L-Series
Switch

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





Typical Applications:

- Construction machinery
- Agricultural equipment
- On-highway transportation equipment

Performance Features:

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

Carling Technologies™
Innovative Designs. Powerful Solutions.

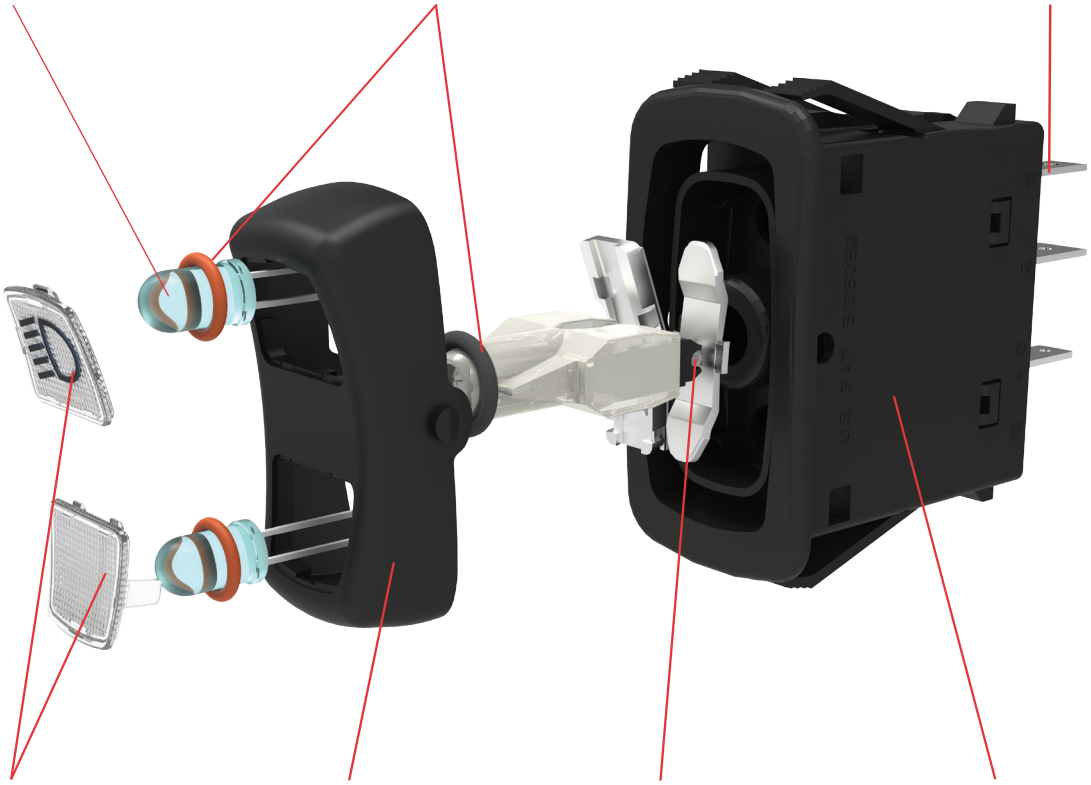
Carling Technologies, Inc.
60 Johnson Avenue • Plainville, CT 06062
Phone: (860) 793-9281 • Fax: (860) 793-9231
Email: sales@carlingtech.com • www.carlingtech.com

L-Series Switch
DESIGN FEATURES

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

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

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



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

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

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

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

Electrical

Contact Rating	.4VA @ 24VDC (MAX) resistive 15 amps, 125VAC 10 amps, 250VAC 20 amps, 4-14VDC 15 amps, 15-28VDC
Dielectric Strength	1250 Volts RMS between pole to pole 3750 Volts RMS between live parts and accessible surfaces
Insulation Resistance	50 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

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.

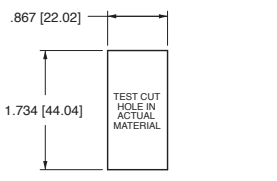
Actuator Travel (Angular Displacement)

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

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

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

1 SERIES
L

2 CIRCUIT[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)

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]

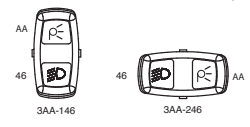
	Black	White	Gray	Red	Laser Etched
Rocker	**A**	**B**	**C**	**D**	**3**
Paddle	**J**	**N**	**K**	**M**	**4**

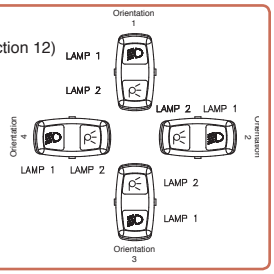
10 & 11 LENS STYLE AND COLOR
Lens color for LEDs must be clear, white, or match color of LED.
0 - No Actuator **Z** - No Lens

Clear	White	Amber	Green	Red	Blue	
1	**-**	**B**	**G**	**M**	**T**	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 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



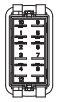


14 ACTUATOR LENS LEGEND
00 No legend this location / no actuator
For legend options & codes, visit us at carlingtech.com

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

1 SERIES
L

2 CIRCUIT[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 (Lock location)
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

3 RATING[5]
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)

5 ILLUMINATION[2]
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.

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]

	Black	Red
Locking Rocker	**P**	**R**

10 LENS STYLE AND COLOR
Lens color for LEDs must be clear, white, or match color of LED.
0 - No Actuator **Z** - No Lens

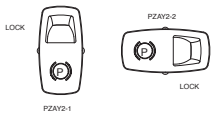
Clear	White	Amber	Green	Red	Blue	
1	**-**	**B**	**G**	**M**	**T**	Large Transparent
-	**7**	**C**	**H**	**N**	**U**	Large Translucent
3	**-**	**D**	**J**	**P**	**V**	Bar Transparent
-	**9**	**E**	**K**	**R**	**W**	Bar Translucent

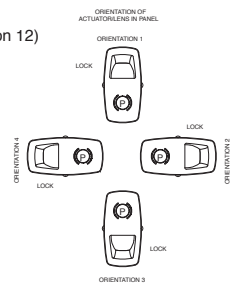
11 LOCK FUNCTION AND COLOR
Locking Position

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

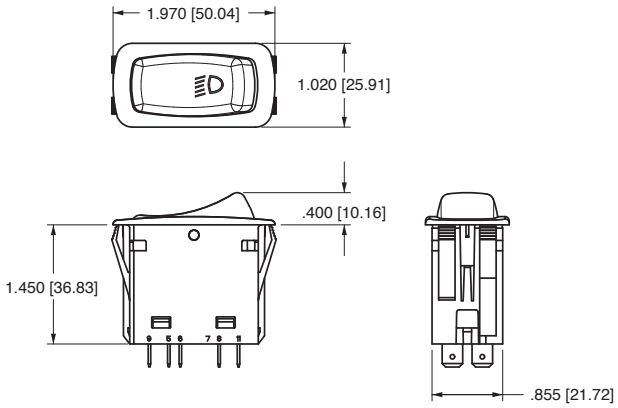
13 LEGEND ORIENTATION
0 No legend (used with codes 11-18 in selection 12)
1 Orientation 1 - vertical, lamp 1 on top
2 Orientation 2 - horizontal, lamp 1 on right
3 Orientation 3 - vertical, lamp 1 on bottom
4 Orientation 4 - vertical, lamp 1 on left



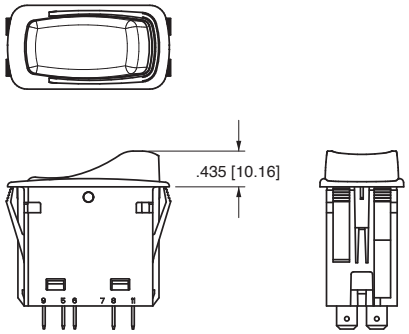


Dimensional Specifications: in. [mm]

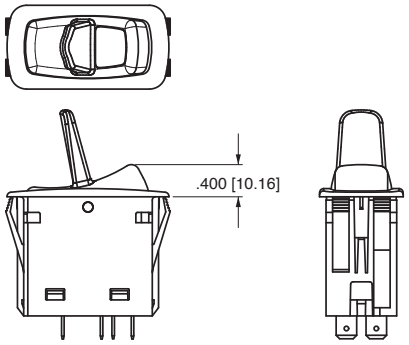
L-SERIES
SHOWN WITH LASER ETCHED ACTUATOR



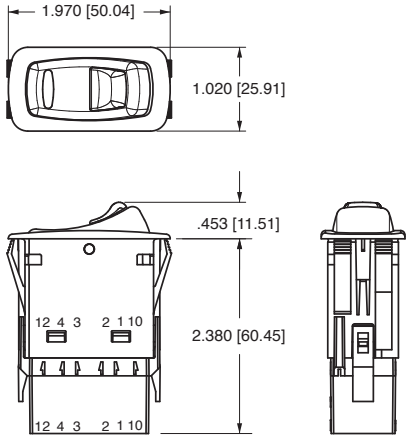
L-SERIES
SHOWN WITH ROCKER GUARD



L-SERIES
SHOWN WITH LARGE LENS AND PADDLE ACTUATOR



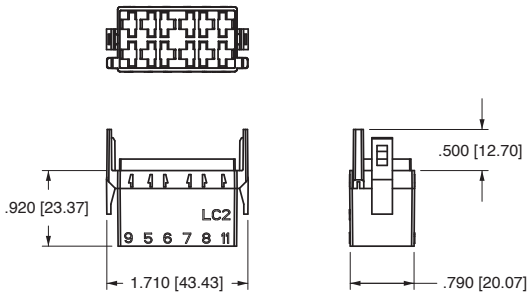
L-SERIES
SHOWN WITH BAR LENS, LOCK AND CONNECTOR



Connector

L-SERIES
CONNECTOR

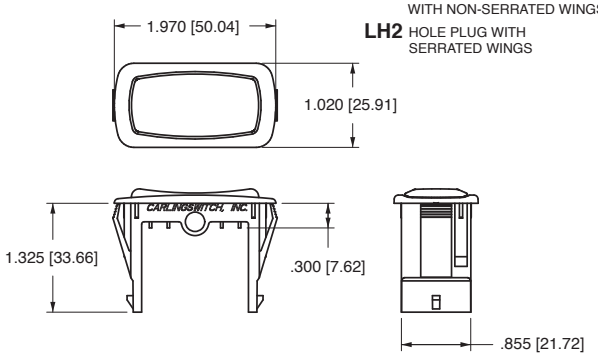
LC1-01 BLACK .250 TAB CONNECTOR (PACKARD 630 SERIES)
LC2-01 BLACK .187 TAB CONNECTOR (PACKARD 480 SERIES)
LC3-01 BLACK .250 TAB CONNECTOR (AMP ONLY)



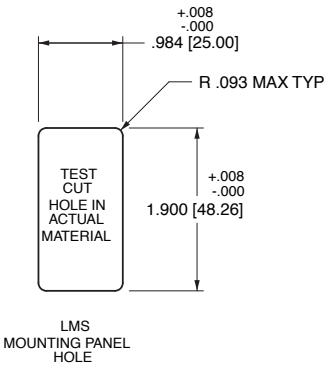
Hole Plug

L-SERIES
HOLE PLUG

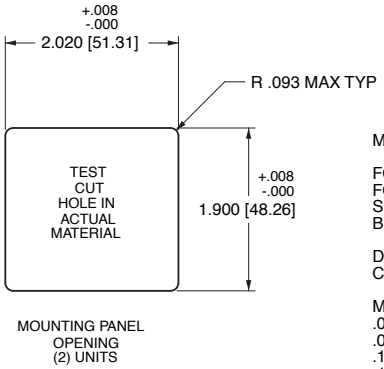
LH1 REMOVABLE HOLE PLUG WITH NON-SERRATED WINGS
LH2 HOLE PLUG WITH SERRATED WINGS



Dimensional Specifications: in. [mm]



LMS
MOUNTING PANEL
HOLE



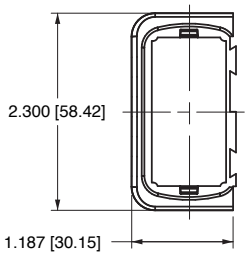
MOUNTING PANEL
OPENING
(2) UNITS

MOUNTING PANEL

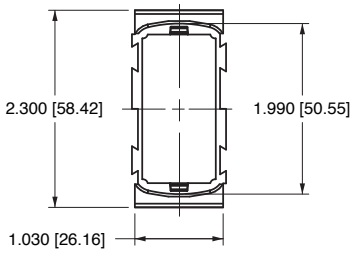
FOR ADDITIONAL UNITS, ADD 1.03 [26.2] PER UNIT. FOR MORE THAN 2 L-SERIES SWITCHES, ADD MIDDLE SECTION. AVAILABLE IN PANEL THICKNESSES LISTED BELOW. CONSULT FACTORY

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

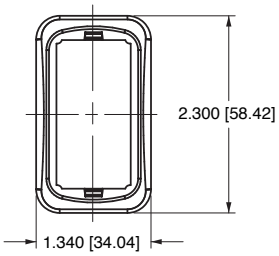
MOUNTING PANEL THICKNESS
.062 [1.57]
.093 [2.36]
.125 [3.17]
.156 [3.96]



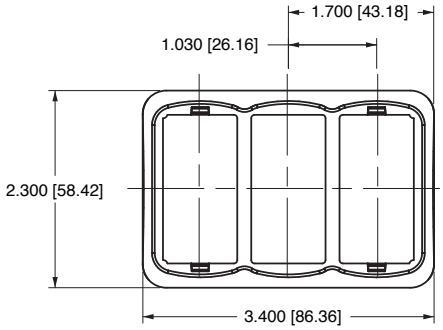
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END



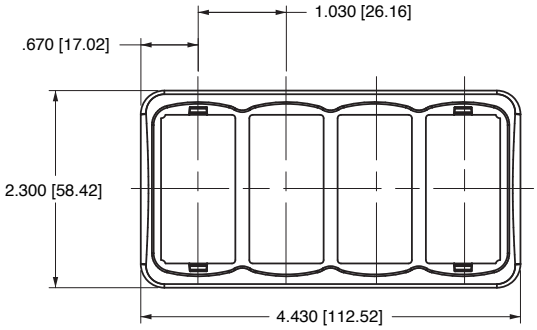
LMM MOUNTING PANEL
MIDDLE



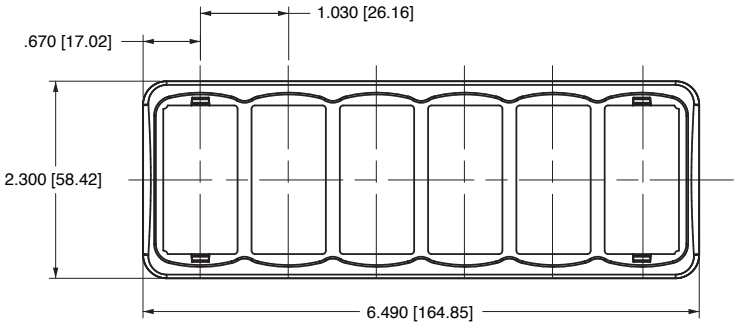
LMS
MOUNTING PANEL



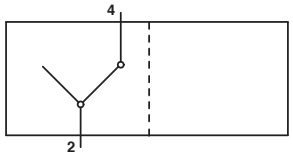
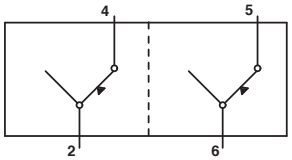
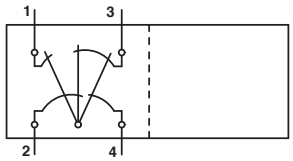
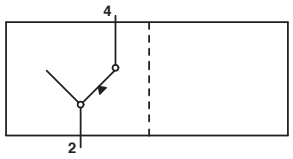
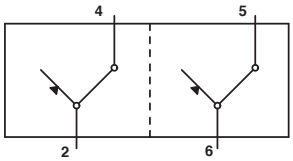
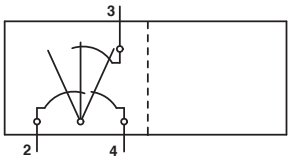
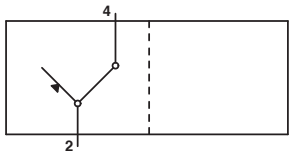
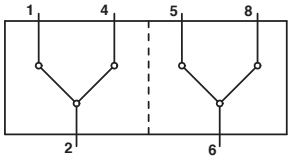
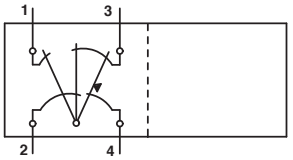
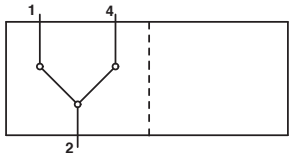
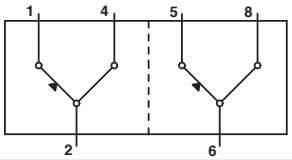
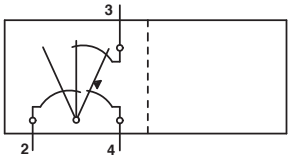
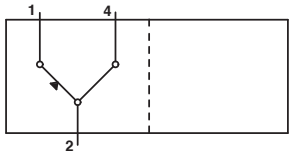
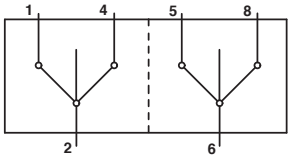
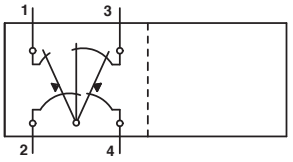
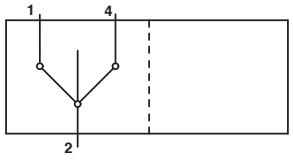
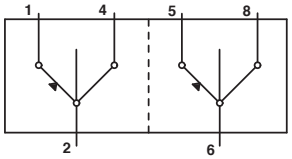
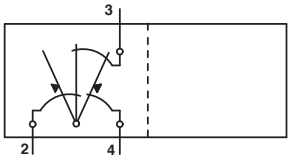
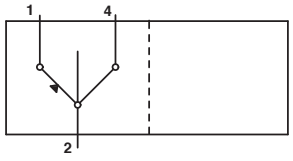
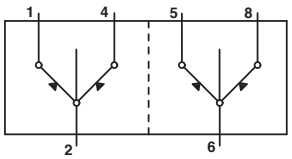
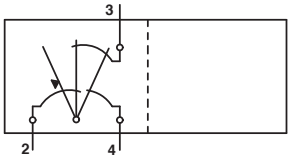
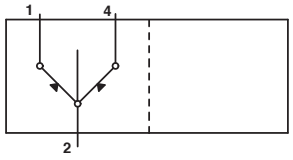
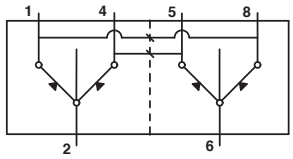
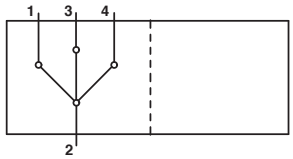
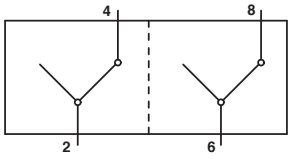
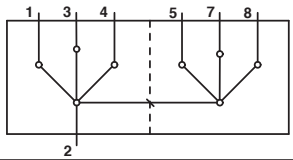
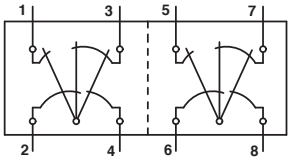
LM3 MOUNTING PANEL
PANEL OPENING SIZE: 1.90 X 3.06 [48.3mm X 77.7mm]

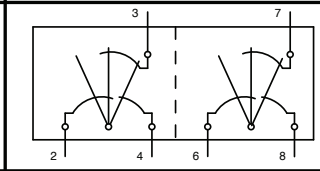
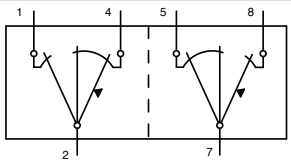
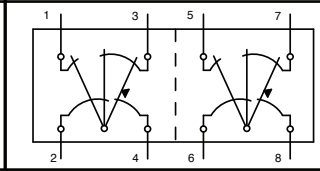
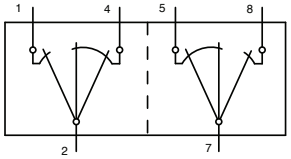
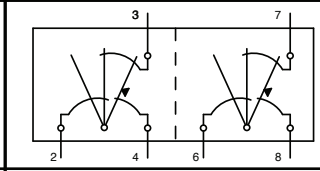
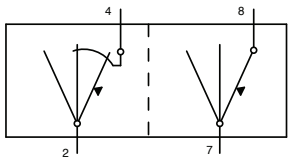
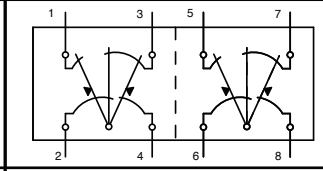
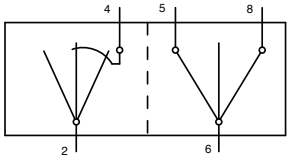
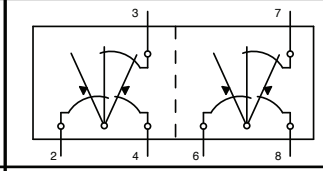
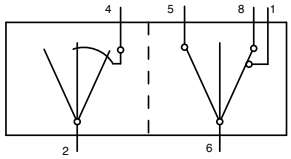
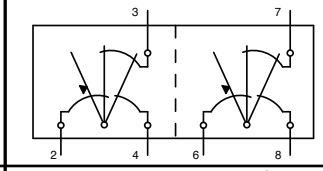
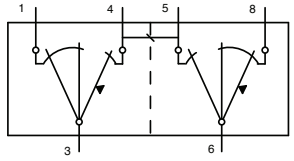
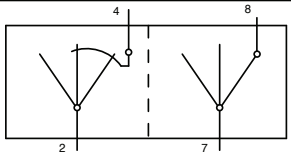
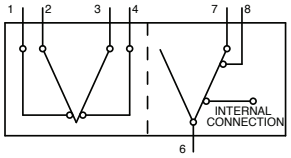
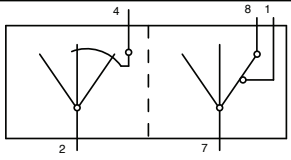
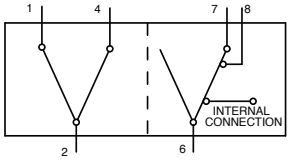
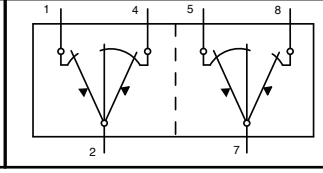


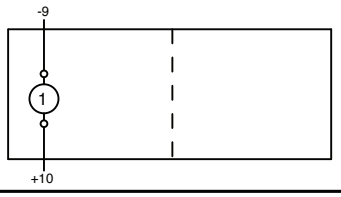
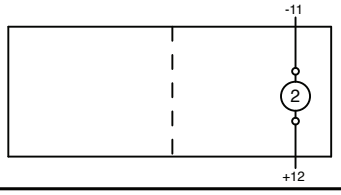
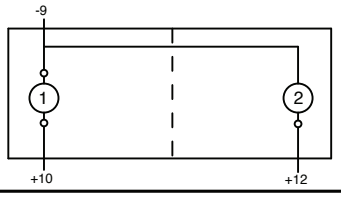
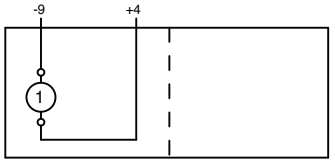
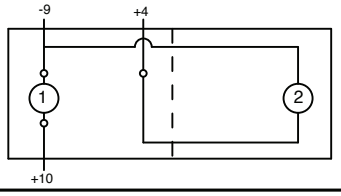
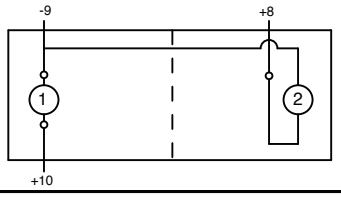
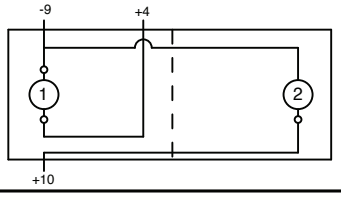
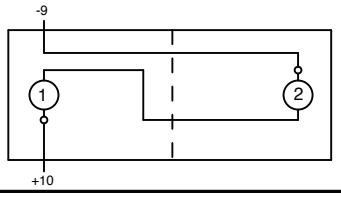
LM4 MOUNTING PANEL
PANEL OPENING SIZE: 1.90 X 4.09 [48.3mm X 103.9mm]

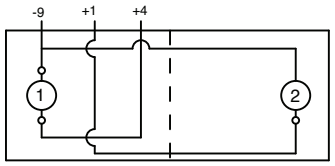
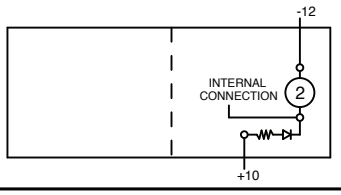
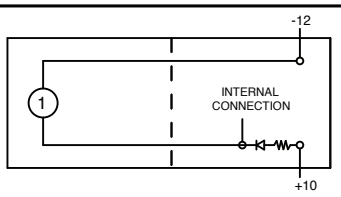
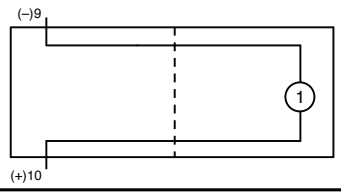


LM6 MOUNTING PANEL
PANEL OPENING SIZE: 1.90 X 6.15 [48.3mm X 156.2mm]

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

ILLUMIN. CODE	SCHEMATIC
A	
B	
C	
D	
E	
F	
G	
H	

ILLUMIN. CODE	SCHEMATIC
J	
1	
2	
K	

LEGEND

SYMBOL	DEFINITION
	TERMINAL LOCATION
	LAMP LOCATION
	MAINTAINED CIRCUIT
	MOMENTARY CIRCUIT
	INTERNAL CONNECTION (JUMPER TERMINAL)
	2 POSITION CONNECTION
P3 P1	2 POSITION
P3 P2 P1	3 POSITION

* Intentionally left blank

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