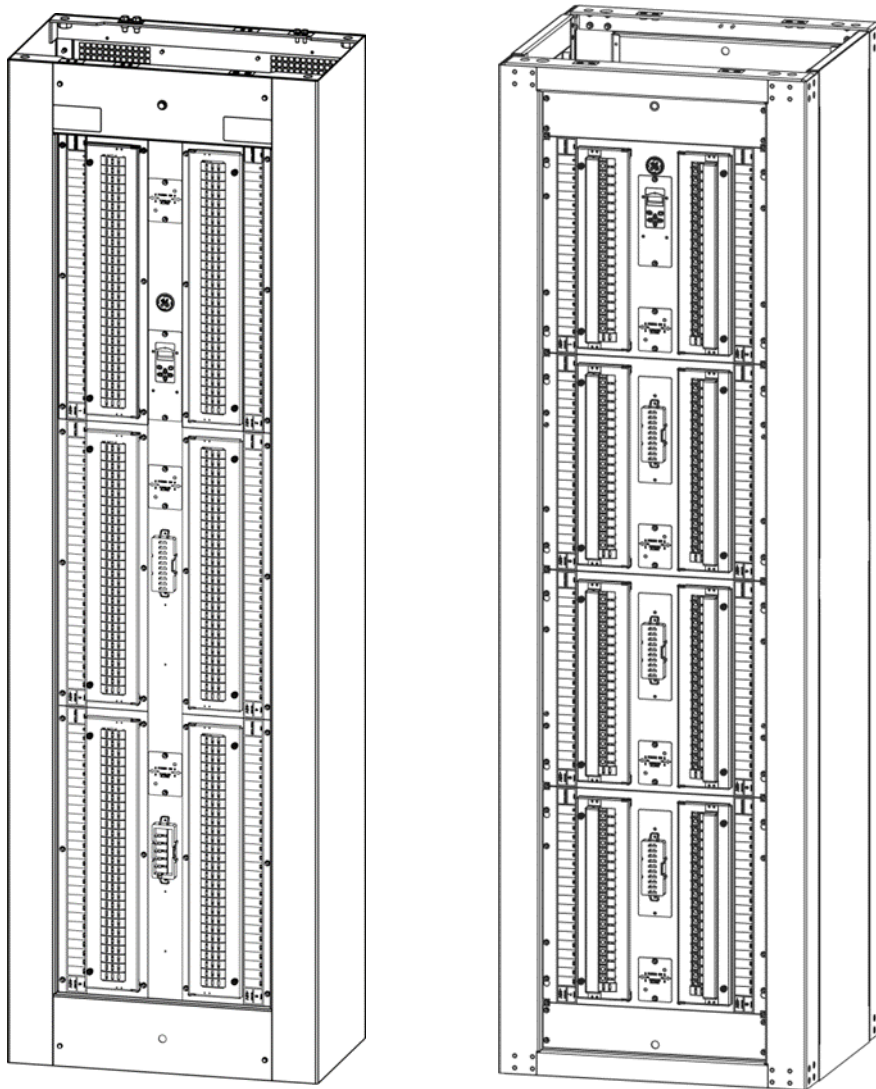


H569-445 Battery Distribution Fuse / Circuit Breaker Bay (BDFB/BDCBB)



Document: 850018552

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Introduction

Customer Service Contacts

Customer Service, Customer Training, Technical Support, Product Repair and Return, and Warranty Service.

Services provided include initiating the spare parts procurement process, ordering documents, product warranty administration, and providing other product and service information.

OmniOn Power™ Energy phones are staffed from 7:00 am to 5:00 pm USA Central Time Zone (GMT -6), Monday through Friday, on normal business days. At other times, this number is still available, but for emergencies only.

Calling from	Phone Number
United States, Canada, Puerto Rico, and the US Virgin Islands	+1 888 546 3243
All other countries	+1 972 244 9288 Or USADCC ¹ +1 877 546 3243

Or contact your local field support center or your sales representative to discuss your specific needs.

¹The USA direct country code for the country where the call is originating.

On-Line Power Systems Product Manuals and Software

Product manuals, product line brochures, and software are available on-line.

Software includes Easy View and SNMP MIB.

omnionpower.com

Product Description

Overview

This manual describes the OmniOn Power™ H569-445 Secondary DC Power Distribution Bay. This Battery Distribution Fuse Bay (BDFB) or Battery Distribution Circuit Breaker Bay (BDCCB) serves as a secondary fuse or circuit breaker distribution center for - 48V DC power delivered from a central office battery plant.

Cabinet

- 7-foot tall
- seismic zone 4
- extensions available for 9 and 11-1/2 foot applications (G7 and G8)

Load Buses

- 800A each G7 and G8 - up to 6, G101 and G102 up to 8
- each fed by a battery plant fuse or circuit breaker
- each feeding one or more Distribution Panels

Distribution Panels

- G7 and G8 - up to six, 28 positions each, G101 and G102 up to eight, 20 positions each
- one or more Distribution Panels per Load Bus
- alarm lights and signals individual to each panel

Protectors

- Fuses or Circuit Breakers
- No position or spacing restrictions
- Fuses: TPS or TLS up to 125A
- Circuit Breakers up to 250A

Cabling

- Top or Bottom fed Input and Output cabling without reconfiguring the cabinet.

Return Bars

- Optional internal 2-hole ground bars
- Optional external ground bars mounted to overhead framing or cable rack

Monitoring - VIM1EC Smart Monitor (standard)

- Voltage and Current of each load bus or combined current of entire BDFB
- Alarm Status – Red backlight and LED
- Alarm Contacts: Fuse Alarm, Power Loss, Overload
- Redundantly Powered – Load Bus A and Load Bus B and ABS input
- Configurable for numerous BDFB applications

OmniOn Power is a trademark of OmniOn Power Inc. All other trademarks belong to their respective owners.

Panel Positions and Labeling

The cabinet is configured for either top or bottom cable entry. The following figures show the default labeling orientation used for top and bottom fed BDFB's. Load Bus designations (A, B, C, D, etc.) are stamped on the labels and the VIM1EC meter is programmed to reflect the Load Bus designations.

A label set is provided for customer specified position labeling: 850018546 for G7 and G8, 850044737 for G101 and G102. If the Load Bus designations change, the VIM1EC meter must identify the new location.

Menu ▶ Load Parameters ▶ First Load locates Load Bus A as upper-left, upper-right, lower-left or lower-right.

Menu ▶ Load Parameters ▶ Number of Loads identifies the number of load shunts in the BDFB.

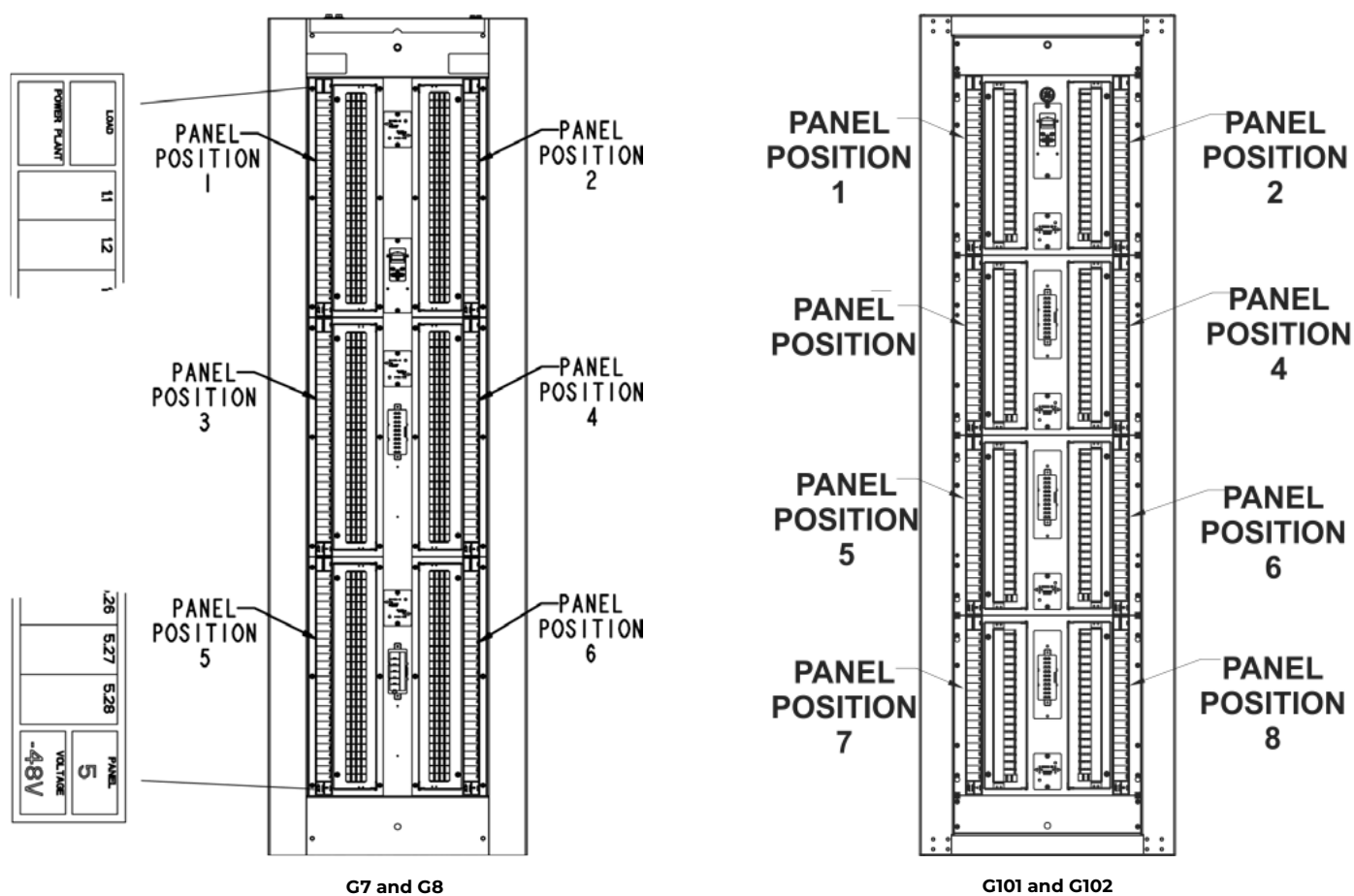


Figure 1 Panel Positions - Top Feed

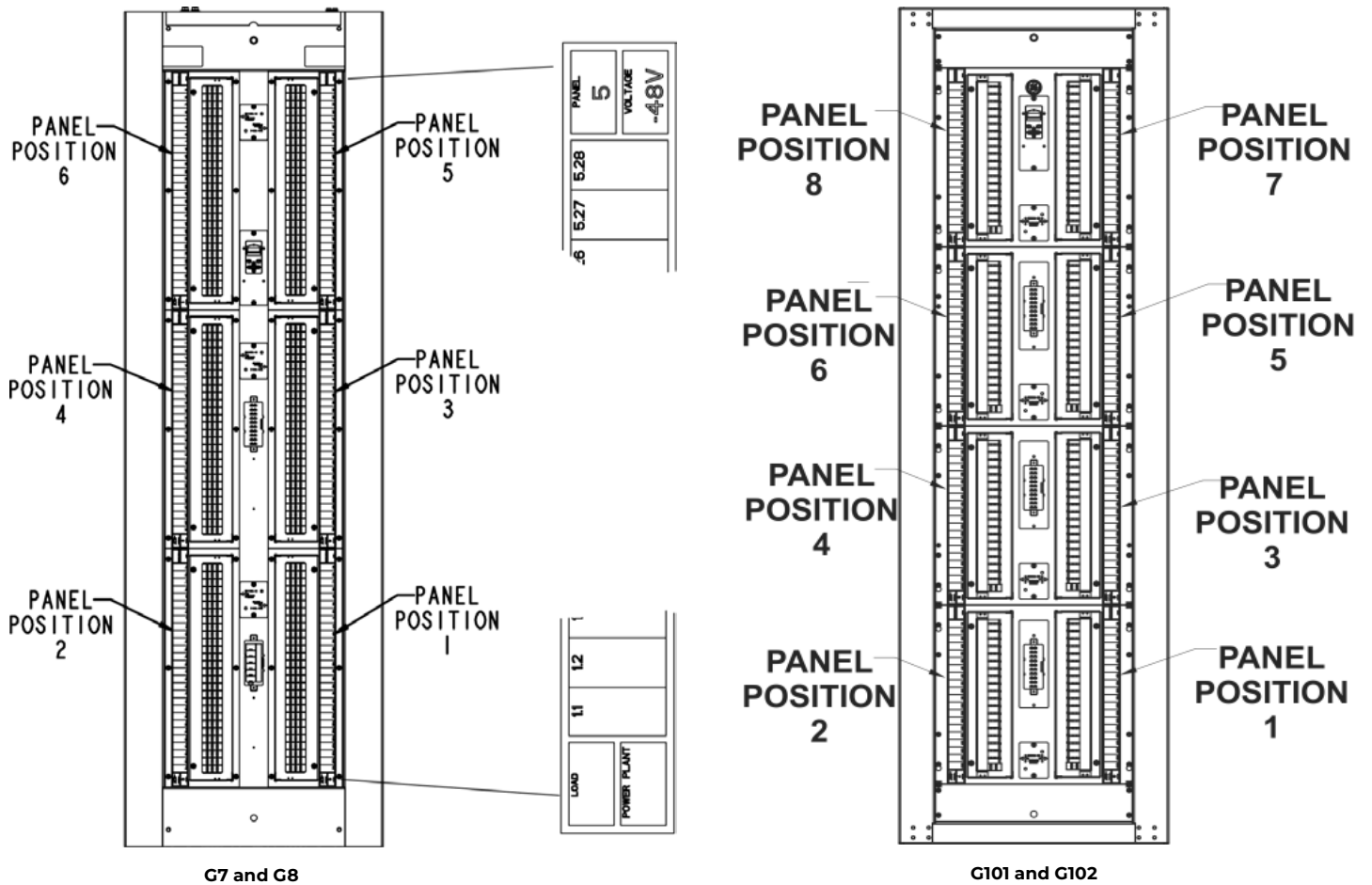


Figure 2 Panel Positions - Bottom Feed

Load Bus Arrangements

A load bus is defined as one or more panels protected by a single circuit breaker or fuse at the battery plant. Cable from the battery plant is terminated at Load Shunt Bus Details rated for 800 amperes. (Two 750 kcmil feeder cables are required per shunt for currents larger than 500 amps per shunt.) 3/8 inch hardware is provided for this connection. The cabinet may be equipped for 2, 4 or 6 loads. In 2 or 4 load configurations a bus bar link connects some panels together vertically. The 800 ampere capacity per load bus applies even if multiple fuse panels are connected together.

When internal return buses are ordered, load return bus details will be located either at the top or the bottom of the cabinet as shown depending on if a top cable feed or bottom cable feed was ordered. These may easily be unbolted and moved if the application requires. 3/8 inch hardware is provided for load return cables.

Note: All bus bars are copper with a bright tin finish.

Bus bars do not require buffing or the application of NO-OX before connection to terminal lugs or other bus bars.

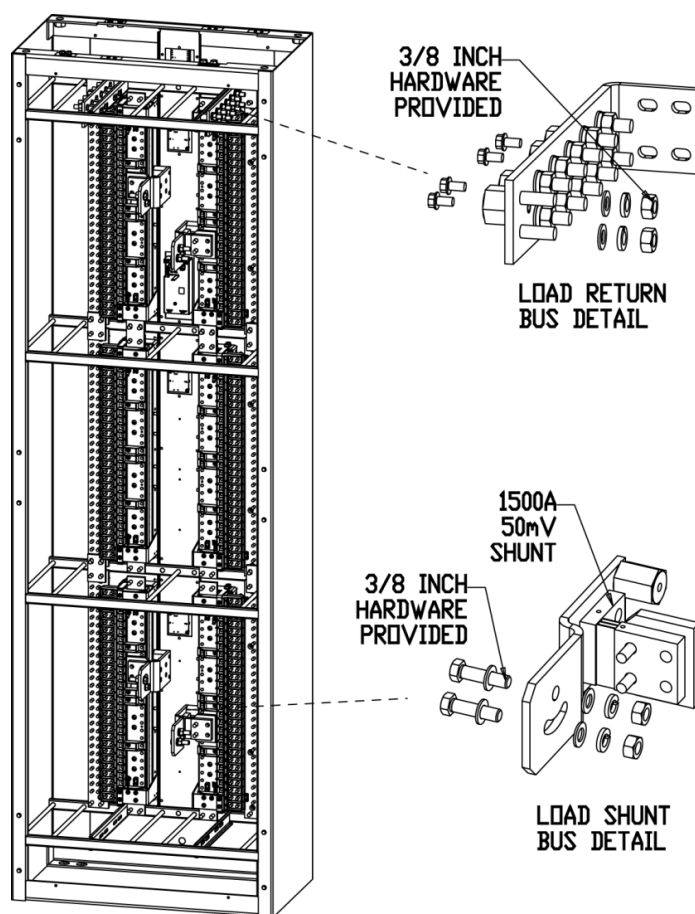


Figure 3 Load Connection Points G7 and G8

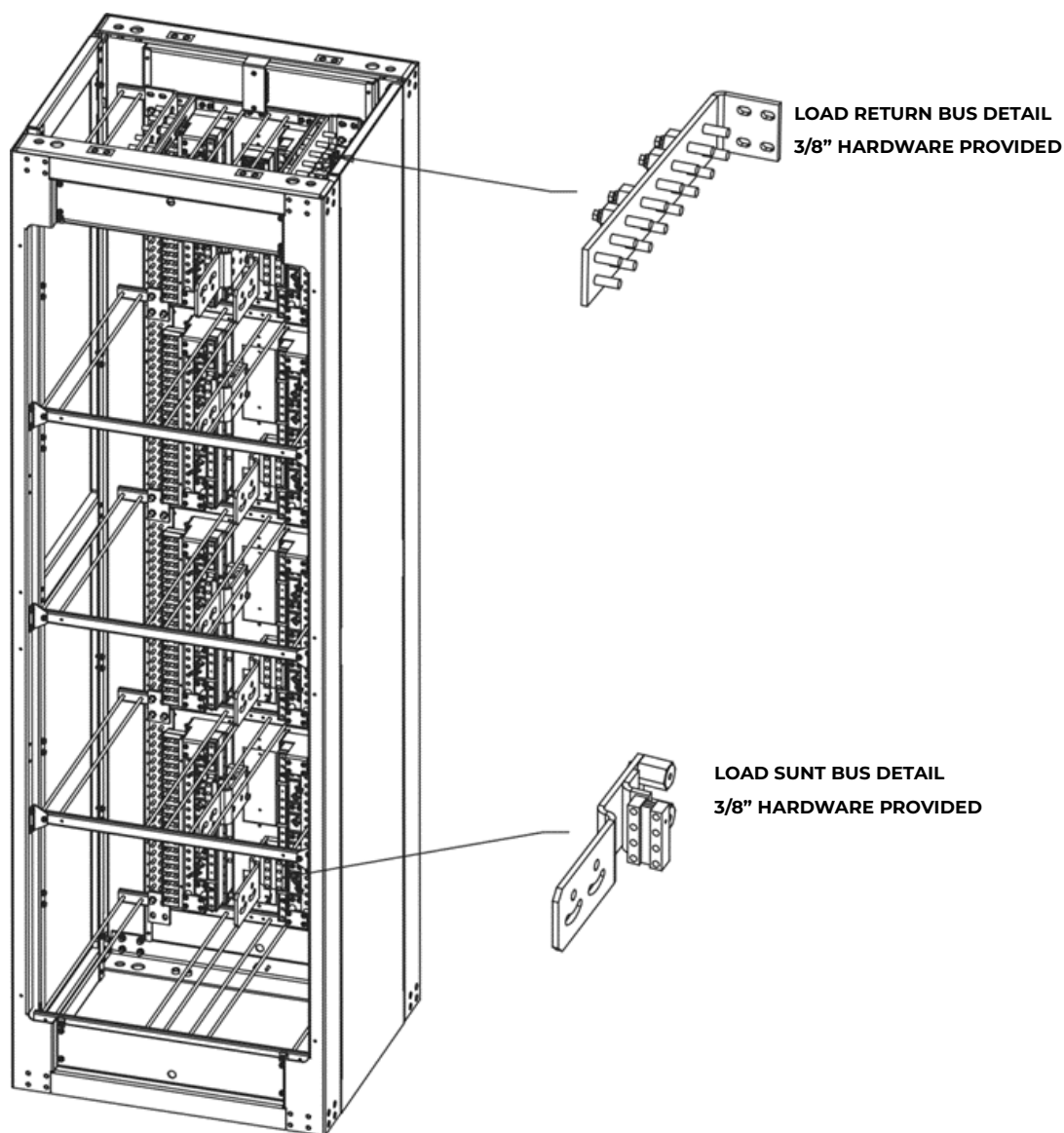


Figure 4 Load Connection Points G101 AND G102

Load Shunt Bus Rearrangement

Sometimes it may be necessary to reconfigure a BDFB in the field. Two common changes are converting two load BDFB's from top feed configurations to bottom feed configurations and changing from a 2-load to a 4, 6, or 8-load BDFB. Additional Load Shunt Bus Kits as shown on Figure 3 and Figure 4 may be purchased separately.

Distribution Panels

- Bullet positions per distribution panel
 - G7 and G8 28
 - G102 and G102 20
- Bullet-style circuit breakers and fuseholders install in any position with no spacing restrictions.
 - Single-pole breakers through 100A
 - Two-pole breakers through 150A
 - Three-pole breakers through 250A
 - Fuse holders for fuses to 125A

Installation Notes:

1. Breakers/fuse holders can only be installed one way or
2. Insert each breaker/fuse holder with its alarm pin inserted into the outer alarm pin opening².
 - The hinged panel door will not close properly if a breaker/fuse holder is not properly installed.
3. Un-snap and remove plastic slot fillers in the panel doors as breakers/fuse holders are installed. Store excess slot fillers in the hardware bin in the back of the cabinet.
4. Ignore Line and Load markings on breakers and fuse holders. They are not consistently applied by all manufacturers.

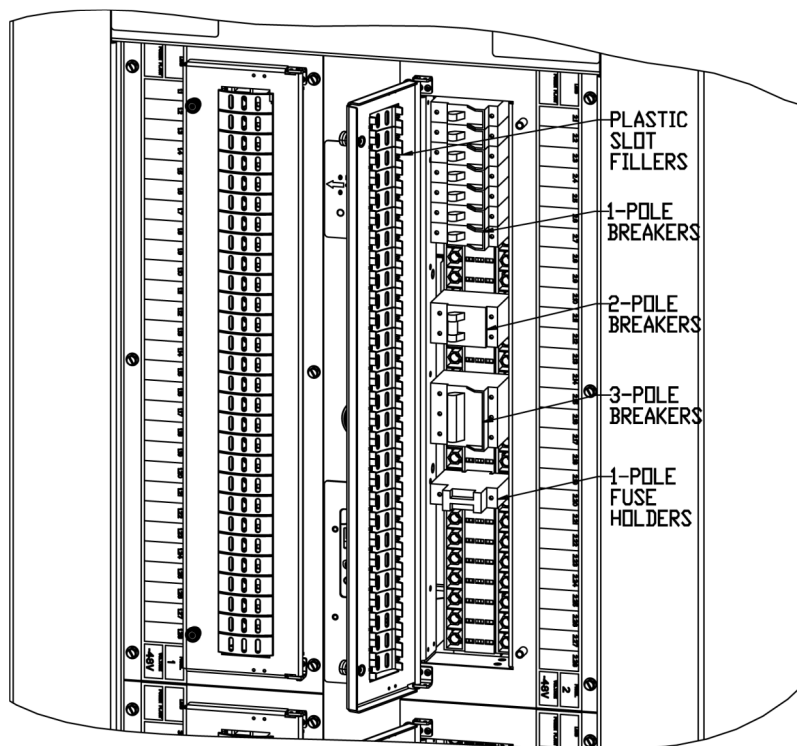


Figure 5 Installing Breakers / Fuse holders (28 position shown)

²Each distribution position has three alarm pin openings. The outer alarm opening is the alarm output. The inner two openings are provided because some breaker styles have additional pins that require alarm power to generate the output alarm.

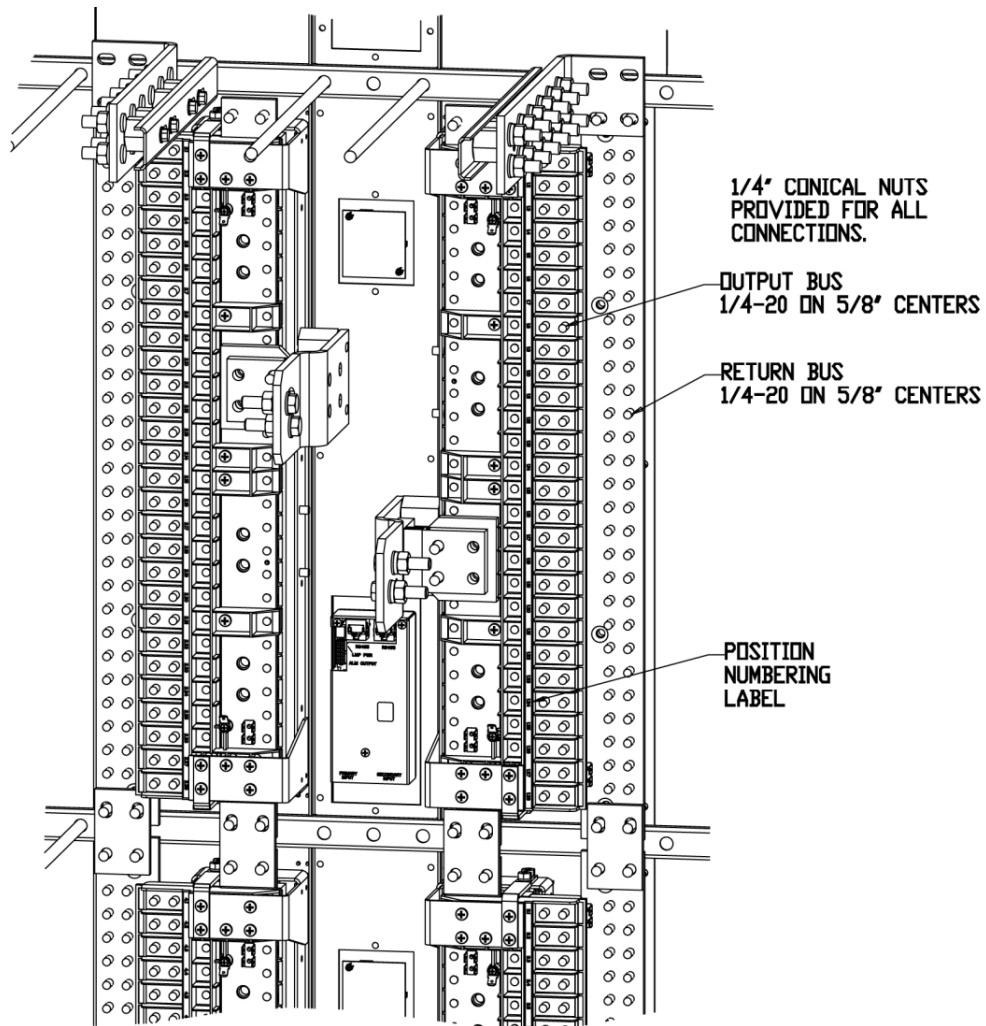


Figure 6 Distribution Connections G7 and G8

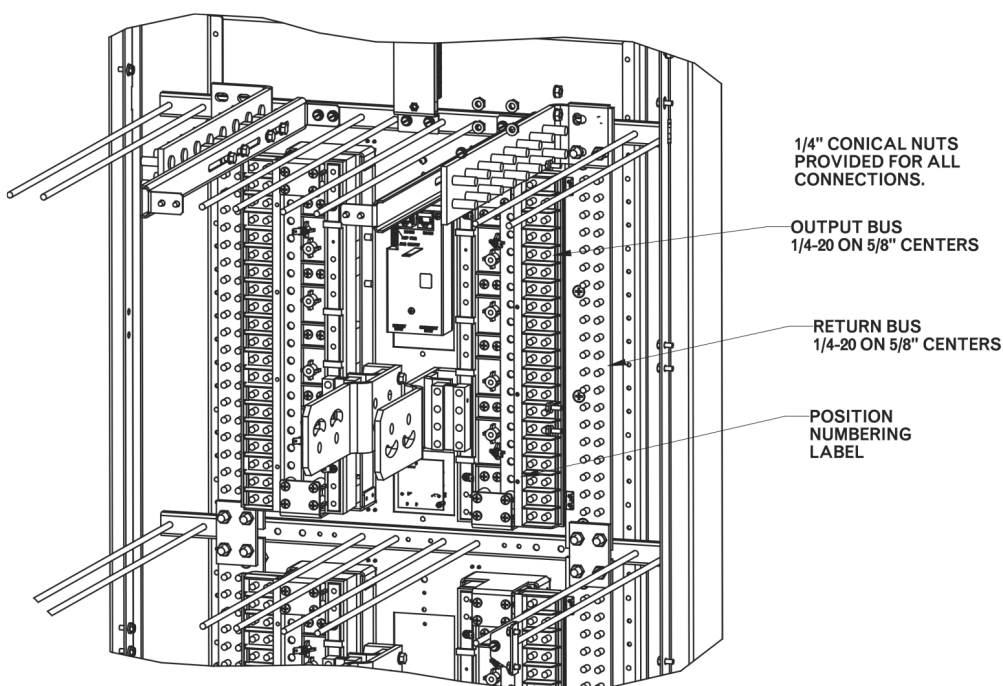


Figure 7 Distribution Connections G101 and G102

Two-pole breakers require two 850019325 2-pole adapter bus kits. Three-pole breakers require two 850025679 3-pole adapter bus kits. They attach to the distribution panel as shown below. The bus has 3/8-16 studs on 1 inch centers. Hardware is included. Terminal lugs are sold separately.

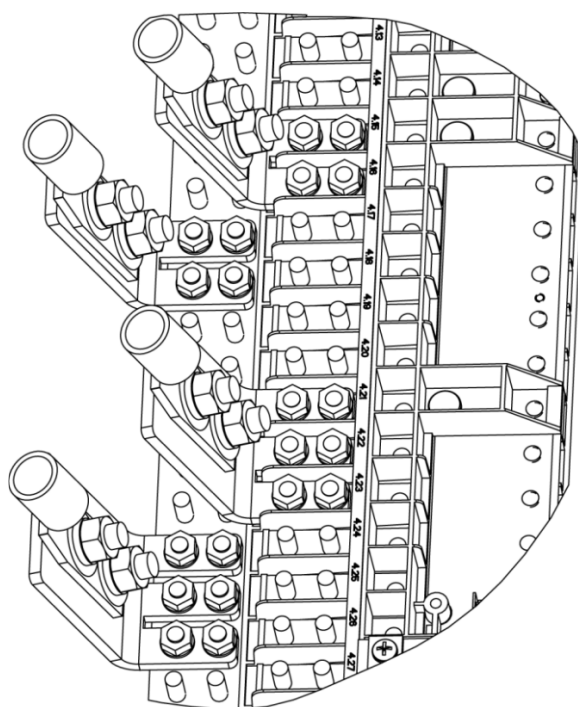


Figure 8 Two-Pole and Three-Pole Adapter Bus Kits

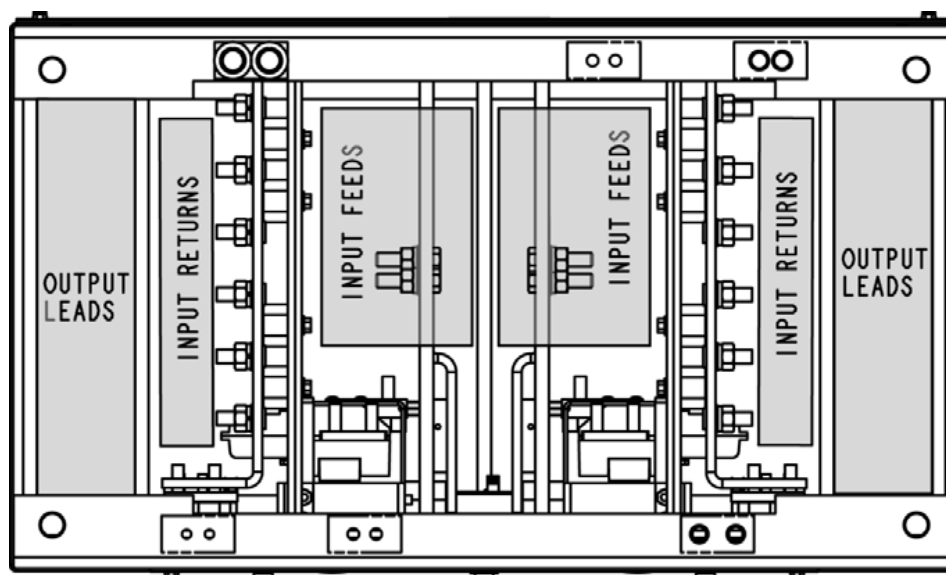


Figure 9 Distribution Cable Routing

Discharge Return Bus Options

Discharge return bus options for terminating fuse or circuit breaker return leads may either be internally mounted in the cabinet or externally mounted outside the distribution bay on a cable rack.

Internal

The internal discharge return bus bar option terminates return cables from the battery plant at the top (and/or bottom) of the cabinet as shown in Figure 6 and Figure 7. There is a left-side bus that interconnects to return bars mounted on the left mounted fuse or circuit breaker panels and a right-side bus for the right mounted panels. The bus at the top of the cabinet is designed for terminating six or eight 3/8 inch double-hole terminal lugs on 1 inch centers with a tongue width up to 1.7 inches wide. Each panel mounted discharge return bus is designed for terminating up to 2 gage cable with 1/4 inch double-hole terminal lugs on 5/8 inch centers.

Advantage: The advantage of internal returns is that load leads are paired at the fuse or circuit breaker and eliminates the need for identification tags on each return lead.

Drawbacks: Both the top and bottom input return connections are required to reach BDFB full output capacity.

Return capacity limit per side:

only Top OR Bottom Return Bar Connections: G7 and G8 – 1200A G101 and G102 – 1600A

both Top AND Bottom Return Bar Connections: G7 and G8 – 2400A G101 and G102 – 3200A

Cable congestion resulting from twice the number of leads in the distribution bay.

For these reasons, the internal discharge return option is recommended only for applications with smaller ultimate capacities. For most applications, the external return bus option is recommended.

External

The external discharge return bus bar options are shown in Figure 10 and Figure 11. The external bus is mounted on a standard 15 or 20 inch ladder type cable rack. ED83019-50 Group 13 (150021156) and Group 13A (150021157) are rated for 2400 amperes of current. Option 150021156 provides the first bus bar and the cable rack mounting hardware. Option 150021157 provides a bus bar, the connecting bus bar and insulating standoffs for stacking additional tiers as required. Refer to ED83019-50 drawing for other ground bar options.

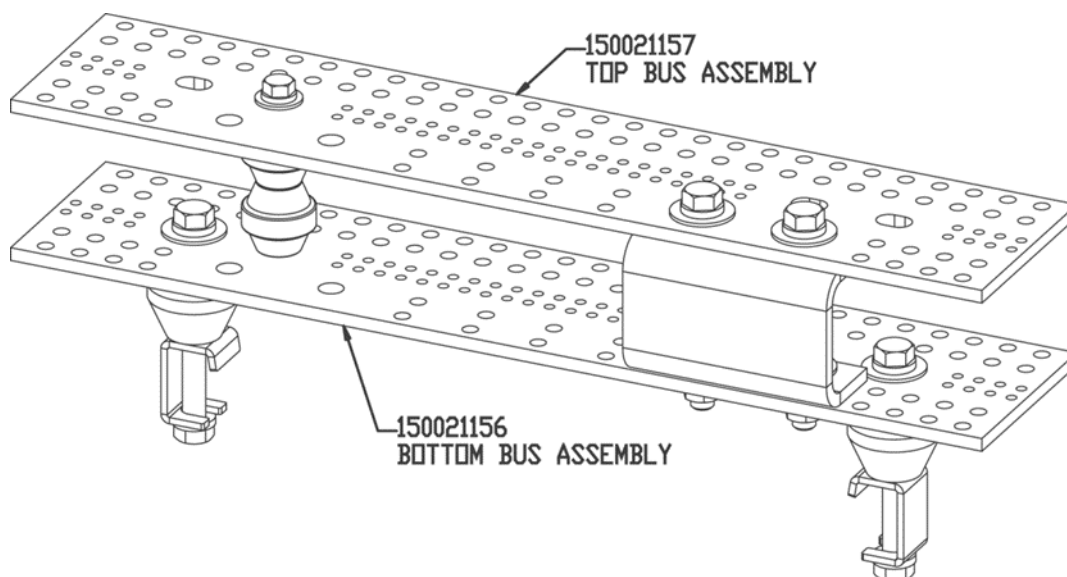


Figure 10 External Discharge Return Bus Options on Cable Rack

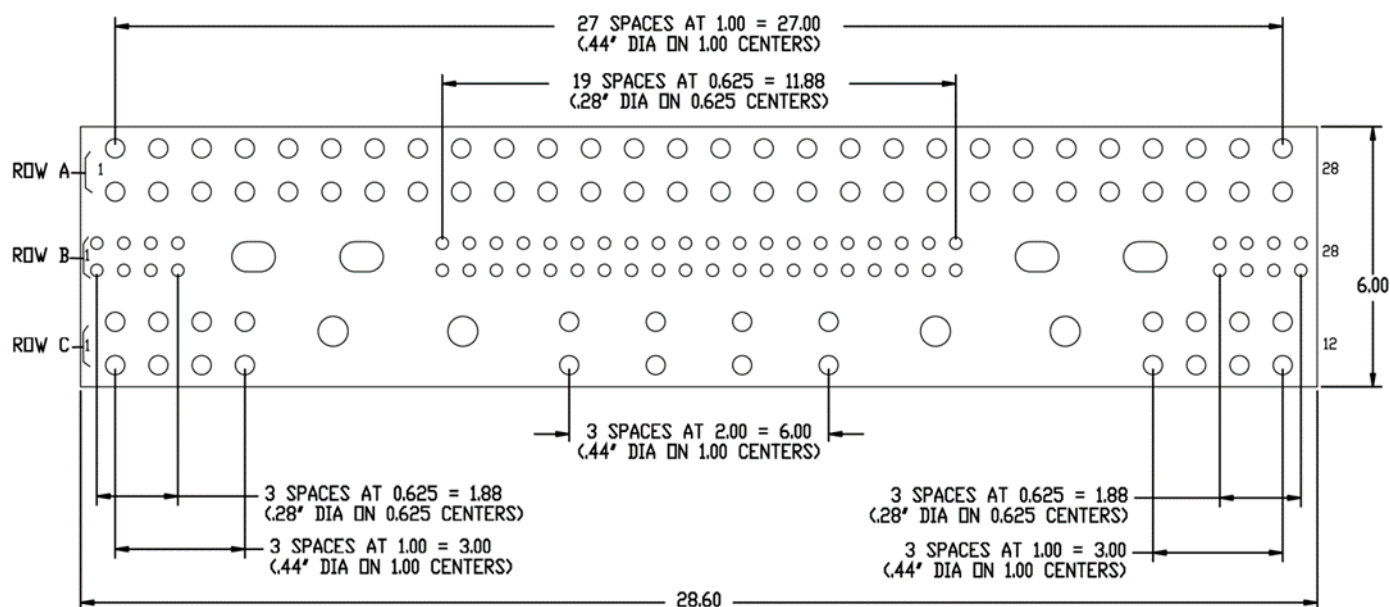


Figure 11 Bus Bar Hole Pattern and Numbering Schemes

VIM1EC Meter

Each load bus is equipped with a shunt: 1500 A for G7 and G8, 1600 A for G101 and G102. The VIM1EC monitors these shunts to determine actual currents and the remaining capacity of each load bus.

VIM1EC features include fuse/breaker alarms, power loss alarms, individually configurable overload thresholds, individually configurable power loss, audible, and remote form-C output alarms. The VIM1EC receives redundant power from the A and B panels and external ABS.

Voltage and Current - VIM1EC displays voltage, current, and identifies each monitored load bus³.

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

Menus and Keys – Menus are structured with 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. Left and Right keys are used to navigate the menu. Up and Down keys are used to adjust the parameters. The VIM1EC includes an audible alarm with a user configurable on/off feature.

³ The default VIM1EC screen displays the label "Panel", rather than "Load Bus", before the Load Bus identifier.



Figure 12 VIM1EC Smart Meter

Alarm Connections and ABS Power

At the top of the cabinet is a Customer Interface Board for connecting Output Alarms and Alarm Battery Supply (ABS) to redundantly power the alarms and the VIM1EC meter.

The VIM1EC receives redundant power from panels 1 and 2 as well as an external ABS connection, so the ABS connection is not mandatory for proper operation but some customers require its use.

A Return connection is required for operation of the meter and alarms. The Return connection on the Customer Interface Board is factory wired when internal return buses are ordered, otherwise it must be field wired to the external return bus.

- Contacts are rated for 60V, 1/2A.
- Maximum wire size to the terminal blocks is 12 AWG.

Alarm Outputs consist of single form-C contact for

- Power loss
- Current overload
- Fuse/breaker alarms

Note: there are two connection points for FAJ/CB but they are connected to the same form-C contact.

Installation

Preparation

Safety

Read and follow all safety statements, warnings, and precautions in the Safety section of this manual and manuals of all other equipment before installing, maintaining or repairing the equipment.

Installation Tools and Hardware

You will need the following tools and hardware to install the BDFB:

- Material-handling equipment to unload the cabinet at the installation site, remove from shipping container, and set in final position [minimum lifting capacity: 500 lbs. (227Kg)] Note: Use the equipment weights and dimensions as a guideline for choosing material-handling equipment.
- Digital multimeter (DMM) with 0.05% accuracy on dc scale
- Insulated hand tools
- Screwdrivers (flat-blade and Phillips)
- Wire cutters and stripper
- Crimp Tools
- Drill and Drill Bits to install floor anchors
- Torque wrenches 25-720 in-lb
- Sockets: 5/16", 7/16", 9/16", 3/4", 15/16", 19mm

Table 1 Torque Settings		
Screw Size	Torque (Nm)	Torque (in-lb)
6-32	1.1	10
10-32	2.8	30
1/4"-20	7.3	65
5/16-18	15	135
3/8"-16	27	240

Unpacking

BDFD

BDFB's ship on a 42 by 42 inch skid as shown below. A 15/16 inch wrench or socket is required to remove 5/8 inch diameter shipping bolts from skid. Before opening the packaging, carefully inspect the outside in the presence of shipping personnel for signs of damage. Carefully open the packaging to verify that the contents are complete and undamaged. If damaged, follow the shipping carrier's procedure for filing a damage claim. If the equipment must be returned, repack in the original shipping packaging.

Before continuing, verify that the following conditions exist at the installation site:

- Floor is conditioned and clean (refers to removal of any combustible flooring, e.g., carpet, wood, etc.).
- Job Site Documentation details cabinet locations.

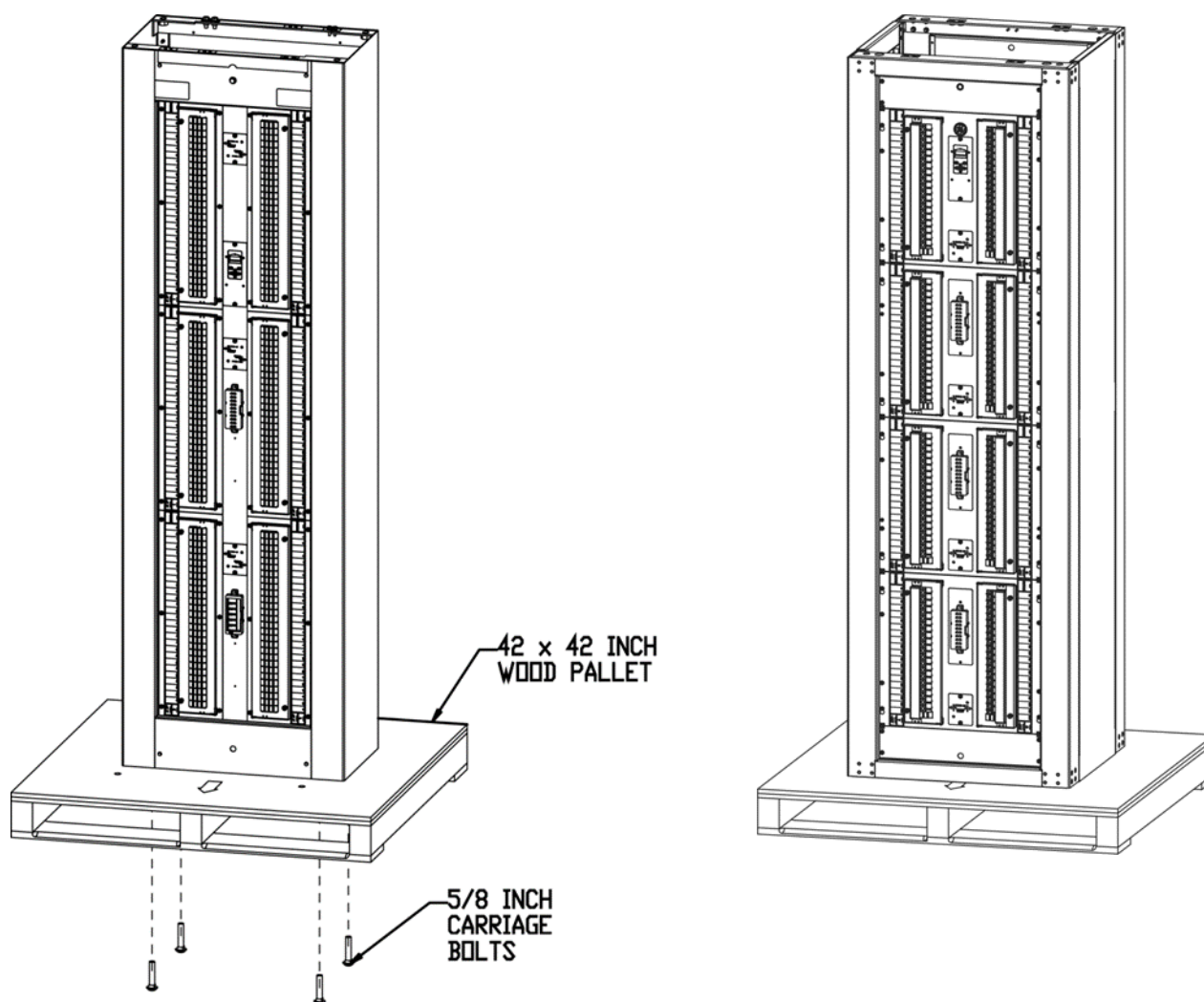


Figure 13 Cabinet Shipping Pallet

Mounting Hardware

Hardware for making all cabled connections is included with the BDFB. 3/8 inch hardware for Input Load Bus connections is installed on the Load Shunt and Load Return Bus Details as shown in section 9. CC408576210 1/4 inch conical nuts are provided for all output load and return connections. These nuts are located in the hardware box as shown below.

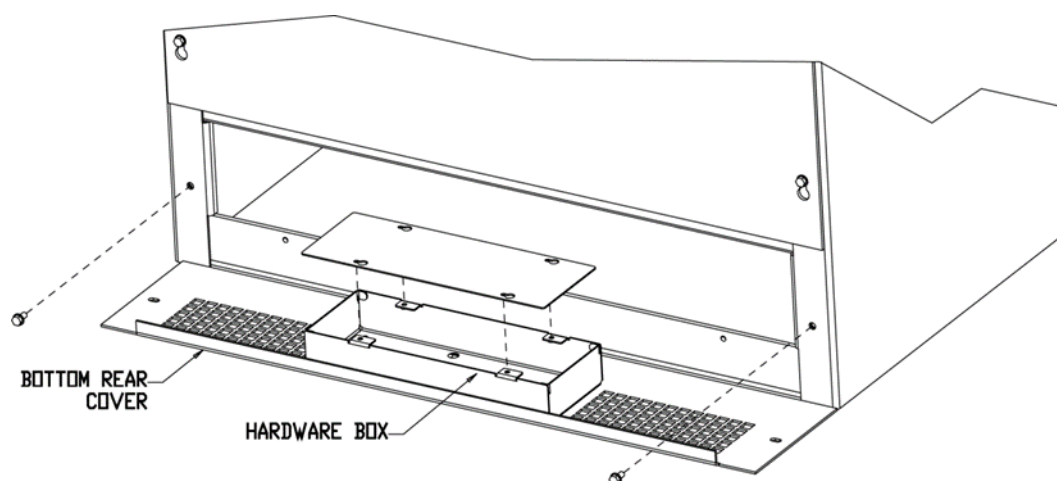


Figure 14 Hardware Box Location

Floor Mounting

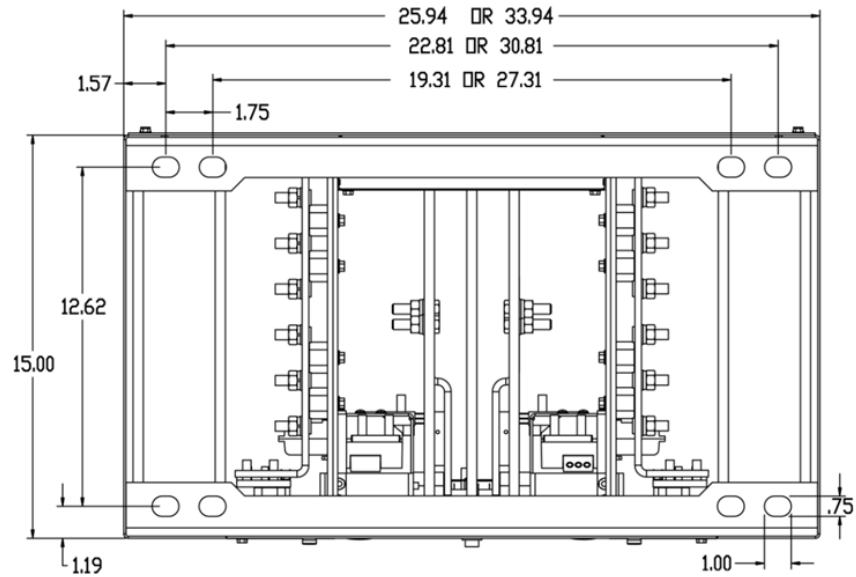
When installing the BDFB cabinet to the floor, the following mounting hardware may be required depending on customer requirements.

- Drill anchor holes to depth specified in table below.
- Place floor insulation pad and/or use insulation bushings provided with anchors if required.
- Shim under cabinet corners as necessary to level.
- Torque anchors as specified in table below.

Table 2 Anchor Kits						
Seismic Zone	Ordering Code	Anchor Type (Hilti)	Hole Size	Wrench	Torque	
0, 1, 2	847135662	(4) 1/2 inch drop-in	5/8 inch bit 2" deep	3/4 inch	216 in·lbs (18 ft·lbs)	24.5 N·m
0, 1, 2, 3, 4	847135688	(4) 12 mm cap bolts	18mm bit 100mm deep	19 mm	720 in·lbs (60 ft·lbs)	81.6 N·m

Table 3 Isolation and Leveling Kits	
Ordering Code	Description
408520408	Floor Insulation Kit (16 in x 24 1/4 in)
CC109121588	Shim Kit

G7 and G8



G101 and G102

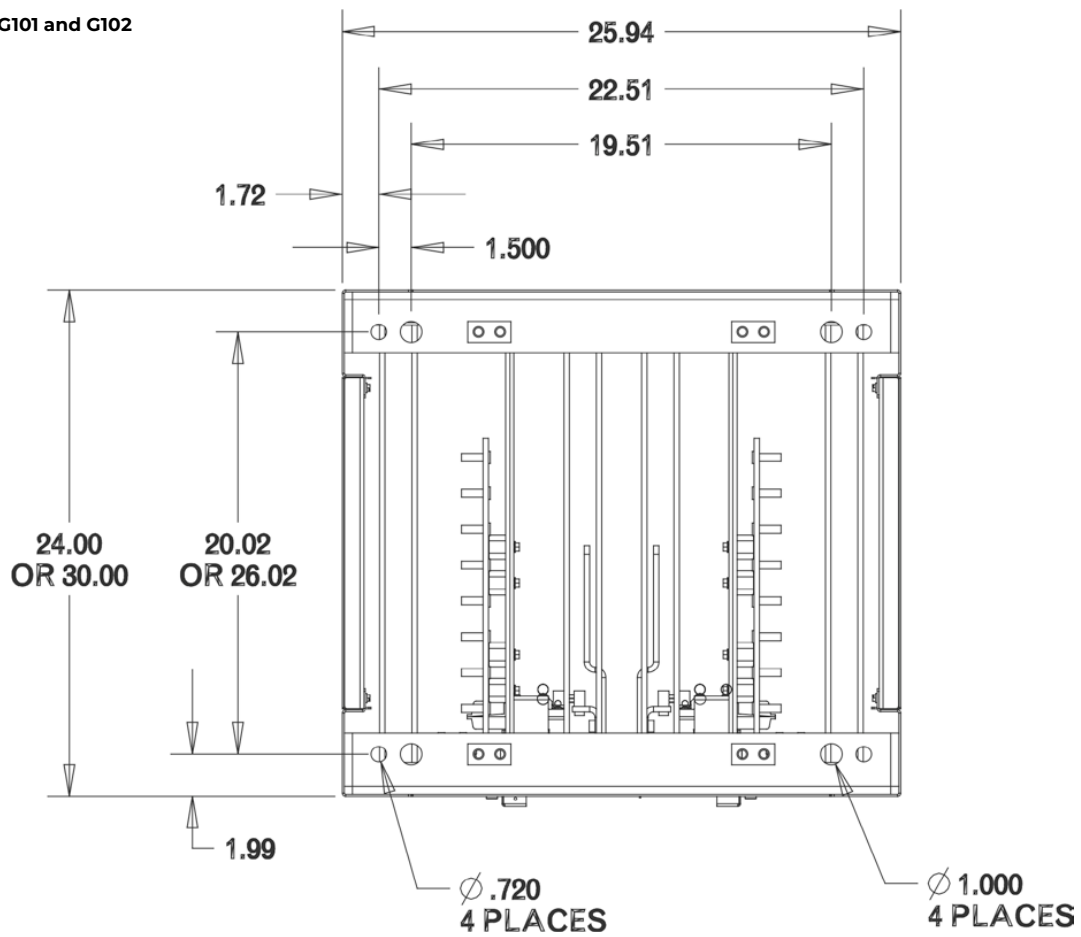


Figure 15 Footprint of Cabinets

Cabinet Extensions – G7 and G8 only

Optional cabinet extensions, constructed in the same manner as the 7 foot cabinet, mount on top of the 26-inch wide cabinet to match the height of adjacent cabinets.

Cabinet Extension Kits for 26-inch Wide Cabinet		
Kit Ordering Code	Height Extension	Height with Extension
848258588	4 -1/2 ft	11-1/5 ft
848258570	2 ft	9 ft

Secure the cabinets together with four 5/8" bolts, lock washers and flat washers (provided). Use a 15/16" socket.

Secure the interframe ground cable with two 7/16" bolts, lock washers, flat washers and nuts (provided). Use 7/16" socket and wrench. This provides a continuous frame ground to the top of the cabinet.

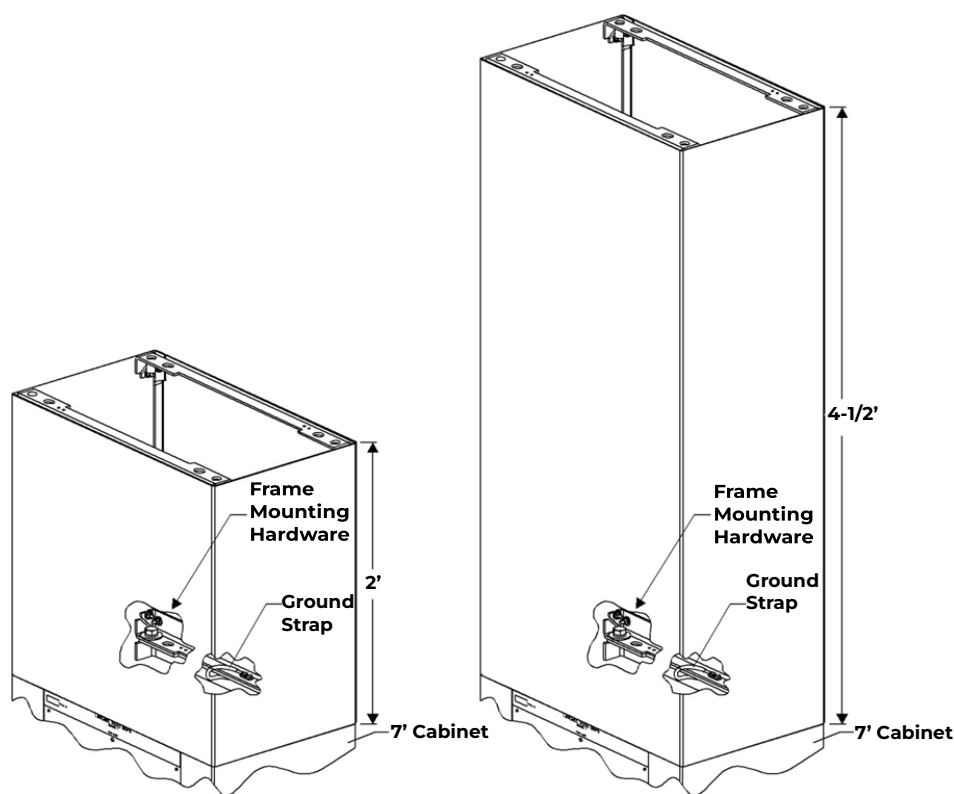


Figure 16 2-Foot or 4-1/2-Foot Extension Cabinet

Cabinet Top Cover

When cabinets are used in bottom feed applications, an optional 848429288 top cover kit may be installed on top of the 26-inch wide cabinet as shown below. Secure cover with four 5/8" bolts and flat washers using a 15/16" socket.

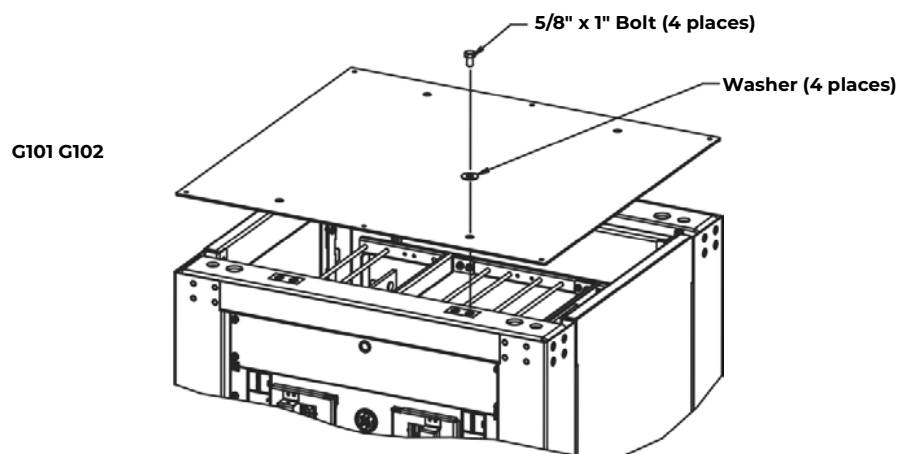
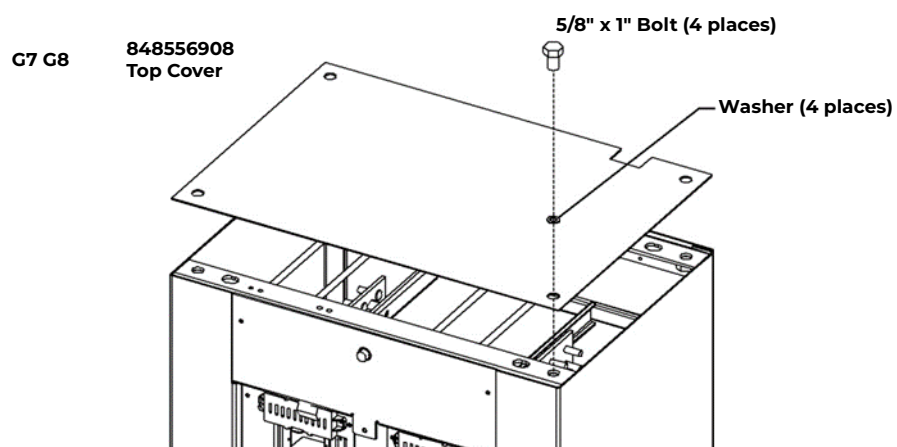


Figure 17 Top Cover for Bottom-Feed Applications

Frame Ground

Frame ground connections are located on the front and rear top of the cabinet.

Local grounding practices will determine the grounding method and size of cable connected to the cabinet.

Lug Landings: All: 3/8" on 1" centers. G7 and G8 only: 1/4" on 0.625" centers.

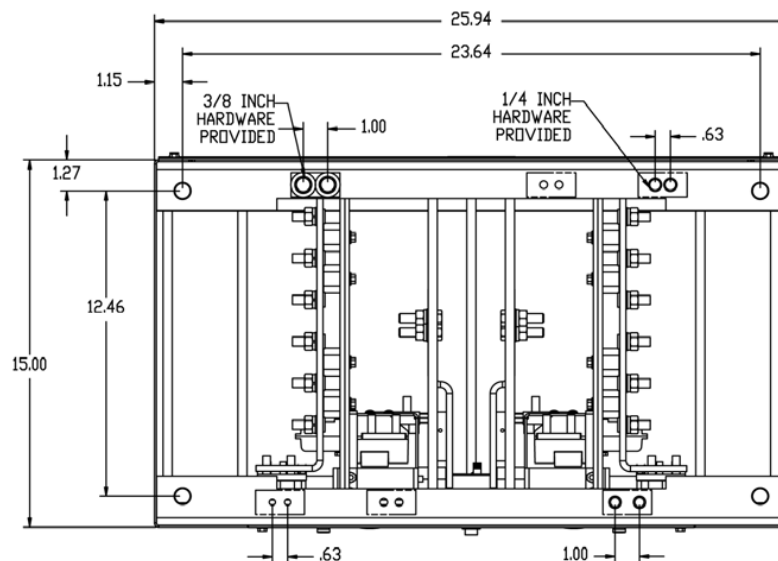


Figure 18 Top View of G7

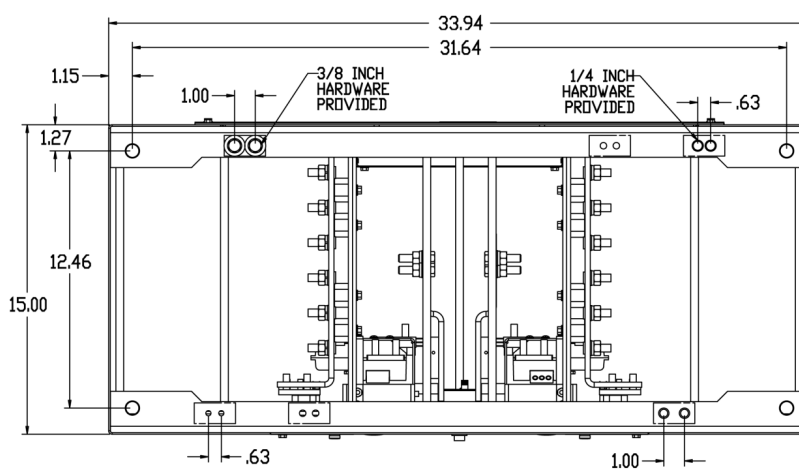


Figure 19 Top View of G8

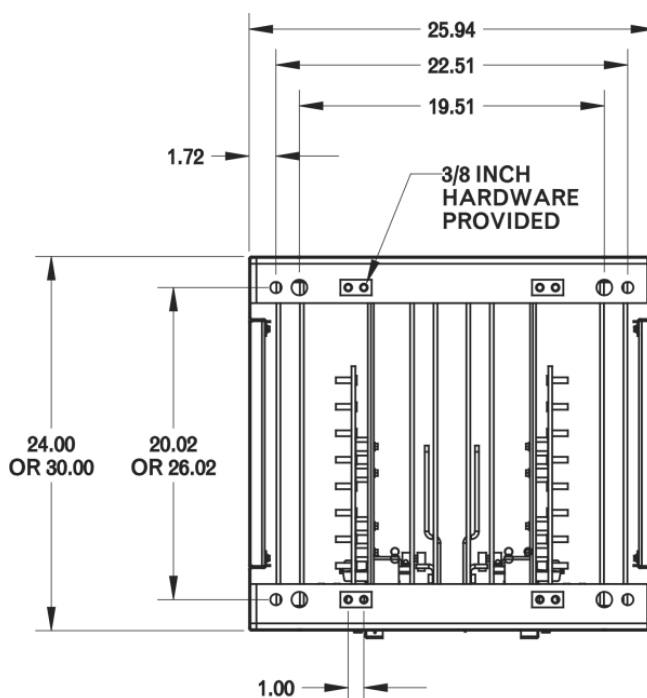


Figure 20 Top View - G101 and G102

Converting Top-Feed to Bottom-Feed

The following steps describe how to convert a top-feed cabinet to a bottom-feed cabinet. Reverse this procedure to convert a bottom-feed to a top-feed cabinet.

1. Disconnect wires from the shunts on the load shunt assembly. Note the wire colors and location. These same colors are used when moving the shunts from panel position 1 to panel 5 position and panel position 2 to panel position 6. The solid color (blue or slate) is closest to the input cables.
2. Disconnect the hardware securing the shunt assembly at the top of the cabinet.
Remove 6-32 screw securing shunt wires to the charge bus bar at the bottom of the cabinet where the shunt assembly will be placed.
1. Relocate load shunt assembly and mount it in the bottom of the cabinet.
2. Connect shunt wires in same location and color as in previous location.
3. Connect shunt wires to the charge bus bar at the top of the cabinet where the shunt assembly was removed using same 6-32 screw.
4. Move the internal return bus bar from the top to the bottom of the cabinet. Note: Internal return bus bars may not be present.
5. The VIMIEC meter needs to be reconfigured. Navigate to Menu ► Load Parameters ► First Load and change Load Bus A location from upper-left to lower-left or lower-right depending on which side you want to be side A and side B.
6. Relabeling might also be required as discussed in the Panel Positions and Labeling section.

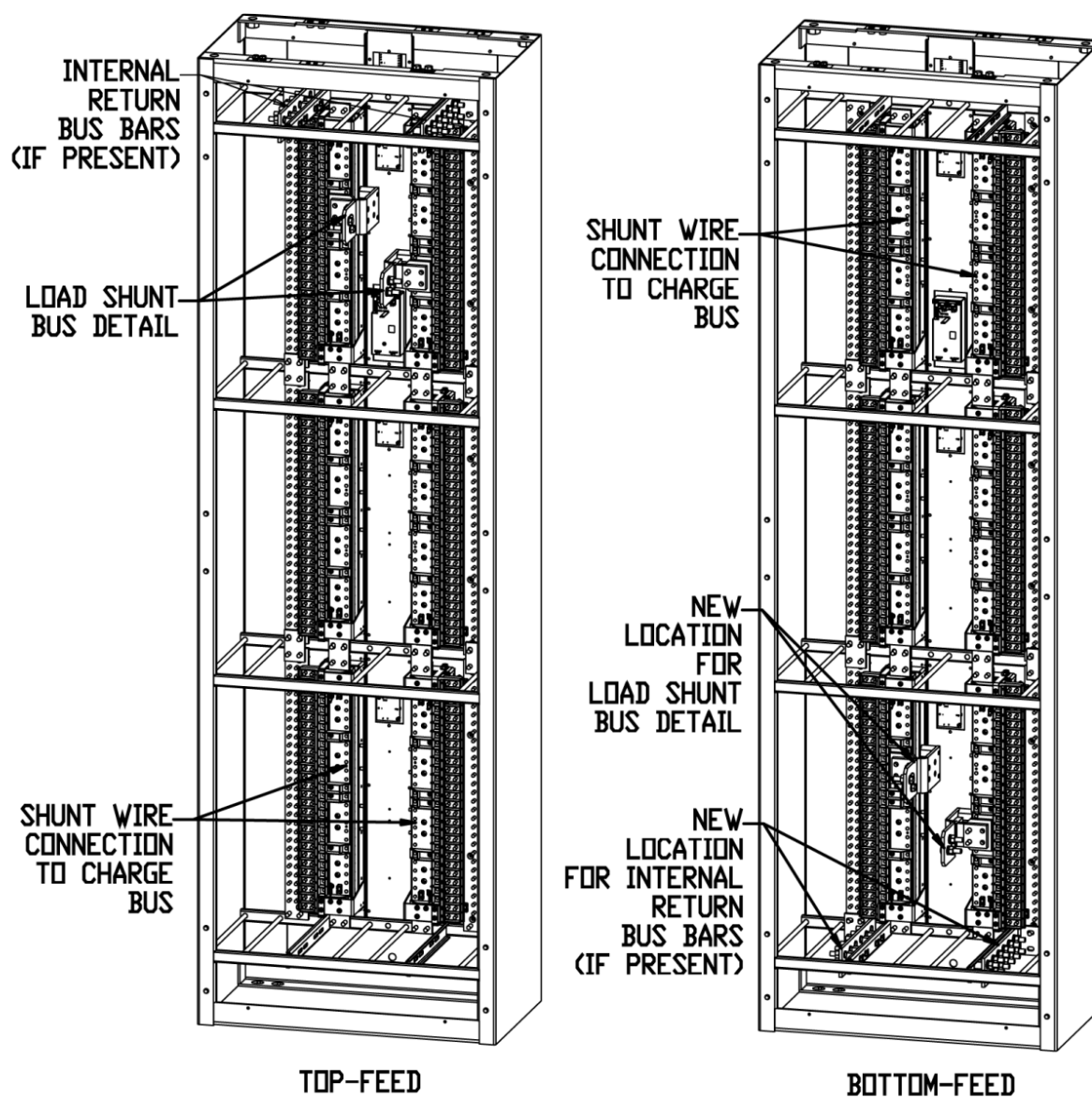


Figure 21 Top-Feed to Bottom-Feed Cabinet Conversion G7 and G8

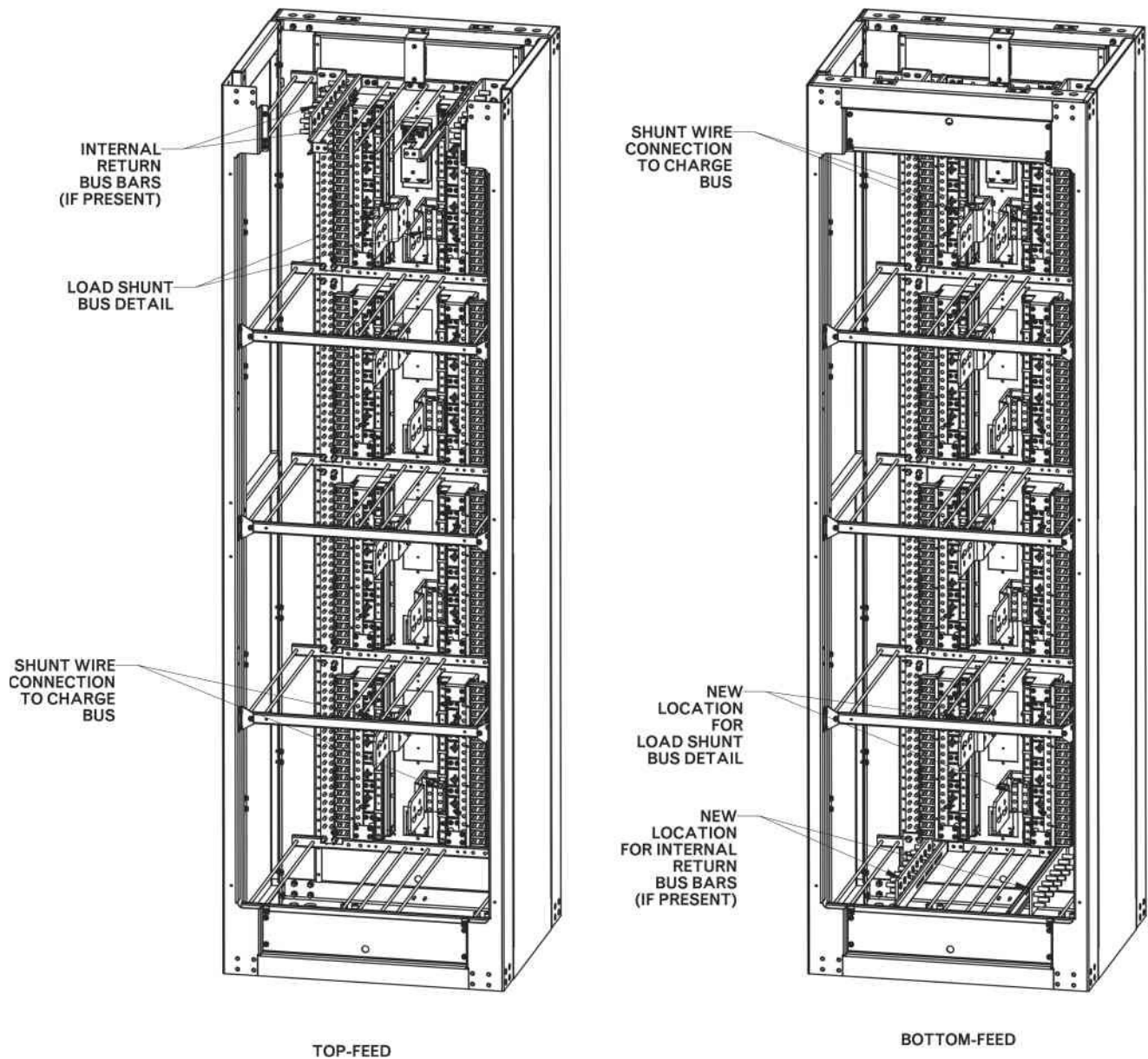


Figure 22 Top-Feed to Bottom-Feed Cabinet Conversion G101 and G1028

Converting from 2-Load to 4, 6, or 8-Load

G7 and G8 can be converted to 4 or 6 Load.

G101 and G102 can be converted to 4, 6, or 8 Load.

This requires that new load shunt bus kits be added to existing panels in the cabinet and linking bus bars between panels be removed or “split” to create the additional loads.

The following steps describe this procedure.

Caution: Live potentials are present within a working BDFB/ BDCBB cabinet! Take proper precautions to insulate all tools and prohibit any live surface from contacting framework or any other grounded surface.

Note: If splitting existing loads within the BDFB/BDCBB, the load shunt assembly will be at a live potential as soon as it comes into contact with a distribution panel bus and must not be allowed to contact framework or any grounded surface during or following this step!

Remove 6-32 screw securing shunt wires to the charge bus bar where the new load shunt bus assembly will be installed. Note color of shunt wires at each position.

Install load shunt bus assembly to the charge bus as shown in Figure 23. Connect (2) red glastic standoffs to panel. Attach shunt detail to panels charge bus with 5/16 hardware provided and ½” socket (Torque to 135 in-lb) and attach to standoffs with 1/4-20 screws provided and 7/16” socket (Torque to 65 in-lb).

1. Connect shunt wires to shunt. There should be a solid color like Blue, Orange, Gray or Brown and a striped color like White-Blue, White-Orange, White-Gray or White-Brown. Attach solid color to back connection (it is connected to input bus). Attach striped color to front connection (it is connected to panels charge bus).
2. Remove Bus Bar Straps to “split off” these panels as individual load buses. Remove 5/16” hardware with ½” socket. Store these links in hardware bin in back of cabinet.
3. The VIM1EC meter needs to be reconfigured. Navigate to Menu ► Load Parameters ► Number of Loads and set the number of load shunts in the BDFB.
4. Relabeling might also be required as discussed in Section 8. Stamp or Label new load designations on the labels.

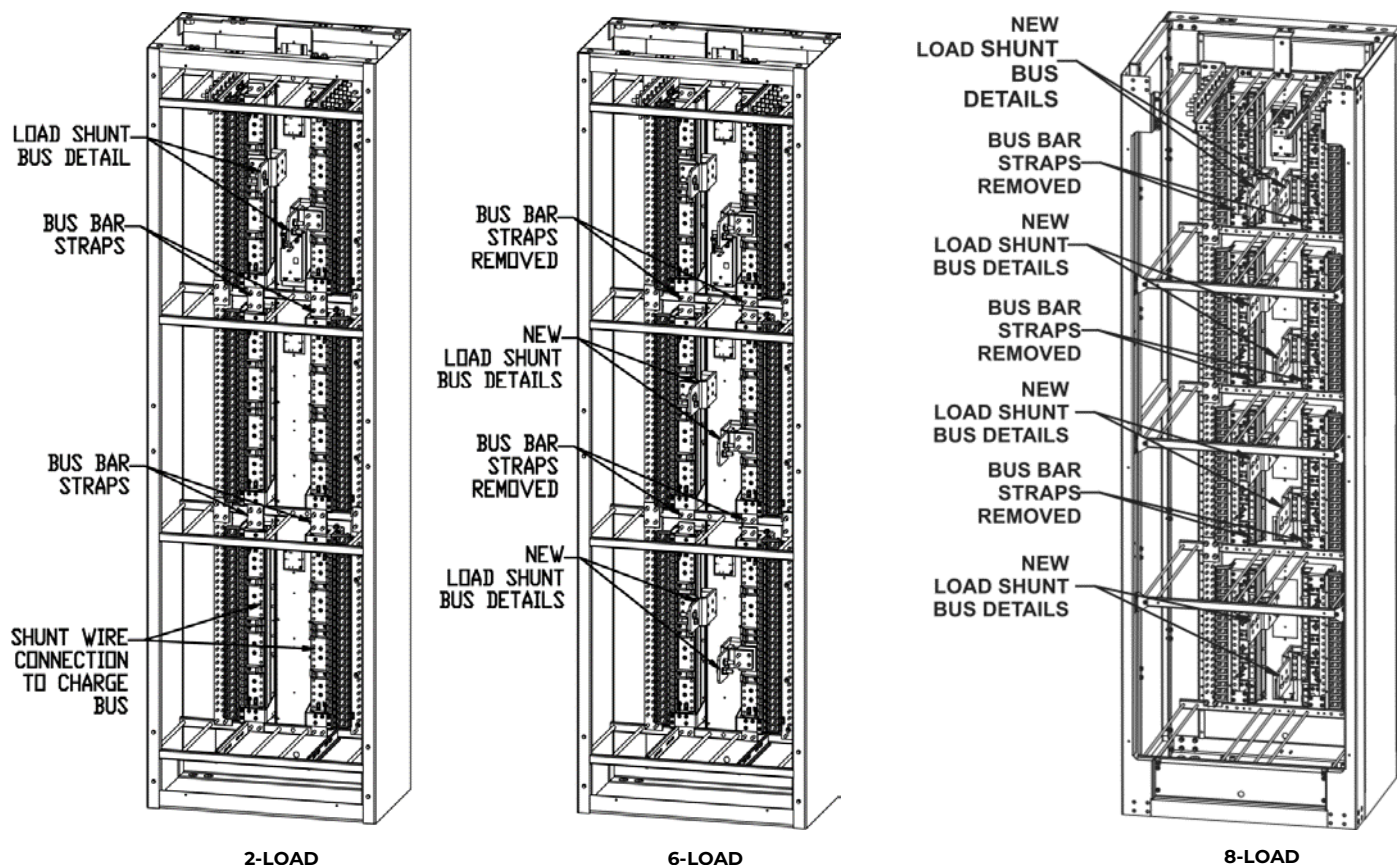


Figure 23 2-Load to 6 or 8-Load Conversion

Connect Input Feeds

Lug landings are 3/8-16 on 1" centers. See Figure 3 and Figure 4.

1. Input Feeds - Run and terminate input feed cables to the Load Shunt Bus of each load bus.
2. Input Feed Returns - Run and terminate input feed return cables to the Load Return Bus.
 - Internal Return Bus - Figure 3 and Figure 4
 - External Return Bus - Figure 10 and Figure 11
3. Torque hardware to 240 in-lb with 9/16" socket.

Connect Breaker/Fuse Loads

Lug Landings:

- Distribution Connections - 1/4-20 on 5/8" centers.
- Adapter Bus Kits - 3/8-16 on 1" centers.

See Figure 6, Figure 7, and Figure 9.

1. Two-Pole and Three-Pole Adapter Bus Kits - Install Two-Pole and Three-Pole Adapter Bus Kits for each Breaker/Fuse Load fed by a Two-Pole and Three-Pole protector - .
 - Secure the Mount Adapter Bus Kits to the associated connection landings with 1/4-20 hardware.
 - Torque to 65 in-lb with 7/16" socket.
2. Breaker/Fuse Loads - Run and terminate Breaker/Fuse Load cables to the distribution connection landings.

3. Input Feed Returns - Run and terminate input feed return cables to the Load Return Bus.

- Internal Return Bus - Figure 3 and Figure 4
- External Return Bus - Figure 10 and Figure 11

4. Torque all lug securing hardware:

- 1/4-20 hardware to 65 in-lb with 7/16" socket
- 3/8-16 hardware to 240 in-lb with 9/16" socket

Alarm Connections and ABS Power

At the top of the cabinet is a Customer Interface Board for connecting Output Alarms and Alarm Battery Supply (ABS) to redundantly power the alarms and the VIMIEC meter.

The VIMIEC receives redundant power from panels 1 and 2 as well as an external ABS connection, so the ABS connection is not mandatory for proper operation but some customers require its use.

A Return connection is required for operation of the meter and alarms. The Return connection on the Customer Interface Board is factory wired when internal return buses are ordered, otherwise it must be field wired to the external return bus.

- Contacts are rated for 60V, 1/2A.
- Maximum wire size to the terminal blocks is 12 AWG.

Alarm Outputs consist of single form-C contact for

- Power loss
- Current overload
- Fuse/breaker alarms

Note: there are two connection points for FAJ/CB but they are connected to the same form-C contact.

Diagram of the rear panel of the 1000 Series Alarm Receiver. The panel features four 6-pin terminal blocks for "ALARM OUTPUTS" on the left. From left to right, the terminals are labeled: NO, C, NC, PWR LOSS; NO, C, NC, OVER LOAD; NO, C, NC, FAJ/CB; and NO, C, NC, FAJ/CB. On the right side, there are two 3-pin terminal blocks labeled "1 2 3" and "-48V RTN". To the right of the panel, two lines point to the terminal blocks with the following descriptions: "ABS FROM POWER PLANT (REDUNDANT METER AND ALARM POWER)" pointing to the top 3-pin block, and "RETURN FROM EXTERNAL RETURN BUS. (FACTORY WIRING FOR INTERNAL RETURNS)" pointing to the bottom 3-pin block.

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Configure Panel Positions

Panel positions are factory labeled and configured in the VIM1EC meter.

No action is required unless site engineering instructions include changing from the factory panel labeling.

Apply Labels

Apply labels in positions per site engineering instructions.

Configure VIM1EC Meter

Configure the VIM1EC meter to match panel positions per site engineering instructions.

1. Set Location of Panel 1 to upper-left, upper-right, lower-left or lower-right

Menu ► Load Parameters ► First Load

2. Set Number of Load Shunts (Input Feeds) in the BDFB

Menu ► Load Parameters ► Number of Loads

VIM1EC Meter Reference

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.

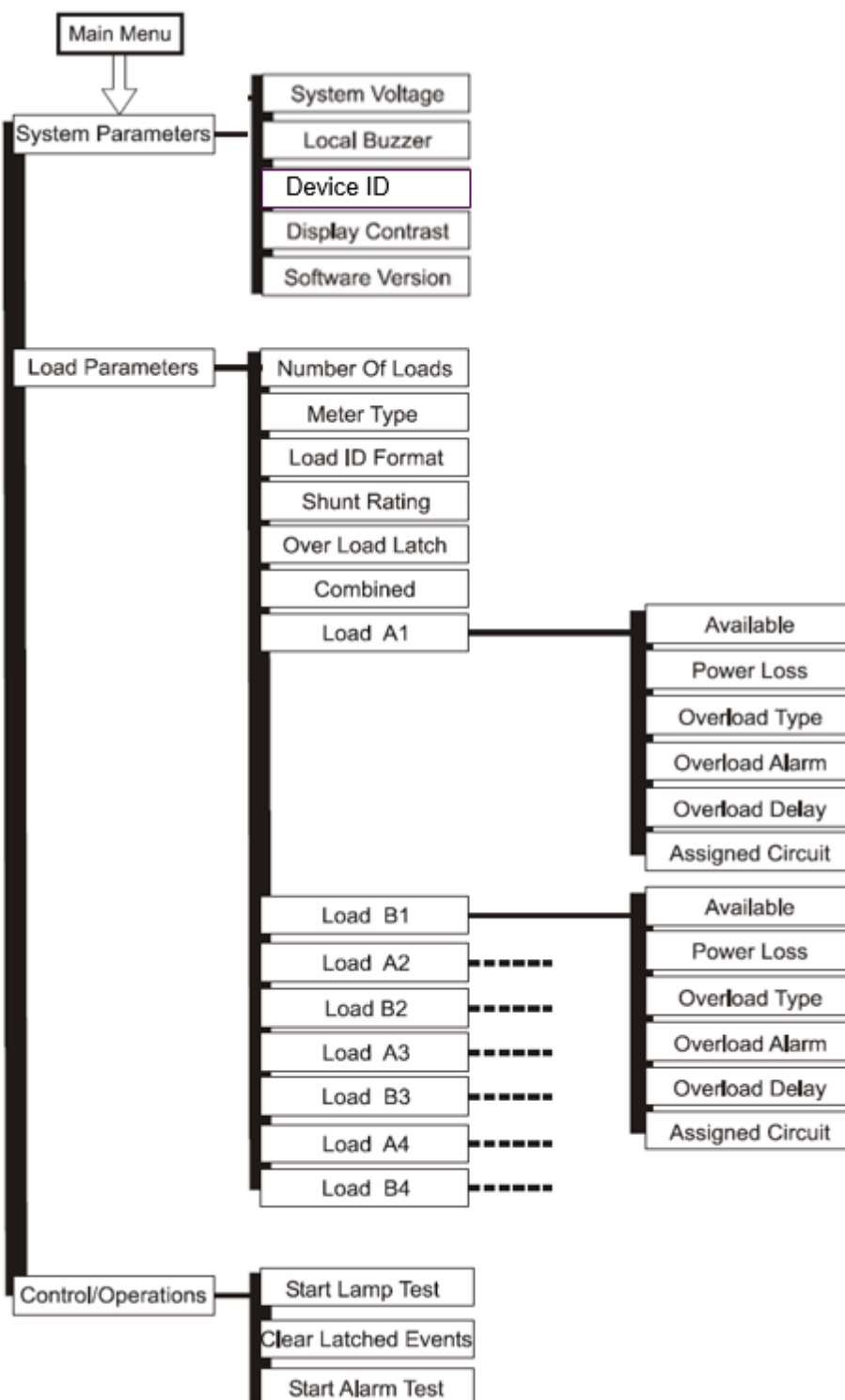


Figure 26 Meter Menu Map

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 meter 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.

Table 4 VIM1EC Meter Parameters	
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".

Programming the Meter (Continued)

Table 4 VIM1EC Meter Parameters	
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	<p>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.</p> <p>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.</p>
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 in a 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 27) 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 27 VIM1EC Meter RS485 Connection

Retrofit or Replacement Configuration

-48V meter

Use the previous VIM1EC menu map and table as a reference to configure the basic items listed below:

- Configure the Number Of Loads present in the BDFB (Item 5)
- Set the display Meter Type (Item 6)
- Configure the Load ID Format presented on the display (Item 7)
- Set the position of the First Load Location (Item 8)
- Configure the Shunt Rating of each monitored load in amps (Item 9)
- Set the state of each load as installed or not installed at Load Available (Item 12)
- Set the local audible alarm indicator capability at Local Buzzer (Item 2)
- Set the Meter ID (1-16) if the meter will be monitored remotely. Leave the ID = 0 if it will not be monitored remotely.

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 28 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.

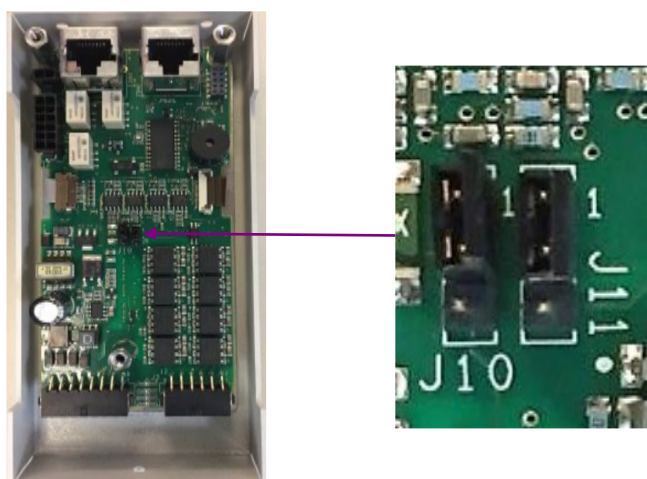


Figure 28 VIM1EC J10 And J11 Settings

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.



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); BP040 System With a Pulsar Plus Controller	Connected To DC+	Connected To DC+
EP (SPS); QS (CPS); CP (CPL); Single Voltage NE INFINITY System (No Converters)	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 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 to be looked at on a per systems basis.

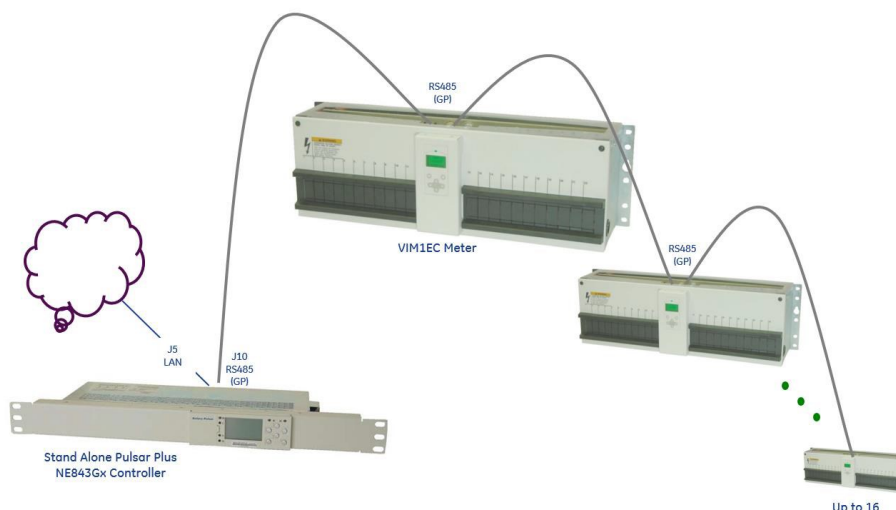


Figure 29 Standalone Pulsar Plus Monitoring VIM1EC ED83368 Panels

Wiring Schematics

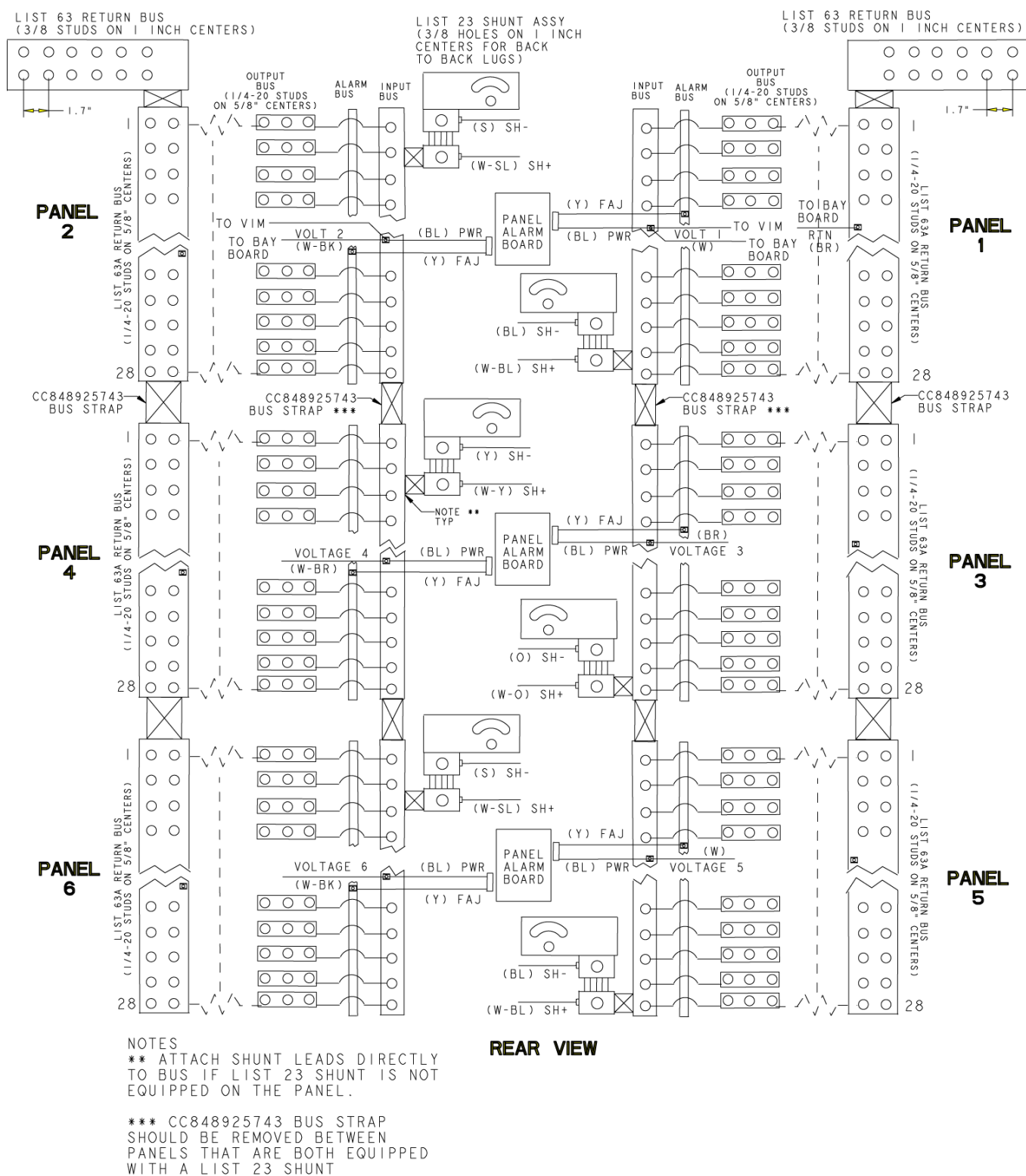


Figure 30 Panel Wiring Schematic G7 and G8

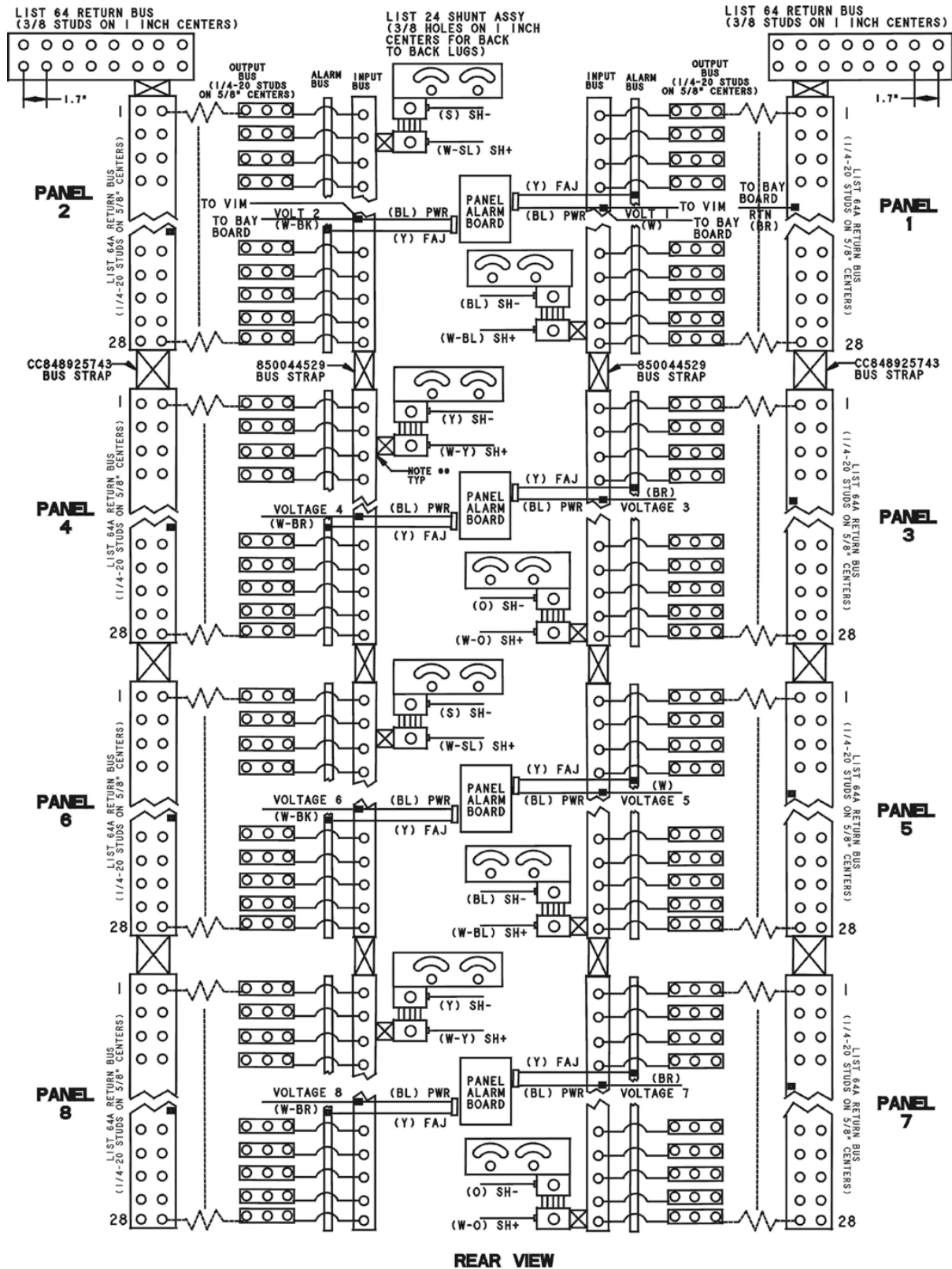


Figure 31 Panel Wiring Schematic G101 and G102



Figure 32 Alarm Wiring Schematic G7 and G8

Alarm Relays are powered (energized) in the Normal (not alarmed) condition.

All alarms are asserted (sent) when the unit is unpowered.

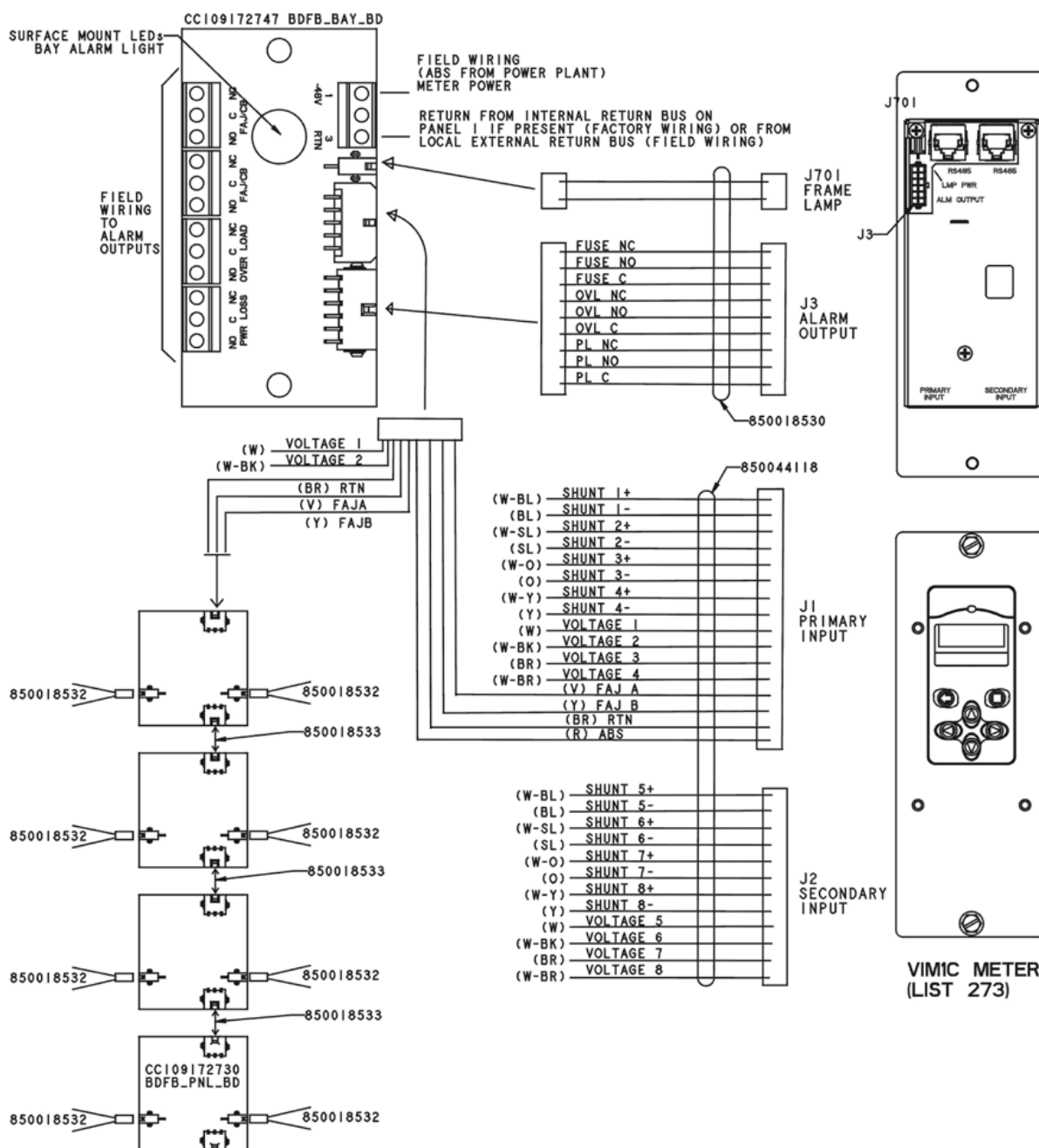


Figure 33 Alarm Wiring Schematic G101 and G102

Alarm Relays are powered (energized) in the Normal (not alarmed) condition.

All alarms are asserted (sent) when the unit is unpowered.

Table 5 Alarm Signal Action

Alarm Signal Designation		Alarm Signal Action	
NO		Open on Alarm	
NC		Close on Alarm	
C		(Common Return)	

Specifications

Output Voltage	-48Volts DC	
Output Capacity	800A per Distribution Panel, 800A per Load	
	8 Load BDFB: 3200A per Side, 6400A Maximum per Bay	G101 and G102 only
	6 Load BDFB: 2400A per Side, 4800A Maximum per Bay	G7 and G8 only
	4 Load BDFB: 1600A per Side, 3200A Maximum per Bay	all
	2 Load BDFB: 800A per Side, 1600A Maximum per Bay	all
Agency Approval	UL Listed (cULus), NEBs	
Environment	Use this equipment in a controlled environment (an area where the humidity is maintained at levels that cannot cause condensation on the equipment, the contaminating dust is controlled, and the steady-state ambient temperature is within the range specified).	
	Safety Tested Limit - maximum ambient temperature: 104°F (40°C).	
Cabinet	Seismic Zone 4 Box Framework	
	Color: Central Office Soft Blue	
	Width: G7, G101, and G102:	26 inches (660 mm)
	G8:	34 inches (864 mm)
	Height: 84 inches (2134mm)	
	Depth:G7 and G8	15 inches (381 mm)
	G101	24 inches (610 mm)
	G102	30 inches (762 mm)
Access	Weight:	
	375 pounds (6 panels, approximate)	
Distribution	Front Fuse/Breaker and Alarm Access, Rear Wiring Access	
	G7 and G8	28-Position Panel for Bullet-Style Protectors
	G101 and G102	20-Position Panel for Bullet-Style Protectors
Protectors	Bullet-Style Fuse Holders, TPS or TLS Fuses through 125A	
	Single Pole LEL Bullet-Style Circuit Breakers through 100A	
	Two-Pole LEL Bullet-Style Circuit Breakers through 150A	
	Three-Pole LEL Bullet-Style Circuit Breakers through 250A	
	No Protector Spacing Restrictions	
	Maximum Loading <ul style="list-style-type: none"> • 60% of protector rating - Continuous (List 1) • 80% of protector rating - Maximum Load (List 2 - typically end of discharge) 	
Input Feed Limit	The short circuit current capability of the input feeds to the distribution panel must not exceed 10,000 amperes.	
Accessories	External Ground Bar Assembly	
	Seismic Anchor Kits	
	Bullet-Style Fuse Holders, Fuses	
	Bullet-Style Circuit Breakers	
	Top Cover for Bottom Feed Applications.	
	For G7 and G8 only <ul style="list-style-type: none"> • 2 ft Extension Cabinet for 9-ft application • 4-1/2 ft Extension Cabinet for 11-1/2 ft applications 	

Safety

Safety Statements

- See equipment specifications for installation and environmental limitations.
- Do not install this equipment over combustible surfaces.
- Rules and Regulations - Follow all national and local rules and regulations when making field connections.
- Compression Connectors
 - U. S. or Canada installations - use Listed/Certified compression connectors to terminate Listed/Certified field-wire conductors.
 - All installations - apply the appropriate connector to the correct size conductor as specified by the connector manufacturer, using only the connector manufacturer's recommended or approved tooling for that connector.
- Electrical Connection Securing: Torque to the values specified on labels or in the product documentation.
- Cable Dress - dress to avoid damage to the conductors and undue stress on the connectors.
- Circuit Breakers and Fuses
 - Use only those specified in the equipment ordering guide.
 - Size as required by the National Electric Code (NEC) and/or local codes.
 - Safety Tested Limits - Refer to the equipment ratings to assure current does not exceed:
 - Continuous Load (List 1) - 60% of protector rating
 - Maximum Load (List 2 - typically end of discharge) - 80% of protector rating.
 - GMT Style Fuses - Use only fuses provided with safety caps.
- Field-wired Conductors - Follow all National Electric Code (NEC) and local rules and regulations.
 - Insulation rating: 90°C minimum; 105°C (minimum) if internal to enclosed equipment cabinets.
 - Size AC field-wired conductors with 75°C ampacity (NEC) equal to or greater than their panel board circuit breaker rating.
- AC and DC input disconnect/protection -
 - Provide accessible devices to remove input power in an emergency.
 - Pluggable equipment – use accessible socket-outlet near equipment.
- Alarm Signals - Provide external current limiting protection. Rating 60V, 0.5A unless otherwise noted.
- Grounding - Connect the equipment chassis directly to ground. In enclosed equipment cabinets connect to the cabinet AC service ground bus. In huts, vaults, and central offices connect to the system bonding network.

Precautions

- Install, service, and operate equipment only by professional, skilled and qualified personnel who have the necessary knowledge and practical experience with electrical equipment and who understand the hazards that can arise when working on this type of equipment.
- Disconnect batteries from outputs and/or follow safety procedures while working on equipment. Batteries may be connected in parallel with the output of the rectifiers. Turning off the rectifiers will not necessarily remove power from the bus.
- Do not disconnect permanent bonding connections unless all power inputs are disconnected.
- Verify that equipment is properly safety earth grounded before connecting power. High leakage currents may be possible.
- Exercise care and follow all safety warnings and practices when servicing this equipment. Hazardous energy and voltages are present in the unit and on the interface cables that can shock or cause serious injury. When equipped with ringer modules, hazardous voltages will be present on the ringer output connectors.
- Use the following precautions in addition to proper job training and safety procedures:
 - Use only properly insulated tools.
 - Remove all metallic objects (key chains, glasses, rings, watches, or other jewelry).
 - Follow Lock Out Tag Out (LOTO) procedures: customer specified, site specific, or general as appropriate. Disconnect all power input before servicing the equipment. Check for multiple power inputs.
 - Wear safety glasses.
 - Follow Personal Protective Equipment requirements: customer specified, site specific, or general as appropriate.
 - Test circuits before touching.
 - Be aware of potential hazards before servicing equipment.
 - Identify exposed hazardous electrical potentials on connectors, wiring, etc.
 - Avoid contacting circuits when removing or replacing covers;.
 - Use a personal ESD strap when accessing or removing electronic components.
 - Follow procedures for working at heights more than 4ft above the floor: customer specified, site specific, or general as appropriate.
- Personnel with electronic medical devices need to be aware that proximity to DC power and distribution systems, including batteries and cables, typically found in telecommunications utility rooms, can affect medical electronic devices, such as pacemakers. Effects decrease with distance.

Revision

Revision	Description	Date Dept./Init.
1	Initial release	Nov/2011
2	Add External Return Bus Options 150021156 and 150021157	Dec/2011
3	Add References to 3-pole circuit breakers and 34-inch wide cabinet	Jun/2012
4	Reformat, rebrand, restructure, clarify alarm signals, clarify protector line/load marking, add G101 and G102	May/2013
5	Released	Sept/2021
5.1	Updated as per template	10/05/2021
5.2	Updated as per OmniOn Power™ template	11/08/2023
6	Sections “Configuring/Verifying Reference Jumper Settings” and “Connecting The RS485 (GP) Communication” are added, Updated “VIM1EC Meter Reference” section	08/05/2024

OmniOn Power Inc.

601 Shiloh Rd.

Plano, TX USA

omnionpower.com

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