VMM-SERIES

MULTIPLEXED SWITCH MODULE

The VMM-Series is a sealed, multiplexed switch module featuring the Carling V-Series Contura® rocker switch styles. The VMM-Series reduces the complexity and cost of traditional wiring harnesses, increases product life and reliability, and reduces installation time.

Product Highlights:

- NMEA2000® CAN Protocol
- IP68 Sealing Protection with Connector
- Configurable
- Horizontal or Vertical Mounting Options

Model Number:

- VMM6

NMEA Model Number: VMM6

*Manufacturer reserves the right to change product specification without prior notice. Please refer to our website for the latest details.

Design Features

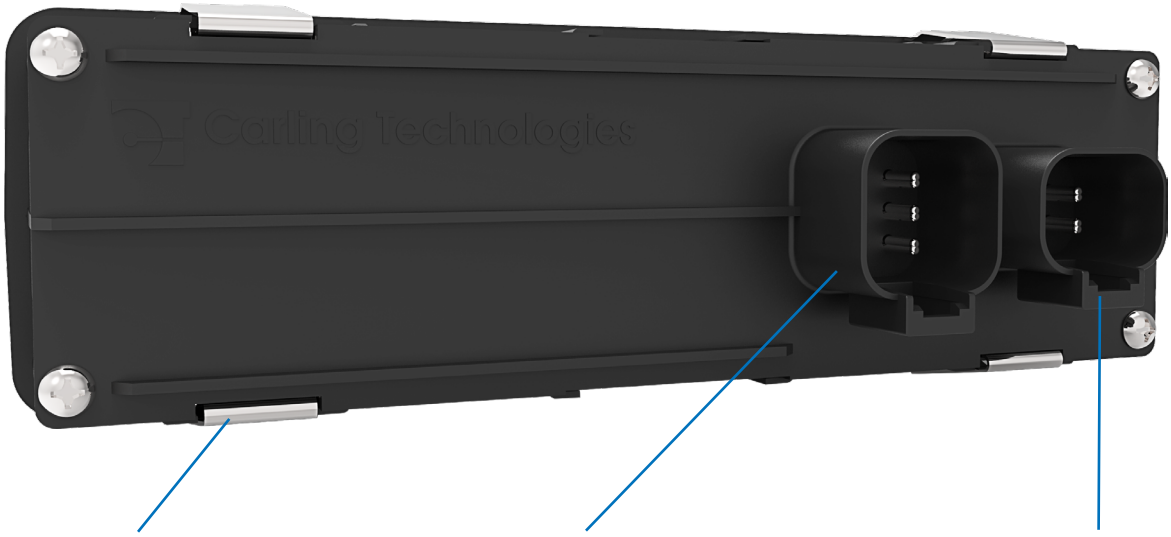
SEALING PROTECTION
Fully sealed IP68 front panel and back panel (when connected)

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

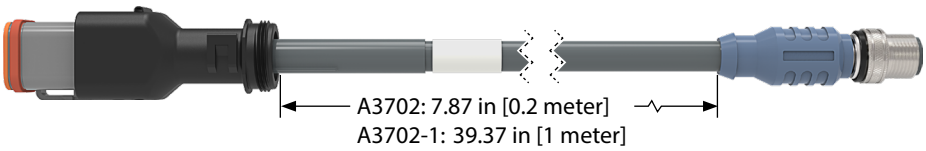


SNAP-IN MOUNTING
For fast, easy assembly.

6 PIN CONNECTOR
Mates to the Deutsch DT-Series Connector.

4 PIN CONNECTOR
Reserved for future use.

INTERFACE ADAPTER CABLE
Deutsch to CAN
(Part Numbers A3702 (standard) and A3702-1)



Configuration

Functions

The mechanical type for each switch must be programmed into the module via CAN message(s).

Switch position will be reported via NMEA2000® Standard "Binary Switch Bank Status" CAN message. To allow each switch to report up to three discrete positions, the top and bottom switch positions will be considered separate binary (on or off) switches and will be numbered as follows:

Illumination

There will be a total of twelve single-color LEDs, and each will be configurable via CAN message to act as a backlight or a function indicator. The LEDs will be located under the top and bottom of each rocker, and will be one of the following colors: Red, Green, Amber, Blue, or White. All LEDs set as backlights will share the same brightness and on/off values.

LEDs set as function indicators can be tied to a channel of any device on the CAN network that reports the NMEA2000® standard "Binary Switch Bank Status" message. When the associated channel reports it is in the "on" state, the LED will be turned on and set to the function indicator brightness level. When the associated channel reports it is in the "off" state, the LED state will depend on if it is also set as a backlight. If it is, it will be on at the backlight brightness level. If it is not, it will be off.

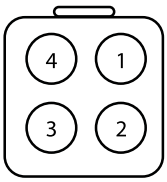
Table A: Illumination Table (for each switch position)

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

Connector Pin Layout:

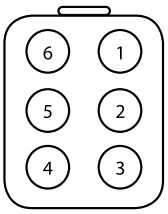
Connector 1 (mating connector: Deutsch DT-Series 4 pins)

Pin	1	2	3	4
Signal	Reserved for future use			



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



Further details regarding software can be found in the Software Interface Integration Specification.

Ordering Scheme: Part 1 (Module and Rocker Style)

VM	6	-	2	F	1
1 Series	2 Size		3 Protocol	4 Rocker	5 Orientation

1 SERIES
VM V-Series Module System

2 SIZE
6 6 Positions

3 COMMUNICATION PROTOCOL
2 NMEA2000®

4 ROCKER STYLE

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

5 ORIENTATION

1	Landscape	**2**	Portrait
3	Reverse Portrait	**4**	Reverse Landscape

Ordering Scheme: Part 2 (Module Circuit and Lamps)

Switch 1					Switch 2					Switch 3				
1	B	2	A	-	2	A	1	0	-	6	0	0	0	-
Circuit	Lamp Circuit	Lamp 1	Lamp 2		Circuit	Lamp Circuit	Lamp 1	Lamp 2		Circuit	Lamp Circuit	Lamp 1	Lamp 2	

Switch 4					Switch 5					Switch 6			
1	B	2	A	-	2	A	1	0	-	6	0	0	0
Circuit	Lamp Circuit	Lamp 1	Lamp 2		Circuit	Lamp Circuit	Lamp 1	Lamp 2		Circuit	Lamp Circuit	Lamp 1	Lamp 2

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

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Continue to next page for Part 3 (Rockers)

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

VV	A	Z	C	00	-	0	00
V-Series Rocker Only	*2 Style*	*3 Lens*	*4 Color*	*5 Legend*		*6 Orientation*	*7 Lens Legend*

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

3 LENS

Z - No Lens

Clear	White	Amber	Green	Red	Blue	Contura Lens Style Location 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.

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

5 ACTUATOR LENS OR BODY LEGENDS

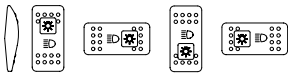
11 ON OFF **12** OFF ON **13** I O **14** O I
15 O O F N F **16** O O N F F **17** O I **18** I O

See Standard Legend Imprinting. Consult factory for additional icons.

6 LEGEND ORIENTATION

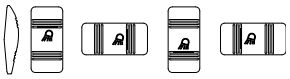
0 No legend (used with codes 11-18 in box 5)
1 Orientation 1
2 Orientation 2
3 Orientation 3
4 Orientation 4

Contura II



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

Contura III



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

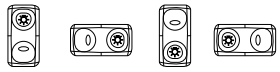
Contura IV

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

Contura V

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

Contura VII



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

Contura XIV

1 **2** **3** **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.

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

VT	H	Z	Z	C	B	–	00	0	00
V-Series Contura VI	*2 Style*	*3 Lens 1*	*4 Lens 2*	*5 Rocker Color*	*6 Insert Color*		*7 Legend*	*8 Orientation*	*9 Lens Legend*

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
C Bright Chrome Plated
D Satin Chrome Painted
N Bright Nickel Plated
S Satin Chrome Plated
T Satin Nickel Plated
W White

7 ACTUATOR LENS OR BODY LEGENDS

00 - No Legend this location

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

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

See Standard Legend Imprinting. 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

1 2 3 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

VV	1	Z	C	00	–	0	00
V-Series Rocker Only	*2 Style & Color*	*3 Lens 1*	*4 Lens 2*	*5 Legend*		*6 Orientation*	*7 Lens Legend*

2 ACTUATOR STYLE

	Black	Gray	White	Red
Contura X	1	2	3	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*** **(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.

5 ACTUATOR LENS OR BODY LEGEND

00 - No Legend this location

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

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

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

25 O / F / F **26** O / N **27** O **28** I

For additional legend options & codes, visit us at 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

1 2 3 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	MT	VU	PS
WM	RN	RP	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	UE	NM	RJ	NR	BLWR VA	UC	VN	PK
VY	HORN UZ	RB	RC	RK	RL	MZ	RG	UP WS	DOWN WT	UD	UR	WD
TY	PA	UK	WATER PUMP WR	UU	UT	ANCHOR YR	VS	UL	UM	VP	YJ	UN
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	I I 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.

General Specifications

Electrical

Operating Voltage	9 to 32 VDC
Max Current	Operation: 300mA
Communication	Master: CAN 2.0b (NMEA2000®)
Programming	At factory or via CAN by 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 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
Supply Voltage	Slow Decrease/Increase: Test according to ISO16750-2- 4.5 Momentary Drop: Apply the test pulse according to ISO 16750-2 (Figure 4 for 12V system, Figure 5 for 24V system)
Electrical Endurance	Minimum 250,000 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	Each of the 6 switches can be one of the following mechanical types: 2-position maintained, 2-position momentary top, 2-position momentary bottom, 3-position maintained, 3-position momentary top and bottom, 3-position momentary top, or 3-position momentary bottom. See next page for more details.
Illumination	Single-color LED Red, Green, Amber, Blue, White See next page for more details.
Dimming	Backlight and function indicator brightness can be set independently.
Connection	Deutsch DT-Series 4 and 6 pin connectors
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	EN 60068-2-2 Test Bb, 85°C for 96 hours
Thermal, Cold Soak	EN 60068-2-1 Test Ad, -40°C for 96 hours
Thermal, Shock	EN 60068-2-14 Test Na, -40°C to 85°C, 10 cycles for 10 hours
Humidity, Soak	EN 60068-2-78 Test Cab, 30°C at 93% RH for 10 days
Humidity, Cyclic	EN 60068-2-30 Test Db Method 1, 55°C to 25°C at >90% RH, 6 cycles of 24 hours each
Thermal, Cycling	EN 60068-2-14 Test Nb, -40°C to 85°C, 2 cycles of 8 hours each
Solar Radiation	EN 60068-2-5 Procedure B, 40°C for 10 days
Ingress Protection	IEC 60529, IP68, 1.2m deep water for 60+/-2 min
Shock	EN 60068-2-27, 3 shocks in each direction of the 3 axes (18 total shocks) at 500 m/s2 for 11 ms
Bump	EN 60068-2-27, 100 shocks in each direction of the 3 axes (600 total shocks) at 400 m/s2 for 6 ms
Drop	EN 60068-2-31 Test Ec Free Fall – Procedure 1, drop in each direction of the 3 axes (6 total drops) from 500mm
Vibration, General	EN 60068-2-6, swept sine wave from 5-500 Hz, +/-15 mm amplitude, 5g, 20 cycles in each plane
Vibration, Random	EN 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	EN 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	EN 60068-2-52 Test Kb, severity level 4

Electromagnetic Compatibility (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.

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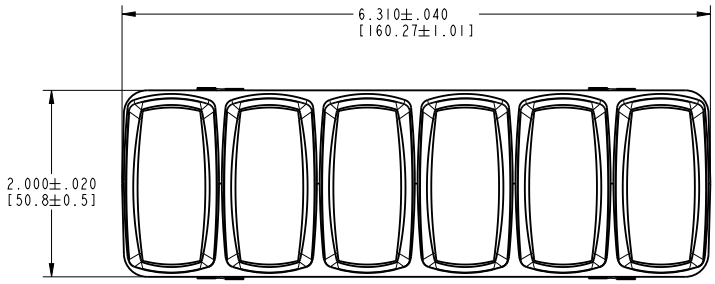
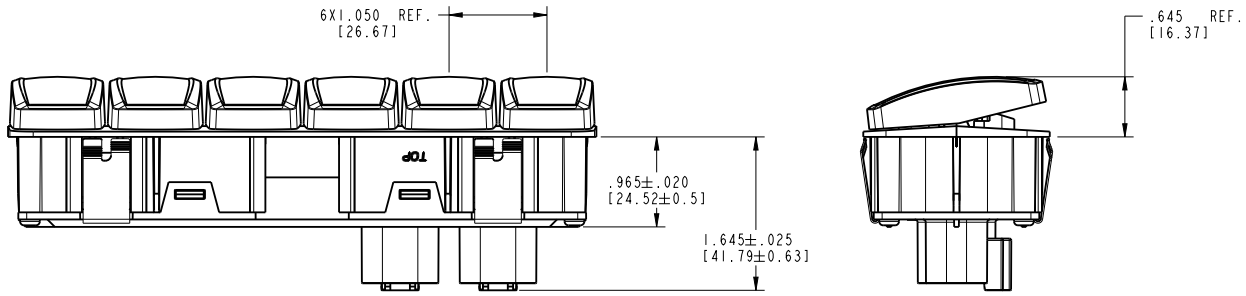
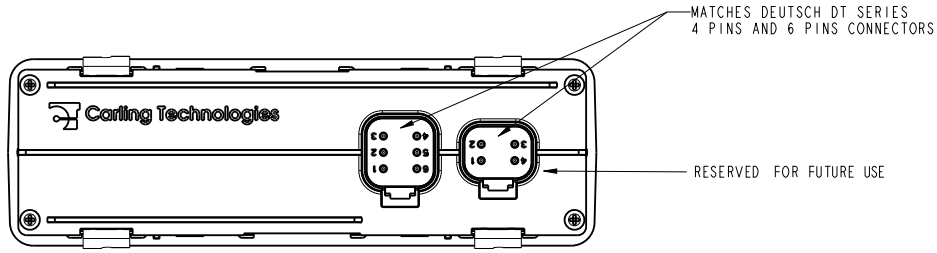
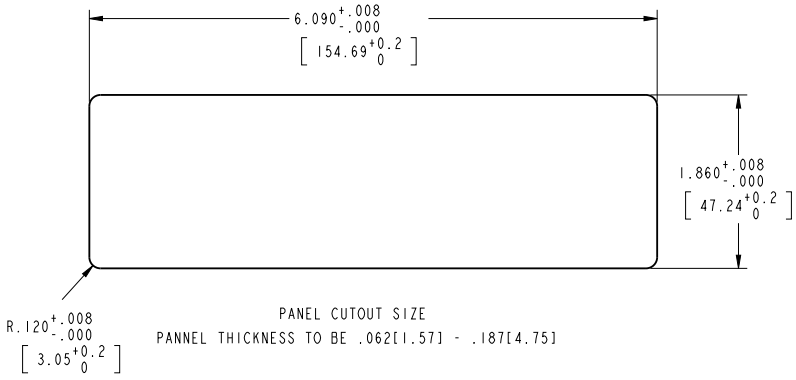
Dimensional Specifications in. [mm]









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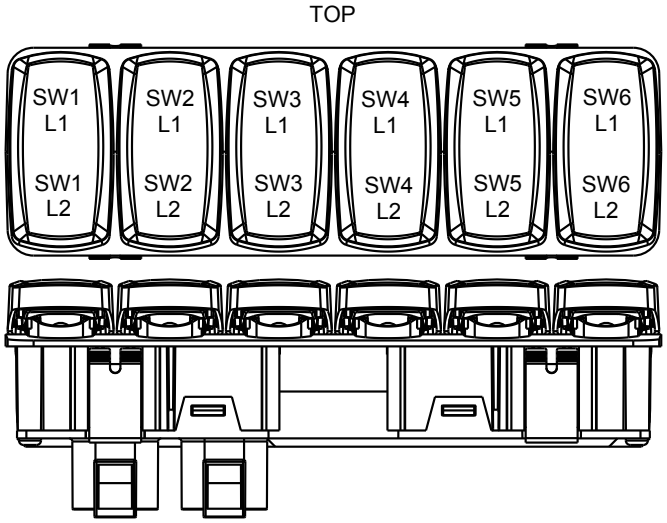
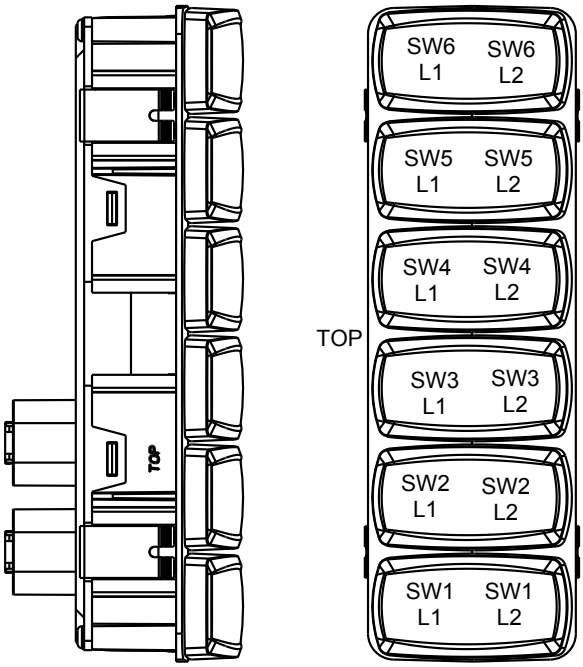
Dimensional Specifications

ORIENTATION

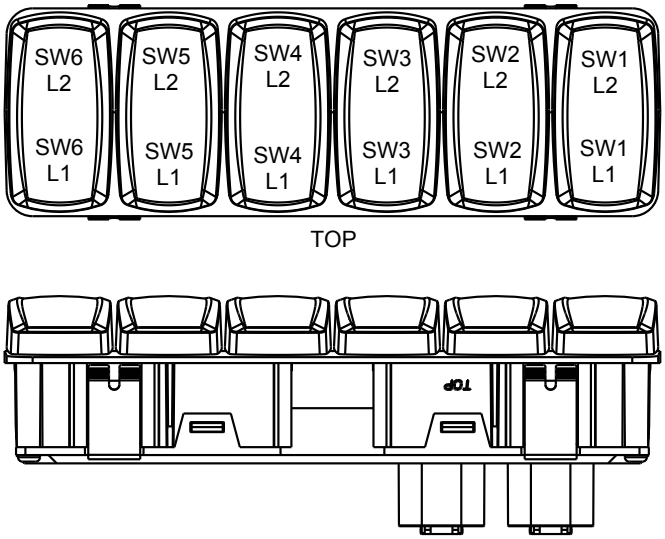
LANDSCAPE



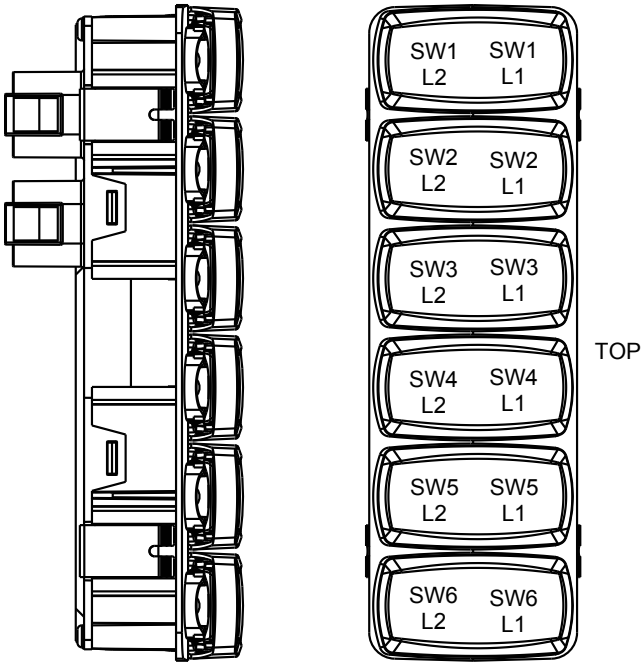
PORTRAIT



REVERSE LANDSCAPE

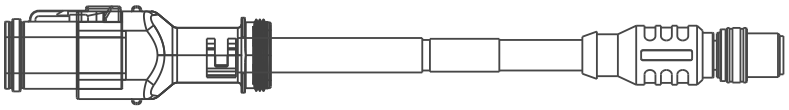


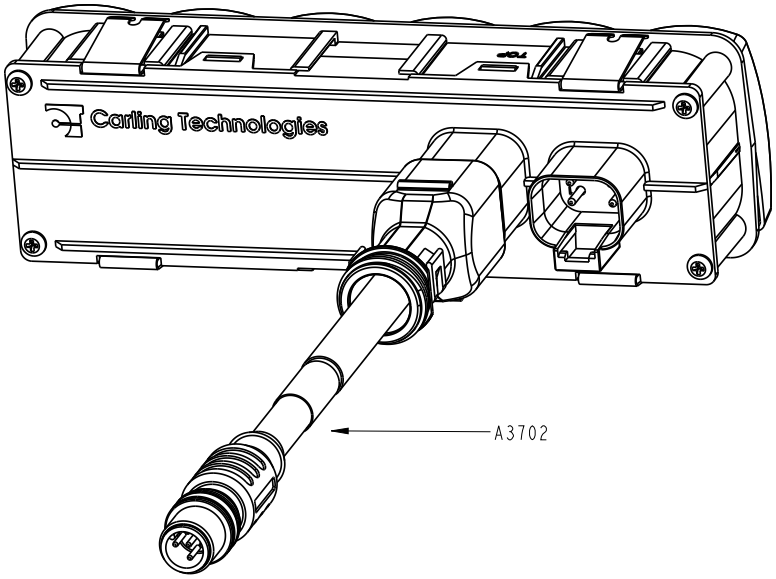
REVERSE PORTRAIT

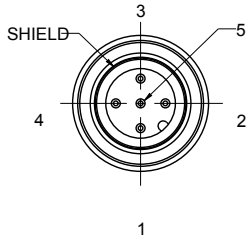


Dimensional Specifications

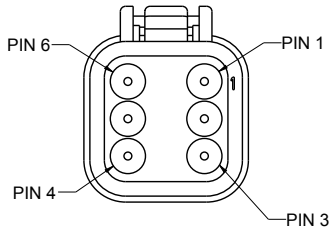
Interface Adapter Cable: Deutsch to CAN (A3702)







DETAIL A



DETAIL B

CLA-0147 Rev: A

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