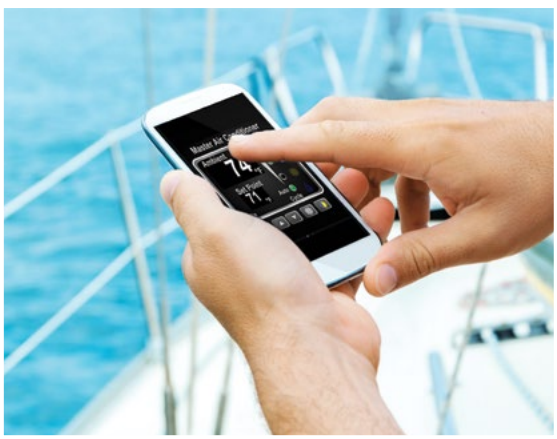
M-POWER®

DIGITAL SWITCHING PLATFORM



Carling Technologies®
Innovative Designs. Powerful Solutions.

Maretron®
Vessel Monitoring & Control

MPower® DIGITAL SWITCHING PLATFORM

CBMD12

CLMD12

CLMD16

VMM6

CKM12

MPOWER®
DIGITAL SWITCHING PLATFORM

MARETRON®, A CARLING TECHNOLOGIES BRAND offers a comprehensive suite of products to enable full functionality, control and monitoring of systems on vessels of virtually any size. The new MPower® Digital Switching Platform delivers simple, intuitive control over the increasingly complex power systems found on today's vessels. The result is a safer, more enjoyable boating experience.

All MPower components connect directly to the NMEA 2000® network, allowing circuit breakers to be controlled or reset from various electronics including the Maretron MBB300C Black Box, Maretron DSM Color Displays, the TSM810C Dedicated Maretron Touchscreen, Garmin OneHelm™ or any device running Maretron's award-winning N2KView® V3 software. Combine MPower digital switching with Wi-Fi, cellular or satellite communications and gain the ability to monitor and control onboard electrical and electronic systems (lighting, security systems, bilge pumps, etc.) both onboard and remotely.

As part of the Carling Technologies family, with 100 years of expertise in switches and circuit protection, Maretron customers have the added bonus of a global network of sales and support. We are your ONE source for creating the intelligent boat … from cables & connectors to complete vessel monitoring & control solutions.

Marine has been our passion for decades. It's where we live, work and play–today, tomorrow & in the future.

12-Channel DC Load Controller Module

Designed for vessels of all sizes with smaller loads, the MPower® CLMD12 is a compact 12-Channel DC Load Controller Module. Two of the 12 breakers handle a maximum of 12 amps, six handle a maximum of 10 amps and four handle a maximum of 5 amps with a total current capacity of 75 Amps. Additionally, circuits can be paralleled.

If a smaller circuit needs to be protected, each of the 12 breakers can be set to trip at lower current levels using the new Maretron N2KAnalyzer® V3 software. In addition, the CLMD12 has inputs for up to 7 hard-wired switches that can be used to switch breaker states, or as inputs for other data such as bilge alarms or hatch positions, etc.

The CLMD12 handles many DC load types such as lights pumps, motors, and electronics. An added benefit of the CLMD12 is that it reports the current through each of the 12 breakers. This allows you to determine if loads are drawing too much or too little electrical current. This information can be used to report overcurrent faults and under-current conditions such as burnt-out bulbs.

For manual control of the loads, an optional MPower 12-Channel Bypass Module (CBMD12) can be installed in conjunction with the CLMD12.

Monitor and control onboard electrical and electronic systems and reset circuits onboard and remotely with the following devices:

- Maretron MBB300C Black Box
- Maretron TSM810C Dedicated Touchscreen
- Garmin OneHelm™
- Any device running Maretron's award-winning N2KView® V3 Software

MPower devices can also be controlled by the new MPower 6-Rocker VMM Series Contura® Digital Switch Module and the new MPower 12-Button CKM Series Customizable Keypad.

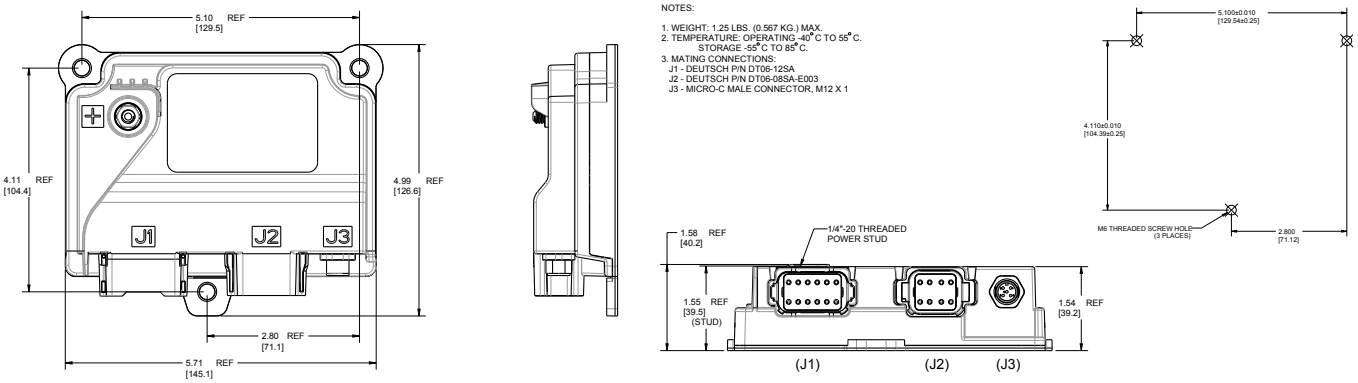
Product Features

- NMEA 2000® Interface
- IP67 Rated
- Ignition Protected
- Opto-isolated from NMEA 2000®, eliminating potential ground loops
- Twelve (12) dimmable Electronic Circuit Breakers (ECBs) for ON/OFF control over NMEA 2000® network
  - 2 breakers capable of carrying up to 12 amps
  - 6 breakers capable of carrying up to 10 amps
  - 4 breakers capable of carrying up to 5 amps
- Individual breaker electrical current monitoring
- Breakers can have power-up states defined (ON, OFF, or PREVIOUS STATE)
- Breakers can be locked against inadvertent actuation
- Seven (7) discrete inputs configurable as Active High, Active Low
- Automatic ECB overcurrent shutdown
- Automatic ECB thermal shutdown (Overtemperature Protection)

PRODUCTS

PART NUMBER	DESCRIPTION
CLMD12-R	12 Channel DC Load Controller Module w/A3706 and A3707
DT06-12SA	J1 (Output) Mating Connector, Deutsch
0462-209-16141	J1 (Output) 14AWG Socket, Deutsch
W12S	J1 (Output) Wedge, Deutsch
1028-043-1205	Back Shell, 12 Way Plug, Deutsch
DT06-08SA-E003	J2 (Input) Mating Connector, Deutsch

PART NUMBER	DESCRIPTION
0462-201-16141	J2 (Input) 16-20AWG Socket, Deutsch
W8S	J2 (Input) Wedge, Deutsch
1011-243-0805	Back Shell, 8 Way Plug, Deutsch
A3706	Output (J1) Mating Connector with 1m Flying Leads
A3707	Input (J2) Mating Connector with 1m Flying Leads
CBMD12	12-Channel DC Bypass Module



SPECIFICATIONS

PARAMETER	VALUE
Number of Channels	12
Switching Voltage	<32VDC
Maximum Unit Current Capacity	75 Amps
Maximum Channel Current Ratings	4x5A, 6x10A, 2x12A

CERTIFICATIONS

PARAMETER	COMMENT
NMEA 2000®	Certified
CE Mark	Recreational Craft Directive 2014/35/EU

NMEA 2000® PARAMETER GROUP NUMBERS (PGNs)

DESCRIPTION	PGN#	PGN NAME	DEFAULT RATE
Periodic Data PGNs	65300	Carling Proprietary	1 time / 4 seconds
	127500	Load Controller Connection State & Control	1 time / 4 seconds and on switch change
	127501	Binary Switch Bank Status	1 time / 15 seconds and on switch change
	127751	DC Voltage / Current	1 time / 15 seconds
Response to Requested PGNs	126464	PGN List (Transmit and Receive)	N/A
	126996	Product Information	N/A
	126998	Configuration Information	N/A
	130818	Maretron Proprietary	N/A
	130825	Maretron Proprietary	N/A
	130921	Carling Proprietary	N/A
Protocol PGNs	059392	ISO Acknowledge	N/A
	059904	ISO Request	N/A
	060928	ISO Address Claim	N/A
	126208	NMEA Request/Command/Acknowledge	N/A
	126993	Heartbeat	1 time / 60 seconds
	130060	Label	N/A

ELECTRICAL

PARAMETER	VALUE	COMMENT
Voltage Input Range	6.5 to 32 VDC	DC Voltage
Power Consumption	150mA @ 12 VDC / 70 mA @ 24 VDC	NMEA 2000® Interface
Load Equivalence Number (LEN)	3	NMEA 2000® Spec. (1LEN = 50 mA)
Reverse Battery Protection	Yes	Indefinitely
Load Dump Protection	Yes	Energy Rated per SAE J1113
Channel Current Measurement Accuracy	+/- 0.5 Amps	Typical
Channel Current Measurement Resolution	0.1 Amps	
Minimum Channel Current Measurement	0.5 Amps	
PWM (all breakers)		
Frequency	200 Hz	
Load	Inductive load interface not recommended when PWM used	
Duty Cycle Range	5% - 100%	
Duty Cycle Resolution	1%	
Programmable Trip Level Resolution	1 Amp	
Discrete Input Channels		
Input Resistance	1KΩ	
Input Voltage, Open Circuit	2.75 V	
Low Voltage Threshold	0 to 1.02 V	
Open Voltage Threshold	1.51 – 4.31 V	
High Voltage Threshold	4.82 – 32.0 V	

MECHANICAL

PARAMETER	VALUE	COMMENT
Size	5.7" x 5.0" x 1.6" (144.8mm x 127mm x 40.6mm)	Including Flanges for Mounting
Weight	1.32 lb. (.599 kg)	
Power Stud Torque Value	20in-lbs. (2.26 N.m)	

12-Channel Optional Bypass Module

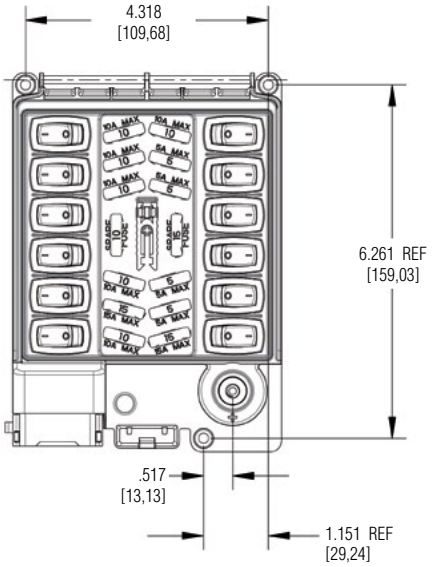
For manual control of the loads, an optional MPower® 12-Channel Bypass Module (CBMD12) can be installed in conjunction with the 12-Channel DC Load Controller Module (CLMD12). The maximum current capacity for the CBMD12 is 75 amps in 12V DC and 24V DC power systems.

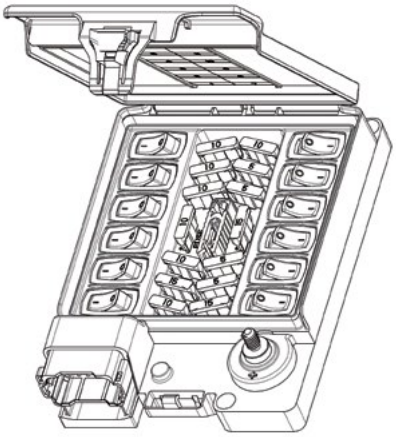
The Bypass Module provides a manual method (ON/OFF switch) to control loads by providing power to each load in case of a CLMD12 malfunction or a NMEA 2000® network failure. The CBMD12 utilizes standard fuses for overcurrent protection and 12 Carling Curvette® Rocker Switches for manual control of each load. With the use of the Curvette rocker switches, there is no arcing that occurs while manually overriding a load. Furthermore, unlike other digital switching products, MPower does not require moving a fuse which can cause electrical connections to degrade, or the possibility for ignition.

It's important to ensure that the current rating of the fuse for each load is appropriate to protect the load and the wiring for that load. Please note that the bypass module does not support paralleled outputs, since each circuit is controlled by a separate switch. Additionally, the bypass module does not support dimming of circuits.

Product Features

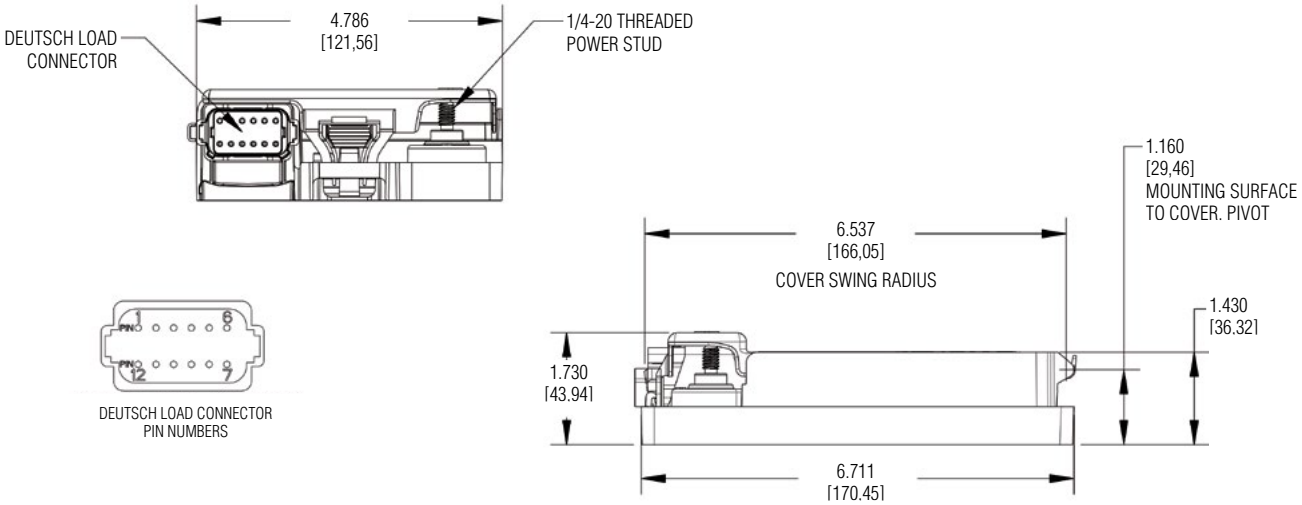
- 75 amps maximum current capacity
- Outputs
  - 12A max (two outputs)
  - 10A max (six outputs)
  - 5A max (four outputs)
- 12 & 24 VDC power systems
- Carling Technologies Curvette® Rocker switches
- Overcurrent protection via ATC standard fuses





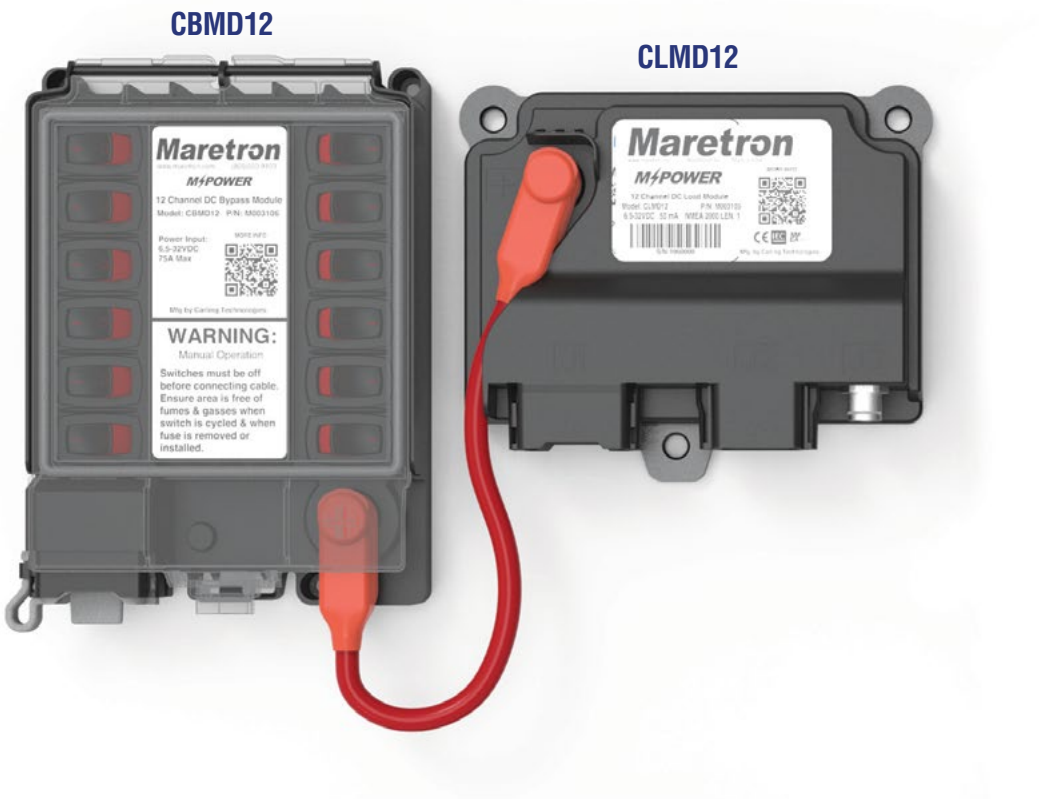
PRODUCT

PART NUMBER	DESCRIPTION
CBMD12-R	12-Channel Bypass Module w/ Fuse Pack and Jumper Wire
A3720	Bypass Module Jumper Wire with Lugs, 6AWG, Red
A3721	Bypass Module Fuse Pack



PIN#	1	2	3	4	5	6	7	8	9	10	11	12
SWITCH#	1	2	3	4	5	6	12	11	10	9	8	7
FUSE MAX RATING	10 AMP	15 AMP	10 AMP	10 AMP	10 AMP	10 AMP	10 AMP	5 AMP	5 AMP	5 AMP	5 AMP	15 AMP

12-Channel Bypass & DC Load Controller Module Installation



16-Channel DC Load Controller Module

For larger breakers and more circuits, the MPower® CLMD16 is a 16-Channel DC Load Controller Module. Four of the 16 breakers handle a maximum of 25 amps and twelve breakers handle a maximum of 12 amps with a total current capacity of 125 Amps. Additionally, circuits can be paralleled.

The CLMD16 also supports two H-Bridge reversing polarity circuits that can be used for loads such as engine hatches, passerelles, trim tabs, etc. The CLMD16 has 8 inputs for hard-wired switches that can be used to switch breaker states, or as inputs for other data such as bilge alarms or hatch positions, etc. There are 3 inputs capable of monitoring tank levels.

The CLMD16 handles many DC load types such as lights, pumps, motors, and electronics. An added benefit of the CLMD16 is that it reports the current through each of the 16 breakers. This allows you to determine if loads are drawing too much or too little electrical current. This information can be used to report overcurrent faults and under-current conditions such as burnt-out bulbs.

Monitor and control onboard electrical and electronic systems and reset circuits onboard and remotely with the following devices:

- Maretron MBB300C Black Box
- Maretron TSM810C Dedicated Touchscreen
- Garmin OneHelm™
- Any device running Maretron's award-winning N2KView® V3 Software

MPower devices can also be controlled by the new MPower 6-Rocker VMM Series Contura® Digital Switch Module and the new MPower 12-Button CKM Series Customizable Keypad.

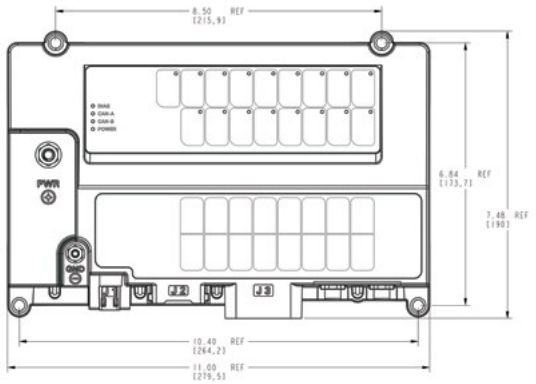
Product Features

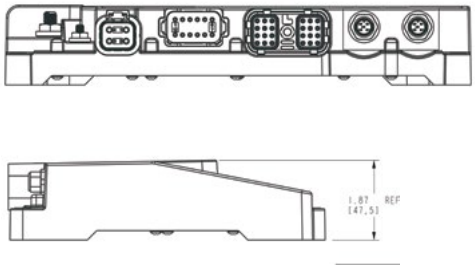
- NMEA 2000® Interface
- IP67 Rated
- Ignition Protected
- Opto-Isolated from NMEA 2000®, eliminating potential ground loops
- 16 Electronic Circuit Breakers (ECBs) for ON/OFF control over NMEA 2000® network
- Each breaker is capable of carrying up to 12 or 25 Amps
- Individual breaker electrical current monitoring
- Breakers can have power-up states defined (ON, OFF, or previous states)
- Breakers can be locked against inadvertent actuation
- Capacitive touch switches for local control of all loads
- All inputs and outputs protected against short to Power and short to Ground
- Automatic ECB overcurrent shutdown
- Automatic ECB thermal shutdown (Overtemperature Protection)

PRODUCTS

PART NUMBER	DESCRIPTION
CLMD16-R	16-Channel DC Load Controller Module w/A3708, A3709 & A3710
DTP06-4S	J1 (Output) Mating Connector, Deutsch
0462-203-12141	J1 (Output) 14AWG Socket, Deutsch
WP-4S	J1 (Output) Wedge, Deutsch
DT06-12SA	J2 (Output) Mating Connector, Deutsch
0462-209-16141	J2 (Output) 14AWG Socket, Deutsch

PART NUMBER	DESCRIPTION
W12S	J2 (Output) Wedge, Deutsch
1028-043-1205	J2 Back Shell, 12 Way Plug, Deutsch
DRC26-24SA	J3 (I/O General Purpose) Mating Connector, Deutsch
0462-201-20141	J3 (I/O General Purpose) 16-20AWG Socket, Deutsch
0413-204-2005	Connector Seal Plug, 20 HD SER, Deutsch
A3708	Output (J2) Mating Connector with 1m Flying Leads
A3709	Output (J1) Mating Connector with 1m Flying Leads
A3710	J3 (I/O Gen Purpose) Harness Kit





SPECIFICATIONS

PARAMETER	VALUE
Number of Channels	16
Switching Voltage	<32VDC
Maximum Unit Current Capacity	125 Amps
Maximum Channel Current Ratings	12x12A, 4x25A

CERTIFICATIONS

PARAMETER	COMMENT
NMEA 2000®	Certified
CE Mark	Recreational Craft Directive 2014/35/EU

NMEA 2000® PARAMETER GROUP NUMBERS (PGNs)

DESCRIPTION	PGN#	PGN NAME	DEFAULT RATE
Periodic Data PGNs	127500	Load Controller Connection State & Control	1 time / 1.5 seconds and on switch change
	127501	Binary Status Report	1 time / 15 seconds and on switch change
	127751	DC Voltage / Current	1 time / 1.5 seconds
Response to Requested PGNs	126464	PGN List (Transmit and Receive)	N/A
	126720	Carling Proprietary	N/A
	126996	Product Information	N/A
	126998	Configuration Information	N/A
	130818	Maretron Proprietary	N/A
	130825	Maretron Proprietary	N/A
Protocol PGNs	059392	ISO Acknowledge	N/A
	059904	ISO Request	N/A
	060928	ISO Address Claim	N/A
	126208	NMEA Request/Command/Acknowledge	N/A
	126993	Heartbeat	1 time / 60 seconds
	130060	Label	N/A

ELECTRICAL

PARAMETER	VALUE	COMMENT
Voltage Input Range	8 to 32 VDC	DC Voltage
Power Consumption	50mA	NMEA 2000® Interface
Load Equivalence Number (LEN)	1	NMEA 2000® Spec. (1LEN = 50 mA)
Reverse Battery Protection	Yes	5 minutes
Load Dump Protection	Yes	12V: 87V, 200ms pulse, 1Ω impedance 24V: 173V, 100ms pulse, 2Ω impedance
12 A ECB peak current capacity	120 A	
25 A ECB peak current capacity	250 A	
Channel Current Measurement Accuracy	+/- 0.5 Amps	Typical
Channel Current Measurement Resolution	0.1 Amps	
Minimum Channel Current Measurement	0.5 Amps	
PWM Frequency	200 Hz	3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16
	20 kHz	1, 2, 11, 12
Load	Inductive load interface	
Duty Cycle Range	10% – 100%	
Duty Cycle Resolution	1%	
Programmable Trip Level Resolution	1 Amp	
Analog/Digital Input Channels Input Resistance	1KΩ	
Input Voltage, Open Circuit	2.75 V	
Alarm Output Maximum Supplied Current	300mA	
Resistive Input Measurement Accuracy	5 Ω	
Resistive Input Measurement Precision	2 Ω	
Resistive Input Measurement Resolution	1 Ω	

MECHANICAL

PARAMETER	VALUE	COMMENT
Size	11.0" x 7.48" x 1.871" (279.4mm x 190.0mm x 47.5mm)	Including Flanges for Mounting
Weight	2.5 lb. (1.2 kg)	
Power Stud Torque Value	30 to 35 in-lbs. (3.39N·m - 3.95N·m)	
Ground Stud Torque Value	10 to 15 in-lbs. (1.13 -1.69N·m)	

VMM6 Series

Contura® Digital Switch Module, 6 Rocker

The VMM-Series is a sealed multiplexed, digital switch module featuring the Carling V-Series Contura® rocker switches. Well known for their cutting-edge design, high quality, maximum performance and unmatched reliability, the VMM-Series reduces the complexity and cost of traditional wiring harnesses, increases product life and reliability, and reduces installation time. Available in six simple configurations, VMM6 is a plug-and-play solution that delivers switching technology at a very attractive price point.

For customers that want the option to source aftermarket actuators, we offer two versions of the VMM6 without actuators (Part numbers A3801-5, A3801-6).

Product Features

- NMEA 2000® CAN Protocol
- IP68 Front Panel Sealing Protection
- Configurable
- Horizontal or Vertical Mounting Options
- Aftermarket Actuators Available
- LED Feedback of Circuit State
- Low Current Switching
- Tactile and Audible Feedback

Front View

SEALING PROTECTION
Fully sealed IP68 front panel (when connected)

CUSTOMIZABLE ICONS
Choose from our standard selection of icons, or customize your own. Consult the factory for additional options.

ROCKERS
Variety of V-Series Contura® actuators

Back View

SEALING PROTECTION
Fully sealed IP68 back panel when connected and mating plug installed (included).

4 PIN CONNECTOR
The included mating plug must be installed to meet IP68 Rating for back panel.

Plug included

SNAP-IN MOUNTING
For fast, easy assembly

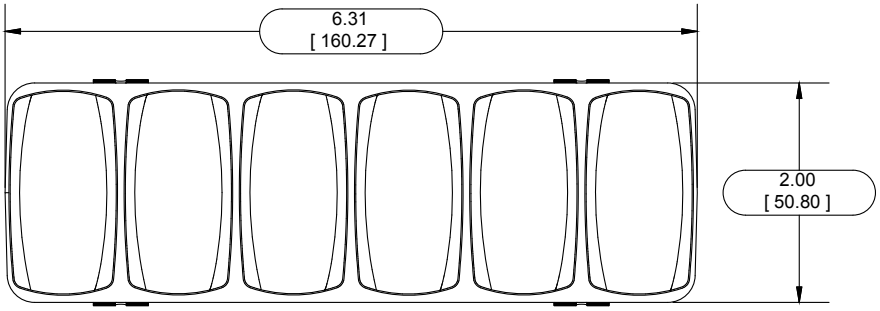
6 PIN CONNECTOR
Mates to the VMM to NMEA 2000® Adapter Cable

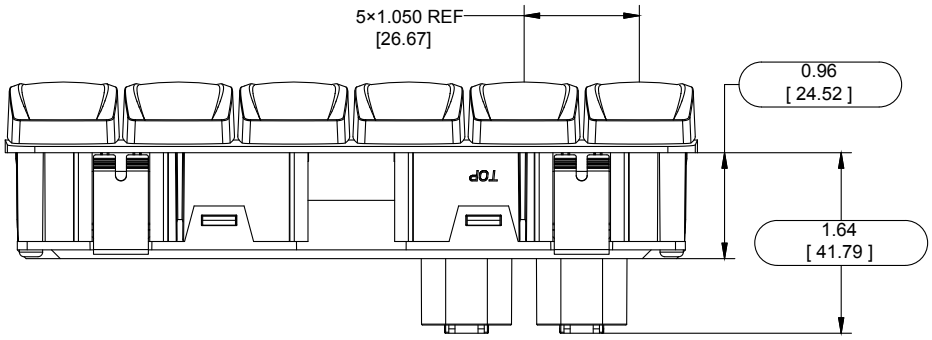
VMM to NMEA 2000® Adapter Cable - .2m (A3702)

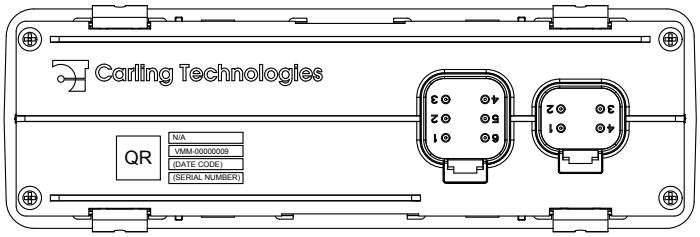
PRODUCTS

PART NUMBER	DESCRIPTION
A3801-1	Contura II (ALL Position Momentary ON) w/ VMM to NMEA 2000® Adapter Cable .2m
A3801-2	Contura II (Right Switch 3-Position) w/ VMM to NMEA 2000® Adapter Cable .2m
A3801-3	Contura V (All Positions Momentary ON) w/ VMM to NMEA 2000® Adapter Cable .2m
A3801-4	Contura V (Right Switch 3-Position) w/ VMM to NMEA 2000® Adapter Cable .2m
A3801-5	No Actuators (ALL Positions Momentary ON) w/ VMM to NMEA 2000® Adapter Cable .2m
A3801-6	No Actuators (Right Switch 3-Position) w/ VMM to NMEA 2000® Adapter Cable .2m
A3702	VMM to NMEA 2000® Adapter Cable - .2m

Dimensional Specifications - Inch [mm]

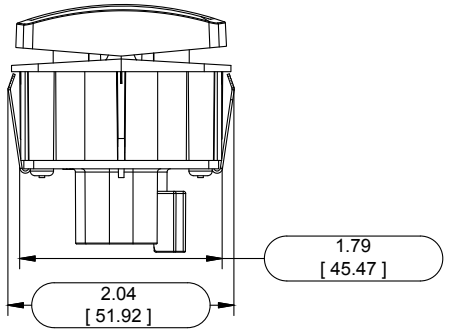


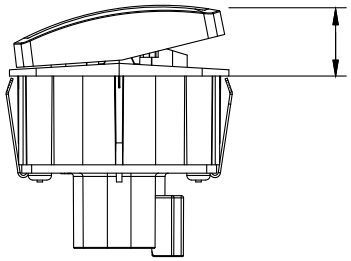




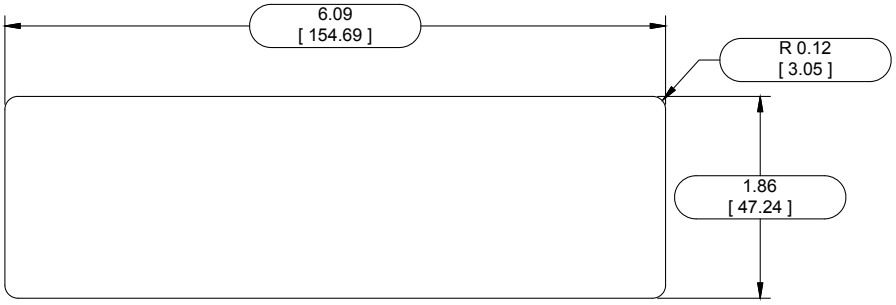
BUILT-IN RECEPTACLES COUPLE WITH DEUTSCH DT SERIES 4 AND 6 POSITION PLUGS

(4 POSITION RECEPTACLE RESERVED FOR FUTURE USE)





REQUIRED MOUNTING PANEL CUTOUT SIZE:



MINIMUM PANEL THICKNESS: 0.06 [1.57]

CKM Series

12-Button Customizable Keypad

The CKM12 is a customizable keypad featuring laser-etched legends and LED function lights for each button. The LEDs also provide diagnostics when fault conditions are detected.

With the rugged mechanical packaging (IP69K), the CKM12 can be installed inside or outside the cabin. The low-profile design offers a seamless dashboard look and it can be mounted either vertically or horizontally.

The CKM12 offers significant advantages over traditional electromechanical switches such as longer actuation cycle (1,000,000), reduced wiring harness and reduced installation time. The CKM12 is sold off the shelf in two configurations and include a CKM to NMEA 2000® Adapter Cable.

Product Features

- NMEA 2000® CAN Protocol
- IP69K Front Panel Sealing Protection
- Configurable
- Diagnostic Feedback
- Standard or Custom Laser Etched Legends
- 1,000,000+ Button Actuation Cycles
- Low Current Switching
- Tactile and Audible Feedback

Front View

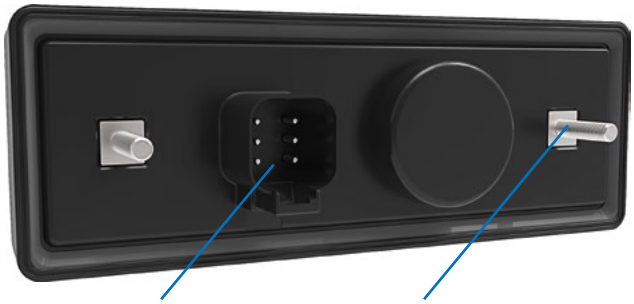
LOW PROFILE DESIGN
.57 inch [14.48 mm] thickness
(See dimensional specifications for more detail)

SEALING PROTECTION
IP69K front panel sealing protection

CUSTOMIZABLE ICONS
Choose from our standard selection of icons or customize your own. Consult the factory for additional options and minimum quantities for customization.

LED FUNCTION LIGHTS
Standard blue. Consult the factory for additional options.

Back View

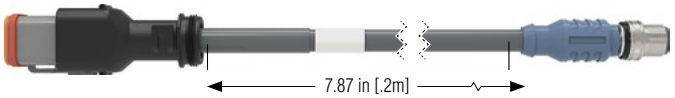


SEALING PROTECTION
Fully sealed IP68 back panel when connected

CONNECTOR
Mates to the CKM to NMEA 2000® Adapter Cable

10-32 MOUNTING STUDS (2X)
Max tightening torque 30 inch lbs.

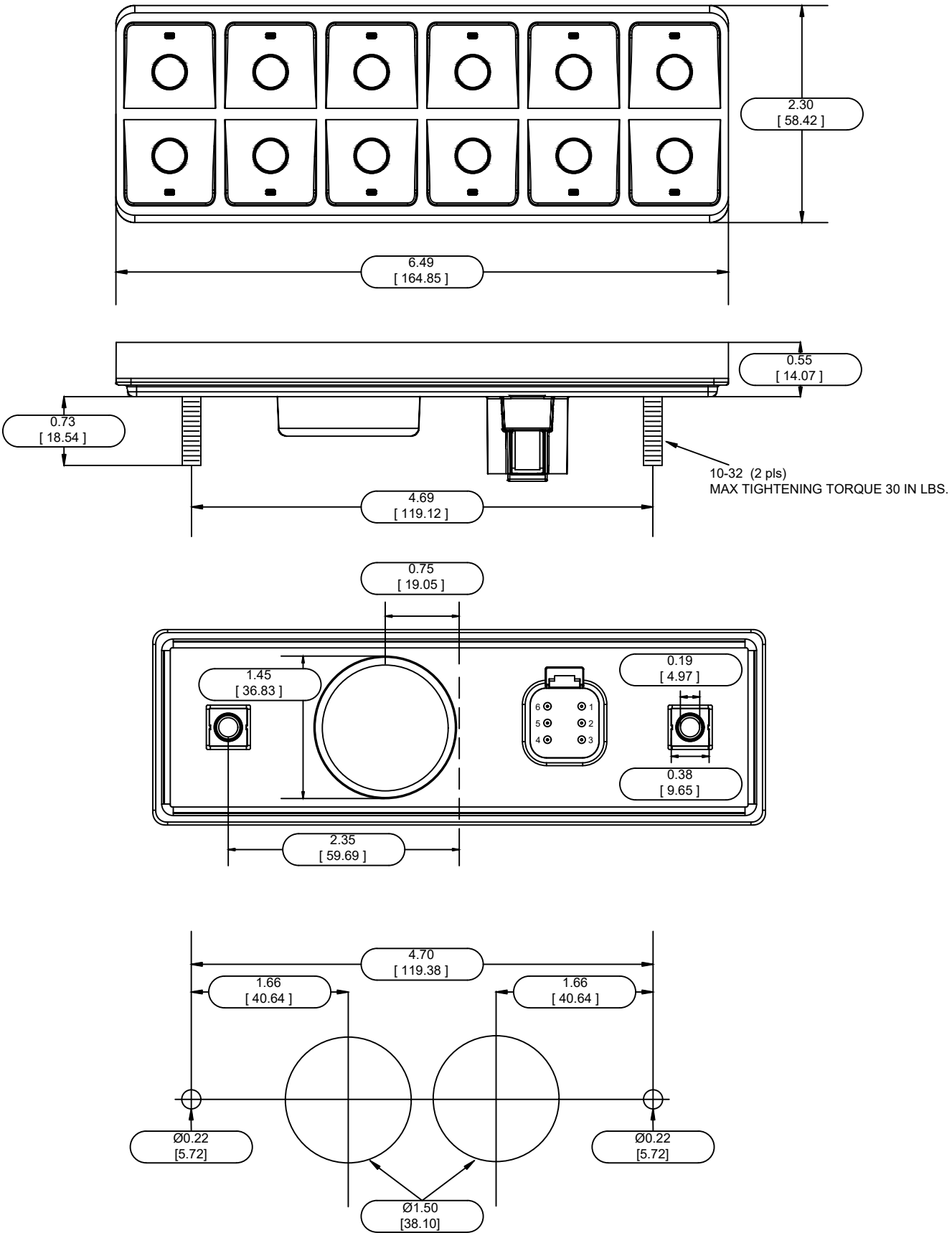
CKM to NMEA 2000® Adapter Cable - .2m (A3703)



PRODUCTS

PART NUMBER	DESCRIPTION
A3802-1	CKM12 Keypad (Circle on Buttons) w/ CKM to NMEA 2000® Adapter Cable .2m
A3802-2	CKM12 Keypad (Number in Center of Circle on Buttons) w/ CKM to NMEA 2000® Adapter Cable .2m
A3703	CKM to NMEA 2000® Adapter Cable - .2m

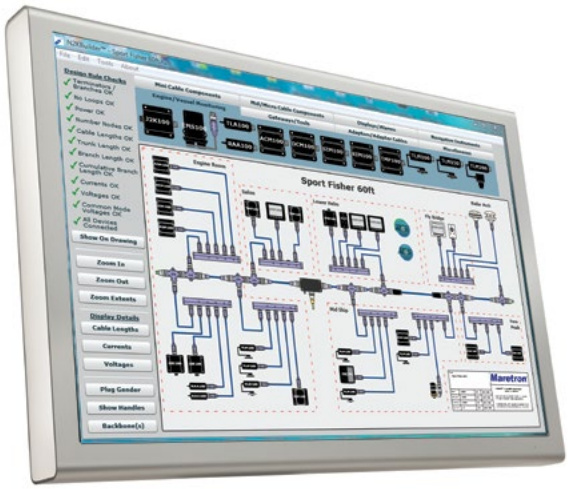
Dimensional Specifications - Inch [mm]



PANEL THICKNESS MIN: 0.05 [1.27] MAX: 0.30 [7.62]

MPower Configuration Tools

Build. Analyze. Integrate. We are the NMEA 2000® Experts



N2KBuilder®

NMEA 2000® Network Design Software

Map out your MPower® network design in N2KBuilder® V3, a powerful, free PC-based software used to plan, document, and validate the design of complex NMEA 2000® networks. In addition, N2KBuilder® V3 will directly produce a Bill of Materials (BOM) for Maretron products, eliminating guesswork and transcription errors. Maretron recently added an M-Power Tab containing MPower builder information for MPower devices (VMM, CKM, CLMD12,CBMD12 and CLMD16). And with the latest release of N2KBuilder® V3 configuration information from the planning stage can be exported directly to N2KAnalyzer® V3.

maretron.com/products/N2KBuilder.php

N2KAnalyzer®

NMEA 2000® Network Analysis Software

N2KAnalyzer® V3 is a Maretron software tool, currently offered free of charge with the purchase of a Maretron NMEA 2000®/USB gateway (USB100) or Maretron NMEA 2000®/Ethernet gate-way (IPG100). N2KAnalyzer® V3 provides you with a detailed view of all of the devices on a NMEA 2000® network and lets you perform a variety of configuration, updating, and troubleshooting tasks. Configure MPower CLMD12/CLMD16 DC Load Controller Modules using N2KAnalyzer® V3 save your final configuration file using the N2KAnalyer® V3 'Save File' function.

maretron.com/products/N2KAnalyzer.php?tab=3

Maretron is Your Gateway to the NMEA 2000® Network

USB 100

NMEA 2000® Network to USB Gateway

Part # USB100-01

Maretron's USB100 is a gateway for bridging computers to an NMEA network. This allows you to use PC based vessel monitoring and control software such as Maretron's N2KView® V3 or PC based navigation software. The gateway provides one simple connection between the network and the PC, which eliminates conventional multiplexers and the maze of wires usually associated with interfacing equipment to PCs. For most Maretron devices, the USB 100 provides a source for updating equipment to their latest software version.

For older PC based navigation software that requires receiving data in NMEA 0183® format, the USB100 automatically converts information from the NMEA 2000® network to NMEA 0183 sentences. This allows you to continue benefiting from navigational and charting software that you already own while enjoying the many benefits of networked NMEA 2000® instruments.

Maretron®
Vessel Monitoring & Control

IPG 100

NMEA 2000® Internet Protocol Cateway

Part # IPG100-01

Connect your PC, Mac, tablet or smartphone to an NMEA 2000® network with the IPG100 gateway Internet Protocol Gateway. Monitor and control your vessel using Maretron's N2KView® V3 software or using Maretron's N2KView® Mobile App both onboard and remotely.

The IPG100 has an NMEA 2000® connector and an Ethernet data port for exchanging information between the onboard NMEA 2000® network and Internet Protocol (IP) enabled devices using conventional technology such as routers, switches, and wireless modems. Once enabled, the IPG100 will automatically connect to Maretron's Real Time Cloud Service, which allows you to remotely connect to your vessel via the Internet. This allows you to keep an eye on your vessel from anywhere in the world.

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