SYSTEM OVERVIEW

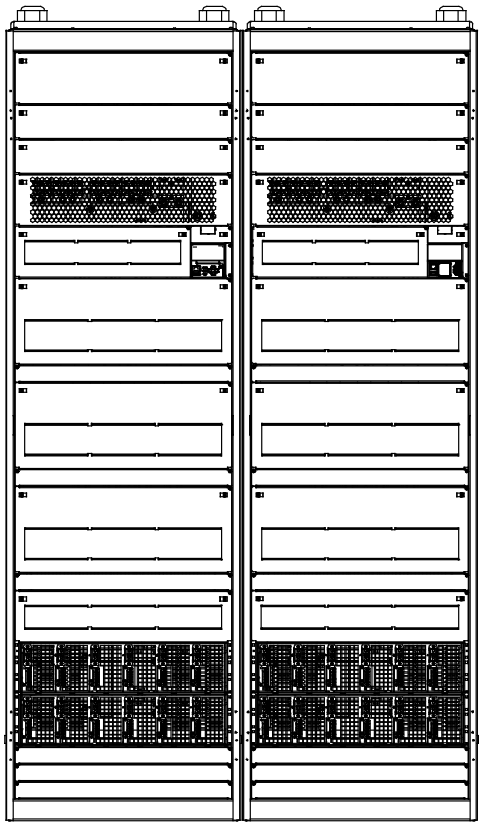
Description: -48 VDC @ up to 7000 Amperes Power System

The Vertiv™ NetSure™ 7100 Multi Cabinet 48 VDC Power System is a complete integrated power system containing rectifiers, intelligent control, metering, monitoring, and distribution.

This power system is designed to power a load while charging a positive grounded battery. This power system is capable of operating in a batteryless installation or off battery for maintenance purposes. The power system is designed for operation with the positive output grounded.

The power system is configured for overhead cabling.

A system consists of the following components.



- **Main Cabinet**

  The system always includes one (1) main cabinet. The main cabinet houses AC distribution, DC load distribution, battery disconnect circuit breakers, rectifier mounting shelves and the main system controller.

- **Extension Cabinet**

  The system may include up to seven (7) extension cabinets. The extension cabinets house AC distribution, DC load distribution, battery disconnect circuit breakers, rectifier mounting shelves and an extension controller.

- **NCU Main Controller**

  The system contains one (1) NCU main controller. The controller provides power system control, rectifier control (including a charge control function), metering functions, monitoring functions, and local/remote alarm functions. The controller also supports rectifier temperature compensation if the system is equipped with a temperature sensor. Temperature sensors may also be designated to monitor ambient temperature and/or battery temperature. The controller also provides data acquisition, system alarm management, and advanced battery and energy management. The controller contains an LCD display and keypad for local access. The controller provides Ethernet connection and supports software upgrade via its USB port. It also comes with a comprehensive web page and SNMP capability for remote system management. Refer to the NCU Controller Instructions (UM1M830BNA) for more information.

- **EXU Extension Controller**

  Each extension cabinet contains an Extension Control Unit (EXU).

  The EXU measures DC bus voltage, battery current, load current and battery voltage, and reports the data to the NCU. The EXU acquires digital values from circuit breakers and reports the acquired data to the NCU.

  As long as the EXU communicates normally with NCU, it accepts the parameter setting and control command from NCU. The EXU monitors the system current and voltage and displays them on the LCD.

  Refer to the EXU Controller Instructions (11VE0162PB) for more information.

- **Rectifier Module Mounting Shelf**

  Each cabinet contains two (2) rectifier mounting shelves. Each shelf houses up to six (6) 3500 W or 3200 W rectifiers.

- **Rectifiers**

  The system contains rectifiers, which provide load power, battery float current, and battery recharge current during normal operating conditions. Refer to the Rectifier Instructions (UM1R483500e) for more information.

General Specifications

See detailed specifications on page 31.

System

Family:	Vertiv™ NetSure™
Spec. No.:	BMK2207221/051, BMK2207221/052
Model:	7100
Nominal AC Input Voltage:	208 VAC / 220 VAC / 230 VAC, Three-Phase (3L+PE), 50 Hz / 60 Hz, 62A /59 A/56 A.
Nominal DC Voltage:	-48 VDC
Maximum Output Current @ 48 VDC:	7000 A
Maximum Number of Cabinets:	8
Agency Approval:	EN 60950-1
Framework Type:	Box Framework
Mounting Dimensions:	Refer to “Overall Dimensions” on page 32 for mounting dimensions.
Access:	Front for installation, operation, and maintenance. Rear for extension bay expansion.
Control:	Microprocessor
Color:	Gray
Environment:	+5 °C to +40 °C (+41 °F to +104 °F)

Cabinet

Maximum Output Current:	875 A (700 A maximum distribution current and 175 A battery recharge current)
Building Practice:	23”
Height (excl. top cover and feet):	1800, 2020 mm
Footprint (width x depth):	600 x 600 mm
Weight:	Maximum 312.98 kg (630 lbs)

Rectifier

1R483500e Rectifier Rating:	See UM1R483500e.
1R483200e Rectifier Rating:	See UM1R483500e.
1R483200 Rectifier Rating:	See UM1R483500e.

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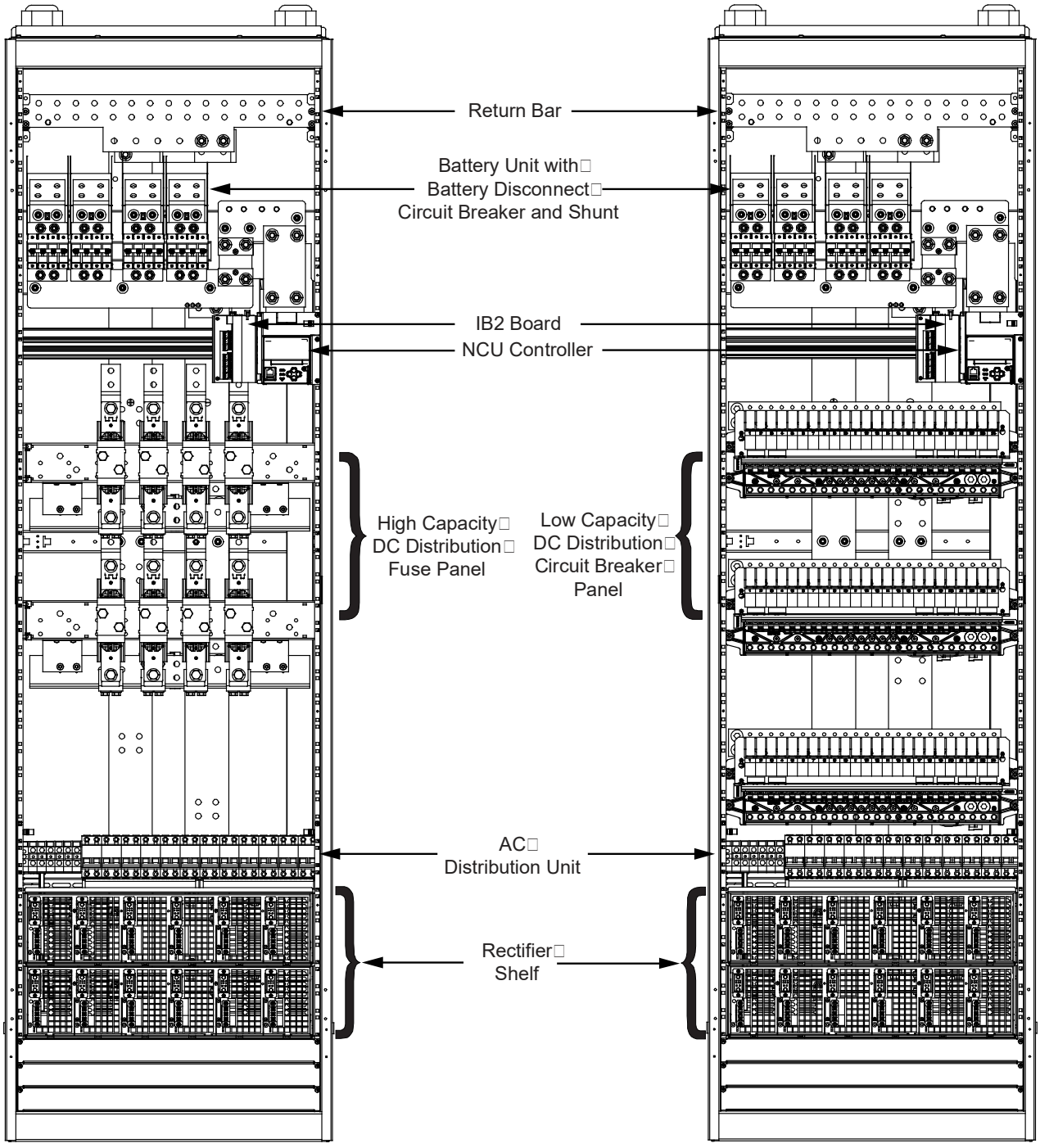
MAIN COMPONENTS ILLUSTRATIONS

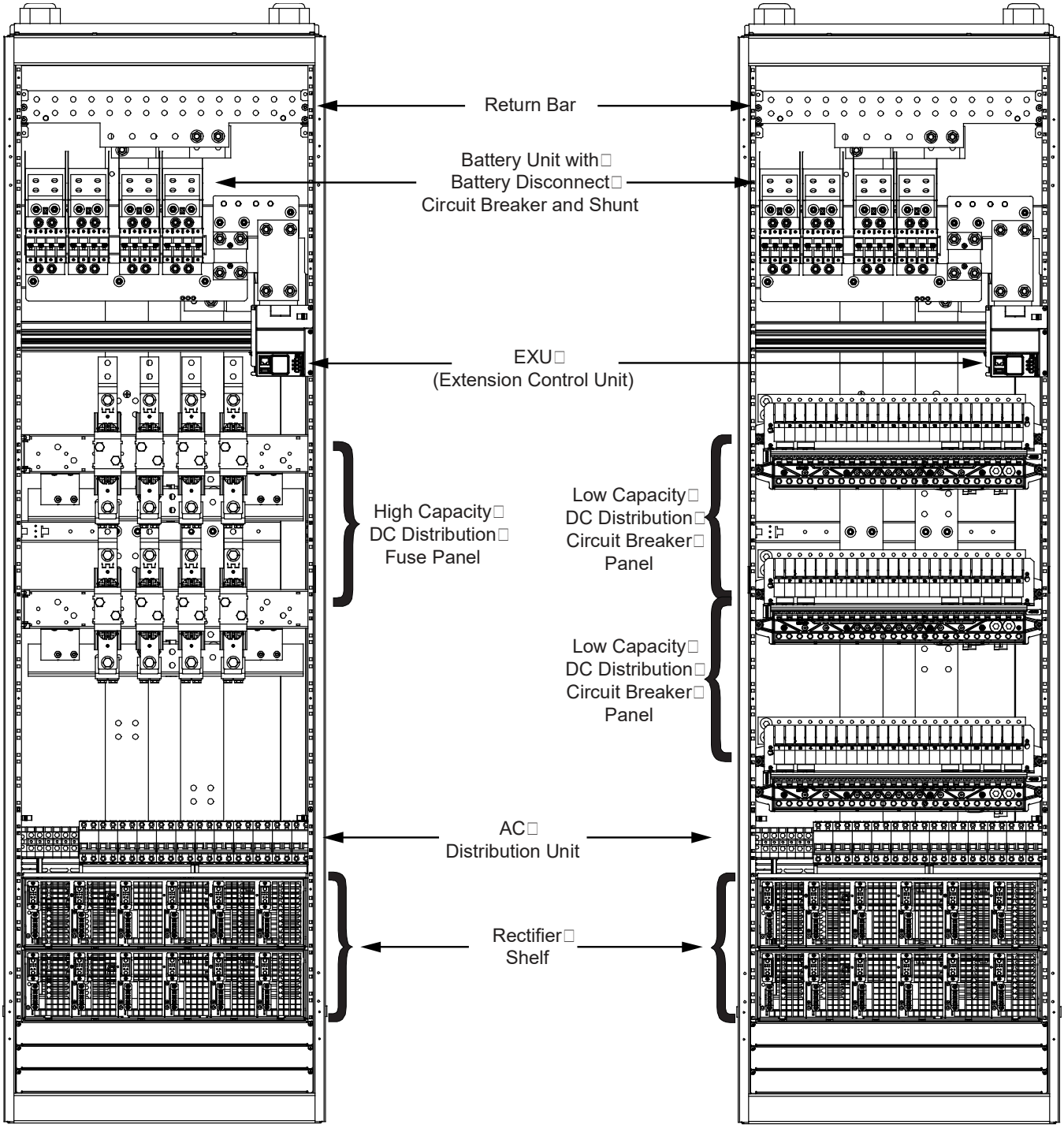
BMK2207221/051



Main Cabinet
(Front cover panels removed)
High Capacity DC Distribution
Fuse Panels Installed

Main Cabinet
(Front cover panels removed)
Low Capacity DC Distribution
Circuit Breaker Panels Installed

BMK2207221/052



MAIN COMPONENTS DESCRIPTIONS

Cabinets

BMK2207221/051: Main Cabinet

Features

- Provides the main cabinet.
- Accepts one (1) NCU controller.
- Includes one (1) IB2 controller interface board (provides eight (8) programmable form C- relay outputs, eight (8) programmable binary inputs, and two (2) temperature inputs).
- Accepts the IB4 controller second Ethernet board. The Ethernet port located on the NCU Controller's front panel can be used to connect a computer directly to the NCU. The Ethernet port located on the IB4 board can be used to connect the NCU to your Local Area Network (LAN).
- Includes a battery unit that accepts up to four (4) battery disconnect circuit breaker and includes a shunt.
- Includes an AC distribution unit factory wired to each rectifier shelf.
- Includes two (2) rectifier shelves.
- Accepts up to twelve (12) rectifiers.
- Accepts up to three (3) DC distribution units.

Ordering Notes

1) Order one (1) main cabinet per system.
2) Order one (1) NCU controller, P/N 1M830DNA (see page 12).
3) Order the optional IB4 controller second Ethernet port board as required (see page 12).
4) Order up to three (3) DC distribution units as required (see page 9).
5) Order DC distribution fuses and/or circuit breakers as required (see page 17).
6) Order battery circuit breakers as required (see page 17).
7) Order battery and load distribution lugs as required (see page 20).
8) Order rectifier modules as required, P/N 1R483500e, 1R483200e or 1R483200 (see page 16).
9) Order a rectifier module mounting position blank cover panel, P/N SDK10863/1, for each empty rectifier module mounting position in the cabinet.

BMK2207221/052: Extension Cabinet

Features

- Provides an extension cabinet.
- Accepts one (1) EXU extension controller.
- Includes a battery unit that accepts up to four (4) battery disconnect circuit breaker and includes a shunt.
- Includes an AC distribution unit factory wired to each rectifier shelf.
- Includes two (2) rectifier shelves.
- Accepts up to twelve (12) rectifiers.
- Accepts up to three (3) DC distribution units.

Ordering Notes

1) Order up to seven (7) extension cabinets per system.
2) Order one (1) EXU extension controller, P/N BMP903083/1, per extension cabinet (see page 12).
3) Order up to three (3) DC distribution units as required per extension cabinet (see page 9).
4) Order DC distribution fuses and/or circuit breakers as required (see page 17).
5) Order battery circuit breakers as required (see page 17).
6) Order battery and load distribution lugs as required (see page 20).
7) Order rectifier modules as required, P/N 1R483500e, 1R483200e or 1R483200 (see page 16).
8) Order a rectifier module mounting position blank cover panel, P/N SDK10863/1, for each empty rectifier module mounting position in the cabinet.

DC Distribution Units

BMG220206/1, BMG220206/2 and BMG220206/3 Low-Capacity Circuit Breaker DC Distribution Unit

Features

- Twenty-Four (24) -48 VDC Load Distribution Fuse Mounting Positions:
  1 A to 300 A Bullet Nose Type Circuit Breakers
- Includes a Return Busbar
- 400 A Maximum Capacity

Restrictions

Can be installed in the top, middle, or bottom row(s).

High-capacity fuse DC distribution unit is always installed above low-capacity circuit breaker DC distribution unit.

Maximum of two (2) high-capacity fuse DC distribution units per cabinet.

Maximum of three (3) low-capacity circuit breaker DC distribution units per cabinet.

Permissible Configurations:

One (1) high-capacity fuse DC distribution unit plus one (1) low-capacity circuit breaker DC distribution unit.

One (1) high-capacity fuse DC distribution unit.

Two (2) high-capacity fuse DC distribution units.

Three (3) low-capacity circuit breaker DC distribution units.

Two (2) low-capacity circuit breaker DC distribution units.

One (1) low-capacity circuit breaker DC distribution unit.

Maximum lug width, 1.88 in (47.75 mm).

Ordering Notes

1) Specify row for panel location(s). Bottom, Middle, and/or Top.
2) Order circuit breakers as required per Table 1.
3) Order load lugs (two hole, 1/4” bolt clearance hole, 5/8” centers) as required for each distribution position per Table 4 and Table 5.

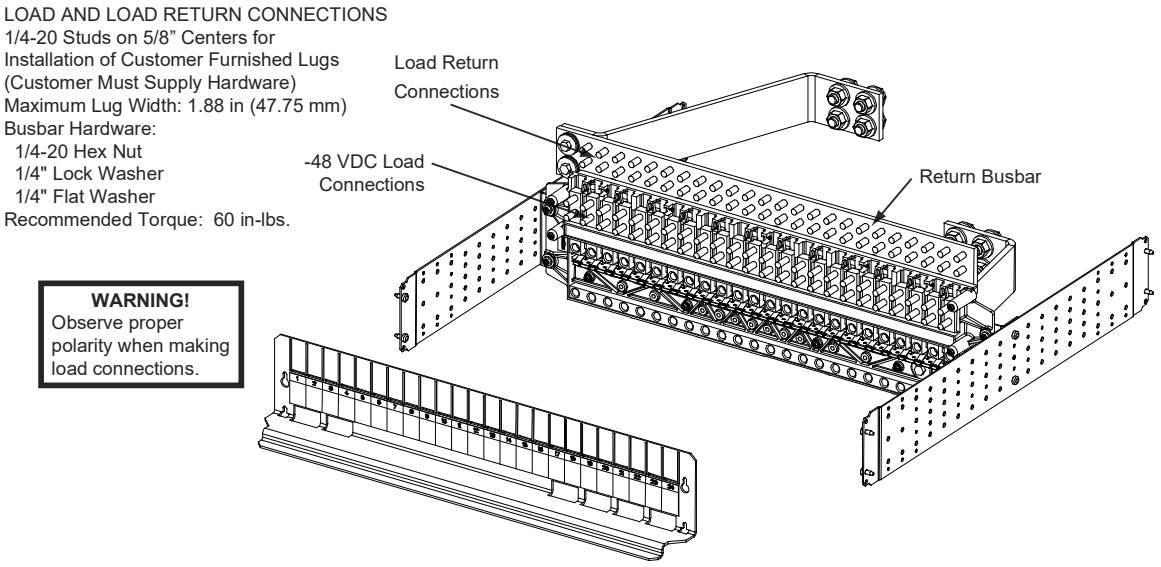


Figure 1
Low-Capacity Circuit Breaker DC Distribution Unit

BMG220205/1 and BMG220205/2 High-Capacity Fuse DC Distribution Unit

Features

- Four (4) -48 VDC Load Distribution Fuse Mounting Positions:
  100 A to 400 A NGG 504 Type Fuses
- Does Not Include a Return Busbar
- 600 A Maximum Capacity

Restrictions

Can only be installed in the top and middle rows.

High-capacity fuse DC distribution unit is always installed above low-capacity circuit breaker DC distribution unit.

Maximum of two (2) high-capacity fuse DC distribution units per cabinet.

Maximum of three (3) low-capacity circuit breaker DC distribution units per cabinet.

Permissible Configurations:

One (1) high-capacity fuse DC distribution unit plus one (1) low-capacity circuit breaker DC distribution unit.

One (1) high-capacity fuse DC distribution unit.

Two (2) high-capacity fuse DC distribution units.

Three (3) low-capacity circuit breaker DC distribution units.

Two (2) low-capacity circuit breaker DC distribution units.

One (1) low-capacity circuit breaker DC distribution unit.

Maximum lug width, 1.88 in (47.75 mm).

Ordering Notes

1) Specify row for panel location(s). Middle and/or Top.
2) Order fuses as required per Table 2.
3) Order load lugs (two hole, 3/8” bolt clearance hole, 1” centers) as required for each distribution position per Table 6.

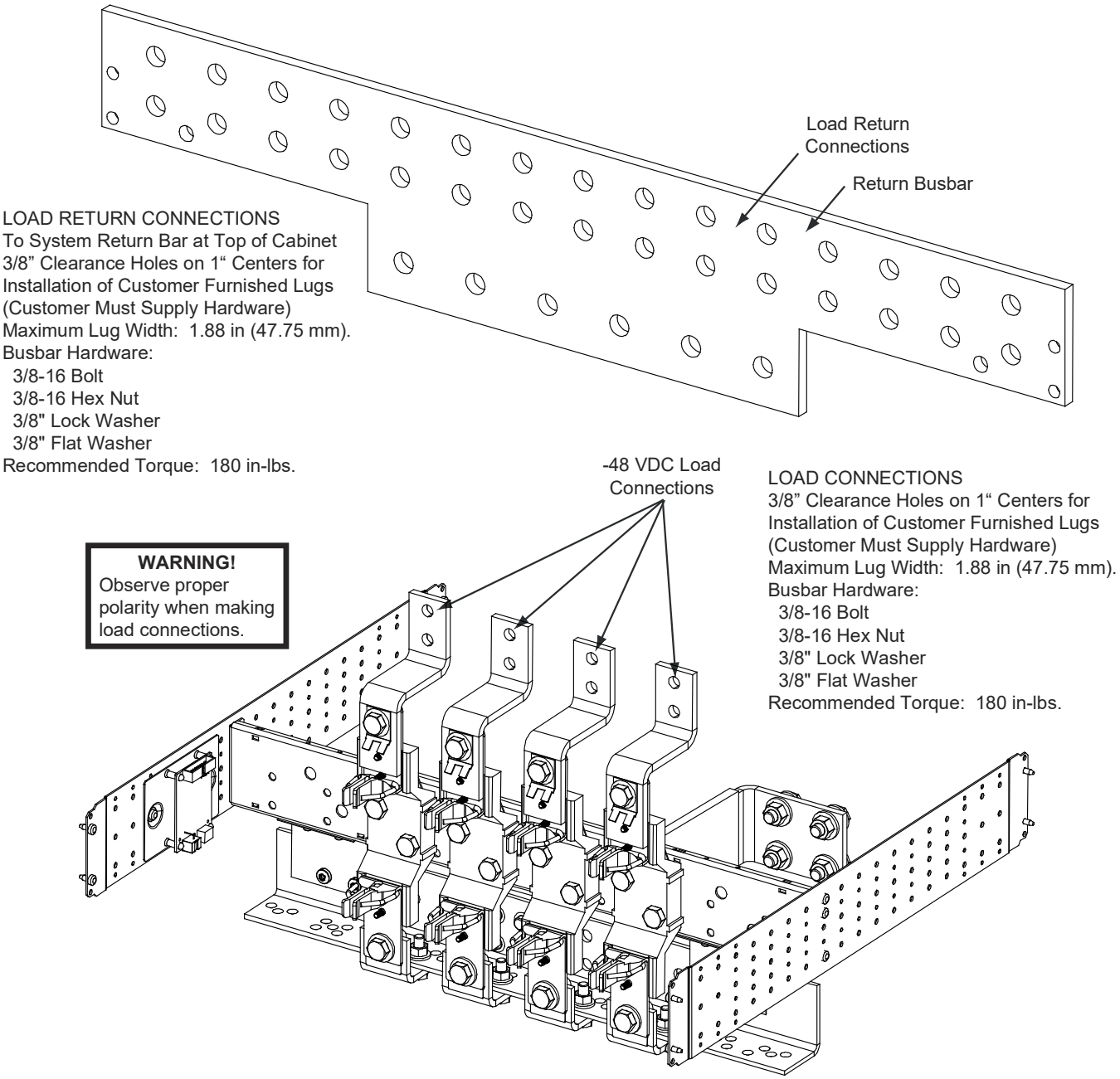


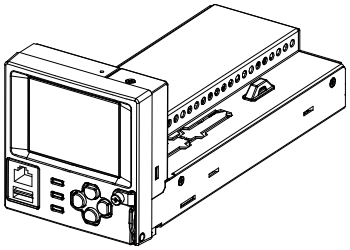
Figure 2
High-Capacity Fuse DC Distribution Unit

ACCESSORY COMPONENTS DESCRIPTIONS

Controller

NCU (NetSure™ Control Unit) Main Controller, P/N 1M830DNA

Features



- NCU Main Controller, Model M830B (Spec. No. 1M830BNA).
- Factory programmed with the configuration file required for the system configuration ordered.
- Refer to the NCU Controller Instructions (UM1M830BNA) for more information.

Restrictions

Only one (1) main controller per power system is required.

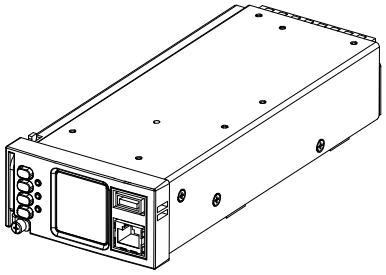
Mounts in the main cabinet.

Ordering Notes

1) Order one (1) NCU main controller per power system, P/N 1M830BNA.
2) Order the optional IB4 controller second Ethernet port board as required (see page 12).
3) Order optional temperature probes for ambient and battery temperature monitoring as required. The temperature probe(s) may also be used for the battery charge temperature compensation feature and BTRM (Battery Thermal Runaway Management). Refer to "Optional Temperature Probes" on page 14.

EXU (Extension Control Unit) Extension Controller, P/N BMP903083/1

Features



- EXU Extension Controller, Spec. No. BMP903083/1.
- Factory programmed with the configuration file required for the system configuration ordered.
- Refer to the EXU Extension Controller Instructions (11VE0162PB) for more information.

Restrictions

Required for each extension cabinet.

Mounts in the extension cabinet.

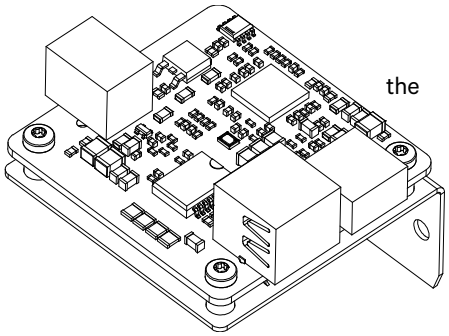
Ordering Notes

1) Order one (1) EXU extension controller for each extension cabinet, P/N BMP903083/1.

Controller Interface Boards

Optional IB4 Controller Interface Board, P/N ROA 119 0908/1

Features



- The IB4 board provides a second Ethernet port. The Ethernet port located on the NCU Controller's front panel can be used to connect a computer directly to the NCU. The Ethernet port located on the IB4 board can be used to connect the NCU to your Local Area Network (LAN).

Restrictions

Mounts in the main cabinet.

Ordering Notes

1) If a second Ethernet port is required, order IB4 board P/N ROA 119 0908/1

In-Line Fuse and Resistor Pigtail Kits

In-line fuse kits should be used for connecting to battery or bus potentials for use with the digital inputs on the IB2 Interface Board.

1 A In-Line Fuse Pigtail Kit, P/N 431300200

Features

- In-line fuse pigtail kit with 3/8” ring lug.

Ordering Notes

1) Order Kit P/N 431300200, as required.

1 A In-Line Fuse Pigtail Kit, P/N 431300300

Features

- In-line fuse pigtail kit with 5/16” ring lug.

Ordering Notes

1) Order Kit P/N 431300300, as required.

1 A In-Line Fuse Pigtail Kit, P/N 535135

Features

- In-line fuse pigtail kit with a splice connector, 3/8” ring lug, and 1/4” ring lug.

Ordering Notes

1) Order Kit P/N 535135, as required.

49.9 Ohm In-Line Resistor Pigtail Kit, P/N 424227900

Features

- In-line resistor pigtail kit with 3/8” ring lug.

Ordering Notes

1) Order Kit P/N 424227900, as required.

49.9 Ohm In-Line Resistor Pigtail Kit, P/N 424228000

Features

- In-line resistor pigtail kit with a splice connector.

Ordering Notes

1) Order Kit P/N 424228000, as required.

49.9 Ohm In-Line Resistor Pigtail Kit, P/N 424228100

Features

- In-line resistor pigtail kit with 5/16” ring lug.

Ordering Notes

1) Order Kit P/N 424228100, as required.

Optional Temperature Probes

Features

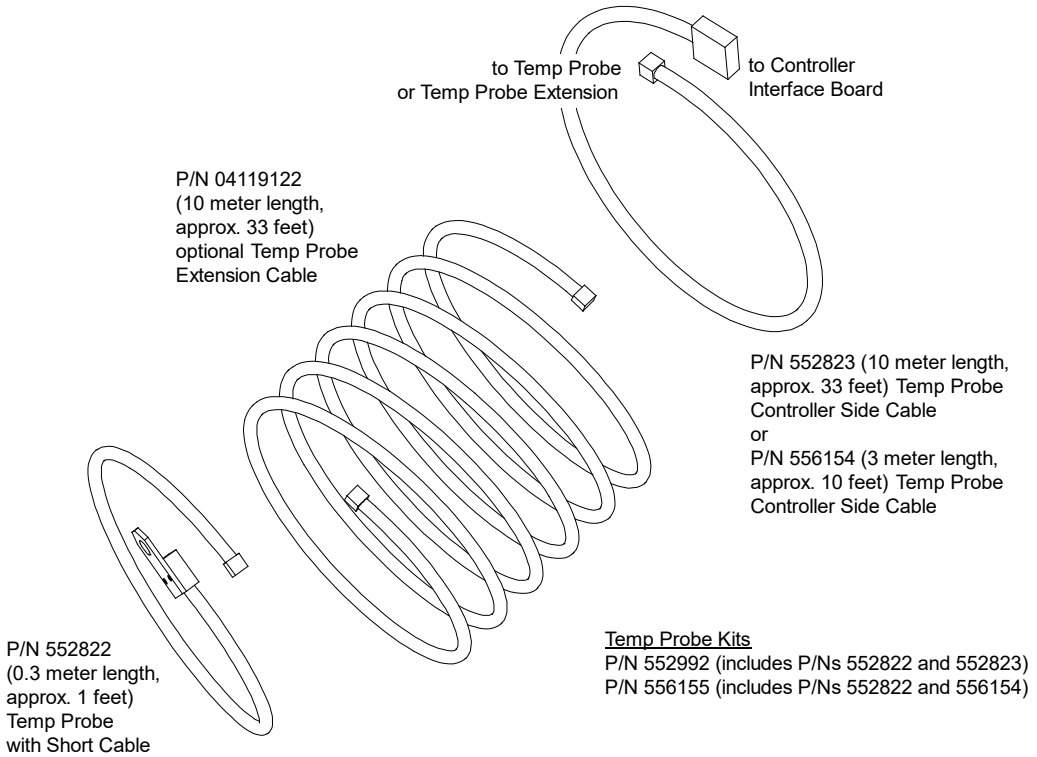
- Up to two (2) temperature probes can be connected to the System Interface Board. Up to two (2) temperature probes can be connected to the IB2 (Controller Interface Board). Any combination of the temperature probes can be programmed to monitor ambient temperature and/or battery temperature. A temperature probe set to monitor battery temperature can also be used for the rectifier battery charge temperature compensation feature, or the battery charge temperature compensation feature can be programmed to use the average or highest value of all battery temperature probes. The battery charge temperature compensation feature allows the controller to automatically increase or decrease the output voltage of the system to maintain battery float current as battery temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained. A temperature probe set to monitor battery temperature can also be used for the BTRM (Battery Thermal Runaway Management) feature. The BTRM feature lowers output voltage when a high temperature condition exists to control against battery thermal runaway.
- The temperature sensor end of the probe contains a tab with a 5/16" clearance hole for mounting.
- Temperature probes can also be used with the optional SM-Temp Temperature Concentrator.

Restrictions

A temperature probe programmed to monitor battery temperature should be mounted on the negative post of a battery cell to sense battery temperature. A temperature probe used for battery charge temperature compensation and/or BTRM (Battery Thermal Runaway Management) should also be mounted on the negative post of a battery cell. A temperature probe programmed to monitor ambient temperature should be mounted in a convenient location, away from direct sources of heat or cold.

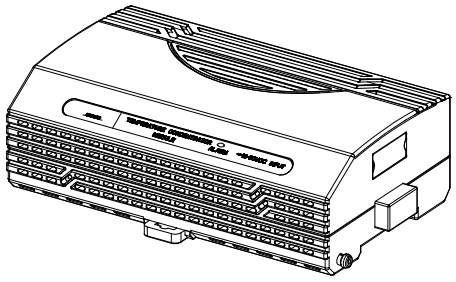
Ordering Notes

1) Order temperature probes as required. Note that each temperature probe consists of two or three pieces which plug together to make a complete probe (see the following illustration). For a complete temperature probe, order one (1) P/N 552992 (10.3 meters) or one (1) P/N 556155 (3.3 meters). If additional length is required, order temperature probe extension cable P/N 04119122 (10 meters).
2) If more probes are desired, order one or more SM-Temp Temperature Concentrator, P/N 547490. See "Optional SM-Temp Temperature Concentrator, P/N 547490" on page 15.



Optional SM-Temp Temperature Concentrator, P/N 547490

Features



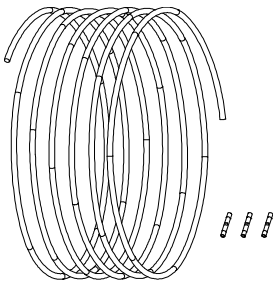
- Allows for multiple temperature probes to be used for ambient temperature monitoring, battery temperature monitoring, temperature compensation, and/or BTRM (Battery Thermal Runaway Management).
- Provides (8) temperature probe inputs per SM-Temp.
- Can cascade up to (8) SM-Temp modules, connecting up to sixty-four (64) temperature probes.
- The SM-Temp Concentrator is connected at the end of the Controller's CAN Bus. Via the CAN Bus, the controller reads each temperature probe from each SM-Temp Concentrator.
- Refer to the SM-Temp Temperature Concentrator Instructions (UM547490) for more information.

Ordering Notes

1) Order SM-Temp Temperature Concentrator, P/N 547490, as required.
2) Order up to (8) temperature probes for each concentrator. See "Optional Temperature Probes" on page 14.
3) Order one (1) SM-Temp CAN Bus Interface Cable, P/N 562868, to connect the SM-Temp into the controller's CAN bus, as required.
4) Order SM-Temp jumpers (P/N 552888) to interconnect SM-Temp units, as required. See "SM-Temp Jumpers, P/N 552888" on page 15.

SM-Temp Jumpers, P/N 552888

Features



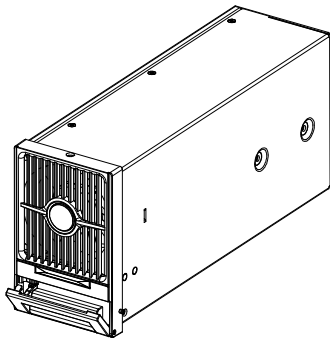
- Provides 20' of 18 AWG solid red / black twisted pair cable and three (3) wire splices for connecting the CAN bus of multiple SM-Temp modules together.

Ordering Notes

1) Order P/N 552888 as required.

Rectifiers

Rectifier Module, P/N 1R483500e



Features

- Model R48-3500e (Spec. No. 1R483500e) 3500 watt / -48 volt rectifier module.
- Refer to the Rectifier Instructions (UM1R483500e) for more information.

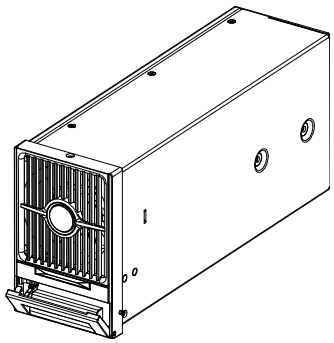
Restrictions

Up to twelve (12) rectifiers can be installed in each cabinet.

Ordering Notes

1) Order by P/N 1R483500e as required.

Rectifier Module, P/N 1R483200e



Features

- Provides one (1) Model R48-3200e, Spec. No. 1R483200e, 3200 watt / -48 volt rectifier module.
- Refer to the Rectifier Instructions (UM1R483500e) for more information.

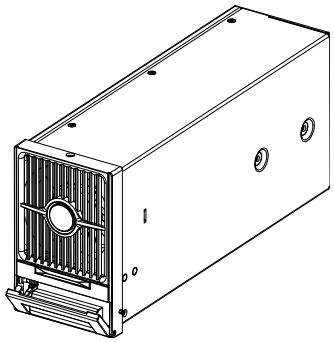
Restrictions

For use in Spec. No. 588705000 module mounting assembly Lists 21, 22, 31, 32, 33.

Ordering Notes

1) Order by P/N 1R483200e as required. Each Spec. No. 588705000 module mounting assembly holds up to six (6) rectifier modules.

Rectifier Module, P/N 1R483200



Features

- Provides one (1) Model R48-3200, Spec. No. 1R483200, 3200 watt / -48 volt rectifier module.
- Refer to the Rectifier Instructions (UM1R483500e) for more information.

Restrictions

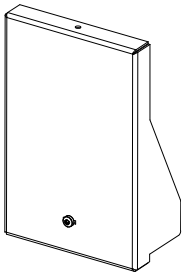
For use in Spec. No. 588705000 module mounting assembly Lists 21, 22, 31, 32, 33.

Ordering Notes

1) Order by P/N 1R483200 as required. Each Spec. No. 588705000 module mounting assembly holds up to six (6) rectifier modules.

Module Mounting Position Blank Cover Panels

Module Mounting Position Blank Cover Panel, P/N SDK10863/1



Features

- Covers one (1) unused module mounting position.

Ordering Notes

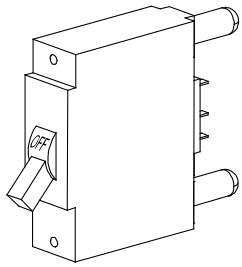
1) Order by P/N SDK10863/1 as required. Order a module mounting position blank cover panel for each empty module mounting position in the system, as desired.

Distribution Devices

Bullet Nose Type Circuit Breakers for Use in Low-Capacity Circuit Breaker DC Distribution Unit P/N BMG220206/1, BMG220206/2 and BMG220206/3

Features

- For use on the low-capacity circuit breaker DC distribution unit P/N BMG220206/1, BMG220206/2 and BMG220206/3
- Each circuit breaker (as listed in Table 1) plugs into one or two mounting position(s) on a low-capacity circuit breaker DC distribution unit.



Toggle Handle
Bullet Nose Circuit Breaker

Restrictions

Load should not exceed 80% of device rating.

Ordering Notes

1) Order circuit breakers as required per Table 1.
2) See “Crimp Lugs for Use on Low-Capacity Circuit Breaker DC Distribution Unit” on page 20 for recommended load distribution lugs.
3) When ordering 2-pole devices, a “Special Application Crimp Lug / Strap Combination” may be ordered per device. See “Special Application Crimp Lug / Strap Combination” on page 20.

Ampere Rating	Number of Poles	Number of Mounting Positions Required	Part Number	
			Electrical Trip[1] (White Handle)	Electrical/ Mechanical Trip[2] (Black Handle)
1	1	1	102272	101596
3	1	1	102273	101597
5	1	1	102274	101598
10	1	1	102275	101599
15	1	1	102276	101600
20	1	1	102277	101601
25	1	1	102278	101602
30	1	1	102279	101603
35	1	1	102280	101604
40	1	1	102281	101605
45	1	1	121998	121997
50	1	1	102282	101606
60	1	1	102283	101607
70	1	1	102284	101608
75	1	1	102285	101609
80	1	1	121996	121995
90	1	1	138887	138888
100	1	1	102286	101610
125	2	2	516991	516838
150	2	2	516993	516839
175	2	2	144883	144884
200	2	2	121831	121832
225	3	3	144885	144886
250	3	3	121835	121836
300	3	3	149075	149076

Circuit Breaker Alarm Operation:

[1] Provides an alarm during an electrical trip condition only.

[2] Provides an alarm during an electrical or manual trip condition.

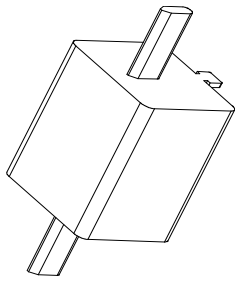
Note: *Electrical Trip only circuit breakers are not typically used for battery disconnect circuit breakers.*

Table 1
Toggle Handle Bullet Nose Type Circuit Breakers

NGG 504 Type Fuses for Use in High-Capacity Fuse DC Distribution Unit P/N BMG220205/1 and BMG220205/2

Features

- For use on the high-capacity fuse DC distribution unit P/N BMG220205/1 and BMG220205/2



Restrictions

Load should not exceed 80% of device rating.

Ordering Notes

1) Order fuses as required per Table 2.
2) See "Crimp Lugs for Use on High-Capacity Fuse DC Distribution Unit" on page 21 for recommended load distribution lugs.
3) See "Crimp Lugs for Use on the System Return Busbar" on page 21 for recommended load distribution lugs.

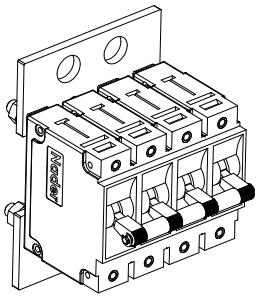
Ampere Rating	Part Number
100	NGG504/S100
200	NGG504/S200
250	NGG504/S250
300	NGG504/S300
400	NGG504/S400

Table 2
NGG 504 Fuses

Circuit Breakers for Use in the Circuit Breaker Battery Unit

Features

- For use on the circuit breaker battery unit.
- Each circuit breaker (as listed in Table 3) installs into one or two mounting position(s) on the circuit breaker battery unit.



Restrictions

Load should not exceed 80% of device rating.

Ordering Notes

1) Order circuit breakers as required per Table 1.
2) See "Crimp Lugs for Use on the Battery Input Busbar of the Circuit Breaker Battery Unit" on page 21 for recommended battery lugs.

Ampere Rating	Number of Poles	Number of Mounting Positions Required	Part Number
300	2	2	NFS81291/300
400	2	2	NFS81291/400

Table 3
Battery Disconnect Circuit Breakers

Lugs

Crimp Lugs for Use on Low-Capacity Circuit Breaker DC Distribution Unit P/N BMG220206/1, BMG220206/2 and BMG220206/3

Features

- For use on the low-capacity circuit breaker DC distribution unit P/N BMG220206/1,BMG220206/2 and BMG220206/3

Ordering Notes

1) Specify part number from Table 4 for desired lead size.

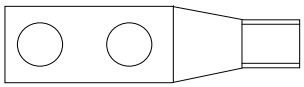
Lead Size	Part Number	
14-10 AWG	245342300	
8 AWG	245390200	
6 AWG	245346700	
4 AWG	245346800	
2 AWG	245346900	

Table 4
Crimp Lugs for Use on Low-Capacity Circuit Breaker DC Distribution Unit
Two-Hole, 1/4" Bolt Clearance Hole, 5/8" Centers

Special Application Crimp Lug / Strap Combination for Use on Low-Capacity Circuit Breaker DC Distribution Unit P/N BMG220206/1, BMG220206/2 and BMG220206/3

Features

- For use on the low-capacity circuit breaker DC distribution unit P/N BMG220206/1,BMG220206/2 and BMG220206/3.
- Straps two circuit breaker wiring positions together, and provides a crimp-type lug which allows distribution wiring up to 350 kcmil size. Designed for use with 125 A and larger bullet nose-type circuit breakers, which require two mounting positions.

Ordering Notes

1) Specify part number from Table 5 for desired lead size.

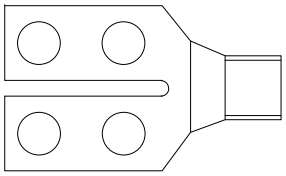
Lead Size	Part Number	
1/0 AWG	245393500	
2/0 AWG	245393600	
3/0 AWG	245393700	
4/0 AWG	245393800	
250 kcmil	514872	
350 kcmil	514873	

Table 5
Special Application Crimp Lug / Strap Combination
for Use on Low-Capacity Circuit Breaker DC Distribution Unit
(Two-Hole Lug, 1/4" Bolt Clearance Hole, 5/8" Centers)

Crimp Lugs for Use on High-Capacity Fuse DC Distribution Unit P/N BMG220205/1 and BMG220205/2

Features

- For use on the high-capacity fuse DC distribution unit P/N BMG220205/1 and BMG220205/2

Ordering Notes

1) Specify part number from Table 6 for desired lead size.

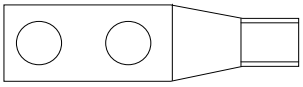
Lead Size	Part Number	
6 AWG	245349900	
4 AWG	245350000	
2 AWG	245348200	
1/0 AWG	245347100	
2/0 AWG	245347200	
3/0 AWG	245347300	
4/0 AWG	245347400	
250 kcmil	245347500	
300 kcmil	245347600	
350 kcmil	245347700	
400 kcmil	245347800	
500 kcmil	245347900	
600 kcmil	245348000	
750 kcmil	245348100	

Table 6
Crimp Lug for Use on High-Capacity Fuse DC Distribution Unit,
Battery Input Busbar, and System Return Busbar
Two-Hole, 3/8” Bolt Clearance Hole, 1” Centers

Crimp Lugs for Use on the Battery Input Busbar of the Circuit Breaker Battery Unit

Features

- For use on the battery input busbar of the circuit breaker battery unit.

Ordering Notes

1) Specify part number from Table 6 for desired lead size.

Crimp Lugs for Use on the System Return Busbar

Features

- For use on the system return bar.

Ordering Notes

1) Specify part number from Table 6 for desired lead size.

User Replaceable Components

Ordering Notes

1) Refer to Table 7.

Item	Part Number
NCU Controller (Main Cabinet)	BMP903100/2 (Order with appropriate software configuration.)
EXU Extension Controller (Extension Cabinets)	BMP903083/1 (Order with appropriate software configuration.)
IB4 Second Ethernet Port Board	BMY220144/1(ASSY), ROA1190908/1(Board only)
IB2 Interface Board	BMY220143/1(ASSY), ROA 119 0872/1 (Board for NGMC)

Table 7
User Replaceable Components

Replacement Cabinet-to-Cabinet Interconnect Cable

Ordering Notes

1) For a replacement cable, order P/N RPM6281046/1
(Cat5 communications cable terminated in RJ-45 connectors).

RECOMMENDED WIRE SIZES, BRANCH CIRCUIT PROTECTION, CRIMP LUGS, AND WIRING ILLUSTRATIONS

Cabinet Frame Grounding Requirements

For cabinet frame grounding requirements, refer to the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC), applicable local codes, and your specific site requirements.

A customer's grounding network lead can be attached to the top of each cabinet as shown in Figure 3 Provision is made for installing a lead with a two-hole lug that has 1/4" bolt clearance holes on 5/8" centers. Refer to Table 4 for lug selection.

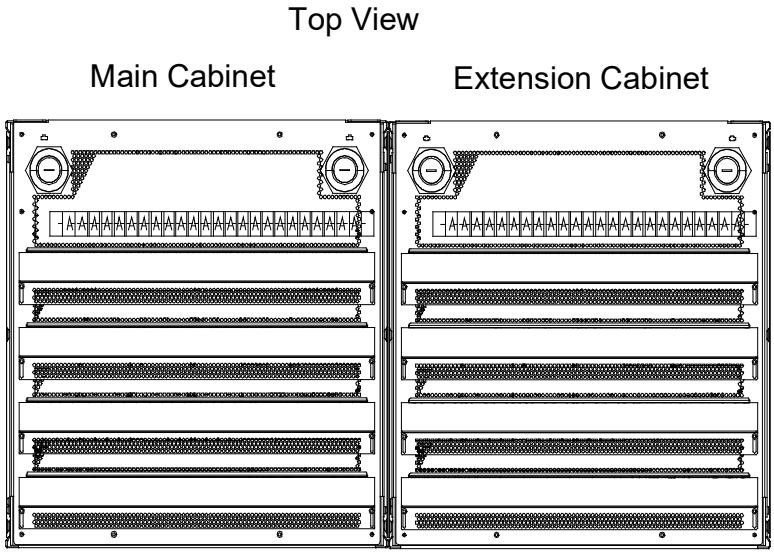


Figure 3
Cabinet Frame Grounding

AC Input Connections

Recommended AC Input Branch Circuit Protection and Wire Size Selection

Refer to Table 8 for recommended wire sizes and branch circuit protection. Refer also to Figure 4.

3 Phase AC Feed per (6) Rectifiers / Shelf (Nominal 208 VAC / 220 VAC / 230 VAC, Three Phase, 50 Hz / 60 Hz) (THHN-90°C Wire-(12) PCU (6 current and 1 ground wire) per Conduit)					
Model	**Input Voltage**	**Input Current [5]**	**Overcurrent Protection [2]**	**40 °C Ambient Temperature**	
				Wire [3] [4] [6]	**Conduit Size**
BMK2207221/051 BMK2207221/052	208 VAC	62 A	80 [2]	2 AWG	1-1/2”
	220 VAC	59 A	80 [2]	2 AWG	1-1/2”
	230 VAC	56 A	70	4 AWG	1-1/4”

[1] The AC input branch circuit protective device should be of the time-delay or high inrush type.

[2] Maximum over current protection device is 90 A.

[3] Wire sizes based on recommendations of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC). Table 310.15 (B) (16) for copper wire at 90 °C conductor temperature. For operation in countries where the NEC is not recognized, follow applicable codes.

[4] Equipment grounding conductors must be provided with the AC input conductors supplied to the assembly. Frame ground terminals must be connected to earth ground, not power system neutral. Equipment grounding conductor size based on recommendations of the NEC Table 250-122 for copper wire. If aluminum or copper clad aluminum grounding conductor is used, refer to Table 250-122 for increased conductor size. For operation in countries where the NEC is not recognized, follow applicable codes.

[5] Input current based on R48-3500e rectifier module.

[6] THHN 90°C Wire.

Table 8
Recommended AC Input Branch Circuit Protection and Wire Size

AC Input Connections Illustration

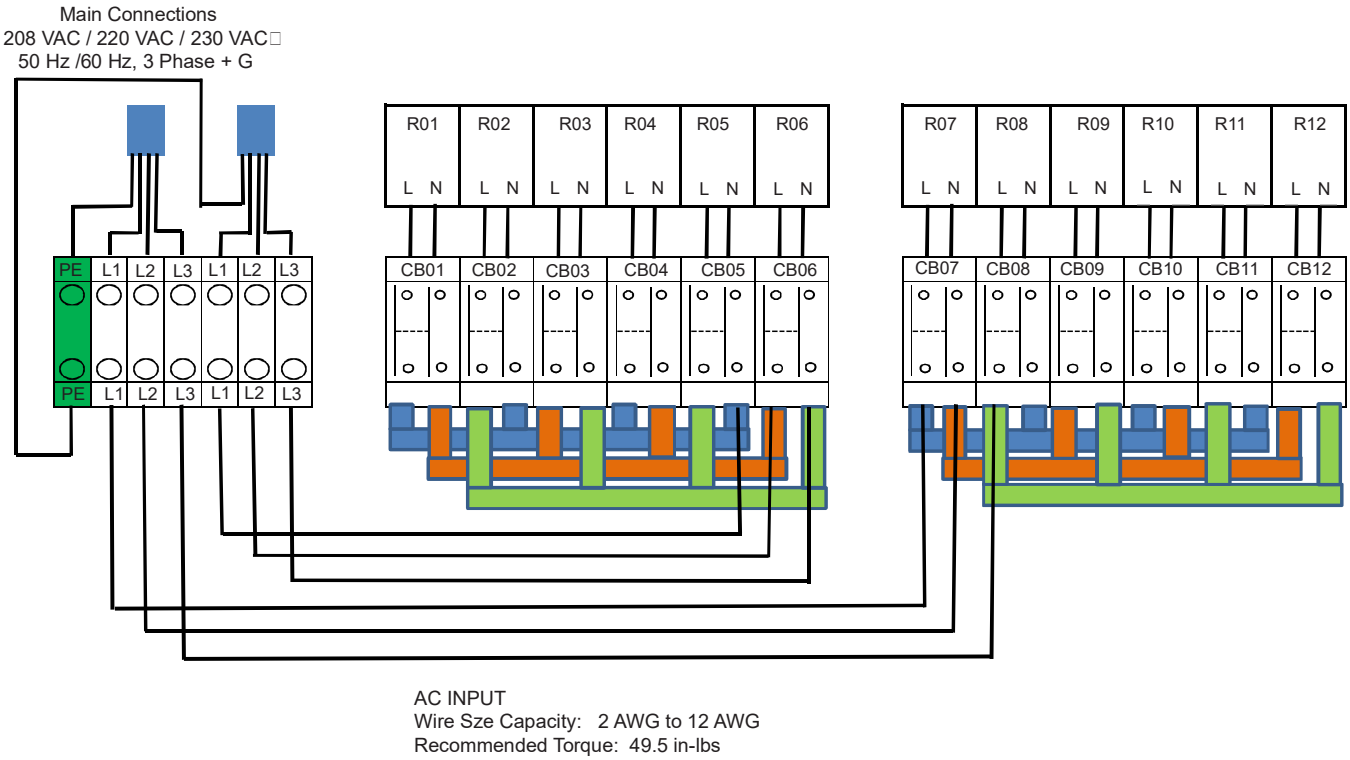


Figure 4
AC Input Connections

External Alarm, Reference, and Monitoring Connections

General

Recommended wire size is 22 AWG for loop lengths up to 200 ft. and 18 AWG to 20 AWG for loop lengths over 200 ft.

External Alarm, Reference, and Monitoring Connections Locations

Refer to Figure 5.

System Interface Board

Refer to Figure 6.

IB2 (Controller Interface Board)

Refer to Figure 7.

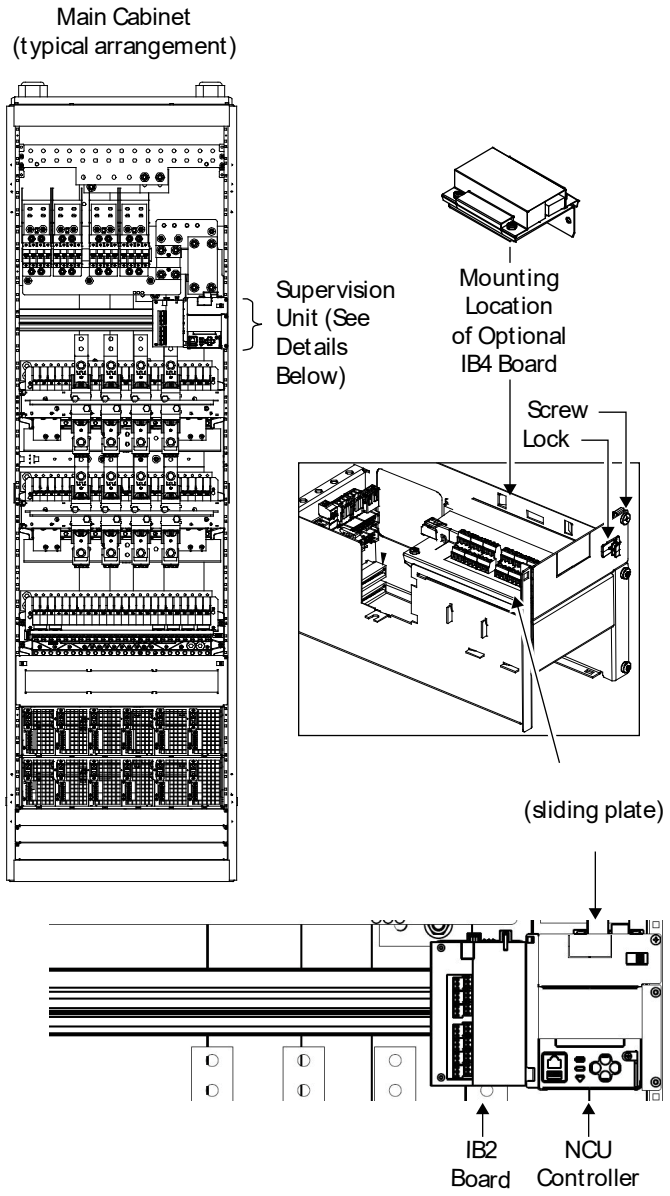


Figure 5
External Alarm, Reference, and Monitoring Connections Locations

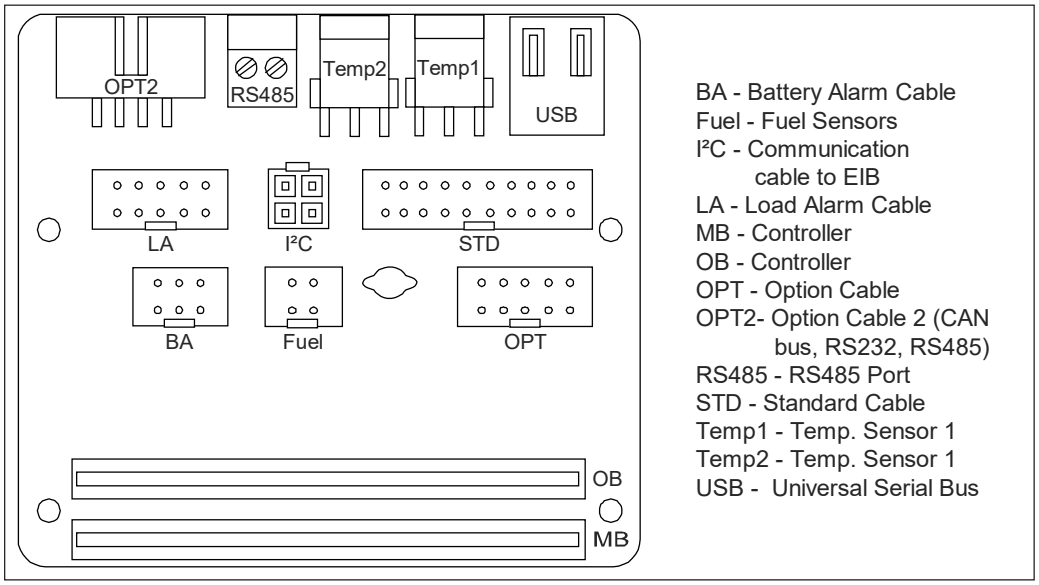
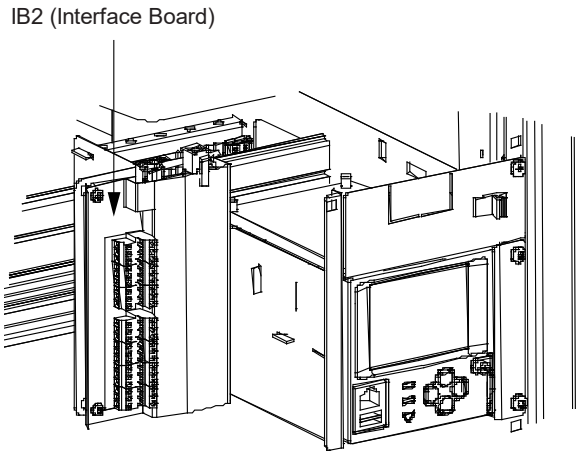
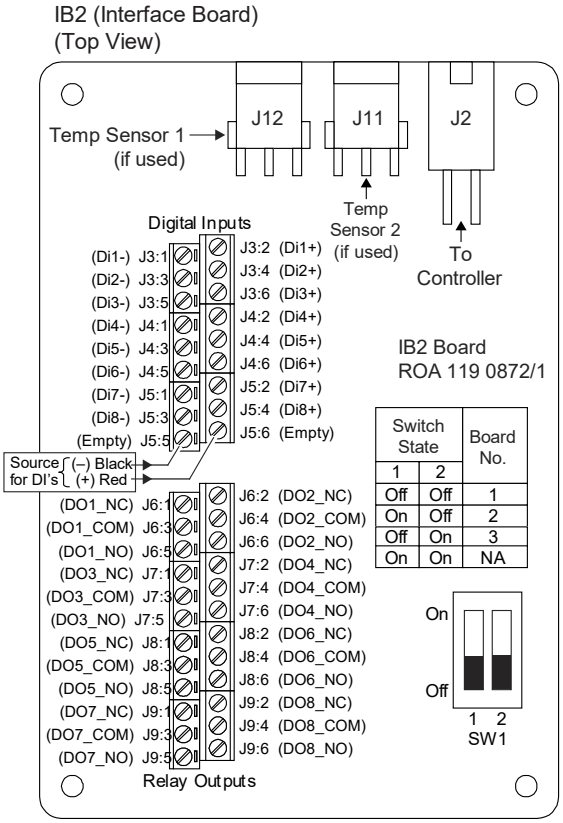


Figure 6
External Alarm, Reference, and Monitoring Connections,
System Interface Board





J3-J9:
Wire Size Capacity: 16-26 AWG.
Recommended Torque: 2.2 in-lbs.

Figure 7
External Alarm, Reference, and Monitoring Connections
IB2 (Controller Interface Board)

Load Distribution Connections

Recommended Load Distribution Wire Sizes and Lugs Selection

The rating of the distribution device determines the load lead wire size requirement. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes. The distribution panel ordered determines the lug hole size and spacing requirements. For lug selection; refer to the following.

- **Low-Capacity Circuit Breaker DC Distribution Unit:** Lug-terminated load leads are connected to the individual load busbars and load return busbar located on the distribution unit.

  The distribution unit's individual load busbars and load return busbar provide 1/4-20 studs for installation of customer-provided two-hole lugs that have 5/8 inch centers and 1/4 inch bolt clearance holes. Customer must provide lugs and lug mounting hardware. The distribution unit's individual load busbars and return busbar are designed to accommodate the lugs listed in Table 4 and Table 5 Maximum size of wire to be connected to a single fuseholder/circuit breaker position is 2 AWG. For wiring up to 350 kcmil, see Table 5.

- **High-Capacity Fuse DC Distribution Unit:** Lug-terminated load leads are connected to the individual load busbars located on the distribution unit. The distribution unit is not equipped with a load return busbar. Load return connections are made to the system return busbar located at the top of the cabinet.

  The distribution unit's individual load busbars provide 3/8" clearance holes on 1" centers for installation of customer-provided two-hole lugs. Customer must provide lugs and lug mounting bolts and hardware. The distribution unit's individual load busbars are designed to accommodate the lugs listed in Table 6.

  The system return busbar provides 3/8" holes on 1" centers for installation of customer-provided two-hole lugs. Customer must provide lugs and lug mounting bolts and hardware. The system return busbar is designed to accommodate the lugs listed in Table 6.

Load Distribution (DC Distribution Units) Illustrations

- **Low-Capacity Circuit Breaker DC Distribution Unit:** Refer to Figure 1.
- **High-Capacity Fuse DC Distribution Unit:** Refer to Figure 2.

Battery Input Connections

Recommended Battery Input Wire Sizes and Lugs Selection

The rating of the battery disconnect circuit breaker determines the input battery lead wire size requirement. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes. The battery unit determines the lug hole size and spacing requirements. For lug selection; refer to the following.

- **Battery Unit with Battery Disconnect Circuit Breakers:** Lug-terminated battery leads are connected to the individual battery busbars located on the battery unit. The battery unit is not equipped with a battery return busbar. Battery return connections are made to the system return busbar located at the top of the cabinet.

  The battery unit's individual load busbars provide 3/8" clearance holes on 1" centers for installation of customer-provided two-hole lugs. Customer must provide lugs and lug mounting bolts and hardware. The battery unit's individual load busbars are designed to accommodate the lugs listed in Table 6.

  The system return busbar provides 3/8" holes on 1" centers for installation of customer-provided two-hole lugs. Customer must provide lugs and lug mounting bolts and hardware. The system return busbar is designed to accommodate the lugs listed in Table 6.

Battery Input (Battery Unit) Illustrations

Refer to Figure 8.

Battery Input Connections Illustration

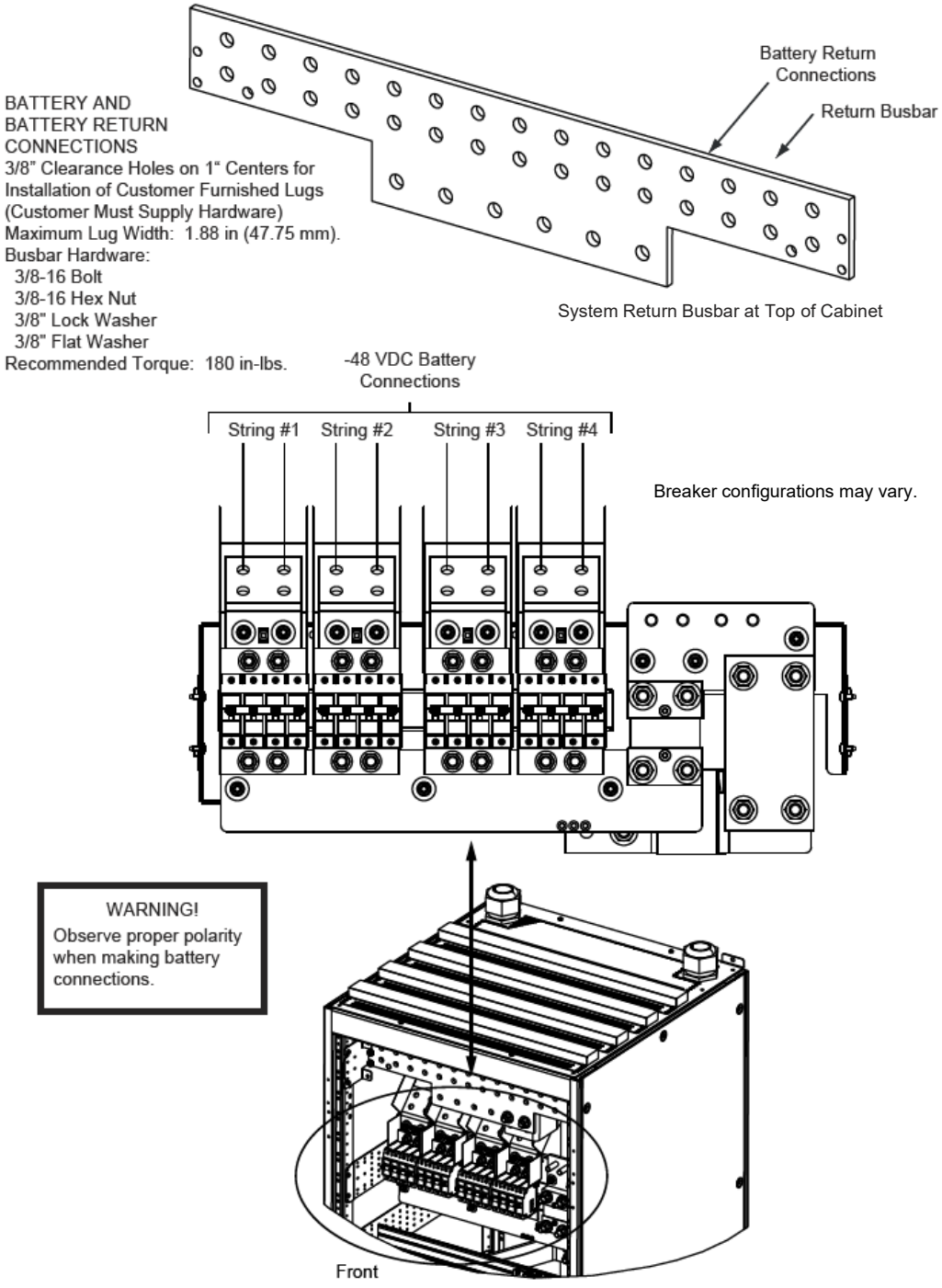


Figure 8
Battery Input Connections Locations

SPECIFICATIONS

1. SYSTEM
   - 1.1 Output Ratings
     - 1.1.1 See “General Specifications” starting on page 2.
   - 1.2 Input Ratings
     - 1.2.1 See “General Specifications” starting on page 2.
   - 1.3 Environmental Ratings
     - 1.3.1 Operating Ambient Temperature Range: +5 °C to +40 °C (+41 °F to +104 °F).
     - 1.3.2 Storage Ambient Temperature Range: -40 °C to +70 °C (-40 °F to +158 °F).
     - 1.3.3 Humidity: This Power System is capable of operating in an ambient relative humidity range of 5% to 90%, non-condensing.
     - 1.3.4 Altitude: Capable of operating in an altitude range of -200 feet to 10,000 feet. The maximum operating ambient temperature should be de-rated by 3 °C per 1000 feet above 5000 feet.
     - 1.3.5 Installation Category:
       - (A) The voltage of supply system is rated for 208 / 220 / 230VAC, 3 phase.
       - (B) The power system is equipment of Overvoltage Category II energy-consuming equipment to be supplied from the fixed installation.
     - 1.3.6 EMC: ETSI EN 300 386 v1.5.1, Class B according to EN 55022
     - 1.3.7 Mounting: Refer to “Overall Dimensions” on page 32 for mounting dimensions.

       Clearance requirements are:
       - (A) Recommended minimum aisle space clearance for the front of each cabinet is 600 mm if the cabinet has an optional door, and 26 mm if the cabinet has no door.
       - (B) Required clearance for the rear of each cabinet is 0 mm.
       - (C) Recommended minimum free space above each cabinet is 300 mm. (Note: Use of large-diameter wire may require greater clearance.)
   - 1.4 Compliance Information
     - 1.4.1 Product Safety: EN 60950-1
     - 1.4.2 Market Approval:
       - (A) CE Marking 93/68/EC
       - (B) Low Voltage Directive 2006/95/EC
       - (C) EMC Directive 2006/95/EC
       - (D) RoHS 2011/65/EU
       - (E) REACH 1907/2006
       - (F) WEEE 2002/96/EC
   - 1.5 IB2 (Controller Interface Board) Ratings
     - 1.5.1 Digital Input Ratings
       - (A) Maximum Voltage Rating: 60 VDC.
       - (B) Active High: > 19 VDC.
       - (C) Active Low: < 1 VDC.
     - 1.5.2 Relay Ratings
       - (A) 1 A Steady State @ 30 VDC.
       - (B) 3 A Peak @ 30 VDC.
2. RECTIFIER

   Refer to the Rectifier Instructions (UM1R483500e).
3. CONTROLLER

   Refer to the NCU Controller Instructions (UM1M830BNA).

   Refer to the EXU Extension Controller Instructions (11VE0162PB).

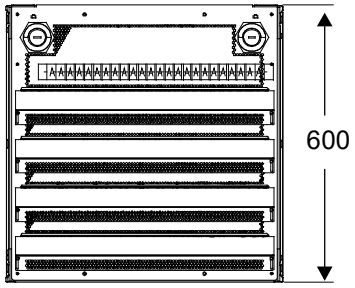
   For controller factory settings, refer to the Controller Configuration Drawing (C-drawing).

MECHANICAL SPECIFICATIONS

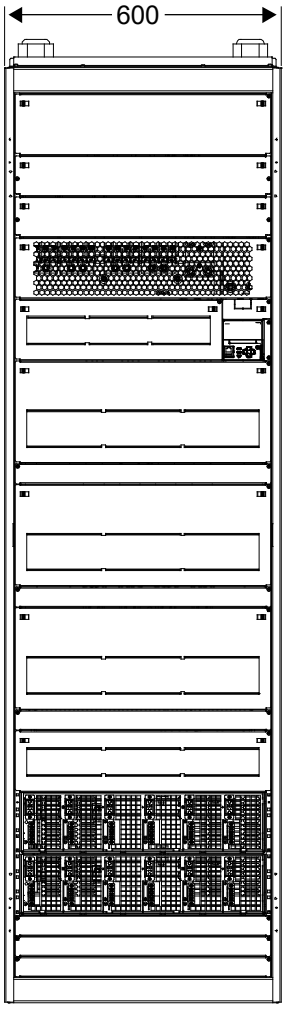
Overall Dimensions

Main Cabinet

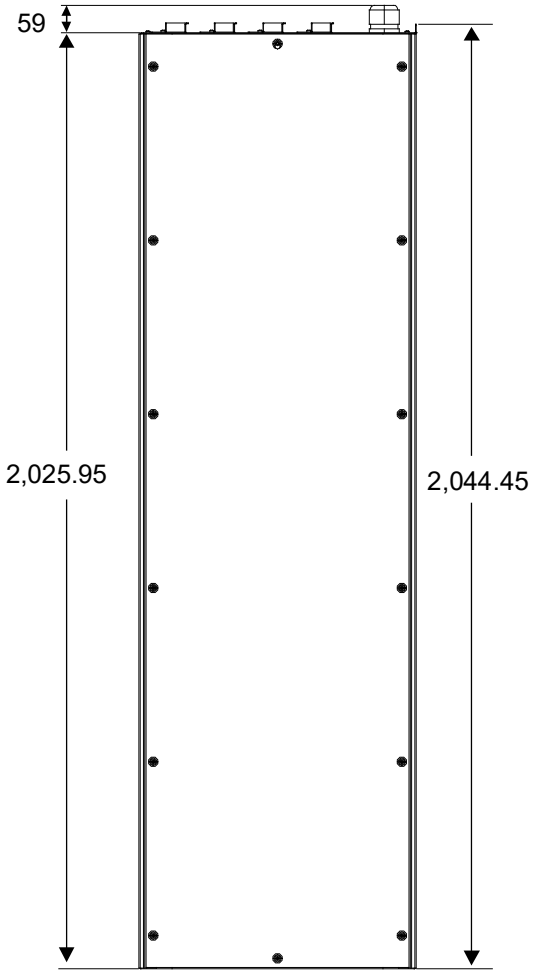
Note: Units in mm.



Top View



Front View

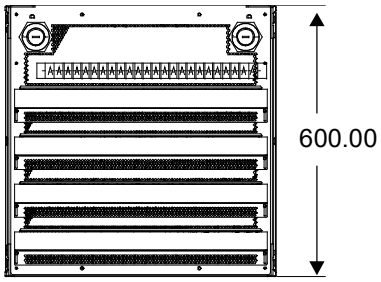


Rear View

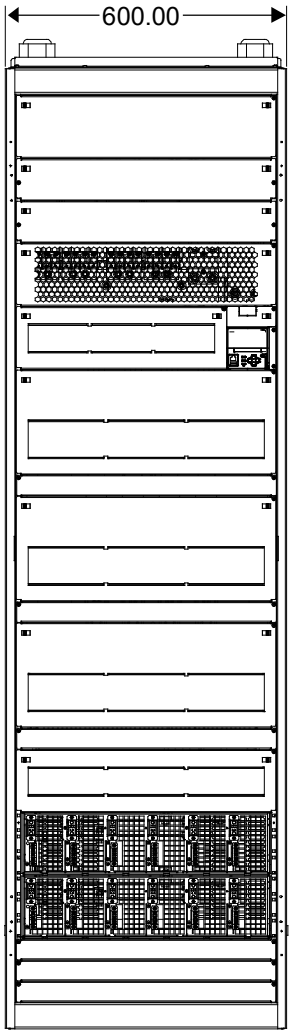
Figure 9
Main Cabinet Dimension

Extension Cabinet

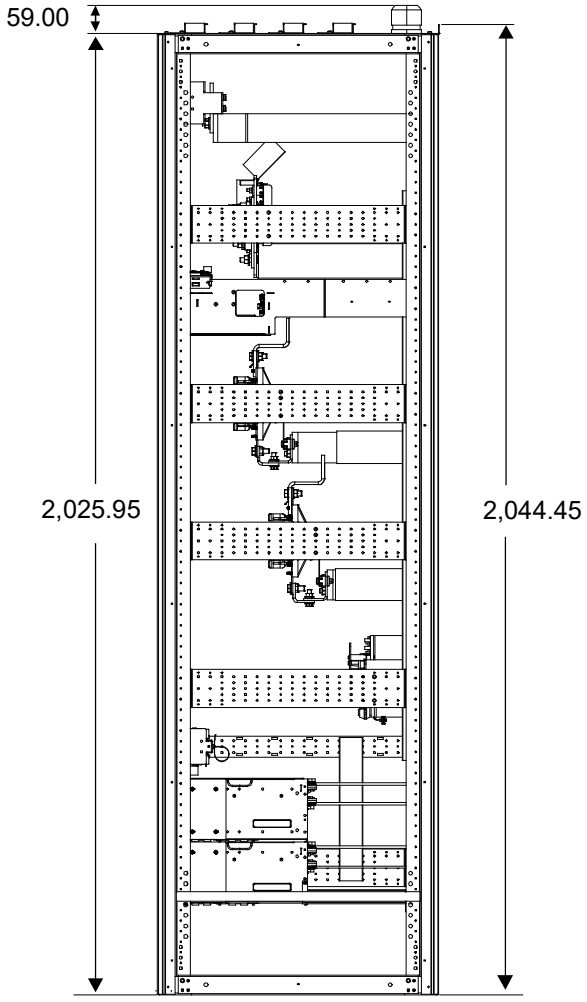
Note: Units in mm.



Top View



Front View



Rear View

Figure 10
Extension Cabinet Dimension

Weights

Part Number	Net Weight (lbs), each	Description
Cabinets		
BMK2207221/051	630	Main Cabinet only
BMK2207221/052	630	Extension Cabinet only
Distribution Panels		
BMG220206/1, BMG220206/2 and BMG220206/3	25	Low-Capacity Circuit Breaker Distribution Unit
BMG220205/1 and BMG220205/2	40	High-Capacity Fuse Distribution Unit

RELATED DOCUMENTATION

System Installation Instructions: IMBMK2207221/051
System User Instructions: UMBMK2207221/051
NCU Main Controller Instructions: UM1M830BNA
EXU Extension Controller Instructions: 11VE0162PB
Rectifier Instructions: UM1R483500e
Main Schematic Diagrams: 11YJ0032AY
Main Wiring Diagrams: 11YJ0032AY

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