

# VM-Series

J1939 multiplexed  
operator control module

**PRODUCT WEBPAGE**

*request sample, watch video*



The sealed VM-Series incorporates the Contura® switches actuator style flexibility with SAEJ1939 CAN Bus technology to create a multiplexed operator control module. Additionally, the VM-Series increases product reliability, while reducing the complexity of wire harnesses and improving assembly efficiencies.

**12/24**  
VDC

**250,000**  
Operations

**IP68 Sealing**  
Above and below panel

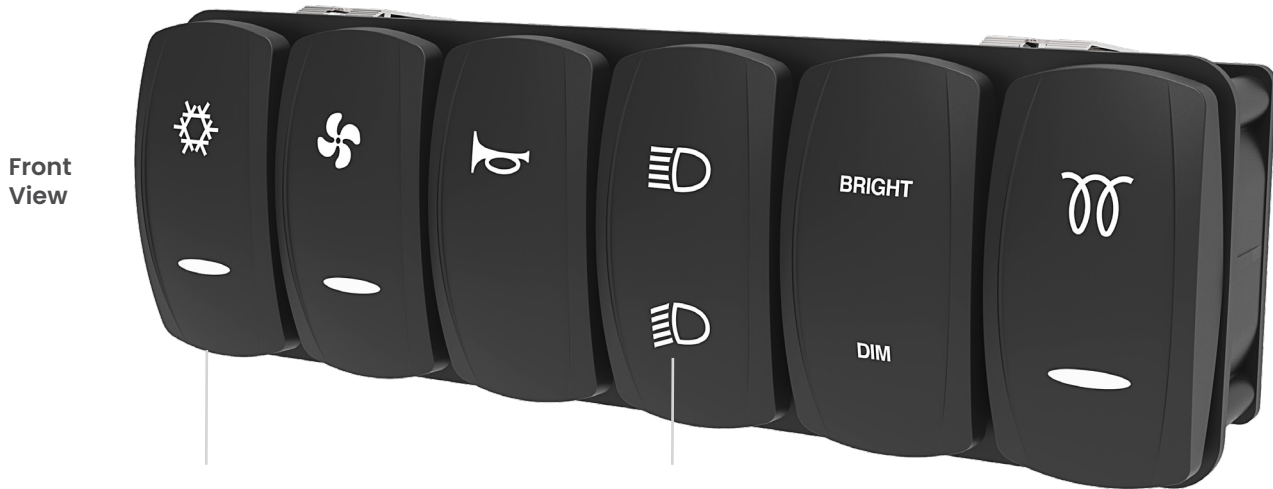
## Typical Applications

- Commercial Vehicles
- Construction Equipment
- Agricultural Equipment
- Work Trucks

# Design Features

## IP68 SEALING PROTECTION

Fully sealed above panel and below panel (when connected)



Front View

### ROCKERS

Variety of removable V-Series Contura® actuator styles

### CUSTOMIZABLE ICONS

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

Back View

VM6

### 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.

# Related Products



**CLTM12-S-Series >**  
Load Controller



**CKJ-Series >**  
Jog Switch



**CKP-Series >**  
Customizable Keypad

# Tech Specs

## Electrical

		VM3	VM6
Operating Voltage		12 or 24VDC systems	
Maximum Current		Operation: 250mA Sleep mode: 6mA	Operation: 300mA Sleep mode: 3mA
Electrical Endurance		Minimum 250,000 operations (50,000 cycles at -40°C, 150,000 cycles at room temperature, and 50,000 cycles at 85°C) with Contura V+ rocker style	
Over Voltage	ISO 16750-2	Apply voltage 36VDC for 60 min at 65°C	
Short Circuit Protection	ISO 16750-2	All signal inputs and outputs short to ground for 60s	
Reverse Polarity Protection	ISO 16750-2	12 VDC systems: -24VDC for 5 minutes 24 VDC systems: -36VDC for 5 minutes	
Starting Profile	ISO 16750-2	Class A	
Withstand Voltage	ISO 16750-2	500Vrms (50 Hz to 60 Hz) with a duration of 60s	
Insulation Resistance	ISO 16750-2	Minimum 10 Mohms at 500 VDC with a duration of 60s	
Superimposed Alternating Voltage	ISO 16750-2	Severity 2, Upp of 4V for Un=12V and Un=24V	
Slow Decrease and Increase of Supply Voltage	ISO 16750-2	Power supply from 8V to 0V, 0V to 8V, (rate of 0.5 ± 0.1V/min linear)	
Momentary Drop in Supply Voltage	ISO 16750-2	Voltage drop from 8V to 4.5V for 12V system, 16V to 9V for 24V system. Dwell 10ms.	

## Electromagnetic Compatibility (EMC)

		VM3	VM6
ESD	ISO 10605	±15kV air discharges, ±8kV contact discharges	
Absorbed-Lined Chamber	ISO 11452-2	100V/m, 80MHz to 2GHz	100V/m, 20MHz to 2GHz
Bulk Current Injection	ISO 11452-4	100mA, 20MHz to 400MHz	
Conducted Transients	ISO 7637-2	Applied level IV according to ISO 7637, Annex A, and ISO 16750-2, sections 4.6.3 & 4.6.4	All test pulses according to ISO 7637, Annex table A2 for 24V systems, level 3 minimum
Transient Emissions	ISO 13766	Annex D and E, 30MHz to 1GHz	

## Environmental

		VM3	VM6
Operating Temperature		-40 °C to + 85°C	
Storage 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 hour per cycle (30 minutes at -40°C, 30 minutes at 85°C) 10 cycles	
Thermal Cycling	IEC 60068-2-14	Test Nb, -40°C to 85°C, 2 cycles of 8 hours each	
Sealing Protection	IEC 60529	IP68, for above and below panel components of actual switch only (when connected), 1.2m deep water for 60 ± 2 min	
Solar Radiation	IEC 60068-2-5	Procedure B, 40°C for 10 days	
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% R.H., 6 cycles of 24 hours each	
Salt Spray	IEC 60068-52	Test Kb, severity level 4	
Chemical Resistance	ISO 16750-5	Method II for engine oil, hydraulic oil, diesel fuel, grease, and urea at max temperature	

# Tech Specs

## Mechanical

		VM3	VM6
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	
Vibration, General	IEC 60068-2-6	Swept sine wave from 5 to 500 Hz, ± 15mm amplitude, 5g, 20 cycles in each plane	
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 Test	IEC 60068-2-31	Test Ec, free fall procedure 1, drop in each direction of the 3 axes (6 total drops) from 500mm	

## Physical

		VM3	VM6
Switch Functions		2 Position Maintained 2 Position Momentary Top 2 Position Momentary Bottom 3 Position Momentary Bottom 3 Position Maintained 3 Position Momentary Top and Bottom 3 Position Momentary Top	
Illumination		Single color LED (Red, Green, Amber, Blue, White) (See Table A)	
Soft Lock		Yes	
Mounting		Front panel, removable from a side	
Depth Behind Panel		Depth behind panel 41mm [1.6 in]	
Weight		~91 grams [0.2 lb]	~227 grams [0.5 lb]
Materials		Housing – Acetal, UV stabilized; Back cover – Acetal, UV stabilized; Rocker – Polycarbonate / Nylon; Mounting clips – Stainless Steel	
RoHS		Yes	
REACH		Yes	
Connector		Deutsch DT-Series 4 and 6 pin (6 pin for VM6 only)	

## Software

		VM3	VM6
Communication		Master: CAN 2.0b (SAE J1939)	
Programming		During manufacture or via CAN	
Sleep Mode		Any switch can be configured to wake the unit, which also activates the switch function.	
Dimming		LED dimming controlled by ECU through CAN bus	

# Tech Specs

## Software Interface Integration

Click below 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

**Table B:** Connector 1 Pinout for VM3

	Pin	1	2	3	4
<b>Option 1</b>	<b>Signal</b>	VCC	GND	CAN_H	CAN_L

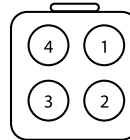


Figure 1:  
Connector 1 Pinout

**Table C:** Connector 1 Pinout for VM6

	Pin	1	2	3	4
<b>Option 1</b>	<b>Signal</b>	VCC	GND	CAN_H	CAN_L
<b>Option 2</b>	<b>Signal</b>	Out 1	Out 2	Out 3	Out 4

Note: Out 1 to Out 4 is to control loads with max output current 0.5A @ 24VDC

**Table D:** Connector 1 Pinout for VM6

	Pin	1	2	3	4	5	6
<b>Option 1</b>	<b>Signal</b>	CAN_L	CAN_H	NC	NC	GND	VCC

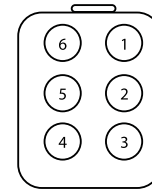


Figure 2:  
Connector 2  
Pinout

**Table E:** Operation Current Values

Size Voltage Sleep Current Value (mA) 100% Brightness Operating Current Value (mA) 10% Brightness Operating Current Value (mA)

Size	Voltage	Sleep Current Value (mA)	100% Brightness Operating Current Value (mA)	10% Brightness Operating Current Value (mA)
VM3	12	~7.15	~78.72	~63.55
	24	~6.75	~42.38	~34.61
VM6	12	~22.74	~155.67	~111.61
	24	~14.05	~78.74	~57.94

# Ordering Scheme

## Part 1: Module and Rocker Style

Sample Part No. **VM 6 - 1 F 1 - 1 000**

Selection 1 2 3 4 5 6 7

### 1. SERIES

**VM** V-Series Module System

### 2. SIZE

**3** 3 Position  
**6** 6 Position

### 3. COMMUNICATION PROTOCOL

**1** J1939  
**3** J1939 with Control Relay (available with 6 position size only)

### 4. ROCKER STYLE

**A** Contura II  
**B** Contura III  
**E** Contura V  
**F** Contura V - Laser Etched  
**H** Contura VII  
**M** Contura XIV  
**N** Contura XIV - Laser Etched  
**Z** No Rockers  
**R**<sup>1</sup> Indicator/Blank Cap

### 5. ORIENTATION See orientation diagram page for more details

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

### 6. NETWORK TYPE

**1** 250K Baud Rate  
**2** 500K Baud Rate

### 7. SOURCE ADDRESS

The Source Address is a unique number (**000-238**) assigned to each node on a CAN network, and is determined based on the specific CAN architecture of each customer application.

[Configure Complete Part Number >](#)

## Part 2: Module Circuit and Lamps

Switch 1 to 3  
VM3 and VM6

**1 B 2 A - 2 A 1 0 - 6 0 0 0 -**

Selection 1 2 3 4 1 2 3 4 1 2 3 4

Switch 4 to 6  
VM6 Only

**1 B 2 A - 2 A 1 0 - 6 0 0 0**

Selection 1 2 3 4 1 2 3 4 1 2 3 4

### 1. 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  
**8**<sup>2</sup> Stationary

### 2. 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  
**O** No Lamp

### 3. LAMP 1

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

### 4. LAMP 2

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

#### Notes:

- 1 Available with stationary switch circuit 8 only, (see part 2 of ordering scheme).
- 2 Available with rocker style r only, (see part 1 of ordering scheme).

# Ordering Scheme

## Part 3: Rockers

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

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

Sample Part No. VV A Z C 00 - 0 00

Selection 1 2 3 4 5 6 7

#### 1. SERIES

VV V-Series Rocker

#### 2. ACTUATOR STYLE

<b>Contura II</b> A Thick end on top	
<b>Contura III</b> C Thick end on top	
<b>Contura V</b> G Contura V P Laser-Etched	
<b>Contura VII</b> Z Contura VII	
<b>Contura XIV</b> FA Contura XIV FB Laser-Etched	

#### 3. LENS

Z - No Lens						Lens Style Location			
Clear	White	Amber	Green	Red	Blue	II	III	V	XIV
1	6	B	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	XIV laser-etched only			

Only Contura VII						Lens Style Location				
Z - No Lens	White	Amber	Green	Red	Blue					
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.

#### 4. ACTUATOR COLOR AND TEXTURE

**Contura II & III**  
**B** Black    **G** Gray    **R** Red    **W** White (Soft Surface)  
**C** Black    **H** Gray    **S** Red    **Y** White (Hard Surface)

**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

#### 5. ACTUATOR LENS OR BODY LEGENDS

<b>11</b> ON	<b>12</b> OFF	<b>13</b>	<b>14</b> O	
OFF	ON	O	I	
<b>15</b> O O	<b>16</b> O O	<b>17</b> O I	<b>18</b> I O	
F N	N F	F	F	

See standard legends codes page. Consult factory for additional icons.

#### 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

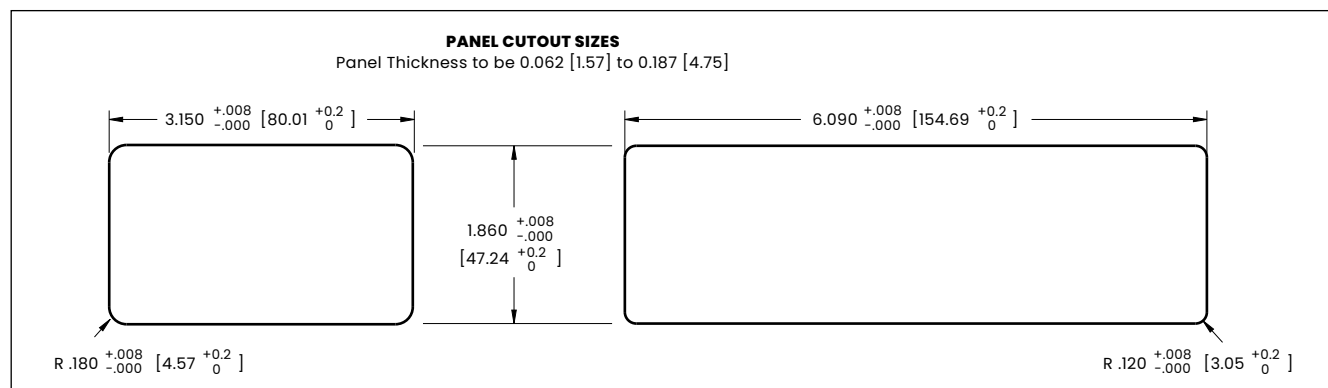
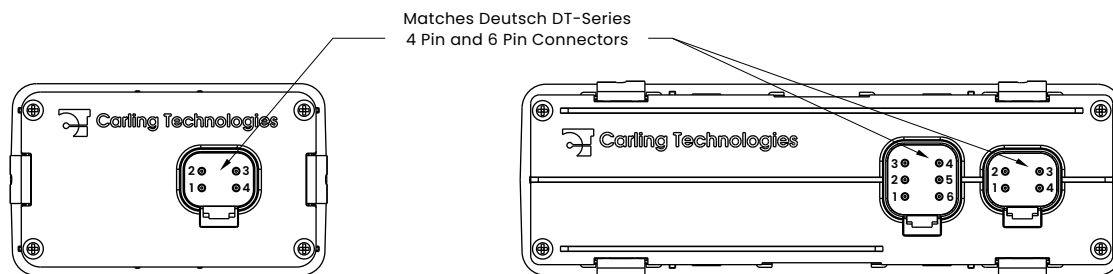
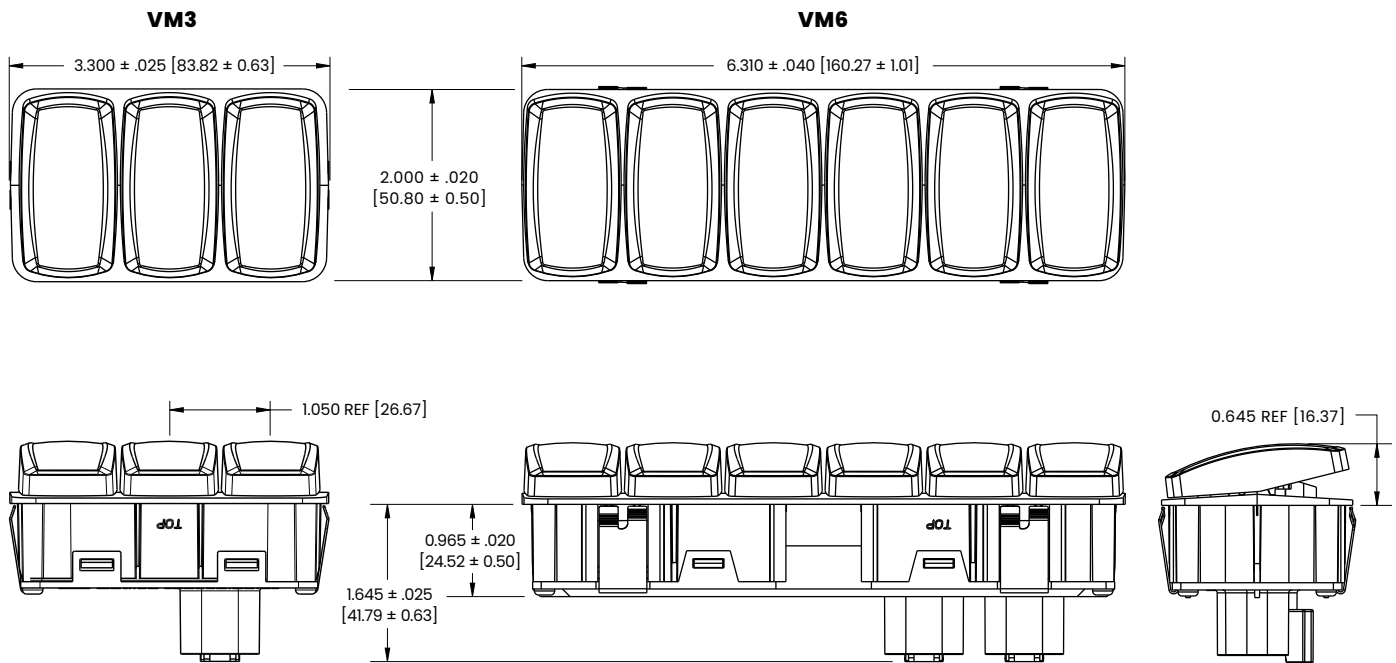
<b>Contura II</b>	<b>Contura III</b>
<b>Contura V</b>	<b>Contura VII</b>
<b>Contura XIV</b>	

#### 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 standard legends codes page. Consult factory for additional icons.

# Dimensional Specs

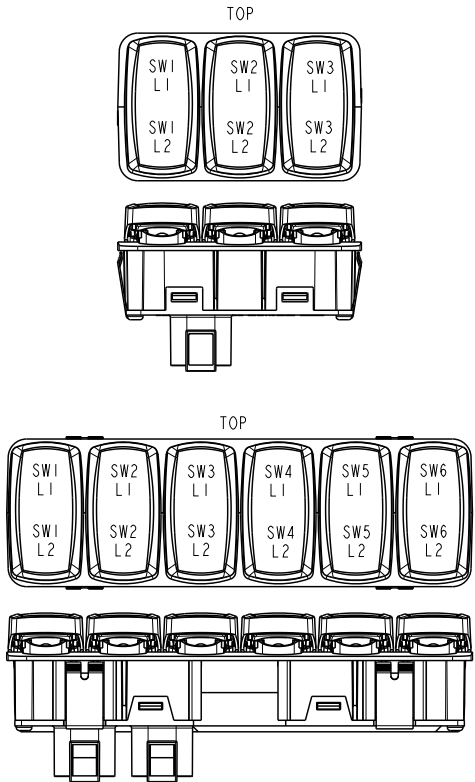
inches [millimeters]



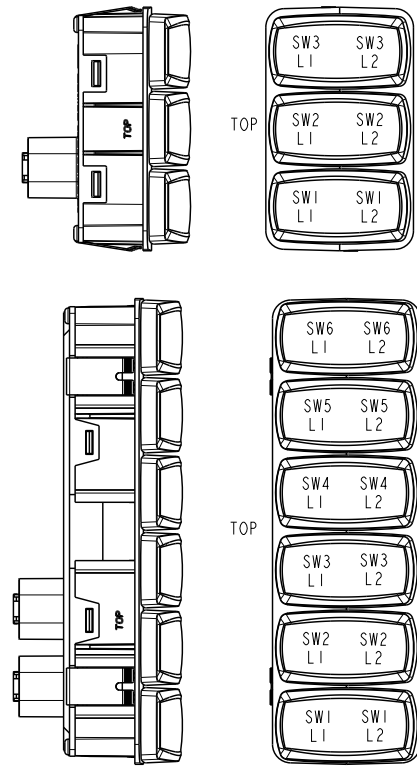


# Orientation Diagram

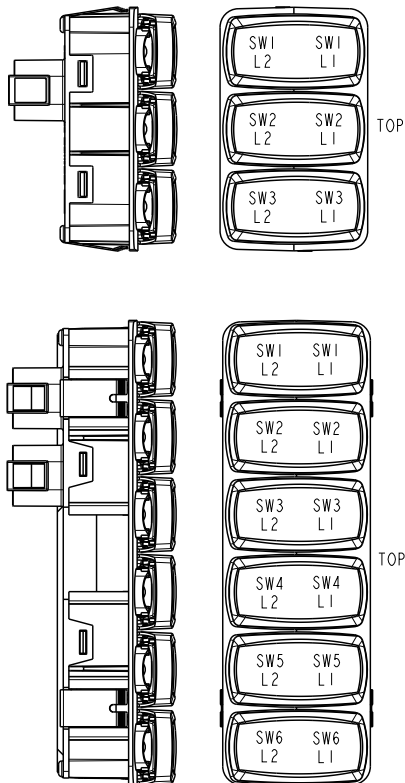
## Orientation 1



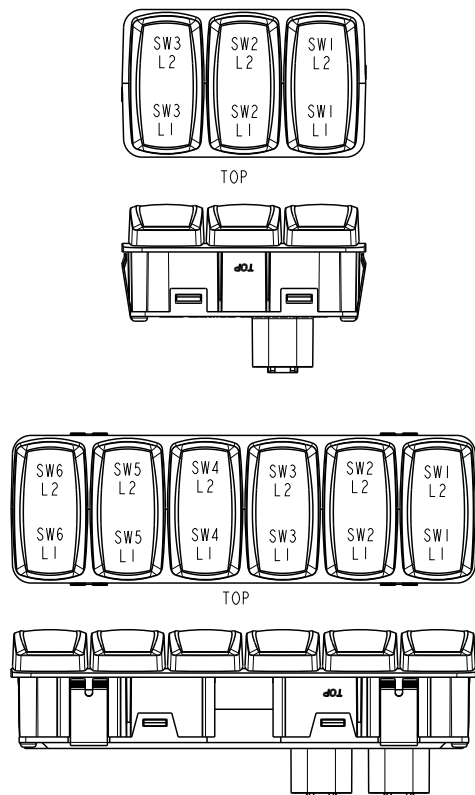
## Orientation 2



## Orientation 3



## Orientation 4



# Standard Legend 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	VD	VE	VF	VG	SH	SM	SN	SP	SR	SY
DIM	BRIGHT	UH	UJ	PD	PE	PF	VC	VJ	UF	UG	MU	TN
WY	WZ	WIPER	VZ	YE	NN	RW	PU	WA	YN	UE	NM	RJ
NS	PB	SE	VR	ENG FAN	BLWR	UC	VN	PK	VY	HORN	RH	NU
NR	YD	TL	VR	SL	VA	UC	VN	PK	VY	UZ	RH	NU
NV	RB	RC	RK	RL	MZ	RG	UP	DOWN	UD	UR	WD	TY
PA	UK	WATER PUMP	UU	UT	ANCHOR	PM	VV	WB	TB	TC	TD	TE
MY	PV	TA	TZ	WC	PT	PN	PH	RA	TU	TT	YL	SK
VS	UL	UM	WK	TS	VT	WL	VP	YJ	PJ	RY	UP	NW
NP	RE	RF	PP	PR	TV	PC	YT	YU	PL	WJ	MV	RR
TK	RT	SEAT	VX	WF	WH	PG	SJ	YA	YB	RM	TM	RD
RS	UN	TP	TR	NT	MX	YC	TW	TJ	YF	TH	TF	TG
YS	YH	AUX	ON OFF	OFF ON	I O	O I	OFF ON	ON OFF	ON OFF	I O	O I	II
RAISE	LOWER	HIGH	LOW	FWD	REV	DEPTH	TRIM TAB	ACC	NAV ANCH	WIND LASS UP/DN	LIVE WELL	REAR
ST	SU	WU	WV	SV	SW	VB	VH	VK	VL	VM	WE	SF
PARK	AUTO	RU	RV	RX								
SG	SS											

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