Micro-BDCBB DC Battery Distribution Circuit Breaker Bay ED83368-30

600 A, -48V/+24V, 19" or 23"
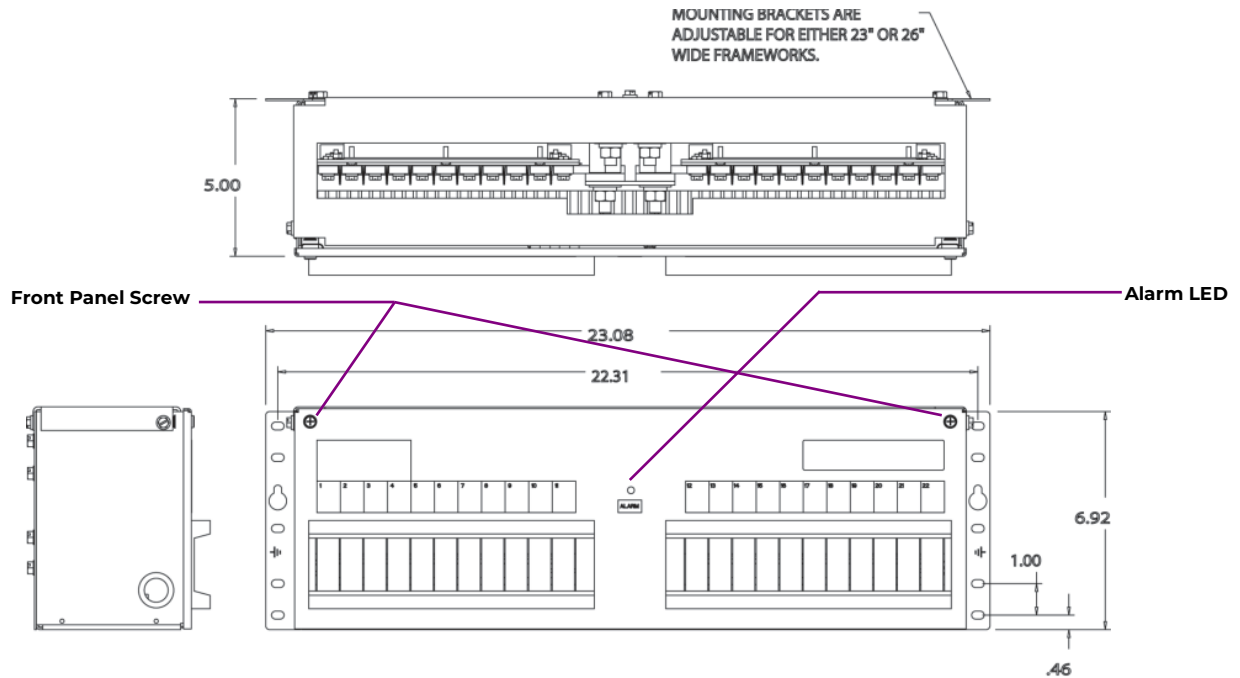
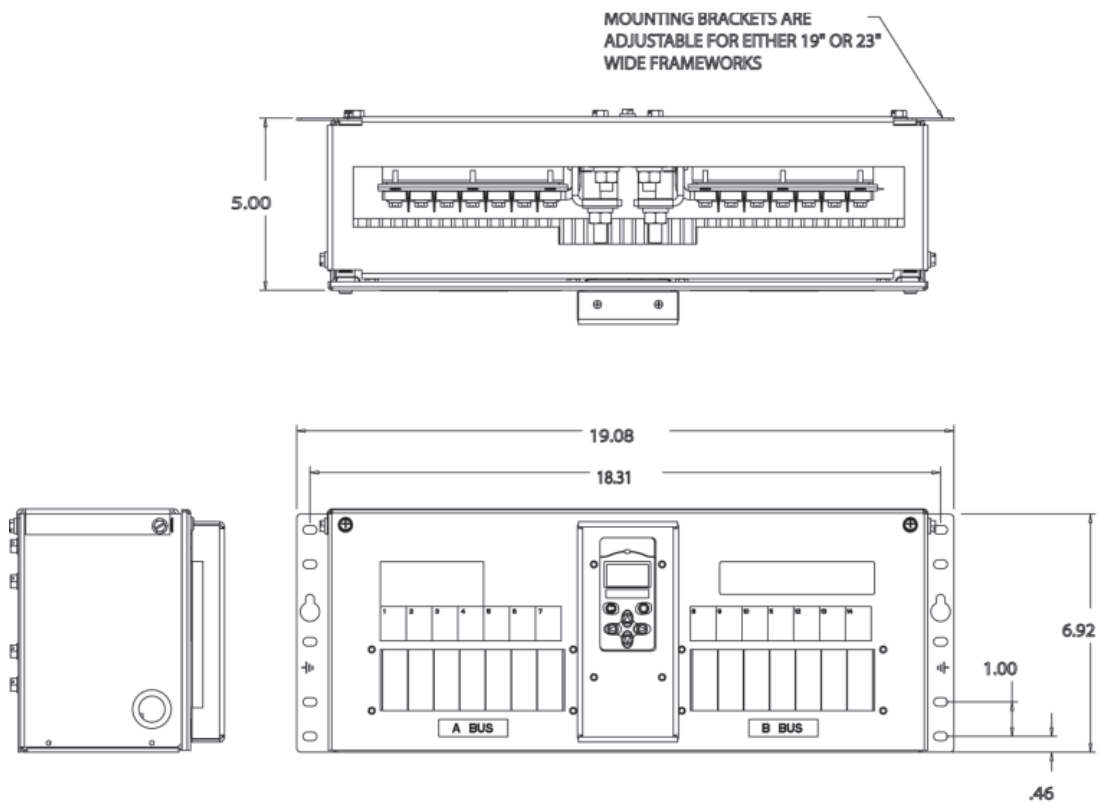| Micro-BDCBB Configurations							
Mounting	Fuse/Breaker Positions	Shunts[1]	Buses		Meter	Ordering Code	Group
			Battery	Return			
19"	14	-	1 or 2	1 or 2	-	108992070	3
19"	14	2	2	1	VIM1EC	CC109145455	4
19"	14	2	1	1	VIM1EC	CC109145447	8
23"	22	-	1 or 2	1	-	108991056	1
23"	22	2	2	1 or 2	VIM1EC	CC109145463	2
23"	22	2	1	1 or 2	VIM1EC	CC109145430	6

Notes:

Group 1 – Field conversion to Dual buses is not supported.

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[1] Shunts, when provided, are two 600A shunts, one on each side - A Bus (left) and B bus (right). The VIM1EC meter sums the two shunts for one battery bus configurations.

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Front Panel Screw

Alarm LED

MOUNTING BRACKETS ARE ADJUSTABLE FOR EITHER 23" OR 26" WIDE FRAMEWORKS.

Figure 1 Group 1 23" Panel with 477D Alarm Card

MOUNTING BRACKETS ARE ADJUSTABLE FOR EITHER 19" OR 23" WIDE FRAMEWORKS

Figure 2 Group 8 19" Panel with VIM1EC Meter

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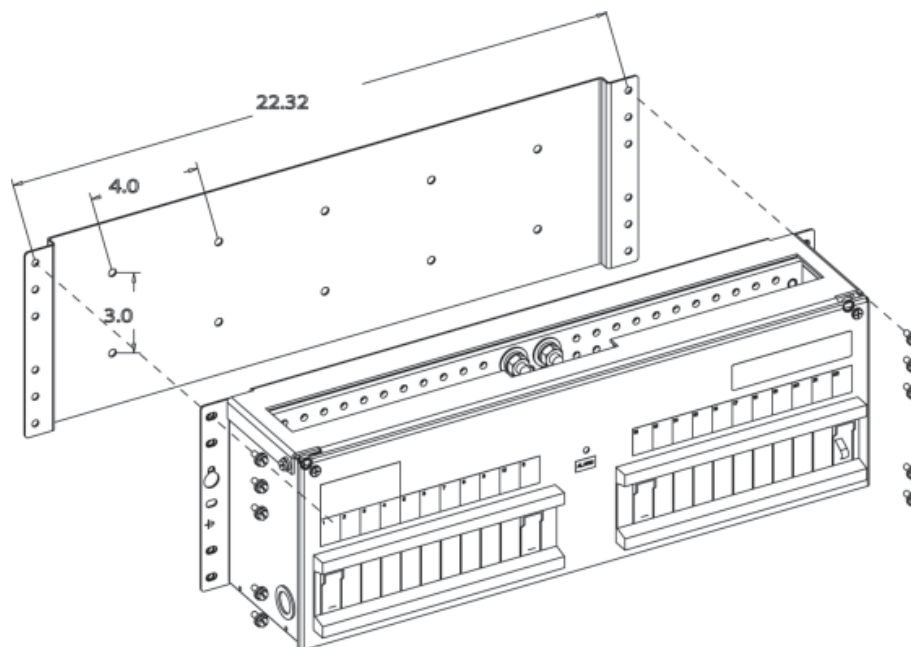
Figure 3 Wall Mounting Bracket CC848786401

ADD 848751875 BRACKETS EITHER AS SHOWN OR REVERSED

PULL UP TO REMOVE FINS FOR MULTI-POLE BREAKERS

848745662 ADAPTER BUS FOR 3-POLE BREAKERS

848631479 ADAPTER BUS FOR 2-POLE BREAKERS
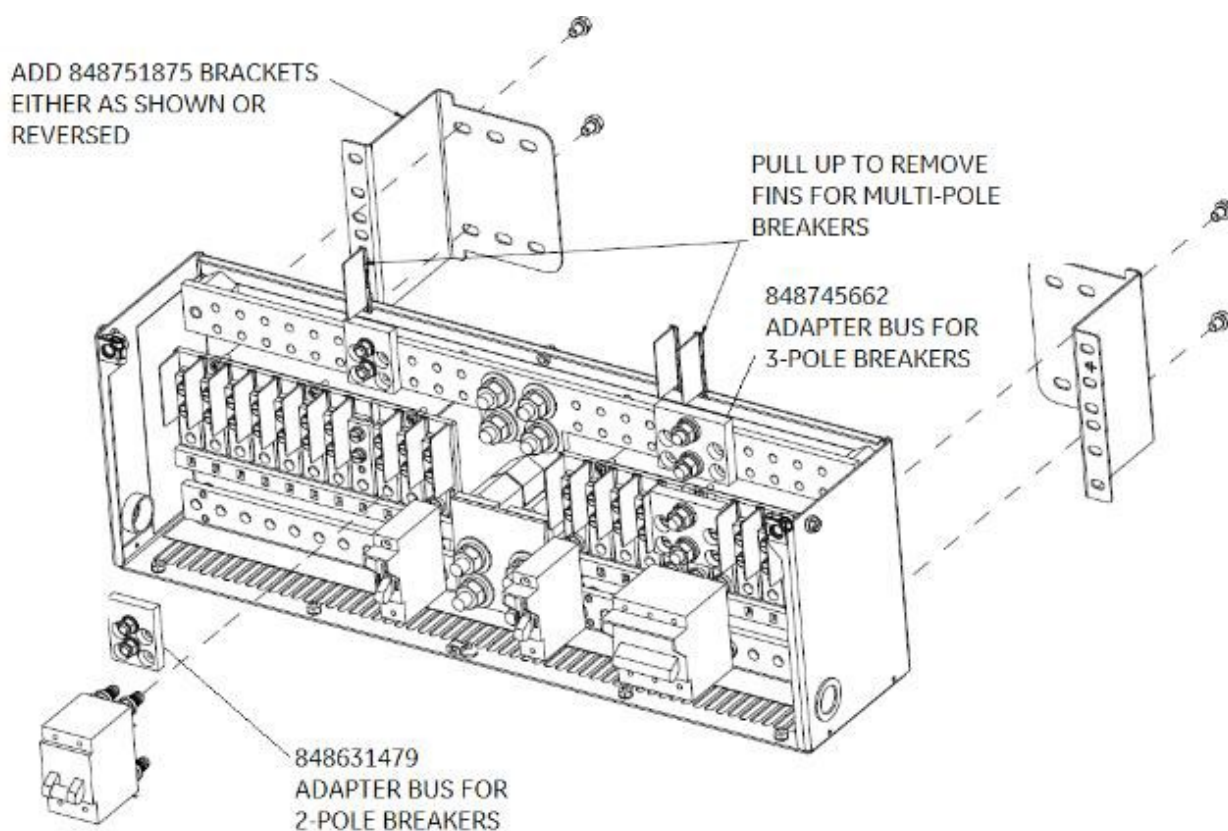
Figure 4 Accessory Items

Micro-BDCBB_QSG

Installation Notes

1. Follow all Installation Notes. Read before installing, maintaining, or repairing the equipment.

2. Follow all site specific installation notes and instructions.

3. Mount to grounded frame using 12-24 screws provided.

   Grounding for the equipment is through this connection to the frame. Make sure frame is properly grounded.

4. Do not install this equipment over combustible surfaces.

5. Follow NEC, and local and national codes and rules.

6. Use a personal ESD strap when accessing or removing electronic components.

7. Use only protectors and holders specified in the equipment Ordering Guide.

8. Size protectors (fuses or circuit breakers) as required by the National Electric Code (NEC) and/or local codes. Refer to the equipment ratings to assure current does not exceed:

   Continuous Load (List 1) - 64% of protector rating

   Maximum Load (List 2 - typically end of discharge) - 80% of protector rating.

9. Field-wired Conductors - Follow all National Electric Code (NEC) and local rules and regulations when making field connections.

   - Size field-wired conductors based on listed recommendations, National Electric Code (NEC) and/or local codes based on 70°C ampacity.

   - Insulation rating: 90°Cminimum; 105°C (minimum) if internal to enclosed equipment cabinets.

10. Bonding Network - Suitable for installation as part of either

    - Common Bonding Network (CBN)

    - Isolated Bonding Network (IBN)

11. Facilities - Suitable for installation in

    - Network Telecommunication Facilities

    - Locations where the NEC applies

12. DC Return - Isolated DC Return (DC-I) or Common DC Return (DC-C)

13. Intra-building ports - Equipment and subassembly ports are suitable for connection to intra-building or unexposed wiring or cabling. The equipment and subassembly ports can be connected to shielded intra -building cabling grounded at both ends.

Note: If a panel using the VIM1EC meter shows a "Shunt Mis-Wired" alarm message when being used in a +24VDC system, it will be necessary to swap/reverse the polarity of the monitored shunt pairs(s):

- For Shunt 1, the shunt pair is S and S/W. Cust this pair in the vicinity of J1 at the VIM1EC meter and butt-splice S to S/W and S/W to S to reverse the input signal polarity.

- For Shunt 2, the shunt pair is BL and BL/W. Cut this pair in the vicinity of J1 at the VIM1EC meter and butt-splice BL to BL/W and BL/W to BL to reverse the input signal polarity.

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Convert Battery and Return from 1 bus to 2 buses – Group 3 only

Notes: 1. Not applicable to panels with VIM1EC meter which must be factory configured for single or dual bus.
     2. Not applicable to Group 1which is single bus only.

Battery and return buses may be converted in configurations bridging bus bars.

1. Remove nuts and washers securing bridging Bus Bar.
2. Remove bridging Bus Bar.
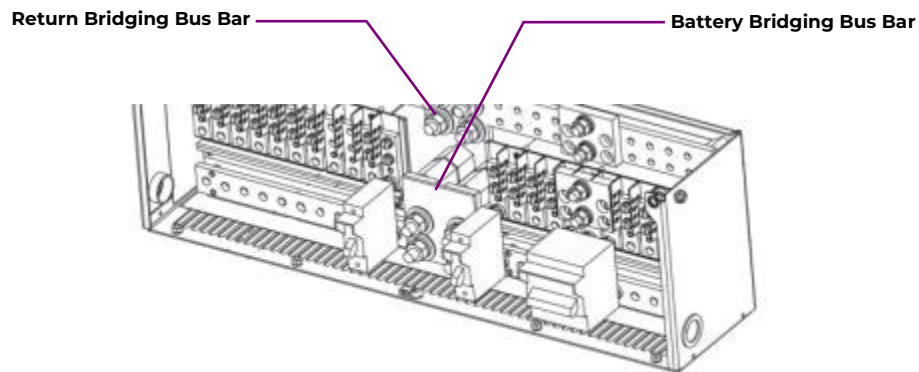3. Replace nuts and washers.
4. Torque to 120 in-lb

Return Bridging Bus Bar   **Battery Bridging Bus Bar**

Figure 5 Bridging Bus Bars

Alarm Card 477 Alarm Jumper

Not applicable to panels with VIM1EC meter.

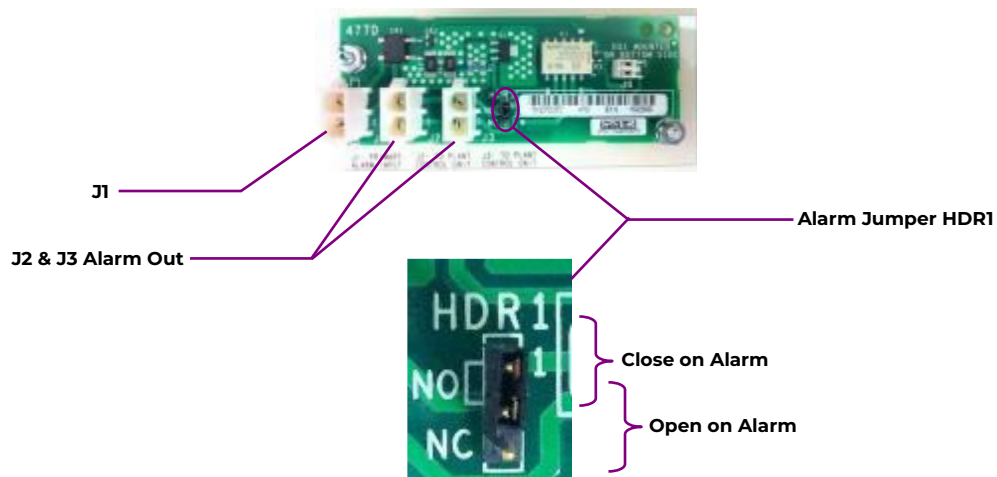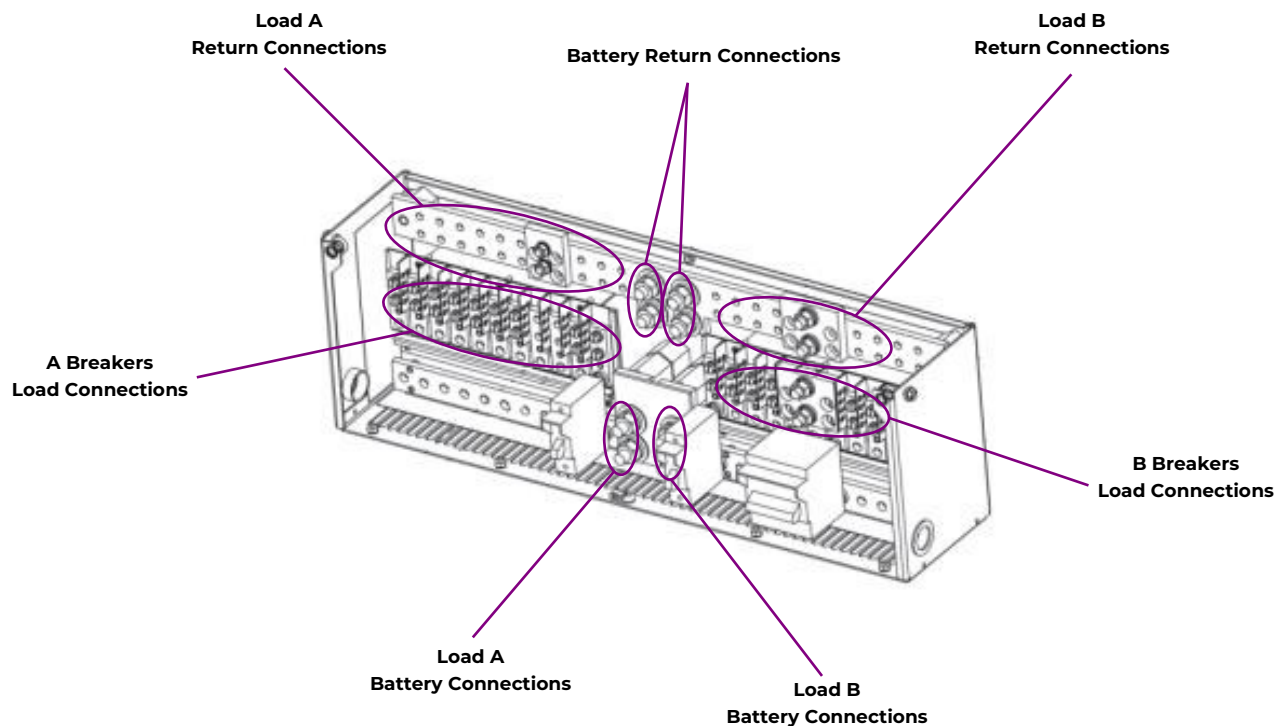Position the jumper on HDR1 for Open on Alarm or Close on Alarm.

J1

J2 & J3 Alarm Out

Alarm Jumper HDR1

Close on Alarm

Open on Alarm

Figure 6 Alarm Card

Load A Return Connections

Battery Return Connections

Load B Return Connections

A Breakers Load Connections

B Breakers Load Connections

Load A Battery Connections

Load B Battery Connections

Battery Lug Landings 3/8" on 1" centers torque 16 ft lb (22 Nm)
Breaker Load Lug Landings 5 mm (#10) on 5/8" centers torque 30 in lb (3.4 Nm)

2 Load configuration shown

Figure 7 DC Connections

Battery Connections – Loads - Figure 7

For single load configurations, A and B sections are bridged: Battery, Battery Return, Breaker Loads, and Load Returns.

1. Connect battery feeds and returns.
2. Connect Breaker loads and returns.

Breakers and Fuse Holders

1. Open Breaker Access Covers by loosening front panel screws.
2. Install protectors and protector holders
3. Close Breaker Access Covers and tighten Breaker Access Screws.
4. Install fuses into fuse holders.
5. Install multi-pole bus kits included with each protector and protector holder occupying 2 or 3 positions.

Load Connections - Figure 7

1. Connect breaker load wires to Breaker Load Connections.
2. Connect breaker load return wires to the Return Bus.

Alarm Wiring

20 AWG recommended.

1. Butt-splice office alarm wires to the provided alarm cable.
2. Connect the alarm cable connector to the VIM1EC meter or alarm card.

Alarm Cable Pinouts and Description							
VIM1EC Meter				**Alarm Card - 477**			
Pin	**Form-C Alarm[2]**	**Wire Color**		**Pin**	**Alarm**	**Wire Color**	
7	Fuse NO	Blue		J2-1	Fuse	Brown	
1	Fuse NC	White/Blue		J2-2	Fuse C	Yellow	
2	Fuse C[3]	Slate		J3-1	Fuse	Brown	
10	OVLNO	White/Slate		J3-2	Fuse C	Yellow	
4	OVLNC	Orange					
5	OVLC	White/Orange					
12	PLNO	Yellow					
6	PLNC	White/Yellow					
11	PLC	White					

[2] NO signals Open on Alarm. NC signals Close on Alarm.

[3] C signals, such as "Fuse C" are common or return signals for the similarly named signals, such as "Fuse NO".

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VIM1EC Meter

The VIM1EC can be configured to display the voltage, current, and panel identifier of each monitored load bus.

The VIM1EC display normally blinks at regular intervals.

Notes specific to application in this equipment 5067:

1. Lamp Test does not activate 5067 Alarm LED - Figure 1.

Alarm Indication

When an alarm occurs, LCD backlight on the display changes color from green (normal) to red (alarm active). The front panel text also changes from "No Alarms" to "Alarms"

Navigation Keys

Left and Right Keys are used for menu navigation. Up and Down keys are used to change the parameter values of the meter. They also allow screen contrast adjustment at:
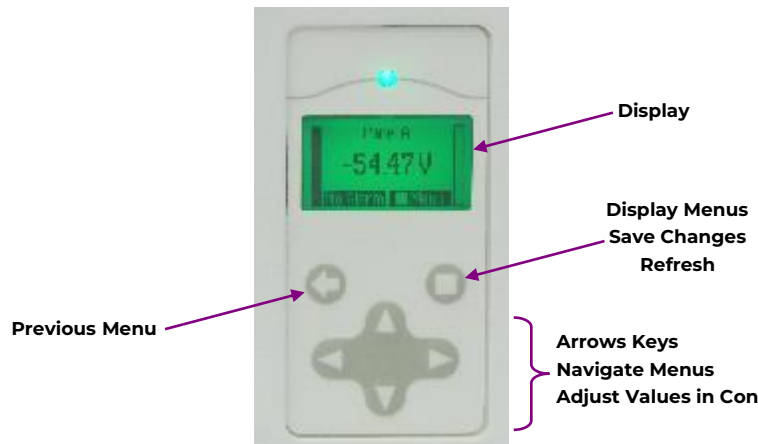
Menu ▸ System Parameters ▸ Display Contrast

Figure 8 VIM1EC Meter

Alarm and Monitoring

Visual, Audible and Remote Alarms

The VIM1EC monitor includes an audible alarm with a user configurable on/off feature. There is a form-C relay for each of the three alarms for remote monitoring.

All alarms are active when the VIM1EC is unpowered. Alarms are asserted when their relay coils are not powered.

Power Loss/Under Voltage

Generates an alarm when power is lost to a load bus or when a user configurable low voltage threshold is reached.

Overload

Generates an alarm when a user configurable current threshold is reached. A configurable time delay may also be set to avoid nuisance alarms due to bus transients.

Breaker/Fuse

Generates an alarm when either a circuit breaker trips or a fuse blows.

Network Connectivity

There are two RJ45 type connectors on the board for future use.

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Menu Map

The VIM1EC front panel is structured such there are three main menu items: System Parameters, Load Parameters, and Control/Operations. Each key menu item has sub items as shown in the menu map below.
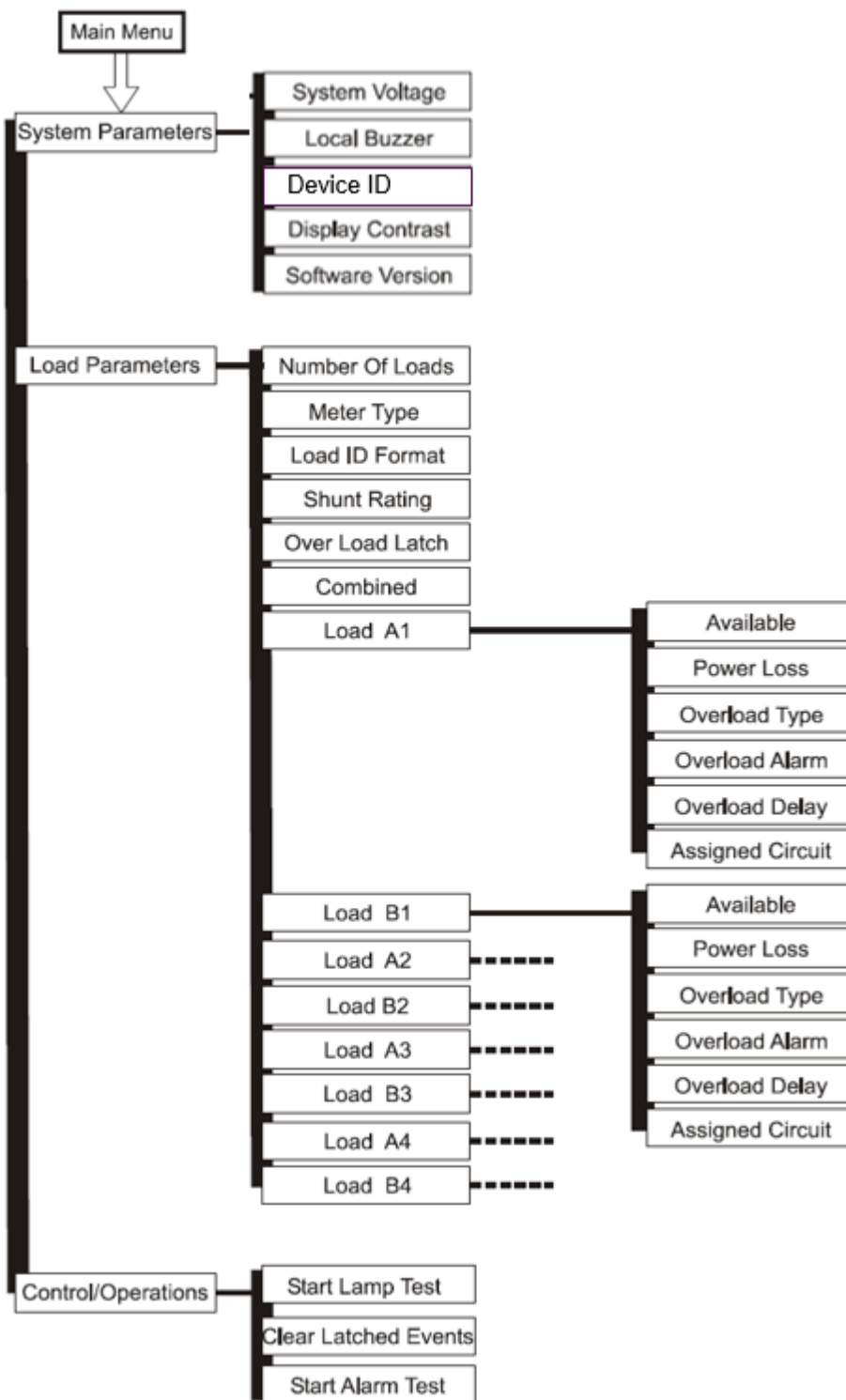
Micro-BDCBB_QSG

Programming the Meter

VIM1EC parameters like shunt size and number of load buses are preconfigured when it is factory installed in a BDFB/ BDCBB or Micro-BDFB. Only customer specific preferences need to be adjusted in the field. As a replacement or mete upgrade, the factory default settings may need to be adjusted for the application. Listed below are the configurable parameters and their associated factory defaults available through the front panel. Following the table are the typical items that need to be configured or verified in a retrofit or replacement application.

System Parameters	Description
System Voltage	Used to identify system voltage. Select able between 24V and 48V. Factory default is 48V.
Local Buzzer	Allows the integrated audible alarm to be Enabled or Disabled. Factory default is Disabled.
Device ID #	Used by system controller to uniquely identify VIM1EC device when connected for remote management. Device canbe configured from 1-16.
Display Contrast	Allows the display contrast to be adjusted for the local ambient lighting. Adjustable from 0-100% in 1% increments. Factory default is 50%.
Software Version	Displays the version of the application code running in the meter in the format (vX.Y). Version 1.5 is the latest as of this printing.
Load Parameters	**Description**
Number Of Loads	Used to identify the number of individual loads/buses in the distribution. Value configurable from 1-8. Factory default is 6.
Meter Type	Configures meter to display individual monitored bus voltages (voltage), voltages and currents (volt_curr), or only currents (current). This configuration is defined by the internal wiring of the distribution. Factory default is Voltage and Current (volt_curr).
Load ID Format	Configures display format used in referencing individual DC loads/buses. Allowable formats: A1, A, and 1. "A1" identifies loads using an A1, B1; A2, B2; … format. "A" identifies loads using an A, B, C, D … format. "1" identifies loads using a 1, 2, 3, 4 … format. Factor Default is to use the A1 format.
First Load (location)	Used to indicate where the first load in the distribution is located. Allowable configurations are: top-left, top-right, btm-left (bottom-left), btm-right (bottom- right). Every monitored shunt is considered a load. Factory default is "top-left".
Shunt Rating	Used to define the current rating of the shunt in the load bus. All shunts in the load must be of the same size. A 50mV shunt is assumed. Allowable range is 1-4000A. The factory default is 800A.
Overload Latch	A single configuration for all panels/buses that allows a temporary Over Load event to be latched. Factory default is "Disabled".
Combined Load	Displays the load value as one combined sum by adding up all shunts in the system and presenting it as values for a single load. Factory default is disabled.
Load Available (A1-A4;B1- B4)	Indicates if the load is available or in use. Allowable configurations are "installed" and "not installed". "Installed" loads imply that the load is in use. "Not Installed" loads imply that the load may be present, but it is not in use. Information obtained from the load should not be relevant. Factor default is set to be "installed".
Load Power Loss	The Power Loss (PL) alarm is triggered upon loss of the primary DC or when the individual's panels' DC input has reached the configured low voltage threshold. This Power Loss voltage threshold is configurable between 40.00-60.00V for 48V systems and 20.00-30.00V for 24V systems. Factory defaults for these thresholds are 40.00V and 20.00V, respectively.
Load Overload Type	The Power Overload Type defines whether the smart meter is to treat the Overload alarm event for a "Single Bus" or for an "Redundant Bus" configuration. The "Single Bus" configuration is based on straight Overload threshold being exceeded. The "Redundant Bus" configuration causes the VIM1EC to sum the two respective left and right load shunt measurements and compare it to the individual overload thresholds configured for the each of the respective panels in the pairing. The lowest Overload value threshold configured for the Redundant loads shall take priority and be used in the comparison. Once the "Redundant Bus" measurement exceeds this threshold, the controller asserts the Over Load (OVL) alarm. Factor default is "Single Bus" configuration".

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Load Parameters	Description
Load Overload	The Load Overload (OVL) alarm event is triggered when any measured panel currents exceed their respective configured thresholds. These OVL thresholds can be configured from 1-4000A. Factory default is 800A.
Load Overload Delay	An Overload Delay can be set to prevent nuisance alarms. This delay is configurable between 0-300 seconds. Factory default is 0 seconds.
Assigned Circuits	The VIM1EC has eight individual load circuits with each circuit having voltage and shunt measurement capability. These circuits are pre-wired with fixed positions in the Lineage BDFB/BDCBBs. If circuit wiring from the VIM is redressed in the field this feature can be used to assign the appropriate circuit to the new load location. Note: in the 6-load H569-445 circuits 1-6 are attached in a descending order viewing from the front of the system in a top left to right numbering scheme. The VIM1EC will automatically assign the right circuit if only the first "Load Location" is utilized and the internal wiring is not touched. Note: if wiring has been rearranged details of the circuit connections can be seen in T83150-30.

Control and Operations Parameters	Description
Start Lamp Test	Cycles the illumination of the front panel LED and Backlight through Red, Amber, and Green
Clear Latched Events	Clears a latched Overload Alarm event. Note the Overload Latched Event must be enabled to have a latched alarm.
Start Alarm Test	Asserts Form-C alarms available at connector J3 ina fixed sequence: Fuse Alarm (FA), Power Loss (PL), and Overload (OVL). Alarm asserted is displayed on the front panel. Feature can be used to test the site's remote monitoring systems and wiring.

Configuring the VIM1EC For Controller Connectivity

The VIM1EC has two shielded RJ45 connectors (figure 9) located on its top-rear that allow connecting the meter to a OmniOn Power™ Galaxy Pulsar Plus or Galaxy Millennium 2 system controller through a cat-5 style communication cable. These two system controllers can be part of a standard DC system where the controller is managing OmniOn Power™ rectifiers or in a Standalone monitoring arrangement where there are no OmniOn Power™ system rectifiers but only ED83368 distribution panels with VIM1ECs. The communication bus utilized is an internal RS485 operating with OmniOn Power™'s proprietary Galaxy Protocol. Providing VIM1EC connectivity to a system controller allows VIM information and alarms is to be managed remotely.


Figure 9 VIM1EC Meter RS485 Connection

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Configuring/Verifying Reference Jumper Settings

To utilize this connectivity, there are two jumper settings on the VIM1EC that must be set properly before connecting the VIM meters to the controller's communication bus. These jumpers reside behind the back cover of the VIM1EC and are used to provide a physical reference for the RS485 communication link. Setting the jumper position is based on the system rectifiers and DC bus potential. Note: Improper settings of these jumpers can result in damage of the RS485 communication circuitry on the VIM, controller, or both when connected.

Remove the three Philipps screws and cover to gain access to the 3-pin J10 and J11 headers on the VIM1EC circuit pack. Note: a future enhancement will allow the cover to remain intact and while making the jumpers accessible. Figure 10 shows the two jumpers with pin 1 identified.

- The factory default position of the jumpers for VIM1EC J10 and J11 header is positions 1/2. This setting coincides with the correct settings for Power Plants with Millennium 2 or Pulsar Plus DC controllers managing 595 (GPS), or GP100 rectifiers, Dual Voltage NE INFINITY Systems (Converters), BP040 System With a Pulsar Plus Controller.

- For VIM1ECs in Power Plants with system controllers managing EP (SPS), QS (CPS), or CP (CPL) family of rectifiers the jumpers shall be placed in position 2/3 on J10 and J11 and Single Voltage NE INFINITY System (No Converters).

- For systems where there are no OmniOn Power™ rectifiers and/or a OmniOn Power™ controller is dedicated to operate as a "Standalone" distribution monitor that is connected only to the system VIM1ECs set the jumpers to position 2/3 on J10 and J11.
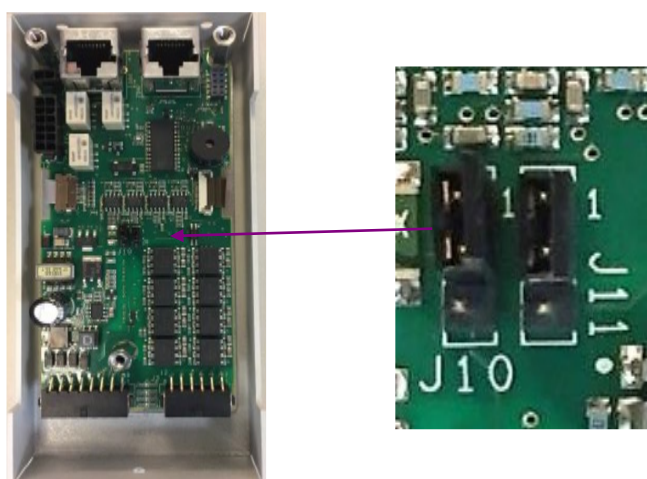
Figure 10 VIM1EC J10 And J11 Settings

The following table summarizes the required jumper settings.

SYSTEM RECTIFIERS	JUMPER POSITION	
	J10	J11
STAND ALONE (CONTROLLER ONLY/NO RECTIFIERS)	2 / 3	2 / 3
595 (GPS); GP100; Dual Voltage NE INFINITY Systems (Converters); BP040 System With a Pulsar Plus Controller	1 / 2	1 / 2
EP (SPS); QS (CPS); CP (CPL); Single Voltage NE INFINITY System (No Converters)	2 / 3	2 / 3

Setting The VIM1EC Device ID

In order to connect the VIM1EC to a system controller RS485 GP bus the VIM1EC must be able to be uniquely identified by the controller. To configure a unique ID for the VIM1EC go to the front panel Menu →System Parameters →Device ID #. Enter the menu and set the ID to a unique value between 1-16 (generally start with 1) and save the configuration. Repeat the configuration to each VIM1EC in the system.

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Connecting The RS485 (GP) Communication Bus

For Standalone controller to VIM1EC operation, make sure the controller's appropriate RS485 GP communication reference lead is properly connected to the correct DC bus potential prior to making the communication cable connections. As with the jumper settings, this reference lead (Part of the power cable connection) either connects to the DC- or DC+ bus based upon rectifier connectivity or Standalone operation. The RS485 GP Communication reference lead is found on pin 2 of J9 on the Pulsar Plus NE843 controller or pin 3 of P6 on the Millennium 2 controller. Connect/Verify reference lead connection per table below. Consult appropriate controller manuals or technical field support for additional information as required.

| SYSTEM RECTIFIERS | Controller / Connector | |
	Pulsar Plus J9.2	Millennium 2 P6.3
STAND ALONE (CONTROLLER ONLY/NO RECTIFIERS)	Connected To DC-	Connected To DC-
595 (GPS); GP100; Dual Voltage NE INFINITY Systems (Converters);	Connected To DC+	Connected To DC+
EP (SPS); QS (CPS); CP (CPL); Single Voltage NE INFINITY System (No	Connected To DC-	Connected To DC-

With the system controller connections verified, VIM1EC jumpers and ID properly set, and both units powered, the VIM1EC is ready to be connected to the controller's system communication bus. For Standalone Controller configurations, the communication connection can be made by simply using straight-thru cat-5 style cable to connect between one of the RS485 ports on the VIM1EC to port J10 on the Pulsar Plus (Figure 12) or on P9 for the Millennium 2. Use the second VIM1EC RS485 port to connect additional VIM1EC in a daisy-chain fashion. Note: Although not needed in many cases, it is recommended for long cable runs (>50') with multiple VIM1ECs (>5) that the last VIM1EC connected have a RS485 bus termination resistor 450050642 installed in the unused RS485 port. In power systems with OmniOn Power™ rectifiers managed by a system controller, the communication connection may not be directly to the controller and will have the be looked at on a per systems basis.
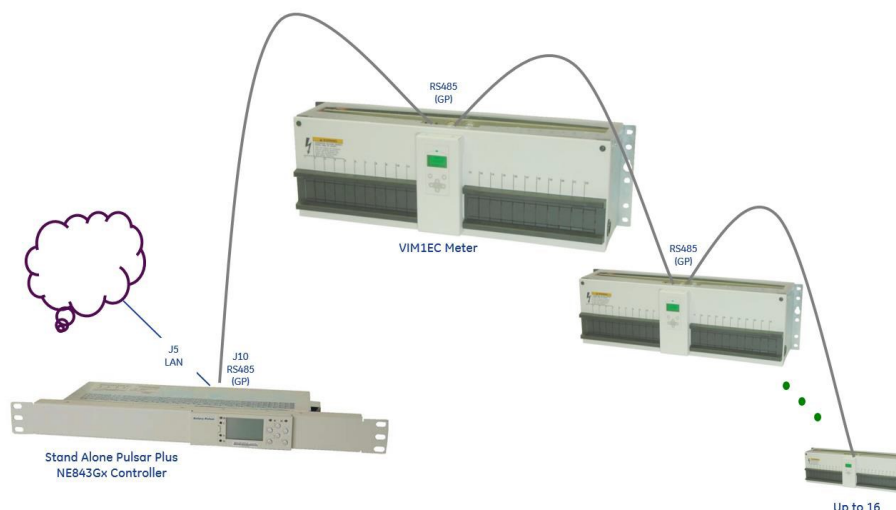
Figure 12 Standalone Pulsar Plus Monitoring VIM1EC ED83368 Panels

Bullet Style Load Circuit Breakers

Ordering Code	Amperage	CB Positions (Poles)	Min. Wire Gage
407998137	3	1	10
407998145	5	1	10
407998152	10	1	10
407998160	15	1	10
407998178	16	1	10
407998186	20	1	10
407998194	25	1	10
407998202	30	1	10
408213486	40	1	8
407998210	45	1	8
407998228	50	1	6
407998236	60	1	6
407998244	70	1	2
407998251	80	1	2
407998269	90	1	2
407998277	100	1	2
CC848808551	100	2	2
408185353	125	2	2
408185346	150	2	1/0
408564941	200	3	2/0
408573975	225	3	4/0
408535752	250	3	4/0

Multi-Pole Adapter Bus Kits – 2 per multi-pole breaker

Ordering Code	CB Positions (Poles)	Hardware Included
848631479	2	5/16" on 1" centers
848745662	3	5/16" on 1" centers

Bullet Style Fuse Holder and TPS/TLS

Ordering Code	Amperage
406700567	3
406700583	5
406700591	6
406700609	10
406700617	15
406700625	20
406700633	25
406700641	30
406700658	40
406700674	50
406700682	60
406700690	70
CC408618020	80
CC408618037	90
CC408618045	100
CC408618061*	125
402328926	0.18 Alarm Fuse
408548944	Bullet Fuse Holder, TFD-101-011-09 (Alarms on Blown Fuse or Fuse Head Removal)
CC408617410	Bullet Fuse Holder, TFD-101-011-10 (Alarms on Blown Fuse Only)

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Bullet Style GMT Fuse Holder and GMT Fuses	
Ordering Code	**Amperage**
405006222	0.25A
406976894	0.5A
405673146	1.33A
405181983	2A
406976985	3A
406159061	5A
405725433	7.5A
406159236	10A
406473959	12A
CC109103157	6-pos GMT Bullet Fuse Holder, requires 2 positions
408515823	Fuse Puller

* Maximum of 3 125A fuses per side. A space must be left between each fuse.

OmniOn Power Inc.

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