

# VM-Series

## OPERATOR CONTROL MODULE

The VM-Series is a multiplexed operator control module ideal for Construction, Agriculture and Commercial vehicles. Rugged and sealed to IP68, the VM-Series can be used in open or closed cab environments and it connects to industry standard SAEJ1939 CAN Bus protocol.

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

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



### Resources:

[Download 3D CAD Files](#)

[IGS >](#)

[STP >](#)

[Watch Product Video](#)



### Product Highlights:

- SAEJ1939 Compatible
- Fully Sealed to IP68, Including Below the Panel with Connector
- Dimming Capabilities
- Horizontal or Vertical Mounting Options
- Variety of V-Series Contura® actuator styles

### Typical Applications:

- On/Off-Highway
  - Construction
  - Agriculture
  - Commercial Vehicles
  - Among Others



**Carling Technologies®**

Innovative Designs. Powerful Solutions.

**Carling Technologies, Inc.**  
60 Johnson Avenue, Plainville, CT 06062  
Email: [sales@carlingtech.com](mailto:sales@carlingtech.com)  
Application Support: [team2@carlingtech.com](mailto:team2@carlingtech.com)  
Phone: 860.793.9281 Fax: 860.793.9231

[www.carlingtech.com](http://www.carlingtech.com)

# VM-Series

## DESIGN FEATURES

### SEALING PROTECTION

Fully sealed IP68 above-panel and below-panel (when connected)



Front View

### CUSTOMIZABLE ICONS

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

### ROCKERS

Variety of V-Series Contura® actuator styles



Back View

### SNAP-IN MOUNTING

For fast, easy assembly.

### 6 PIN CONNECTOR

Mates to the Deutsch DT-Series Connector.

### 4 PIN CONNECTOR

Mates to the Deutsch DT-Series Connector. Can be used to Daisy-chain multiple VM-Series.

## Electrical

Operating Voltage	12VDC or 24VDC systems
Max Current	Operation: 300mA Sleep Mode: 3mA
Communication Programming	Master: CAN 2.0b (SAE J1939) At factory or via CAN (special tool)
Reverse Polarity	12V systems: -24V for 5 minutes 24V systems: -36V for 5 minutes
Withstand Voltage	ISO 16750-2 500Vrms (50Hz to 60 Hz) with a duration of 60s
Insulation Resistance	ISO 16750-2 Minimum 10 Mohms at 500Vdc with a duration of 60s
Superimposed Alt Voltage	ISO 16750-2 severity 2, Upp of 4V for Un=12V and Un=24V
Overvoltage	ISO 16750-2 Apply voltage DC 36V for 60min at 65 °C
Slow Decrease/Increase of Supply Voltage	Test Method according to ISO 16750-2: 4.5
Momentary Drop in Supply Voltage	Apply the test pulse according to ISO 16750-2 (Figure 4 for 12V system, Figure 5 for 24V system)
Electrical Endurance	Minimum 250K Operations (50K cycles at Tmin, 150K cycles at Tnom, 50K cycles at Tmax)

## Physical

Number of Switches	6 per module
Actuator Type	Rockers – all Contura styles (No locking feature available)
Materials	Housing - Acetal, UV stabilized Back Cover - Acetal, UV stabilized Rocker – Polycarbonate / Nylon Mounting Clips – Stainless steel
Weight	≈0.5 lbs
Functions	2 position maintained, 2 position momentary top, 2 position momentary bottom, 3 position maintained, 3 position momentary top/bottom, 3 position momentary top, 3 position momentary bottom
Sleep Mode	Soft-lock Defined as the state after a pre-defined time of no activity to reduce current draw on the system. Any switch can be configured to wake the unit, and doing so will also activate the switch function.
Illumination	Single-color LED Red, Green, Amber, Blue, White Illumination Table (for each switch position)
Dimming	LED dimming controlled by the ECU through the CAN bus
Connection	Deutsch DT-Series 4 and 6 pin
Mounting	Front panel, removable from a-side
Panel Opening	See dimensional specifications
Depth Behind Panel	≈ 1.6in (41mm) to bottom of header

## Environmental

Operating Temperature	-40 °C to +85°C
Thermal, Hot Soak	IEC 60068-2-2 Test Bb, 85°C for 96 hours
Thermal, Cold Soak	IEC 60068-2-1 Test Ad, -40°C for 96 hours
Thermal, Shock	IEC 60068-2-14 Test Na, -40°C to 85°C, 1 hours per cycle (30 minutes at -40°C, 30 minutes at +85°C), total 10 cycles.
Humidity, Soak	IEC 60068-2-78 Test Cab, 30°C at 93% RH for 10 days
Humidity, Cyclic	IEC 60068-2-30 Test Db Method 1, 55°C to 25°C at >90% RH, 6 cycles of 24 hours each
Thermal, Cycling	IEC 60068-2-14 Test Nb, -40°C to 85°C, 2 cycles of 8 hours each
Solar Radiation	IEC 60068-2-5 Procedure B, 40°C for 10 days
Ingress Protection	IP68, for above and below-panel (with connector) components of actual switch only.
Shock	IEC 60068-2-27, 3 shocks in each direction of the 3 axes (18 total shocks) at 500 m/s <sup>2</sup> for 11 ms
Bump	IEC 60068-2-27, 100 shocks in each direction of the 3 axes (600 total shocks) at 400 m/s <sup>2</sup> for 6 ms
Drop	IEC 60068-2-31 Test Ec Free Fall – Procedure 1, drop in each direction of the 3 axes (6 drops) from 500mm
Vibration, General	IEC 60068-2-6, swept sine wave from 5-500 Hz, +/-15 mm amplitude, 5g, 20 cycles in each plane
Vibration, Random	IEC 60068-2-64 Test Fh Method 1, random excitation at 10, 150, 220, and 350 Hz breakpoint frequencies, 5 hours in each axis
Vibration, Resonance	IEC 60068-2-6, sinusoidal from 10-2000 Hz, 5 minutes at resonant points
Chemical Resistance	ISO 16750-5 Method II for Engine oil, hydraulic oil, diesel fuel, Grease and Urea at Tmax .
Salt Spray	IEC 60068-2-52 Test Kb, severity level 4

## Electromagnetic (EMC)

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

\*Manufacturer reserves the right to change product specification without prior notice.  
GPS-0009 Rev: A

## Software Interface Integration

Click below for details on integrating the VM-Series into J1939 CAN network:  
[www.carlingtech.com/sites/default/files/documents/vm-series\\_interface.pdf](http://www.carlingtech.com/sites/default/files/documents/vm-series_interface.pdf)

## Tables

**Table A:** Illumination Table (for each switch position)

Location	Type	Color	Option
Top LED	Backlight	Red, Green, Amber, Blue or White	Continuous Flashing
	Function	Red, Green, Amber, Blue or White	ON with Switch, ON with Device
Bottom LED	Backlight	Red, Green, Amber, Blue or White	Continuous Flashing
	Function	Red, Green, Amber, Blue or White	ON with Switch, ON with Device

### Connector Pin Layout:

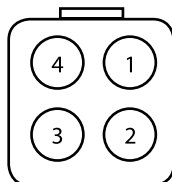
Connector 1 (mating connector: Deutsch DT-Series 4 pins)

Pin	1	2	3	4
Signal	VCC	GND	CAN_H	CAN_L

or

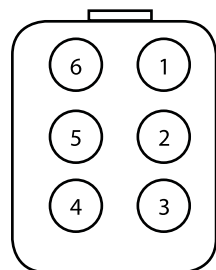
Pin	1	2	3	4
Signal	Out 1	Out 2	Out 3	Out 4

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

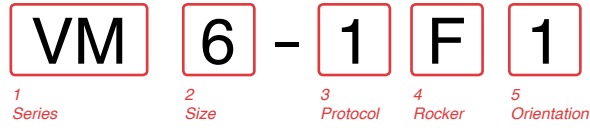


Connector 2 (mating connector: Deutsch DT-Series 6 pins)

Pin	1	2	3	4	5	6
Signal	CAN_L	CAN_H	NC	NC	GND	VCC



### Ordering Scheme: Part 1 (Module and Rocker Style)



**1 SERIES**  
**VM** V-Series Module System

**2 SIZE**  
**6** 6 Positions

**3 COMMUNICATION PROTOCOL**  
**1** J1939  
**3** J1939 with Control Relay

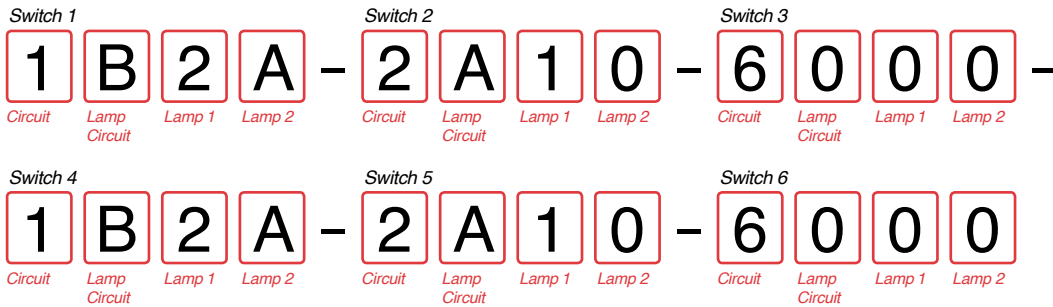
**4 ROCKER STYLE**

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

**5 ORIENTATION**

<b>1</b> Landscape	<b>2</b> Portrait
<b>3</b> Reverse Portrait	<b>4</b> Reverse Landscape

### Ordering Scheme: Part 2 (Module Circuit and Lamps)



**SWITCH CIRCUIT**

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

**LAMP 1**

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

**LAMP CIRCUIT**

- A** L1 Backlight
- B** L1, L2 Backlight
- C** L2 Backlight
- D** L1 Backlight, L2 Function Light
- E** L1, L2 Function Light
- F** L1 Function Light, L2 Backlight
- G** L1 Function Light
- H** L2 Function Light
- 0** No Lamp

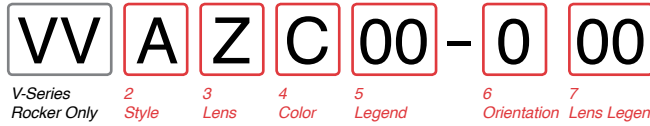
**LAMP 2**

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

## Ordering Scheme: Part 3 (Rockers)

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

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



**2 ACTUATOR STYLE**

**Contura II**  
**A** Thick over terminals 1-4  
**B** Thick over terminals 3-6

**Contura III**  
**C** Thick over terminals 1-4  
**D** Thick over terminals 3-6

**Contura IV**  
**E** Left brow, lens  
**T** Left brow, laser-etched  
**F** Right brow, lens  
**R** Right brow, laser-etched

**Contura V**  
**G** Contura V  
**P** Laser-Etched

**Contura VII**  
**Z** Contura VII

**Contura XIV**  
**FA** Contura XIV  
**FB** Laser-Etched

**5 ACTUATOR LENS OR BODY LEGENDS**

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

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

**3 LENS**

Z - No Lens  
 Clear White Amber Green Red Blue

	II	III	IV	V	XIV
1 6 8	G	M	T		
2 7	C	H	N	U	
3 8	D	J	P	V	
4 9	E	K	R	W	N/A
5 A	F	L	S	Y	N/A
5 A	N/A	N/A	N/A	N/A	Contura XIV laser-etched only

Only **Contura VII**  
 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

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

**6 LEGEND ORIENTATION**

0 No legend (used with codes 11-18 in box 5)  
 1 Orientation 1  
 2 Orientation 2  
 3 Orientation 3  
 4 Orientation 4

Contura II    Contura III

Contura IV    Contura V

Contura VII    Contura XIV

**7 ACTUATOR LENS LEGEND**

00 No legend this location  
 (used with codes 11-18 in box 5) Box 7 required when rocker requires two legends. If the two legends consist of one lens and one body legend, lens legend must be specified in box 5; body legend specified in box 7.  
 See next page for standard icons. Consult factory for additional icons.

**4 ACTUATOR COLOR AND TEXTURE**

**Contura II & Contura III**  
**B** black    **G** gray    **R** red    **W** white (Soft Surface)  
**C** black    **H** gray    **S** red    **Y** white (Hard Surface)

**Contura IV & Contura V**  
**C** black    **H** gray    **S** red    **Y** white  
 Laser-Etched only    **D** nickel    **E** pewter

**Contura VII**  
**C** black    **H** gray    **S** red    **Y** white

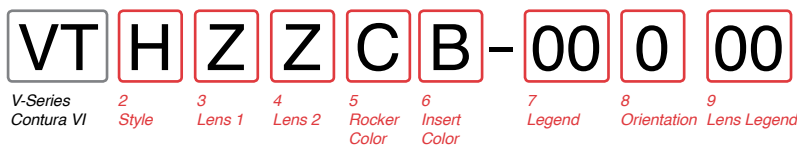
**Contura XIV**  
**C** black    **S** red    **Y** white



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





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

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

### Contura VI (WAVE) Rocker Style





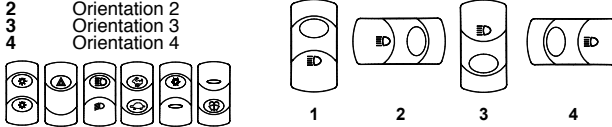
**2 ACTUATOR STYLE**  
**Contura VI**  
**H** High Insert  **L** Low Insert 

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

**5 ACTUATOR COLOR**  
**C** Black **H** Gray **S** Red **Y** White

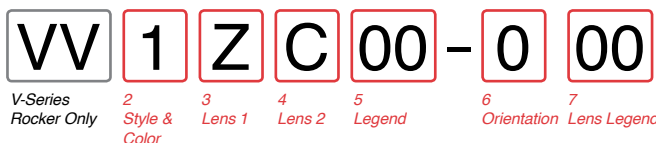
**6 INSERT COLOR**  
**B** Black **N** Bright Nickel Plated  
**C** Bright Chrome Plated **S** Satin Chrome Plated  
**D** Satin Chrome Painted **T** Satin Nickel Plated  
**W** White




**7 ACTUATOR LENS OR BODY LEGENDS**  
**00** - No Legend this location  
**11** ON **12** OFF **13** | **14** O   
 OFF ON O I  
**15** O O **16** O O **17** O I **18** I O   
 F N N F F  
 See next page for standard icons. Consult factory for additional icons.


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






**9 ACTUATOR LENS LEGEND**  
**00** No legend this location (used with codes 11-18 in box 7) Box 9 required when rocker requires two legends. If the two legends consist of one lens and one body legend, lens legend must be specified in box 7; body legend specified in box 9. See next page for standard icons. Consult factory for additional icons.

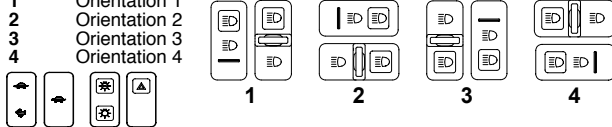
### Contura X, XI and XII Rockers



**2 ACTUATOR STYLE**  
 Contura X Black 1 Gray 2 White 3 Red 4   
 Contura XI 6 7 8 9   
 Contura XII J K N M 

**4 LENS - ABOVE LAMP #1 TERMINALS**  
**4 LENS - ABOVE LAMP #2 TERMINALS**  
**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** (With clear top protective lens)  
**1** 6 **B G M T** Two piece Square\*  
 (With smoke 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.

**5 ACTUATOR LENS OR BODY LEGEND**  
**00** - No Legend this location  
**11** ON **12** OFF **13** | **14** O   
 OFF ON O I  
**15** O O **16** O O **17** O I **18** I O   
 F N N F F  
**21** OFF **22** ON **23** O **24** I   
**25** O **26** O **27** O **28** I   
 F N  
 For additional legend options & codes, visit us at [www.carlingtech.com](http://www.carlingtech.com).

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


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



Standard Legend Imprinting Codes:

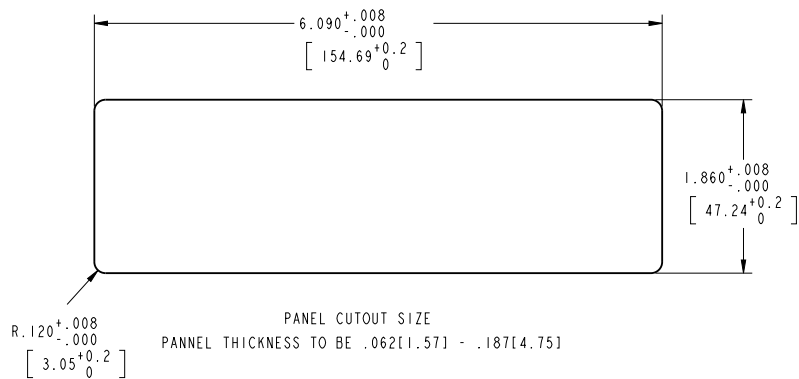
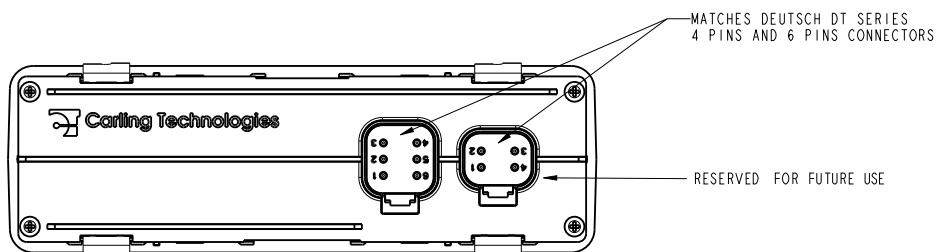
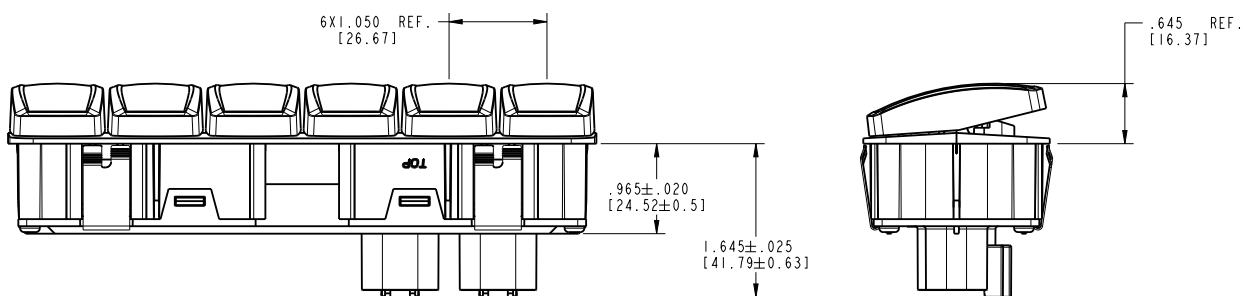
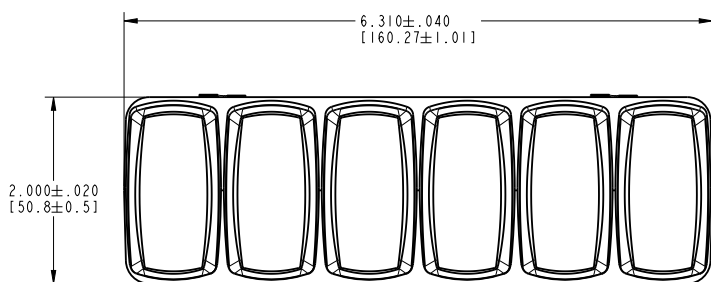
YK	UA	UB	US	UV	UW	UX	UY	MP	MR	PX	MS	MT
VU	MW	NZ	NX	NY	YM	VW	PS	PW	PZ	WG	WM	RN
RP	YG	TX	NAV LIGHTS VD	COURT LIGHTS VE	PANEL LIGHTS VF	ANCH LIGHTS VG	HEAD LIGHTS SH	FOG LIGHTS SM	DASH LIGHTS SN	DOCK LIGHTS SP	BEACON SR	LIGHT SY
DIM WY	BRIGHT WZ	UH	UJ	PD	PE	PF	BILGE PUMP VC	BILGE VJ	UF	UG	MU	TN
NS	PB	WIPER SE	VZ	YE	NN	RW	PU	WA	YN	UE	NM	RJ
NR	YD	TL	VR	ENG FAN SL	BLWR VA	UC	VN	PK	VY	HORN UZ	RH	NU
NV	RB	RC	RK	RL	MZ	RG	UP WS	DOWN WT	UD	UR	WD	TY
PA	UK	WATER PUMP WR	UU	UT	ANCHOR YR	PM	VV	WB	TB	TC	TD	TE
MY	PV	TA	TZ	WC	PT	PN	PH	RA	TU	TT	ENG HATCH YL	ENG BRAKE SK
VS	UL	UM	WK	TS	VT	TCS WL	VP	YJ	PJ	RY	UP	NW
NP	RE	RF	PP	PR	TV	PC	YT	YU	PL	WJ	MV	RR
TK	RT	SEAT SZ	VX	WF	WH	PG	CRUISE SJ	YA	YB	RM	TM	RD
RS	UN	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	OFF ON WW	ON WX	OFF SA	I SB	O SC	II SD
RAISE ST	LOWER SU	HIGH WU	LOW WV	FWD SV	REV SW	DEPTH VB	TRIM TAB VH	ACC VK	NAV ANCH VL	WIND LASS UP/DN VM	LIVE WELL WE	REAR SF
PARK SG	AUTO SS	RU	RV	RX								

Notes:

- 1 ISO compliant symbols. Consult factory for custom legends.
- 2 New legend codes recommended for new part set ups. Previous codes still valid for existing customers.



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

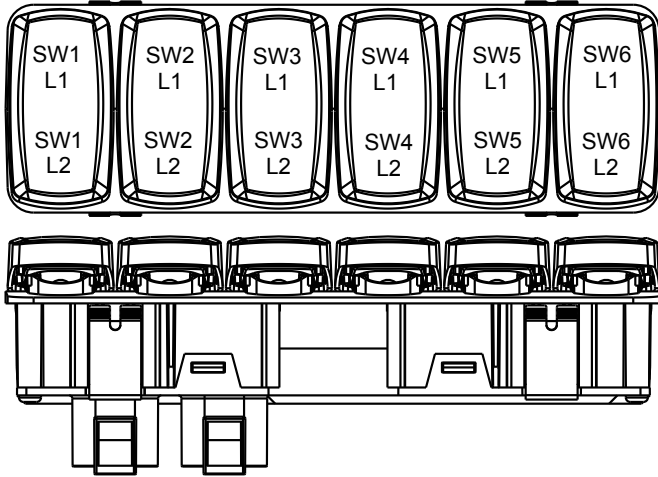


Dimensional Specifications: in. [mm]

ORIENTATION

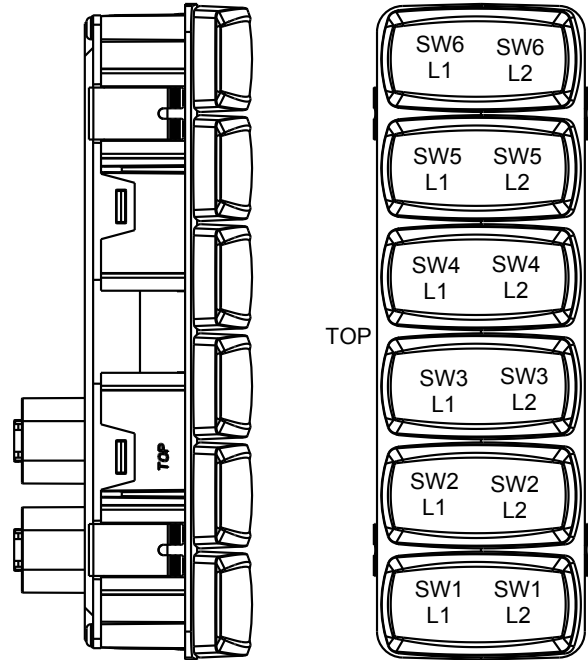
LANDSCAPE

TOP



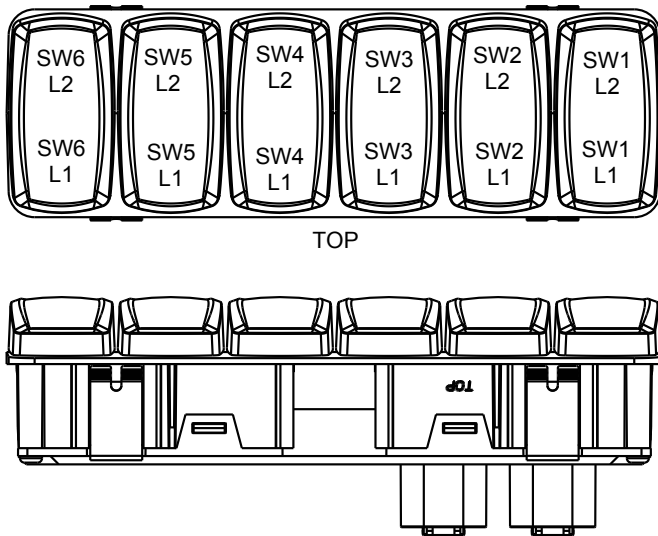
PORTRAIT

TOP



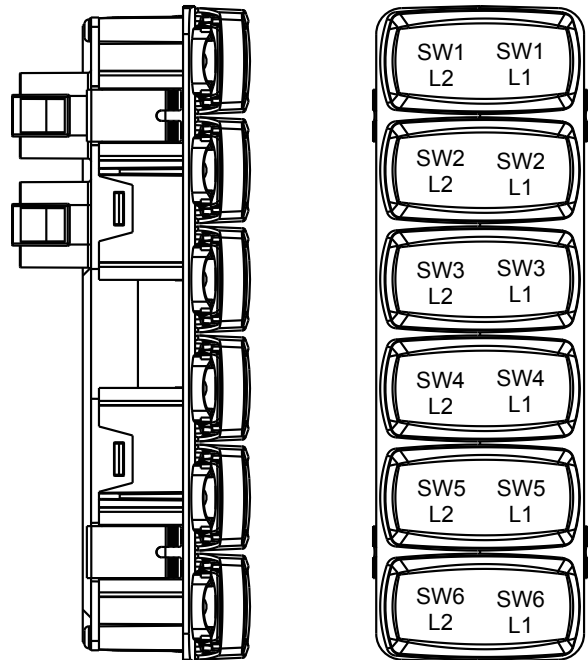
REVERSE LANDSCAPE

TOP



REVERSE PORTRAIT

TOP



## Authorized Sales Representatives and Distributors

Click on a region of the map below to find your local representatives and distributors or visit [www.carlingtech.com/findarep](http://www.carlingtech.com/findarep).



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

To view all of Carling's environmental, quality, health & safety certifications please visit [www.carlingtech.com/environmental-certifications](http://www.carlingtech.com/environmental-certifications)

### **Worldwide Headquarters**

Carling Technologies, Inc.  
60 Johnson Avenue, Plainville, CT 06062  
**Phone:** 860.793.9281 **Fax:** 860.793.9231  
**Email:** sales@carlingtech.com

**Northern Region Sales Office:** nrsm@carlingtech.com  
**Southeast Region Sales Office:** sersm@carlingtech.com  
**Midwest Region Sales Office:** mrsm@carlingtech.com  
**West Region Sales Office:** wrsm@carlingtech.com  
**Latin America Sales Office:** larsm@carlingtech.com

### **Asia-Pacific Headquarters**

Carling Technologies, Asia-Pacific Ltd.,  
Suite 1607, 16/F Tower 2, The Gateway,  
Harbour City, 25 Canton Road,  
Tsimshatsui, Kowloon, Hong Kong  
**Phone:** 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  
**Phone:** Int + 44 1392.364422 **Fax:** Int + 44 1392.364477  
**Email:** ltd.sales@carlingtech.com

**Germany:** gmbh@carlingtech.com  
**France:** sas@carlingtech.com



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