Datacom



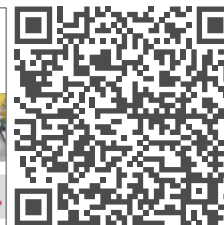
catalog



brochure

Complete line of hydraulic-magnetic circuit breakers specific for telecom/datacom applications.

## Industrial Automation



brochure

Complete line of switches and circuit breakers specific for industrial automation & controls applications.

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

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