LINEAGE POWER

Secondary DC Power Distribution Bay H569-445

Product Manual
Select Code 157-005-104
Comcode 108405283
Issue 9
September 2009

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Secondary DC Power Distribution Bay
H569-445

Notice:
The information, specifications, and procedures in this manual are subject to change without notice. Lineage Power assumes no responsibility for any errors that may appear in this document.

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1 Introduction

Product Summary

This product manual (Select Code 157-005-104) describes the H569-445 Secondary DC Power Distribution Bay. This unit is also known as a Battery Distribution Fuse Bay (BDFB) or a Battery Distribution Circuit Breaker Bay (BDCCB). The H569-445 series bay is shown in Figure 1-1. It serves as a secondary fuse or circuit breaker distribution center for dc power delivered from a central office battery plant to the using equipment. It provides space-efficient branch loading for distributing +24, -48, or ±130 volt dc power, or combinations of these voltages from different battery plants. (BDCBB versions of the Distribution Bay do not offer the ±130 volt dc option.)

In many applications, telecommunication equipment requires power redundancy from the battery plant. A BDFB or BDCBB provides this redundancy through the use of multiple load buses. The H569-445 is a cabinetized distribution system that supports these applications by providing up to six distinct load buses for the 7-foot cabinet or up to eight distinct load buses for the 9-foot cabinet.

Each load bus has a rated current carrying capacity of 600 amperes. Each load bus may be configured to include one or multiple fuse or circuit breaker panels. Each fuse panel provides 20 mounting positions that may be equipped with either WP-92461 cartridge fuses that range from 3 to 70 amperes and/or GMT fuse modules containing three fuses ranging from 1/2 to 5 amperes. Fuse panels may also be equipped with 70-150 ampere TPL type fuse blocks. Each circuit breaker panel provides 20 positions for circuit breakers ranging from 3 to 100 amperes.

Additional features include: digital meters; remote monitoring capability for alarms; multiple cabinet heights, and optional 2-hole ground bus arrangements mounted either in the cabinet or external to the cabinet on a cable rack. These options and many more provide greater flexibility for customers with different distribution requirements.

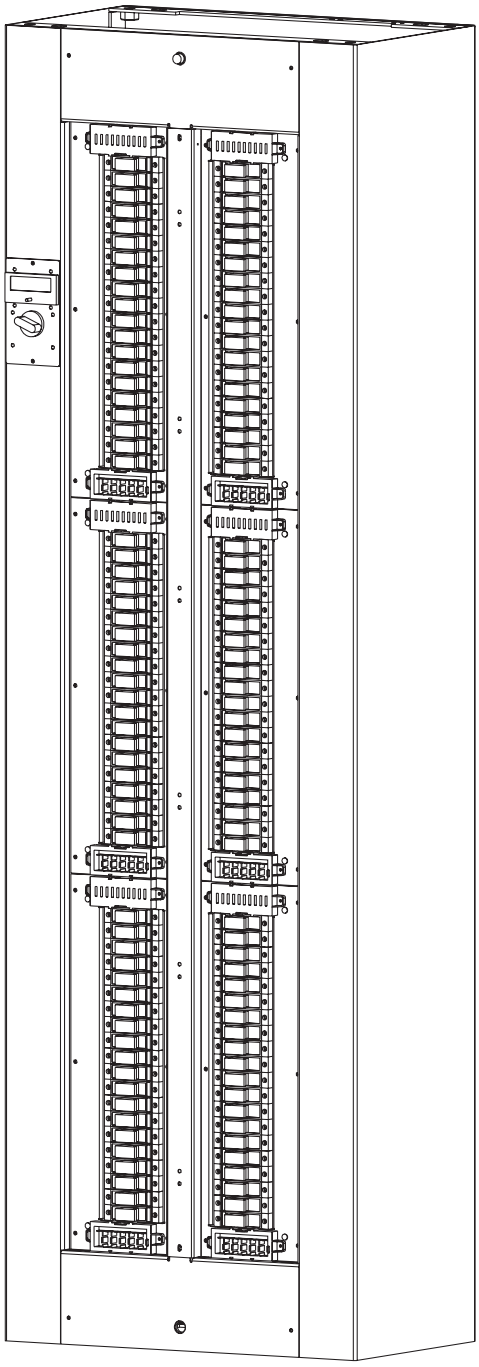


Figure 1-1: H569-445 Secondary DC Power Distribution Bay

Documentation

This product manual is part of a set of documentation developed to assist engineering and installation personnel. Additional product information includes the following:

- H569-445 Ordering and Installation Guide
- T-83150-30 Wiring Drawing
- SD-83150-01 Schematic Drawing

This documentation is provided with each H569-445 bay in Documentation Service Kit, Comcode 848296505.

Customer Service Contacts

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

For customers in the United States, Canada, Puerto Rico, and the US Virgin Islands, call 1-800-THE-1PWR (1-800-843-1797). This number is staffed from 7:00 am to 5:00 pm Central Time (zone 6), Monday through Friday, on normal business days. At other times this number is still available, but for emergencies only. Services provided through this contact include initiating the spare parts procurement process, ordering documents, product warranty administration, and providing other product and service information.

For other customers worldwide the 800 number may be accessed after first dialing the AT&T Direct country code for the country where the call is originating, or you may contact your local field support center or your sales representative to discuss your specific needs.

Customer Training

Lineage Power offers customer training on many Power Systems products. For information call 1-972-244-9378. This number is answered from 8:00 a.m. until 4:30 p.m., Central Time Zone (Zone 6), Monday through Friday.

Downloads and Software

To download the latest product information, product software and software upgrades, visit our web site at http://www.lineagepower.com/

2 Product Description

Cabinet Arrangements

The Secondary DC Power Distribution Bay, Model H569-445, is available in six cabinet arrangements. These include:

7-foot cabinet: 26 inches wide by 15 inches deep
7-foot cabinet with 2-foot extension cabinet
7-foot cabinet with 4-1/2-foot extension cabinet
7-foot cabinet 23.6 inches wide by 23.6 inches deep
9-foot cabinet: 26 inches wide by 18 inches deep
9-foot cabinet with 2-1/2-foot extension cabinet

The 7-foot cabinet has six fuse or circuit breaker panel positions and the 9-foot cabinet has eight fuse or circuit breaker panel positions. Alarms include both remote signaling and visual indication of fuse or circuit breaker failure and panel power loss.

The 7-foot cabinet may be configured with one to six separate load buses. The 9-foot cabinet may be configured with one to eight separate load buses.All input battery and battery return feeds are terminated at the load connection point on the fuse or circuit breaker panel. Each load connection point has a 800A monitoring shunt. A digital meter is also provided with each bay.

Load leads from each fuse or circuit breaker are routed along cable troughs on either side of the cabinet. Discharge return leads from the load equipment can be handled in one of two ways. A discharge return bus bar arrangement mounted either on the fuse or circuit breaker panels in the cabinet or external to the cabinet on a cable rack. Both configurations comply with Bellcore 2-Hole grounding requirements.

Features

The following is a list of the many features provided with this product:

- Distributes +24, -48, or ±130 volt dc power (±130 volt not offered with BDCBB)
- 7-, 9-, or 11-1/2-foot cabinet arrangements
- One to eight load buses
- VIM1 Smart Distribution Monitor
  - •Panel Power Loss Alarm
  - •Panel Overload Alarm
  - •Intuitive menu
  - •Lamp Test
  - •Alarm Test
- Cable entry from the top or bottom of cabinet
- 120 cartridge fuse or circuit breaker positions in 7-foot cabinet
- 160 cartridge fuse or circuit breaker positions in 9-foot cabinet
- Accommodates fuse sizes 1/2 to 150 amperes or circuit breaker sizes 3 to 100 amperes.
- 800-ampere monitoring shunts
- Frame alarm indicator lamp
- Panel fuse or circuit breaker alarm and power loss indicator lamps
- Individual fuse or circuit breaker alarm indicator
- Alarm circuit modules for remote monitoring
- Optional internal or external ground bus arrangements

Specifications

Group 1 Cabinet: Six fuse or circuit breaker panel positions

Height	84 inches (2134mm)
Width	26 inches (660mm)
Depth	15 inches (381mm)
Weight	approx. 375 pounds (6 panels)

Group 2 Cabinet: Eight fuse or circuit breaker panel positions

Height	108 inches (2743mm)
Width	26 inches (660mm)
Depth	18 inches (457mm)
Weight	approx. 450 pounds (8 panels)

Group 3 Cabinet: Six fuse or circuit breaker panel positions

Height	84.0 inches (2134mm)
Width	23.6 inches (600mm)
Depth	23.6 inches (600mm)
Weight	approx. 375 pounds (6 panels)

The following cabinet extension options are also available:

848258562	2-1/2 ft Extension Cabinet for 9-ft cabinet
848258588	4-1/2 ft Extension Cabinet for Group 1 7-ft Cabinet
848258570	2 ft extension cabinet for Group 1 7-ft cabinet

The Group 1 or Group 3 cabinet contains six fuse or circuit breaker panel positions and the Group 2 cabinet has eight fuse or circuit breaker positions. Each of these panel positions must be equipped with either a fuse panel, a circuit breaker panel, or a Group 90 blank panel.

The 848258562 2-1/2-foot extension cabinet mounts on top of the 9-foot cabinet as shown in Figure 2-1. Constructed in the same manner as the other cabinets, it offers a clean, aesthetically pleasing solution for 11-1/2-foot central office applications. Interconnection hardware and interframe ground cabling and mounting hardware are furnished to provide a continuous frame ground to the top of the cabinet.

The 848258588 4-1/2-foot extension cabinet for the Group 1 cabinet offers another option for the 11-1/2-foot office environment. The 848258570 2-foot extension cabinet for the Group 1 cabinet to offers a similar option for the 9-foot environment. The extensions, shown in Figure 2-2, may be disassembled if future wire center modernization requires a 7-foot office environment. Intercabinet ground cable and

mounting hardware is furnished to provide a continuous frame ground to the top of the cabinet.

The frame ground connection is located on top of each cabinet. Connection is made using a 1/4 inch double hole terminal lug on 0.625 inch centers. For ground wire connection greater than 2 gauge, order Comcode 846337798 bus bar adapter to allow for 3/8 inch double hole terminal lugs on 1.00 inch centers.

Cabinets may be configured for either top or bottom cable entry. For either configuration, the dc cable designations may start with position 1 at the top left or bottom right. Figures 2-4 and 2-5 show the possible configurations. When ordering fuse or circuit breaker panels for the distribution bay it is important to remember the numbering schemes associated with top and bottom feed applications. Refer to Figures 2-4 and 2-5 for fuse or circuit breaker panel position numbers for each application. This information is necessary to communicate where fuse or circuit breaker panels with different configurations should be located on factory orders. Panel numbering is also stamped on the front of each cabinet at the factory as an installation reference.

Cabinet Types and Features, continued

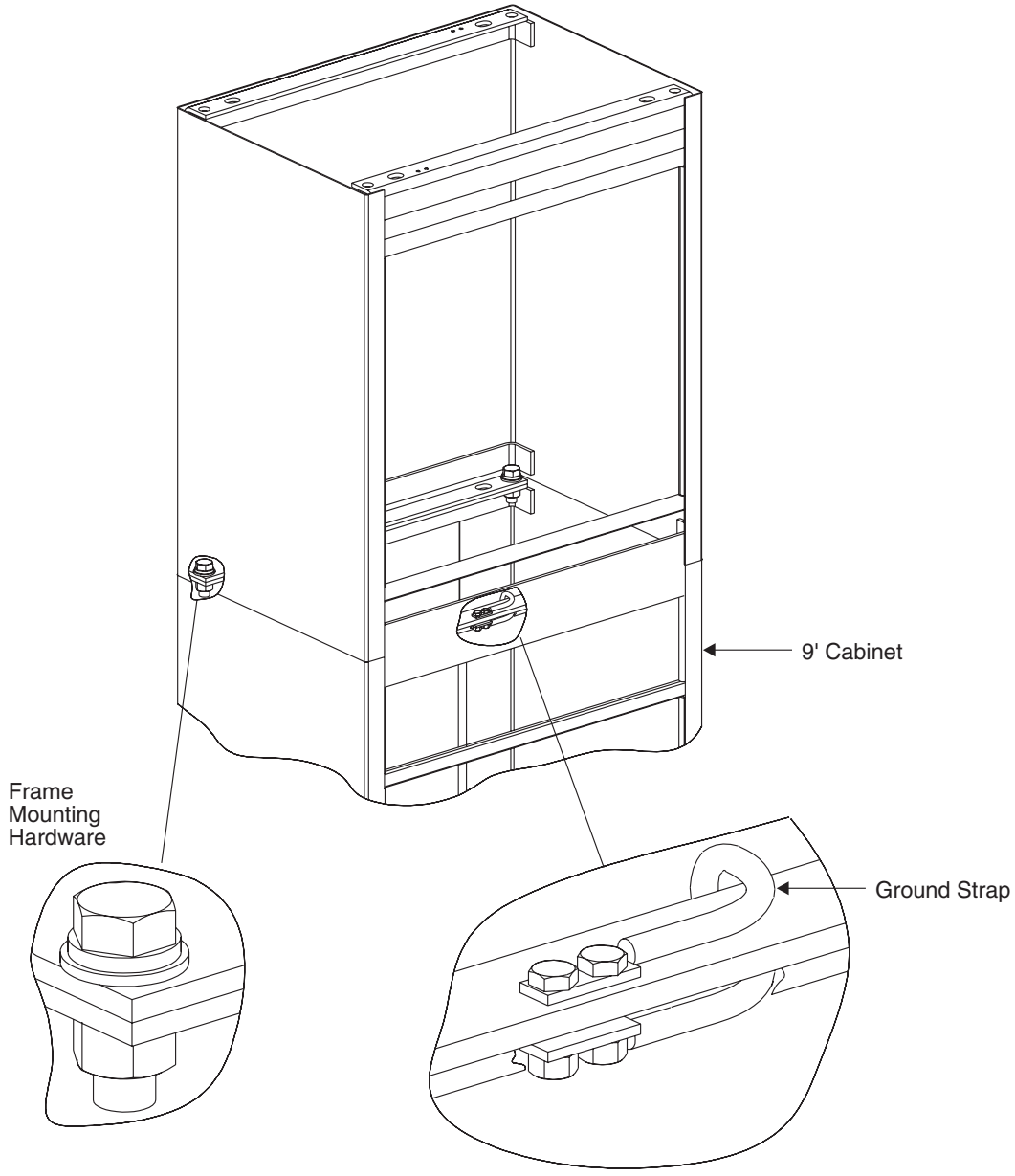


Figure 2-1: 2-1/2-Foot Extension Cabinet

Cabinet Types and Features, continued

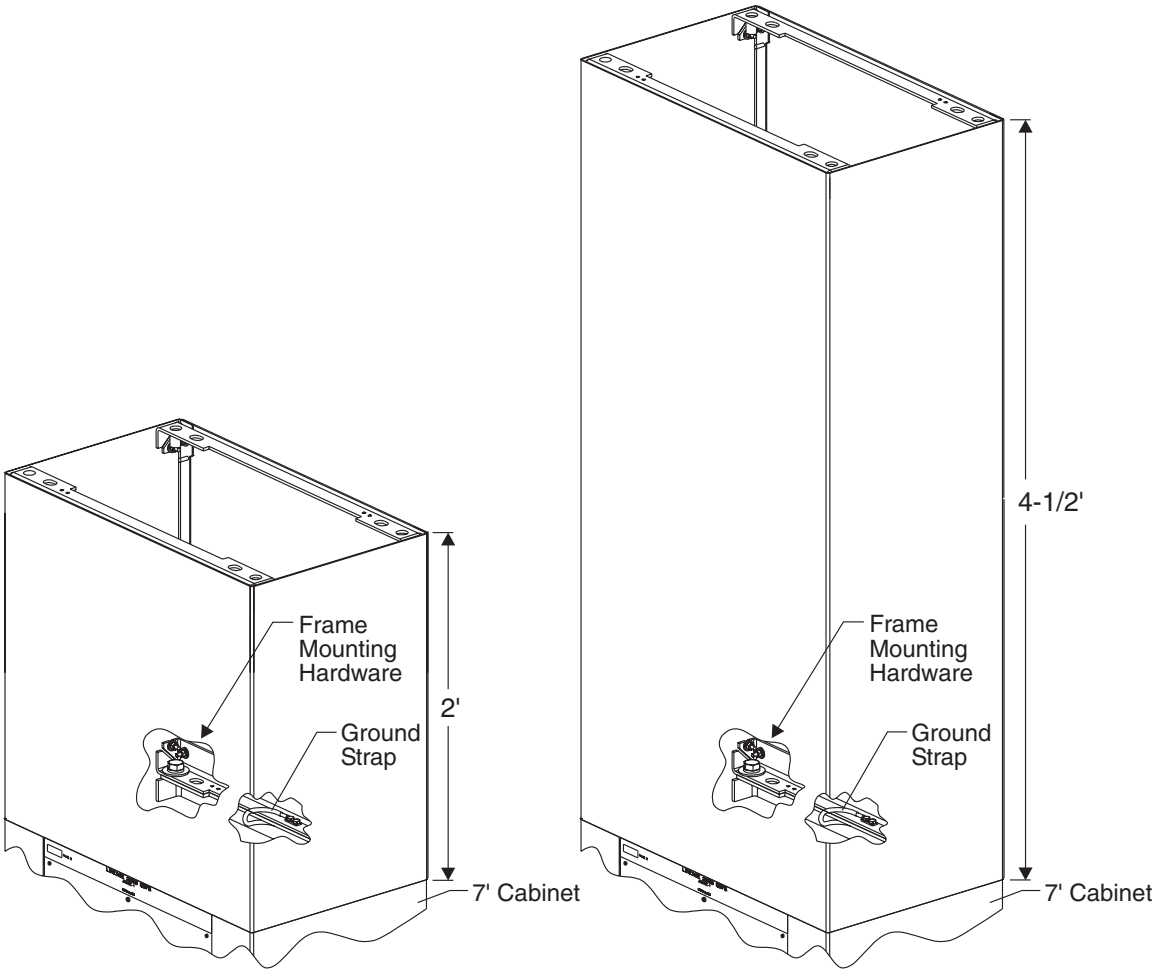


Figure 2-2: 2-Foot or 4-1/2-Foot Extension Cabinet

Cabinet Types and Features, continued

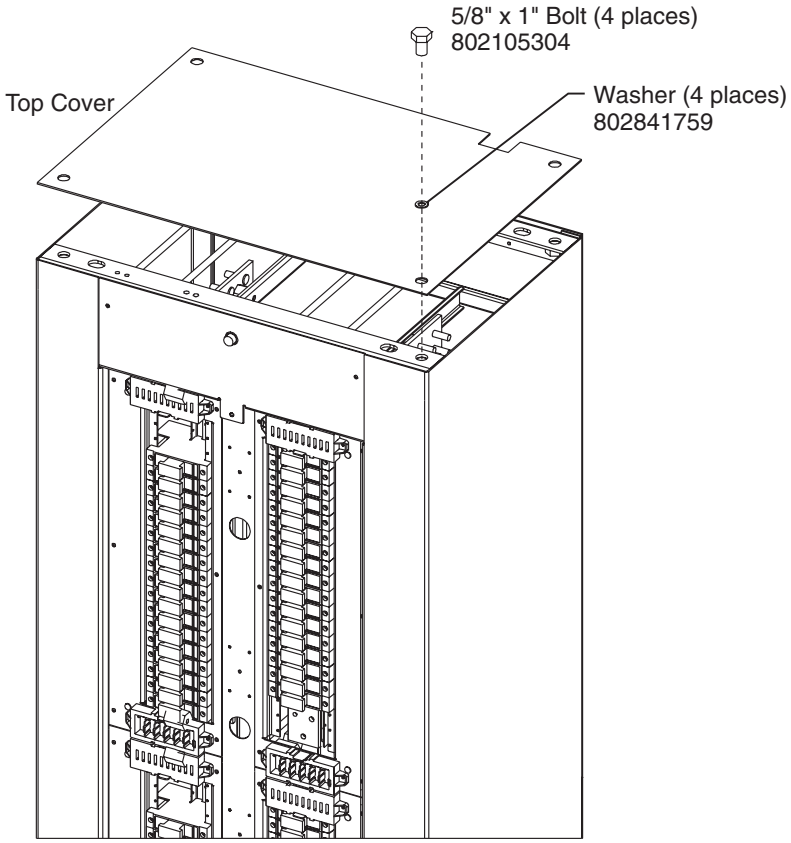
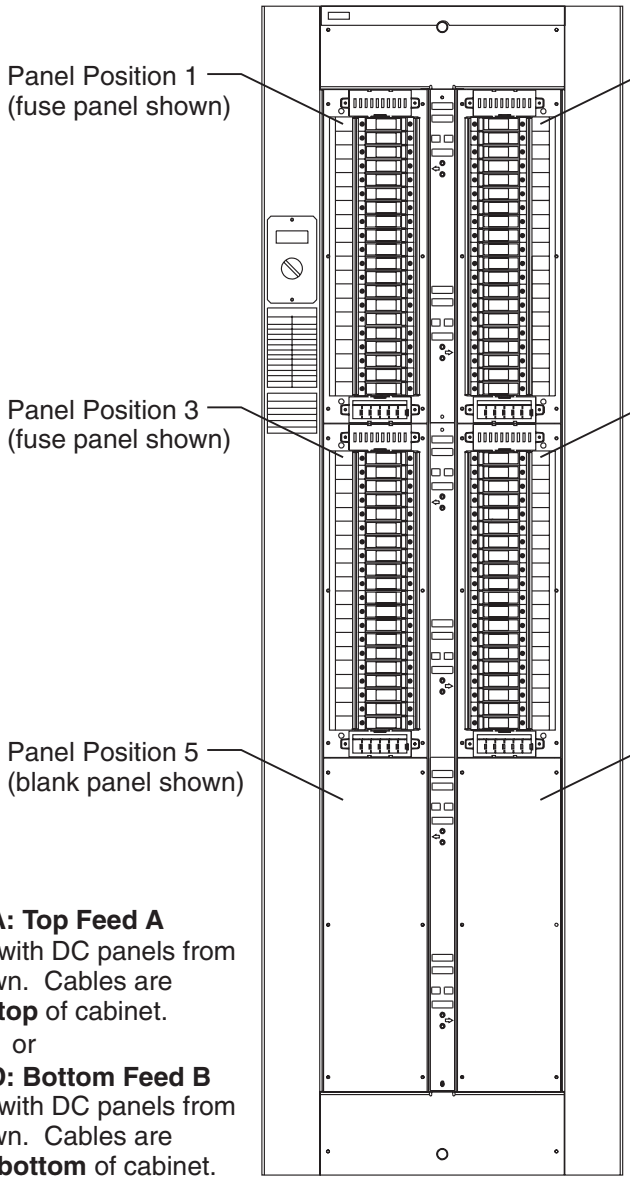


Figure 2-3: Top Cover for Bottom-Feed Applications

Cabinet Types and Features, continued



Group 10A: Top Feed A
Populated with DC panels from the top down. Cables are routed out **top** of cabinet.

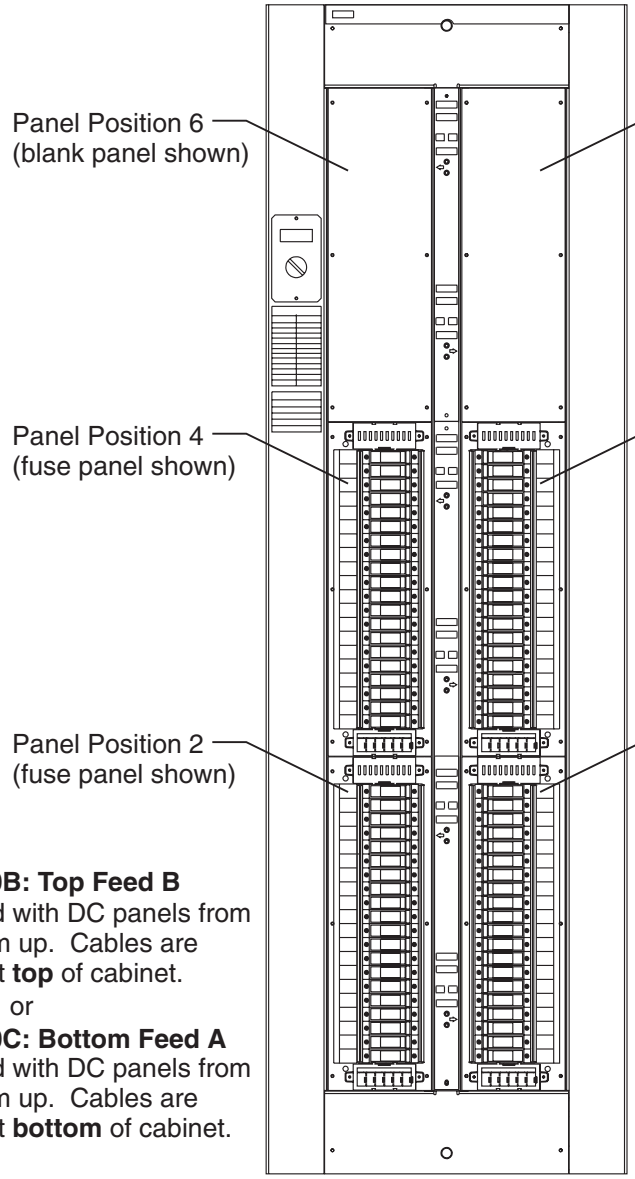
or

Group 10D: Bottom Feed B
Populated with DC panels from the top down. Cables are routed out **bottom** of cabinet.

Note: 7 foot cabinet shown. Similar for 9 foot cabinet.

Figure 2-4: Fuse Panel Position Numbering

Cabinet Types and Features, continued



Group 10B: Top Feed B
Populated with DC panels from the bottom up. Cables are routed out **top** of cabinet.

or

Group 10C: Bottom Feed A
Populated with DC panels from the bottom up. Cables are routed out **bottom** of cabinet.

Note: 7 foot cabinet shown. Similar for 9 foot cabinet.

Figure 2-5: Circuit Breaker Panel Position Numbering

Note

Equip fuse or circuit breaker panels starting at panel position 1 to eliminate possible cable congestion when installing additional fuse or circuit breaker panels in the field.

Load Bus Arrangements

The bus bars used in the distribution bay are sized to provide a rated current carrying capacity of 600 amperes. (A minimum of two 750 KCMIL feeder cables are required per shunt for currents larger than 500 amps per shunt.) A load bus is defined as one or more fuse or circuit breaker panels protected by a single circuit breaker or fuse at the battery plant. Cable from the battery plant is terminated at the load connection mounted on the dc panel.Group 20 provides load connection points for two load buses. Figure 2-6 shows this Group 20 load connection. As Figure 2-6 shows, battery is bused across a load monitoring shunt to each fuse/circuit breaker panel.

Note: Group 20 provides connection points for two side-by-side loads.

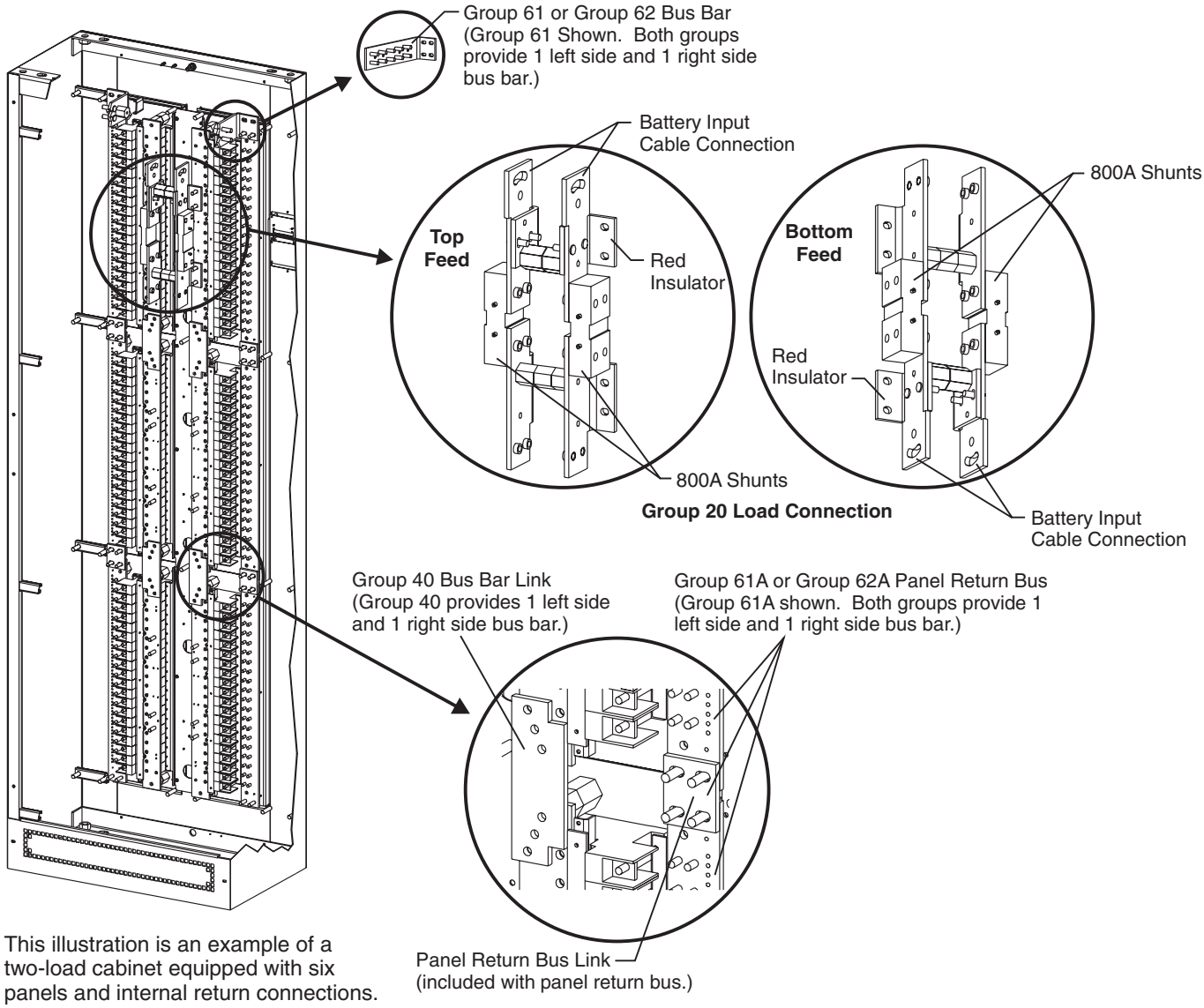
If fewer load buses are required, it is possible to connect fuse or circuit breaker panel battery buses together using a Group 40 bus bar link. This feature is shown on Figure 2-6. This may be desirable for two or four load distribution bays where more than twenty fuse or circuit breaker positions are required for a single load. Only fuse or circuit breaker panels mounted above or below one another may be connected, i.e., panels mounted on the left side of the cabinet cannot be joined to panels mounted on the right side of the cabinet. Remember that the 600 ampere capacity per load bus applies even if multiple fuse panels are connected together.

Note: Group 40 provides two bus bar links, one for the left side and one for the right side.

Note

All bus bars used in this product are copper with a solder plate finish. Bus bars do not require buffing or the application of NO-OX before connection to terminal lugs or other bus bars.

Load Bus Arrangements, continued



This illustration is an example of a two-load cabinet equipped with six panels and internal return connections.

Figure 2-6: Group 20 Load Connection Points

Addition of New Loads to a Working H569-445

Additional loads (input circuits) may be provided for existing H569-445 BDFB/BDCBB cabinets as load and distribution requirements change over the life of the product. Loads are provided in pairs for service to adjacent left and right side distribution panels. Distribution panels should be equipped from top to bottom in applications where the distribution conductors exit the top of the cabinet and from bottom to top where the distribution conductors exit the bottom of the cabinet as denoted in Figures A through D of the H569-445 Ordering Guide. Cable routing strategies for the input and distribution conductors in each of these applications are identified on sheet-B12 of H569-445 and should be referred to throughout this procedure.

Fuse or circuit breaker panels and the bus bar network used in the BDFB/BDCBB cabinet are designed for a maximum current carrying capacity of 600 amps for each load. The internal return bus option (G-61, G1A) is sized for a maximum of 600 amps per left or right side, regardless of the number of loads. The G62A is sized for a maximum of 1800 amps per left or right side. The external return bus option (G-60) must be employed if the total load on either side is required to exceed 600 amps.

The following procedure may be used for either splitting existing panels presently "linked" together into separate loads or for adding a pair of new fuse or circuit breaker panels as new loads (with new input circuits). All material required for this procedure outside of the input conductors, terminals, and their mounting hardware, is furnished in the 848376331 800 Amp Load Shunt Assembly kit. This assembly includes two 800A shunts, one for adjacent left and right side distribution panels.

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.

1. If new fuse (848376323 2-panel kit) or circuit breaker (848376315 2-panel kit) distribution panels are to be added into the cabinet, complete this work as indicated in the 848376299 instruction sheet furnished with these distribution panel kits. This work includes the connection of the two BEP1 alarm cards for these panels to the previous alarm cards in the cabinet as shown on SD83150-01 CAD-1. The two bus bar battery straps furnished with this kit shall be discarded. The two internal return bus bars and their straps may be used only if internal return bars are used in the previous panels of the cabinet already AND the total load carried by the distribution panels down either side of the cabinet will not exceed 600 amps for Group 61A, or 1800 amps for Group 62A. If both of

these requirements are not met, they too must be discarded and an external return bus utilized instead.

2. Mount the dual 800 Amp load shunt assembly onto the four 5/16-18 studs located on the rear of the input bus of both of the two adjacent fuse or circuit breaker panels making up the two new loads. Orient this assembly with the input side (glastic brackets) up for top feed and down for bottom feed. Secure using 5/16 nuts, washers, and lock washers furnished bagged in the kit, torquing to 135 in-lbs.

   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!

3. For a cabinet equipped with a load-only meter, connect the shunt monitoring pairs of the meter cable assembly to the appropriate shunts of the load shunt assembly. This meter cable set should already be in place with the required connectors tied back near the load shunt assembly mounting. Refer to SD83150-01 FS-7 and 9 for wire colors and polarity if necessary. Note that for a negative voltage (-48V) distribution cabinet, the solid lead of each shunt pair connects to the input side of its shunt to create a positive load reading on the ammeter. For cabinets utilizing the combination voltage and load meter, also connect the voltage monitoring lead of the meter cable set to a terminal strip on the rear of the input bus of each distribution panel, in addition to the shunt pair. Lead colors for this cable set are identified on SD83150-01 FS-10 and 11. Stamp the new positions on the meter selector switch as necessary to identify the added assignments.

4. Refer to H569-445 sheets B4 and B12 for cable routing recommendations for the input load and return conductors into the cabinet and install this cabling as necessary from the office power plant. Up to two cables at 750 kcmil maximum may terminate back-to-back onto the input bus assembly for each load of the dual 800 Amp load shunt assembly. If more than 2-750 cables per load are required for voltage drop requirements, H-taps or splice plates must be used outside the cabinet to limit those physically terminated within the cabinet to 2-750 cables per load. Return conductors for the added loads terminate onto the common internal return bus for each side located at the top (top feed) or bottom (bottom feed) of the cabinet or onto an external return bus.

Addition of New Loads to a Working H569-445, continued

5. Positively identify all cables back to their source and verify absence of potential prior to their termination. Torque all terminations to 240 in-lbs.

   Note: If splitting existing loads within the BDFB/BDCBB, the load conductor(s) will be at a live potential as soon as contact is made with its input bus assembly!

6. For loads serving new distribution panels, energize the new loads by inserting the fuses or closing the circuit breakers for those loads at the office power plant.

   If splitting existing loads within the BDFB/BDCBB, test that the voltage difference across the new loads' input circuit protection (empty fuse holders or open circuit breakers) at the office power plant is 1V or less and energize the new loads by inserting the fuses or closing the circuit breakers. At the BDFB/BDCBB ammeter, verify that a portion of the load current has shifted to the new load shunts. Then remove the battery strap bus bar links tying the panels with the new loads to the existing panels above or below them by removing the 6, 1/4-20 bolts securing each of them. Reuse one of the 1/4-20 x 5/8 bolts removed from each panel to re-secure the input bus for each panel to the apple insulators connected to the rear of these panels. Do NOT remove the internal return bus links to adjacent panels (secured via 4, 5/16-18 nuts) when the internal return bus option is used.

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.

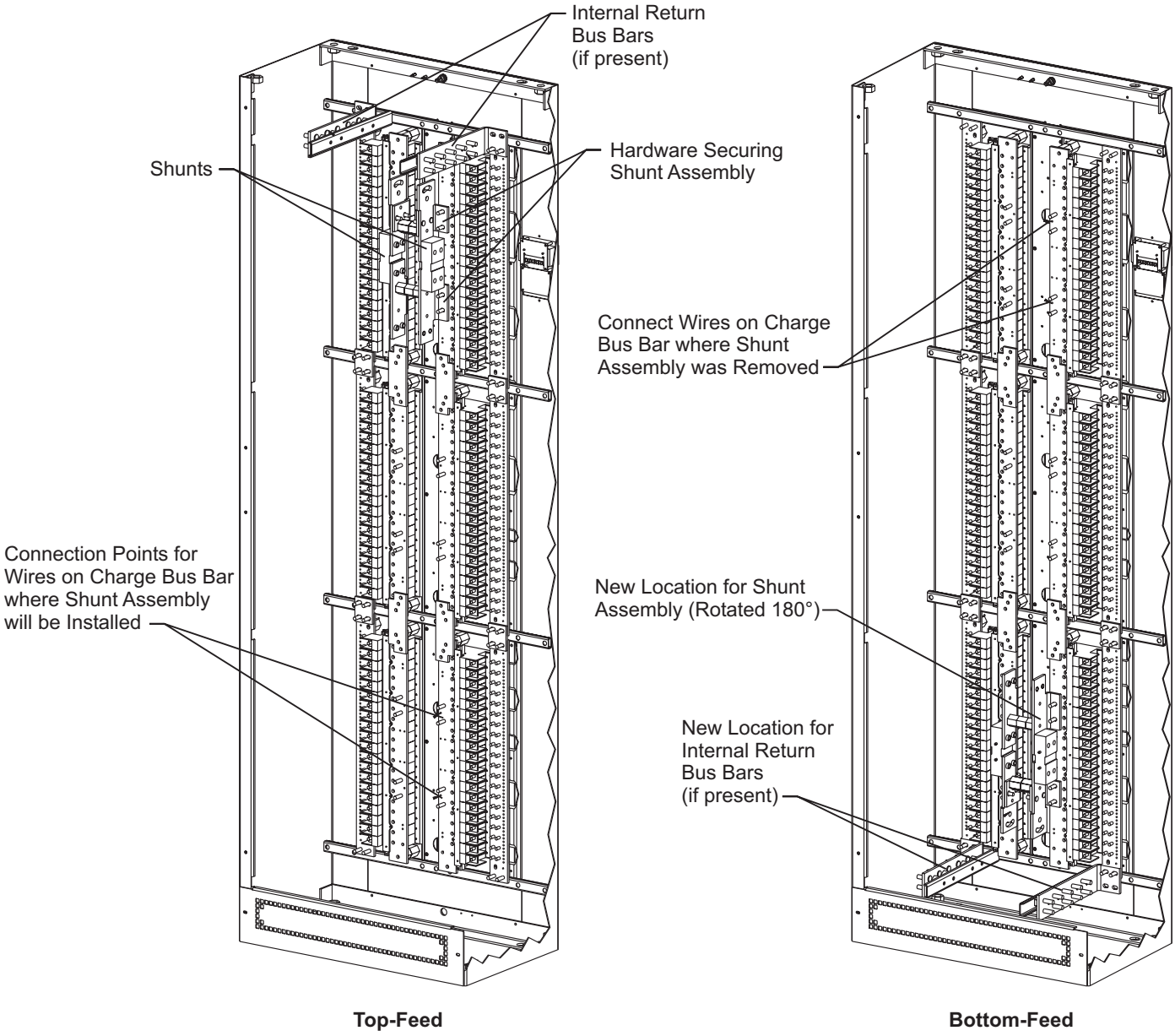


Figure 2-7: Top-Feed to Bottom-Feed Cabinet Conversion

2. Disconnect the hardware securing the shunt assembly at the top of the cabinet.

Converting Top-Feed to Bottom-Feed, continued

3. Remove wires from the charge bus bar at the bottom of the cabinet where the shunt assembly will be placed. (Or if these wires are connected together with a male/female quick-connect, disconnect these from each other.

4. Rotate the load shunt assembly 180° and mount it in the bottom of the cabinet.

5. Connect shunt wires as shown in drawing T83150-30.

6. Connect shunt wires to the charge bus bar at the top of the cabinet where the shunt assembly was removed. (Or reconnect wires if shunt wires were connected together with a male/female quick-connect.

7. Move the internal return bus bar from the top to the bottom of the cabinet. **Note:** Internal return bus bars may not be present.

Discharge Return Bus Options

Two optional discharge return bus options are available for terminating fuse or circuit breaker return leads: (1) Bus bar returns located in the distribution bay (G-61 and G-61A) or (2) A return bus located outside the distribution bay on a cable rack.

The first option involves a bus bar arrangement similar to the battery bus connection scheme discussed in the previous section. Discharge return cable from the battery plant is terminated at the top (or bottom) of the cabinet adjacent to the battery input cabling on Group 61 bus bars. Group 61 provides bus bars to connect the battery plant discharge return cabling to Group 61A bus bars mounted on each fuse or circuit breaker panel adjacent to the fuse blocks or circuit breakers. This option is shown in Figure 2-6. Internal returns offer the advantage of paired leads directly from the fuse or circuit breaker and eliminates the need for identification tags on each return lead. The discharge return bus is designed for terminating 1/4 inch double hole terminal lugs.

Note: Group 61A and Group 62A provide two bus bar links, one for the left side and one for the right side.

The drawback to this cabling scheme is that you are limited to 600 amps (G61A) or 1800 amps (G62A) capacity. A second concern is the potential 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.

The external discharge return bus bar options are shown in Figures 2-8 and 2-9. The external bus is mounted on a standard 15 or 20 inch ladder type cable rack. Options 848258679 and 848258687 are rated for 2400 amperes of current. Option 848258679 provides the first bus bar and the cable rack mounting hardware. Option 848258687 provides a bus bar, the connecting bus bar and insulating standoffs for stacking additional tiers as required. The ED83019-50 G1 bus bar assembly has a 1200 ampere current rating.

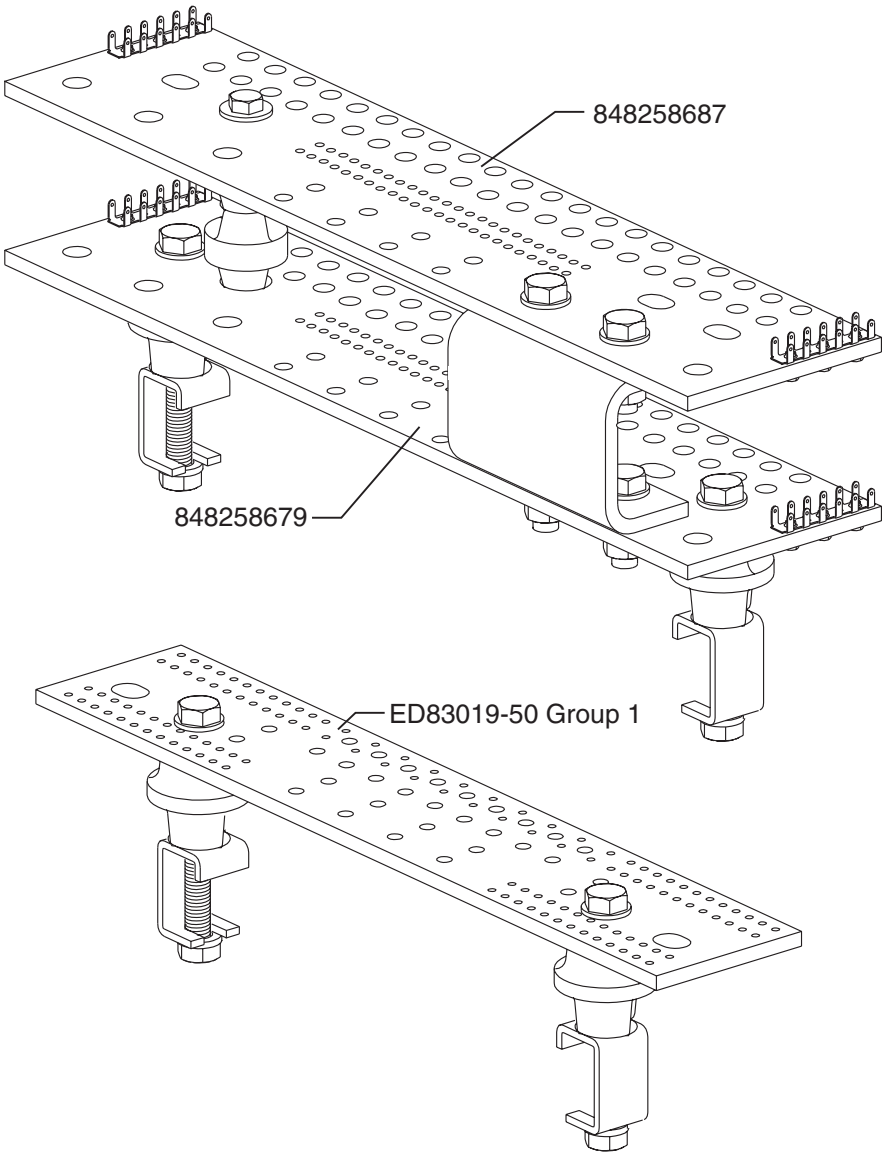


Figure 2-8: External Discharge Return Bus Options on Cable Rack

Discharge Return Bus Options, continued

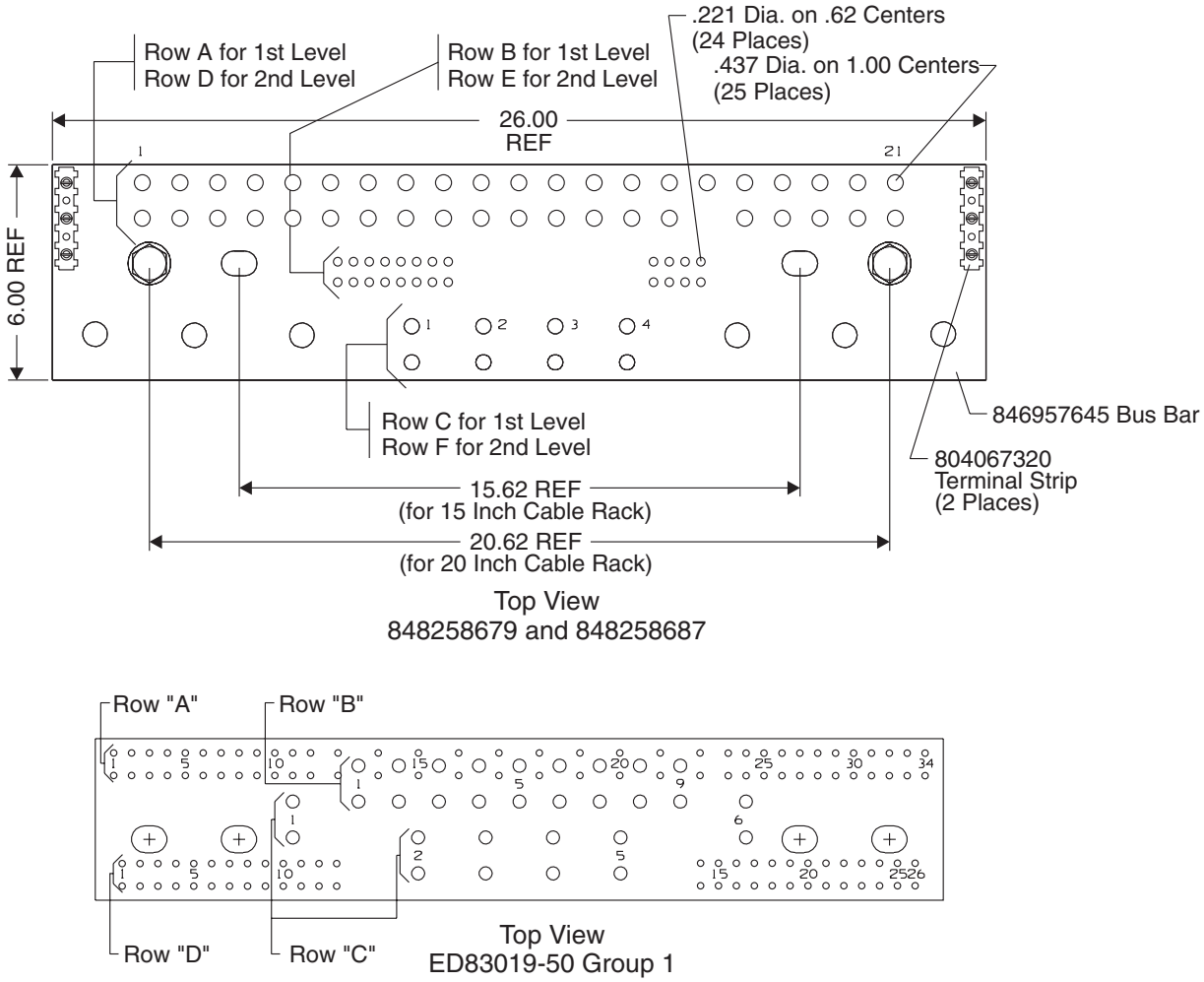


Figure 2-9: Bus Bar Hole Pattern and Numbering Schemes

Lugs and Hardware

Breakers and Fuses

Table 2-A: Lugs and Hardware for Breakers and Fuses

Lug Comcode	Type	Wire Gauge		Hardware
		Std	Flex	
406338152	Load	14-10	14-10	Provided
406144428	Return			Provided
405356189	Load	8	8	Provided
406021626	Return			Provided
405347436	Load	6	6	Provided
405347519	Return			Provided
405347543	Load	4	4	Provided
405347576	Return			Provided
405348186	Load	2	--	Provided
405348202	Return			Provided
405347659	Load	--	2	Provided
405347683	Return			Provided
406338707	Load	1/0	--	Provided
407817568	Return			Provided
406467187	Load	2/0	1/0	Provided
407817550	Return			Provided

Lugs and Hardware, continued

External Return Bus Bars

Table 2-B: Lugs and Hardware for External Return Bus Bars

Lug Comcode	Wire Gauge		
	Std	Flex	
405356171	10-14	10-14	Rows B & E for 848258679 & 848258687 & Rows A & D for ED83019-50 G1*
405348178	8	8	
406338400	6	6	
406332841	6	6	Rows A, C, D, & F for 848258679 & 848258687 & Rows B & C for ED83019-50 G1*
405332940	4	4	
406338665	2	--	
405348228	1/0	--	
405348236	2/0	1/0	
406021725	--	2/0	
405348251	4/0	--	
405347923	--	4/0	
405348277	350	--	Rows C & F for 848258679 & 848258687 & Row C for ED83019-50 G1*
406021915	--	350	
405348293	500	--	
406434241	--	500	
406335141	750	--	
405434290	--	750	
847073756	Hardware Kit Bolt Size (8-32, 10-32, 10-24)		
847073731	Hardware Kit bolt Size (3/8-16) (Grade 2)		
* Refer to Figure 2-9.			

Digital Meters and Monitoring Shunts

As discussed in the previous sections, there are six possible load buses in the 7-foot distribution bay, three per side, and eight possible load buses in the 9-foot distribution bay, four per side. Each load bus is equipped with an 800 ampere shunt per Group 20. Group 20 provides two shunts, one for the left dc panel and one for the right dc panel. Shunts are provided to determine actual currents and the remaining capacity of each load bus. They can be monitored externally by other office equipment or in the distribution bay with a digital meter. The digital meter monitors the shunt currents and the panel voltages.

The VIM1 Smart Monitor (Figure 2-10) is the newest digital meter used on Battery Distribution Fuse Bays (BDFB) and Battery Distribution Circuit Breaker Bays (BDCBB). The VIM1 features include individual configurable overload thresholds, individually configurable power loss thresholds, audible and remote alarms with network connectivity and much more. Specific Kits are available to upgrade existing meters in the field. The VIM1 receives redundant power from the A and B panels.

The discontinued G-70/G-71/G-72 digital meters monitor only the 800-ampere shunts. The shunts are wired to the meter through a rotary switch, enabling the user to select any of the load buses. The meter is powered from the first equipped panel position.

Figure 2-10: VIM1 Smart Distribution Monitor

VIM1 Meter

The VIM1 Meter can be configured to display voltage, current, and panel identifier of each monitored load bus. When an alarm occurs, the backlight on the display changes color from green (normal) to red (alarm

active). The front panel text also changes from “No Alarms” to “Alarms.” Left and Right keys are used to navigate the menu. Up and Down keys are used to adjust the parameters. They also allow screen contrast adjustment; Menu > System > Parameters > Display Contrast. The VIM1 includes an audible alarm with a user configurabel on/off feature. There are three form-C relays available (Alarm cable CC848846287) for remote monitoring.

Alarm Cable Pinouts and Description

Pin	Form-C Alarm	Wire Color
7	Fuse NO	Blue
1	Fuse NC	White/Blue
2	Fuse C	Slate
10	OVL NO	White/Slate
4	OVL NC	Orange
5	OVL C	White/Orange
12	PL NO	Yellow
6	PL NC	White/Yellow
11	PL C	White

Digital Meters and Monitoring Shunts, continued

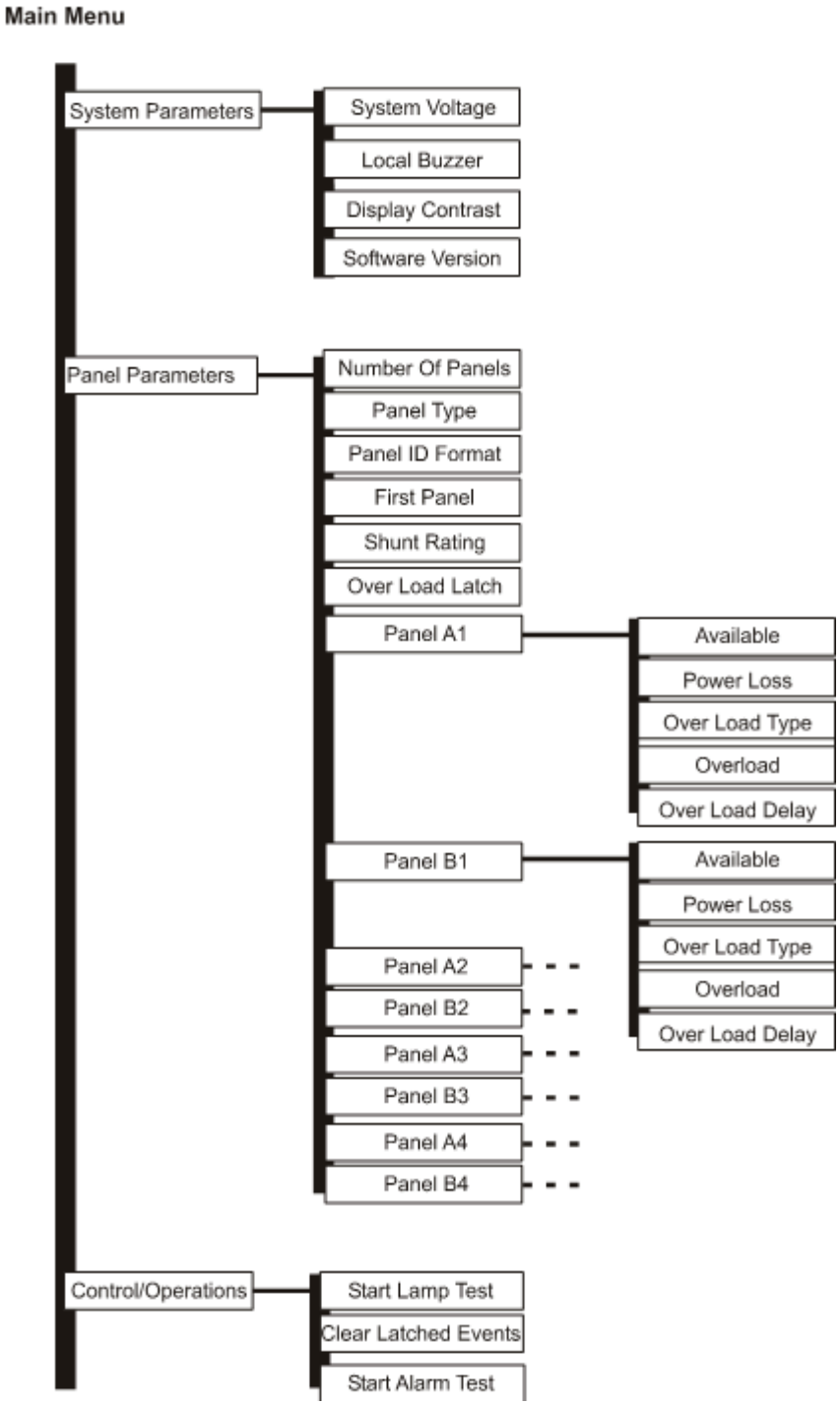


Figure 2-11 VIM1 Menu

Digital Meters and Monitoring Shunts, continued

G-70, G-72

The G-70/G-72 digital meter only monitors the 800-ampere shunt (see Figure 2-12. The shunts are wired to the meter through a rotary switch, enabling the user to select any of the possible load buses. The meter is powered from the first equipped panel position.

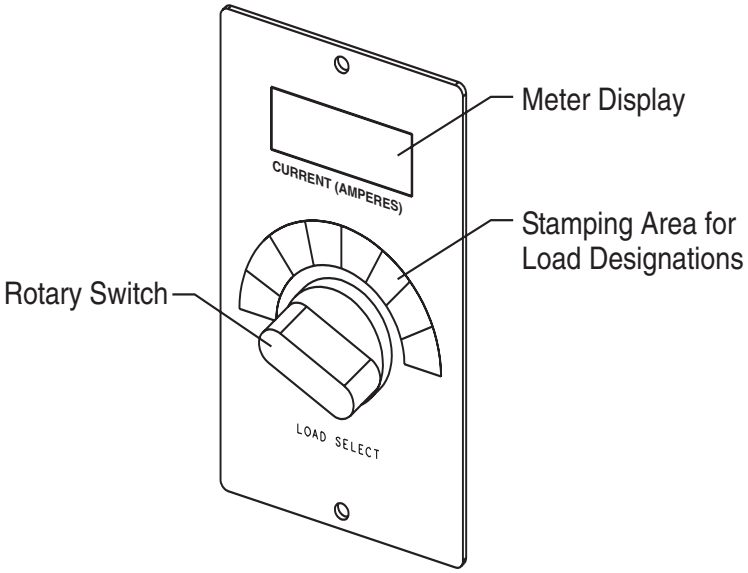


Figure 2-12: G-70/G-72 Digital Meter

Digital Meters and Monitoring Shunts, continued

G-71

The G-71 digital meter monitors the 800-ampere shunts, as well as each distribution panel voltage (see Figure 2-13). The shunts are wired to the meter through a rotary switch, enabling the user to select any of the possible load buses. the meter is powered from the load panel selected with the rotary switch. A toggle switch is used to select voltage or current..

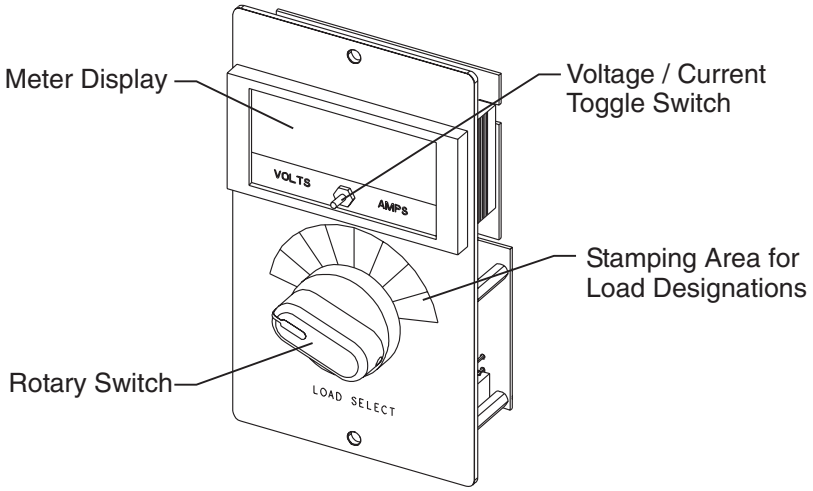


Figure 2-13: G-71 Digital Meter

ED83127-30
Fuse Panels

Groups 30A-30D

Each fuse panel is equipped with 20 single position fuse blocks for TPS fuses. If alternate fuse blocks are desired, they can be ordered separately and installed in the field. Spare fuse holders are supplied with the fuse panels.

The Group 30A-30D fuse panels provide two fuse panels, each with 20 3-70 ampere cartridge type fuse holders, comcode 406686980. These fuse blocks are UL recognized and provide a more compact design than previous fuse holders. The fuse block will accommodate the WP-92461 series of fuses. These fuses offer a big advantage over other fuse types in that they are UL recognized to UL standard 198L “DC Industrial Fuses” and have a 170 Vdc, 100,000 ampere interrupt rating.

Note: Each of the fuse panel groups (30A-30D) provides two fuse panels, one for the right side and one for the left side.

ED83127-30 G-B (field installed) provides one GMT fuse module containing three fuse positions. Each fuse position may be equipped with a GMT fuse ranging from 1/2 to 5 amperes. The GMT fuse module offers the customer the option of using the distribution bay for small miscellaneous loads in the office that might otherwise require a separate fuse panel.

ED83127-30 G-D (field installed) provides one 70-150A TPL type fuse block. These fuse blocks occupy two positions within the fuse panel.

ED83127-30 Fuse Panels, continued

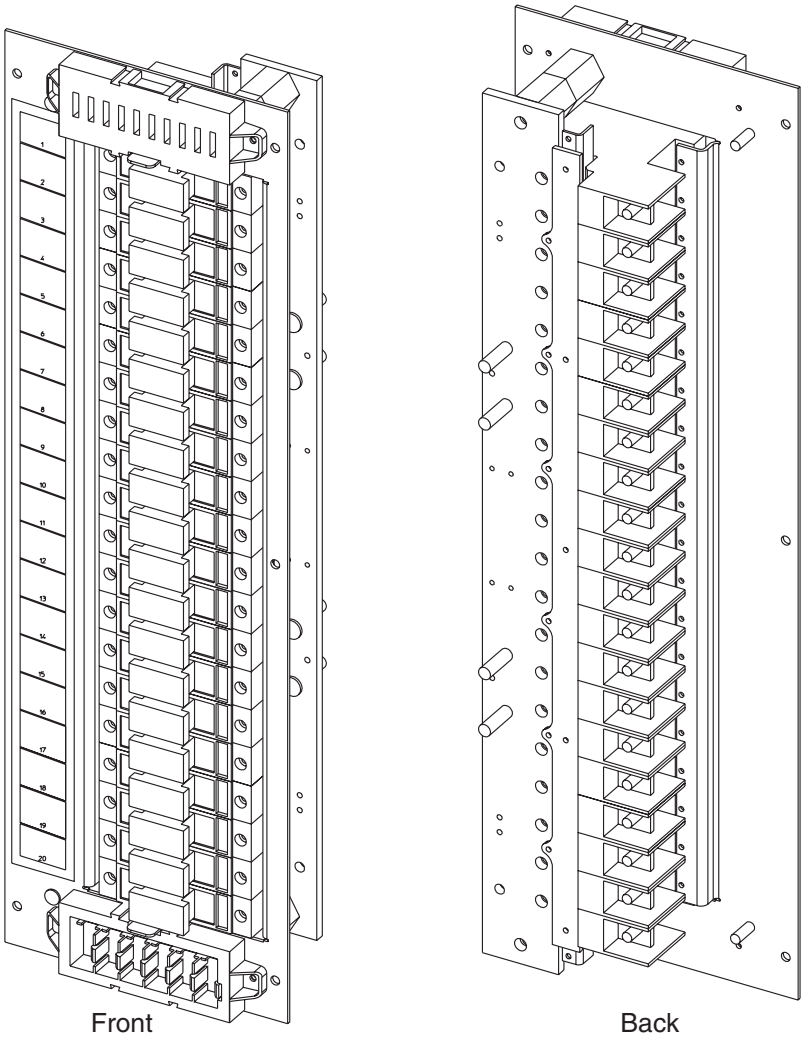


Figure 2-14: H569-445 Group 30A-30D Fuse Panel (One Shown; Two Are Provided Per Group)

ED83127-30 Fuse Panels, continued

Groups 31A and 31B

Groups 31A and 31B each provide two circuit breaker panels, one for the left side and one for the right side of the bay. See Figure 2-15 (one shown; two provided per group). Each circuit breaker panel has 20 positions. The circuit breakers are sized from 3 to 100 amperes. They are UL listed. The breakers are rated at 80Vdc with a 10,000 amp interrupt capacity. The ±130V option is not offered for circuit breaker panels.

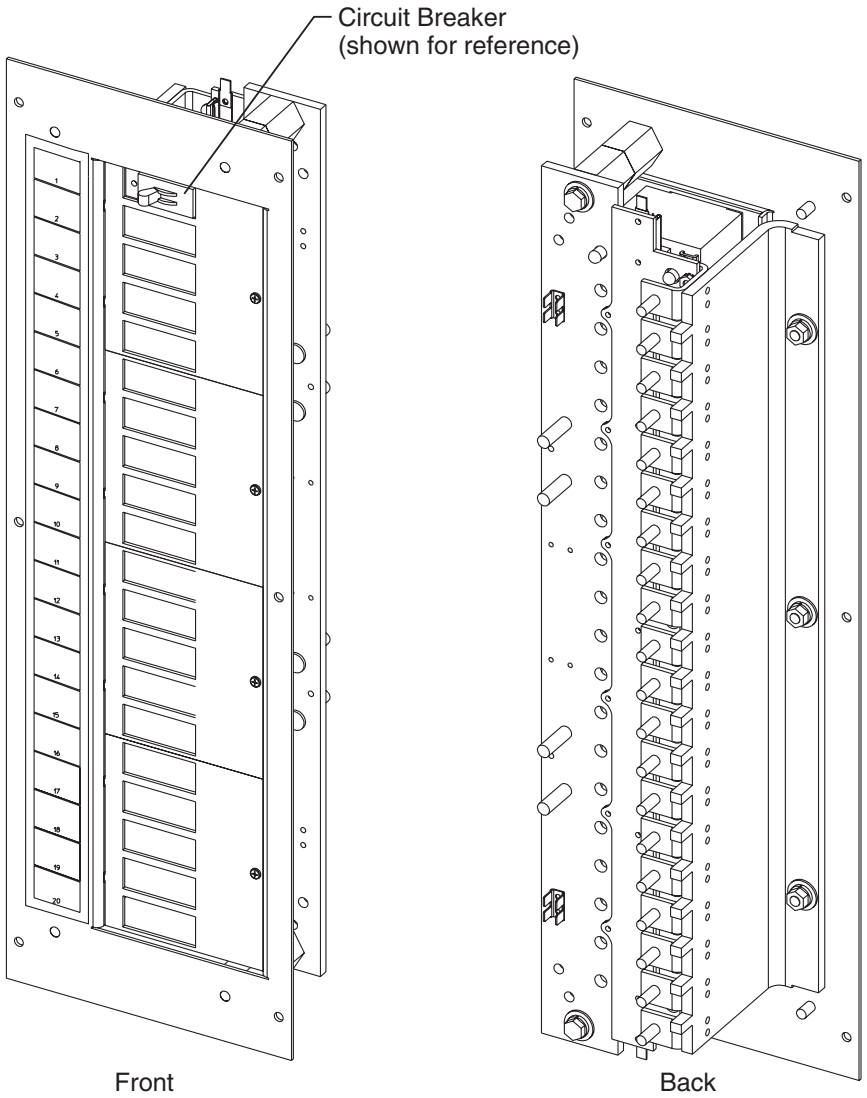


Figure 2-15: H569-445 Groups 31A and 31B Circuit Breaker Panel

ED83127-30 Fuse Panels, continued

Group 40

Group 40 provides 6 ABS fuses (3A max/position, 15A total.) The input power to G40 may be obtained from an external source or from any of the fuse or circuit breaker positions as part of Group 30A, Group 30B, Group 31A or Group 31B.

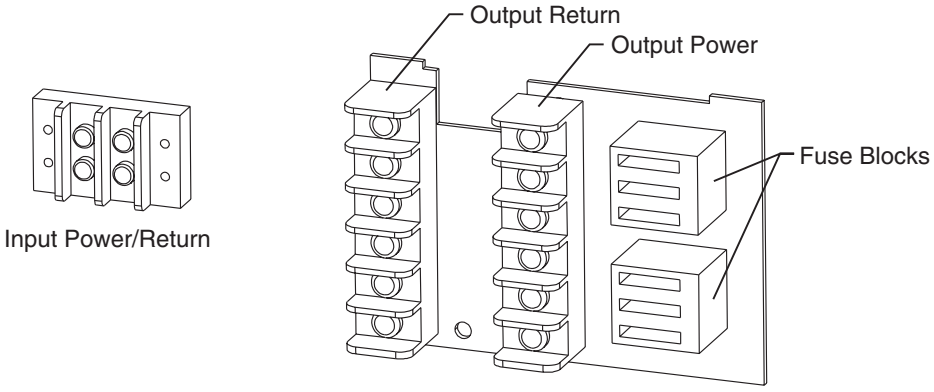


Figure 2-16: A-CP/BEP1 Board Layout

Alarm Circuit Module (BEP1)

The alarm circuit module, apparatus code A-CP/BEP1, provides a means for indicating a power loss and a fuse or circuit breaker alarm for each fuse or circuit breaker panel. Indications of these alarms are by means of an LED and by contact closures.

The BEP1 pack will accept nominal input voltages of 24 and 48 volts. Operation in ±130 volt distribution bay frames (not an option for circuit breaker distribution frames) is achieved by addition of a dropping resistor mounted on the fuse panel to drop the nominal 130 volt level to the nominal 48 volt level.

The BEP1 alarm module is provided with the fuse or circuit breaker panels. These groups describe the nominal voltage at which the fuse (24, 48, or 130 volts) or circuit breaker panel will operate (24 or 48 volts). Figure 2-17 shows the layout of the alarm circuit module and Figure 2-18 shows the input (P102) and output (P101) connector pin descriptions. The alarm module provides two Form C contacts for power loss and three Form C contacts for fuse or circuit breaker failure. The alarm output connector references of audible, visual and remote given with each alarm module are arbitrary and are provided as a suggested standard for remote monitoring equipment. However, installation personnel may select any set of Form C contacts.

When power loss to a panel occurs, a closure exists between pins 1 and 2 and pins 3 and 4 on the output connector (P101), while an open condition exists between pins 1 and 9 and pins 3 and 10.

When a fuse or circuit breaker operates on a panel, a closure exists between pins 8 and 15, pins 11 and 12, and pins 13 and 14 of connector P101, while an open condition exists between pins 7 and 8, pins 6 and 12, and pins 5 and 13.

Alarm Circuit Module (BEP1), continued

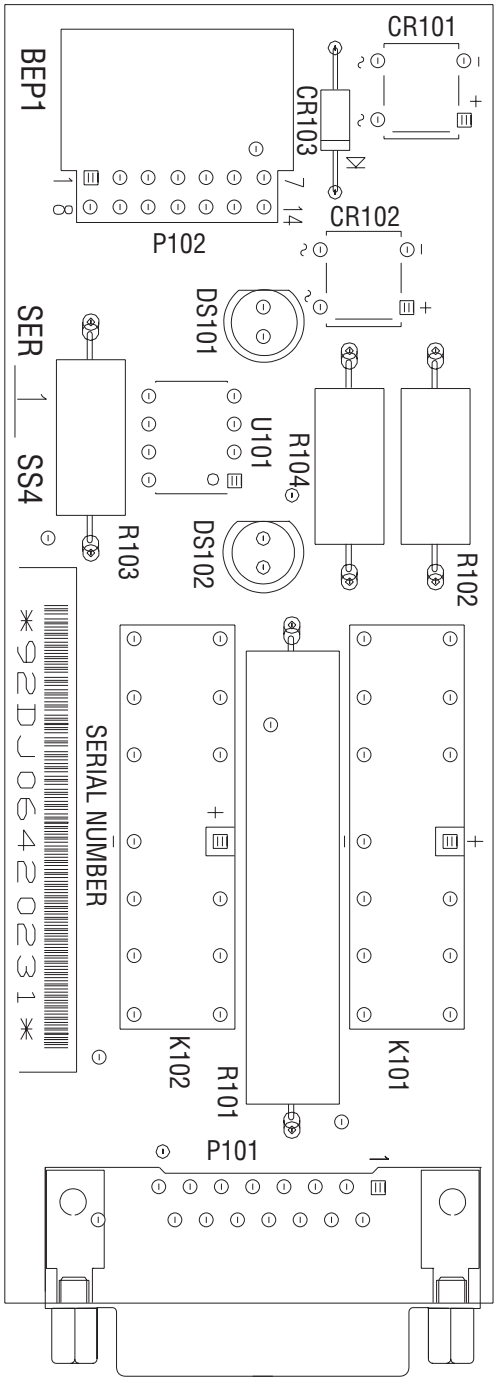
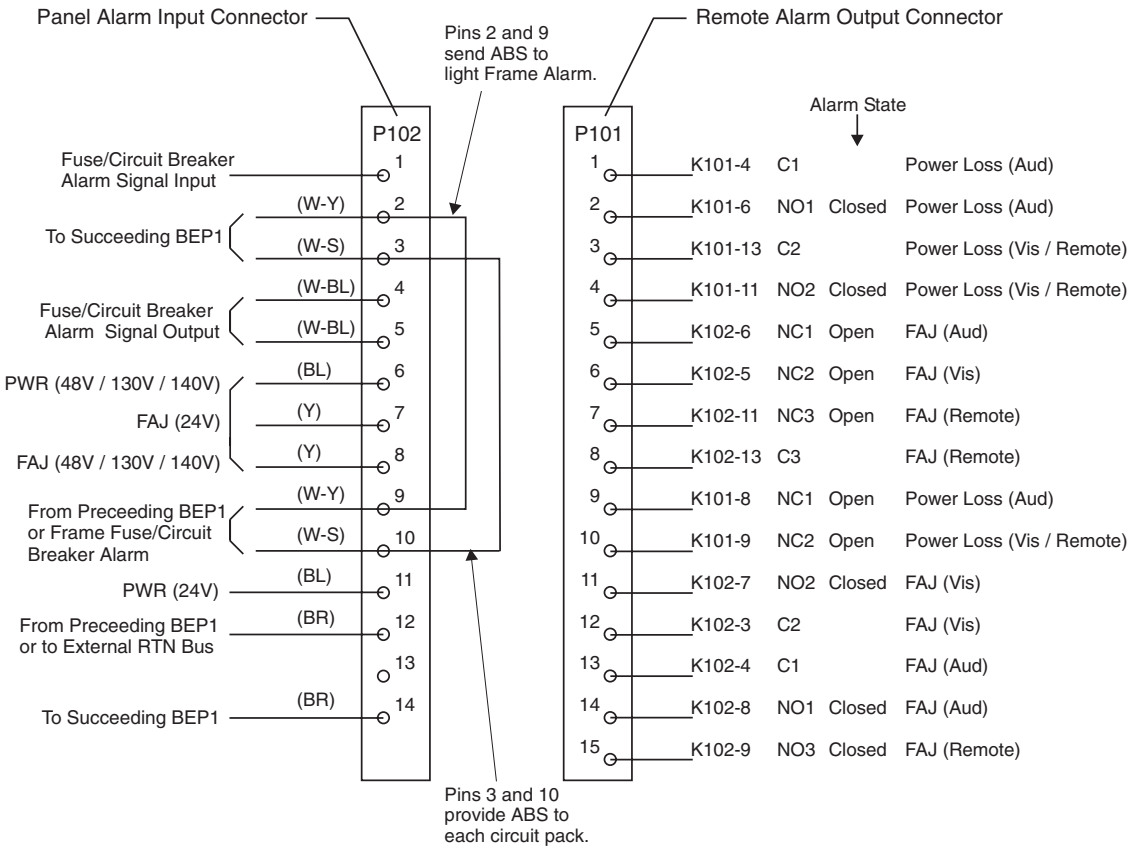


Figure 2-17: A-CP/BEP1 Board Layout

Alarm Circuit Module (BEP1), continued



Power Loss Relay, Normal Operating Condition:

Open condition exists between pins 1 & 2, and pins 3 & 4.
Closed condition exists between pins 1 & 9, and pins 3 & 10.
When power loss occurs, the above conditions are reversed.

Fuse Alarm Relay, Normal Operating Condition:

Open condition exists between pins 13 & 14, 11 & 12, and pins 8 & 15.
Closed condition exists between pins 5 & 13, pins 6 & 12, and pins 7 & 8.
When fuse alarm occurs, the above conditions are reversed.

Figure 2-18: A-CP/BEP1 Input/Output Connections (Alarm Module With No Power Is in "Normal" State)

Alarm Circuit Module (BEP1), continued

Detailed Circuit Description

The BEP1 consists of two monitoring circuits, one for panel power loss and the other for fuse failures. These circuits are described as follows.

Power Input: DC power (24, 48, or 130 Vdc through external resistor) is provided to P102 pins 11 or 6. Nominal input voltage to bridge CR101 is 24 Vdc. Bridge CR101 allows the BEP1 to operate from either positive or negative voltages. Output voltage of nominal 22 Vdc from CR101 is applied to relay K101 and LED DS101. Relay K101 is held normally operated and DS101 (green) is illuminated. Fuse or circuit breaker alarm power is provided through P102 pins 7 or 8. Bridge CR102 allows operation from either voltage polarity. CR102 output of 22 Vdc nominal is applied to relay K102 and LED DS102 (red). Fuse or circuit breaker alarm power is normally present only when a fuse or circuit breaker blows and thus K102 is normally released and DS102 is extinguished. The return path for the power monitor and fuse or circuit breaker alarm monitor is through P102-12 and 14.

Power Loss Alarm: Loss of bus voltage will cause relay K101 to release and LED DS101 (green) to extinguish. Two Form C contacts on K101 are available through P101 to monitor for power loss.

Fuse or Circuit Breaker Alarm: A cleared fuse or circuit breaker will apply power through P102 to operate relay K102 and illuminate LED DS102 (red). Three Form C contacts on K102 are provided through P101 for external alarms.

Frame Alarm: In addition to the individual panel alarm indicators, there is a frame alarm lamp at the top of the bay. This frame alarm lights when power is lost to a fuse or circuit breaker panel or there is a fuse or circuit breaker alarm. Power for lighting the frame lamp is brought from the battery plant on an auxiliary battery supply (ABS) lead. Figure 2-19 shows the frame alarm and ABS termination points at the top of the cabinet. When ABS is from a positive ground battery plant, it is brought into the distribution bay on terminal E3. This signal is daisy chained through all the circuit modules. A fuse or circuit breaker failure or power loss on a circuit module sends the ABS signal back up to the frame lamp socket. The ABS return lead back to the battery plant is also connected to the frame alarm lamp via terminal E4 to complete the circuit.

Alarm Circuit Module (BEP1), continued

Detailed Circuit Description, continued

In some installations, the use of a ABS lead from the battery plant may not be available or desirable. An alternative alarming method substitutes power from a load bus for ABS. A 22-gauge wire may be run from the battery bus of fuse or circuit breaker panel number 1 to terminal E3. The return lead from the frame lamp via terminal 4 would go to the discharge return bus located on the cable rack. The obvious consequence of this option is if power is lost to fuse or circuit breaker panel number 1, the frame alarm will not light.

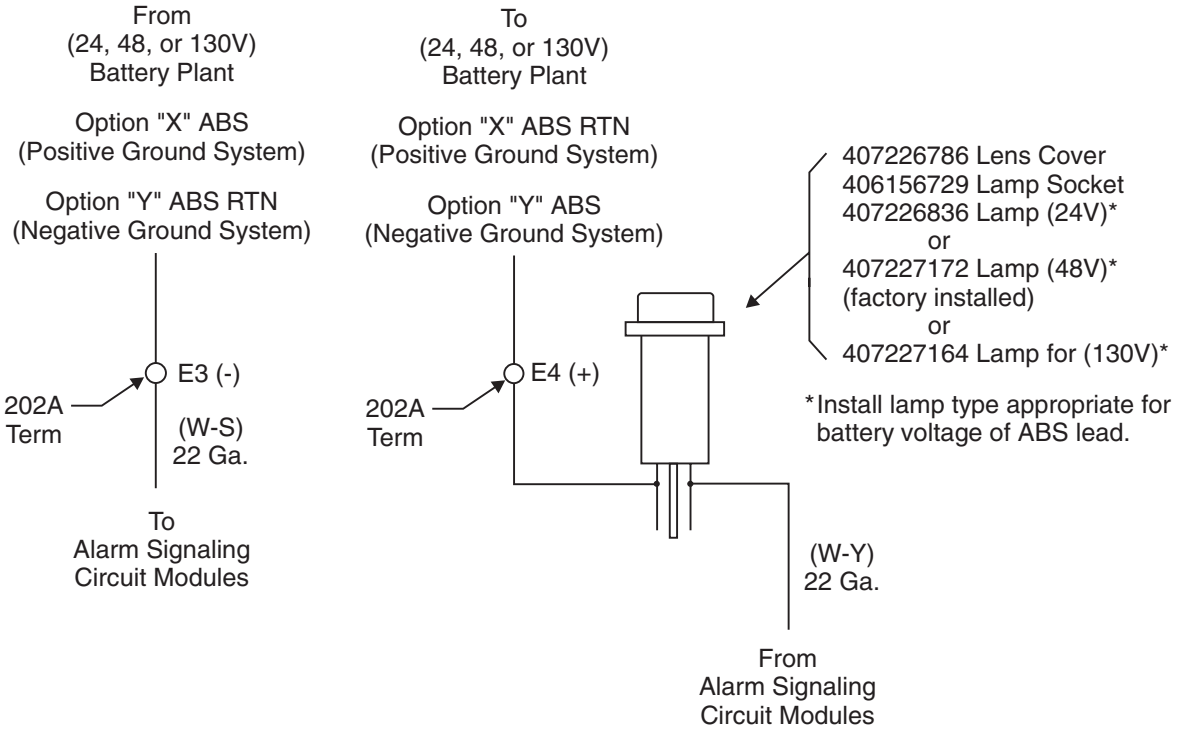


Figure 2-19: Frame Alarm

Alarm Circuit Module (BEP1), continued

Monitoring Multiple Alarm Modules for Negative Plants

In most distribution bay applications, customers require remote monitoring of a frame, fuse or circuit breaker alarm only and not individual load buses. Therefore, fuse or circuit breaker alarms on multiple packs may be connected so that the remote fuse or circuit breaker alarm signal on one pack can be operated from the other packs. This daisy chain is factory wired so that frame fuse or circuit breaker alarm may be monitored from the position 1 alarm module. A fuse or circuit breaker alarm on any pack will cause current flow through opto-isolator U101 causing it to turn on and apply voltage to P102 pins 4 and 5. Pins 4 or 5 are alternately connected from pack to pack providing a common fuse or circuit breaker alarm output signal. The position 1 alarm module monitors the other packs by connecting its P102 pin 1 fuse or circuit breaker alarm input to P102 pin 4 of the position 2 alarm module. See Figure 2-20. Thus voltage from any pack with an active fuse or circuit breaker alarm will cause K102 of the position 1 pack to be operated via P102 pin 1, causing an alarm on its P101 contacts. This feature is intended to provide a local visual indication of a fuse or circuit breaker alarm (DS102 of the pack with the alarm) and remote monitoring of the Form C contacts of a single alarm module. All packs will alarm independently by simply disconnecting pin 1.

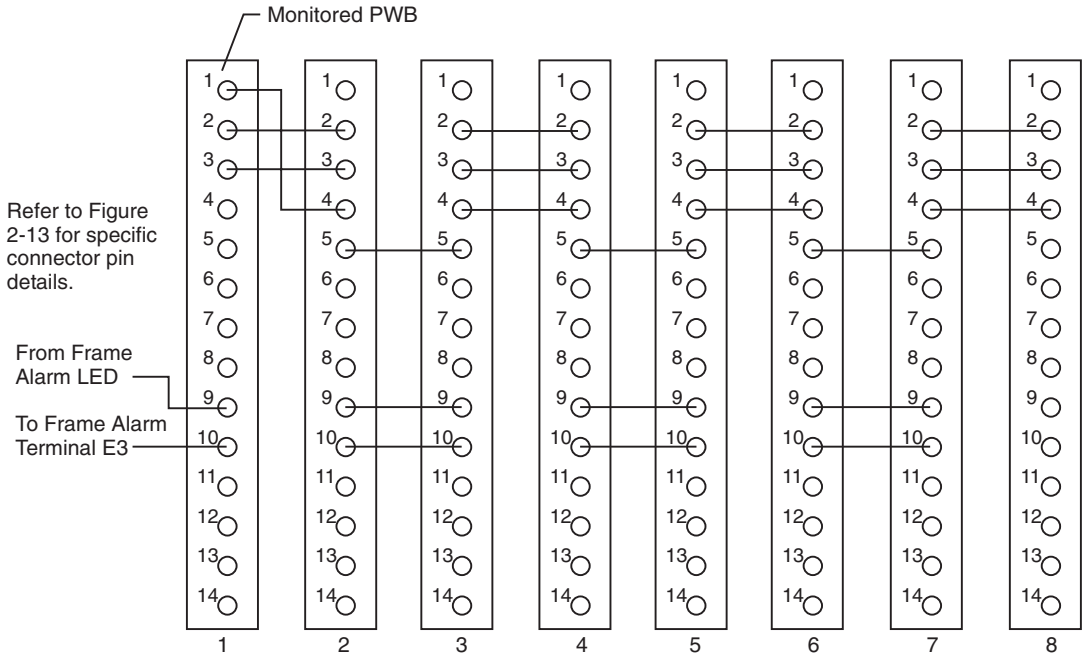


Figure 2-20: P102 Factory Alarm Wiring

Alarm Circuit Module (BEP1), continued

Monitoring Multiple Alarm Modules for Negative Plants, continued

Remote monitoring of power loss is furnished for individual fuse or circuit breaker panels. However, power loss alarms will probably not be remotely monitored in most applications because loss of power in a distribution bay usually results in a number of other simultaneous alarms from the battery plant and load equipment. If power loss alarm for the entire cabinet is desired, the installer must connect the alarm module output pins P101 - 1, 2, 3, 4, (close on alarm) or 1, 3, 9, 10 (open on alarm) as shown in Figure 2-21. The connections can be made with 26-gauge solid wire soldered or wire-wrapped to the 405095043 output connectors. These connectors are furnished with each alarm module.

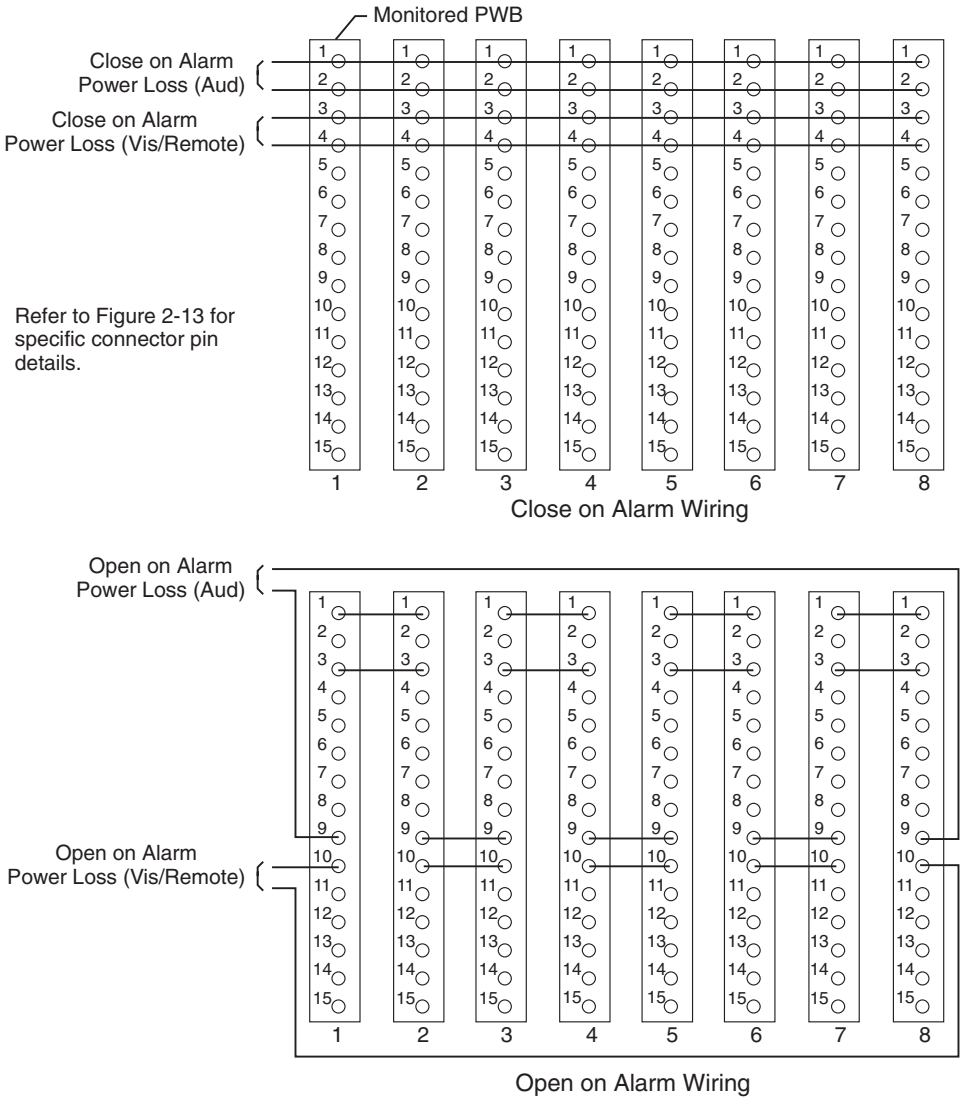


Figure 2-21: P101 Frame Power Loss Alarm Wiring

Alarm Circuit Module (BEP1), continued

Monitoring Multiple Alarm Modules for Positive Plants

Opto-isolator U101 is current-direction sensitive. Therefore, remote monitoring of frame alarms for positive plants is wired differently than for negative plants. For positive plants, fuse alarms on multiple packs should be daisy-chained together via P101. This allows the remote fuse or circuit breaker alarm signal on any pack to be monitored from the position 1 alarm module. Three Form C contacts are provided. They must be connected to alarm module output pins on connector P101 - 5, 6, 7, 8, 11, 12, 13, 14, and 15 (see Figure 2-22). The connections can be made with 26-gauge solid wire and wire-tapped to the 405095043 output connector provided with each alarm module.

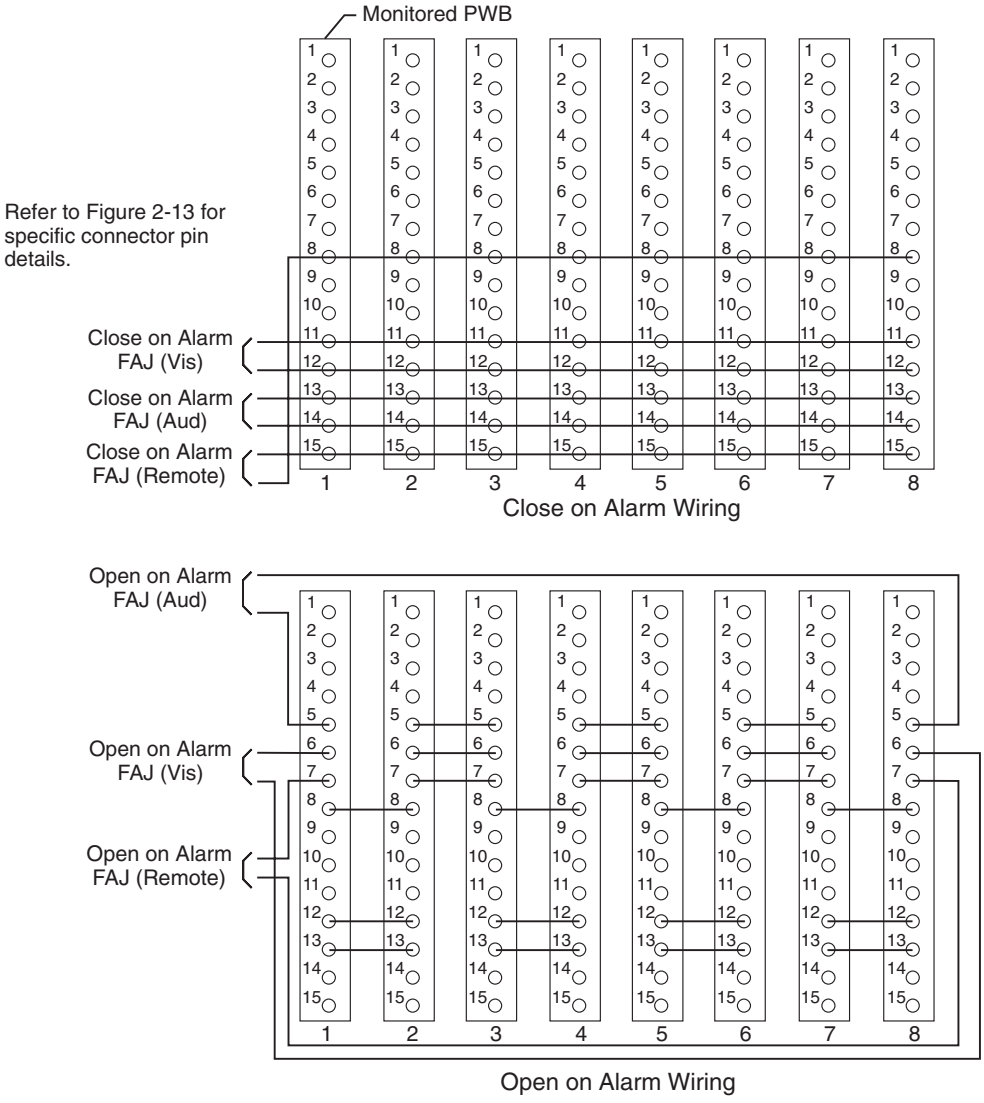


Figure 2-22: P101 Fuse or Circuit Breaker Alarm Wiring for Positive Plant

Alarm Circuit Module (BEP1), continued

Reference Data

Input Voltage: 24V (21 to 30 Vdc), 48V (42 to 60 Vdc)

Current Drain: 12 milliamps normal operation, 22 milliamps with fuse or circuit breaker alarm.

Functional Designations:

R101	Dropping resistor 48V to 24V, power monitor
R102	LED current limit resistor, power monitor
R103	Dropping Resistor 48V to 24V, fuse alarm
R104	LED current limit resistor, fuse alarm
U101	Opto-isolator, remote fuse alarm
K101	Relay, 24V, power monitor
K102	Relay, 24V, fuse alarm
CR101	Diode bridge, power monitor
CR102	Diode bridge, fuse alarm
CR103	Voltage blocking diode
DS101	Green power LED
DS102	Red fuse alarm LED

3 Safety

Safety Statements

Please read and follow all safety instructions and warnings before installing, maintaining, or repairing the power system. Reference the individual module product manuals for additional safety statements specific to the modules.

- The H569-445 Secondary DC Power Distribution Bay is Underwriters Laboratories (UL) Listed per: Subject Letter 1801 (DC Power Distribution Centers for Telecommunications Equipment) for use in the USA.
- Install only in restricted access areas (dedicated equipment rooms, equipment closets, or the like) in accordance with articles 110-16, 110-17, and 110-18 of the U.S. National Electrical Code (NEC), ANSI/NFPA No. 70, and pursuant to applicable local codes.
- This equipment is to be used in controlled environments (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).
- This equipment has been evaluated for use in a continuous ambient temperature of up to 113° Fahrenheit (45° Celsius).
- This equipment must not be installed over combustible surfaces.
- For installations in the U.S. and Canada, Listed/Certified compression connectors are to be used to terminate Listed/Certified field-wired conductors where required. For all installations, the appropriate connector is to be applied only to the correct size conductor as specified by the connector manufacturer using only the connector manufacturer's recommended tooling or tooling approved for that connector.

Safety Statements, continued

- If the proper connector for the country of installation is not provided, obtain appropriate connectors and follow manufacturer's and all local requirements for proper connections. All national and local rules and regulations are to be followed when making field connections.

- The field wiring connections have been evaluated for connection of minimum 90°C conductors sized per the U.S. National Electrical Code using 75°C ampacity tables.

- Torque electrical connections to the values specified on labels or in the product documentation.

- Battery input cables must be dressed to avoid damage to the insulation (caused by routing around sharp edges or routed in areas where wires could get pinched) and undue stress on the connectors.

- The short circuit current capability of the battery input to the distribution panel must not exceed 10,000 amperes.

- Fuses/circuit breakers may not be provided with the equipment. Refer to the product documentation for the proper hardware. Use only the parts specified in the equipment documentation. Installing fuses or circuit breakers not specified for use in this equipment may result in injury to service personnel or equipment damage.

- External loading must not exceed 80% of its fuse/circuit breaker current rating.

Warning and Safety Symbols

The symbols may sometimes be accompanied by some type of statement; e.g., “Hazardous voltage/energy inside. Risk of injury. This unit must be accessed only by qualified personnel.” Signal words as described below may also be used to indicate the level of hazard

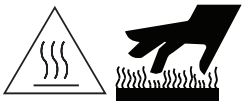
DANGER	Indicates the presence of a hazard that will cause death or severe personal injury if the hazard is not avoided.
WARNING	Indicates the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.
CAUTION	Indicates the presence of a hazard that will or can cause minor personal injury or property damage if the hazard is not avoided.

This symbol identifies the need to refer to the equipment instructions for important information.

These symbols (or equivalent) are used to identify the presence of hazardous ac mains voltage.

This symbol is used to identify the presence of hazardous ac or dc voltages. It may also be used to warn of hazardous energy levels.

One of these two symbols (or equivalent) may be used to identify the presence of rectifier and battery voltages. The symbol may sometimes be accompanied by some type of statement, for example: “Battery voltage present. Risk of injury due to high current. Avoid contacting conductors with uninsulated metal objects. Follow safety precautions.”



One of these two symbols may be used to identify the presence of a hot surface. It may also be accompanied by a statement explaining the hazard. A symbol like this with a lightning bolt through the hand also means that the part is or could be at hazardous voltage levels.

This symbol is used to identify the protective safety earth ground for the equipment.

This symbol is used to identify other bonding points within the equipment.

This symbol is used to identify the need for safety glasses and may sometimes be accompanied by some type of statement, for example: “Fuses can cause arcing and sparks. Risk of eye injury. Always wear safety glasses.”

Precautions

When working on or using this type of equipment, the following precautions should be noted:

- This unit must be installed, serviced, and operated only by 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.

- Hazardous energy and voltages are present in the unit and on the interface cables that can shock or cause serious injury. Follow all safety warnings and practices when servicing this equipment. Exercise care when servicing this area.

- Batteries may be connected in parallel with the output of the rectifiers. Turning off the rectifiers will not necessarily remove power from the bus. Make sure the battery power is also disconnected and/or follow safety procedures while working on any equipment that contains hazardous energy/voltage.

- In addition to proper job training and safety procedures, the following are some basic precautions that should always be used:

  – Use **only** properly insulated tools.

  – Remove all metallic objects (key chains, glasses, rings, watches, or other jewelry).

  – Wear safety glasses. Fuses can produce sparks. High energy levels on buses and distribution components can produce severe arcing.

  – Test circuits before touching.

  – Lock out and tag circuit breakers/fuses when possible to prevent accidental turn on.

  – Be aware of potential hazards before servicing equipment.

  – Identify exposed hazardous electrical potentials on connectors, wiring, etc. (note the condition of these circuits, especially wiring).

  – Use care when removing or replacing covers; avoid contacting circuits.

4 Product Warranty

A. Seller warrants to Customer only, that:

1. As of the date title to Products passes, Seller will have the right to sell, transfer, and assign such Products and the title conveyed by Seller shall be good;
2. During the warranty period stated in Sub-Article B below, Seller's Manufactured Products (products manufactured by Seller), which have been paid for by Customer, will conform to industry standards and Seller's specifications and shall be free from material defects;
3. With respect to Vendor items (items not manufactured by Seller), Seller warrants that such Vendor items, which have been paid for by Customer, will be free from material defects for a period of sixty (60) days commencing from the date of shipment from Seller's facility.

B. The Warranty Period listed below is applicable to Seller's Manufactured Products furnished pursuant to this Agreement, commencing from date of shipment from Seller's facility, unless otherwise agreed to in writing:

Warranty Period

Product Type	New Product	Repaired Product*
Central Office Power Equipment	24 Months	6 Months

**The Warranty Period for a repaired Product or part thereof is six (6) months or, the remainder of the unexpired term of the new Product Warranty Period, whichever is longer.*

C. If, under normal and proper use during the applicable Warranty Period, a defect or nonconformity is identified in a Product and Customer notifies Seller in writing of such defect or nonconformity promptly after Customer discovers such defect or nonconformity, and follows Seller's instructions regarding return of defective or nonconforming Products, Seller shall, at its option attempt first to repair or replace such Product without charge at its facility or, if not feasible, provide a refund or credit based on the original purchase price and installation charges if installed by Seller. Where Seller has elected to repair a Seller's Manufactured Product (other than Cable and Wire Products) which has been installed by Seller and Seller ascertains that the Product is not readily returnable for repair, Seller will repair the Product at Customer's site.

With respect to Cable and Wire Products manufactured by Seller which Seller elects to repair but which are not readily returnable for repair, whether or not installed by Seller, Seller at its option, may repair the cable and Wire Products at Customer's site.

D. If Seller has elected to repair or replace a defective Product, Customer shall have the option of removing and reinstalling or having Seller remove and reinstall the defective or nonconforming Product. The cost of the removal and the reinstallation shall be borne by Customer. With respect to Cable and Wire Products, Customer has the further responsibility, at its expense, to make the Cable and Wire Products accessible for repair or replacement and to restore the site. Products returned for repair or replacement will be accepted by Seller only in accordance with its instructions and procedures for such returns. The transportation expense associated with returning such Product to Seller shall be borne by Customer. Seller shall pay the cost of transportation of the repaired or replacing Product to the destination designated by Customer.

E. Except for batteries, the defective or nonconforming Products or parts which are replaced shall become Seller's property. Customer shall be solely responsible for the disposition of any batteries.

F. If Seller determines that a Product for which warranty service is claimed is not defective or nonconforming, Customer shall pay Seller all costs of handling, inspecting, testing, and transportation and, if applicable, traveling and related expenses.

G. Seller makes no warranty with respect to defective conditions or nonconformities resulting from actions of anyone other than Seller or its subcontractors, caused by any of the following: modifications, misuse, neglect, accident, or abuse; improper wiring, repairing, splicing, alteration, installation, storage, or maintenance; use in a manner not in accordance with Seller's or Vendor's specifications or operating instructions, or failure of Customer to apply previously applicable Seller modifications and corrections. In addition, Seller makes no warranty with respect to Products which have had their serial numbers or month and year of manufacture removed, altered, or experimental products or prototypes or with respect to expendable items, including, without limitation, fuses, light bulbs, motor brushes, and the like. Seller's warranty does not extend to any system into which the Product is incorporated. This warranty applies to Customer only and may not be assigned or extended by Customer to any of its customers or other users of the Product.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. CUSTOMER'S SOLE AND EXCLUSIVE REMEDY SHALL BE SELLER'S OBLIGATION TO REPAIR, REPLACE, CREDIT, OR REFUND AS SET FORTH ABOVE IN THIS WARRANTY.