

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:

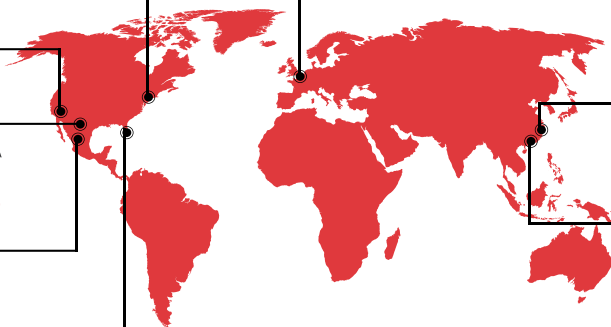
Carling Technologies
World Headquarters
Plainville, CT, USA
ISO 9001:2008
ISO/TS16949:2009

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:

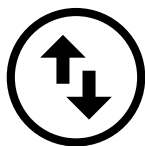


2000+
EMPLOYEES

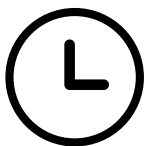


150+
ENGINEERS

COMPETITIVE ADVANTAGES⁺



Vertical Integration



Reliable & On-Time Delivery



Excellent Customer Service



Innovative & Eco-Friendly Products



70+
DISTRIBUTORS



50+
REP FIRMS

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>
Poles	1, 2	1, 2	1, 2	1	1, 2	1, 2
Ratings	16A 12V 16A 18V 14A 24V 15A 125VAC 10A 250VAC	up to 20/15A 12/24VDC 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
Actuator	toggle (bat)	rocker, paddle, locking rocker	ergonomic knob	sealed spring- loaded access doors	bezel-less rocker, paddle & locking rocker	IP67, rocker, paddle, locking rocker
Mounting Hole Specifications	.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
Termination	.250 tabs screw terminals	.250 tabs solder lug wire leads	solder lugs .250 tabs wire leads	.250 tabs	.110 tabs	.187 tab .250 tabs
Sealing	IP68	IP66/68 above panel	IP67 above panel	IP64 above panel	IP68 above and below panel, fully submersible	IP67 above panel
Illumination	n/a	incandescent, LED, neon	incandescent, LED	LED	LED	incandescent, LED
Approvals	UL, cUL pending	UL, CSA	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>
Poles	1, 2	1	multi-function	multi-function	multi-function	1
Ratings	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
Actuator	bezel-less rocker	rocker, paddle	rocker, paddle	joystick	rocker, paddle	ergonomic knob
Mounting Hole Specifications	.787" x 1.575" snap-in, keyed	.867" x 1.734" [22mm x 4mm] 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
Termination	.110 Tabs	.187 tabs	.250 tabs	wire leads with connector	.187 tabs	M10 Stud
Sealing	n/a	IP67 above panel	IP67 above panel	Water Resistant	n/a	IP67
Illumination	LED	LED	LED	n/a	LED	n/a
Approvals	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
Number of Poles	1	1
Actuator	pushbutton	pushbutton
Leakage Current Trip Level	n/a	n/a
Leakage Current Trip Time	n/a	n/a
Max Current & Voltage Ratings	3 to 20A, 125-250VAC, 32VDC	3 to 60A, 125-250VAC, 32VDC
Max Interrupting Capacity	2500A@32 VDC	2500A@32 VDC
Available Circuits	series trip manual reset	series trip manual 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
Mounting Method	threaded bushing, front panel snap-in	threaded bushing, front panel snap-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

ELECTRONIC SWITCHING PRODUCTS	
Software	SAE J1939 CAN 2.0b Protocol
Circuitry	12 individual loads
Operating Voltage	8-32 V
Illumination	1, 2, or 3 LED's per load
Sealing	IP69 Front Panel; IP68 Back Panel when connected
Termination	Deutsch DT-Series Connector
Legends	Custom or standard laser etched back-lighting



CKP-Series

CUSTOM ELECTRONIC CONTROLS, POWER MANAGEMENT MODULES & DISPLAYS								
								
TOTAL VEHICLE CONTROL	<i>Cruise Control</i>	<i>Light Control Module</i>	<i>Horn Control</i>	<i>HVAC Motor Controller</i>	<i>Solid State Power Control</i>	<i>Multiplexed V-Series Rocker Modules</i>	<i>Control Interface</i>	<i>Multi-function Displays</i>

*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](#)



[Watch Product Video](#)



Product Highlights:

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

V-Series Switch

DESIGN FEATURES

INTERCHANGEABLE ACTUATORS

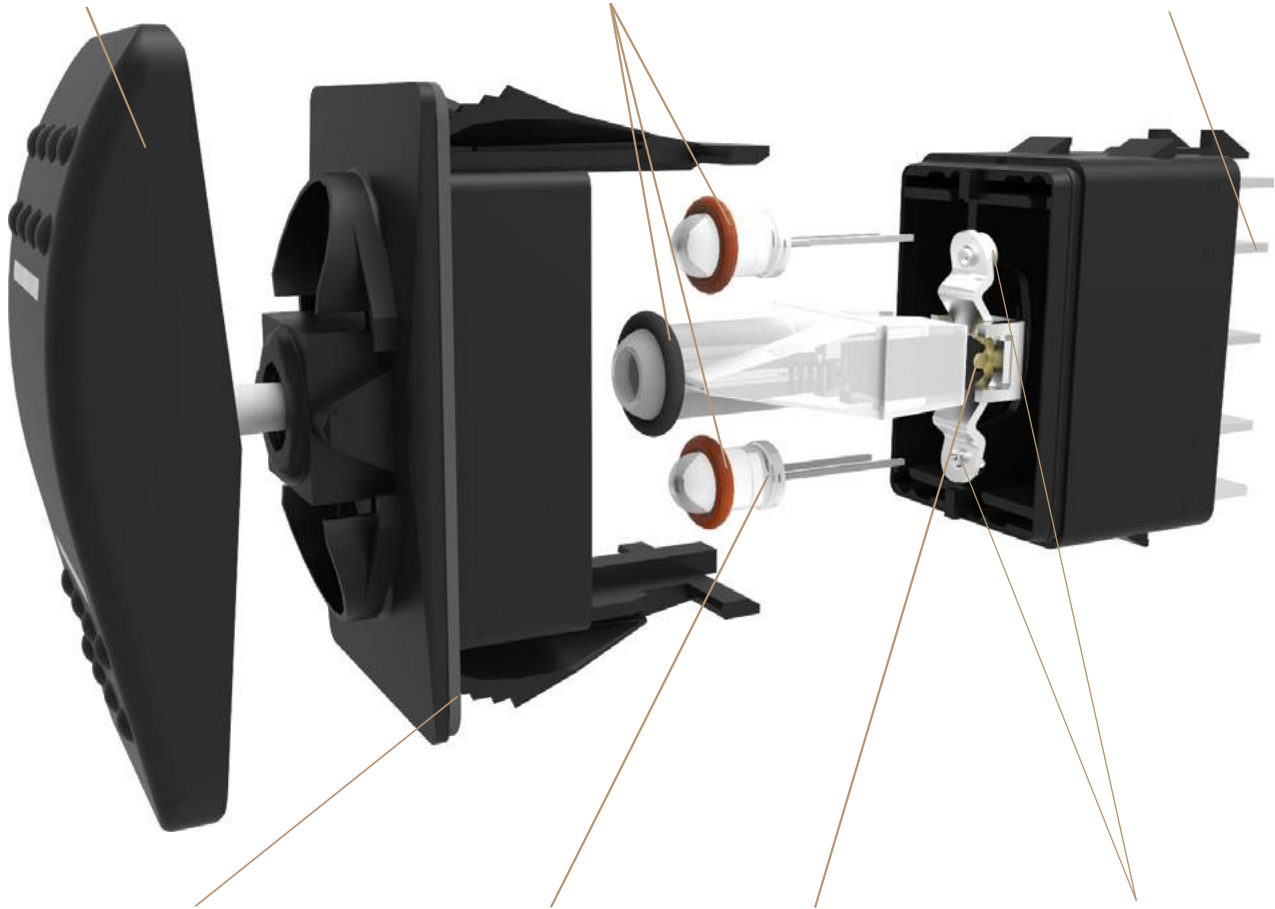
Panel redesign is a snap with our wide range of rocker styles. Achieve maximum design variety with minimum inventory. Simply swap rockers to create an entirely new look for your panel.

DUAL SEAL PROTECTION

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

CLEAN CONNECTIONS

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



OPTIONAL PANEL SEAL

Prevents water/dust ingress behind panel.

MULTIPLE LIGHTING OPTIONS

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

BRASS ROLLER PIN

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

SILVER PLATED BUTT CONTACT MECHANISM

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

Contura II & III

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



Contura 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 a 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

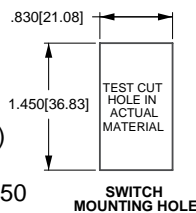
Lighted	Incandescent - rated 10,000 hours Neon - rated 25,000 hours LED - rated 100,000 hours 1/2 life (LED is internally ballasted for voltages to 24VDC)
Seals	Internal
Base	Optional external gasket panel seal Polyester blend rated to 125°C with a UL flammability rating of 94V0.
Contura II,III,IV,V, VI, VII Actuator	Hard Surface: Basic actuator structure molded of thermoplastic polycarbonate with a hard Nylon 66 thermoplastic surface overlay. Soft Surface: Basic actuator structure molded of thermoplastic polycarbonate with an elastomer overlay.
Contura X,XI,XII Actuator,VP 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: IP66/68, this rating applies to front panel components of the actual switch only, and signifies complete protection against dust as well as powerful jets of water.
Corrosion	Mixed Flowing Gas (MFG) Class III 3 year accelerated exposure per ASTM B-827, B-845 Silver and gold contacts
Operating Temp.	-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	Mil STD 810, Method 510.2 Air Velocity 300 Ft/Min Duration 16Hr
Thermal Shock	Per Mil-Std 202F, Method 107F, Test Cond. A, -55°C to +85°C. Test criteria - pre and post test contact resistance
Moisture Resistance	Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance
Ignition Protection	All Contura switches with sealed construction meet the requirements of UL1500/ISO8846 for ignition protection, in addition to conformance with EC directive 94/25/EC for marine products.

V 1 D A B T O B - A R B 00 - 0 00

1 Series 2 Circuit 3 Rating 4 Termination Illumination 5 Lamp 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. 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 3

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

5 ILLUMINATION

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

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 (-)
SINGLE POLE SWITCHES ONLY				
J	8	1	DOWN	3 (+) 8 (-)
		2	INDEPENDENT	6 (+) 7 (-)
K	W	1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)
DOUBLE POLE SWITCHES ONLY				
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				
Neon	1	125VAC	2	250VAC	
Incandescent	4	3V	5	6V	6
LED*					12V superbright
					7
					18V superbright
					8
					24V
2VDC	A	Red	L	Amber	F
6VDC	B		M		G
12VDC	C		N		H
24VDC	D		P		J

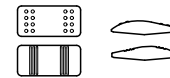
* Consult factory for "daylight bright" LED options. Typical current draw for LED is 20ma.

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
A, B	Contura II
C, D	Contura III



Actuator thick end over terminals: 3,6 1,4

10 LENS

0 - No Actuator Z - No Lens

	Amber	Green	Red	Blue
1	6	8	G	M T
2	7	C	H	N U
3	8	D	J	P V

Square lens options only available for Contura II.

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 AND TEXTURE

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

12 ACTUATOR LENS OR BODY LEGENDS 2

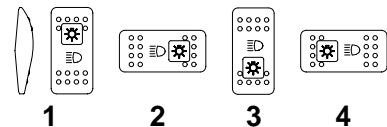
11 ON	12 OFF	13 I	14 O
OFF	ON	O	I
15 O O	16 O O	17 O I	18 I O
F N	N F	F	F

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

13 LEGEND ORIENTATION

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

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



14 ACTUATOR LENS LEGEND

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

Notes:

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

- 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 O B - A Z E 00 - 0

1 Series 2 Circuit 3 Rating 4 Termination Illumination 5 Lock 6 Lamp 7 Bracket 8 Actuator 9 Lens 10 Function 11 Legend 12 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. **8 terminal 10 terminal** 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	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*	(2 & 3, 5 & 6)	2 & 3	5 & 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. Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

5 ILLUMINATION & SWITCH SEALING

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

Sealed	Unsealed	Lamps	Illumination Type	Lamp wired to Terminals
S	0	NONE	-	-
C	3	2	UP	3 (+) 7 (-)
H	Z	2	INDEPENDENT	8 (+) 7 (-)
DOUBLE POLE SWITCHES ONLY				
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	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	

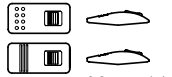
* Consult factory for "daylight bright" LED options. Typical current draw for LED is 20ma.

8 FLUSH BRACKET COLOR 1, PANEL SEAL

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

9 HARD SURFACE ACTUATOR 1

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



Actuator orientation above terminals:

10 LENS

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



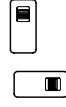
Lens color for LEDs must be clear, white, or match color of LED. Green or blue lenses are not recommended with Neon lamps.

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

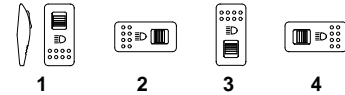
00 - No Legend				
21 OFF	22 ON	23 O	24 I	
25 O	26 O	27 O	28 I	
F	N			



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

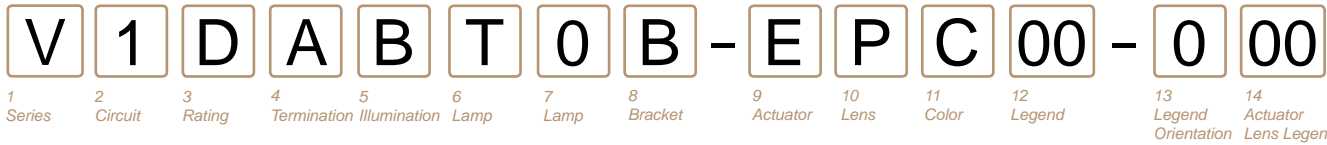
13 LEGEND ORIENTATION

- 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.
- 1 Custom colors are available. Consult factory.
- 2 White imprinting is standard on black actuators; Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
- 3 Only available with 3 position circuits. Center OFF and special circuits only available with center position lock function.
- 4 Additional ratings available. See V-Series Switch Accessories page.



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

Position:

SP	DP	1	2	3
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

H*	2 & 3	2 & 3, 5 & 4	5 & 4
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 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. Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

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

Sealed	Unsealed	Lamps	Illumination Type	Lamp wired to Terminals
S	0	NONE	-	-
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	3 (+) 7 (-)
H	Z	2	INDEPENDENT	8 (+) 7 (-)
U	Y	1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	10 (+) 9 (-)

SINGLE POLE SWITCHES ONLY

J	8	1	DOWN	3 (+) 8 (-)
K	W	1	INDEPENDENT	6 (+) 7 (-)
		2	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)

DOUBLE POLE SWITCHES ONLY

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				
Neon	1	125VAC	2	250VAC	
Incandescent	4	3V	5	6V	
LED*			6	12V	7
				superbright	8
				Green	24V
				Red	

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

* 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	H
	C	Y	

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 over terminals:

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 CHART

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

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

13 LEGEND ORIENTATION

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

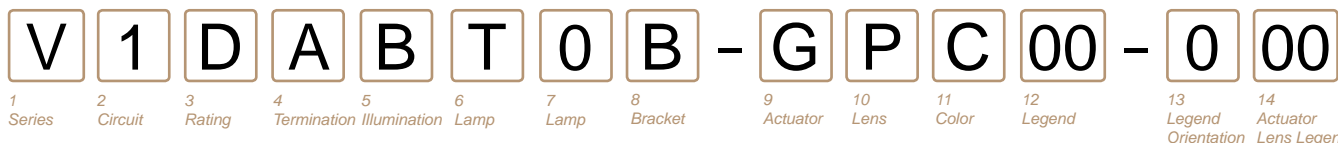
14 ACTUATOR LENS LEGEND

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

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

Notes:

- Consult factory to verify horsepower rating for your particular circuit choice.
- Custom colors are available. Consult factory.
- White imprinting is standard on black actuators; Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
- 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.



1 SERIES
V

2 CIRCUIT
Terminal Connections as viewed () - momentary from bottom of switch: SP - single pole - uses terminals 1, 2 & 3. DP - double pole uses terminals 1, 2, 3, 4, 5 & 6. **8 terminal 10 terminal** 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

H*	2 & 3	2 & 3, 5 & 4	5 & 4
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 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. Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

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

Sealed	Unsealed	Lamps	Illumination Type	Lamp wired to Terminals
S	0	NONE	-	-
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	1	UP	1 (+) 7 (-)
F	6	2	UP	3 (+) 7 (-)
G	7	1	INDEPENDENT	8 (+) 7 (-)
H	Z	2	UP	3 (+) 7 (-)
U	Y	1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	10 (+) 9 (-)

SINGLE POLE SWITCHES ONLY

J	8	1	DOWN	3 (+) 8 (-)
		2	INDEPENDENT	6 (+) 7 (-)
K	W	1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)

DOUBLE POLE SWITCHES ONLY

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				
Neon	1	125VAC	2	250VAC	
Incandescent	4	3V	5	6V	
LED*			6	12V	7 18V
		Red	Amber	superbright	superbright
				Green	Red
2VDC	A		L	F	R
6VDC	B		M	G	S
12VDC	C		N	H	T
24VDC	D		P	J	V

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

8 FLUSH BRACKET COLOR 1, PANEL SEAL

No Seal	Black	White	Gray
One Seal	B	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	bar
2	7	C	H	N	U	bar/bar
3	8	D	J	P	V	oval
4	9	E	K	R	W	oval/bar
5	A	F	L	S	Y	oval/oval

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.

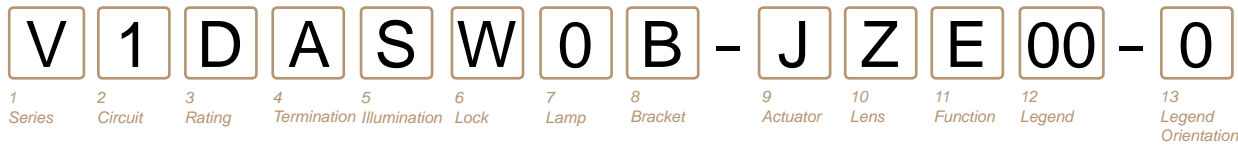
13 LEGEND ORIENTATION

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

14 ACTUATOR LENS LEGEND

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

- Notes:
- Consult factory to verify horsepower rating for your particular circuit choice.
 - Custom colors are available. Consult factory.
 - White imprinting is standard on black actuators; Black imprinting is standard on white, red and gray actuators. Custom colors are available, consult factory.
 - 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.



1 SERIES
V

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

Position:

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 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
E	F	Wire Leads no barriers	No
		Wire Leads	No

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

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

Sealed	Unsealed	Lamps	Illumination Type	Lamp wired to Terminals
S	0	NONE	-	-
C	3	2	UP	3 (+) 7 (-)
H	Z	2	INDEPENDENT	8 (+) 7 (-)
DOUBLE POLE SWITCHES ONLY				
M	R	1	UP	3 (+) 6 (-)

6 LOCK
Lock above terminals 1 & 4 end of switch.

W	low profile lock	Y 6	high profile lock
---	------------------	-----	-------------------

- 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	2 250VAC		6 12V superbright Green	7 18V superbright Red	8 24V superbright Red
Neon	1 125VAC	2	5 6V			
Incandescent	4 3V					
LED*		Red	Amber			
		A	L	F	R	
2VDC	B		M	G	S	
6VDC	C		N	H	T	
12VDC	D		P	J	V	
24VDC						

* 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	H

9 HARD SURFACE ACTUATOR

CONTURA IV:

Orientation	Black	Gray	Red	White
Left	J	K	L	M
Right	N	P	R	S

CONTURA V:

Orientation	Black	Gray	Red	White
	U	V	W	Y

Actuator orientation over terminals: 3,6 1,4

10 LENS 5

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 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
Gray	F	G	N	6

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		
F			

For additional legend options & codes, visit us at 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	14 Actuator Lens	15 Legend	16 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

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

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
E	6	Wire Leads no barriers	No
N	F	Wire Leads	No

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

5 ILLUMINATION & SWITCH SEALING

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

Sealed	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 (-)
SINGLE POLE SWITCHES ONLY				
J	8	1	DOWN	3 (+) 8 (-)
		2	INDEPENDENT	6 (+) 7 (-)
K	W	1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)
DOUBLE POLE SWITCHES ONLY				
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

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 1, PANEL SEAL

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

9 ACTUATOR

0	No Actuator	H	High Insert	L	Low Insert
---	-------------	---	-------------	---	------------

10,11 LENS

0 - No Actuator	Z - No Lens				
Clear	White	Amber	Green	Red	Blue
-	7	C	H	N	U
3	-	D	J	P	V
4	-	E	K	R	W
-	A	F	L	S	Y

Bar Lens Translucent
Bar Lens Transparent
Oval Lens Transparent
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 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		F

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

15 LEGEND ORIENTATION

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

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.

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	14 Actuator Orientation	Lens Legend	

1 SERIES
V

2 CIRCUIT

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

H*	2 & 3	2 & 3, 5 & 4	5 & 4
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 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	F	Wire Leads no barriers	No
E	F	Wire Leads	No

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

5 ILLUMINATION & SWITCH SEALING

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

Sealed	Unsealed	Lamps	Illumination Type	Lamp wired to Terminals
	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 (-)
SINGLE POLE SWITCHES ONLY				
J	8	1	DOWN	3 (+) 8 (-)
		2	INDEPENDENT	6 (+) 7 (-)
K	W	1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)
DOUBLE POLE SWITCHES ONLY				
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				
Neon	1	125VAC	2	250VAC	
Incandescent	4	3V	5	6V	6 12V
LED*					7 18V
		Red	Amber	superbright	8 24V
				Green	superbright
2VDC	A	L	F	R	Red
6VDC	B	M	G	S	
12VDC	C	N	H	T	
24VDC	D	P	J	V	

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

8 FLUSH BRACKET COLOR 1, PANEL SEAL

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

9 ACTUATOR

0 No Actuator
Z Contura VII

Actuator orientation over terminals:



10 LENS

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

0 - No Actuator Z - No Lens

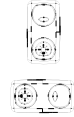
	White	Amber	Green	Red	Blue	Lens style & location
6	B	G	M	T		
7	C	H	N	U		
8	D	J	P	V		
9	E	K	R	W		
A	F	L	S	Y		
1	2	3	4	5		

11 ACTUATOR COLOR / THUMB PRINT COLOR 1

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

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		

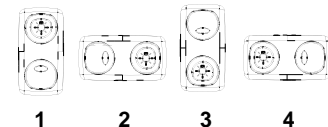


For additional legend options & codes, visit us at www.carlingtech.com.

13 LEGEND ORIENTATION

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

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



14 ACTUATOR LENS LEGEND

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

Notes:

- Consult factory to verify horsepower rating for your particular circuit choice.
- 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 Illumination 5 Lamp 6 Lamp 7 Lamp 8 Bracket 9 Actuator 10 Lens 11 Lens 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. 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:

SP DP	1	2	3
A	ON	NONE	OFF
B	(ON)	NONE	OFF
C	ON	NONE	(OFF)
D	ON	NONE	ON
E	ON	NONE	(ON)
F	ON	NONE	ON
J	ON	OFF	(ON)
K	ON	OFF	(ON)
L	(ON)	OFF	(ON)

SPECIAL CIRCUITS

	2 & 3	2 & 3, 5 & 6	2 & 3, 5 & 4	5 & 4
H*	2 & 3	2 & 3, 5 & 6	2 & 3, 5 & 4	5 & 4
G*	2 & 3	2 & 3, 5 & 6	2 & 3, 5 & 4	OFF
M*	(2 & 3, 5 & 6)	(2 & 3, 5 & 6)	(2 & 3, 5 & 6)	1 & 2
S*	(2 & 3, 5 & 6)	(2 & 3, 5 & 6)	(2 & 3, 5 & 6)	OFF
R*	(2 & 3, 5 & 6)	(2 & 3, 5 & 6)	(2 & 3, 5 & 6)	5 & 1
E*	5 & 6	5 & 6	5 & 6	2 & 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. Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

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

Sealed	Unsealed	Lamps	Illumination Type	Lamp wired to Terminals
S	0	NONE	-	-
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 (+) 7 (-)
H	Z	1	INDEPENDENT	8 (+) 7 (-)
U	Y	2	UP	3 (+) 6 (-)
		2	UP	8 (+) 7 (-)
		2	UP	3 (+) 7 (-)
		2	UP	8 (+) 7 (-)
		2	UP	10 (+) 9 (-)
SINGLE POLE SWITCHES ONLY				
J	8	1	DOWN	3 (+) 8 (-)
K	W	1	INDEPENDENT	6 (+) 7 (-)
		1	INDEPENDENT	8 (+) 7 (-)
		2	INDEPENDENT	6 (+) 7 (-)
DOUBLE POLE SWITCHES ONLY				
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
 Neon 1 125VAC 2 250VAC
 Incandescent 4 3V 5 6V
 LED* 6 12V superbright Green 7 18V superbright Red 8 24V superbright Red
 2VDC A Red L Amber F Green R Red
 6VDC B Amber M Green S Red
 12VDC C Green N Green T Red
 24VDC D Red P Green V Red

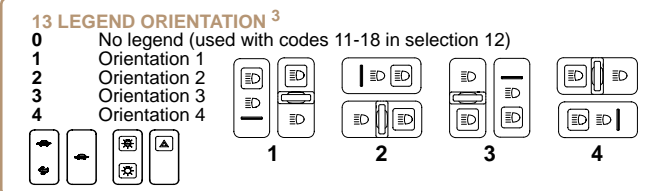
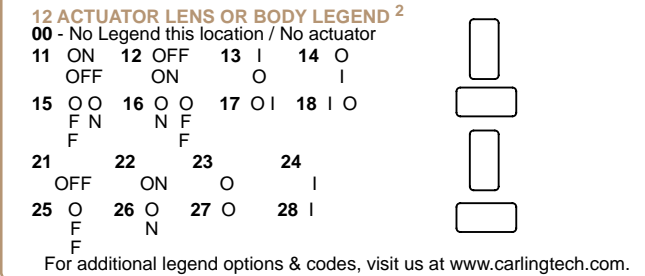
*Consult factory for "daylight bright" LED. Typical current draw for LED is 20ma

8 BRACKET COLOR 1, PANEL SEAL (EXTERNAL FOAM GASKET)
 X & XI with Flush Bracket X, XI, XII with Raised Bracket
 # of gaskets 0 1 2 0 1
 Black B C D 1 4
 White W Y Z 2 5
 Gray G H J 3 6

9 ACTUATOR
 No Actuator 0
 Contura X 1 Black Gray White Red
 Contura XI 2 3 4
 Contura XII 6 7 8 9
 Actuator orientation over terminals: J K L M N 3,6 1,4

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*
 2 7 C H N U Two piece Square*
 1 6 B G M T Two piece Square*
 (With clear top protective lens)
 (With white top protective lens)
 (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.



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

- Notes:
 Consult factory to verify horsepower rating for your particular circuit choice.
 1 Custom colors are available. Consult factory.
 2 White imprinting is standard on black actuators; Black imprinting is standard on white, red & gray actuators. Custom colors are available, consult factory.
 3 With 2 square lenses, use selection 12 for lens above lamp 1, & 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 O 1 - 1 P B 00 - 0

1 Series 2 Circuit 3 Rating 4 Termination Illumination Lock 5 Lamp 6 Bracket 7 Actuator 8 Lens 9 Function 10 Legend 11 Legend 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	2 & 3, 5 & 4	5 & 4
G*	2 & 3, 5 & 6	2 & 3	OFF
S*	2 & 3, 5 & 6	2 & 3	1 & 2
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. Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

5 ILLUMINATION & SWITCH SEALING

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

Sealed	Unsealed	Lamps	Illumination Type	Lamp wired to Terminals
S	0	NONE	-	-
C	3	2	UP	3 (+) 7 (-)
H	Z	2	INDEPENDENT	8 (+) 7 (-)
DOUBLE POLE SWITCHES ONLY				
M	R	1	UP	3 (+) 6 (-)

6 LOCK

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

Notes:

- Consult factory to verify horsepower rating for your particular circuit choice.
- 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 Located over T1-4 end of switch.
- 4 Additional ratings available. See V-Series Switch Accessories page.
- 5 Located over T3-6 end of switch.

6,7 LAMP (same coding for both selections)

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

No lamp	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	
2VDC	A	L	F	R	
6VDC	B	M	G	S	
12VDC	C	N	H	T	
24VDC	D	P	J	V	

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

8 FLUSH BRACKET COLOR 1, PANEL SEAL

	Black	White	Gray
No Gasket	1	2	3
One Gasket	4	5	6

9 HARD SURFACE ACTUATOR

Contura X	Black	Gray	Red	White
	1	2	3	4



Actuator orientation over 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	V
Black	B	J	S
White	C	K	T
Red	D	L	W
Gray	E	M	X
Safety Orange	F	N	Y

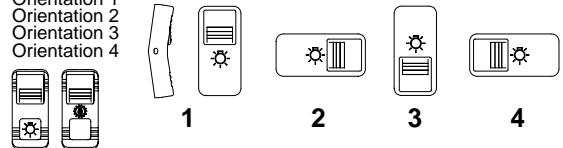
12 ACTUATOR LENS OR BODY LEGEND 2

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

For additional legend options & codes, visit us at 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



V	1	D	B	B	C	O	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. DP - double pole uses terminals 1, 2, 3, 4, 5 & 6. **8 terminal 10 terminal** Terminals 7, 8, 9 & 10 for lamp circuit only.

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:

SP DP	1	2	3
1 A	2 & 3, 5 & 6	Connected	1 & 2, 4 & 5
2 B	ON	NONE	OFF
3 C	(ON)	NONE	OFF
4 D	ON	NONE	(OFF)
5 F	ON	NONE	ON
6 J	ON	OFF	(ON)
7 K	ON	OFF	(ON)
8 L	(ON)	OFF	(ON)

SPECIAL CIRCUITS

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

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

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	6	Wire Leads no barriers	No
E	F	Wire Leads	No

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

5 ILLUMINATION
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

S	Lamps	Illumination Type	Lamp wired to Terminals
	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	3 (+) 7 (-)
G	2	UP	3 (+) 6 (-)
H	1	INDEPENDENT	8 (+) 7 (-)
	2	UP	3 (+) 7 (-)
	2	INDEPENDENT	8 (+) 7 (-)
SINGLE POLE SWITCHES ONLY			
J	1	DOWN	3 (+) 8 (-)
K	2	INDEPENDENT	6 (+) 7 (-)
	1	INDEPENDENT	8 (+) 7 (-)
	2	INDEPENDENT	6 (+) 7 (-)
DOUBLE POLE SWITCHES ONLY			
L	1	DOWN	3 (+) 6 (-)
M	1	UP	3 (+) 6 (-)
N	1	DOWN	3 (+) 6 (-)
	2	DOWN	1 (+) 4 (-)
P	1	UP	1 (+) 4 (-)
	2	UP	3 (+) 6 (-)
U	1	INDEPENDENT	8 (+) 7 (-)
	2	INDEPENDENT	10 (+) 9 (-)

6 & 7 LAMP

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 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


□ Laser-Etched Actuator Only
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

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

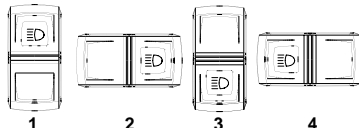
12 ACTUATOR LENS or BODY LEGEND 2

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



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.

- 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.

V 1 D A B W 0 B - FC Z B 00 - 0

1 Series 2 Circuit 3 Rating 4 Termination Illumination Lock 5 Lamp 6 Bracket 7 Actuator 8 Lens 9 Actuator Color 10 Legend 11 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.
 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
- B	(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

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

*Jumper between terminals 2 & 5 for circuits H, G, M, R & S are specified in selection 4. 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 RATING³

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

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

5 ILLUMINATION

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

Lamps	Illumination Type	Lamp wired to Terminals
S	NONE	-
C	2 UP	3 (+) 7 (-)
H	2 INDEPENDENT	8 (+) 7 (-)

DOUBLE POLE SWITCHES ONLY

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

6 LOCK OPTION

W Low Profile Lock

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.

7 LAMP

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

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

8 BRACKET COLOR & PANEL SEAL

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

9 ACTUATOR COLOR / STYLE

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



10 LENS COLOR / STYLE

Z - No Lens	Clear	White	Amber	Green	Red	Blue
1	6	B	G	M	T	
3	8	D	J	P	V	
5	A	N/A	N/A	N/A	N/A	Laser-Etched Actuator Only

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 COLOR / FUNCTION¹

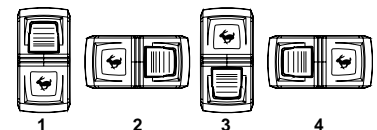
Lock Color	UP	DOWN	UP & DOWN	CENTER
Match Actuator	A	H	R	1
Black	B	J	S	2
White	C	K	T	3
Red	D	L	V	4
Orange	E	M	W	5
Gray	F	G	N	6

12 ACTUATOR LENS or BODY LEGEND²

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

13 LEGEND ORIENTATION

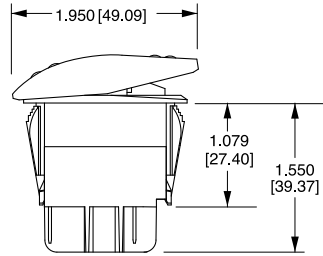
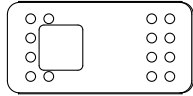
0	No legend
1	Orientation 1
2	Orientation 2
3	Orientation 3
4	Orientation 4



Dimensional Specifications: in. [mm]

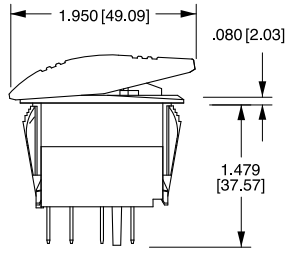
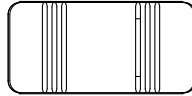
CONTURA II

SHOWN WITH SQUARE LENS



8 TERMINAL BASE W/BARRIERS

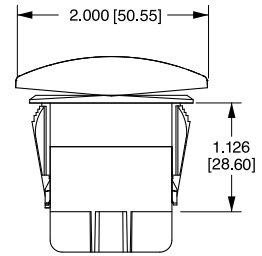
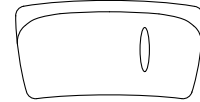
CONTURA III



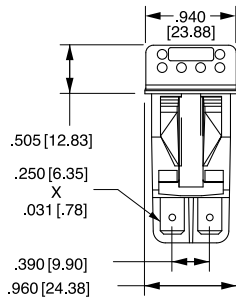
8 TERMINAL BASE W/O BARRIERS

CONTURA IV

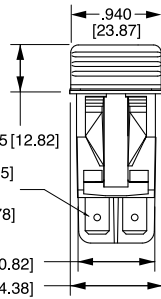
SHOWN WITH BAR LENS



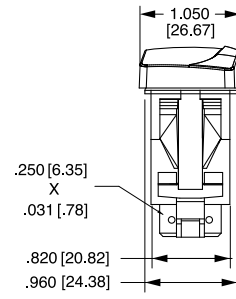
10 TERMINAL BASE W/BARRIERS



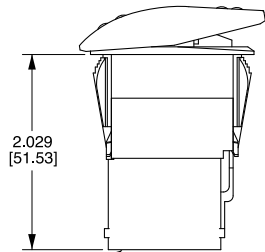
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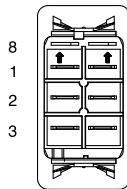
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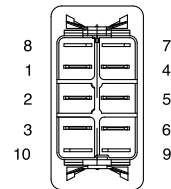
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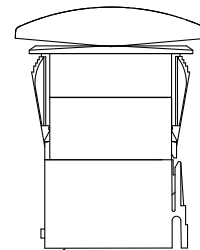
SWITCH SHOWN WITH VCH CONNECTOR 8 TERMINAL



BOTTOM VIEW TERMINAL ARRANGEMENT 8 TERMINAL BASE



BOTTOM VIEW TERMINAL ARRANGEMENT 10 TERMINAL BASE

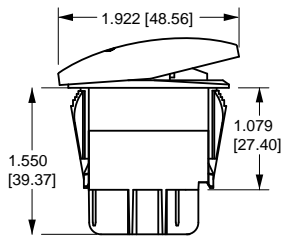
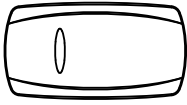


SWITCH SHOWN WITH VC1 CONNECTOR 10 TERMINAL

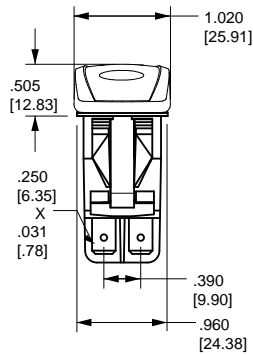
Dimensional Specifications: in. [mm]

CONTURA V

SHOWN WITH
BAR LENS



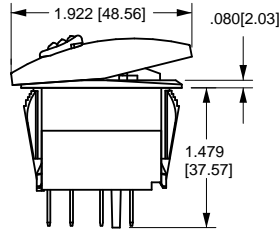
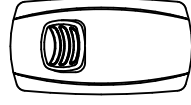
**8 TERMINAL BASE
W/BARRIERS**



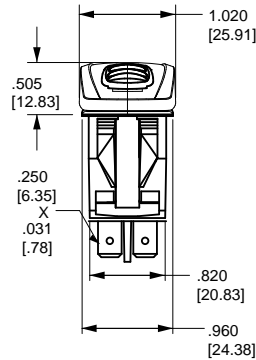
**8 TERMINAL BASE
W/BARRIERS**

CONTURA V

SHOWN WITH
LOW PROFILE LOCK



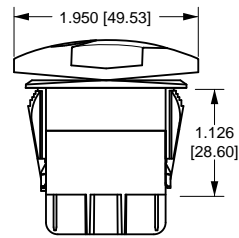
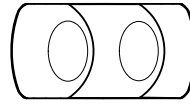
**8 TERMINAL BASE
W/O BARRIERS**



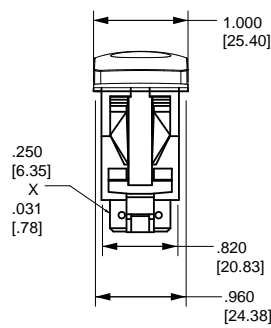
**8 TERMINAL BASE
W/O BARRIERS**

CONTURA VI

SHOWN WITH OVAL
LENS



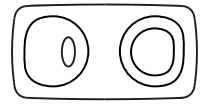
**10 TERMINAL BASE
W/BARRIER AND
LAMP TERMINAL**



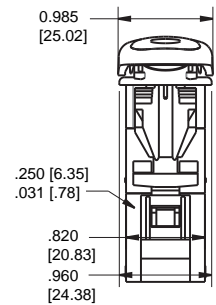
**10 TERMINAL BASE
W/O BARRIERS**

CONTURA VII

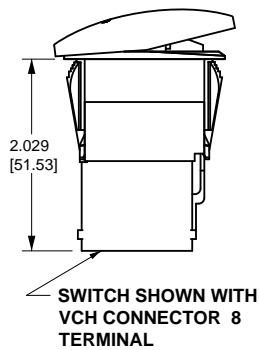
SHOWN WITH LARGE LENS
AND BAR LENS



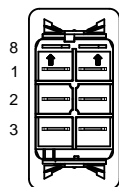
**10 TERMINAL BASE
W/O BARRIERS**



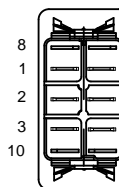
**10 TERMINAL BASE
W/O BARRIERS**



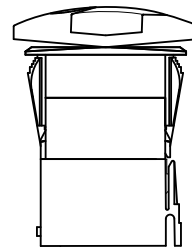
SWITCH SHOWN WITH
VCH CONNECTOR 8
TERMINAL



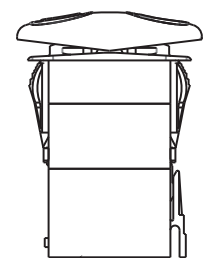
**BOTTOM VIEW
TERMINAL
ARRANGEMENT
8 TERMINAL BASE**



**BOTTOM VIEW
TERMINAL
ARRANGEMENT
10 TERMINAL BASE**



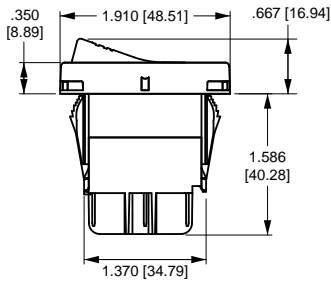
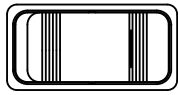
SWITCH SHOWN WITH
VC1 CONNECTOR 10
TERMINAL



SWITCH SHOWN
WITH VC1
CONNECTOR 10
TERMINAL

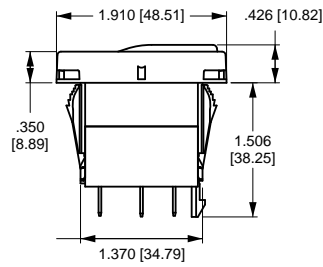
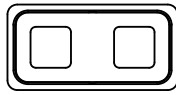
Dimensional Specifications: in. [mm]

CONTURA X
SHOWN WITH RAISED BRACKET



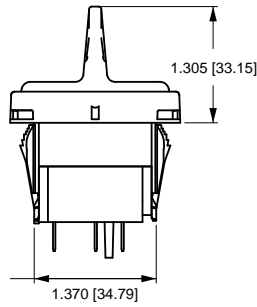
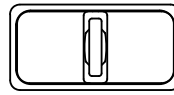
8 TERMINAL BASE
W/BARRIERS

CONTURA XI
SHOWN WITH RAISED
BRACKET AND TWO SQUARE
LENSES



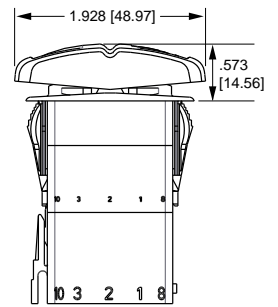
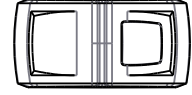
10 TERMINAL BASE
W/O BARRIERS

CONTURA XII
SHOWN WITH PADDLE
ACTUATOR

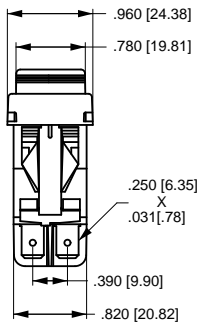


8 TERMINAL BASE
W/O BARRIERS

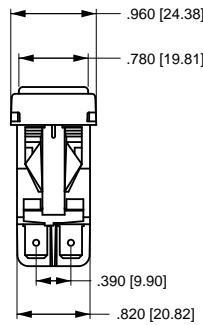
CONTURA XIV
SHOWN WITH LARGE LENS



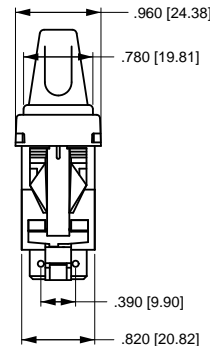
10 TERMINAL BASE
W/O BARRIERS



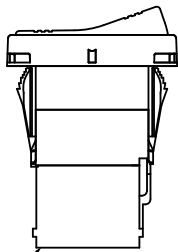
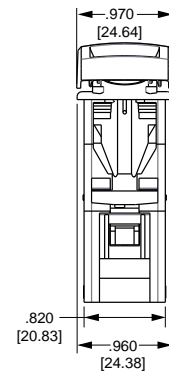
8 TERMINAL BASE
W/BARRIERS



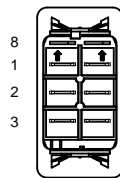
10 TERMINAL BASE
W/BARRIERS



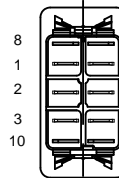
10 TERMINAL
BASE
W/O BARRIERS



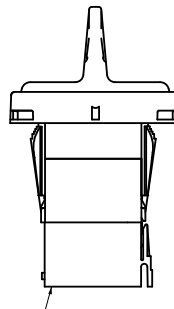
SWITCH SHOWN WITH
VCH CONNECTOR
8 TERMINAL



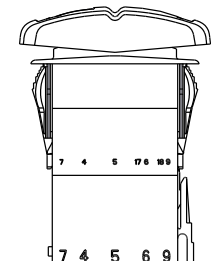
BOTTOM VIEW
TERMINAL
ARRANGEMENT
8 TERMINAL BASE



BOTTOM VIEW
TERMINAL
ARRANGEMENT
10 TERMINAL BASE



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](#)



[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

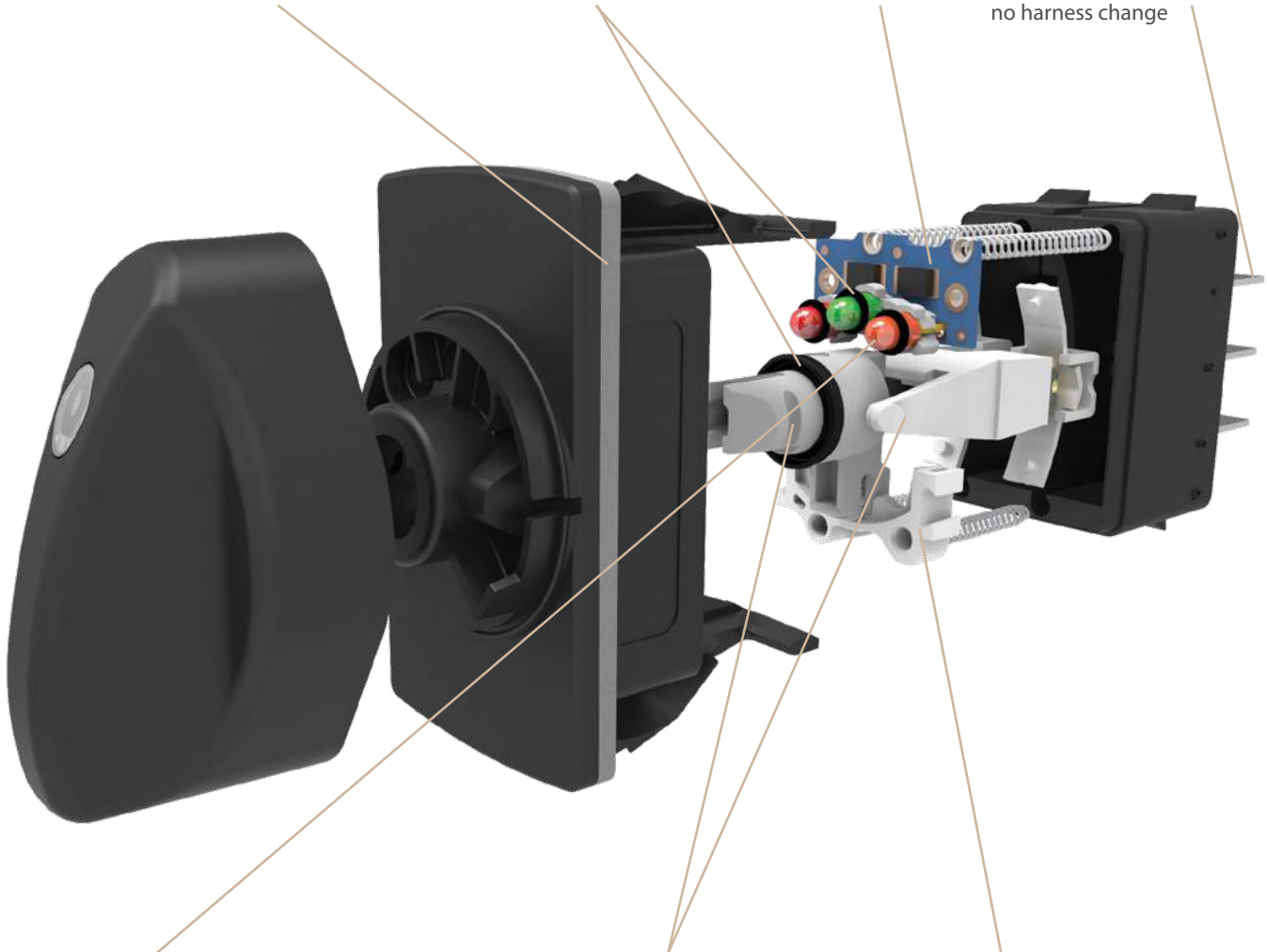
LED and stem seals provide IP67 protection above panel

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)

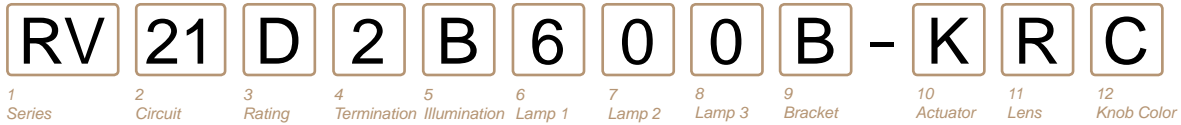
Mechanical

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

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



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	Independent	3+ 7-
N	# 2	Independent	8+ 7-
P	# 3	Independent	10+ 7-
R	# 1	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

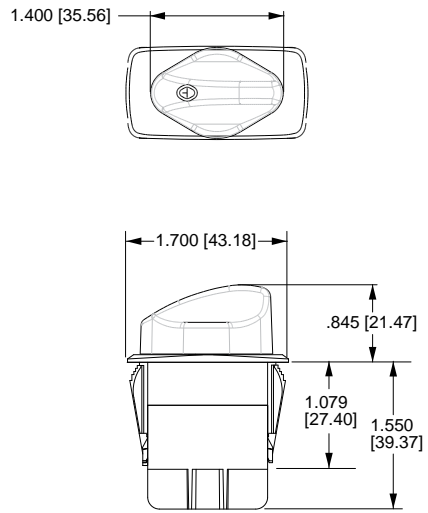
11 LENS COLOR 8

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

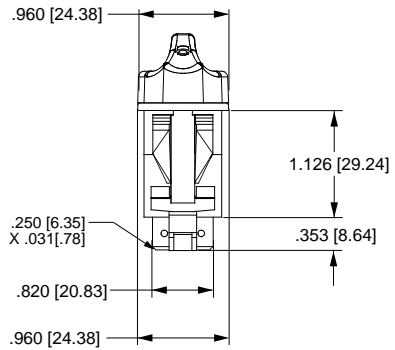
12 KNOB COLOR

Black	Gray	Red	White
C	H	S	Y

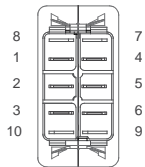
Dimensional Specifications: in. [mm]



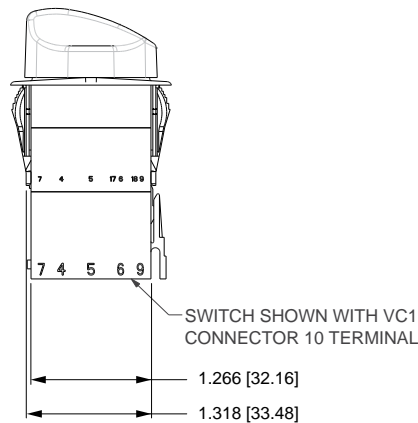
**10 TERMINAL BASE
W/ BARRIERS**



**10 TERMINAL BASE
W/O BARRIERS**



**BOTTOM VIEW
TERMINAL ARRANGEMENT
10 TERMINAL BASE**



SWITCH SHOWN WITH VC1
CONNECTOR 10 TERMINAL

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
A	
B	
C	
D	
E	
F	
G	
H	
J	
K	

LAMP CIRCUIT CODE	CIRCUIT DIAGRAM
L	
M	
N	
P	
R	
T	

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

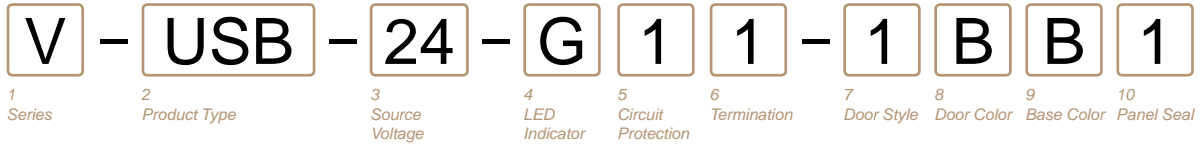
Environmental

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

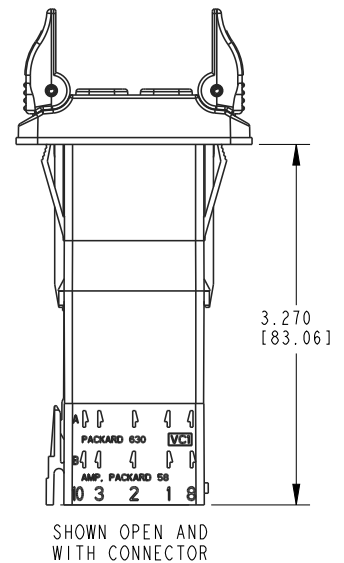
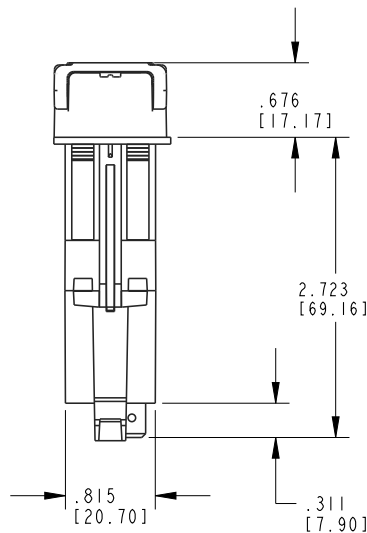
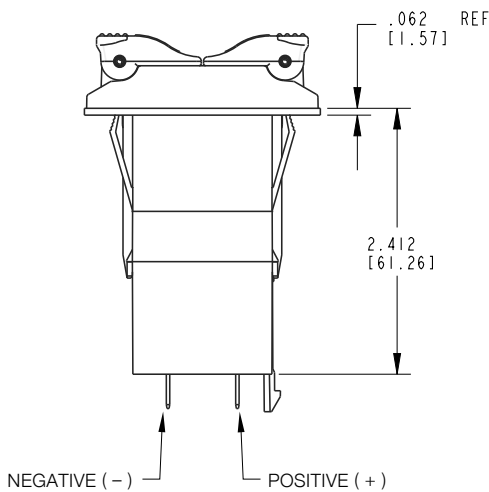
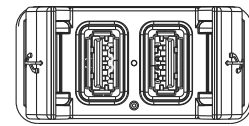
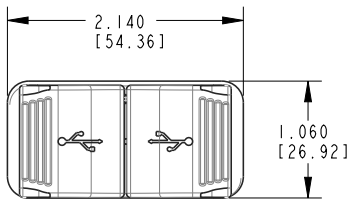
Endurance	10,000 door cycles minimum
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Ordering Scheme



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

For additional legend options & codes, visit us at 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 TOP OF LENS SEPARATELY VVT
1 Lens Separately	2 Color	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
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3,4 LENS OPENING FOR

Z No lens	1 Bar lens	2 Square lens
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5, 7 LENS OR BODY LEGEND 2

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

For additional legend options & codes, visit us at 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 F	26 O N	27 O	28 I

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

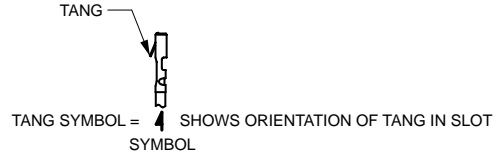
5 LEGEND ORIENTATION 3

0 No legend	1 Orientation 1	2 Orientation 2	3 Orientation 3	4 Orientation 4
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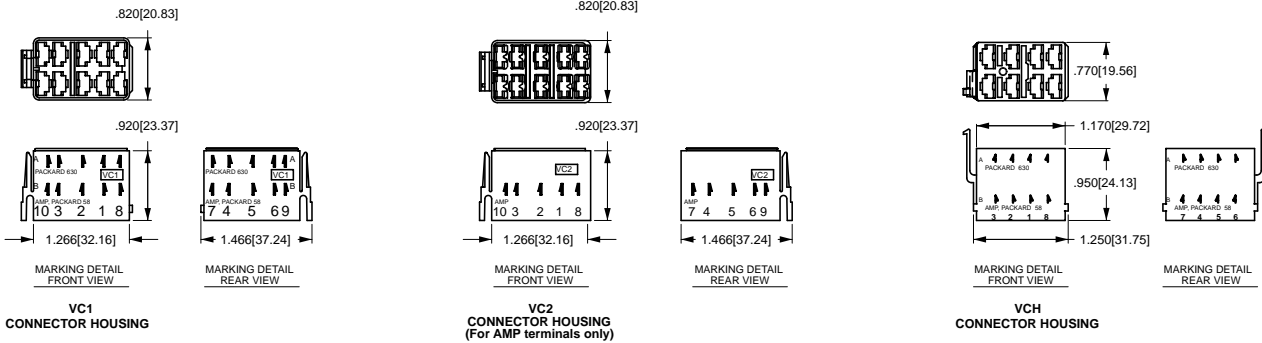
Easily integrate Contura products into your system, with Contura Accessories

Contura Connectors

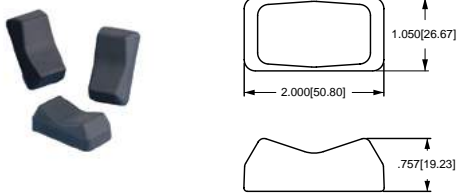
Q.C. SELECTION GUIDE						
COMPANY SERIES	PART NO		WIRE RANGE		ORIENTATION	
	PLAIN BRASS	TIN PLATED BRASS	AWG	MM ² (REF)		
PACKARD 58 SERIES	02965580		12	3.0	B	
	02965471	12010601	(2)16-14	(2)1.0-2.0		
	02965470		16-14	1.0-2.0		
	02965469	06288318	20-18	.5-.8		
PACKARD METRI-PACK 630 SERIES		12084590	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		
	60295-1	60295-2	22-18	.3-9		



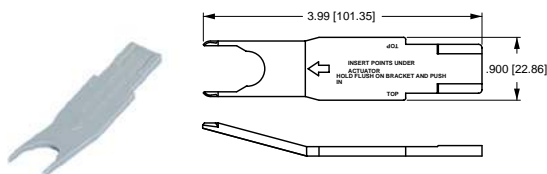
NOTE: Consult Delphi Packard and/or Amp on actual part numbers and availability. AMP is a registered trademark of AMP Inc. Harrisburg, PA. Delphi Packard is a registered trademark of Delphi-Packard Electrical Systems Warren, Ohio



Contura X Boot (P/N VB1-01)



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



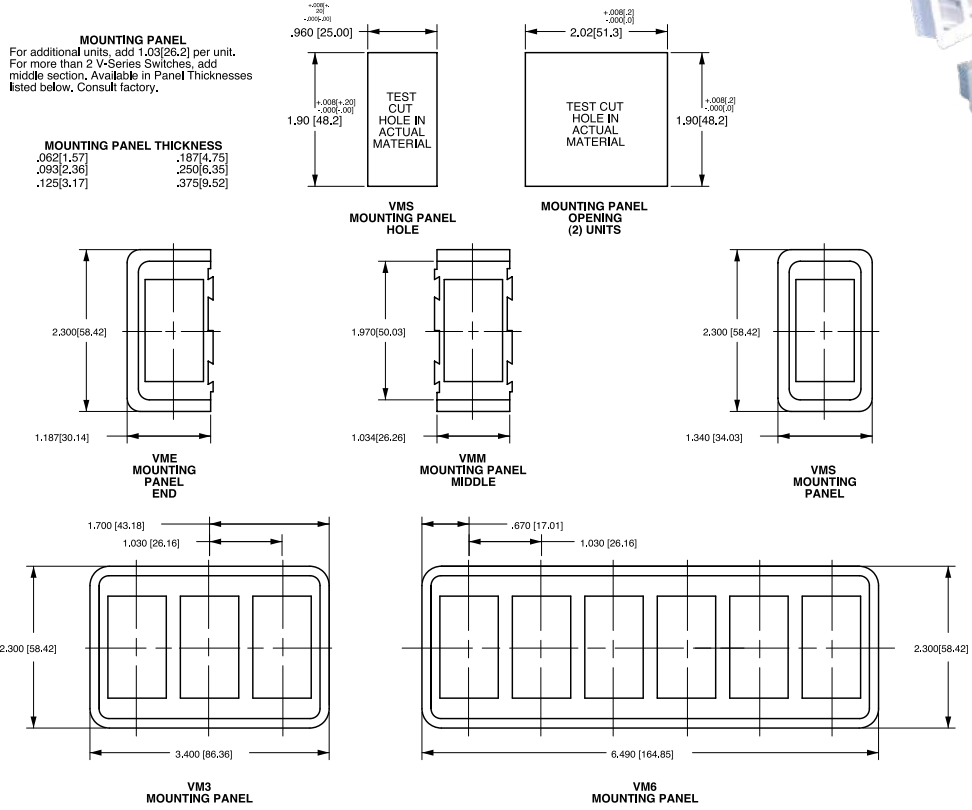
Additional V-Series Ratings

- 1 .4VA @ 28VDC Resistive
- 4 10A 250VAC 1/2 HP, 15A 125 VAC 1/2 HP, No Agency Listings
- 5¹ 10A 250VAC 1/2 HP, 15A 125 VAC 1/2 HP, UL Recognized, CSA Certified
- 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
- L² 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)

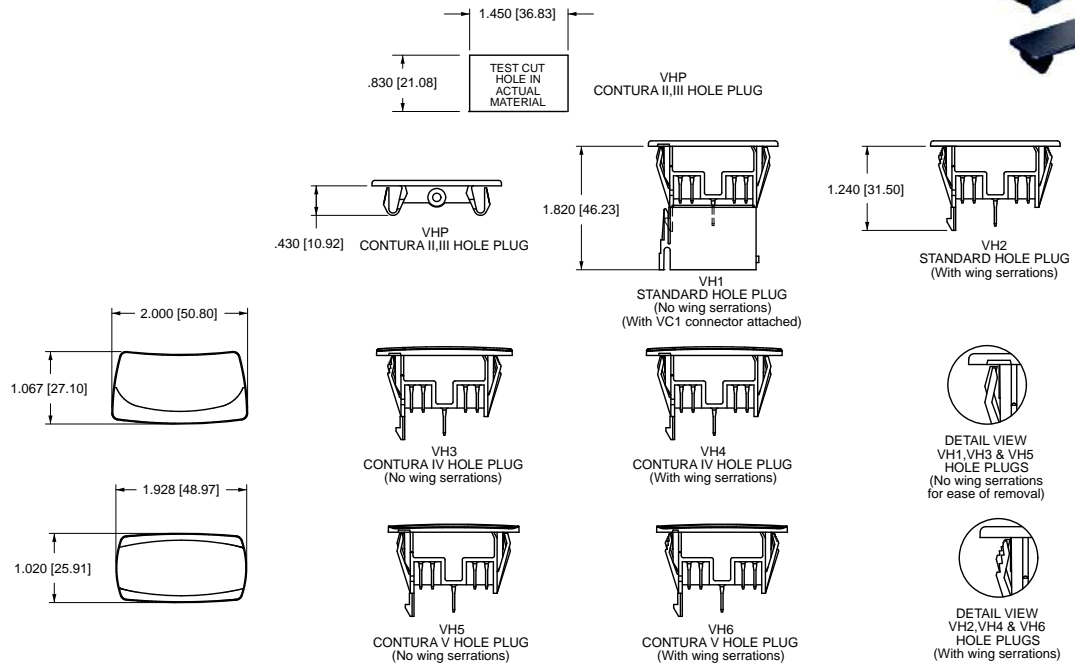
NOTES

- Consult factory to determine availability for individual circuits and their HP rating.
1. Not available with Contura 7 or 14 rocker styles.
 2. Rating L available with circuits 1, 4, A & D only.

Contura Mounting Panels Dimensional Specifications: in. [mm]



Contura Hole Plug Dimensional Specifications: in. [mm]



VP-Series

VP-Series

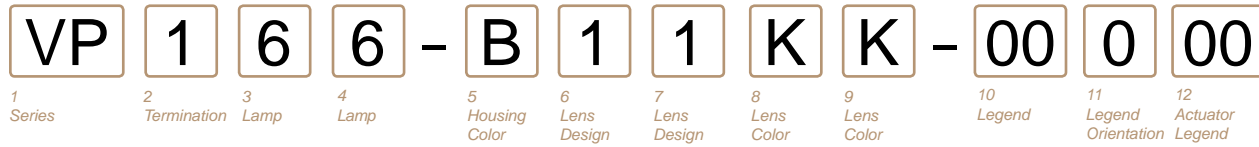
CONTURA ILLUMINATED INDICATORS

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



Product Highlights:

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



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

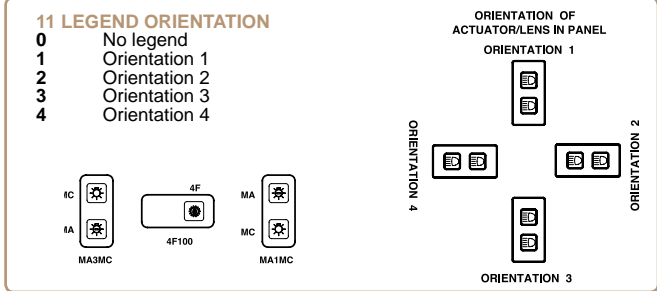
3,4 LAMP (same coding for both selections) ^{4,5,6,8,9,12}
 No lamp **0**
 Neon **1** 125VAC **2** 250VAC
 Incandescent **5** 6V **6** 12V **7** 18V
8 24V
 LED* **L** Amber **F** Green **R** Red
 2VDC **L** **F** **R**
 6VDC **M** **G** **S**
 12VDC **N** **H** **T**
 24VDC **P** **J** **V**
 *Typical current draw for LED is 20ma.

5 HOUSING COLOR
 flush bracket raised bracket ¹³ oval bezel (Contura V)
 Black **B** **6** **1**
 Gray **W** **-** **2**
 White **R** **5** **3**
 Red **G** **-** **4**

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}
Z No Lens
 Clear White Amber Green Red Blue Lens Style
4 **9** **E** **K** **R** **W** One piece Square/Oval ¹¹
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.

10 LAMP #1 LENS OR BODY LEGEND ⁵
00 No legend
 For legend options, visit us at carlingtech.com

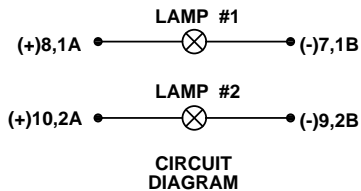
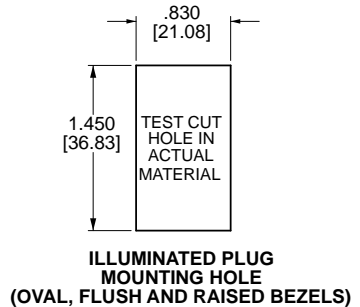
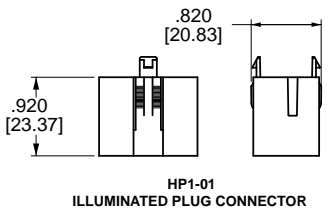
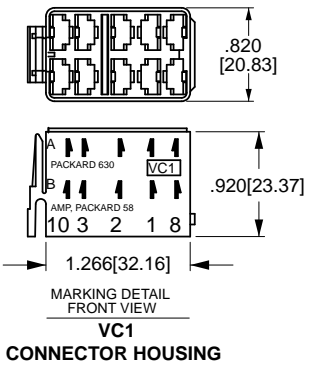
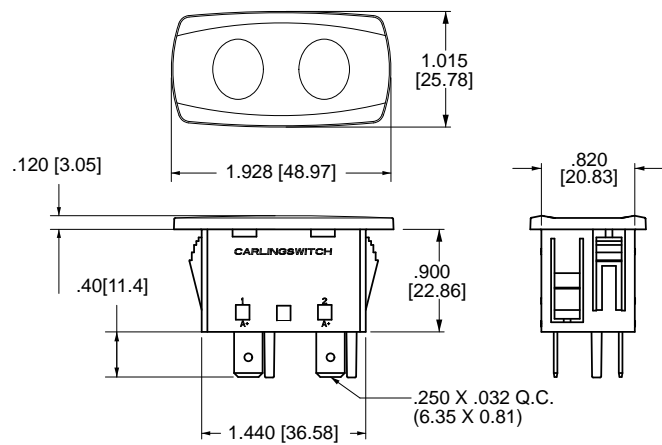
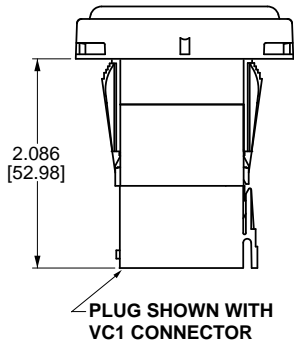
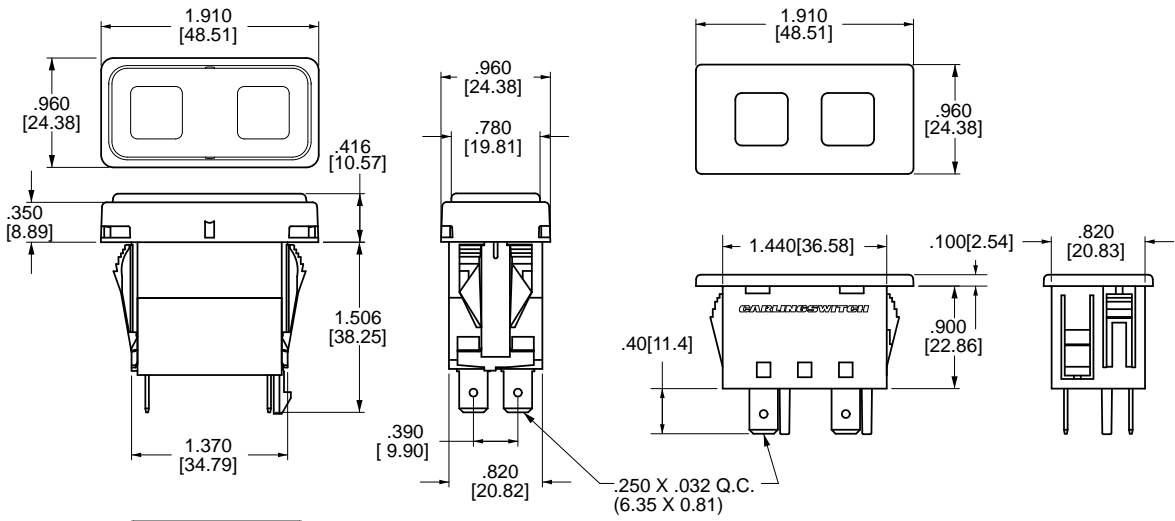


12 LAMP #2 LENS OR BODY LEGEND ⁵
00 No legend
 For legend options, visit us at carlingtech.com

- 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.

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

Dimensional Specifications: in. [mm]



(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

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

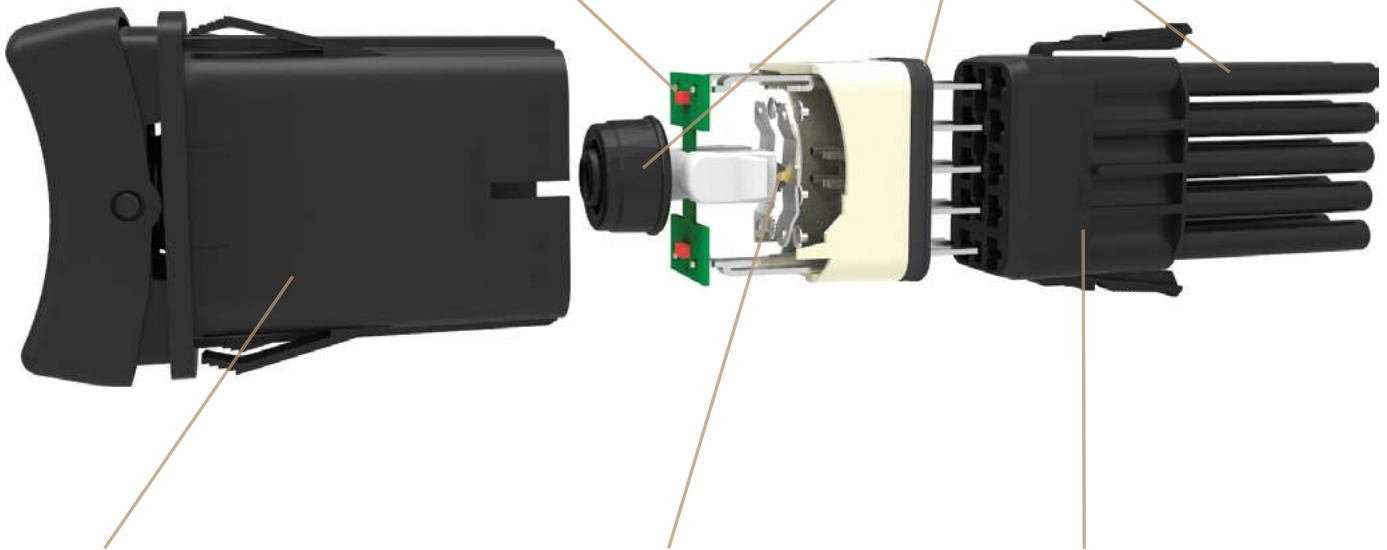
DESIGN FEATURES

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	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

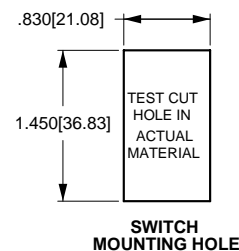
Environmental

Environmental Corrosion/ Chemical Splash	IP68, Fully sealed Flowing Mixed Gas (FMG) Class III 3 year accelerated exposure per ASTM B-827, B-845
Operating Temperature	-40°C to +85°C, 22 cycles, 300 hours
Vibration 1	Per Mil-Std 202F, Method 204D Test Condition A 0.06 DA or 10G's 10-500 Hz.
Vibration 2	Resonance search 24-50 Hz 0.40 DA 50-2000 ±10 G's peak Results Horizontal Axis 3-5 G's max. Random 24 Hz 0.06 PSD-Gsq/Hz 60 Hz 0.50 100 Hz 0.50 200 Hz 0.025 2000 Hz 0.025
Handling/Drop	One meter onto concrete floor
Salt Spray	Per Mil-Std 202F, Method 101D, Test Condition A, 48 Hrs.
Dust	IP6X
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/ Humidity	Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance

Mounting Specifications

Panel Thickness Range .032 to .125

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



W 11 D 2 B C 0 1 - A 7 Z 00 - 0 00

1 Series 2 Circuit 3 Rating 4 Termination Illumination Lamp 5 Lamp 6 Lamp 7 Bracket 8 Actuator 9 Lens 10 Lens 11 Legend 12 Legend 13 Actuator Orientation 14 Lens Legend

1 SERIES
W

2 CIRCUIT () - momentary
For terminal arrangement, see dimensional specifications

Position:	1	2	3
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)
- 42	2 & 3, 5 & 6	NONE	1 & 8
- 43	2 & 3	2 & 3, 4 & 5	4 & 5
- 44	2 & 3, 5 & 6	2 & 3	OFF
- 45	(2 & 3), (5 & 6)	2 & 3	OFF
- 46	(2 & 3), (5 & 6)	2 & 3	2 & 1
- 47	2 & 3 & 4, 5 & 6	2 & 3, 4 & 5	2 & 1, 4 & 5
- 48	2 & 3, 5 & 6	2 & 3	2 & 1
- 49	2 & 3, 5 & 6	2 & 3, 4 & 5	2 & 1, 4 & 5
51 -	3 & 10	2 & 3	OFF
52 -	3 & 10	2 & 3	2 & 1
53 -	(3 & 10)	2 & 3	OFF
54 -	3 & 10	2 & 3	(OFF)
55 -	(3 & 10)	2 & 3	2 & 1
56 -	(3 & 10)	2 & 3	(OFF)
57 -	(3 & 10)	2 & 3	(2 & 1)
58 -	OFF	2 & 3	2 & 1
- 61	3 & 10, 6 & 9	2 & 3, 5 & 6	OFF, OFF
- 62	3 & 10, 6 & 9	2 & 3, 4 & 5	2 & 1, 5 & 4
- 63	(3 & 10, 6 & 9)	2 & 3, 4 & 5	OFF, OFF
- 64	3 & 10, 6 & 9	2 & 3, 4 & 5	(OFF, OFF)
- 65	(3 & 10, 6 & 9)	2 & 3, 4 & 5	2 & 1, 5 & 4
- 66	(3 & 10, 6 & 9)	2 & 3, 4 & 5	(OFF, OFF)
- 67	(3 & 10, 6 & 9)	2 & 3, 4 & 5	(2 & 1, 5 & 4)
- 68	OFF, OFF	2 & 3, 4 & 5	2 & 1, 5 & 4

3 RATING

B 10A 24V	D 10A 12V	G 10A 6V	H 10A 3V
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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
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 & 4; Selection 7: above terminals 3 & 6

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

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

8 BRACKET COLOR 1

1 Black

9 ACTUATOR 1

3 Black with Laser Etched
A Black

10 LENS COLOR / STYLE - ABOVE LAMP #1 TERMINALS 1 AND 4
11 LENS COLOR / STYLE - ABOVE LAMP #2 TERMINALS 3 AND 6

Z - No Lens

	Clear	White	Amber	Green	Red	Blue	
1	-	B	G	M	T		Large Transparent
-	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 2

00 - No Legend this location/No actuator

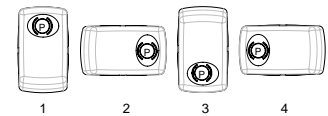
11 ON	12 OFF	13 I	14 O
OFF	ON	O	I
15 O O	16 O O	17 O I	18 I O
F N	N F		
F	F		
21 OFF	22 ON	23 O	24 I
25 O	26 O	27 O	28 I
F	N		



For additional legend options & codes, visit us at 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 2

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 & one body legend, lens legend must be specified in selection 12; body legend specified in selection 14. For legend options & codes, visit us at carlingtech.com

Notes:

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

W
11
D
2
0
W
0
J -
 P
7
B
00 -
 0

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

1 SERIES
W

2 CIRCUIT () - momentary
For terminal arrangement, see dimensional specifications

Position:

	1	2	3
SP DP	2 & 3, 5 & 6	Connected Terminals	1 & 2, 4 & 5
11 21	ON	NONE	OFF
14 24	ON	NONE	ON

3 RATING

1 0.4VA 28V DC Resistive
B 10A 24V
D 10A 12V

4 TERMINATION / BASE STYLE

2 .110 TAB (QC)

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

	<u>Lamps</u>	<u>Illumination Type</u>	<u>Lamp Wired to Terminals</u>
O	NONE		
C	# 2	Up	3+ 7-
H	# 2	Independent	8+ 7-

6 LOCK
W Lock Option

7 LAMP #2

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

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

8 BRACKET COLOR ¹
J Black

9 ACTUATOR ¹
P Black
R Red

10 LENS
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

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

11 LOCK FUNCTION

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

12 LASER ETCHED, LENS OR BODY LEGEND ¹
00 No legend this location / no actuator
For legend options & codes, visit us at carlingtech.com

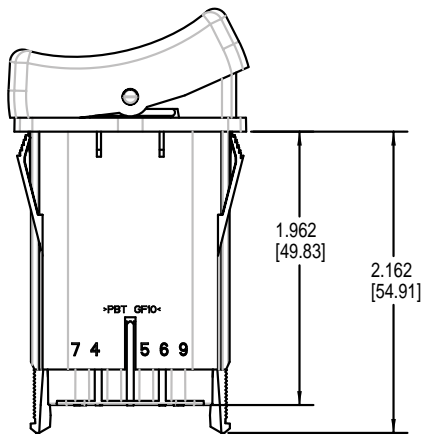
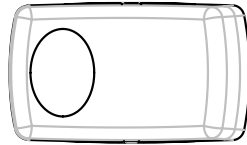
13 LEGEND ORIENTATION

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

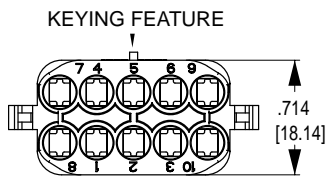
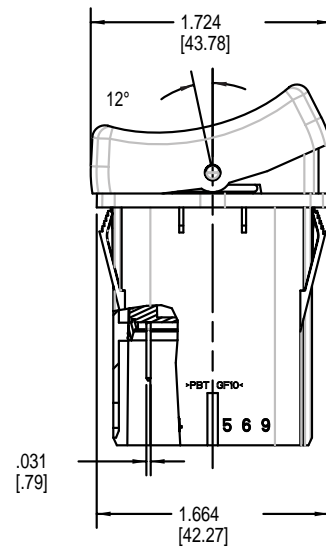
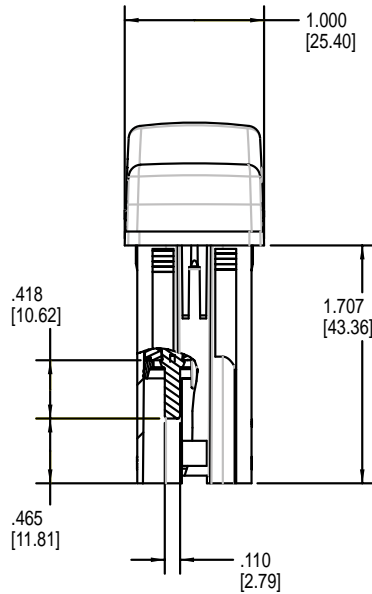


Notes:
¹ White imprinting is standard on black actuators; Black imprinting is standard on white, red & gray actuators; Custom colors are available, consult factory.

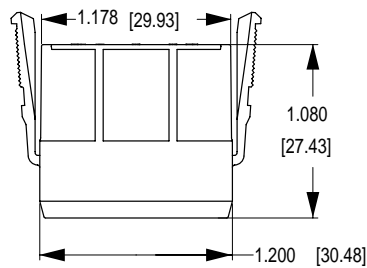
Dimensional Specifications: in. [mm]



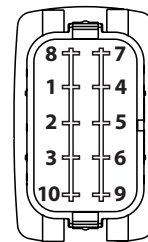
SWITCH SHOWN WITH CONNECTOR INSTALLED



WCH CONNECTOR
(190-31214-001)



TERMINAL ARRANGMENT



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



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

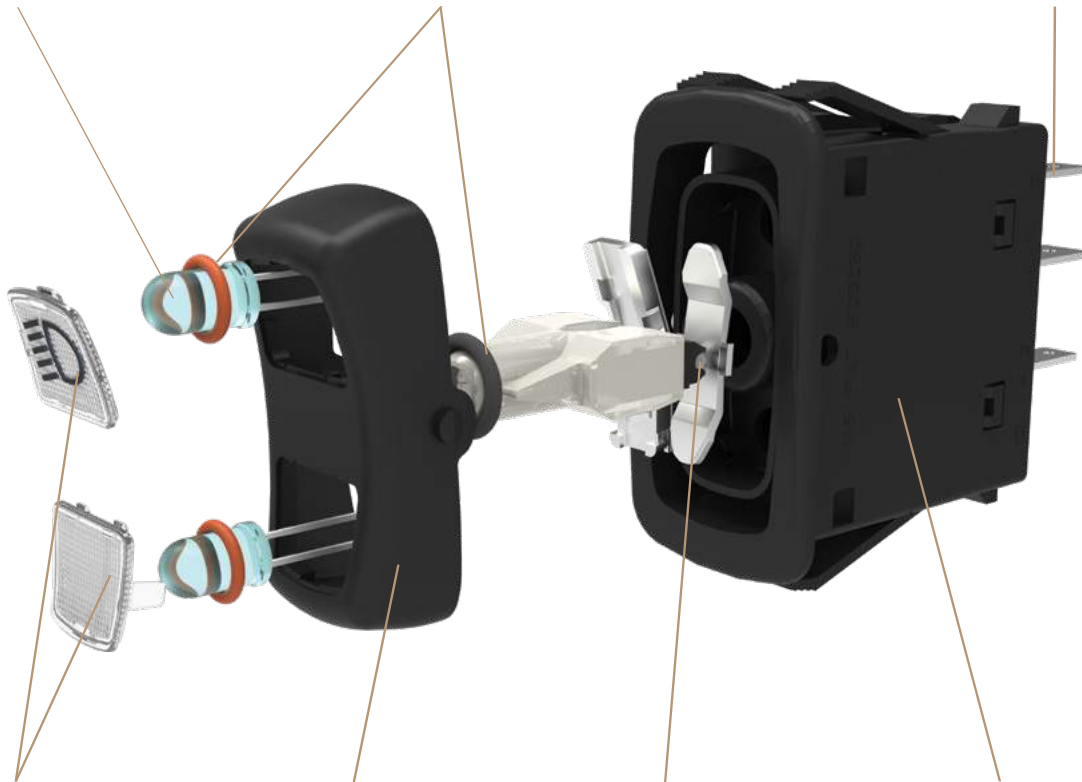
Utilize less current and are not affected by vibration, providing long lasting illumination. Available in 3 standard colors.

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-oxide, gold
Terminals	Brass or copper/silver plate 3/16" (4.76mm) & 1/4" (6.3mm) Quick Connect terminations standard.

Mechanical

Endurance	250,000 cycles minimum
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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.

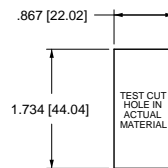
Actuator Travel (Angular Displacement)

2 position	26°
3 positions	13° from center

Environmental

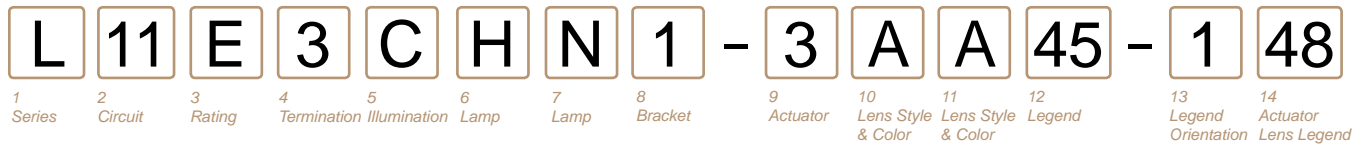
Environmental	IP67 for above panel components of the actual switch, representing an index of protection as applied to electrical equipment in accordance with IEC 529, BS 5490, DIN 400 50 & NFC 20 010.
Corrosion	Mixed Flowing Gas MFG Class III per ASTM B-827 & B-845, Method H, with 3 years exposure.
Operating 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 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.

Mounting Specifications



MOUNTING HOLE

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



1 SERIES
L

2 CIRCUIT 2

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
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)

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 2

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

4 TERMINATION 2,3

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

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

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-
	& # 2 Independent	12+ 9-
D	# 1 Dependent	4+ 9-
E	# 1 Independent	10+ 9-
	& # 2 Dependent	4+ 9-
F ⁴	# 1 Independent	10+ 9-
	& # 2 Dependent	8+ 9-
G	# 1 Dependent	4+ 9-
	& # 2 Independent	10+ 9-
H	# 1 Both Independent	10+ 9-
	& # 2 (in series)	
J	# 1 Dependent	4+ 9-
	& # 2 Dependent	1+ 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 1

	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 1

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

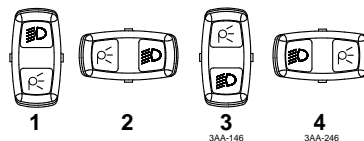
Large Transparent
Large Translucent
Bar Transparent
Bar Translucent
Laser Etched background color

12 LASER ETCHED, LENS OR BODY LEGEND

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

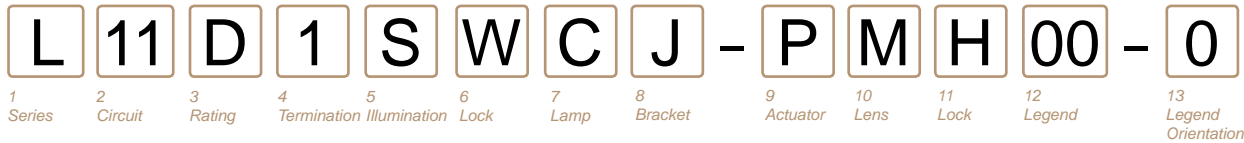
13 LEGEND ORIENTATION

- 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



1 SERIES
L

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

Position:	1	2	3
SP DP	2 & 4, 6 & 8	Connected Terminals	1 & 2, 5 & 6
11 21	ON	NONE	OFF
14 24	ON	NONE	ON
16 26	ON	OFF	ON
17 27	ON	OFF	(ON)
18 28	(ON)	OFF	(ON)

CIRCUITS WITH JUMPER TERMINALS

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

6 LOCK
W Lock above terminals 10 & 9.

7 LAMP
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 1
J Black

9 ACTUATOR STYLE AND COLOR 1
Locking Rocker **Black** **Red**
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 Large Transparent
-	7	C	H	N	U Large Translucent
3	-	D	J	P	V Bar Transparent
-	9	E	K	R	W Bar Translucent

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

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

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

1 PZAY2-1 **2** PZAY2-2 **3** **4**

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

4 TERMINATION 4
1 .250 (6.4mm) TAB (QC)
3 .187 (4.7mm) TAB (QC)
Do not use silicone based lubricants to reduce terminal insertion forces during connector assembly, as it is detrimental to function and performance.

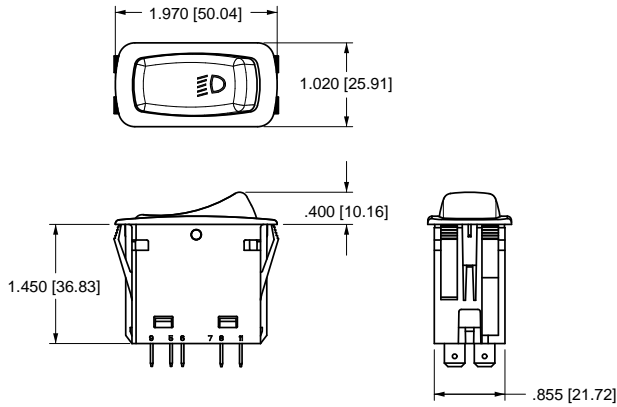
5 ILLUMINATION
Lamp #1: above terminals 9 & 10 end of switch.; Lamp #2 above terminals 11 & 12 end of switch. Positive (+) and negative (-) symbols apply to LED lamps only.

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

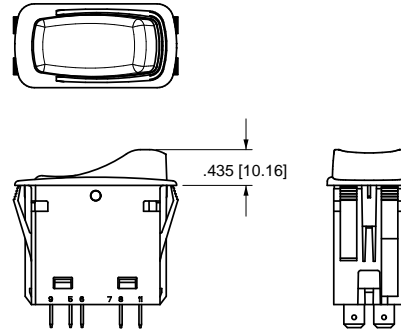
Notes:
Consult factory to verify horsepower rating for your particular circuit choice.
1 Custom colors are available. Consult factory.
2 Additional lamp circuits available. Consult factory.
3 Available only with 3 position circuits.
4 Termination 3 only available with ratings 1, B and E.
5 Circuits 30, 31, 58 and 69, are not available with rating codes 4, C, D, G or H.

Dimensional Specifications: in. [mm]

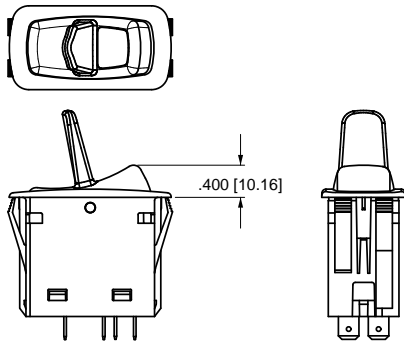
L-SERIES
SHOWN WITH LASER ETCHED
ACTUATOR



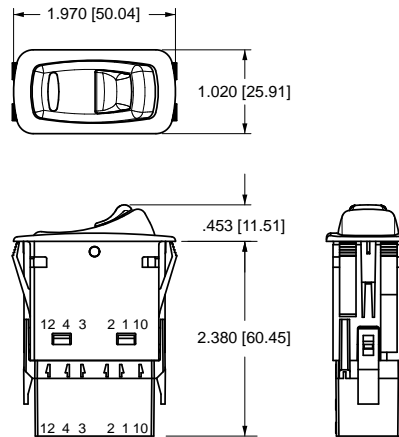
L-SERIES
SHOWN WITH ROCKER GUARD



L-SERIES
SHOWN WITH LARGE LENS
AND PADDLE ACTUATOR



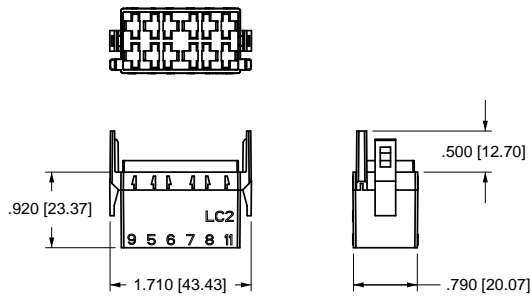
L-SERIES
SHOWN WITH BAR LENS, LOCK
AND CONNECTOR



Connector

L-SERIES
CONNECTOR

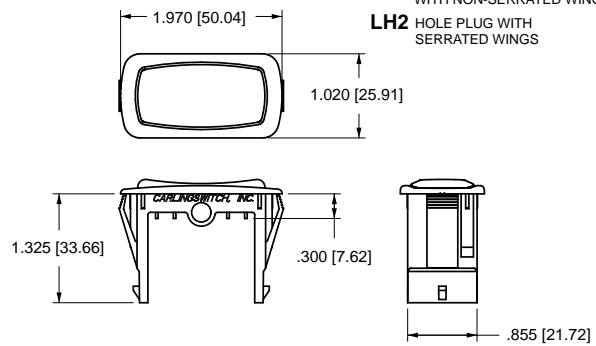
- LC1-01** BLACK .250 TAB CONNECTOR (PACKARD 630 SERIES)
- LC2-01** BLACK .187 TAB CONNECTOR (PACKARD 480 SERIES)
- LC3-01** BLACK .250 TAB CONNECTOR (AMP ONLY)



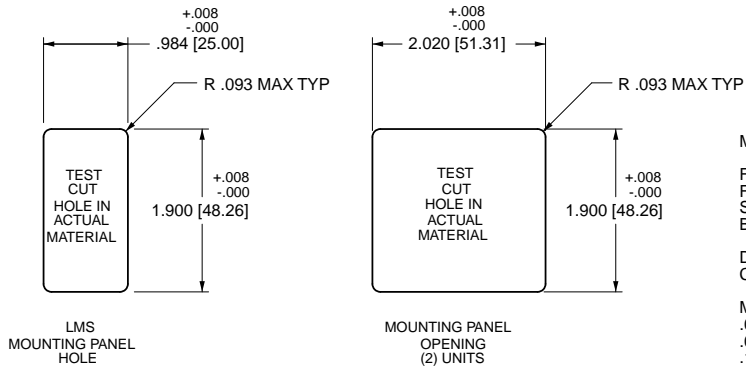
Hole Plug

L-SERIES
HOLE PLUG

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



Dimensional Specifications: in. [mm]



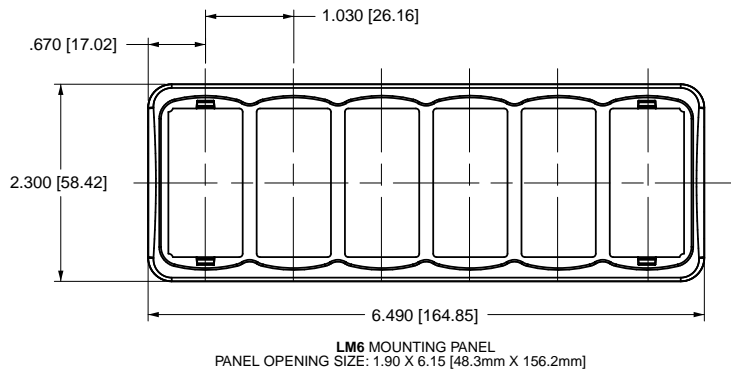
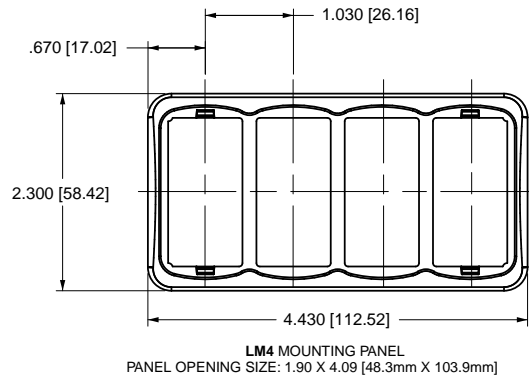
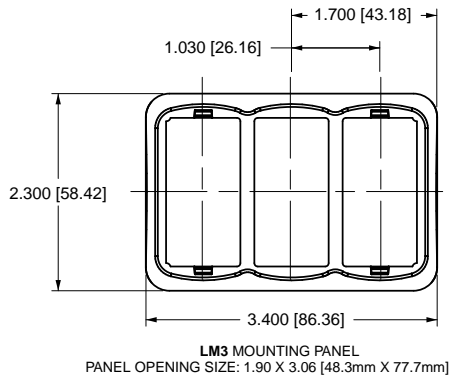
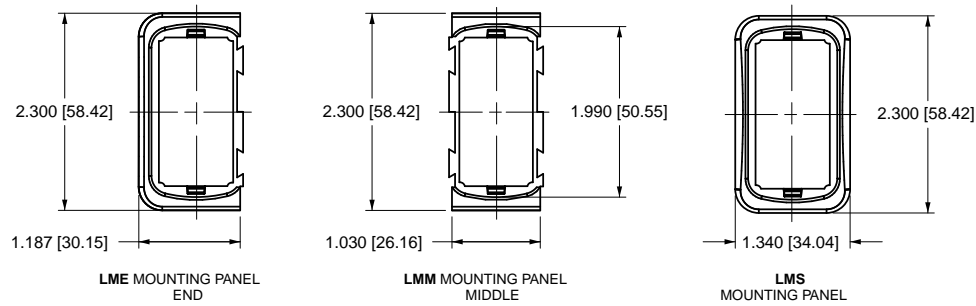
MOUNTING PANEL

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
A	
B	
C	
D	
E	
F	
G	
H	

LAMP CIRCUIT CODE	CIRCUIT DIAGRAM
J	
1	
2	
K	

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

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

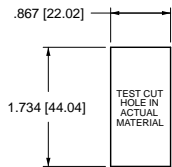
Electrical

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



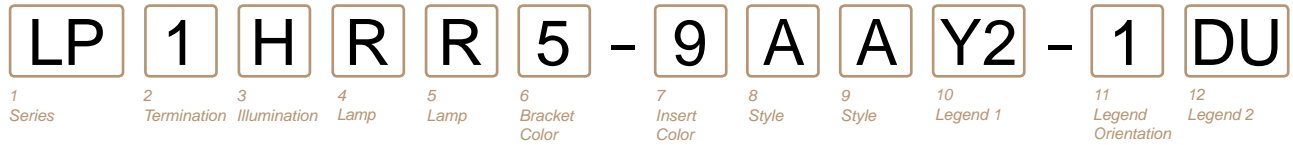
MOUNTING HOLE

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.



1 SERIES
LP L-Series Illumination Plug

2 TERMINATION³
1 .250 (8.35) x .032 (0.51) Quick Connect
3 .187 (4.75) x .032 (0.51) Quick Connect

3 ILLUMINATION

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

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

7 INSERT COLOR^{1,2}
9 Painted Black - Laser Etch
A Clear (Transparent)
B White (Translucent)
C Red (Translucent)
D Amber (Translucent)
E Green (Translucent)
F Blue (Translucent)

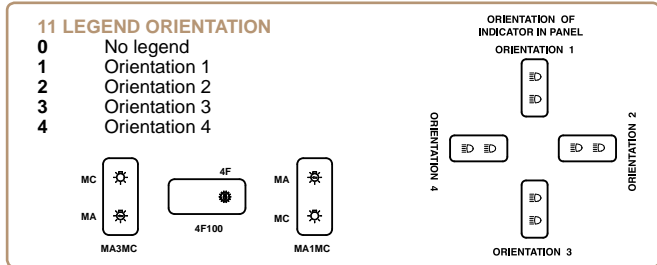
8, 9 STYLE (same coding for both selections)
Z Not Painted (used with Insert Colors A-F)
5 Clear Laser Etch Background Color (used with Insert Color 9)
A White Laser Etch Background Color (used with Insert Color 9)

10 LEGEND OVER LAMP¹
00 No legend
- Laser Etched or Body Legends
For legend options, visit us at carlingtech.com

4,5 LAMP (same coding for both selections)²

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

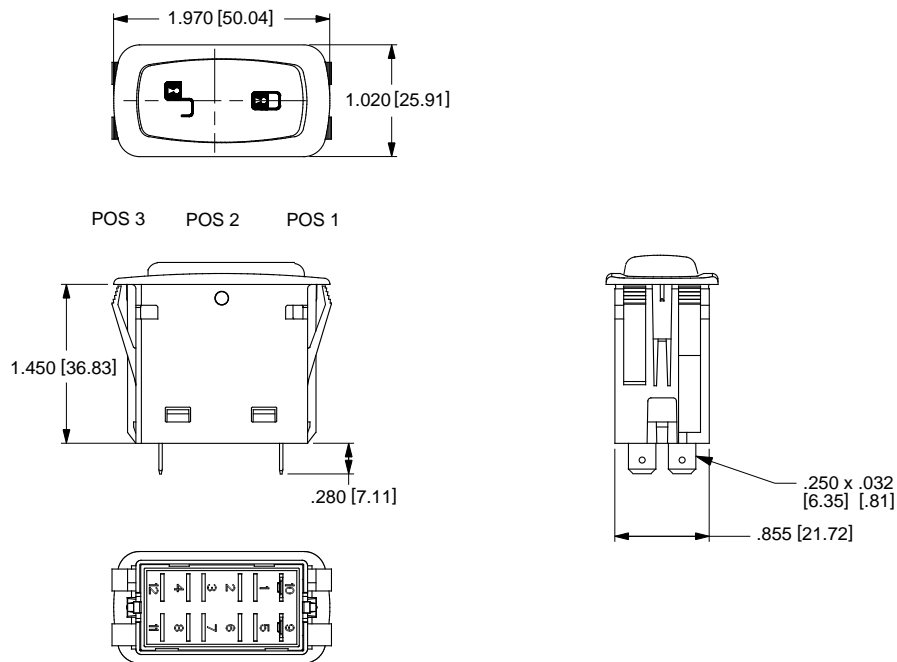
No lamp	0 (position 5 only)	6 12V	7 18V	8 24V
Incandescent	4 3V 5 6V	Red		
LED	Amber Green			
2VDC	L F	R		
6VDC	M G	S		
12VDC	N H	T		
24VDC	P J	V		



6 BRACKET COLOR
5 Black

12 LEGEND OVER LAMP²
00 No legend
- Laser Etched or Body Legends
For legend options, visit us at carlingtech.com

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



ST-Series

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](#)



[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

ST-Series Switch

DESIGN FEATURES

PINNED TOGGLE / BUSHING

Keeps metal toggle firmly in place and prevents rotation

BRASS ROLLER PIN

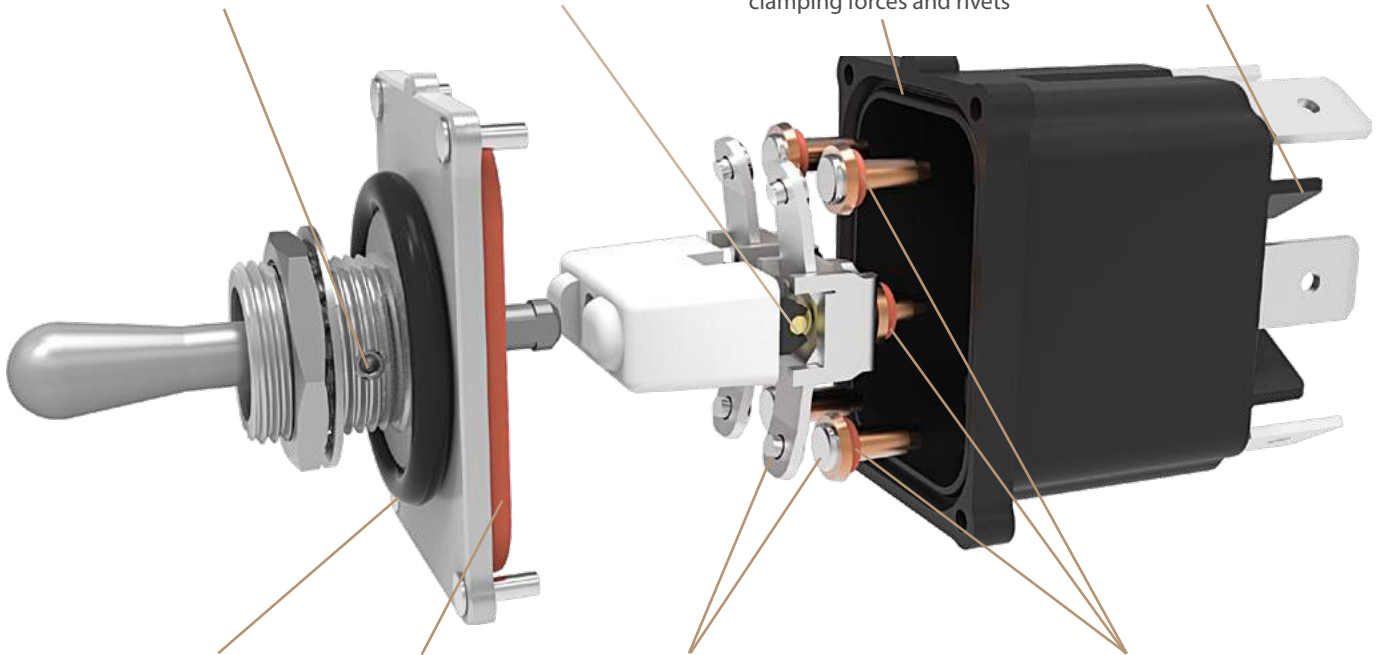
Provides rolling metal on metal actuation for maximum endurance

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 Actuator	Tin plated brass 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 ± 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)
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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.

Chemical	Concentration
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.



1 SERIES 1
ST Sealed Toggle

4 RATING
E 16A, 12/24V

2 CIRCUIT

	2 & 3, 5 & 6	Connected Terminals	1 & 2, 4 & 5
Position:	1	2	3
A	ON	NONE	OFF
B	(ON)	NONE	OFF
C	ON	NONE	(OFF)
D	ON	NONE	ON
F	ON	NONE	(ON)
J	ON	OFF	ON
K	ON	OFF	(ON)
L	(ON)	OFF	(ON)
Special Circuits			
E ^{2,3}	5 & 6	5 & 3	5 & 1
G ^{2,4}	2 & 3, 5 & 6	2 & 3	OFF
M ^{2,4}	(2 & 3, 5 & 6)	2 & 3	OFF

5 TERMINATION

1 .250 (6.4mm) TAB (QC)
4 Screw with Cage Clamps
B⁵ .250 (6.4mm) TAB (QC). Jumper T2 to T5. No terminal at T5
E⁵ Screw with Cage Clamps. Jumper T2 to T5. No terminal at T5

6 TOGGLE STYLE

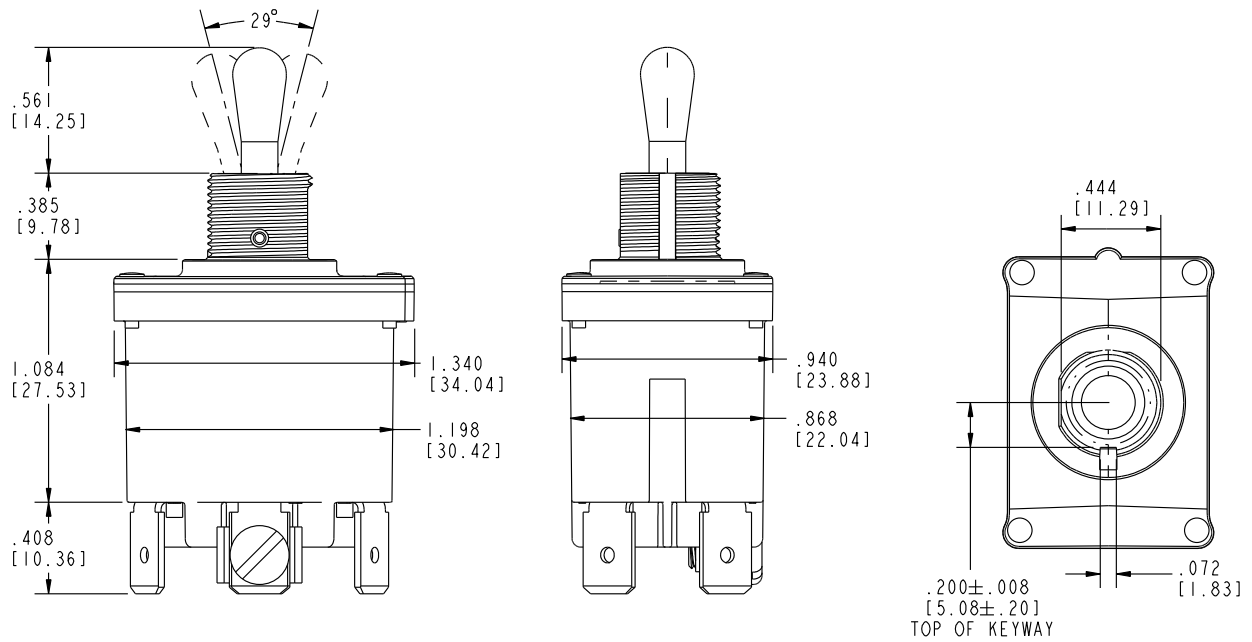
Without Panel Seal	Toggle Length	Bushing Length
53	.561	.385
With Panel Seal (Bulk)		
58	.561	.385

3 POLES

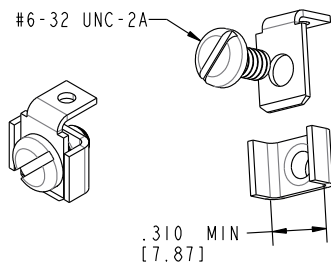
1 Single pole using terminals 1, 2 & 3
2 Double pole using terminals 1, 2, 3, 4, 5 & 6

- 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.

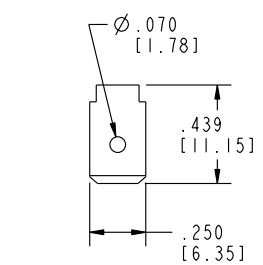
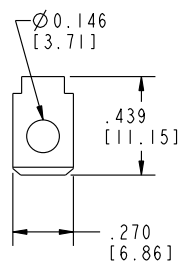
Dimensional Specifications: in. [mm]



TERMINALS

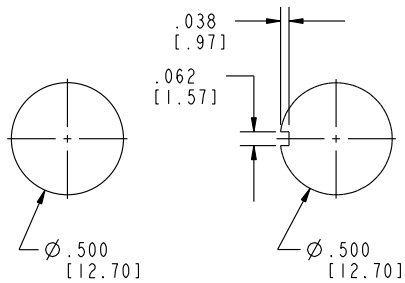


SCREW (AND CAGE) TERMINAL

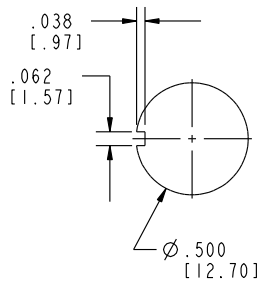


.250 TAB (Q.C.) TERMINAL

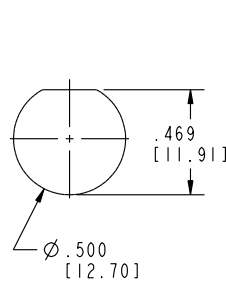
PANEL CUTOUTS



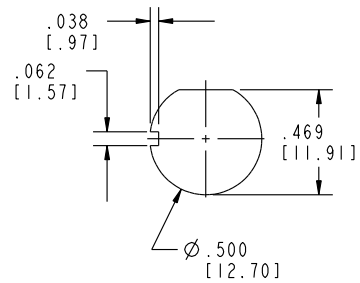
MOUNTING HOLE



WITH KEYWAY



WITH FLAT



WITH KEYWAY, FLAT

S-Series

S-Series

ROCKER SWITCHES

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



Product Highlights:

- ◆ Abbreviated travel ½ throw actuation
- ◆ Ergonomic rockers
- ◆ Recognizable and simple to operate controls
- ◆ Compact Design

Electrical

Contact Rating	10A@ 28VDC
Dielectric Strength	1500 Volts RMS between pole to pole
Insulation Resistance	50 Megaohms
Contact Resistance	10 milliohms max. @ 4VDC
Contact Bounce Life	<20 milliseconds 100,000 cycles maintained 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 4 sides. Test criteria - No loss of circuit during test, pre & post test contact resistance.
Thermal Shock	Per IEC 68-2-14, -40°C to +85°C. Test criteria - pre & post test contact resistance.

Mounting Specifications

Snap in Mount	40mm x 20mm keyed hole (see dimensional specifications for details.)
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*Manufacturer reserves the right to change product specification without prior notice.

S	18	A	A	R	F	0	4	-	M	Z	Z	Z	00	-	1	00	00
1 Series	2 Circuit	3 Rating	4 Illumination	Lamp 1	Lamp 2	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	() - momentary
3, 5 & 7.	SP - single pole uses terminals
3 - - 4	
3, 5, 7 & 4, 6, 8.	DP - double pole uses terminals
5 - - 6	
7 - - 8	
9 - - 10	

Position:

SP	DP	1	2	3
		5 & 7, 6 & 8	Connected Terminals	3 & 5, 4 & 6
16	26	ON	OFF	ON
18	28	(ON)	OFF	(ON)

SPECIAL CIRCUITS

31	(6 & 8)	4, 5, 6, 7	OFF
41	51	ON	NONE ¹
42	52	(ON)	OFF
43	53	(ON)	3 & 5
44	54	ON	3 & 5
45	55	(ON)	OFF
46	56	NONE	5 & 7
47	57	NONE	5 & 7
	75	(5 & 7, 3 & 6)	(3 & 5, 4 & 6)
	98 ²	(5 & 7, 2 & 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	0	Red	Orange	Yellow	Green
LED	A	C	E	H	
12VDC	B	D	F	J	
24VDC					

8 BRACKET COLOR

1	Black
4	Dark Carbon

9 ACTUATOR

Standard Rocker, Laser Etched	Black M	Titan Gray N	Dark Carbon R
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10, 11, 12 LEGEND COLOR

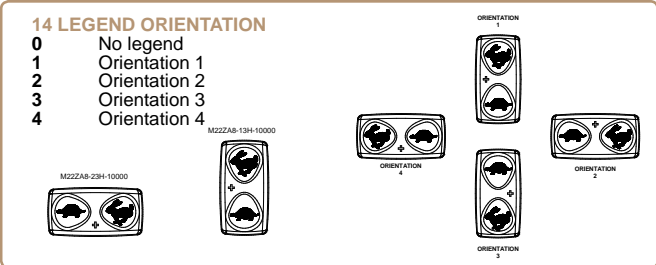
Z	No Legend
1	Clear

13 LEGEND 1 ⁵

00	No Legend
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3 RATING

1	0.4VA 28VDC Resistive
A ³	10.5mA 1.5A 28VDC, 5A 28V 50A Inrush Lamp Load
B ⁴	3.5A 28VDC, 18A Inrush
C ³	10mA 10A 28VDC
D ³	20mA 10A 14VDC



4 ILLUMINATION

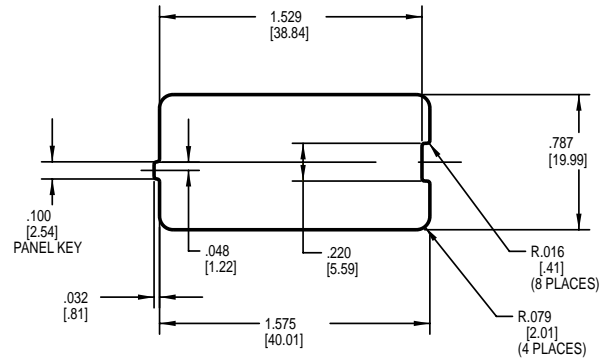
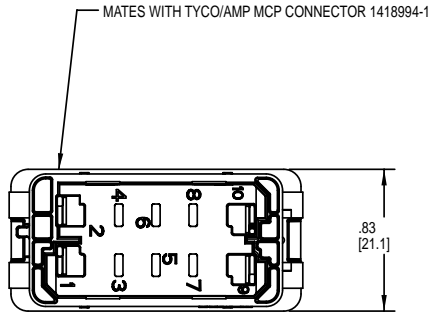
	Lamps	Illumination Type	Lamp wired to Terminals
S	NONE	INDEPENDENT	-
A	1	INDEPENDENT	1 (+) 2 (-)
C	1	INDEPENDENT	1 (+) 2 (-)
	2	INDEPENDENT	9 (+) 2 (-)
D	1	INDEPENDENT	1 (+) 2 (-)
	2	INDEPENDENT	9 (+) 10 (-)
E	1 & 3	INDEPENDENT	1 (+) 2 (-)
		PARALLEL	
F	1	INDEPENDENT	1 (+) 10 (-)
		SNAP	
G	1 & 2	INDEPENDENT	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 ⁶

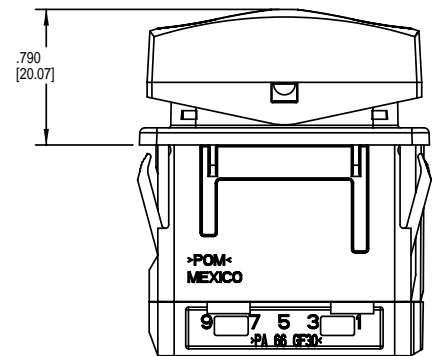
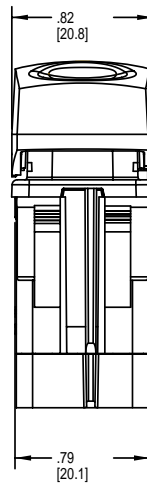
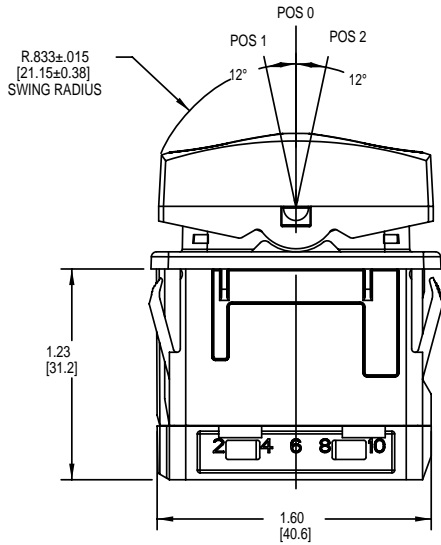
00	No legend
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- Notes:
- Indicates 1/2 travel for actuator.
 - Snap-Action Contact Mechanism
 - Not available with circuit 98.
 - Available with circuit 98 only.
 - Located over T1-2.
 - Legend 2 located in center of rocker, Legend 3 located over T9-10. 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

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	Polycarbonate rated at 100°C.
Lens	Polycarbonate rated at 100°C. Front snap-in.
Connector	Nylon 66 rated at 85°C. Polarized.
Bracket	Nylon Zytel

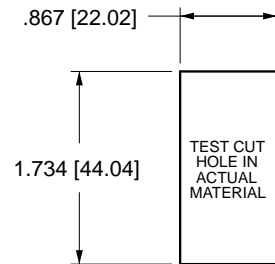
Actuator Travel (Angular Displacement)

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

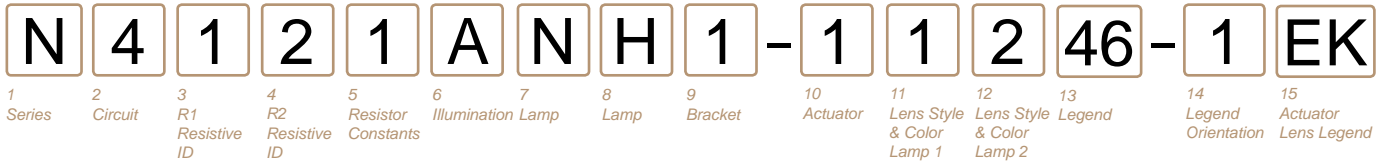


MOUNTING HOLE

Panel Thickness Range

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

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



1 SERIES
N

2 CIRCUIT²
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.

S	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*	Red	Amber	Green
12VDC	C	N	H

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

9 BRACKET COLOR¹

	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 COLOR¹

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

Large Transparent, Large Translucent, Bar Transparent, Bar Translucent, Laser Etch background color

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

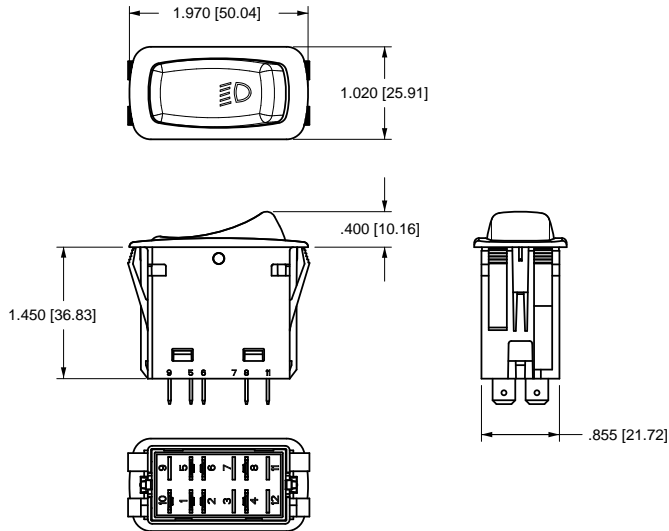
15 ACTUATOR LENS LEGEND
00 No legend this location / no actuator
For legend options & codes, see pages 54-65 of this catalog.

Notes:
1 Custom colors are available. Consult factory.
2 Switch supplied with .187 tab terminals.

Dimensional Specifications: in. [mm]

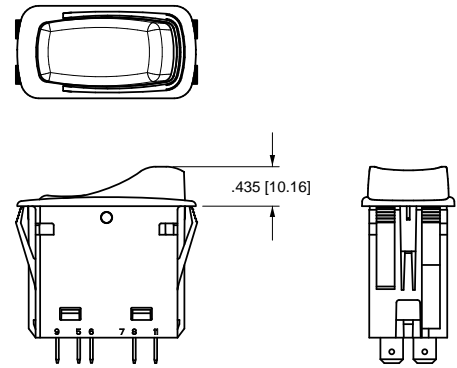
N-SERIES

SHOWN WITH LASER ETCHED ACTUATOR



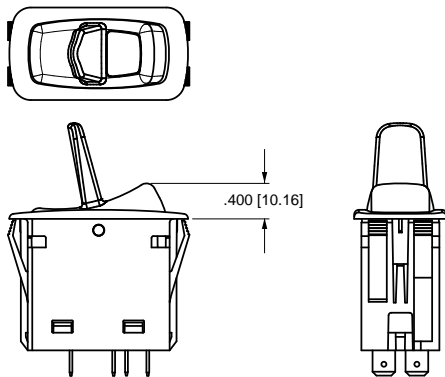
N-SERIES

SHOWN WITH ROCKER GUARD



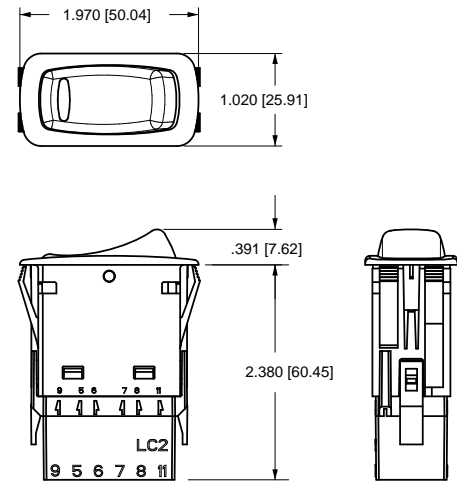
N-SERIES

SHOWN WITH LARGE LENS AND PADDLE ACTUATOR



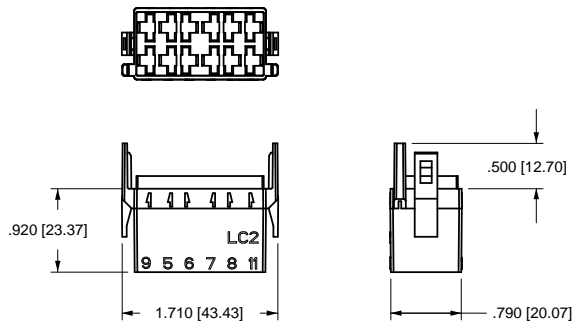
N-SERIES

SHOWN WITH BARS LENS AND CONNECTOR



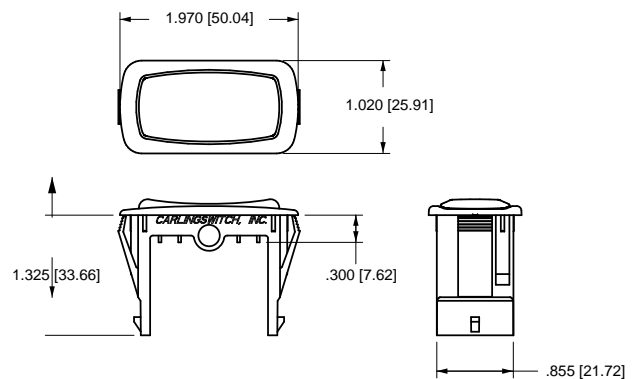
N-SERIES

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



N-SERIES

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



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 and providing cost-savings as well with minimized electrical connections; IP67 sealing which prevents PCB degradation and eliminates short circuit potential. Superior heat dissipation is achieved with a heat sink mass which is over 50% larger than competitive products. Fully programmable circuitry lets the designer decide illumination levels and detent positions. EMC eliminates electrical “noise” and provides interference-free radio signals. Ease of assembly is accommodated with polarized integral connectors and an industry standard mounting hole.



Product Highlights:

- 3 Choices for incremental dimming rates
- 12 or 24 Volts
- Laser Etched or Lens Illumination
- IP67 Sealing

Electrical

Contact Rating	9-16VDC, 2-10Amp.
Terminals	6.3mm (0.250" TAB)
Contacts	solid-state load switching
Output	PWM 200 Hz.
EMI/EMC	SAE J 1113 and SAE J 1455
	Conducted Transient Emissions
	RF Conducted Emissions
	Conducted Susceptibility:
	Test pulse #1
	Test pulse #2
	Test pulse #3a, #3b
	Load Dump: Test Pulse #5
	Power lead Disturbance (Power Dips)
	AF Conducted Immunity
	Direct RF Injection (DRFI)
	Abnormal Vehicle Operating Conditions
	RF Radiated Emissions
	Radiated Immunity-Absorber Lined Chamber
	Electrostatic Discharge: Shipping / handling Electrostatic Discharge: Human Static Discharge
Dielectric Strength	1000V @ 60 Hz was applied for each unit for 1 minute
Reverse Polarity	24VDC for 5 minutes

Mechanical

Endurance	100,000 cycles minimum
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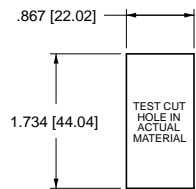
Physical

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

Environmental

Operating Temperature	-40°C to + 85°C
Vibration	Resonance Search Individual resonance searches were conducted with vibration applied along each of the three mutually perpendicular axes. 24-50 Hz 0.40DA 50-2000 Hz ± 10 G's peak Random Vibration The random vibration endurance test conditions were sequentially conducted in each of the three mutually perpendicular axes, 1hr/axis Freq. (Hz) PSD (G ² /Hz) 9.36 grms 24 Hz 0.06 60 Hz 0.50 100 Hz 0.025 1000 Hz 0.025 2000 Hz 0.025 During the test, all units were operated at a load current of 2A with 12.5VDC.
Salt Spray	Per Mil-Std 202F, Method 101D, Test Condition A. Duration 96 hrs.
Dust	Per Mil-Std 810C, Method 510.2. Air velocity 300 ± 200 Feet/Min., Test Duration 16 Hr.
Moisture Resistance	Per Mil-Std 202F, Method 106E. Test Criteria-pre and post test operation of switch.

Mounting Specifications



MOUNTING HOLE

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

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

LD 3 5 1 C C 1 - 3 A A FE - 1 FC

1 Series 2 Rating 3 Dimming Rate 4 Termination 5 Illumination 6 Illumination 7 Bracket Color 8 Actuator Style/Color 9 Lens Color 10 Lens Color 11 Legend 1 12 Legend Orientation 13 Legend 2

1 SERIES
LD Electronic Dimmer Control

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

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

4 TERMINATION
1 .230 TABS (5.84 mm)

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

7 BRACKET COLOR 1
1 Black 2 White 3 Gray

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

9 & 10 LENS COLOR
Z No Lens
Clear White Amber Green Red Blue
1 - 7 C B G M T
3 - 9 D E H N U
5 A - J K P R V
- - - - - W

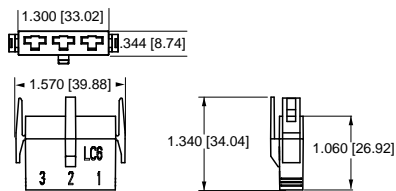
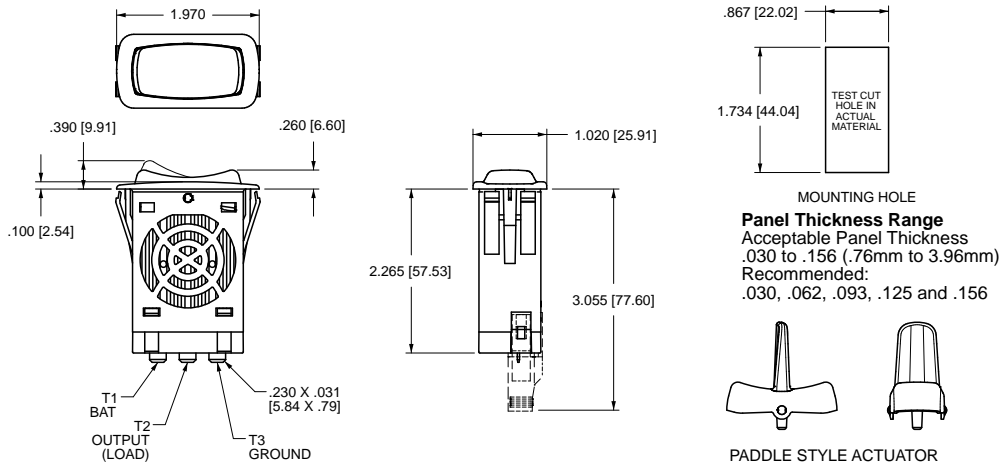
Lens Style
Large Transparent
Large Translucent
Bar Transparent
Bar Translucent
Laser Etch

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

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

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

Notes:
1 Custom colors are available. Consult factory.

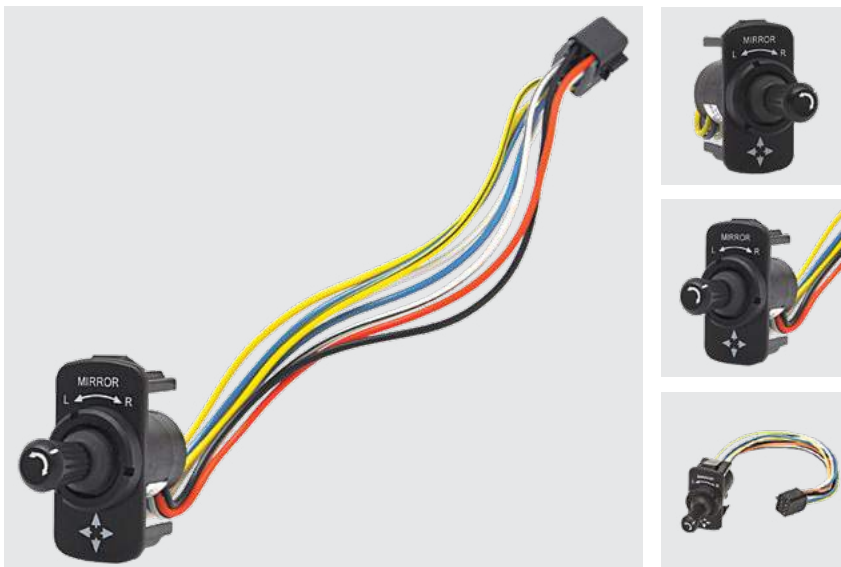


Q.C. SELECTION GUIDE			
COMPANY SERIES	PACKARD PART NO.	WIRE GAGE	
		AWG	MM ²
PACKARD METRI-PACK 630 SERIES TIN PLATED BRASS	12084590	12	3.0
	12052224	12	3.0
	12015870	16-14	2.0-1.0
	12015869	20-18	1.0-.80
	12020035	22-18 (2 REQD)	.80-.50 (2 REQD)
	12052222	20-22	.50-.35

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 ¹

9" wire leads with Delphi-Packard connector #12047886 ³

Mechanism

Sliding contacts in conjunction with a circuit board

LMR - 01 - 1

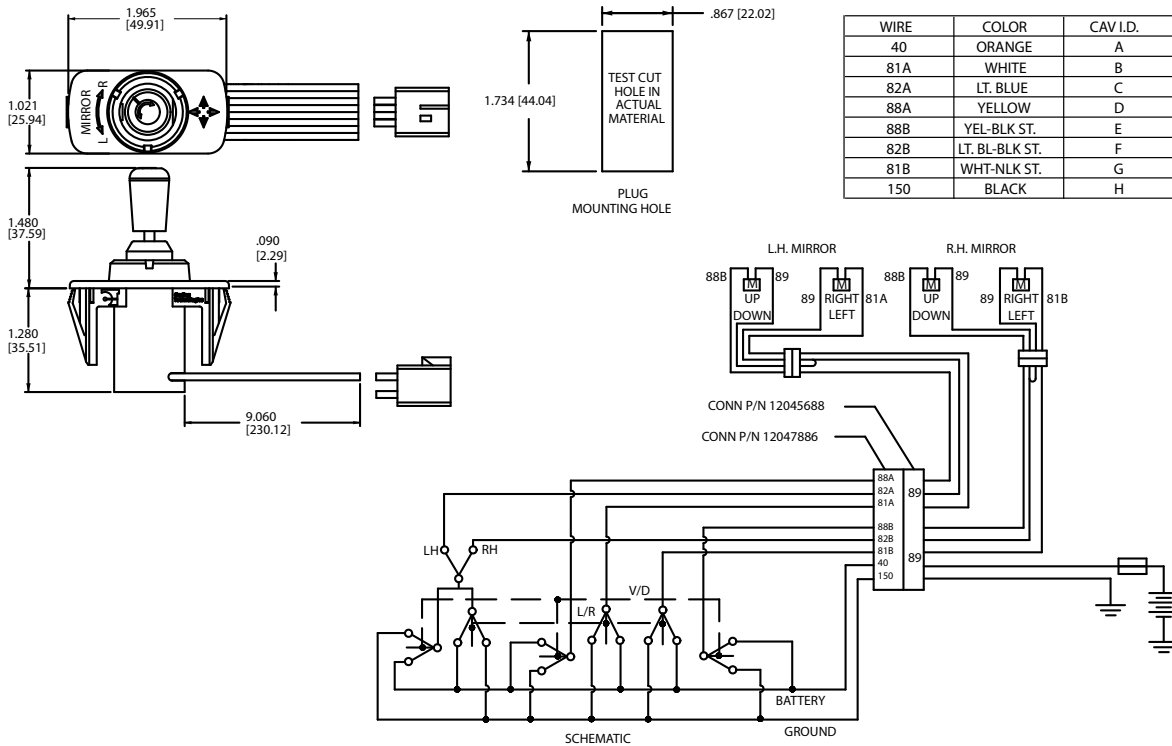
¹ Base Part Number ² Color ³ Legend

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 ²
Z no legend
1 2 arrows symbol (left, right)
2 4 arrows symbol (front, back and left, right)

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



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

LW-Series

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

Mechanical

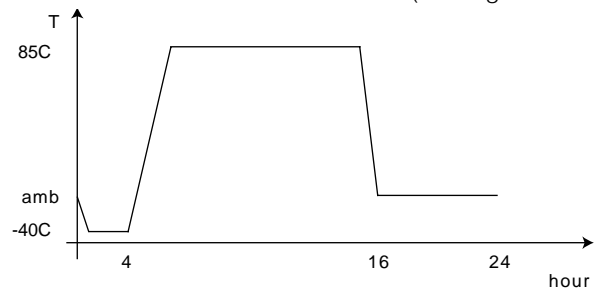
Mechanical Vibration	Sinusoidal Vibration: 10-55-10 Hz, 0.06" DA, one minute-cycle, three hours/axis Random Vibration: Three hours/axis, three mutually perpendicular axes with a test level 4G's. Frequency Amplitude 5Hz 0.16 G2/Hz 100Hz 0.16 G2/Hz 500Hz -3dB/octave roll-off Tests were conducted according 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

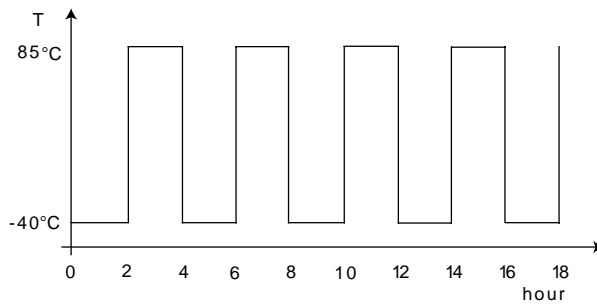
Illumination	LED, rated 100,000 hours 1/2 life
Cover	Acetate
Washer Actuator	Silicone
Toggle Actuator	Nylon 6/6 glass filled
Bracket	Nylon 6/6
Connector	Nylon 6/6 rated 85°C polarized
Washer Function	Momentary
Toggle Function	Maintained Intermittent
Operation	Momentary
Weight	44 grams

Environmental

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

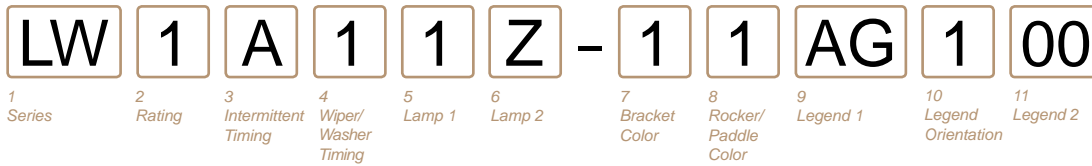


Thermal Shock	According to SAE J1455, Sec. 4.1.3.2 (See Figure below)
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Humidity	According to SAE J1455, Sec. 4.2.3 (30 cycles for 8 hrs. with maximum temperature of 85°C and 95% relative humidity.
Dust Bombardment	According to SAE J1455, Sec. 4.7.3 (with dust concentration of 0.88gm/m for 24 hours.)
Salt Spray	MIL-STD-202G, Method 101D for 96 hours.

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



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

2 RATING 1
1 8A, 14VDC (1 relay) **4** 1A, 14VDC (1 relay)
2 4A, 28VDC (1 relay) **5** 1A, 14VDC (2 relay)
3 1A, 14VDC (1 relay) **6** 1A, 28VDC (2 relay)

3 INTERMITTENT TIMING
A 2-15 seconds

4 WIPER/WASHER TIMING
1 3 seconds

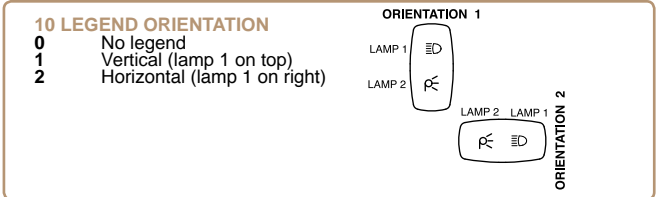
5 LAMP #1 (ABOVE WASH)
Z No Lamp **2** Red LED
1 Green LED **3** Amber LED

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

7 BRACKET COLOR
1 Black

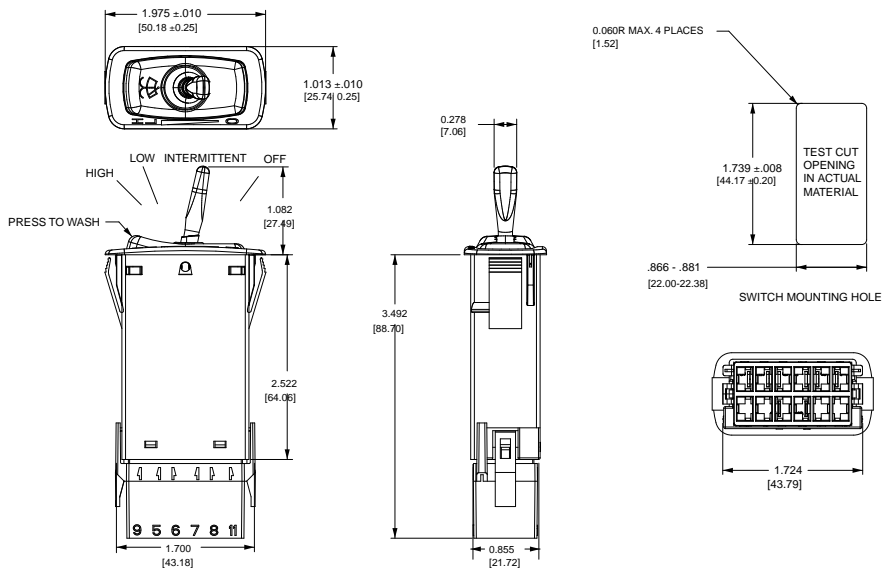
8 ROCKER / PADDLE COLOR
1 Black

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



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

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



Principles of operation:

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

The Wiper Control is designed to interface with single or dual relay systems for intermittent delay and the park function. The high speed is driven directly via a power transistor internal to the module. The coil of the relay is pulled down to ground during the intermittent, low-speed and high-speed modes respectively. (Contact Carling Technologies for wiring diagrams)

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.



Resources:

[Download 3D CAD Files](#)

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

[Watch Product Video](#)

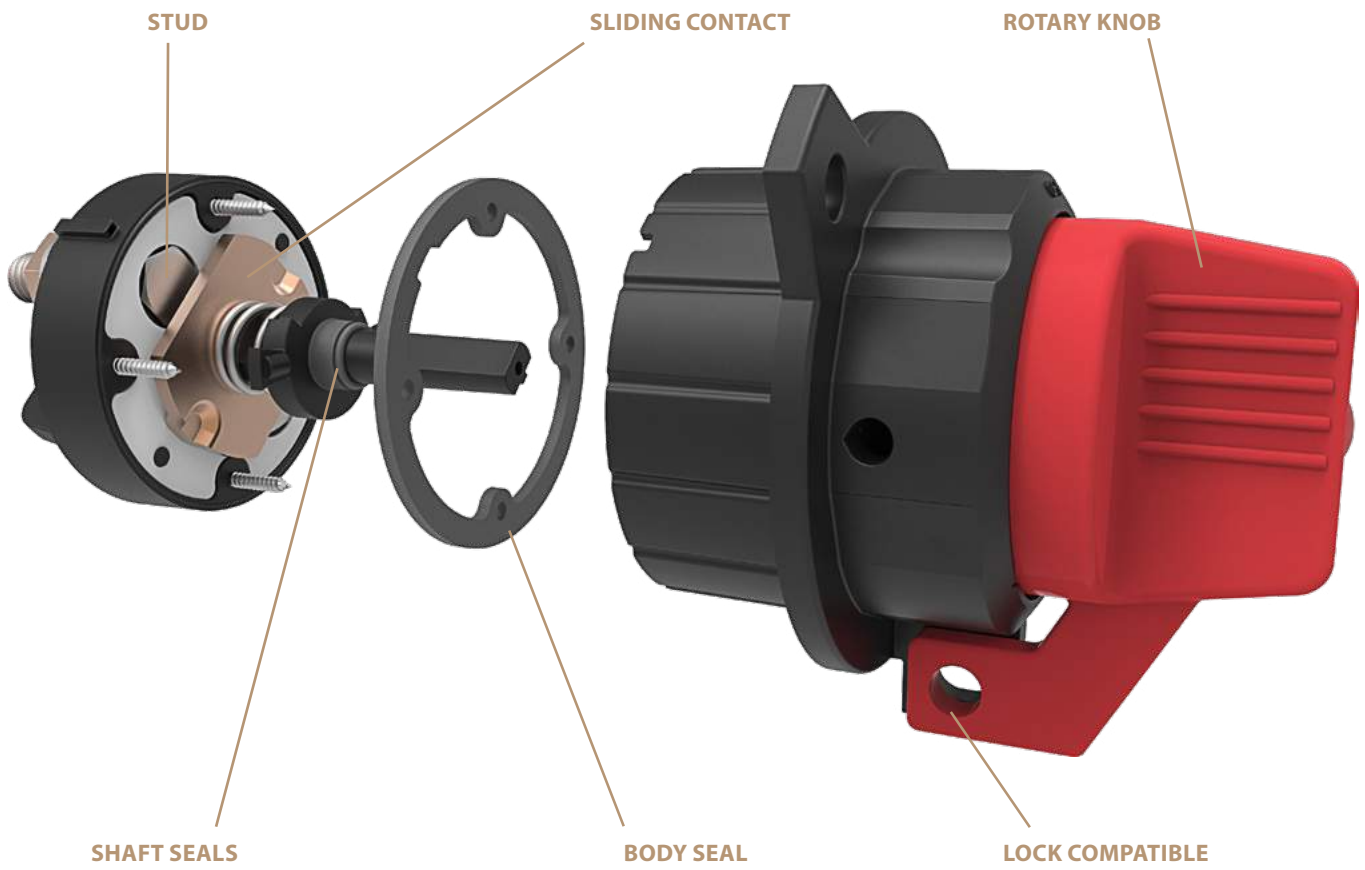


Product Highlights:

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

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	24VDC/1500A, 3 seconds on, 60 seconds off, 10 cycles: voltage drop should not exceed 400mV between main terminals. 28V/1500A/30 seconds: voltage drop should not exceed 400mV 28V/2000A/5 seconds followed by 28V/750A/30 seconds followed by 28V/250A/24 hours: voltage drop should not exceed 100mV
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.

Mechanical

Handling Shock	Fully functional after 3 drops from 1000 mm height. Surface damage may occur.
Endurance	More than 100,000 cycles without load

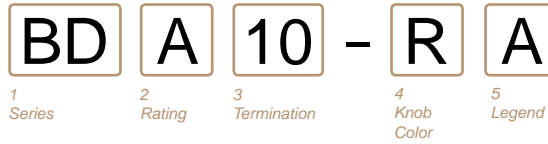
Environmental

Operating Temp.	-40 °C to +85 °C.
Moisture Resistance	IEC 60068-2-38 or G/T 2423.34, Test Z/AD: Composite temperature/humidity cycle test, ten 24-hour cycles @ -10°C to +65°C, ≤80-96% RH.
Thermal Cycling	IEC 60068-2-14 or GB/T 2423.22, Test Nb, 25 Cycles -40°C to +85°C
Thermal Shock	IEC 60068-2-14 or GB/T 2423.22, Test Na (Five cycles @ -55°C to +25°C to +85°C to +25°C)
Thermal Resistance	IEC 60068-2-1 or GB/T 2423.1 Cold: Test A, operate 8 hours @ -40°C IEC 60068-2-2 or GB/T 2423.2 Heat: Test B, operate 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/(m2-nm), wavelength 420 nm.

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 filled), Bracket & Knob (nylon glass filled), Studs (Copper + Tin plating), Nuts (Brass)

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



1 SERIES
BD Battery Disconnect Power Switch

3 TERMINATION
10 M10 Stud

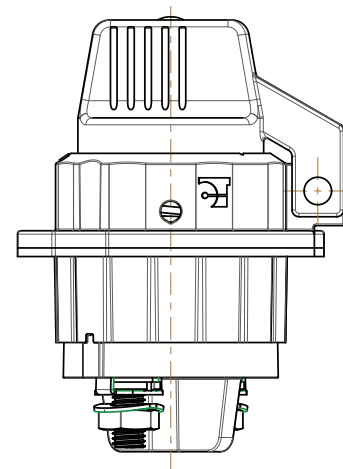
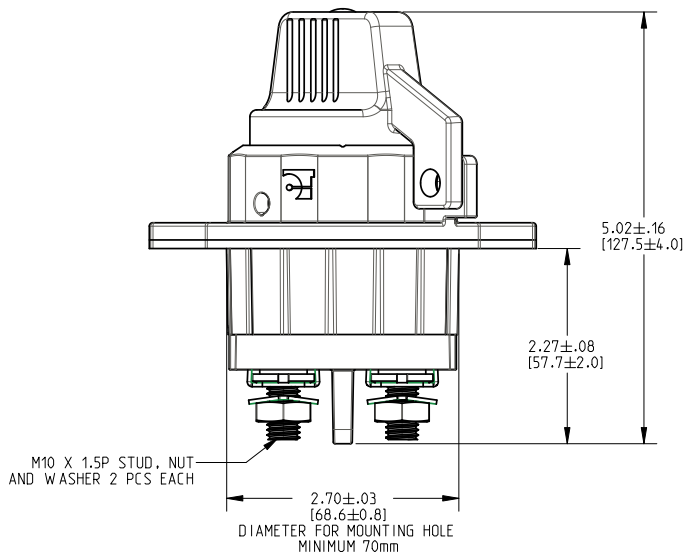
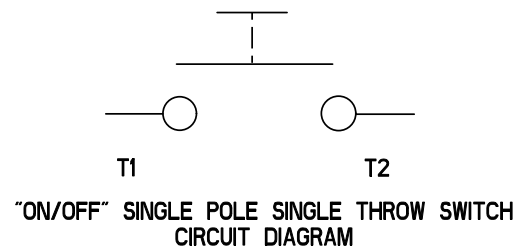
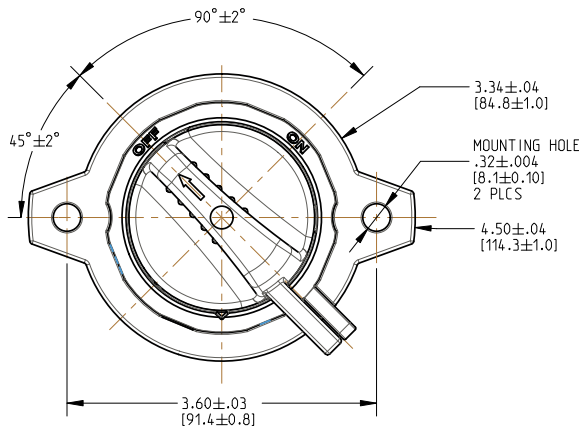
2 RATING / OPERATION CYCLE
A 100A @ 24VDC: 50,000 Operation
 200A @ 24VDC: 20,000 Operation
 250A @ 24VDC: 3,000 Operation

Note: Refer to General Specifications for test parameters.

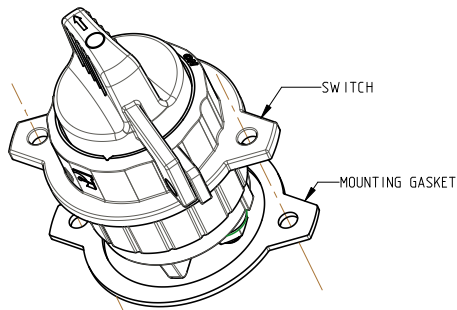
4 KNOB COLOR
R Red

5 LEGEND
A Arrow Legend, White Color

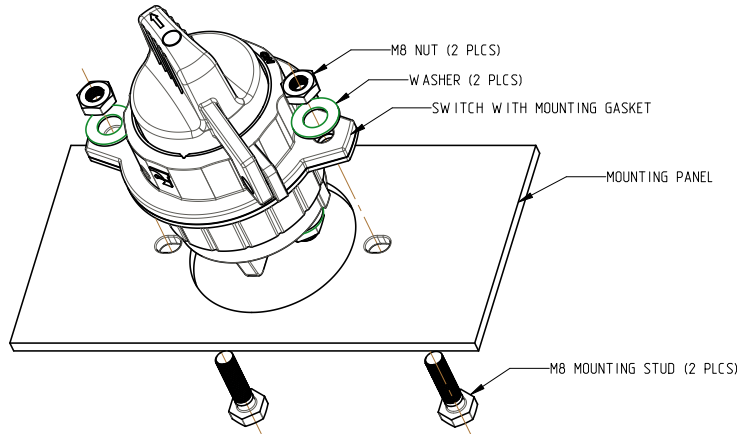
Dimensional Specifications: in. [mm]



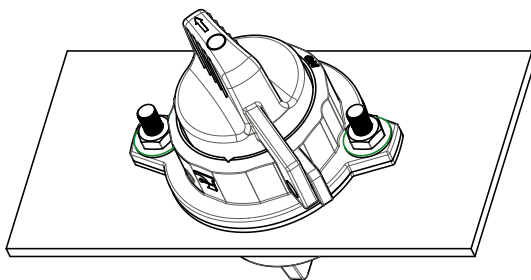
Mounting Method 1: in. [mm]



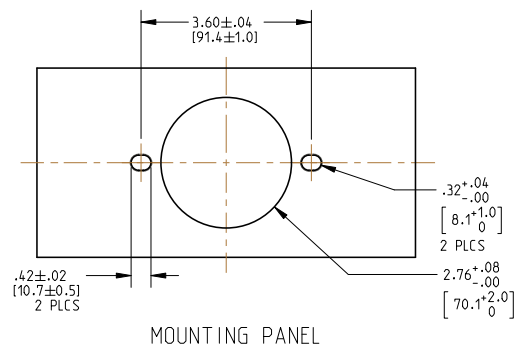
MOUNTING STEP 1: ATTACH MOUNTING GASKET WITH THE SWITCH ORIENTATION AS SHOWN



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



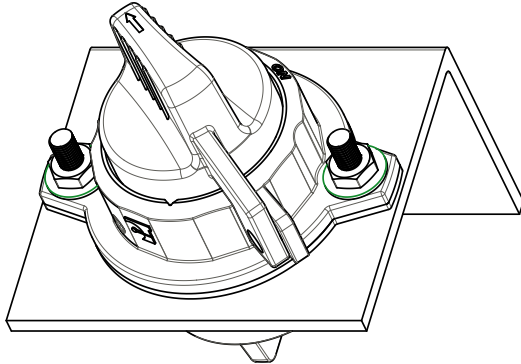
MOUNTING STEP 3: TIGHTEN 2PCS M8 NUTS (REC. TORQUE [10-15Nm])



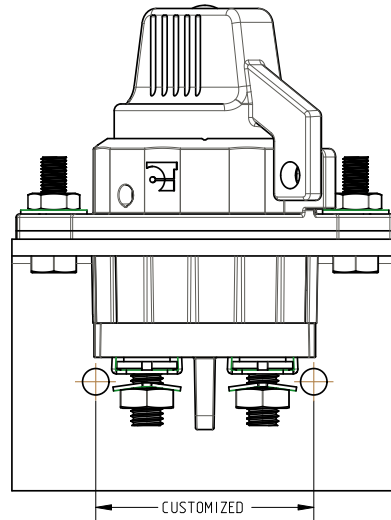
Notes:

- 1 Switch can be mounted horizontally or vertically.

Mounting Method 2: in. [mm]



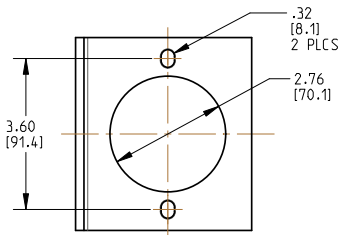
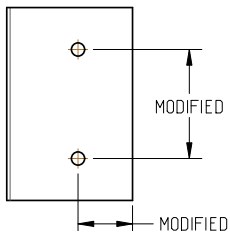
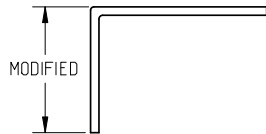
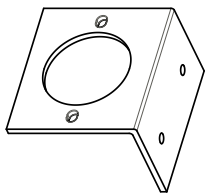
MOUNTING STEP 1: INSTALL SWITCH WITH MOUNTING BRACKET ORIENTATION AS SHOWN



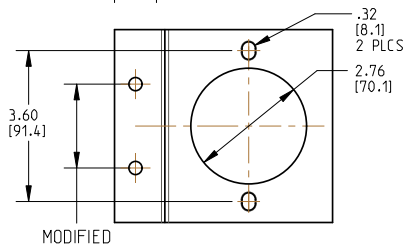
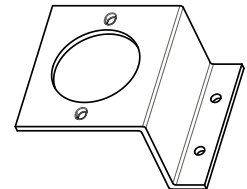
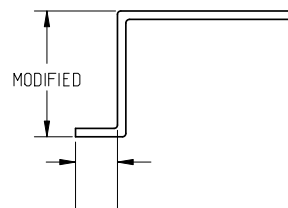
MOUNTING BRACKET CAN BE MODIFIED AS BELOW

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

"L" SHAPE MOUNTING BRACKET

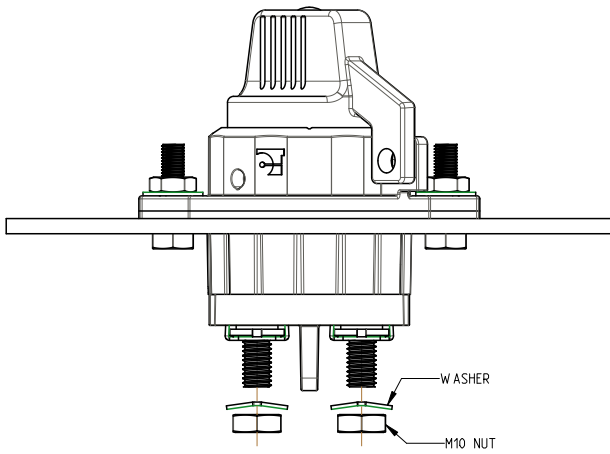


"Z" SHAPE MOUNTING BRACKET

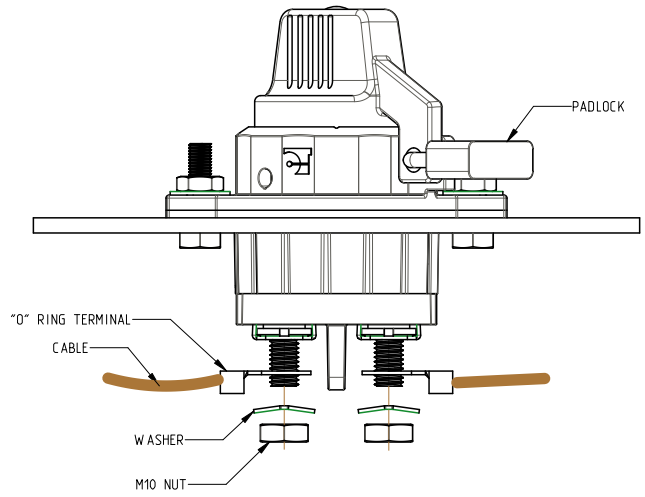


Notes:
1 Switch can be mounted horizontally or vertically.

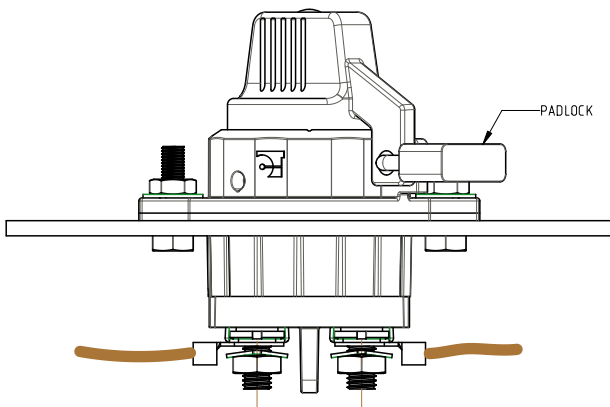
Wiring: in. [mm]



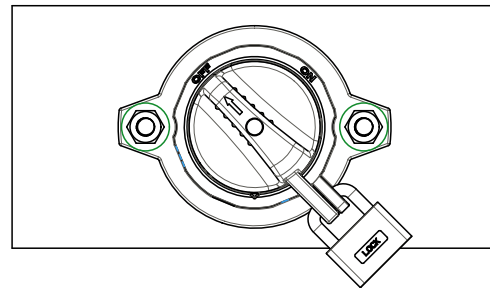
WIRING 1: DISCONNECT WASHERS AND NUTS



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



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



WHEN USED IN CONJUNCTION WITH A PAD LOCK, SWITCH CAN BE LOCKED IN THE "OFF" POSITION AS A SAFETY MEASURE

CKP-SERIES

CKP-Series

SAE J1939 CAN KEYPAD

Compliant with SAE J1939 CAN standards, the CKP-Series is a customizable keypad featuring laser etched legends and up to three dimmable LED function lights per button, which also offer diagnostic feedback by blinking if there is a fault.

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

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



Resources:

[Download 3D CAD Files](#)

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

[Watch Product Video](#)



Product Highlights:

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

Typical Applications:

- Military
- On/Off-Highway
 - Trucks & Buses
 - Construction
 - Mining
 - Agriculture
 - Among Others

CKP-Series DESIGN FEATURES

LOW PROFILE DESIGN

0.57 inch [14.48 mm] thickness (see dimensional specifications for more detail)



SEALING PROTECTION

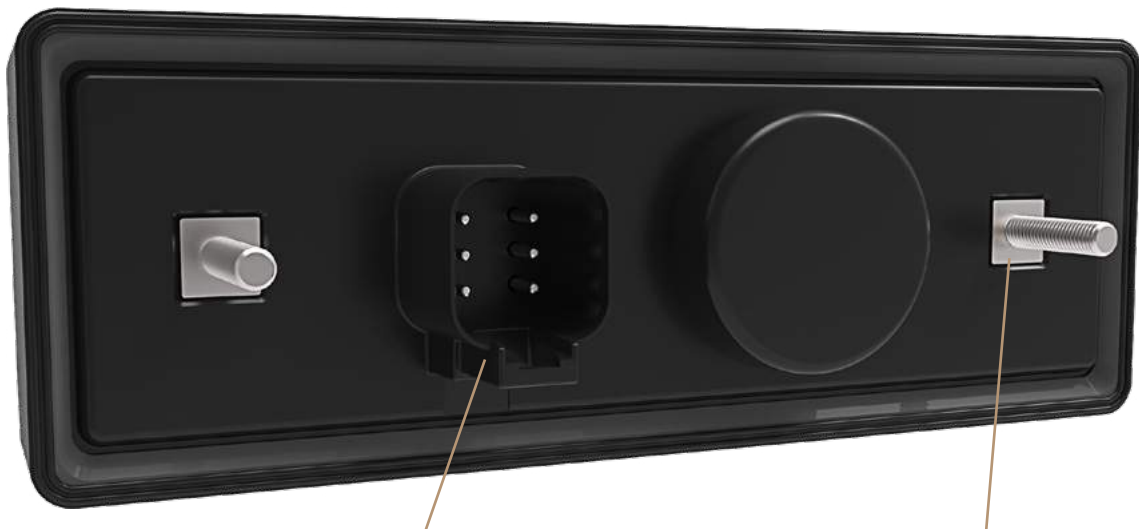
Fully sealed IP69 front panel

LED FUNCTION LIGHTS

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

CUSTOMIZABLE ICONS

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



SEALING PROTECTION

Fully sealed IP68 back panel when connected

CONNECTOR

Mates to the Deutsch DT-Series Connector

10-32 MOUNTING STUDS (2x)

Max tightening torque 30 inch lbs.

General

Illumination	LED backlit icons and function lights Up to 3 function lights per button Dimmable illumination, controlled by CAN messages
Connection / Wiring	Duetsch DT series connector (See Dimensional Specifications)

Electrical

Operating Voltage	Designed for 12/24 Volt systems Minimum 8 VDC Maximum 32VDC
Sleep Mode	Low current sleep mode draws less than 1.5 mA throughout the supply voltage range wakes on keypress or CAN message
Supply Voltage ratings	The keypad passes SAE J1455 section 4.13.1 for power up, operating voltage, over voltage, reverse polarity, and short circuit
EMC	Transient immunity: ISO 11452-2, 100 V/m, 20 MHz to 2,000 MHz, Class A per ISO 11451-1 Conducted Transient immunity: ISO 7637-2:2004, Annex A Table A2 (for 24V systems), Class A ESD immunity: ISO 10605:2001, Test level IV (8 kV direct discharge, 15 kV air discharge) Transient Emission: ISO 13766, Broadband: Annex D, Narrow band: Annex E, 30-1000 MHz

Mechanical

Overall Dimensions	See Dimensional Specifications
Panel cutout	See Dimensional Specifications
Endurance	Each button functions for at least 1,000,000 total actuations (100,000 actuations at -40°C, 100,000 actuations at +85°C, and 800,000 actuations at +25°C ± 10°C)

Software

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

Environmental

Thermal	-40°C to +85°C The following codes were passed: Cold Soak (IEC 60068-2-1) Heat Soak (IEC 60068-2-2) Cycling/Shock (IEC 60068-2-14) IEC 60068-2-5, procedure B, 10 cycles, Total irradiation per cycle = 22.4 kWh/m ²
Solar Radiation:	IEC 60068-2-13 Soak: IEC 60068-2-78, 93% RH (±3%), 10 days
Low pressure Humidity	IEC 60068-2-30, test Db: Damp Heat Cyclic (12hr + 12hr cycle), variant 1, 6 cycles
Cyclic	IP6k9k per ISO 20653 (front side) IP6k8 per ISO 20653 when connected (back side)
Ingress Protection	IEC 60068-2-27, Shock 500 m/s ² 11 milliseconds, Bump 400 m/s ² 6 milliseconds 600 cycles
Shock and Bump	IEC 60068-2-31, Free fall, Procedure 1, 1000 mm height, drop in all 3 axes in both directions
Drop test	IEC 60068-2-6, Swept sine wave section 8.2, 5 - 500 Hz 20 cycles 5g acceleration
Vibration	IEC 60068-2-6, Vibration sinusoidal, section 8.1, 10 - 2000 Hz, 5g acceleration IEC 60068-2-64, Method 1, random excitation, 10 - 350 Hz, 5 hours in each axis
Chemical Resistance	IEC 60068-2-74, Class B, Engine oil, Diesel, Hydraulic oil, Ethylene Glycol, Urea Nitrogen, Liquid Lime, NPK Fertiliser, Ammonia, Calcium Chloride, Brake fluid
Corrosion Resistance	IEC 60068-2-52, Test Kb, Severity level 4
Weathering/Cracking Resistance	ASTM D1171-99, method A, 72 hours
Abrasion/Wear Resistance:	40 cycles of ASTM F2357 testing with 0.25" paper at 175 grams of force

Software Interface Integration

Click below for details on integrating the CKP-Series into J1939 CAN network:
www.carlingtech.com/sites/default/files/documents/ckp-series_interface.pdf

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

Ordering Scheme: Part 1 (Keypad)

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

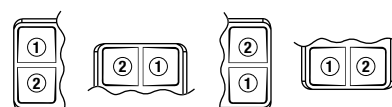
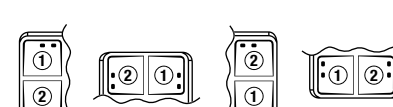
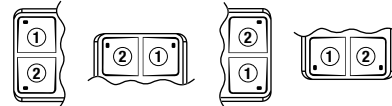
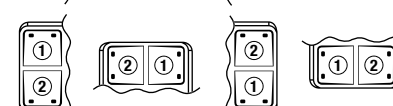
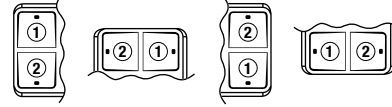
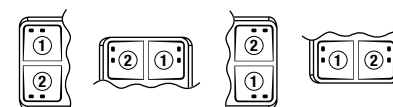
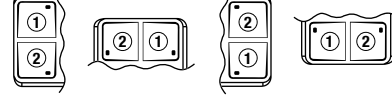
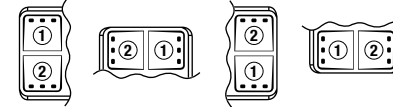
1 Series 2 Styling 3 Button Layout 4 Orientation 5 Keypad Color 6 Backlight 7 Function Light Color 8 Un-illuminated Image Code 9 Network Type 10 Source Address

1 SERIES CKP Carling Keypad	6 BACKLIGHT A White
2 KEYPAD STYLING 1 Standard	7 FUNCTION LIGHT COLOR B Amber C Green D Red E Blue
3 BUTTON LAYOUT 1 Two by Six	8 NON-ILLUMINATED IMAGE CODE A White
4 ORIENTATION A Landscape C Reverse Landscape B Portrait D Reverse Portrait See "icon artwork button layout" section for details.	9 NETWORK TYPE J J1939
5 KEYPAD COLOR 1 Black	10 SOURCE ADDRESS The Source Address is a unique number (000-248) assigned to each node on a CAN network, and is determined based on the specific CAN architecture of each customer application.

Ordering Scheme: Part 2 (Icon Artwork)

Button 1 2 RS <small>11 Function 12 Icon Code</small>	Button 2 2 RA <small>13 Function 14 Icon Code</small>	Button 3 3 UV <small>15 Function 16 Icon Code</small>	Button 4 3 UW <small>17 Function 18 Icon Code</small>	Button 5 6 MT <small>19 Function 20 Icon Code</small>	Button 6 8 UB <small>21 Function 22 Icon Code</small>
Button 7 8 NN <small>23 Function 24 Icon Code</small>	Button 8 8 PU <small>25 Function 26 Icon Code</small>	Button 9 5 PR <small>27 Function 28 Icon Code</small>	Button 10 5 PP <small>29 Function 30 Icon Code</small>	Button 11 4 RH <small>31 Function 32 Icon Code</small>	Button 12 4 NU <small>33 Function 34 Icon Code</small>

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

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

Additional function light colors available, please consult factory.

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

Continue to next page for layout and icons.

Orientation - Icon Artwork Button Number Layout

(see dimensional specifications for more detail)

A: Landscape



B: Reverse Landscape



C: Portrait



D: Reverse Portrait



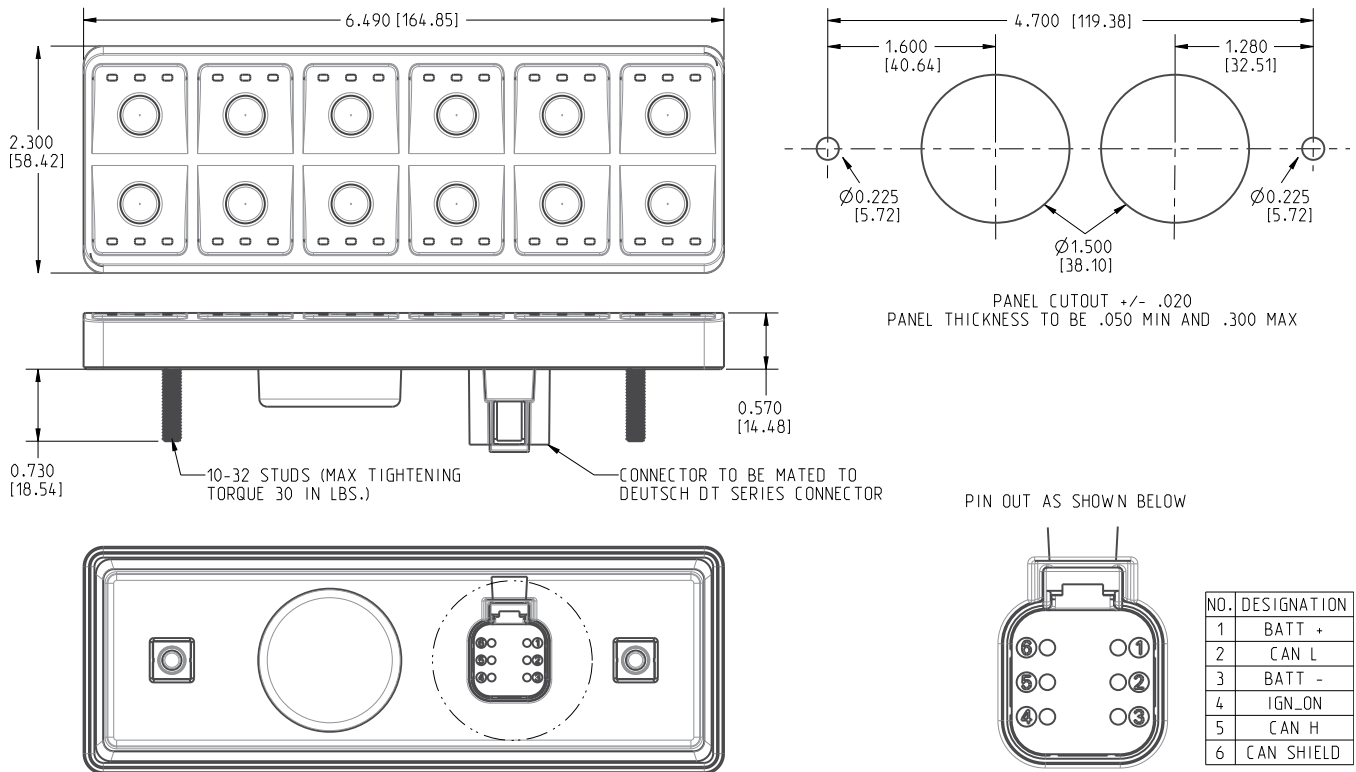
Standard Icons Codes:

Standard Icon Codes continued on next page.

Standard Icons Codes:

SEAT SZ	VX	WF	WH	PG	CRUISE SJ	YA	YB	RM	TM	RD	RS	TP
TR	NT	MX	YC	TW	TJ	YF	TH	TF	TG	YS	YH	AUX SX
ON OFF RZ	OFF ON YP	I O WN	O I WP	O F F O N WW	ON WX	OFF SA	I SB	O SC	II SD	RAISE ST	LOWER SU	HIGH WU
LOW WV	FWD SV	REV SW	ACC VK	REAR SF	PARK SG	AUTO SS	RU	RV	RX			

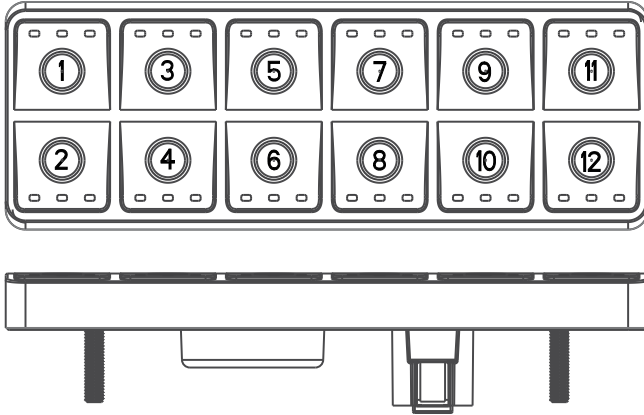
Dimensional Specifications: in. [mm]



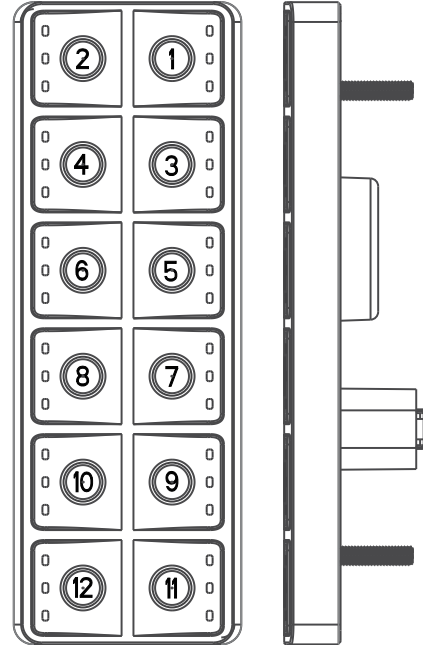
Dimensional Specifications: in. [mm]

ORIENTATION - ICON ARTWORK BUTTON NUMBER LAYOUT

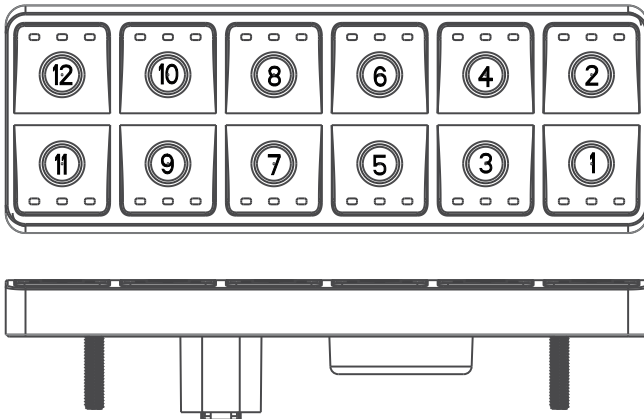
LANDSCAPE



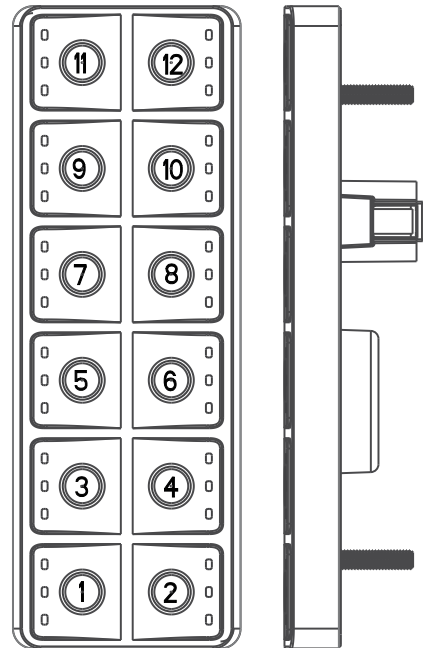
PORTRAIT



REVERSE LANDSCAPE



REVERSE PORTRAIT



CMB

CMB-Series

THERMAL CIRCUIT PROTECTORS

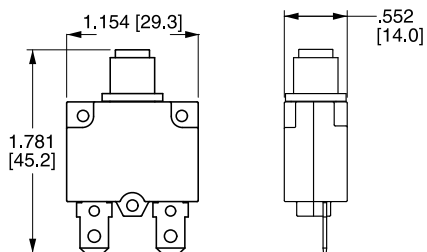
The CMB-Series is a compact, single pole, push-to-reset family of thermal circuit breakers designed to protect equipment. Utilizing simple, precision design with few moving parts, these breakers offer cost effective, extremely reliable circuit protection with high resistance against shock and vibration.



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

03	3 amps	10	10 amps
04	4 amps	12	12 amps
05	5 amps	13	13 amps
06	6 amps	14	14 amps
07	7 amps	15	15 amps
08	8 amps	16	16 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 ± 0.05 [1.27] unless otherwise specified.

- | | |
|---|---|
| 1 Used with bushing C or D only. | 10 Amp rating must match button marking (ex: 20 will be marked on the button of CMB-203-27G3N-W-A/20) |
| 2 Used with H bushing only. | 11 Includes molded in "PRESS TO RESET" marking. |
| 3 Used with bushing E only. | 12 Available with K bushing only. |
| 4 Used with M11 mounting hole only. | 13 Available with mounting hole 28 only. |
| 5 Used with mounting hole 00 only. | 14 Thickness is 3.0 mm, .118 in. |
| 6 Used with M12 mounting hole only. | 15 Available with G or J bushing only. |
| 7 All hardware available separately. Consult factory. | |
| 8 Available with mounting hole 27 only. | |
| 9 Available with G, J or K bushing only. | |

8 BUTTON

B	Black	R	Red	W	White
---	-------	---	-----	---	-------

9 TERMINAL

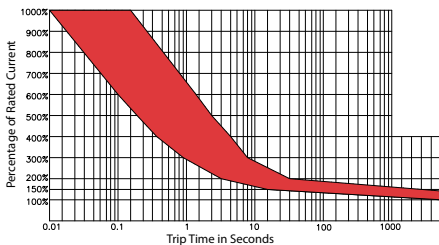
A	Type A	F	Type F
B	Type B	G	Type G
C	Type C	H	Type H
D	Type D	J	Type J
E	Type E	R	Type R

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

10 BUTTON MARKING (IF BLANK, NO MARKING)¹⁰ 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 ¹	
-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 ¹	
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.

CLB

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.

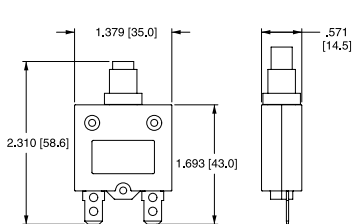


Product Highlights:

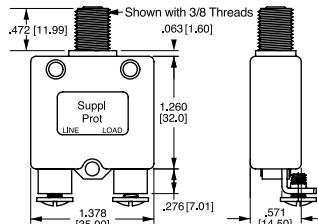
- Ratings from 3-60A, 125, 250VAC, 32VDC
- 2500 VAC/1 minute
- 60°C Max Operating Temperature
- 2500A @ 32VDC Interrupting Capacity
- 100M ohms Insulation Resistance
- Voltage drop <0.25 V
- UL, cUL, CSA, TUV, CE
- UL1500/ISO8846 for ignition protection/marine

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

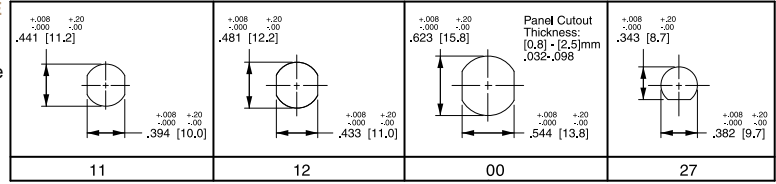
3 VOLTAGE
3 125-250VAC/ 32 VDC

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

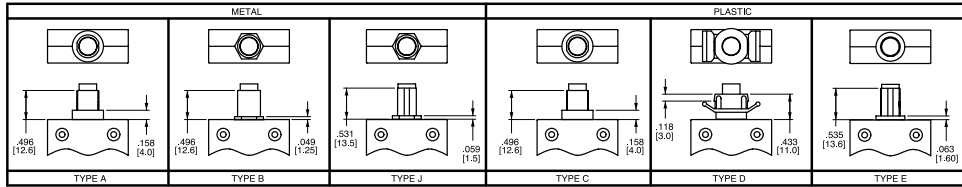
11 1 M11
12 2 M12
00 3 Snap In Style
27 4 3/8" 27 UNS



5 BUSHING

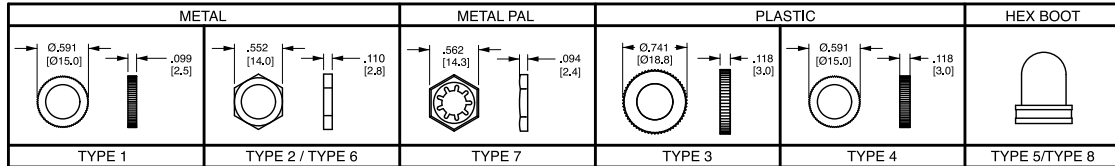
METAL

A 6 Type A
B 16 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

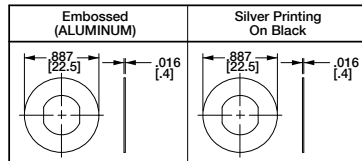


NOTE: Type 5 is clear hex boot. Type 8 is black hex boot (available for bushings E & J only); Type 3 nut includes molded in "PRESS TO RESET" marking.

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 ±0.05 [1.27] unless otherwise specified.

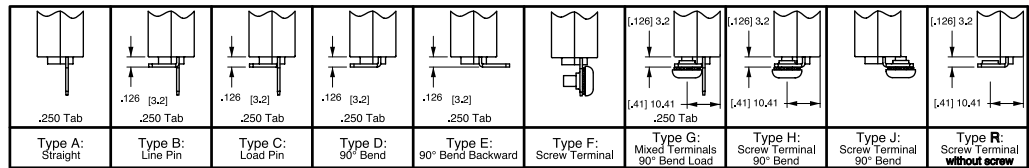
- 1 Used with bushing A or B only.
- 2 Used with bushing A or C only.
- 3 Used with bushing D only.
- 4 Used with bushing E & J only.
- 5 Used with M12 mounting hole only.
- 6 Used with M11 and M12 mounting hole only.
- 7 Used with mounting hole 00 only.
- 8 Used with 27 mounting hole only.
- 9 All hardware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

8 BUTTON

B Black R Red W White

9 TERMINAL 10,11,15

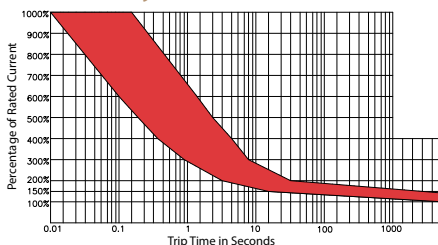
A Type A F Type F
B Type B G Type G
C Type C H Type H
D Type D J Type J
E Type E R Type R



10 BUTTON MARKING (IF BLANK, NO MARKING)¹³ Button Marking Orientation: line 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 ¹	Temperature
-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 ¹	Temperature
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.



Cruise Control

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



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



Horn Control

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



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



Light Control Module

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

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



HVAC Motor Controller

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

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



Keypads

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

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



Solid State Power Control

Module Features:

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



VOCM

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

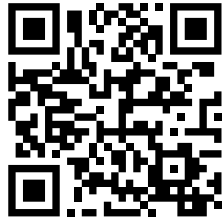
Below is a list of useful product catalogs.
Please scan the QR codes below or visit carlingtech.com/onthego for complete details.

WEBSITE

Product Selector, Resources, Configurit,
Find Rep, Product Materials and Videos.



carlingtech.com



/onthego

SWITCHES AND CONTROLS

Rocker, toggle, pushbutton, rotary, battery
disconnects and controls.



catalog

MINI & SUB-MINI SWITCHES

Sealed and non-sealed rocker, toggle,
pushbutton and slide options.



catalog

HYDRAULIC-MAGNETIC CIRCUIT PROTECTION

1-6 poles from .02 to 700A with CSA, VDE, TUV,
UL489, UL489A, UL1500 approvals.



catalog

THERMAL CIRCUIT PROTECTION

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



catalog

GFCI/ELCI CIRCUIT PROTECTION

1-3 poles from 0.10 to 50A with CSA, UL489,
UL1077, UL1053, UL1500 approvals.



catalog

Below is a list of useful market specific catalogs and brochures.
Please scan the QR codes below or visit carlingtech.com/onthego for complete details.

ON-OFF HIGHWAY

Switches, Controls and Custom Solutions



catalog



brochure

MARINE

Circuit Protection and Switches



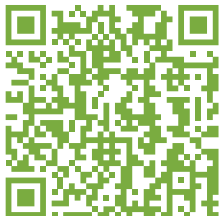
catalog



brochure

RENEWABLE ENERGY

Circuit Breakers and Disconnect products



catalog



brochure

MILITARY

COTS Switches and Circuits Breakers



catalog



brochure

TELECOM/DATACOM

Hydraulic-Magnetic Circuit Breakers



catalog



brochure

INDUSTRIAL AUTOMATION

Switches and Circuit Breakers



brochure

Authorized Sales Representatives and Distributors

Click on a region of the map below to find your local representatives and distributors or visit www.carlingtech.com/findarep.



About Carling

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.

To view all of Carling’s environmental, quality, health & safety certifications please visit www.carlingtech.com/environmental-certifications

Worldwide Headquarters

Carling Technologies, Inc.

60 Johnson Avenue, Plainville, CT 06062

Tel: (860) 793-9281

Fax: (860) 793-9231

Email: sales@carlingtech.com

Web: www.carlingtech.com

Northern Region Sales Office

nrsm@carlingtech.com

Southeast Region Sales Office

sersm@carlingtech.com

Midwest Region Sales Office

mrsms@carlingtech.com

West Region Sales Office

wrsms@carlingtech.com

Latin America Sales Office

larsms@carlingtech.com

Asia-Pacific Headquarters

Carling Technologies, Asia-Pacific Ltd.

Kowloon, Hong Kong

Tel: Int + 852-2737-2277

Fax: Int + 852-2736-9332

Email: sales@carlingtech.com.hk

Shenzhen, China

shenzhen@carlingtech.com

Shanghai, China

shanghai@carlingtech.com

Pune, India

india@carlingtech.com

Kaohsiung, Taiwan

taiwan@carlingtech.com

Yokohama, Japan

japan@carlingtech.com

Europe/Middle East/ Africa Headquarters

Carling Technologies Ltd.

4 Airport Business Park, Exeter

Airport, Clyst Honiton, Exeter,

Devon, EX5 2UL, UK

Tel: Int + 44 1392-364422

Fax: Int + 44 1392-364477

Email: ltd.sales@carlingtech.com

Germany

gmbh@carlingtech.com

France

sas@carlingtech.com

