

SYSTEM OVERVIEW

Description: -48 VDC @ up to 62.5 Amperes Power System

The Vertiv™ NetSure™ 2100 Series -48 VDC Power System is an integrated power system containing rectifiers, intelligent control, metering, monitoring, and distribution.

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

The NetSure 2100 Series -48 VDC Power System consists of the following components mounted in a 19" or 23" wide relay rack or cabinet rack. Wall mounting options are also available.

- **NetSure Mini Control Unit (Controller)**

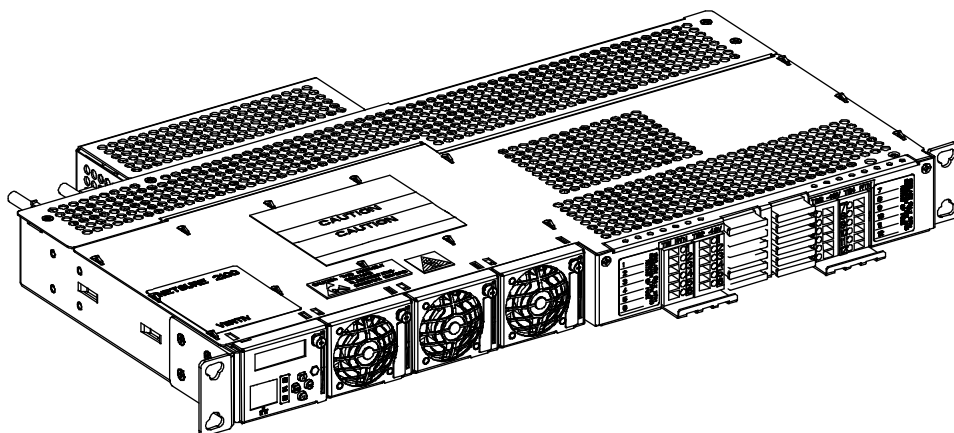
The controller provides power system control (including optional low voltage battery disconnect [LVBD]), rectifier control (including a charge control function), metering functions, monitoring functions, local/remote alarm functions, and connections for binary inputs and programmable relay outputs. The controller also supports rectifier temperature compensation if the system is equipped with a temperature probe(s). Temperature probe(s) 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 a front panel display and keypad for local access. The controller provides an Ethernet port and comes with comprehensive webpages for remote access. The controller has optional SNMP v3 capability for remote system management. Refer to the NetSure Mini Control Unit instructions (UM1M831ANA) for more information.

- **Rectifier Modules**

The system contains rectifier modules which provide load power, battery float current, and battery recharge current during normal operating conditions. Refer to the rectifier instructions (UM1R481000e3) for more information.

- **Distribution Unit**

Various distribution unit options are available, as described in this document. The distribution unit can be equipped with an optional Low Voltage Battery Disconnect (LVBD) contactor. The various distribution units provide DC distribution through circuit breakers and/or fuses.



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General Specifications

See detailed specifications starting on page 61.

Family:	NetSure™
Spec. No.:	582138000
Model:	2100
System AC Input Voltage:	Nominal 120 VAC / 208 VAC / 240 VAC, single phase, 3-wire, 50 Hz / 60 Hz, with an operating range of 100 VAC to 250 VAC. Acceptable input frequency range is 45 Hz to 65 Hz. Permitted Variation: 85 VAC to 300 VAC.
System AC Input Current:	
Individual Rectifier Feed:	4.7 A @ 120 VAC; 5.5 A @ 208 VAC; 4.7 A @ 240 VAC
Single Shelf Feed:	14.0 A @ 120 VAC; 15.7 A @ 208 VAC; 13.5 A @ 240 VAC
System DC Output Voltage:	-48 VDC
System DC Output Capacity:	62.5 A @ +40 °C, maximum 51.6 A @ +65 °C, maximum 48.0 A @ +70 °C, maximum (See “Distribution Units” starting on page 13 for any de-rating.)
Rectifier Rating (1R481000e3):	See UM1R481000e3.
System Agency Approval:	UL 1801 Recognized (“cURus”), NEBS (pending)
Framework Type:	Rack Mounted in a Relay Rack or Cabinet (Wall Mounting Options Available)
Mounting Width, Depth, Height:	See “Mechanical Specifications” starting on page 63.
Access:	Front for Operation and Maintenance Front and Rear for Installation and Maintenance
Supplemental Bay(s) Available:	None
Control:	Microprocessor
Color:	Front Panels are Gray, Shelf is Galvanized
Environment:	-40 °C to +70 °C (-40 °F to +158 °F)

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MAIN COMPONENTS ILLUSTRATIONS

582138000

BASE SHELF:

[58213800001](#) 19" W / 23" W System, 1RU.

Factory installed with 19" W mounting brackets.
Also supplied with 23" W mounting brackets.

OPTIONAL WALL MOUNTING KITS:

[541285](#) Horizontal or Vertical Wall Mount Bracket Kit.

582136800 LIST 01 AC INPUT KITS:

[564840](#) Individual rectifier AC input feed with cords
(IEC receptacles). AC input cords ordered separately.

[564841](#) Single shelf AC input feed with cord
(direct connection). AC input cord is ordered
separately (and factory connected).

DIGITAL INPUT AND RELAY OUTPUT CABLE:

See page 25.

TEMPERATURE PROBE OPTIONS:

See page 26.

RECTIFIER AC INPUT LINE CORDS AND CABLE ASSEMBLIES: See page 19.

OTHER OPTIONS:

[58213800093](#): Pre-Cabled Battery Tray (23").

[58213800094](#): Pre-Cabled Battery Tray (19").

See also "Accessory Descriptions" on page 17.

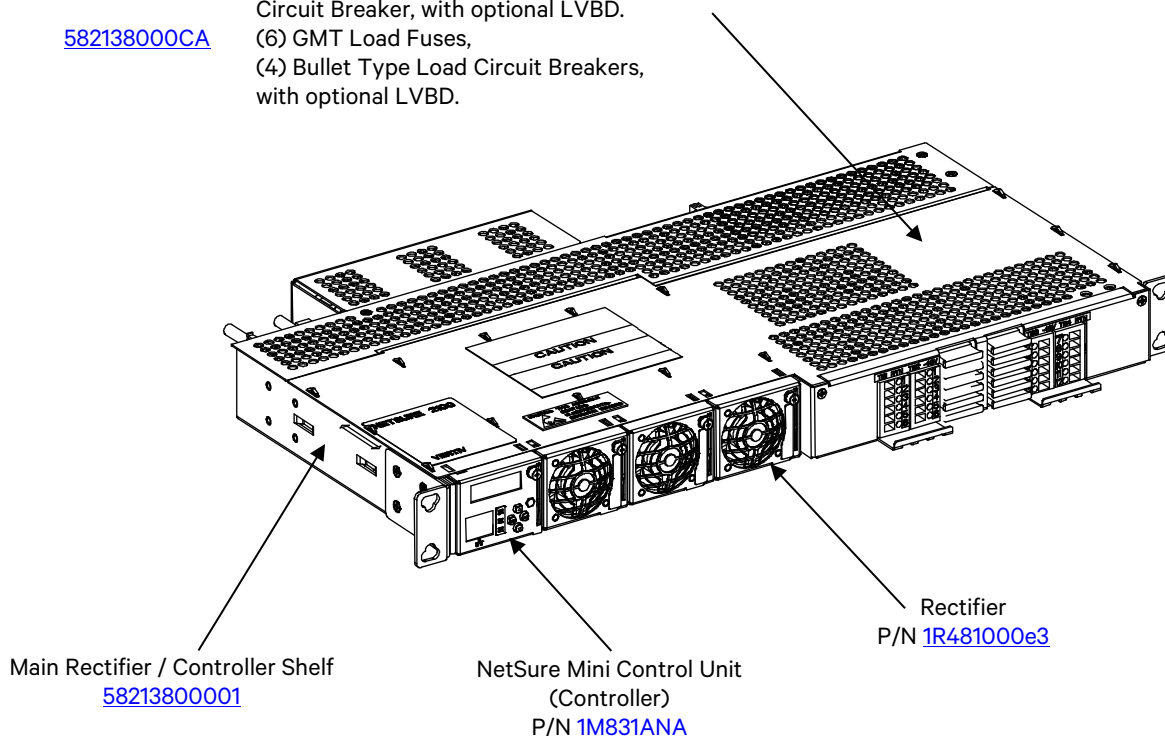
DISTRIBUTION UNIT OPTIONS:

[582138000AA](#) (12) GMT Load Fuses, with optional LVBD.

[582138000BA](#) (6) GMT Load Fuses,
(7) Compact Type Load Circuit Breakers,
with optional LVBD.

[582138000BB](#) (6) GMT Load Fuses,
(4) Compact Type Load Circuit Breakers,
(1) Bullet Type Battery Disconnect
Circuit Breaker, with optional LVBD.

[582138000CA](#) (6) GMT Load Fuses,
(4) Bullet Type Load Circuit Breakers,
with optional LVBD.



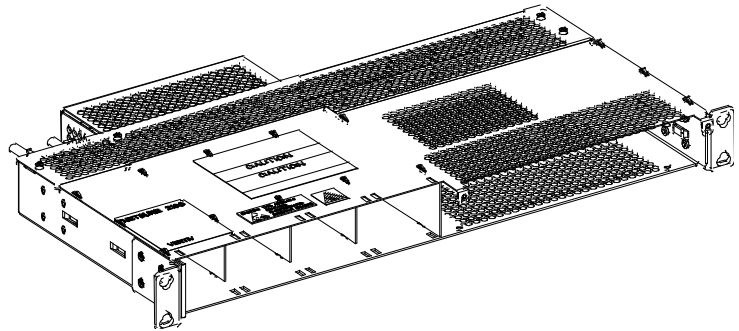
LIST DESCRIPTIONS

List Numbers

5821380001 (List 01): Main Rectifier / Controller Shelf

Features

- ◆ Consists of a 1RU high by 19" wide shelf. Factory installed with 19" W mounting brackets. Also supplied with 23" W mounting brackets.
- ◆ Contains a system controller mounting slot.
- ◆ Contains three (3) rectifier module mounting slots.
- ◆ Contains a distribution unit mounting slot.
- ◆ Provides connections for up to two (2) temperature probes.
- ◆ Provides connections for the four (4) controller programmable form-C relay outputs.
- ◆ Provides connections for the two (2) controller programmable binary digital inputs.



Restrictions

The short circuit interrupting capacity of the Spec. No. 582138000 system is 10 kA.

Ordering Notes

- 1) Order a List 01 shelf for each system.
 - a) Order one (1) distribution unit (List AA, BA, BB, or CA) per List 01 (see page 13).
 - b) For horizontal or vertical wall mounting, order wall mount bracket kit P/N 541285 per List 01 (see page 18).
 - c) Order an AC input kit for each List 01 (see page 18).
 - d) Order up to three (3) rectifier modules P/N 1R481000e3 per List 01 (see page 19).
 - e) Order one (1) controller P/N 1M831ANA per List 01 (see page 24).
Also specify appropriate configuration file for your site.
- 2) Order battery tray(s) as required per List 93 or List 94 (see page 6 and 10).
- 3) Order battery and load distribution lugs as required (see the distribution unit list option descriptions starting on page 13).
- 4) Order a relay rack as required (see page 17).
 - a) Order relay rack earthquake anchor kit as required. See page 17.
- 5) Order a rectifier module mounting position blank cover assembly P/N 10007653 for each unused rectifier module mounting position in the system as required (see page 19).
- 6) Order rectifier AC input line cords or cables as required (see page 19).
- 7) Order an external IB4 board kit if desired (see page 25).
- 8) Order a digital input and relay output cable as required (see page 25).
- 9) Order optional temperature probes for ambient and battery temperature monitoring as required (see page 26). The temperature probe(s) may also be used for the battery charge temperature compensation feature and BTRM (Battery Thermal Runaway Management).
- 10) Order fuses and/or circuit breakers as required (see page 28).
- 11) Order battery cables as required (see page 33).
- 12) Order battery cabinet(s) as required (see page 34).

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58213800093 (List 93): Pre-Cabled Battery Tray for 23" W Relay Rack

Features

- ◆ Each List 93 provides one (1) battery tray factory mounted in the 23" wide system relay rack specified when ordered. Each battery tray holds four (4) 12 VDC front terminal valve regulated lead acid (VRLA) batteries. Battery cabling is factory provided and connected to the system's main busbars. Batteries are configured as one (1) 48 VDC string per tray.
- ◆ Battery trays can be ordered with or without a battery disconnect circuit breaker. When a circuit breaker is ordered, it is provided in the -48 VDC lead of each battery string (one [1] circuit breaker per tray).
- ◆ Battery spacers included.
- ◆ See "58213800093 (23" W Battery Tray)" on page 65 for battery tray dimensions and typical arrangement. Note different battery trays are available to accommodate the various size batteries listed below.

Restrictions

For 23" W relay racks only.

Designed to accommodate the batteries listed below.

A single battery tray must mount at bottom of relay rack. Multiple battery trays must mount starting at bottom of relay rack and working upward. Factory spaces battery trays 6RU, 7RU, or 8RU apart as determined by battery selected. If no battery selected, factory spaces battery trays 8RU apart. Spacing can be increased above that required for the battery selected up to a maximum of 8RU.

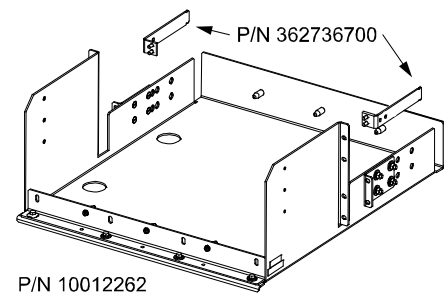
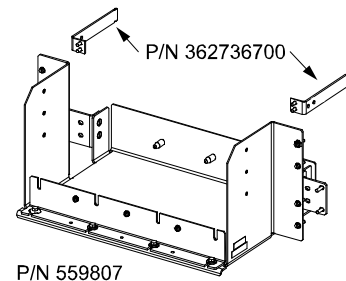
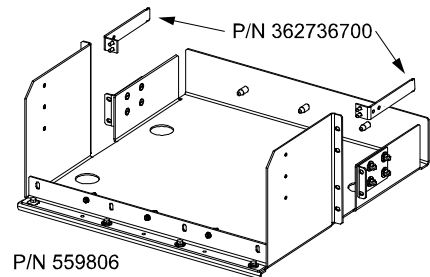
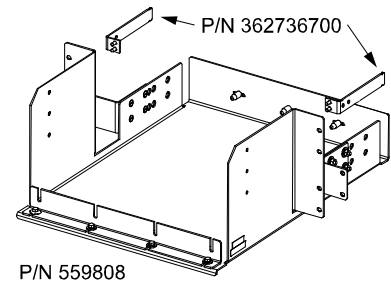
A system can accommodate up to two (2) List 93's, depending on rack size and tray spacing. List BB accommodates a single string of batteries.

Cable size for each tray is 2 AWG for optional battery disconnect circuit breaker selected (up to 100 A).

Not a stand-alone battery system. Must be used as part of a power system that includes a distribution unit list option and a relay rack.

Ordering Notes

- 1) Order multiples of List 93 for more than one (1) battery tray. See **Restrictions** above.
- 2) Order one (1) or more P/N 362736700 cable bracket(s) as required.
- 3) Order batteries separately. Table 1, Table 2, Table 3, and Table 4 list the batteries recommended for use with List 93.
- 4) Specify rack spacing of 6U (10.5"), 7U (12.25"), or 8U (14") between trays and above top tray as required for battery clearance. See Table 1, Table 2, Table 3, and Table 4.
- 5) Specify the batteries you intend to use with each List 93 ordered. Lugs for battery connections vary according to the batteries to be installed. Battery cables will be lugged as shown in Table 1, Table 2, Table 3, and Table 4.
Note: If battery model is **not** specified, lugs will **not** be installed at factory. Instead, both available lug kits for the furnished wire size will be shipped loose with the order.
- 6) Specify with or without tray-mounted battery disconnect circuit breakers.
Note: All List 93 trays in a rack will be furnished with or without battery disconnect circuit breakers as specified for the first tray ordered.
- 7) If ordering List 93 with tray-mounted circuit breakers, order one (1) breaker per List 93 from Table 5.
- 8) If ordering List 93 with tray-mounted circuit breakers, specify breaker mounting on left or right side of tray. Circuit breaker mounting kits shown in Table 5 will be installed. Kit numbers are provided for reference only.
- 9) If ordering List 93 with tray-mounted circuit breakers, order alarm jumper P/N 524384 and P/N 565513 for each system to connect the alarm terminal of up to two (2) battery disconnect circuit breakers.
- 10) Order battery cables as required (see page 33).



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Battery Tray P/N 559806							
Manufacturer ¹	Model	P/N	Rated 8-Hr. Capacity (Ah)	Dimension W x L x H (Inches)	Minimum Tray Spacing	Weight (per battery) (lb)	Lug Kit ² (2 AWG) (90°)
Northstar	NSB155FT RED	--	155	4.9 x 22.0 x 11.0	7RU	101	528234
Northstar	NSB170FT RED	126111	170	4.9 x 22.0 x 12.6	8RU	116	528234
Northstar	NSB190FT RED	--	190	4.9 x 22.0 x 12.6	8RU	123	528234
Northstar	NSB155FT HT	--	154	4.9 x 22.0 x 11.0	7RU	117	528234
Northstar	NSB170FT HT	--	174	4.9 x 22.0 x 12.6	8RU	121	528234
Northstar	NSB190FT HT	--	190	4.9 x 22.0 x 12.6	8RU	132	528234
Deka Unigy I	12AVR-150ET	122018	150	4.90 x 22.00 x 11.75	8RU	115	528234
Deka Unigy I	12AVR-170ET	541381	170	4.90 x 22.00 x 12.60	8RU	120	528234
Deka Unigy I	HT170ET	--	164	4.93 x 22.17 x 12.58	8RU	118	528234
C&D	TEL12-160F	140456	157	5.0 x 22.0 x 11.1	7RU	116.8	528236
C&D	TEL12-180F	--	181	5.0 x 22.0 x 12.6	8RU	132.3	528236
C&D	TEL12-210F	554579	202	5.0 x 22.0 x 12.6	8RU	132.3	528236
Energys	12V155FS	122010	155	4.90 x 22.10 x 11.10	7RU	106.9	528234
Energys	12V170FS	--	170	4.90 x 22.10 x 11.10	7RU	112	528234
Energys	SBS 170F	--	170	4.92 x 22.10 x 11.10	7RU	116	528234
Energys	SBS 190F	--	190	4.90 x 22.10 x 12.40	8RU	132	528234
FIAMM	12FAT100	--	100	4.96 x 21.97 x 9.06	6RU	95	528234
FIAMM	12FAT155	--	155	4.96 x 21.97 x 12.64	8RU	129	528234
FIAMM	12FAT180	--	180	4.96 x 21.97 x 12.64	8RU	134	528234
GS Yuasa	PYL12V160FT	--	160	4.9 x 21.9 x 11.0	7RU	116.2	528234
GS Yuasa	PYL12V185FT	--	185	4.9 x 21.9 x 12.5	8RU	133.8	528234

¹ See "Battery Manufacturer Information" on page 68.

² Battery lug kit provides two lugs for one tray. Up to 100 A battery disconnect.

Table 1

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Battery Tray P/N 559807							
Manufacturer ¹	Model	P/N	Rated 8-Hr. Capacity (Ah)	Dimension W x L x H (Inches)	Minimum Tray Spacing	Weight (per battery) (lb)	Lug Kit ³ (2 AWG) (90°)
Northstar	NSB40FT ²	--	38.1	3.80 X 9.80 X 8.20	6RU	34	528234
Northstar	NSB60FT ²	--	57.9	4.20 X 11.30 X 10.40	7RU	49	528234
Energys	12TD50F	--	48	4.2 X 10.9 X 8.7	6RU	38	528234

¹ See “Battery Manufacturer Information” on page 68.

² Batteries MUST be equipped with front access terminal option. See battery manufacturer for ordering information.

³ Battery lug kit provides two lugs for one tray. Up to 100 A battery disconnect.

Table 2

Battery Tray P/N 559808							
Manufacturer ¹	Model	P/N	Rated 8-Hr. Capacity (Ah)	Dimension W x L x H (Inches)	Minimum Tray Spacing	Weight (per battery) (lb)	Lug Kit ² (2 AWG) (90°)
Energys	12TD150F	--	143	4.3 X 21.7 X 11.3	8RU	105	528234

¹ See “Battery Manufacturer Information” on page 68.

² Battery lug kit provides two lugs for one tray. Up to 100 A battery disconnect.

Table 3

Battery Tray P/N 10012262							
Manufacturer ¹	Model	P/N	Rated 8-Hr. Capacity (Ah)	Dimension W x L x H (Inches)	Minimum Tray Spacing	Weight (per battery) (lb)	Lug Kit ² (2 AWG) (90°)
Deka	12AVR200ET	--	200	4.97 X 24.30 X 12.74	8RU	151	528234
Deka	HT200ET	--	200	4.97 X 24.15 X 12.74	8RU	151	528234

¹ See “Battery Manufacturer Information” on page 68.

² Battery lug kit provides two lugs for one tray. Up to 100 A battery disconnect.

Table 4

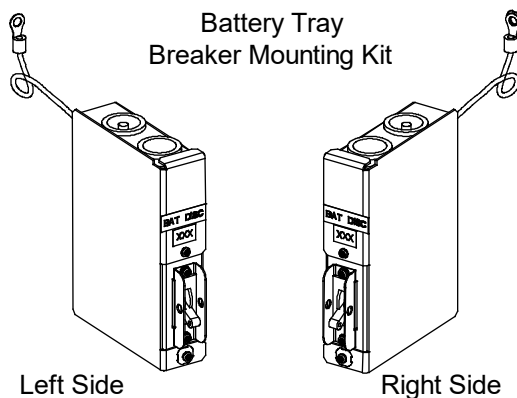
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Ampere Rating	Part No., Circuit Breaker, Electrical/Mechanical Trip ¹ (Black Handle)	Part No., Left-Side Breaker Mtg. Kit (For Reference Only)	Part No., Right-Side Breaker Mtg. Kit (For Reference Only)
50	256694300	559814	559813
60	256694700		
70	256695100		
75	256695500		
100	256695900		

¹ Provides an alarm during an electrical or manual trip condition.

Table 5



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58213800094 (List 94): Pre-Cabled Battery Tray for 19" W Relay Rack

Features

- ◆ Each List 94 provides one (1) battery tray factory mounted in the 19" wide system relay rack specified when ordered. Each battery tray holds four (4) 12 VDC front terminal valve regulated lead acid (VRLA) batteries. Battery cabling is factory provided and connected to the system's main busbars. Batteries are configured as one (1) 48 VDC string per tray.
- ◆ Battery trays can be ordered with or without a battery disconnect circuit breaker. When a circuit breaker is ordered, it is provided in the -48 VDC lead of each battery string (one [1] circuit breaker per tray).
- ◆ Battery spacers included.
- ◆ See "58213800094 (19" W Battery Tray)" on page 66 for battery tray dimensions and typical arrangement. Note different battery trays are available to accommodate the various size batteries listed below.

Restrictions

For 19" W relay racks only.

Designed to accommodate the batteries listed below.

A single battery tray must mount at bottom of relay rack. Multiple battery trays must mount starting at bottom of relay rack and working upward. Factory spaces battery trays 6RU, 7RU, or 8RU apart as determined by battery selected. If no battery selected, factory spaces battery trays 8RU apart. Spacing can be increased above that required for the battery selected up to a maximum of 8RU.

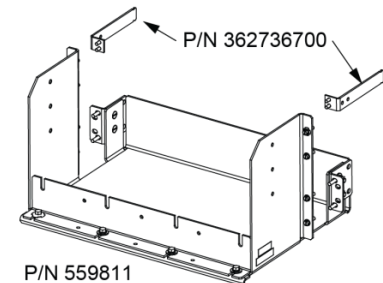
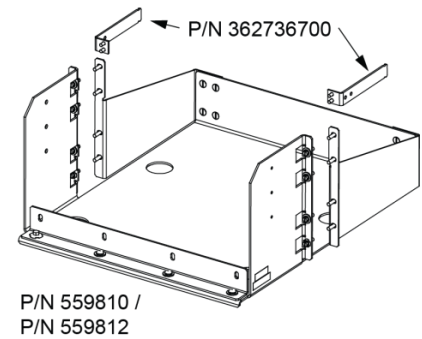
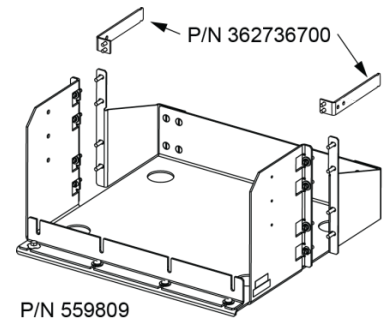
A system can accommodate up to two (2) List 94's, depending on rack size and tray spacing. List BB accommodates a single string of batteries.

Cable size for each tray is 2 AWG for optional battery disconnect circuit breaker selected (up to 100 A).

Not a stand-alone battery system. Must be used as part of a power system that includes a distribution unit list option.

Ordering Notes

- 1) Order multiples of List 94 for more than one (1) battery tray. See **Restrictions** above.
- 2) Order one (1) or more P/N 362736700 cable bracket(s) as required.
- 3) Order batteries separately. Table 6, Table 7, Table 8 and Table 9 list batteries recommended for use with List 94.
- 4) Specify rack spacing of 6U (10.5"), 7U (12.25"), or 8U (14") between trays and above top tray as required for battery clearance. See Table 6, Table 7, Table 8 and Table 9.
- 5) Specify the batteries you intend to use with each List 94 ordered. Lugs for battery connections vary according to the batteries to be installed. Battery cables will be lugged as shown in Table 6, Table 7, Table 8 and Table 9.
Note: If battery model is **not** specified, lugs will **not** be installed at factory. Instead, both available lug kits for the furnished wire size will be shipped loose with the order.
- 6) Specify with or without tray-mounted battery disconnect circuit breakers.
Note: All List 94 trays in a rack will be furnished with or without battery disconnect circuit breakers as specified for the first tray ordered.
- 7) If ordering List 94's with tray-mounted breakers, order one (1) circuit breaker per List 94 from Table 10.
- 8) If ordering List 94 with tray-mounted circuit breakers, specify breaker mounting on left side or right side of tray. Circuit breaker mounting kits shown in Table 10 will be installed. Kit numbers are provided for reference only.
- 9) If ordering List 94 with tray-mounted circuit breakers, order alarm jumper P/N 524384 and P/N 565513 for each system to connect the alarm terminal of up to two (2) battery disconnect circuit breakers to the system.
- 10) Order battery cables as required (see page 33).



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Battery Tray P/N 559809							
Manufacturer ¹	Model	P/N	Rated 8-Hr. Capacity (Ah)	Dimension W x L x H (Inches)	Minimum Tray Spacing	Weight per Battery (lb)	Lug Kit ² (2 AWG) (90°)
Northstar	NSB90FT	--	90	4.25 X 15.59 X 10.04	7RU	71	528234
Northstar	NSB100FT	--	100	4.25 X 15.59 X 11.03	7RU	78	528234
Enersys	12TD100F4	--	96	4.3 X 15.5 X 11.3	8RU	71	528234
Enersys	12V92F	122005	92	4.10 X 16.40 X 10.10	7RU	61.7	528234
Enersys	SBS 100F	--	100	4.30 X 15.60 X 11.30	7RU	71.9	528234
Enersys	SBS C11F	--	91	4.10 X 16.40 X 10.10	7RU	61.6	528234
FIAMM	12UMTX100/19 FT	--	100	4.25 X 15.55 X 10.83	7RU	74.8	528234
Northstar	NSB12-330FT	--	(330W)	4.20 X 15.60 X 10.00	7RU	70.6	528234
Northstar	NSB12-380FT	--	(380W)	4.20 X 15.60 X 11.30	7RU	78.3	528234

¹ See "Battery Manufacturer Information" on page 68.

² Battery lug kit provides two lugs for one tray. Up to 100 A battery disconnect.

Table 6

Battery Tray P/N 559810							
Manufacturer ¹	Model	P/N	Rated 8-Hr. Capacity (Ah)	Dimension W x L x H (Inches)	Required Tray Spacing	Weight per Battery (lb)	Lug Kit ² (2 AWG) (90°)
Enersys	12TD100F6	--	97	4.3 X 20.0 X 9.4	7RU	73	528234
Deka	12AVR100ET	241270905	96	4.33 X 20.13 X 9.38	6RU	75	528234
Enersys	12VE115F	--	101	4.33 X 20.10 X 9.25	6RU	80.5	528234

¹ See "Battery Manufacturer Information" on page 68.

² Battery lug kit provides two lugs for one tray. Up to 100 A battery disconnect.

Table 7

Battery Tray P/N 559811							
Manufacturer ¹	Model	P/N	Rated 8-Hr. Capacity (Ah)	Dimension W x L x H (Inches)	Required Tray Spacing	Weight per Battery (lb)	Lug Kit ³ (2 AWG) (90°)
Northstar	NSB40FT ²	--	38.1	3.80 X 9.80 X 8.20	6RU	34	528234
Northstar	NSB60FT ²	--	57.9	4.20 X 11.30 X 10.40	7RU	49	528234
Enersys	12TD50F	--	48	4.2 X 10.9 X 8.7	6RU	38	528234

¹ See "Battery Manufacturer Information" on page 68.

² Batteries MUST be equipped with front access terminal option. See battery manufacturer for ordering information.

³ Battery lug kit provides two lugs for one tray. Up to 100 A battery disconnect.

Table 8

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Battery Tray P/N 559812							
Manufacturer ¹	Model	P/N	Rated 8-Hr. Capacity (Ah)	Dimension W x L x H (Inches)	Required Tray Spacing	Weight (per battery) (lb)	Lug Kit ² (2 AWG) (90°)
Enersys	12V125F	122009	125	4.10 X 22.10 X 12.40	8RU	124	528236
Enersys	12TD150F	--	143	4.3 X 21.7 X 11.3	8RU	105	528234

¹ See “Battery Manufacturer Information” on page 68.

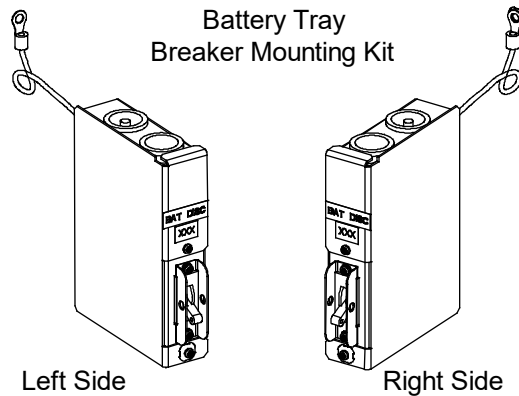
² Battery lug kit provides two lugs for one tray. Up to 100 A battery disconnect.

Table 9

Ampere Rating	Part No., Circuit Breaker, Electrical/Mechanical Trip ¹ (Black Handle)	Part No., Left-Side Breaker Mtg. Kit (For Reference Only)	Part No., Right-Side Breaker Mtg. Kit (For Reference Only)
50	256694300	559814	559813
60	256694700		
70	256695100		
75	256695500		
100	256695900		

¹ Provides an alarm during an electrical or manual trip condition.

Table 10



Distribution Units

582138000AA (List AA): Distribution Unit with Twelve (12) GMT Load Fuses and Optional Low Voltage Battery Disconnect (LVBD)

Features

- ◆ A distribution unit with optional Low Voltage Battery Disconnect (LVBD), a battery shunt, two (2) battery connection points, and twelve (12) GMT fuse load distribution positions (0 A to 15 A).

Restrictions

Factory installed in List 01.

The six (6) positions of each GMT fuse block is rated for 35 A at +40 °C (+104 °F), +65 °C (+149 °F) and +70 °C (+158 °F). A space is required between 15 A fuses at 70 °C.

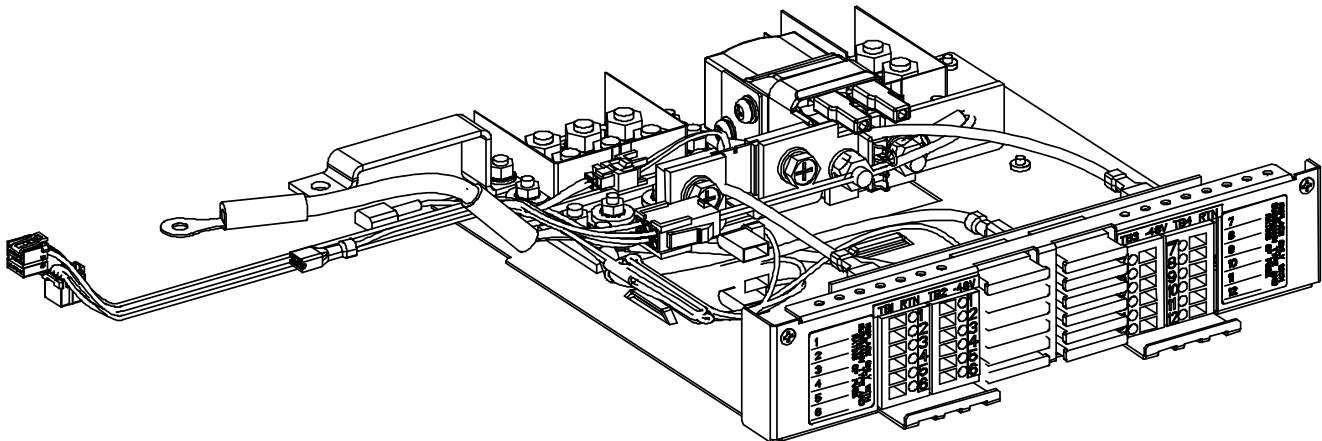
Maximum GMT fuse size is 15 A.

See also “Restrictions” under “GMT Type Load Distribution Fuses” on page 31.

Maximum Temperature	Maximum Distribution Current	Maximum Battery Charging Current While Powering the Distribution Loads	Total Maximum Power
+40 °C (+104 °F)	48 A	17.5 A	Not to exceed 3000 W at -48 VDC.
+65 °C (+149 °F)	43 A	11.6 A	Not to exceed 2475 W at -48 VDC.
+70 °C (+158 °F)	38 A	13 A	Not to exceed 2400 W at -48 VDC.

Ordering Notes

- 1) Order one (1) distribution unit for each List 01.
- 2) Order GMT fuses as required per “GMT Type Load Distribution Fuses” on page 31.
- 3) Order battery input lugs as required per “Load Distribution Wiring, Input Battery Wiring, and CO Ground Wiring” starting on page 51.
- 4) Order battery cables as required (see page 33).
- 5) Order a digital input and relay output cable as required (see page 25).
- 6) Order optional low voltage battery disconnect (LVBD) as required (see “582138000LB (List LB): Low Voltage Battery Disconnect (LVBD)” on page 17).



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582138000BA (List BA): Distribution Unit with Seven (7) Compact Type Load Circuit Breakers, Six (6) GMT Load Fuses, and Optional Low Voltage Battery Disconnect (LVBD)

Features

- ◆ A distribution unit with optional Low Voltage Battery Disconnect (LVBD), a battery shunt, two (2) battery connection points, seven (7) compact type circuit breaker load distribution positions (5 A to 30 A), and six (6) GMT fuse load distribution positions (0 A to 15 A).

Restrictions

Factory installed in List 01.

Breakers and distribution wiring accessible by sliding front distribution unit panel forward.

The six (6) positions of the GMT fuse block is rated for 35 A at +40 °C (+104 °F), +65 °C (+149 °F) and +70 °C (+158 °F). A space is required between 15 A fuses at 70 °C.

Maximum GMT fuse size is 15 A.

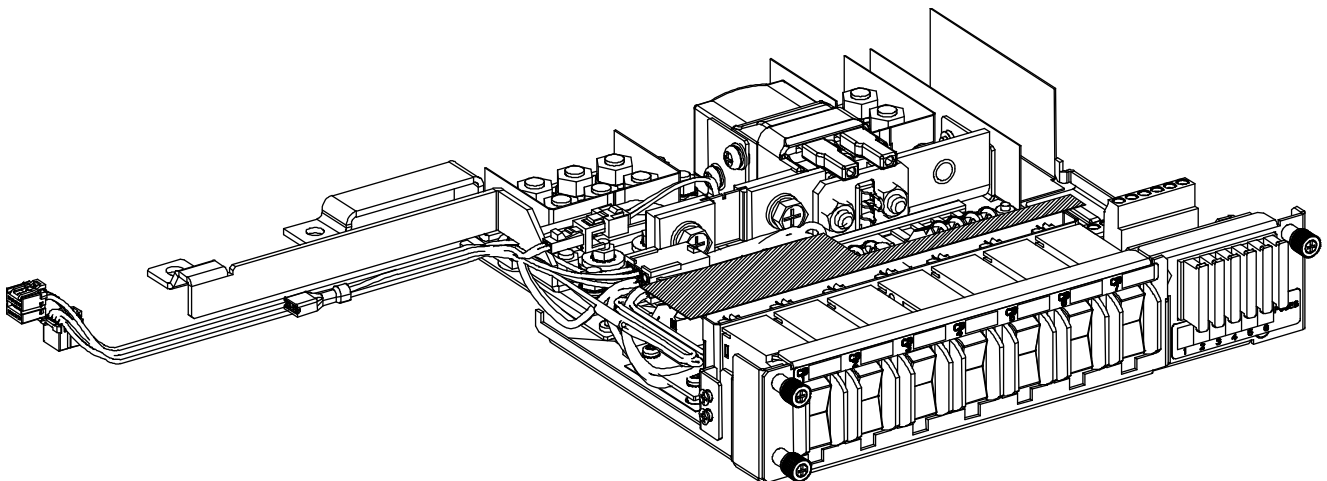
Maximum load distribution circuit breaker size is 30 A @ +40 °C (+104 °F), +65 °C (+149 °F) and +70 °C (+158 °F).

See also “Restrictions” under “Compact Type Circuit Breakers (Load Distribution)” on page 28 and “GMT Type Load Distribution Fuses” on page 31.

Maximum Temperature	Maximum Distribution Current	Maximum Battery Charging Current While Powering the Distribution Loads	Total Maximum Power
+40 °C (+104 °F)	48 A	17.5 A	Not to exceed 3000 W at -48 VDC.
+65 °C (+149 °F)	43 A	11.6 A	Not to exceed 2475 W at -48 VDC.
+70 °C (+158 °F)	38 A	13 A	Not to exceed 2400 W at -48 VDC.

Ordering Notes

- 1) Order one (1) distribution unit for each List 01.
- 2) Order load circuit breakers as required per “Compact Type Circuit Breakers (Load Distribution)” on page 28.
- 3) Order GMT fuses as required per “GMT Type Load Distribution Fuses” on page 31.
- 4) Order battery input lugs as required per “Load Distribution Wiring, Input Battery Wiring, and CO Ground Wiring” starting on page 51.
- 5) Order battery cables as required (see page 33).
- 6) Order a digital input and relay output cable as required (see page 25).
- 7) Order optional low voltage battery disconnect (LVBD) as required (see “582138000LB (List LB): Low Voltage Battery Disconnect (LVBD)” on page 17).



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582138000BB (List BB): Distribution Unit with Four (4) Compact Type Load Circuit Breakers, Six (6) GMT Load Fuses, One (1) Bullet-Nose Type Battery Disconnect Circuit Breaker, and Optional Low Voltage Battery Disconnect (LVBD)

Features

- ◆ A distribution unit with optional Low Voltage Battery Disconnect (LVBD), a battery shunt, one (1) battery connection point, four (4) compact type circuit breaker load distribution positions (5 A to 30 A), six (6) GMT fuse load distribution positions (0 A to 15 A), and one (1) bullet nose-type circuit breaker battery disconnect position (1 A to 70 A).

Restrictions

Factory connected to List 01.

Breakers and distribution wiring accessible by sliding front distribution unit panel forward.

The six (6) positions of the GMT fuse block is rated for 35 A at +40 °C (+104 °F), +65 °C (+149 °F) and +70 °C (+158 °F). A space is required between 15 A fuses at 70 °C.

Maximum GMT fuse size is 15 A.

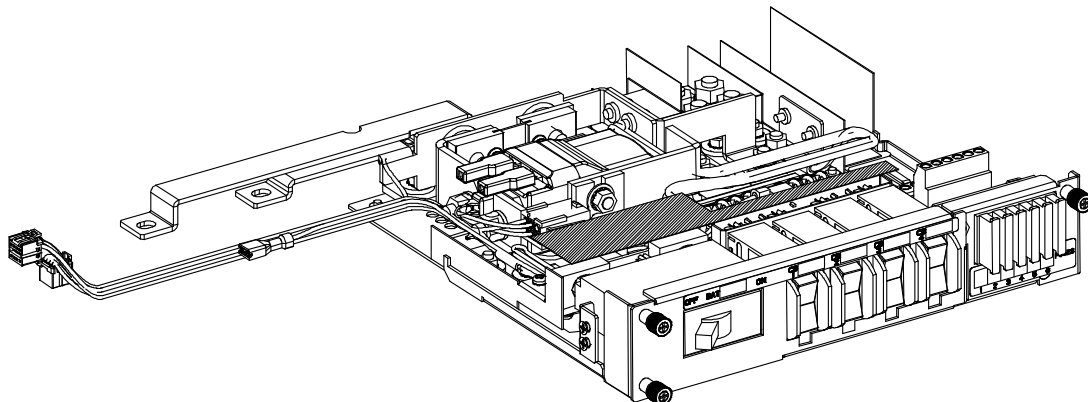
Maximum load distribution circuit breaker size is 30 A @ +40 °C (+104 °F), +65 °C (+149 °F) and +70 °C (+158 °F).

See also “Restrictions” under “Compact Type Circuit Breakers (Load Distribution)” on page 28, “Bullet Nose Type Circuit Breakers (Battery Disconnect and Load Distribution)” on page 30, and “GMT Type Load Distribution Fuses” on page 31.

Maximum Temperature	Maximum Distribution Current	Maximum Battery Charging Current While Powering the Distribution Loads	Total Maximum Power
+40 °C (+104 °F)	48 A	17.5 A	Not to exceed 3000 W at -48 VDC.
+65 °C (+149 °F)	43 A	11.6 A	Not to exceed 2475 W at -48 VDC.
+70 °C (+158 °F)	38 A	13 A	Not to exceed 2400 W at -48 VDC.

Ordering Notes

- 1) Order one (1) distribution unit for each system.
- 2) Order load circuit breakers as required per “Compact Type Circuit Breakers (Load Distribution)” on page 28.
- 3) Order battery circuit breaker as required per “Bullet Nose Type Circuit Breakers (Battery Disconnect and Load Distribution)” on page 30.
- 4) Order GMT fuses as required per “GMT Type Load Distribution Fuses” on page 31.
- 5) Order battery input lugs as required per “Load Distribution Wiring, Input Battery Wiring, and CO Ground Wiring” starting on page 51.
- 6) Order battery cables as required. See page 33.
- 7) Order a digital input and relay output cable as required (see page 25).
- 8) Order optional low voltage battery disconnect (LVBD) as required (see “582138000LB (List LB): Low Voltage Battery Disconnect (LVBD)” on page 17).



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582138000CA (List CA): Distribution Unit with Four (4) Bullet-Nose Type Load Circuit Breakers, Six (6) GMT Load Fuses, and Optional Low Voltage Battery Disconnect (LVBD)

Features

- ◆ A distribution unit with optional Low Voltage Battery Disconnect (LVBD), a battery shunt, two (2) battery connection points, four (4) bullet nose-type circuit breaker load distribution positions (1 A to 60 A), and six (6) GMT fuse load distribution positions (0 A to 15 A).

Restrictions

Factory connected to List 01.

The six (6) positions of the GMT fuse block is rated for 35 A at +40 °C (+104 °F), +65 °C (+149 °F) and +70 °C (+158 °F). A space is required between 15 A fuses at 70 °C.

Maximum GMT fuse size is 15 A.

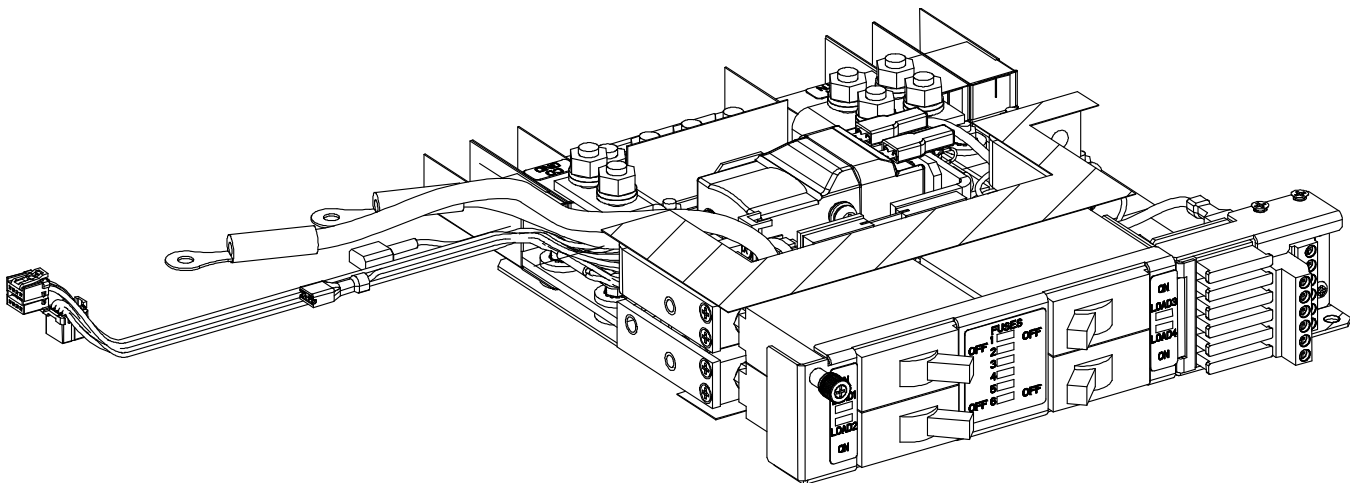
Maximum load distribution circuit breaker size is 60 A @ +40 °C (+104 °F), +65 °C (+149 °F) and +70 °C (+158 °F).

See also “Restrictions” under “Bullet Nose Type Circuit Breakers (Battery Disconnect and Load Distribution)” on page 30 and “GMT Type Load Distribution Fuses” on page 31.

Maximum Temperature	Maximum Distribution Current	Maximum Battery Charging Current While Powering the Distribution Loads	Total Maximum Power
+40 °C (+104 °F)	48 A	17.5 A	Not to exceed 3000 W at -48 VDC.
+65 °C (+149 °F)	43 A	11.6 A	Not to exceed 2475 W at -48 VDC.
+70 °C (+158 °F)	38 A	13 A	Not to exceed 2400 W at -48 VDC.

Ordering Notes

- 1) Order one (1) distribution unit for each List 01.
- 2) Order load circuit breakers as required per “Bullet Nose Type Circuit Breakers (Battery Disconnect and Load Distribution)” on page 30.
- 3) Order GMT fuses as required per “GMT Type Load Distribution Fuses” on page 31.
- 4) Order circuit breaker load lugs and battery input lugs as required per “Load Distribution Wiring, Input Battery Wiring, and CO Ground Wiring” starting on page 51.
- 5) Order battery cables as required. See page 33.
- 6) Order a digital input and relay output cable as required (see page 25).
- 7) Order optional low voltage battery disconnect (LVBD) as required (see “582138000LB (List LB): Low Voltage Battery Disconnect (LVBD)” on page 17).



Low Voltage Disconnect Options

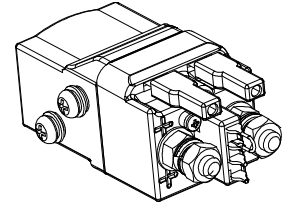
58213800LB (List LB): Low Voltage Battery Disconnect (LVBD)

Features

- ◆ Adds Low Voltage Battery Disconnect (LVBD) to the system.

Ordering Notes

- 1) Order if Low Voltage Battery Disconnect (LVBD) is required.



ACCESSORY DESCRIPTIONS

Relay Racks

Features

- ◆ The system is factory mounted in the relay rack specified when ordered.
- ◆ Relay racks are 19" W or 23" W standard mounting (see Table 11).

Ordering Notes

- 1) Order from relay racks listed in Table 11.
- 2) Order relay rack earthquake anchor kit as required. See page 17.

Part Number	Size	Available Mounting Positions (1RU = 1-3/4")	Notes
23" W Relay Racks			
559817	51.906" H x 24.376" W x 15" D	28RU	Welded
559818	72.000" H x 24.375" W x 15" D	37RU	Welded
559819	84.000" H x 25.000" W x 15" D	45RU	Seismic (Note 1)
559820	84.000" H x 24.375" W x 15" D	45RU	Welded
562353	84.000" H x 25.800" W x 18" D	45RU	Seismic (Note 1, 2)
559821	90.000" H x 24.375" W x 15" D	48RU	Welded
559822	96.000" H x 24.375" W x 15" D	51RU	Welded
19" W Relay Racks			
559823	84.000" H x 20.375" W x 15" D	45RU	Seismic (Note 1)
559824	84.000" H x 21.000" W x 15" D	45RU	Welded
563922	84.000" H x 21.800" W x 18" D	45RU	Seismic (Note 1, 2)

Note 1: Complies with Bellcore Seismic Zone 4 requirements.

Note 2: For power systems mounted in relay racks with more than one battery tray.

Table 11
Available Relay Racks

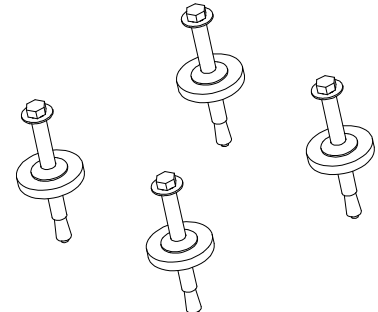
Relay Rack Earthquake Anchor Kit, P/N 562977

Features

- ◆ Provides four (4) sets of hardware for anchoring the relay rack to the floor.

Ordering Notes

- 1) Order as required.



Optional Wall Mount Bracket Kit, P/N 541285

Features

- ◆ Allows for horizontal or vertical wall mounting.
- ◆ See “System with Wall Mount Bracket Kit P/N 541285” on page 64 for mounting dimensions.

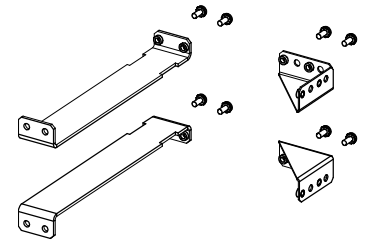
Restrictions

Customer must supply mounting fasteners for securing the wall mount brackets to the wall.

This kit will not support wall-mounting when the shelf is flush mounted.

Ordering Notes

- 1) Order P/N 541285, which consists of two (2) P/N 545701 horizontal wall mounting brackets and two (2) P/N 541284 vertical wall mounting brackets, and eight (8) 12-24 x 1/2” screws for attaching the brackets to the shelf.



AC Input Options

AC Input Kit P/N 564840

Features

- ◆ Individual rectifier AC input feed with cords (IEC receptacles).
- ◆ Provides a factory installed AC input wiring cover and one (1) IEC AC input receptacle for each rectifier mounting position in the shelf.

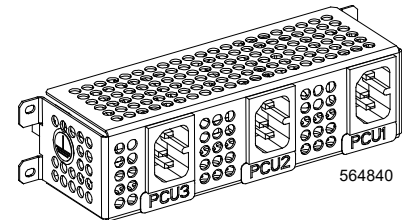
Restrictions

For use with List 01 only.

AC input cords are ordered separately.

Ordering Notes

- 1) Specify P/N 564840 as required.
- 2) See “Rectifier AC Input Line Cords and Rectifier AC Input Cable Assemblies” on page 19 for AC input cord options.



AC Input Kit P/N 564841

Features

- ◆ Single shelf AC input feed with cord (direct connection).
For applications when a direct connection single AC input line cord or cable assembly is required for AC input feed to all rectifier mounting positions in the shelf.
- ◆ Provides an AC input wiring cover with cable clamp factory installed to a List 01 shelf for factory AC input wiring or factory wired AC input line cord or cable assembly.

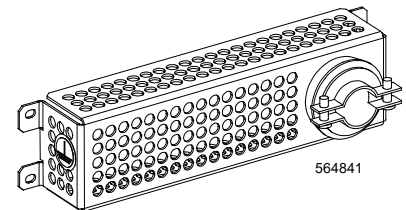
Restrictions

For use with List 01 only.

AC input cord or AC input cable assembly is ordered separately. AC input cord or AC input cable assembly is factory installed.

Ordering Notes

- 1) Specify P/N 564841 as required.
- 2) See “Rectifier AC Input Line Cords and Rectifier AC Input Cable Assemblies” on page 19 for AC input cord and assembly options.



Rectifier Module

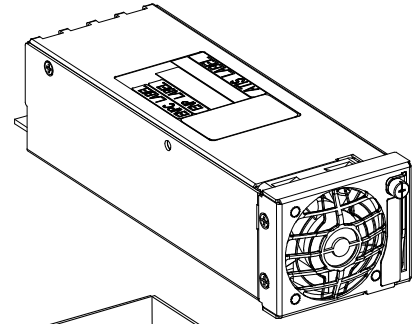
Rectifier Module, P/N 1R481000e3

Features

- ◆ Rectifier Module Model R48-1000e3 (Spec. No. 1R481000e3), 1000 W / -48 VDC.
- ◆ Refer to the rectifier instructions (UM1R481000e3) for more information.

Ordering Notes

- 1) Order by P/N 1R481000e3 as required. Each shelf holds three (3) rectifiers.



Rectifier Module Mounting Position Blank Cover Assembly

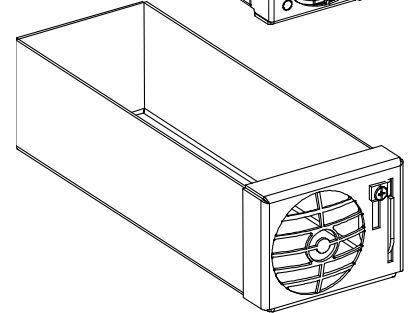
Rectifier Module Mounting Position Blank Cover Assembly, P/N 10007653

Features

- ◆ Covers one (1) unused rectifier module mounting position.

Ordering Notes

- 1) Order by P/N 10007653 as required. Order a rectifier module mounting position blank cover assembly for each empty rectifier module mounting position in the system, as desired.



Rectifier AC Input Line Cords and Rectifier AC Input Cable Assemblies

AC Input Kit Option P/N 564840 (One AC Feed per Rectifier Position)

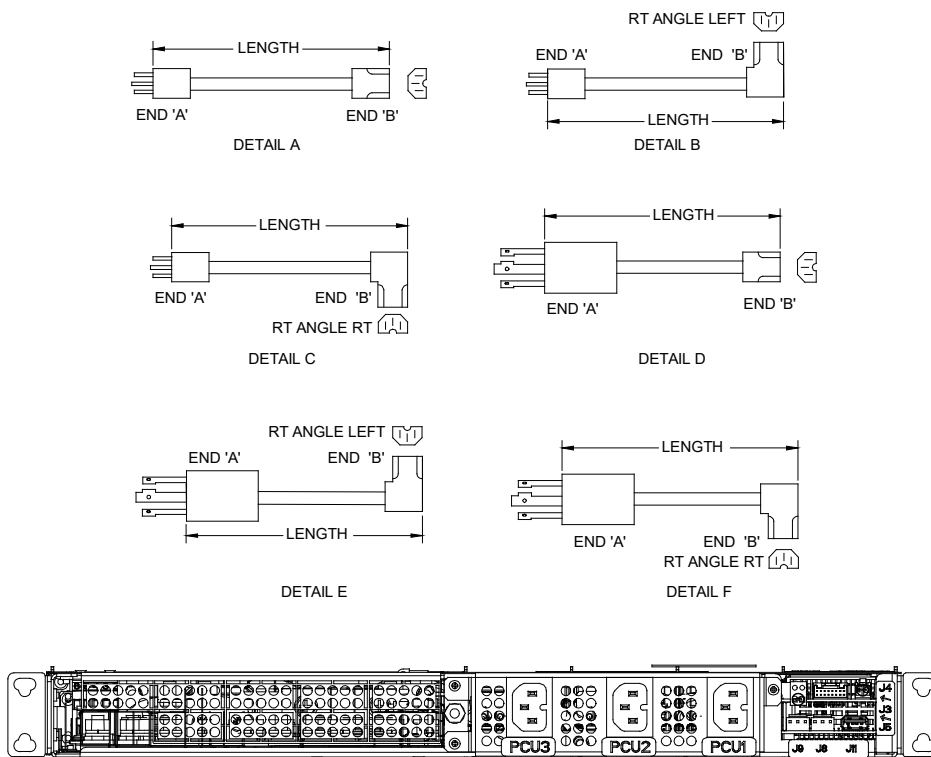
For use with a List 01 shelf that requires three (3) AC input cable assemblies or line cords.

One AC input feed for each rectifier position in the shelf.

See Figure 1 and Table 12.

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Rear View of Shelf Showing AC Input Socket Orientation

Figure 1
 AC Input Kit Option P/N 564840 (One AC Feed per Rectifier Position)

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Part Number	See Detail	End 'A'	End 'B'	Length	Rating	Cord
151873	A	NEMA 5-15P	IEC 320-C15 STRAIGHT	6 FT	15 A / 125 VAC	14/3 AWG
151874	D	NEMA L5-15P	IEC 320-C15 STRAIGHT	6 FT	15 A / 125 VAC	14/3 AWG
151875	D	NEMA L6-15P	IEC 320-C15 STRAIGHT	6 FT	15 A / 250 VAC	14/3 AWG
151876	B	NEMA 5-15P	IEC 320-C15 RT ANGLE LEFT	6 FT	15 A / 125 VAC	14/3 AWG
151877	E	NEMA L5-15P	IEC 320-C15 RT ANGLE LEFT	6 FT	15 A / 125 VAC	14/3 AWG
151878	E	NEMA L6-15P	IEC 320-C15 RT ANGLE LEFT	6 FT	15 A / 250 VAC	14/3 AWG
151879	C	NEMA 5-15P	IEC 320-C15 RT ANGLE RT	6 FT	15 A / 125 VAC	14/3 AWG
151880	F	NEMA L5-15P	IEC 320-C15 RT ANGLE RT	6 FT	15 A / 125 VAC	14/3 AWG
151881	F	NEMA L6-15P	IEC 320-C15 RT ANGLE RT	6 FT	15 A / 250 VAC	14/3 AWG
151882	A	NEMA 5-15P	IEC 320-C15 STRAIGHT	14 FT	15 A / 125 VAC	14/3 AWG
151883	D	NEMA L5-15P	IEC 320-C15 STRAIGHT	14 FT	15 A / 125 VAC	14/3 AWG
151884	D	NEMA L6-15P	IEC 320-C15 STRAIGHT	14 FT	15 A / 250 VAC	14/3 AWG
151885	B	NEMA 5-15P	IEC 320-C15 RT ANGLE LEFT	14 FT	15 A / 125 VAC	14/3 AWG
151886	E	NEMA L5-15P	IEC 320-C15 RT ANGLE LEFT	14 FT	15 A / 125 VAC	14/3 AWG
151887	E	NEMA L6-15P	IEC 320-C15 RT ANGLE LEFT	14 FT	15 A / 250 VAC	14/3 AWG
151888	C	NEMA 5-15P	IEC 320-C15 RT ANGLE RT	14 FT	15 A / 125 VAC	14/3 AWG
151889	F	NEMA L5-15P	IEC 320-C15 RT ANGLE RT	14 FT	15 A / 125 VAC	14/3 AWG
151890	F	NEMA L6-15P	IEC 320-C15 RT ANGLE RT	14 FT	15 A / 250 VAC	14/3 AWG

Table 12
AC Input Kit Option P/N 564840 (One AC Feed per Rectifier Position)

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AC Input Kit Option P/N 564841 (One AC Feed per Shelf)

For use with a List 01 shelf that requires one (1) AC input cable assembly or line cord.

Single AC input which feeds all rectifier positions in the shelf.

See Figure 2 and Table 13.

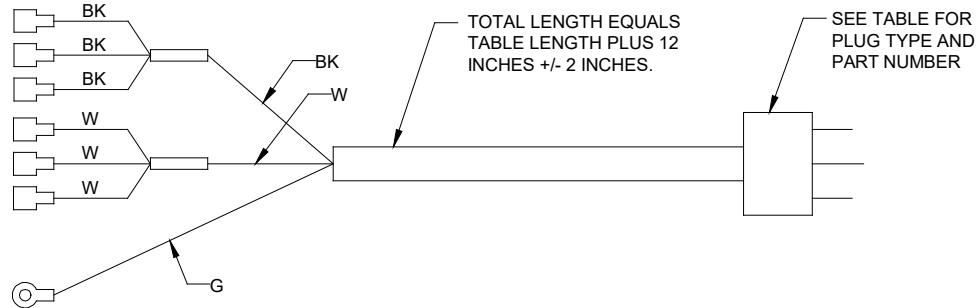


Figure 2
AC Input Kit Option P/N 564841 (One AC Feed per Shelf)

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Part Number	Nominal Length (see figure for total length)	Plug Part Number	Plug Type	Rating	Cord
565487	30 Inches	Unterminated	--	20 A	12/3 AWG
565488	6 FT	Unterminated	--	20 A	12/3 AWG
565489	12 FT	Unterminated	--	20 A	12/3 AWG
565490	6 FT	142841	NEMA 5-20P	20 A / 125 VAC	12/3 AWG
565491	14 FT	142841	NEMA 5-20P	20 A / 125 VAC	12/3 AWG
565494	6 FT	140393	NEMA L5-20P	20 A / 125 VAC	12/3 AWG
565495	14 FT	140393	NEMA L5-20P	20 A / 125 VAC	12/3 AWG
565496	6 FT	247113700	NEMA L6-20P	20 A / 250 VAC	12/3 AWG
565497	14 FT	247113700	NEMA L6-20P	20 A / 250 VAC	12/3 AWG
565498	6 FT	144267	IEC C20	See Note 1	12/3 AWG

Note 1: The C20 plug is rated 16 A @ 250 VAC (international rating) and 20 A @ 250 VAC (US rating). Can be used with rectifiers operating @ 120 VAC in +40 °C (+104 °F) or +65 °C (+149 °F) ambient. Can be used with rectifiers operating @ 208 VAC / 240 VAC in +40 °C (+104 °F) ambient. CANNOT be used with rectifiers operating @ 208 VAC / 240 VAC in +65 °C (+149 °F) ambient. Per UL 60950-1, 2nd Edition, when this cord is used with this power system, the following restrictions apply:

- The power system must be used in a location having equipotential bonding (such as a telecommunications center, a dedicated computer room or a restricted access location).
- The building installation shall provide a means for connection to protective earth; and the equipment is to be connected to that means; and a service person shall check whether or not the socket-outlet from which the equipment is to be powered provides a connection to the building protective earth. If not, the service person shall arrange for the installation of a protective earthing conductor from the separated protective earthing terminal to the protective earth wire in the building.

Table 13
AC Input Kit Option P/N 564841 (One AC Feed per Shelf)

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Controller

NetSure Mini Control Unit (Controller), P/N 1M831ANA

Features

- ◆ NetSure Mini Control Unit, Model M831A (Spec. No. 1M831ANA).
- ◆ Factory programmed with the configuration file specified when ordered.
Note: The controller is provided with the factory default configuration unless otherwise specified.
Note: Contact Vertiv for custom NetSure Mini Control Unit configurations.
- ◆ Provides two (2) temperature probe ports.
- ◆ Provides four (4) programmable form-C relay outputs.
- ◆ Provides two (2) programmable binary digital inputs.
- ◆ Refer to the NetSure Mini Control Unit instructions (UM1M831ANA) for more information.

Restrictions

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

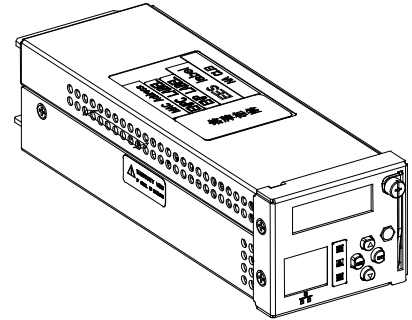
Ordering Notes

- 1) Order one (1) NetSure Mini Control Unit per power system, P/N 1M831ANA.
- 2) Order an external IB4 board kit if desired (see page 25).
- 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 26.
- 4) Order a digital input and relay output cable as required (see page 25).
- 5) Order optional SM-Temp temperature concentrator (supervisory module for temperature probes) as desired (shipped loose) (see page 27). Also order SM-Temp CAN bus interface cable, P/N 562868, and “SM-Temp Jumpers, P/N 552888” (see page 27) as required.

Note: A system can have up to (8) SM-Temp modules for a total of sixty-six (66) temperature probes that can be used in the power system for ambient and battery monitoring.

- 6) Ordering a NetSure Mini Control Unit for replacing a NetSure Mini Control Unit or as a spare NetSure Mini Control Unit.
If the NetSure Mini Control Unit is to be used as a replacement in a specific system it should be ordered with the same configuration file as the original NetSure Mini Control Unit. This is identified by a six digit number. If the controller part number ends with a six digit number, for example, 1M831ANA559242, the configuration file number is the last six characters. The controller may also have a Unique Identification Number (UIN). This number indicates that certain parameters were set at the factory to match the controller to the options selected with the power plant (such as low voltage disconnect, battery shunt ratings, etc.). If the controller has a UIN, the plant will have shipped with a USB drive labelled with the UIN. The UIN label may also be located near the controller slot in the system. If the controller has a UIN, provide this UIN number, along with the configuration number, when ordering so that the new controller will match that of the original controller shipped with the system. The user manual provided with the controller provides instructions for replacing and programming the controller. It is important to follow these instructions carefully. The user manual also provides instructions for saving certain controller files that are created when changes are made to the system after leaving the factory. These files can be programmed into the replacement controller so it can match the latest saved state of the original controller.

If the NetSure Mini Control Unit is being ordered as a spare part for any of a group of power plants, the same procedure can be followed. If the replacement controller’s configuration does not match that of the original controller, the original files can be retrieved from the USB drive shipped with the plant, if available. If the USB drive is not available, contact the factory or technical assistance center to obtain a copy of the original configuration file (all package) so it can be programmed into the new controller.



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External IB4 Controller Interface Board Kit, P/N 559239

Features

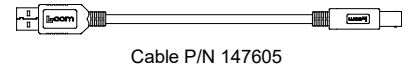
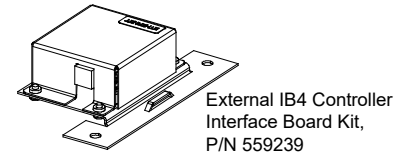
- ◆ Provides a kit to externally install the IB4 board.
- ◆ The IB4 board provides a second Ethernet port. The Ethernet port located on the controller's front panel can be used to connect a computer directly to the controller. The Ethernet port located on the IB4 board can be used to connect the controller to your Local Area Network (LAN).

Restrictions

Mounts external to the system.

Ordering Notes

- 1) If a second Ethernet port is required, order IB4 kit P/N 559239.
- 2) Also order cable P/N 147605 to interconnect the IB4 to the system.



Digital Input and Relay Output Cable, P/N 565286

Features

- ◆ Twelve foot cable terminated at one end with a connector that mates with the alarm connector located on the rear of the power shelf. The other end unterminated for connection into customer alarm and monitoring circuits.
- ◆ See also Figure 5 on page 43.

Ordering Notes

- 1) Order P/N 565286 as required.

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Optional Temperature Probes

Features

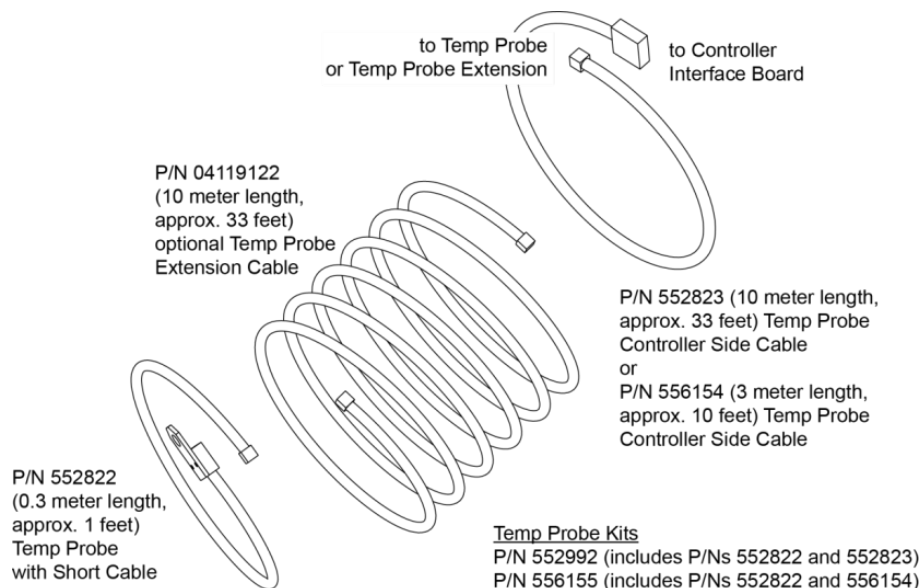
- ◆ Up to two (2) temperature probes can be connected to the system. Each temperature probe can be programmed to monitor ambient temperature and/or battery temperature. A temperature probe set to monitor battery temperature can also be used for the rectifier battery charge temperature compensation feature, 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 "SM-Temp Temperature Concentrator" on page 27.

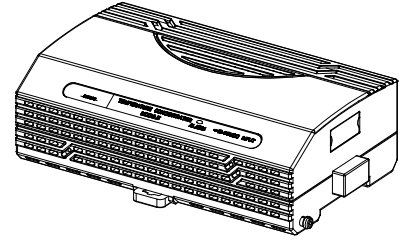


SM-Temp Temperature Concentrator

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 unit.
- ◆ Can cascade up to (8) SM-Temp units, connecting up to sixty-four (64) temperature probes.
- ◆ The SM-Temp temperature concentrator is connected at the end of the NetSure Mini Control Unit CAN bus. Via the CAN bus, the NetSure Mini Control Unit reads each temperature probe from each SM-Temp temperature 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 SM-Temp. See “Optional Temperature Probes” on page 26.
- 3) Order one (1) SM-Temp CAN bus interface cable, P/N 565458, 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 27.

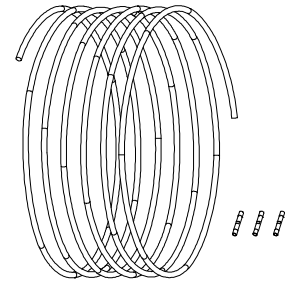
SM-Temp Jumpers, P/N 552888

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.



Distribution Devices

Compact Type Circuit Breakers (Load Distribution)

Features

- ◆ Each circuit breaker (as listed in Table 15) plugs into one mounting position on a distribution unit containing compact type distribution positions.

Restrictions

For use in Lists BA and BB

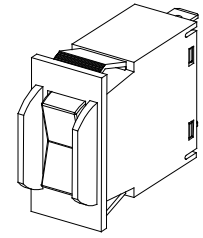
Each List BA distribution unit holds up to seven (7) single-pole compact-type load distribution circuit breakers.

Each List BB distribution unit holds up to four (4) single-pole compact-type load distribution circuit breakers.

The short circuit interrupting capacity of the compact type circuit breakers is 600 A.

See the “Distribution Units” list descriptions (starting on page 13) for additional restrictions.

See Table 14 for deratings.



Compact Circuit Breaker

Mounting	Operating Temperature	Derating
Horizontal	40 °C	80% of Device Rating (No Space is Required Between Distribution Devices)
Horizontal	65 °C	70% of Device Rating (Space is Required Between 30 A Distribution Devices)
Horizontal	70 °C	30 A Breakers: 55% of Device Rating (Space is Required Between Distribution Devices) All Other Breaker Sizes: 65% of Device Rating (No Space is Required Between Distribution Devices)
Vertical (Distribution Down)	65 °C	70% of Device Rating (Space is Required Between 30 A Distribution Devices)
Vertical (Distribution Up)	65 °C	30 A Breakers: 50% of Device Rating (Space is Required Between Distribution Devices) All Other Breaker Sizes: 55% of Device Rating (No Space is Required Between Distribution Devices)
Vertical (Distribution Down)	70 °C	30 A Breakers: 55% of Device Rating (Space is Required Between Distribution Devices) All Other Breaker Sizes: 65% of Device Rating (No Space is Required Between Distribution Devices)
Vertical (Distribution Up)	70 °C	40% of Device Rating (No Space is Required Between Distribution Devices)

Table 14
Deratings

Ordering Notes

- 1) Order circuit breakers as required per Table 15.
- 2) See Table 22 for recommended battery and load distribution wire sizes and lugs.

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Ampere Rating	Number of Poles	Number of Mounting Positions Required	Part Number¹
5	1	1	151313
10	1	1	151314
15	1	1	151315
20	1	1	151316
25	1	1	151317
30	1	1	151318
See Table 22 for recommended battery and load distribution wire sizes and lugs.			

Circuit Breaker Alarm Operation:

- ¹ Provides an alarm during an electrical or manual trip condition.

Table 15
Compact Type Circuit Breakers (Load Distribution)

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Bullet Nose Type Circuit Breakers (Battery Disconnect and Load Distribution)

Features

- ◆ Each circuit breaker (as listed in Table 16) plugs into one mounting position on a distribution unit containing bullet nose type battery disconnect or load distribution positions.

Restrictions

For use in List BB and CA

Each List BB distribution unit holds up to one (1) single-pole bullet nose-type battery disconnect circuit breaker.

Each List CA distribution unit holds up to four (4) single-pole bullet nose-type load distribution circuit breakers.

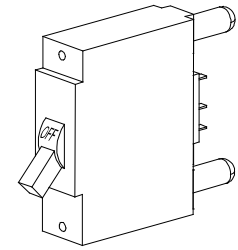
Load should not exceed 80% of device rating.

The short circuit interrupting rating of the bullet nose type circuit breakers is 50 kA.

See the “Distribution Units” list descriptions (starting on page 13) for additional restrictions.

Ordering Notes

- 1) Order circuit breakers as required per Table 16.
- 2) See Table 22 for recommended load distribution wire sizes and lugs.



Toggle Handle
Bullet Nose Circuit Breaker

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	--	101608
See Table 22 for recommended load distribution wire sizes and lugs.				

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.

Note: The 70 A circuit breaker for use as a battery disconnect circuit breaker only.

Table 16
Toggle Handle Bullet Nose Type Circuit Breakers

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GMT Type Load Distribution Fuses

Features

- ◆ Each List AA distribution unit holds up to twelve (12) 18/100 A to 15 A GMT load distribution fuses.
- ◆ Each List BA, BB, and CA distribution unit holds up to six (6) 18/100 A to 15 A GMT load distribution fuses.

Restrictions

When used for power distribution, load should not exceed 80% of device rating, except 10 A and 15 A fuses, for which load should not exceed 70% of device rating.

The short circuit interrupting capacity of the GMT type fuses is 450 A.

See the “Distribution Units” list descriptions (starting on page 13) for additional restrictions.

Ordering Notes

- 1) Order GMT fuses as required per Table 17.

Ampere Rating	Part Number	Fuse Color
18/100 (GMT-A)	248610301	---
1/4	248610200	Violet
1/2	248610300	Red
3/4	248610500	Brown
1-1/3	248610700	White
2	248610800	Orange
3	248610900	Blue
5	248611000	Green
7-1/2	248611300	Black-White
10	248611200	Red-White
15	248611500	Red-Blue
Replacement Safety Fuse Cover (GMT-X)	248898700	---
Replacement Dummy Fuse	248872600	---

Table 17
GMT Fuses

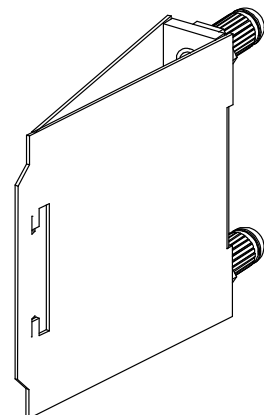
Bullet Nose Bypass Busbar with Handle, P/N 563020

Features

- ◆ Replaces a bullet nose circuit breaker when a protective or disconnect device is not required.

Ordering Notes

- 1) Order by P/N 563020 as required.



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Lugs

Standard Crimp Lugs

Features

- ◆ For use on the rear battery and load busbars.

Restrictions

Maximum lug size for rear battery and load landing point connections is 2 AWG.

A narrow tongue lug is required for 2 AWG Flex wire.

Lugs must be crimped per lug manufacturer's specifications.

Ordering Notes

- 1) Specify part number from Table 18 for desired lead size.

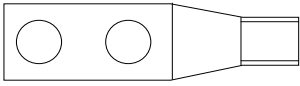
Lead Size	Part Number	
14-10 AWG	245342300	
8 AWG	245390200	
6 AWG	245346700	
4 AWG	245346800	
2 AWG	245346900	
2 AWG	140541 (Narrow Tongue, Flex Wire)	

Table 18
Crimp Lug
Two-Hole, 1/4" Bolt Clearance Hole, 5/8" Centers

Battery Cables

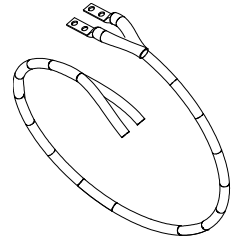
Battery Cables, P/N 565456

Features

- ◆ Provides two (2) 15' long, 2 AWG, battery cables terminated with lugs for connection to the shelf. Remaining end unterminated for connection to batteries.

Ordering Notes

- 1) Order as required. Lists AA, BA, and CA provide landings for up to two (2) battery strings. List BB provides landings for one (1) battery string.



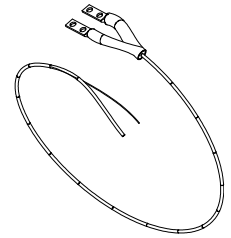
Battery Cables, P/N 565457

Features

- ◆ Provides two (2) 15' long, 8 AWG, battery cables terminated with lugs for connection to the shelf. Remaining end unterminated for connection to batteries.

Ordering Notes

- 1) Order as required. Lists AA, BA, and CA provide landings for up to two (2) battery strings. List BB provides landings for one (1) battery string.



Battery Cables, P/N 545709

Features

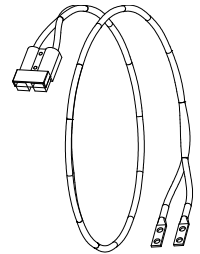
- ◆ Provides two (2) 4' long, 8 AWG, battery cables terminated in a 2-position Red SB50 Anderson connector on the battery side. Remaining end terminated in lugs for connection to shelf.
- ◆ Mates with connector on listed battery cabinet.

Restrictions

For use with P/N 541434, P/N 545534, or 545506 battery cabinets only.

Ordering Notes

- 1) Order one (1) for each battery cabinet feed required. Lists AA, BA, and CA provide landings for up to two (2) battery strings. List BB provides landings for one (1) battery string.



Battery Cables, P/N 557304

Features

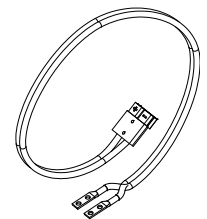
- ◆ Provides two (2) 3' long, 6 AWG, battery cables terminated in a 2-position Red SB50 Anderson connector on the battery side. Remaining end terminated in lugs for connection to shelf.
- ◆ Mates with connector on listed battery cabinet.

Restrictions

For use with P/N 541434, P/N 545534, or 545506 battery cabinets only.

Ordering Notes

- 1) Order as required. Lists AA, BA, and CA provide landings for up to two (2) battery strings. List BB provides landings for one (1) battery string.

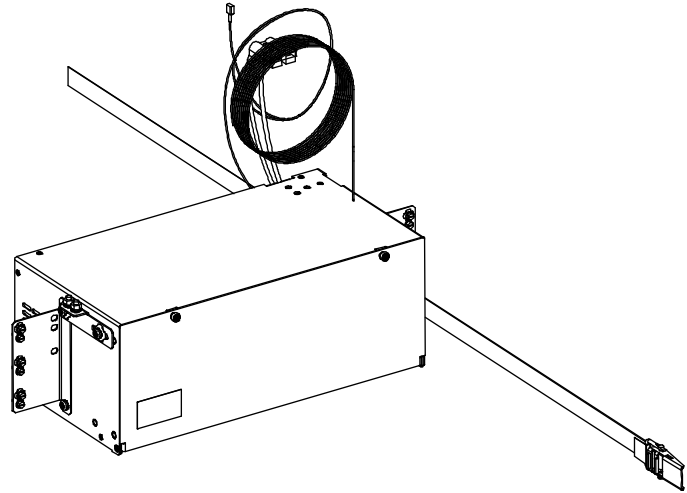


Battery Cabinets

NetSure 211BC Battery Cabinet (Spec. No. 541434)

Features

- ◆ The NetSure 211BC Battery Cabinet is rated at 30 amperes, and can be mounted in a 19" W or 23" W nominal relay rack, or mounted to a suitable wall.
- ◆ The battery cabinet contains one (1) 40 ampere battery disconnect circuit breaker.
- ◆ Battery circuit breaker alarm leads are provided to tie into the power system's alarm circuit.
- ◆ The battery cabinet is equipped with a battery cable terminated in an Anderson connector.
- ◆ Cables to connect the batteries (as specified in the table under *Order Notes*) into the battery cabinet provided.
- ◆ Battery cabinets can be paralleled to provide greater reserve time. Battery cabinets contain a second Anderson battery connector for plugging one cabinet into another.
- ◆ Refer to the battery cabinet instructions (Section 6023) for more information.



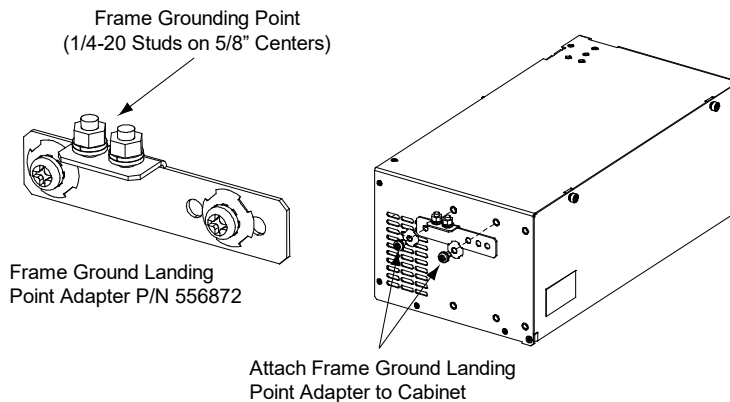
Ordering Notes

- 1) Order by Spec. No. 541434 as required.
- 2) Also order four (4) batteries per battery cabinet per the following table.

Battery Manufacturer	Manufacturer P/N	P/N	Capacity Amp-Hours (8 Hr rate)	Weight (lb) per Battery
Hawker	SBS 15	139091	14	12.50
Fiamm	12SLA12	139092	12	12.35
Energys	NP18-12FR	139774	16 *	13.60

* 10Hr rate

- 3) When ordering P/N 139774 batteries, also order P/N 545427 battery connection kit.
- 4) When wall mounted, also order a battery cabinet frame grounding landing point adapter P/N 556872. This adapter installs in the relay rack mounting bracket holes located on either side of the cabinet.



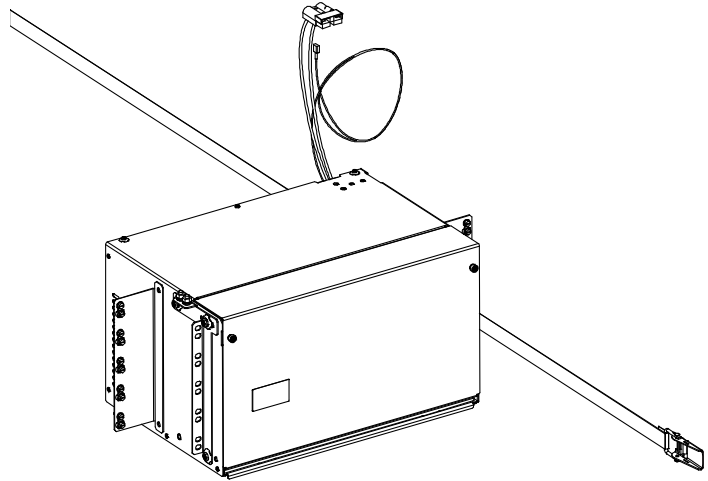
Vertiv™ NetSure™ 2100 DC Power System

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NetSure 211BC Battery Cabinet (Spec. No. 545534)

Features

- ◆ The NetSure 211BC Battery Cabinet is rated at 30 amperes, and can be mounted in a 19" W or 23" W nominal relay rack, or mounted to a suitable wall.
- ◆ The battery cabinet contains one (1) 40 ampere battery disconnect circuit breaker.
- ◆ Battery circuit breaker alarm leads are provided to tie into the power system's alarm circuit.
- ◆ The battery cabinet is equipped with a battery cable terminated in an Anderson connector.
- ◆ Cables to connect the batteries (as specified in the table under *Ordering Notes*) into the battery cabinet provided.
- ◆ Battery cabinets can be paralleled to provide greater reserve time. Battery cabinets contain a second Anderson battery connector for plugging one cabinet into another.
- ◆ Refer to the battery cabinet instructions (Section 6033) for more information.

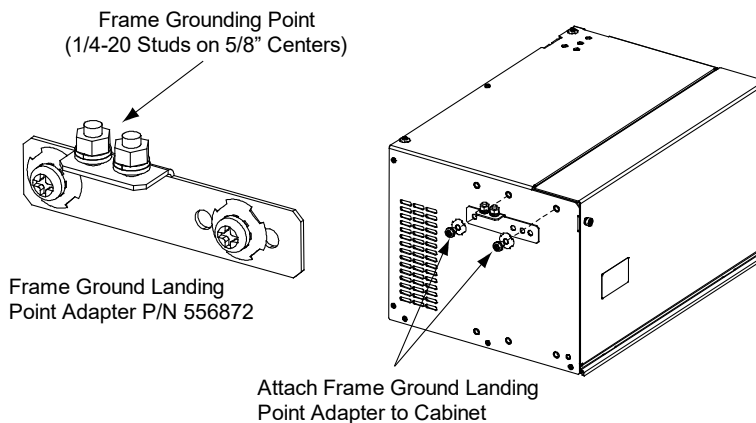


Ordering Notes

- 1) Order by Spec. No. 545534 as required.
- 2) Also order four (4) batteries per battery cabinet per the following table.

Battery Manufacturer	Manufacturer P/N	P/N	Capacity Amp-Hours (8 Hr rate)	Weight (lb) per Battery
Energys	SBS B10	140553	38	28.20
C&D / Dynasty	TEL12-30	140455	30.5	26.70
Energys	SBS-30	--	26	20.09
Energys	SBS-40	140581	38	28

- 3) When wall mounted, also order a battery cabinet frame grounding landing point adapter P/N 556872. This adapter installs in the relay rack mounting bracket holes located on either side of the cabinet.



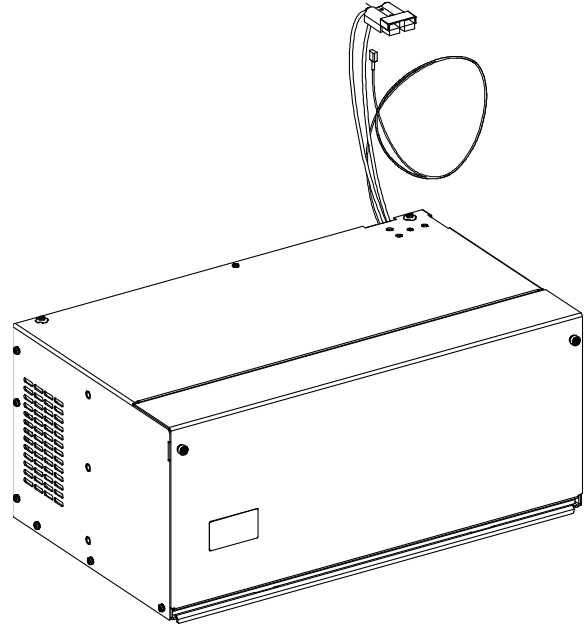
Vertiv™ NetSure™ 2100 DC Power System

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NetSure 211BC Battery Cabinet (Spec. No. 545506)

Features

- ◆ The NetSure 211BC Battery Cabinet is rated at 30 amperes, and can be mounted in a 23" W nominal relay rack, or mounted to a suitable wall.
- ◆ The Battery Cabinet contains one (1) 40 ampere battery disconnect circuit breaker.
- ◆ Battery circuit breaker alarm leads are provided to tie into the power system's alarm circuit.
- ◆ The Battery Cabinet is equipped with a battery cable terminated in an Anderson connector.
- ◆ Cables to connect the batteries (as specified in the table under *Ordering Notes*) into the Battery Cabinet provided.
- ◆ Battery Cabinets can be paralleled to provide greater reserve time. Battery cabinets contain a second Anderson battery connector for plugging one cabinet into another.
- ◆ Refer to the battery cabinet instructions (Section 6036) for more information.

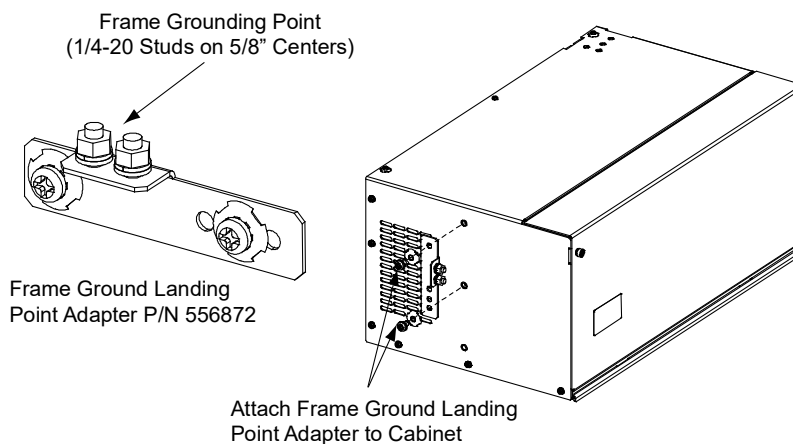


Ordering Notes

- 1) Order by Spec. No. 545506 as required.
- 2) Also order four (4) batteries per battery cabinet per the following table.

Battery Manufacturer	Manufacturer P/N	P/N	Capacity Amp-Hours (8 Hr rate)	Weight (lb) per Battery
Energys	SBS B10	140553	38	28.20
Energys	SBS 40	140581	38	28.00
C&D/ Dynasty	TEL12-30	140455	30.5	26.70
C&D/ Dynasty	TEL12-45	140454	46	26.70

- 3) When wall mounted, also order a battery cabinet frame grounding landing point adapter P/N 556872. This adapter installs in the relay rack mounting bracket holes located on either side of the cabinet.



User Replaceable Components

Ordering Notes

- 1) Refer to Table 19.

Item	Part Number
Rectifier Module	1R481000e3
NetSure Mini Control Unit	1M831ANA
External IB4 (second Ethernet port) Board	558076 (IB4 Board) 559239 (Complete Assembly, External)

Table 19
User Replaceable Components

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

Relay Rack / Cabinet Frame Grounding Requirements

For relay rack / cabinet 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 relay rack. 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 18 for lug selection.

Shelf Grounding Connection

For shelf 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.

An M4 frame ground stud is located on the rear of the system shelf.

Central Office Grounding Connection

Landing points are provided on the battery return bus for a central office ground lead (see Figure 12, Figure 13, Figure 14, or Figure 15). For central office 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.

Recommended CO ground wire size is 6 AWG.

Rectifier AC Input Connections

General

List 01 may be equipped with rear IEC receptacles for connection of AC input line cords (one AC feed per rectifier position) or pre-wired AC input with a single AC input line cord or AC input cable assembly (one AC feed per shelf).

See "Rectifier AC Input Line Cords and Rectifier AC Input Cable Assemblies" on page 19 for AC input line cord and cable assembly options.

List 01 AC Input Connectors

Refer to Table 20 for recommended AC input branch circuit protection when using the supplied rectifier AC input line cords (one AC feed per rectifier position). Refer to Figure 3 for an illustration.

Refer to Table 21 for recommended AC input branch circuit protection when using the supplied rectifier AC input line cords or AC input cable assemblies (one AC feed per shelf). Refer to Figure 4 for an illustration.

Recommended Rectifier AC Input Branch Circuit Protection (Nominal 120 VAC / 208 VAC / 240 VAC, Single Phase, 50 Hz / 60 Hz) Supplied AC Input Line Cords (One AC Input Branch Circuit per One Rectifier Module) (see “Rectifier AC Input Line Cords and Rectifier AC Input Cable Assemblies” on page 19)		
Input Voltage	Input Current ⁽²⁾	Overcurrent Protection ⁽¹⁾
120 VAC	4.7 A	Size per AC Line Cord Plug Rating
208 VAC	5.5 A	
240 VAC	4.7 A	

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

² Input current based on R48-1000e3 rectifier module.

Table 20
Recommended Rectifier AC Input Branch Circuit Protection
(Nominal 120 VAC / 208 VAC / 240 VAC, Single Phase, 50 Hz / 60 Hz)
Supplied AC Input Line Cords (One AC Input Branch Circuit per One Rectifier Module)

Recommended Rectifier AC Input Branch Circuit Protection (Nominal 120 VAC / 208 VAC / 240 VAC, Single Phase, 50 Hz / 60 Hz) Factory Wired AC Input Line Cord or Cable Assembly (One AC Input Branch Circuit per Shelf) (see “Rectifier AC Input Line Cords and Rectifier AC Input Cable Assemblies” on page 19)		
Input Voltage	Input Current ⁽²⁾	Overcurrent Protection ⁽¹⁾
120 VAC	14 A	20 A
208 VAC	15.7 A	20 A
240 VAC	13.5 A	20 A

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

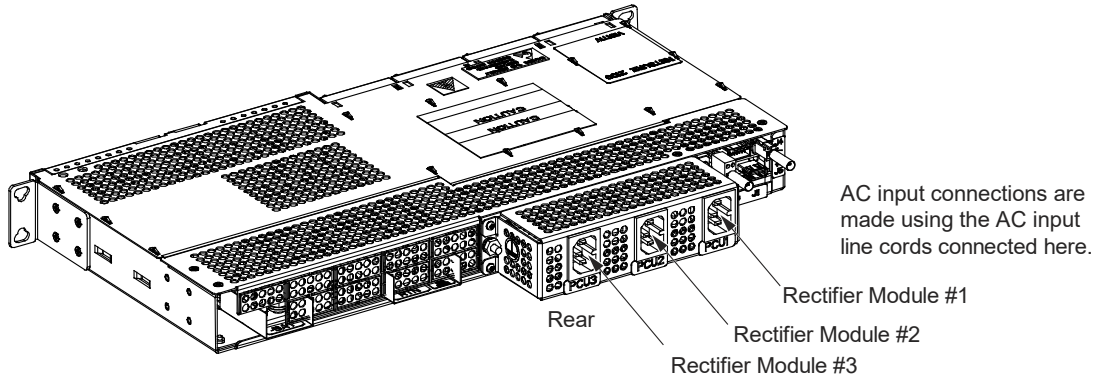
² Input current based on R48-1000e3 rectifier module.

Table 21
Recommended Rectifier AC Input Branch Circuit Protection
(Nominal 120 VAC / 208 VAC / 240 VAC, Single Phase, 50 Hz / 60 Hz)
Factory Wired AC Input Line Cord or Cable Assembly (One AC Input Branch Circuit per Shelf)

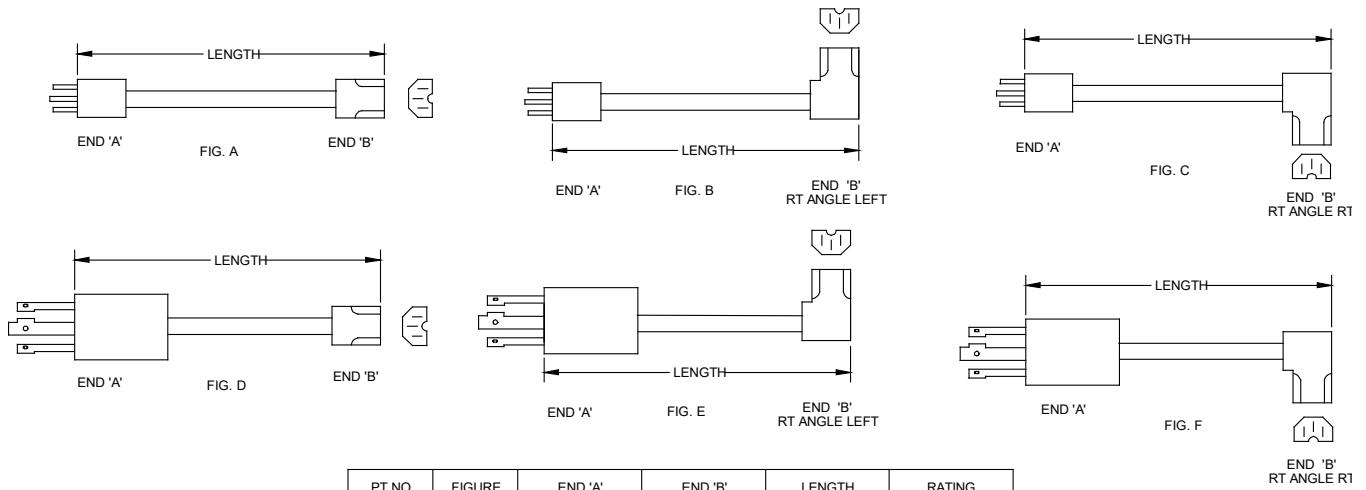
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AC Input Kit Option P/N 564840 (One AC Feed per Rectifier Position)



Rectifiers are numbered left to right as viewed from the front.



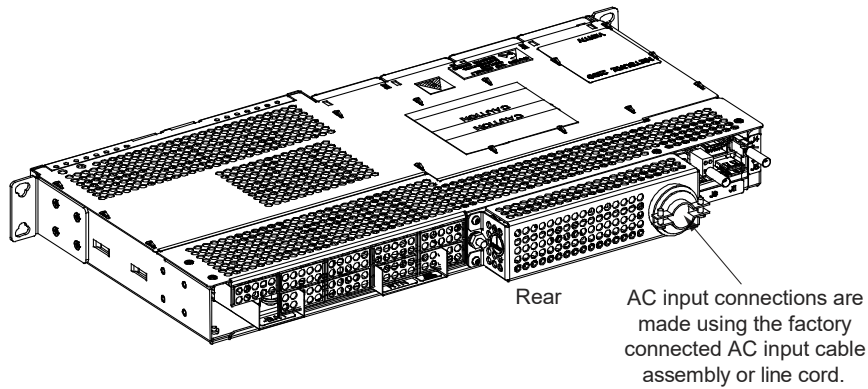
PT NO	FIGURE	END 'A'	END 'B'	LENGTH	RATING
151873	A	NEMA 5-15P	IEC 320-C15 STRAIGHT	6 FT	15A-125V
151874	D	NEMA L5-15P	IEC 320-C15 STRAIGHT	6 FT	15A-125V
151875	D	NEMA L6-15P	IEC 320-C15 STRAIGHT	6 FT	15A-250V
151876	B	NEMA 5-15P	IEC 320-C15 RT ANGLE LEFT	6 FT	15A-125V
151877	E	NEMA L5-15P	IEC 320-C15 RT ANGLE LEFT	6 FT	15A-125V
151878	E	NEMA L6-15P	IEC 320-C15 RT ANGLE LEFT	6 FT	15A-250V
151879	C	NEMA 5-15P	IEC 320-C15 RT ANGLE RT	6 FT	15A-125V
151880	F	NEMA L5-15P	IEC 320-C15 RT ANGLE RT	6 FT	15A-125V
151881	F	NEMA L6-15P	IEC 320-C15 RT ANGLE RT	6 FT	15A-250V
151882	A	NEMA 5-15P	IEC 320-C15 STRAIGHT	14 FT	15A-125V
151883	D	NEMA L5-15P	IEC 320-C15 STRAIGHT	14 FT	15A-125V
151884	D	NEMA L6-15P	IEC 320-C15 STRAIGHT	14 FT	15A-250V
151885	B	NEMA 5-15P	IEC 320-C15 RT ANGLE LEFT	14 FT	15A-125V
151886	E	NEMA L5-15P	IEC 320-C15 RT ANGLE LEFT	14 FT	15A-125V
151887	E	NEMA L6-15P	IEC 320-C15 RT ANGLE LEFT	14 FT	15A-250V
151888	C	NEMA 5-15P	IEC 320-C15 RT ANGLE RT	14 FT	15A-125V
151889	F	NEMA L5-15P	IEC 320-C15 RT ANGLE RT	14 FT	15A-125V
151890	F	NEMA L6-15P	IEC 320-C15 RT ANGLE RT	14 FT	15A-250V

Figure 3
AC Input Kit Option P/N 564840 (One AC Feed per Rectifier Position)

Vertiv™ NetSure™ 2100 DC Power System

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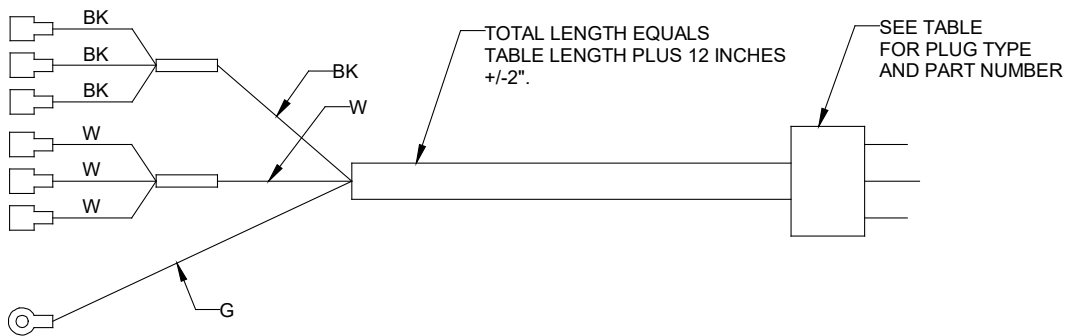
AC Input Kit Option P/N 564841 (One AC Feed per Shelf)



Customer Nominal
120 VAC / 208 VAC / 240 VAC
Rectifier AC Input
Connection

Plug or — White* — L2-N — Factory
 Unterminates — Green* — Ground — Connections
 Wires — Black* — L1 — to Shelf

* Color of AC input cable
assembly or line cord lead.



PT NO	NOMINAL LENGTH. SEE FIGURE FOR TOTAL LENGTH.	PLUG PT NO	PLUG TYPE
565487	30"	UNTERMINATED.	---
565488	6 FT	UNTERMINATED.	---
565489	12 FT	UNTERMINATED.	---
565490	6 FT	142841	5-20P 125V, 20A
565491	14 FT	142841	5-20P 125V, 20A
565494	6 FT	140393	L5-20P 125V, 20A
565495	14 FT	140393	L5-20P 125V, 20A
565496	6 FT	247113700	L6-20P 250V, 20A
565497	14 FT	247113700	L6-20P 250V, 20A
565498	6 FT	144267	IEC C20 250V, 16A

Figure 4
AC Input Kit Option P/N 564841 (One AC Feed per Shelf)

External Alarm, Reference, Monitoring, and Control 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, Monitoring, and Control Connections Locations

Refer to Figure 5.

Optional External RS-485 Connector

Refer to Figure 5 for location.

Optional IB4 Assembly (NetSure Mini Control Unit Second Ethernet Port Board)

Refer to Figure 5 for system interface connector location and Figure 6 for IB4 assembly connector locations. Use cable P/N 147605 (ordered separately) to connect the external IB4 assembly to the system. Refer also to “NetSure Mini Control Unit Ethernet Connection (if required)” on page 50.

Circuit Breaker Alarm Connections to Battery Disconnect Circuit Breakers on Battery Trays

Refer to Figure 7 and Figure 8.

Circuit Breaker Alarm Connections to Battery Disconnect Circuit Breakers on Battery Cabinets

Refer to Figure 9 and Figure 10.

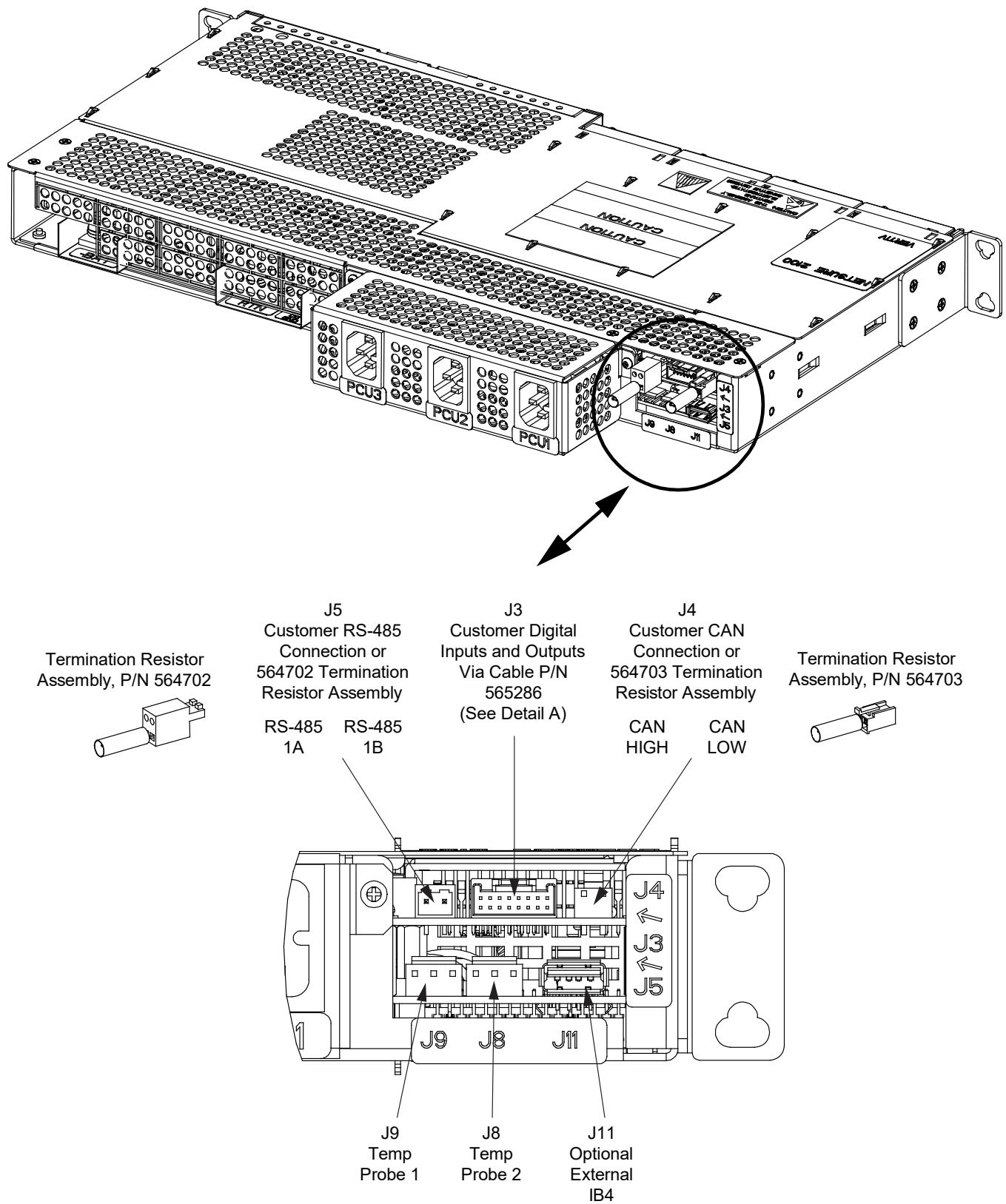
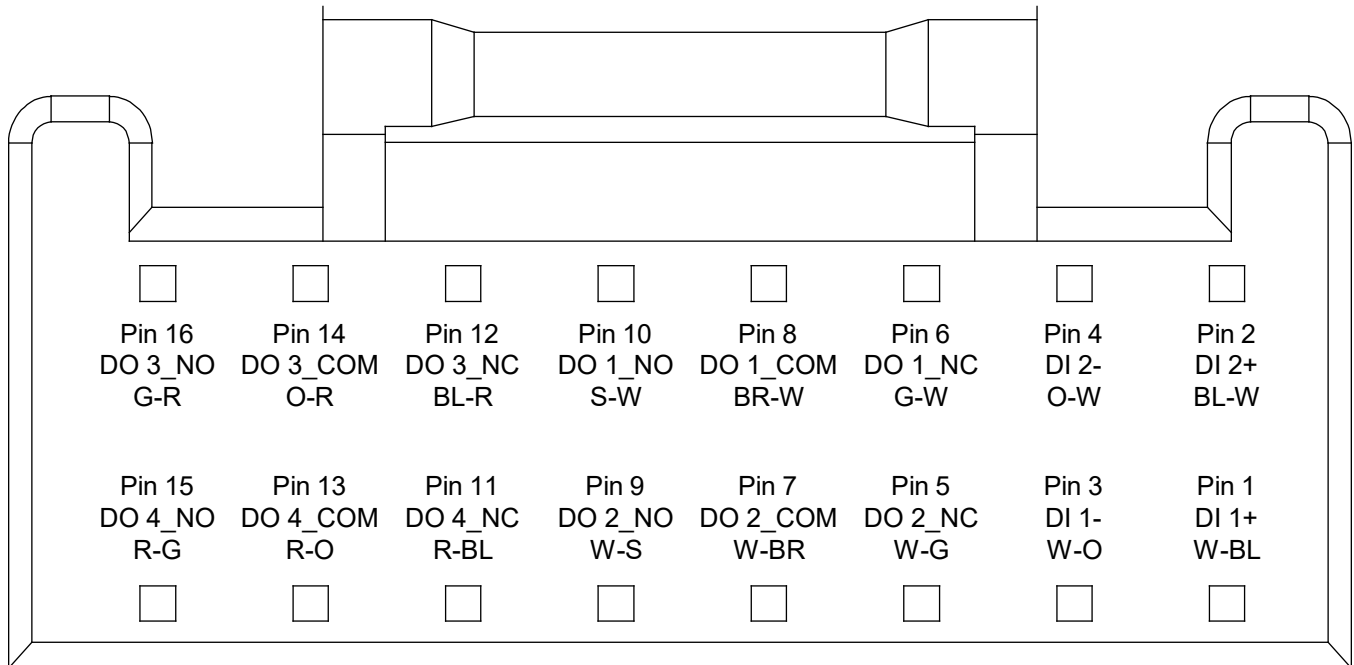


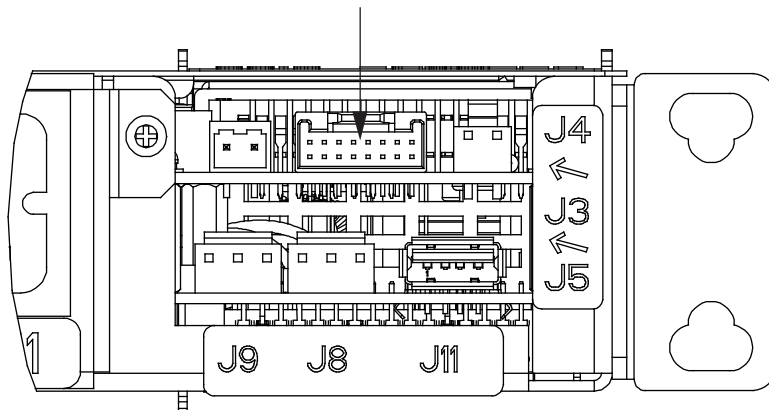
Figure 5
 External Alarm, Reference, Monitoring, and Control Connections Locations (cont'd on next page)

DETAIL A

J3 Pin-Outs and
 Customer Digital Inputs and Outputs
 Cable P/N 565286 Color Scheme



J3
 Customer Digital
 Inputs and Outputs
 Via Cable P/N
 565286



The controller relay assigned to “Critical Summary” alarm (relay 1 by default) will operate in the “Fail Safe Mode”. “Fail Safe Mode” means Relay 1 is de-energized during an alarm condition, opening the contacts between the C and NO terminals, and closing the contacts between the C and NC terminals.

The controller’s remaining three (3) relays energize during an alarm condition, closing the contacts between the C and NO terminals, and opening the contacts between the C and NC terminals.

Figure 5
 External Alarm, Reference, Monitoring, and Control Connections Locations (cont’d from previous page)

Vertiv™ NetSure™ 2100 DC Power System

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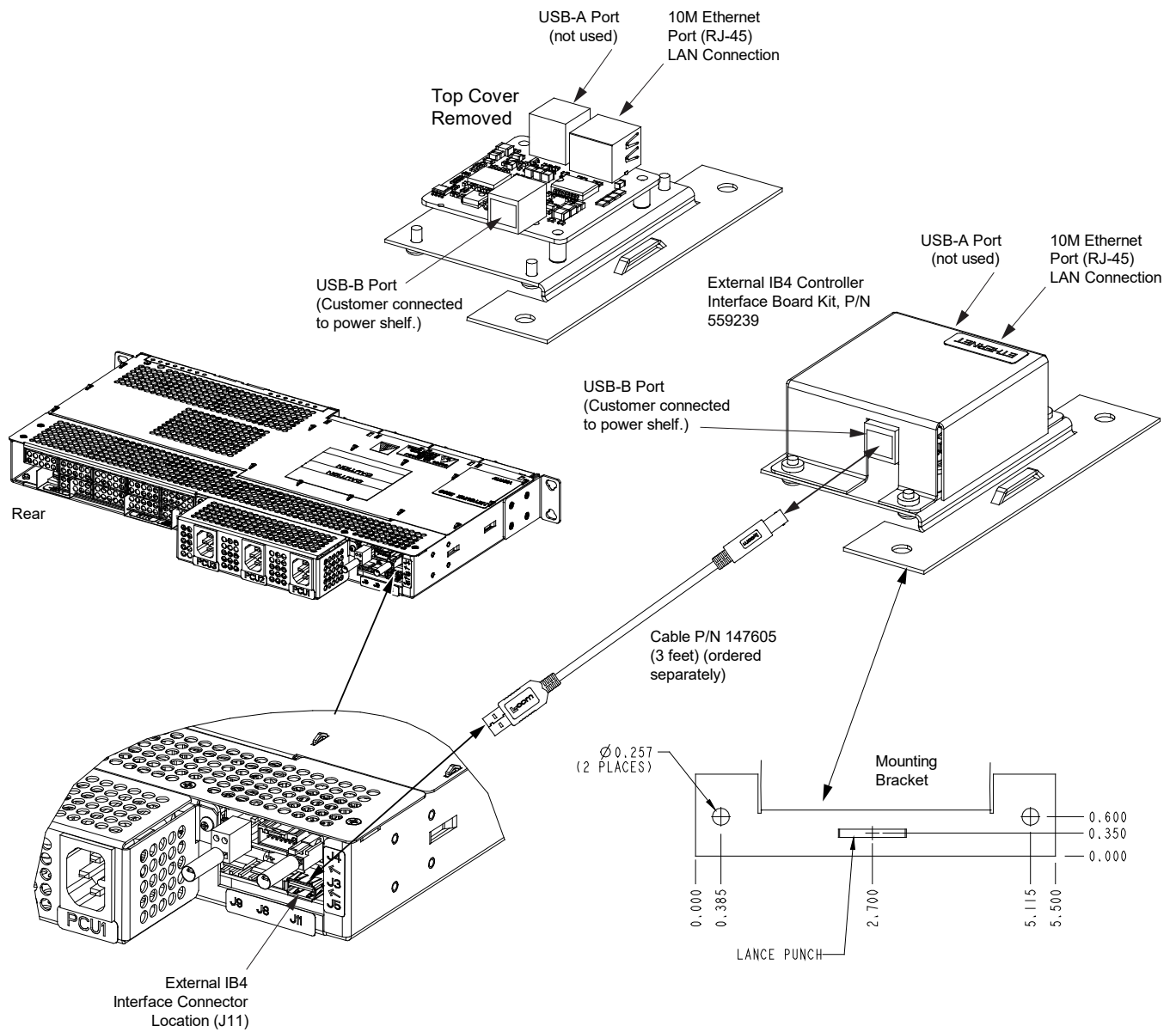


Figure 6
Optional External IB4 Connections Locations

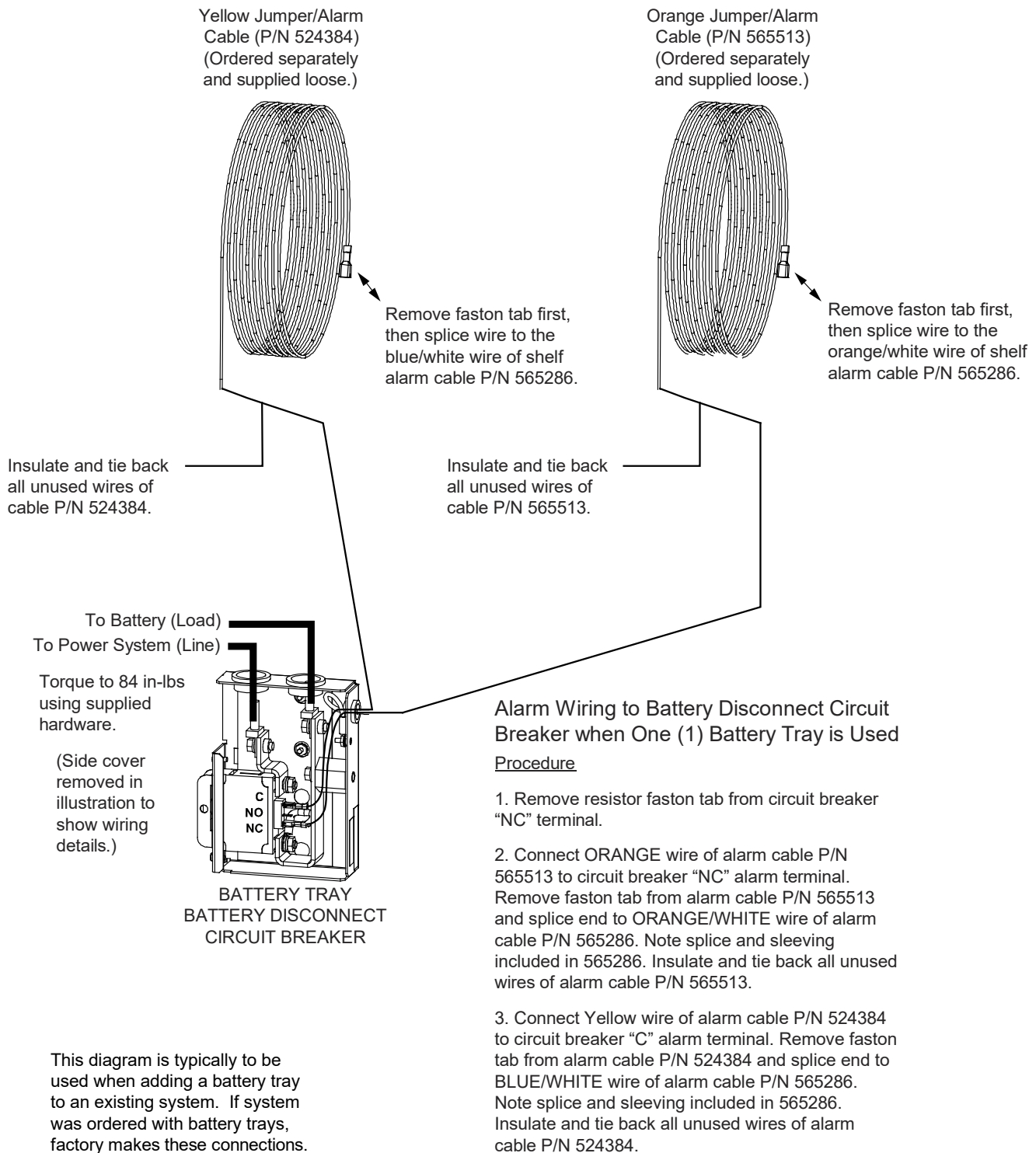
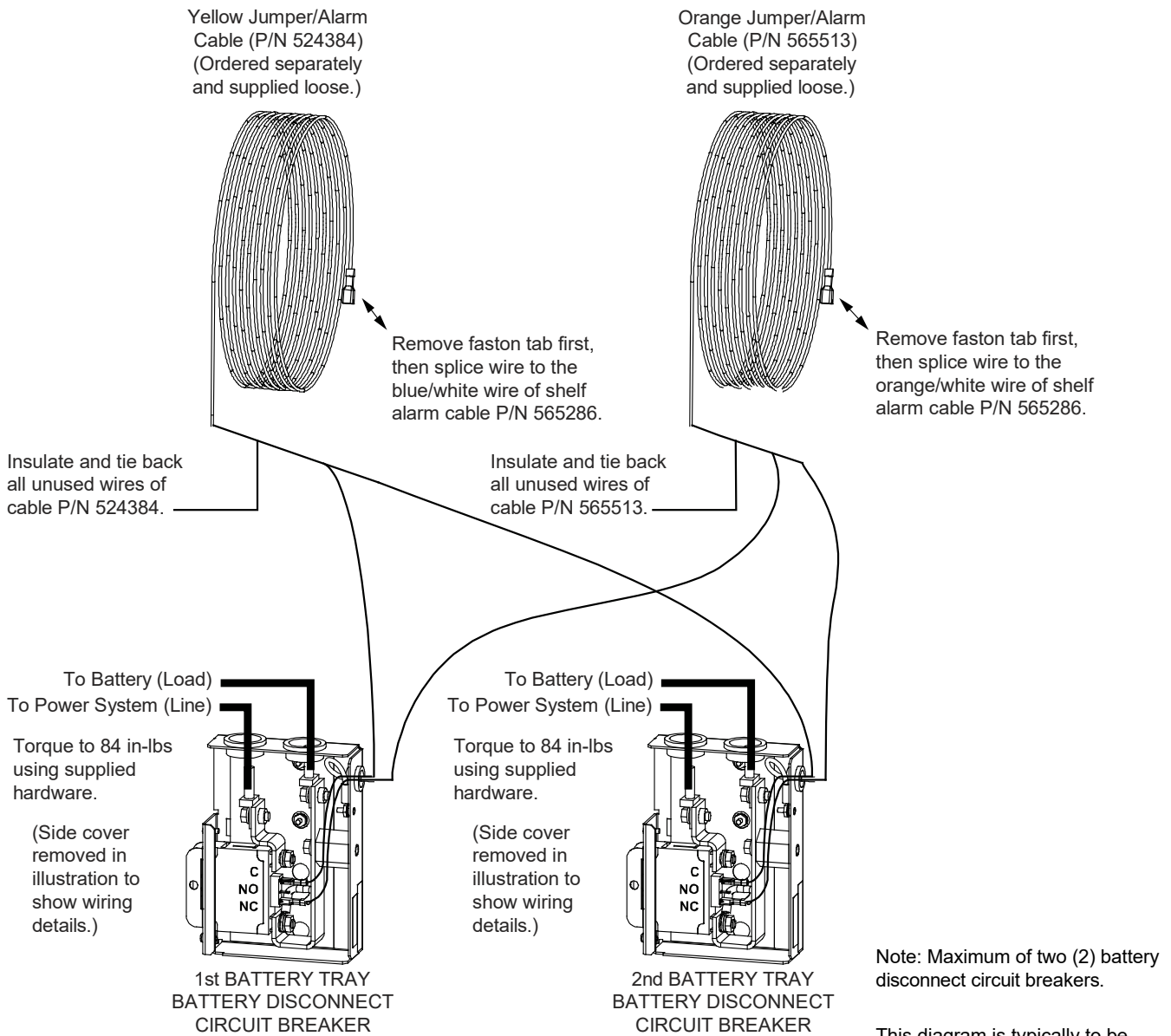


Figure 7
Alarm Wiring to Battery Disconnect Circuit Breaker when One (1) Battery Tray is Used

Vertiv™ NetSure™ 2100 DC Power System

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Alarm Wiring to Battery Disconnect Circuit Breakers when Two (2) Battery Trays are Used

Procedure

1. Remove resistor faston tab from circuit breaker "NC" terminal on each battery disconnect.
2. Connect an ORANGE wire of alarm cable P/N 565513 to each circuit breaker "NC" alarm terminal. Remove faston tab from alarm cable P/N 565513 and splice end to ORANGE/WHITE wire of alarm cable P/N 565286. Note splice and sleeving included in 565286. Insulate and tie back all unused wires of alarm cable P/N 565513.
3. Connect a Yellow wire of alarm cable P/N 524384 to each circuit breaker "C" alarm terminal. Remove faston tab from alarm cable P/N 524384 and splice end to BLUE/WHITE wire of alarm cable P/N 565286. Note splice and sleeving included in 565286. Insulate and tie back all unused wires of alarm cable P/N 524384.
4. There is NO connection to the circuit breaker "NO (Normally Open)" alarm terminal.

Figure 8
Alarm Wiring to Battery Disconnect Circuit Breakers when Two (2) Battery Trays are Used

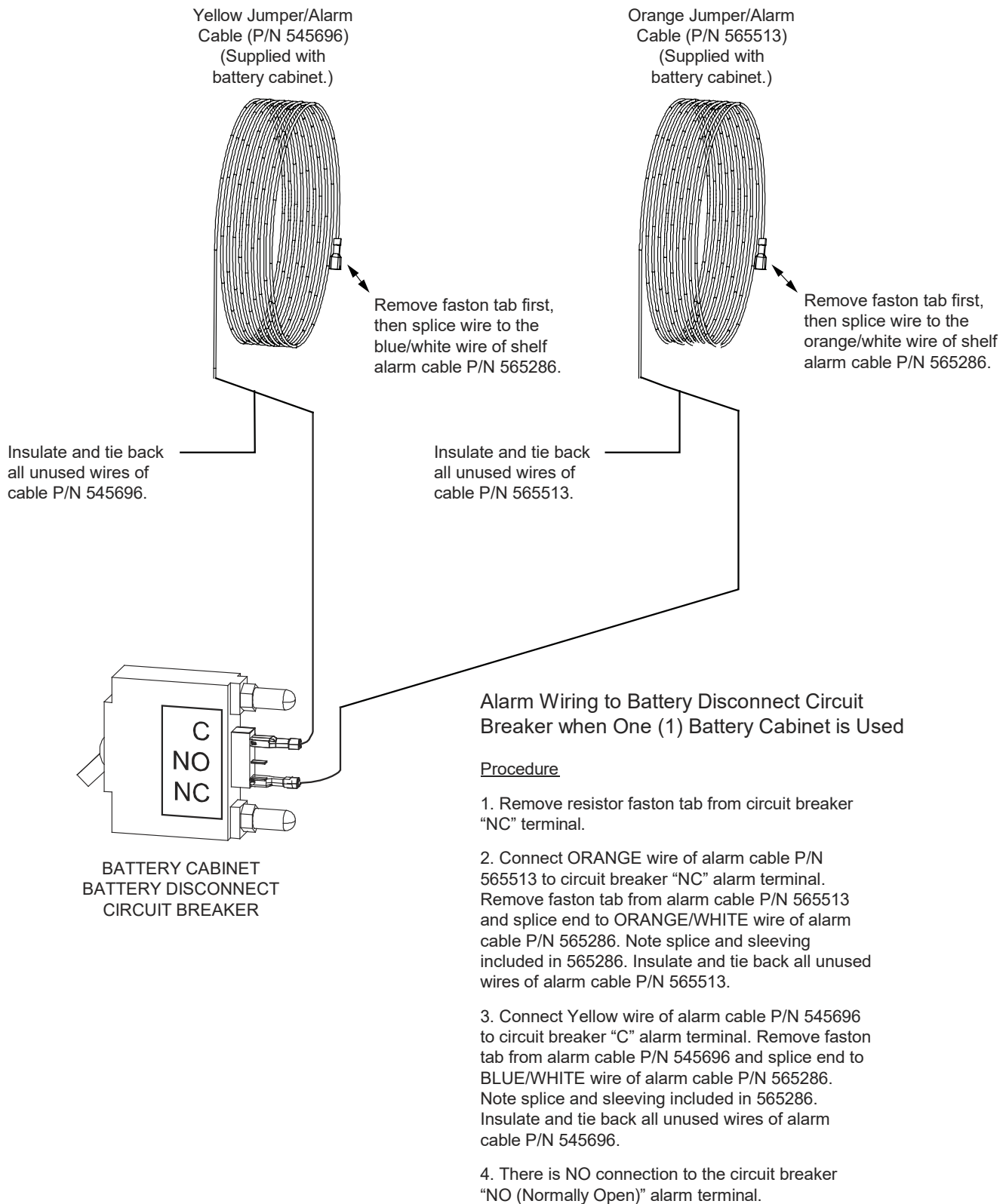
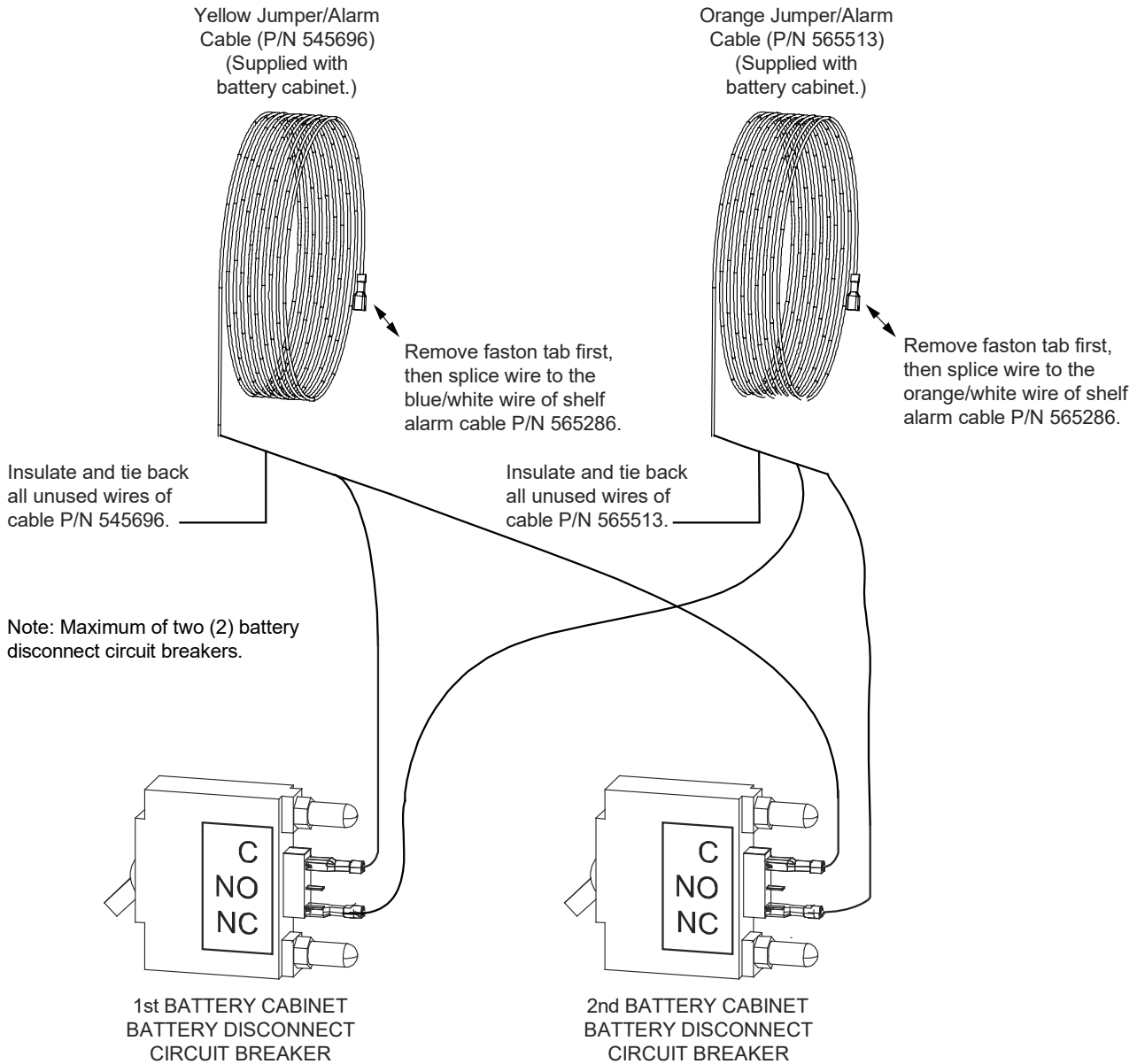


Figure 9
Alarm Wiring to Battery Disconnect Circuit Breaker when One (1) Battery Cabinet is Used

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Alarm Wiring to Battery Disconnect Circuit Breakers when Two (2) Battery Cabinets are Used

Procedure

1. Remove resistor faston tab from circuit breaker "NC" terminal on each battery disconnect.
2. Connect an ORANGE wire of alarm cable P/N 565513 to each circuit breaker "NC" alarm terminal. Remove faston tab from alarm cable P/N 565513 and splice end to ORANGE/WHITE wire of alarm cable P/N 565286. Note splice and sleeving included in 565286. Insulate and tie back all unused wires of alarm cable P/N 565513.
3. Connect a Yellow wire of alarm cable P/N 545696 to each circuit breaker "C" alarm terminal. Remove faston tab from alarm cable P/N 545696 and splice end to BLUE/WHITE wire of alarm cable P/N 565286. Note splice and sleeving included in 565286. Insulate and tie back all unused wires of alarm cable P/N 545696.
4. There is NO connection to the circuit breaker "NO (Normally Open)" alarm terminal.

Figure 10
Alarm Wiring to Battery Disconnect Circuit Breakers when Two (2) Battery Cabinets are Used

NetSure Mini Control Unit Ethernet Connection (if required)

To Controller Front Panel

The NetSure Mini Control Unit provides a Web Interface via an Ethernet connection to a TCP/IP network. This interface can be accessed locally on a computer or remotely through a network. An RJ-45 Ethernet jack is provided on the front of the NetSure Mini Control Unit.

Note: If your system has an IB4 board, DO NOT connect your Local Area Network (LAN) to the NetSure Mini Control Unit front Ethernet port.

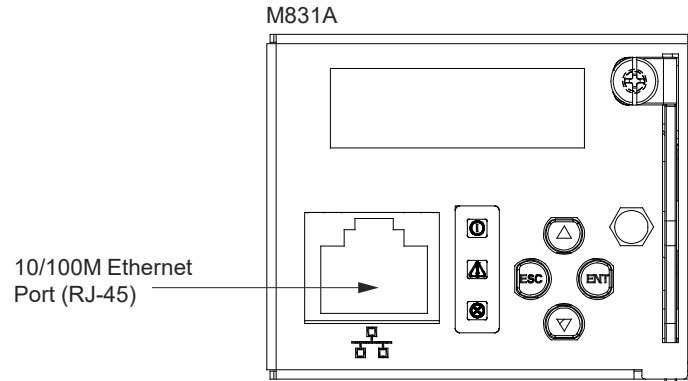


Figure 11
NetSure Mini Control Unit Ethernet Port

To IB4 Board (if furnished)

Your system may be furnished with an external IB4 board. The IB4 board provides a second Ethernet port. When installed, the Ethernet port located on the controller's front panel can ONLY be used to connect a computer directly to the controller. The Ethernet port located on the IB4 board can be used to connect the controller to your Local Area Network (LAN). See Figure 5 on page 43 and Figure 6 on page 45 for wiring details.

Note: If your system has an IB4 board, DO NOT connect your Local Area Network (LAN) to the controller's front Ethernet port.

Load Distribution Wiring, Input Battery Wiring, and CO Ground Wiring

List AA

Refer to Figure 12.

CO Ground Wiring

Refer to “Central Office Grounding Connection” on page 38.

Load Distribution Wiring to GMT Fuse Blocks

Load and load return leads are connected to screw-type terminal blocks located on the front of the distribution unit. Refer to Figure 12 for terminal block wire size capacity and recommended torque.

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

Input Battery Wiring

Input battery and battery return leads terminated in two-hole lugs are connected to threaded studs located on the rear inside of the distribution unit. Refer to Figure 12 for stud size/spacing and recommended torque.

Battery wire size and lug requirements are determined by site requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes. All lugs for customer connections must be ordered separately. See Table 18 for available lugs. Lugs must be crimped per lug manufacturer's specifications.

List BA

Refer to Figure 13.

CO Ground Wiring

Refer to “Central Office Grounding Connection” on page 38.

Optional CO Ground Jumper

A jumper is supplied loose with the system (P/N 10020338). This jumper is used as required to tie the CO ground terminal located on the return bus (see Figure 13) to the shelf frame ground stud located on the rear of the unit.

Load Distribution Wiring to GMT Fuse Blocks

Load and load return leads are connected to screw-type terminal blocks located inside the distribution unit. Refer to Figure 13 for terminal block wire size capacity and recommended torque.

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

Load Distribution Wiring to Distribution Circuit Breakers

Load and load return leads are connected to screw-type terminal blocks located inside the distribution unit. Refer to Figure 13 for terminal block wire size capacity and recommended torque.

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

Input Battery Wiring

Input battery and battery return leads terminated in two-hole lugs are connected to threaded studs located on the rear inside of the distribution unit. Refer to Figure 13 for stud size/spacing and recommended torque.

Battery wire size and lug requirements are determined by site requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes. All lugs for customer connections must be ordered separately. See Table 18 for available lugs. Lugs must be crimped per lug manufacturer's specifications.

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List BB

Refer to Figure 14.

CO Ground Wiring

Refer to “Central Office Grounding Connection” on page 38.

Optional CO Ground Jumper

A jumper is supplied loose with the system (P/N 10020338). This jumper is used as required to tie the CO ground terminal located on the return bus (see Figure 14) to the shelf frame ground stud located on the rear of the unit.

Load Distribution Wiring to GMT Fuse Blocks

Load and load return leads are connected to screw-type terminal blocks located inside the distribution unit. Refer to Figure 14 for terminal block wire size capacity and recommended torque.

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

Load Distribution Wiring to Distribution Circuit Breakers

Load and load return leads are connected to screw-type terminal blocks located inside the distribution unit. Refer to Figure 14 for terminal block wire size capacity and recommended torque.

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

Input Battery Wiring

Input battery and battery return leads terminated in two-hole lugs are connected to threaded studs located on the rear inside of the distribution unit. Refer to Figure 14 for stud size/spacing and recommended torque.

Battery wire size and lug requirements are determined by the circuit breaker rating. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes. All lugs for customer connections must be ordered separately. For wire size and lug selection, refer to Table 18 and Table 22. Lugs must be crimped per lug manufacturer's specifications.

List CA

Refer to Figure 15.

CO Ground Wiring

Refer to “Central Office Grounding Connection” on page 38.

Load Distribution Wiring to GMT Fuse Blocks

Load and load return leads are connected to screw-type terminal blocks located on the front of the distribution unit. Refer to Figure 15 for terminal block wire size capacity and recommended torque.

The rating of the distribution device determines the wire size requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes.

Load Distribution Wiring to Distribution Circuit Breakers

Load and load return leads terminated in two-hole lugs are connected to threaded studs located on the rear inside of the distribution unit. Refer to Figure 15 for stud size/spacing and recommended torque.

Load wire size and lug requirements are determined by the circuit breaker rating. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes. All lugs for customer connections must be ordered separately. For wire size and lug selection, refer to Table 18 and Table 22. Lugs must be crimped per lug manufacturer's specifications.

Note: Connect these leads prior to mounting the shelf in a rack with no rear access.

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Input Battery Wiring

Input battery and battery return leads terminated in two-hole lugs are connected to threaded studs located on the rear inside of the distribution unit. Refer to Figure 15 for stud size/spacing and recommended torque.

Battery wire size and lug requirements are determined by site requirements. Refer to the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC) and applicable local codes. All lugs for customer connections must be ordered separately. See Table 18 for available lugs. Lugs must be crimped per lug manufacturer's specifications.

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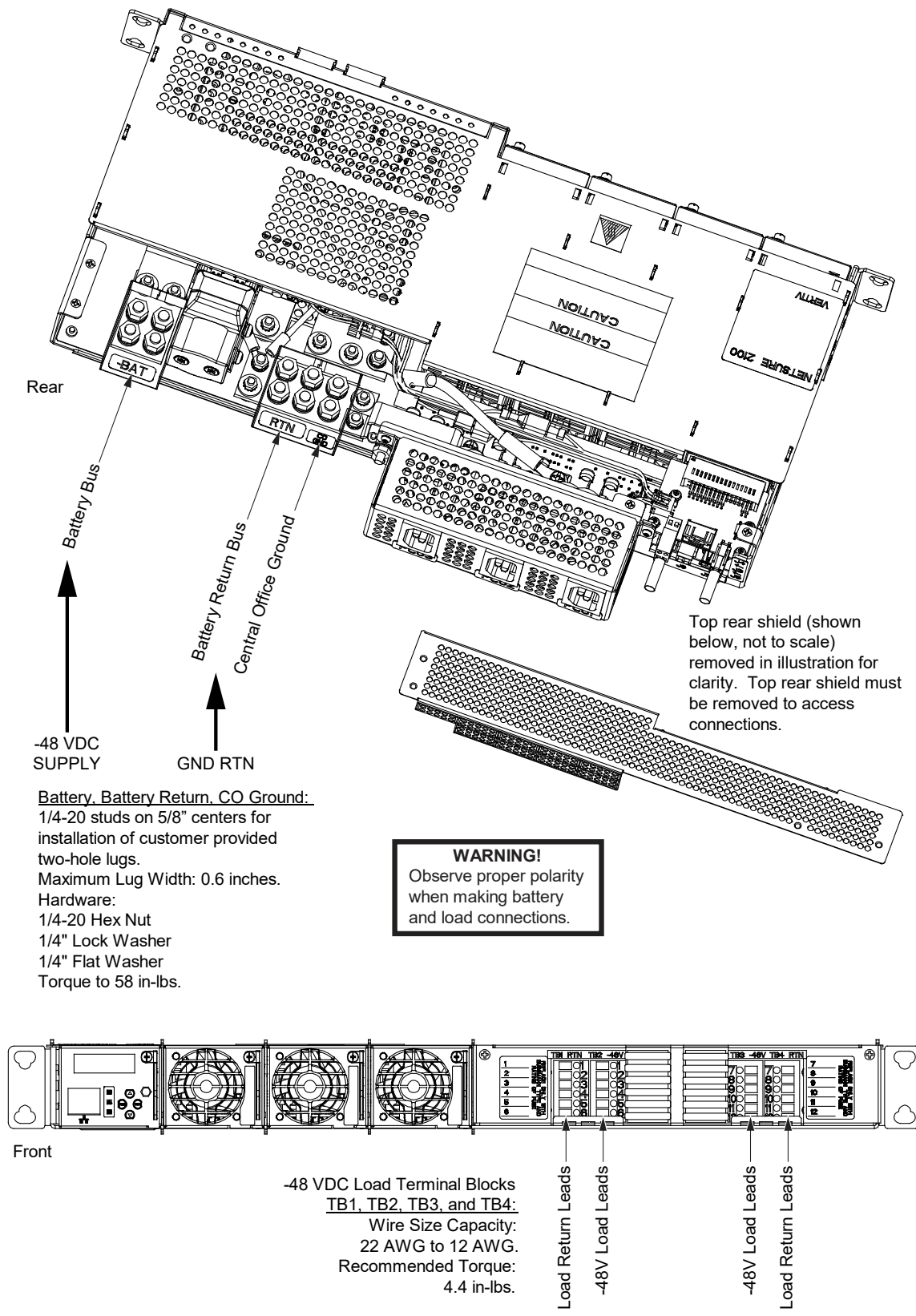
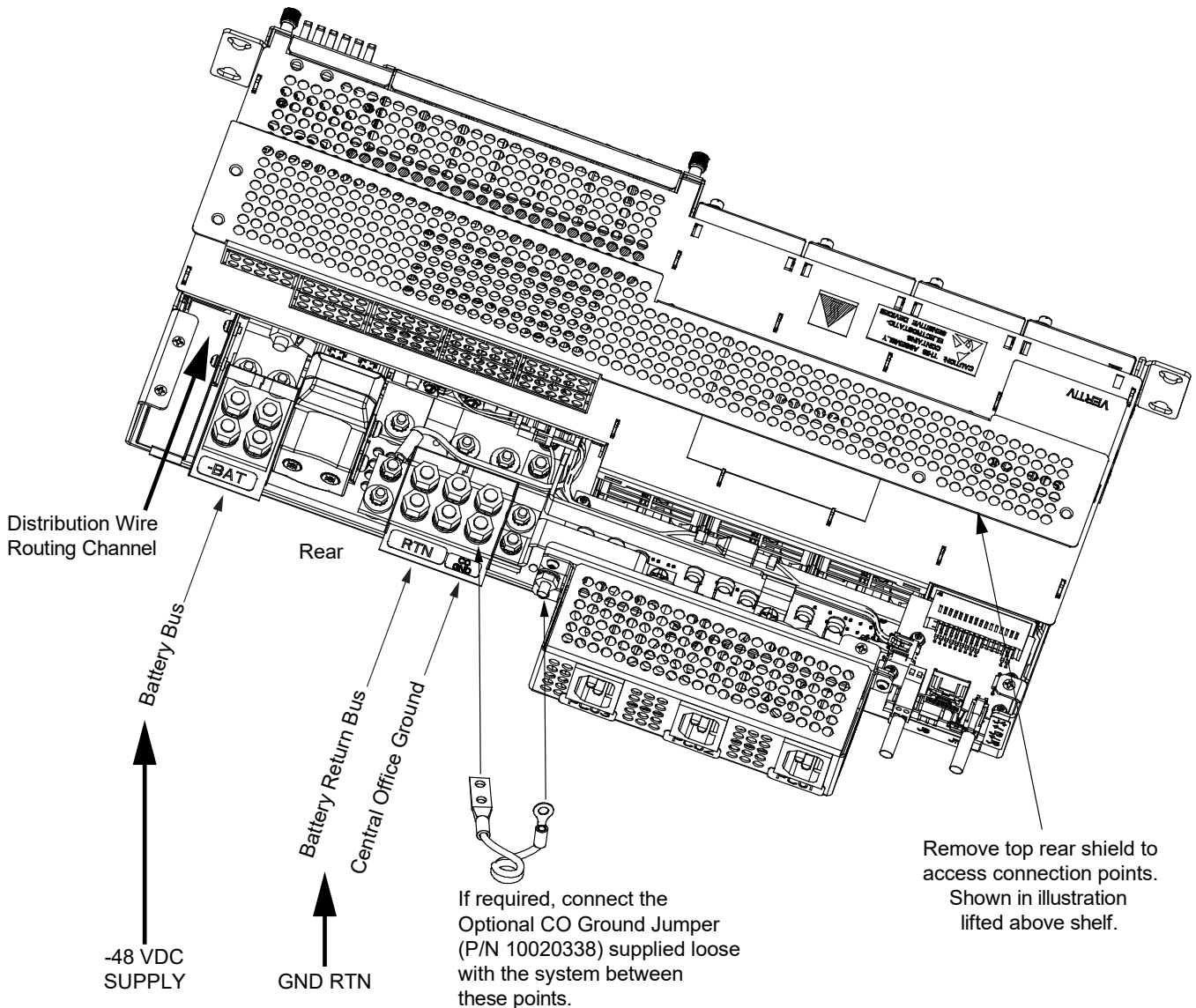


Figure 12
Load Distribution Wiring, Input Battery Wiring, and CO Ground Wiring (List AA)



Battery, Battery Return, CO Ground:
 1/4-20 studs on 5/8" centers for installation of customer provided two-hole lugs.
 Maximum Lug Width: 0.6 inches.
 Hardware:
 1/4-20 Hex Nut
 1/4" Lock Washer
 1/4" Flat Washer
 Torque to 58 in-lbs.

WARNING!
 Observe proper polarity when making battery and load connections.

Figure 13 (cont'd on next page)
 Load Distribution Wiring, Input Battery Wiring, and CO Ground Wiring (List BA)

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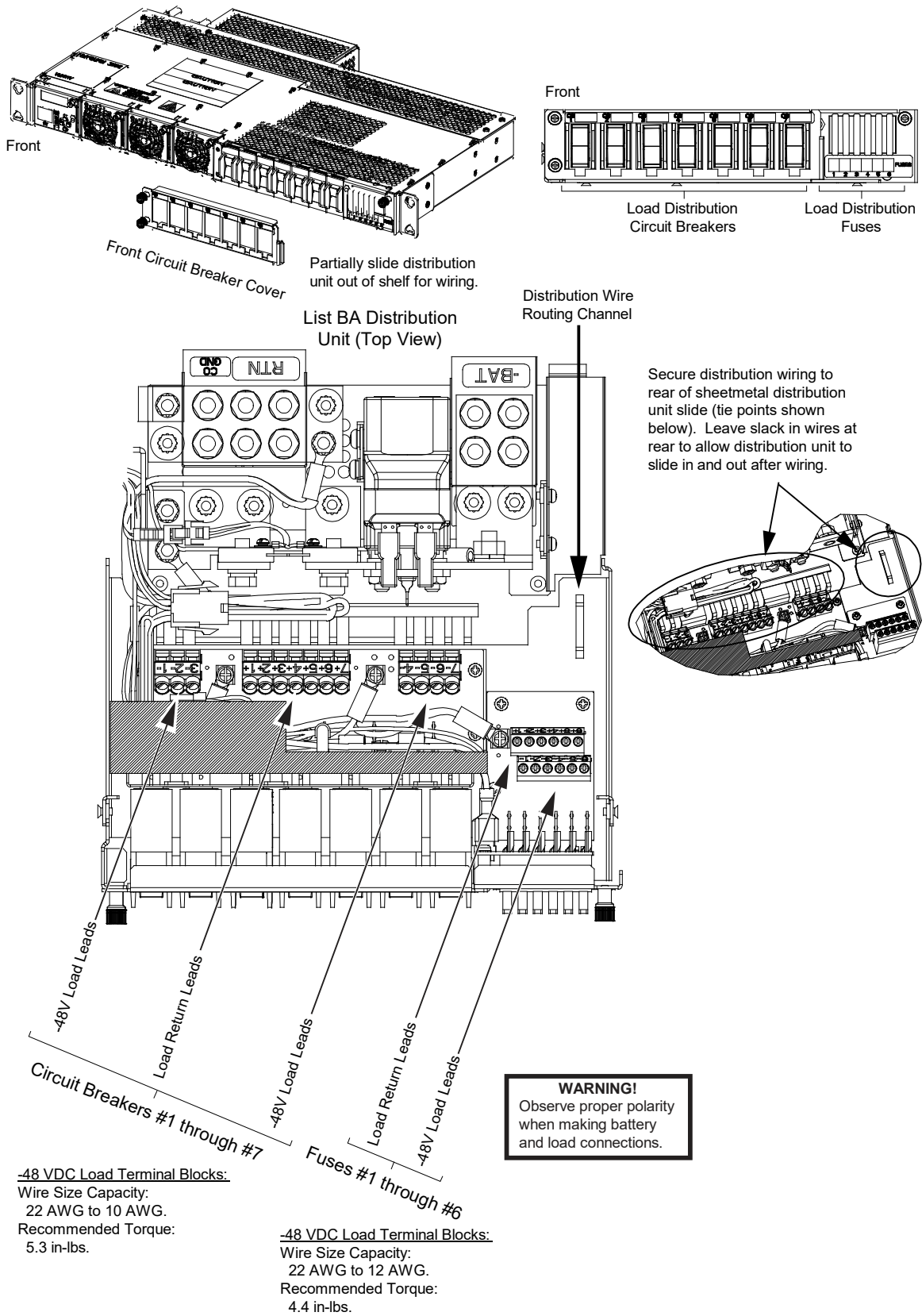
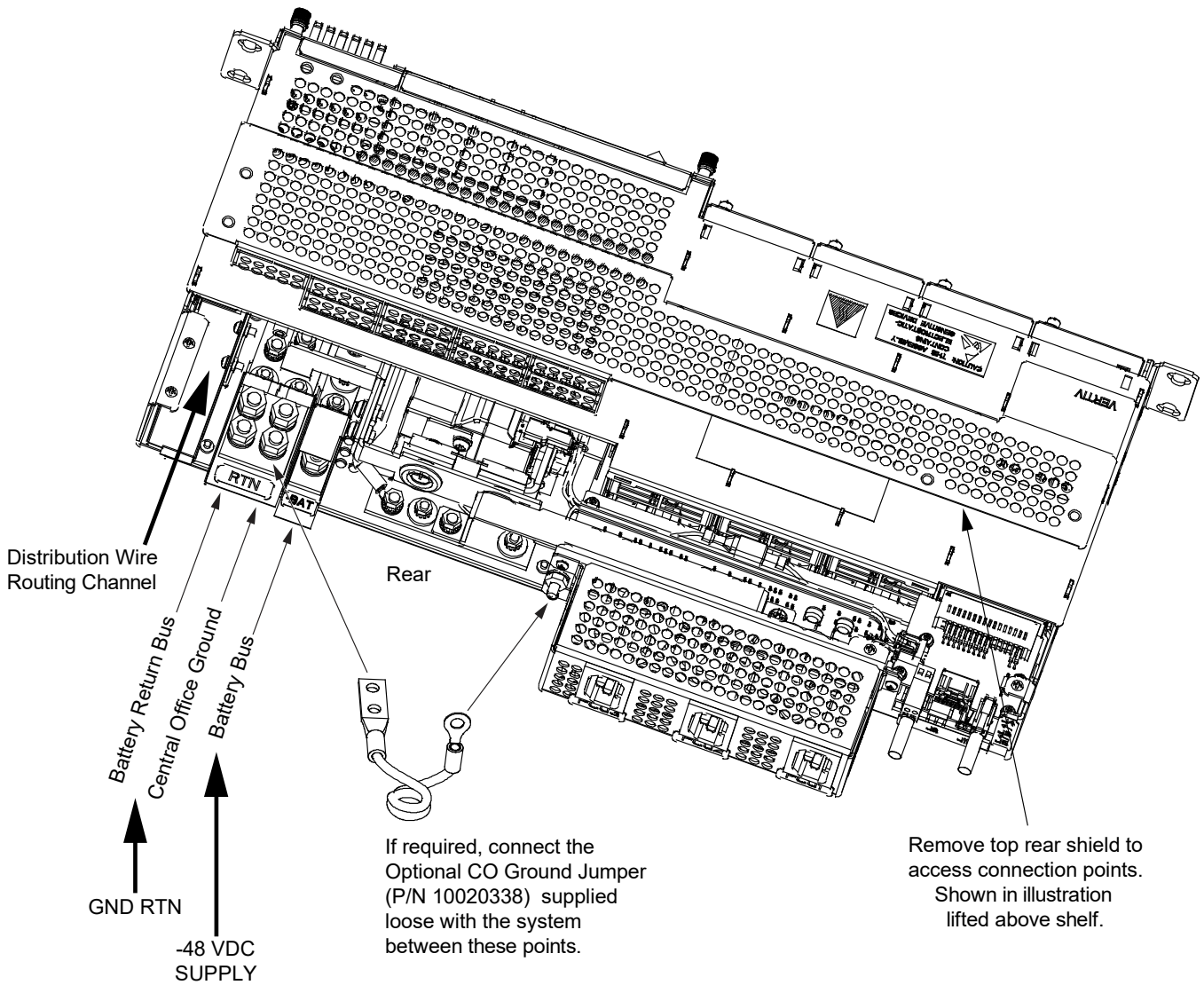


Figure 13 (cont'd from previous page)
Load Distribution Wiring, Input Battery Wiring, and CO Ground Wiring (List BA)



Battery, Battery Return, CO Ground:

1/4-20 studs on 5/8" centers for installation of customer provided two-hole lugs.
Maximum Lug Width: 0.6 inches.
Hardware:
1/4-20 Hex Nut
1/4" Lock Washer
1/4" Flat Washer
Torque to 58 in-lbs.

WARNING!
Observe proper polarity when making battery and load connections.

Figure 14 (cont'd on next page)
Load Distribution Wiring, Input Battery Wiring, and CO Ground Wiring (List BB)

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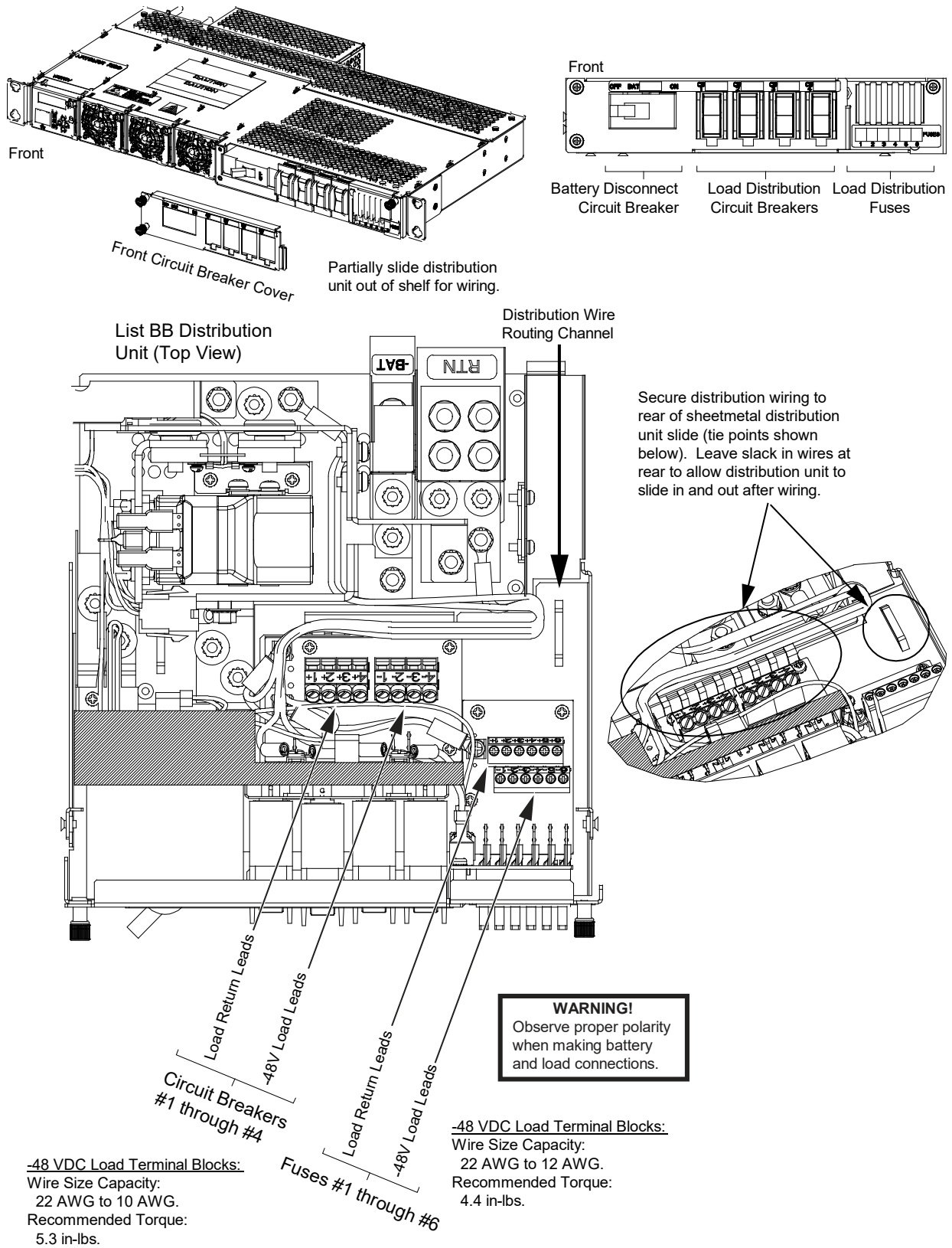


Figure 14 (cont'd from previous page)
Load Distribution Wiring, Input Battery Wiring, and CO Ground Wiring (List BB)

Vertiv™ NetSure™ 2100 DC Power System
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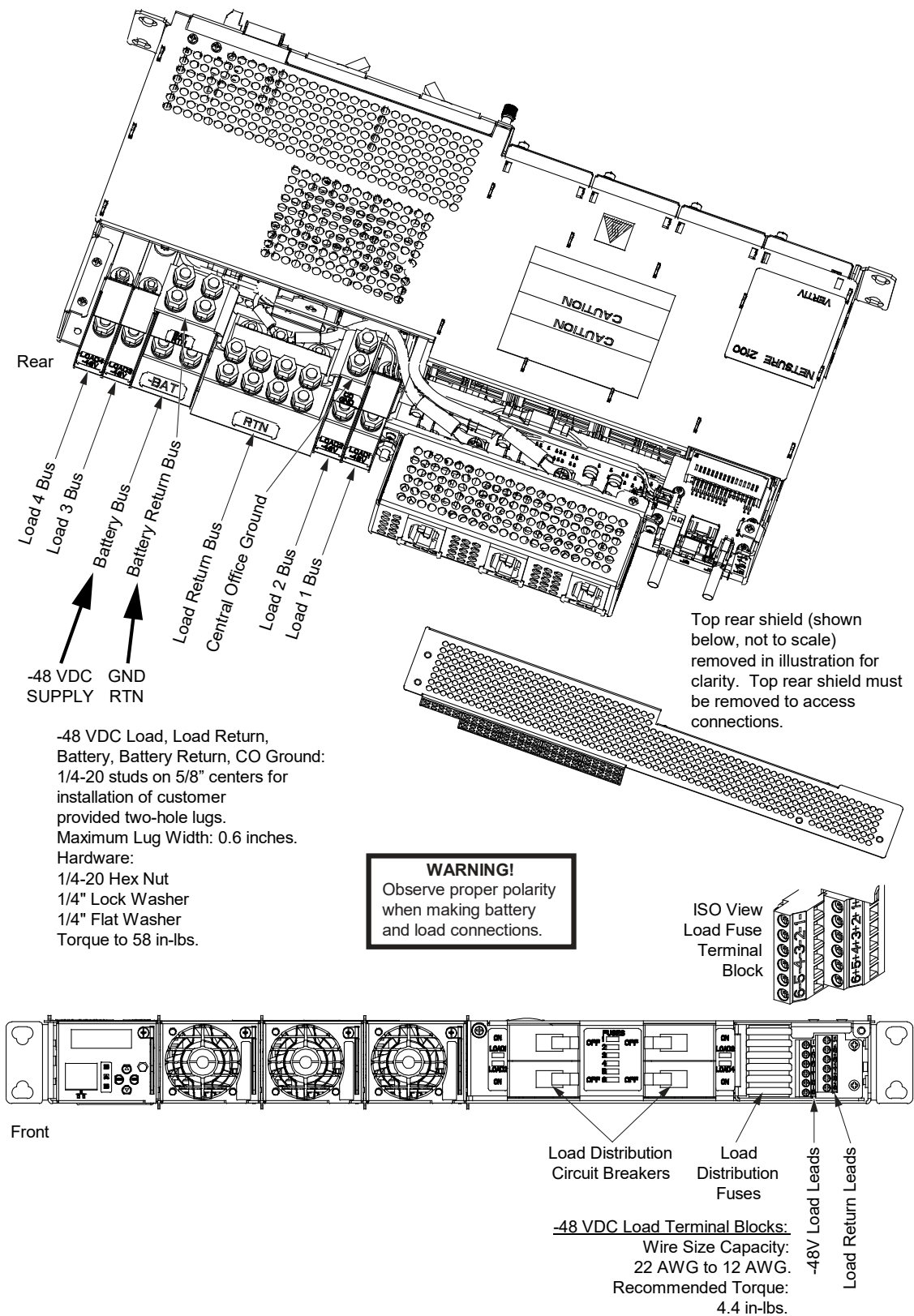


Figure 15
Load Distribution Wiring, Input Battery Wiring, and CO Ground Wiring (List CA)

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Circuit Breaker Amperage	Recommended 90°C Wire Size ⁽¹⁾						
	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG	4 AWG	2 AWG
	Loop Length (feet) ⁽²⁾						
1, 3, 5, 10 A	37 ^(3, 4, 5, 6)	58 ^(3, 4, 5, 6)	93 ^(3, 4, 5, 6)	148 ^(3, 4, 5, 6)	236 ^(3, 4, 5, 6)	376 ^(3, 4, 5, 6)	597 ^(3, 4, 5, 6)
15 A	24 ^(3, 4, 5, 6)	39 ^(3, 4, 5, 6)	62 ^(3, 4, 5, 6)	99 ^(3, 4, 5, 6)	157 ^(3, 4, 5, 6)	250 ^(3, 4, 5, 6)	398 ^(3, 4, 5, 6)
20 A	--	29 ^(3, 4, 5, 6)	46 ^(3, 4, 5, 6)	74 ^(3, 4, 5, 6)	118 ^(3, 4, 5, 6)	188 ^(3, 4, 5, 6)	298 ^(3, 4, 5, 6)
25 A	--	--	37 ^(3, 4, 5, 6)	59 ^(3, 4, 5, 6)	94 ^(3, 4, 5, 6)	150 ^(3, 4, 5, 6)	239 ^(3, 4, 5, 6)
30 A	--	--	31 ^(3, 4, 5)	49 ^(3, 4, 5)	78 ^(3, 4, 5, 6)	125 ^(3, 4, 5, 6)	199 ^(3, 4, 5, 6)
35 A	--	--	--	42 ^(3, 4, 5, 6)	67 ^(3, 4, 5, 6)	107 ^(3, 4, 5, 6)	170 ^(3, 4, 5, 6)
40 A	--	--	--	37 ^(3, 4, 5)	59 ^(3, 4, 5, 6)	94 ^(3, 4, 5, 6)	149 ^(3, 4, 5, 6)
45 A	--	--	--	33 ^(3, 4)	52 ^(3, 4, 5, 6)	83 ^(3, 4, 5, 6)	132 ^(3, 4, 5, 6)
50 A	--	--	--	29 ^(3, 4)	47 ^(3, 4, 5)	75 ^(3, 4, 5, 6)	119 ^(3, 4, 5, 6)
60 A	--	--	--	--	39 ^(3, 4)	62 ^(3, 4, 5, 6)	99 ^(3, 4, 5, 6)
70 A	--	--	--	--	--	53 ^(3, 4)	85 ^(3, 4)
Recommended Crimp Lug							
Lug	245342300 ⁽⁷⁾	245342300 ⁽⁷⁾	245342300 ⁽⁷⁾	245390200 ⁽⁷⁾	245346700 ⁽⁷⁾	245346800 ⁽⁷⁾	245346900 (or 140541 if flex wire is used) ⁽⁷⁾

Notes:

- ¹ 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.
- ² Recommended wire sizes are sufficient to restrict voltage drop to 1.0 volt or less at listed branch current for the loop lengths shown. Loop length is the sum of the lengths of the positive and negative leads.
- ³ Wire Size / Loop Length Combination Calculated using 40 °C Ambient Operating Temperature.
- ⁴ Wire Size / Loop Length Combination Calculated using 50 °C Ambient Operating Temperature.
- ⁵ Wire Size / Loop Length Combination Calculated using 65 °C Ambient Operating Temperature.
- ⁶ Wire Size / Loop Length Combination Calculated using 70 °C Ambient Operating Temperature.
- ⁷ These lugs are two-hole for 1/4" bolt clearance on 5/8" centers. Lugs must be crimped per lug manufacturer's specifications.

Table 22
Recommended Battery and Load Distribution Wire Size and Lug Selection
for Bullet Nose-Type and Compact Type Circuit Breakers

SPECIFICATIONS

1. SYSTEM

1.1 DC Output Ratings

1.1.1 See “General Specifications” starting on page 2.

1.2 AC Input Ratings

1.2.1 See “General Specifications” starting on page 2.

1.3 Environmental Ratings

1.3.1 Operating Ambient Temperature Range: -40 °C to +70 °C (-40 °F to +158 °F).

1.3.2 Storage Ambient Temperature Range: -40 °C to +85 °C (-40 °F to +185 °F).

1.3.3 Relative Humidity: Capable of operating in an ambient relative humidity range of 0% to 93%, 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 derated by 2 °C per 1000 feet above 5000 feet.

1.3.5 Audible Noise: Refer to UM1R481000e3.

1.3.6 Surge Protection: Refer to UM1R481000e3.

1.3.7 Mounting: This power system is designed to mount in a standard 19” W or 23” W relay rack or equipment rack having 1” or 1-3/4” multiple drillings. The system may be mounted vertically in an OSP enclosure with the distribution unit (DU) portion of the unit up or down. The system may be mounted horizontally or vertically on a wall using the optional wall mounting bracket kit. Refer to “Overall Dimensions” on page 63 for mounting dimensions.

- This product is intended only for installation in a restricted access location on or above a non-combustible surface.
- This product must be located in a controlled environment with access to crafts persons only.
- This product is intended for installation in network telecommunication facilities (CO, vault, hut, or other environmentally controlled electronic equipment enclosure).
- This product is intended to be connected to the common bonding network in a network telecommunication facility (CO, vault, hut, or other environmentally controlled electronic equipment enclosure).
- The DC return connection to this system can remain isolated from system frame and chassis (DC-I).
- This system is suitable for installation as part of the Common Bonding Network (CBN).
- The system must be mounted in an environment that does not exceed the Operating Ambient Temperature Range stated above.
- Clearance requirements are (relay rack or equipment rack):
 - a) Minimum clearance is one inch from the face of the rectifier modules and one inch from the surface of the rear sheet metal (for ventilation only; operation, installation and maintenance require more clearance).
 - b) Recommended minimum aisle space clearance for the front of each bay is 2'6" (for operation and maintenance).
 - c) Recommended minimum aisle space clearance for the rear of each bay is 2'0" (for installation and maintenance).
 - d) List AA and CA: No space required above or below the unit (for ventilation only, installation and maintenance may require more clearance).
 - e) List BA and BB: Space is required above or below the unit (for ventilation only, installation and maintenance may require more clearance).
- Clearance requirements are (cabinet or wall mounting):
 - a) Minimum clearance is one inch from the face of the rectifier modules and one inch from the surface of the rear sheet metal (for ventilation only; operation, installation and maintenance require more clearance).
 - b) The system may also be mounted horizontally or vertically. Vertical mounting can be with the distribution located at the top of the unit orientation or at the bottom of the unit orientation.

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1.4 Compliance Information

1.4.1 Safety Compliance: This panel is UL Recognized for use in DC Power Distribution Centers for Communications Equipment.

1.4.2 NEBS Compliance (pending): Compliance verified by a Nationally Recognized Testing Laboratory (NRTL) per GR-1089-CORE and GR-63-CORE. Contact Vertiv for NEBS compliance reports.

Rectifier Modules: In order to remain compliant during a fan failure condition, the backup battery connection must be utilized to provide sufficient power to the loads for up to eight (8) hours when the system is operated at greater than 50% output power. If no backup battery connection is used, the system must operate with a redundant module installed.

1.4.3 GR-3108: GR-3108 Class 2 compliant (pending).

1.5 Controller Digital Input Ratings

1.5.1 Maximum Voltage Rating: 60 VDC.

1.5.2 Active High: > 19 VDC.

1.5.3 Active Low: < 1 VDC.

1.6 Controller Relay Ratings

1.6.1 Steady State: 0.5 A @ 60 VDC, 1 A @ 30 VDC.

1.6.2 Peak: 3 A @ 30 VDC.

2. RECTIFIER

Refer to the rectifier instructions (UM1R481000e3).

3. CONTROLLER

Refer to the NetSure Mini Control Unit instructions (UM1M831ANA).

For controller factory settings, refer to the controller configuration drawing (C-drawing).

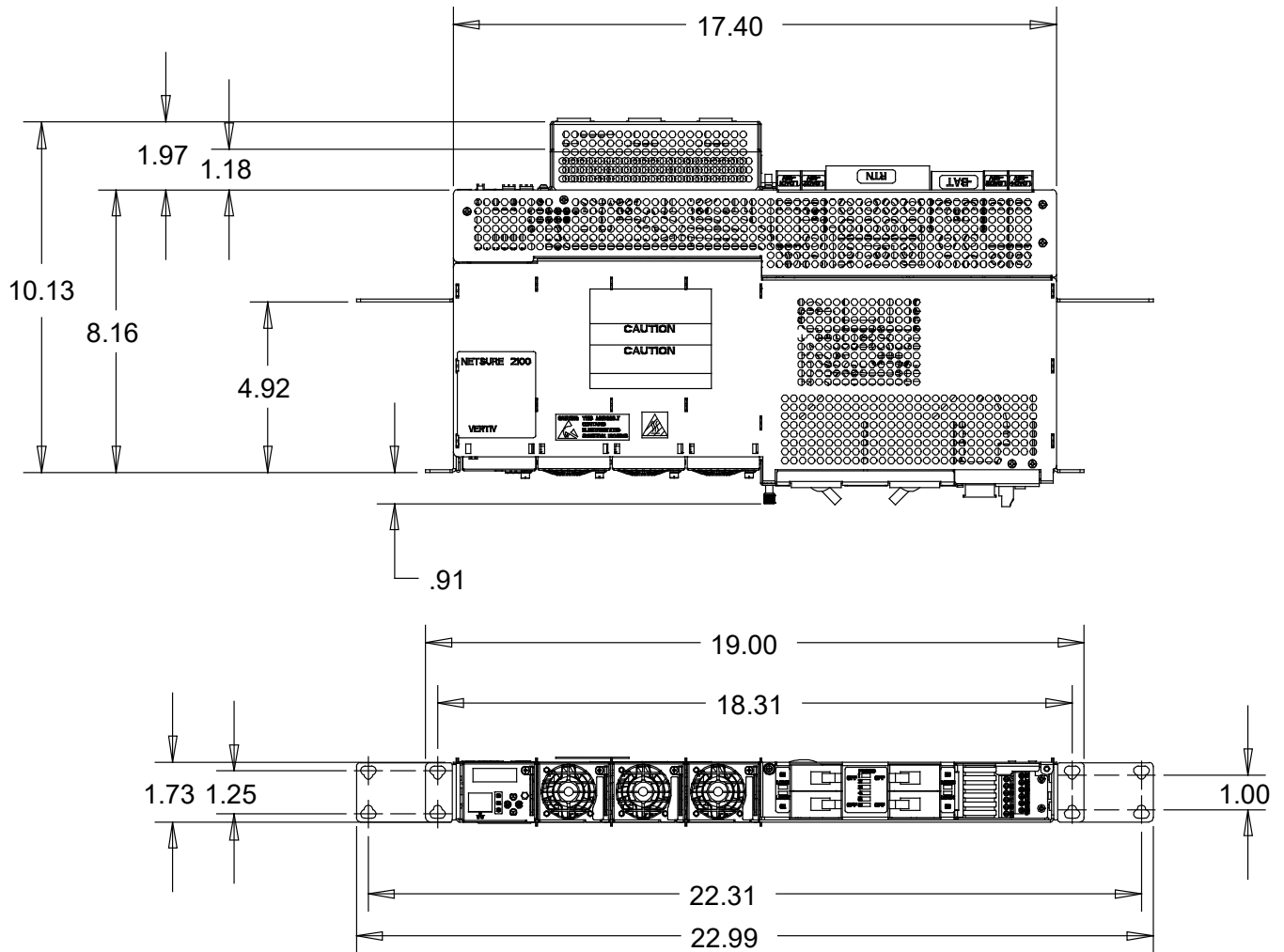
MECHANICAL SPECIFICATIONS

Overall Dimensions

Relay Racks

Refer to Table 11 for relay rack dimensions.

System



Notes:

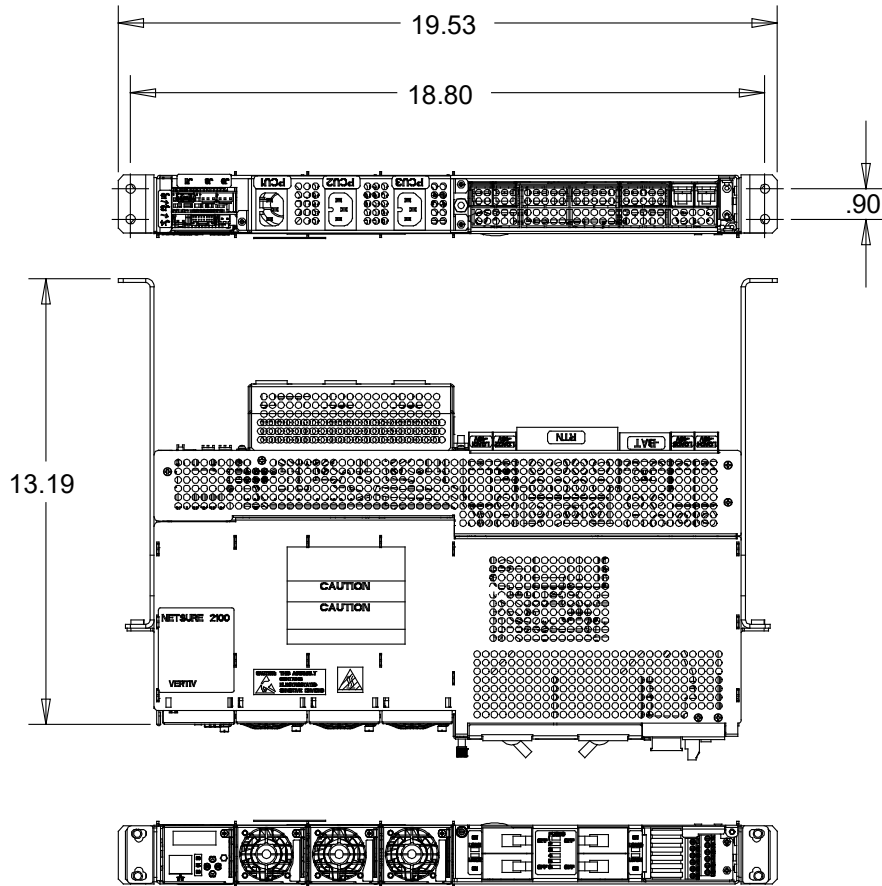
1. All dimensions are in inches, unless otherwise specified.
2. Finish: Galvanized Steel.

Vertiv™ NetSure™ 2100 DC Power System

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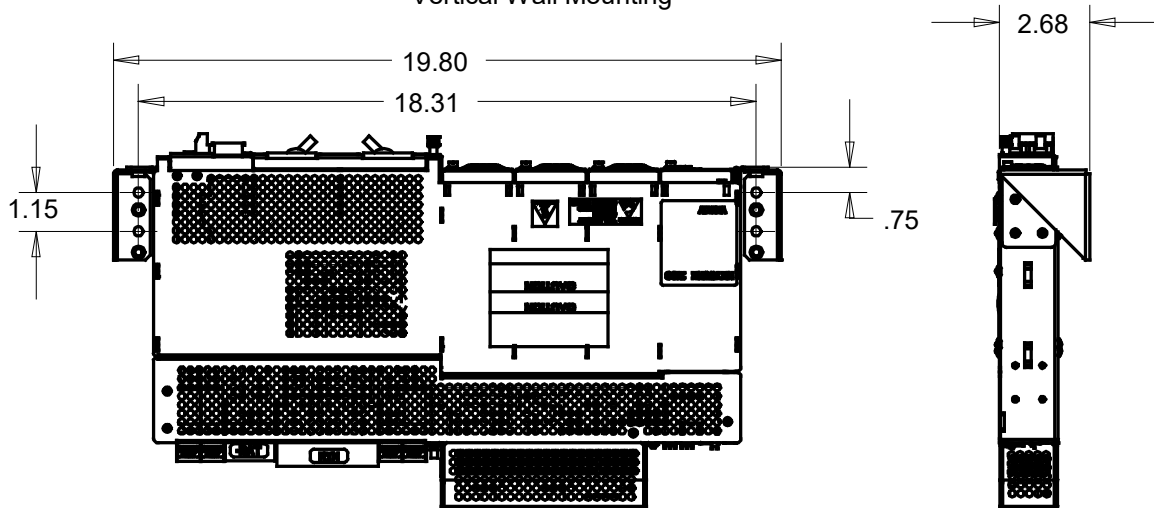
System with Wall Mount Bracket Kit P/N 541285

Horizontal Wall Mounting



Note: All dimensions are in inches.

Vertical Wall Mounting

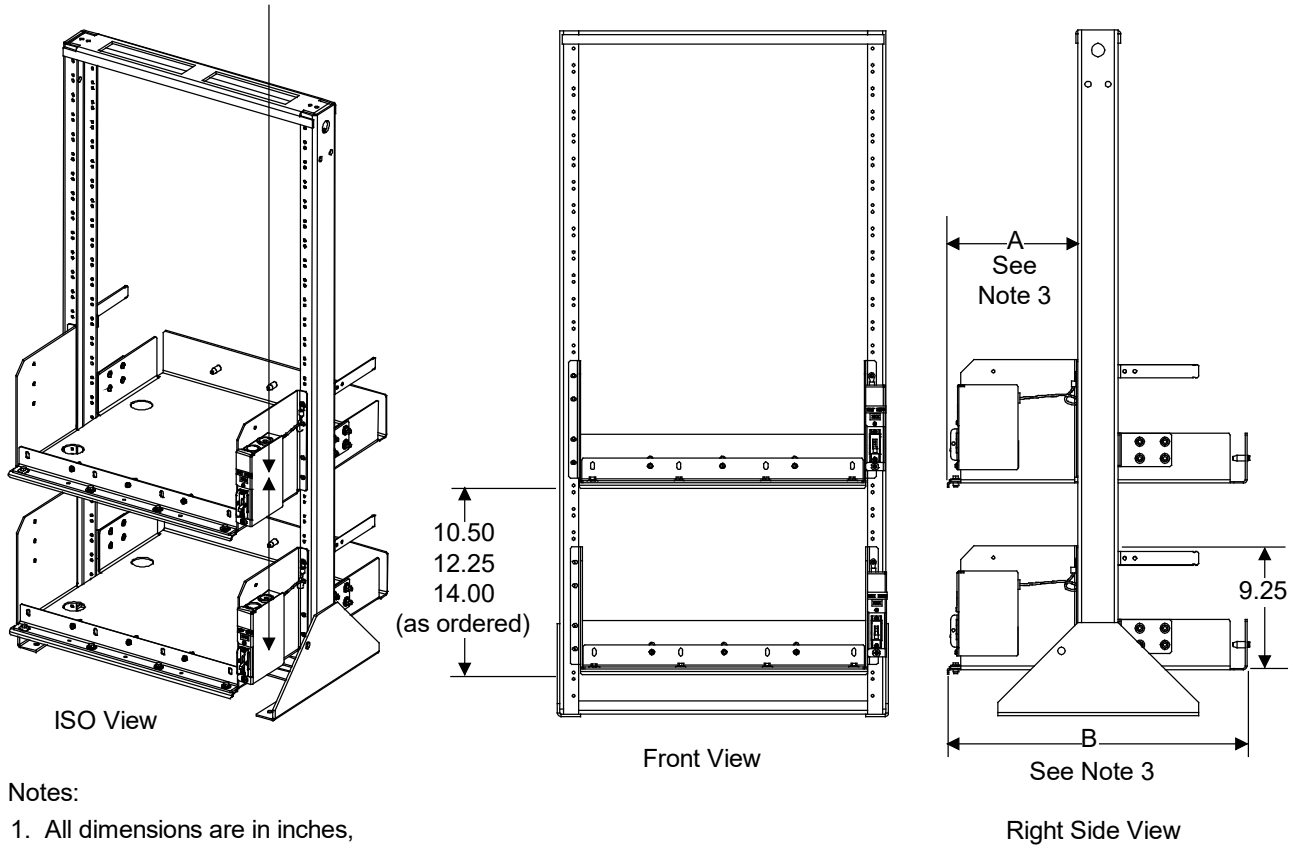


Vertiv™ NetSure™ 2100 DC Power System

System Application Guide

5821380093 (23" W Battery Tray) (List 93)

Optional Battery Disconnect Circuit Breakers
(Shown on Right Side, Available on Either Side)



Notes:

1. All dimensions are in inches, unless otherwise specified.
2. P/N 559806 tray shown. Other part numbers are similar.

3.

Tray P/N	Dimension A	Dimension B
559806	9.78	24.44
559807	6.90	12.50
559808	10.48	23.14
10012262	10.80	24.79

4. Weight in LBS.
(per tray, less batteries).

Part No.	With Circuit Breaker Option	Without Circuit Breaker Option
559806	33 lbs	29 lbs
559807	20 lbs	18 lbs
559808	25 lbs	23 lbs
10012262	38 lbs	36 lbs

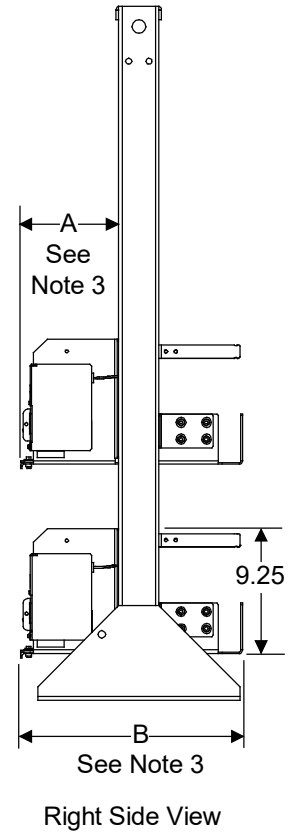
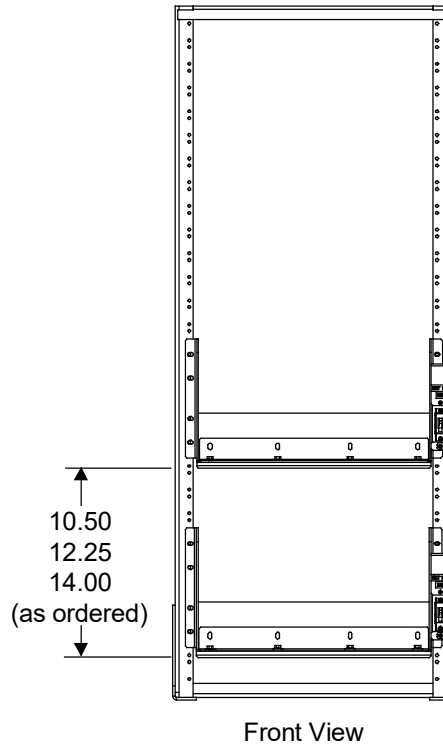
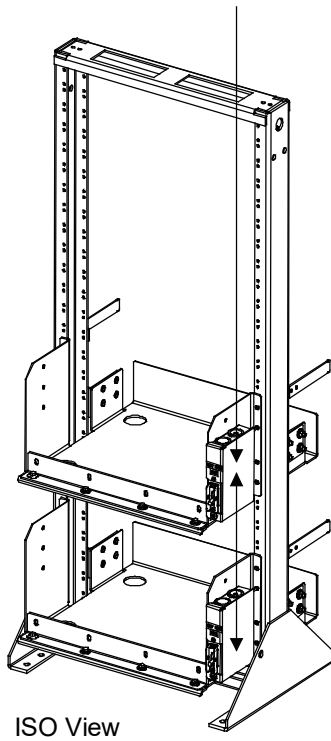
5. Finish: Textured Dark Gray.
6. A system can accommodate up to two (2) battery trays, depending on rack size and tray spacing.

Vertiv™ NetSure™ 2100 DC Power System

System Application Guide

5821380094 (19" W Battery Tray) (List 94)

Optional Battery Disconnect Circuit Breakers
(Shown on Right Side, Available on Either Side)



Notes:

1. All dimensions are in inches, unless otherwise specified.
2. P/N 559809 tray shown. Other part numbers are similar.
- 3.

Tray P/Ns	Dimension A	Dimension B
559809	7.78	17.04
559810	7.28	20.95
559811	6.90	12.50
559812	7.98	23.04

4. Weight in LBS.
(per tray, less batteries).

Tray P/Ns	With Circuit Breaker Option	Without Circuit Breaker Option
559809	25.0 lbs	23.0 lbs
559810	25.3 lbs	23.3 lbs
559811	18.5 lbs	16.5 lbs
559812	26.0 lbs	24.0 lbs

5. Finish: Textured Dark Gray.
6. A system can accommodate up to two (2) battery trays, depending on rack size and tray spacing.

Vertiv™ NetSure™ 2100 DC Power System

System Application Guide

Weights

List Number or Part Number	Net Weight (lb), each	Description
Controller/Rectifier Shelf		
58213800001	5	Main Shelf
Controller		
1M831ANA	0.5	NetSure Mini Control Unit
Rectifier		
1R481000e3	1.3	Rectifier Module
Distribution Unit		
582138000AA	3	(12) GMT Load Fuses (with LVBD)
582138000BA	3.25	(6) GMT Load Fuses / (7) Compact Type Load Circuit Breakers (with LVBD)
582138000BB	3.50	(6) GMT Load Fuses / (4) Compact Type Load Circuit Breakers / (1) Bullet Type Battery Disconnect Circuit Breaker (with LVBD)
582138000AC	6	(6) GMT Load Fuses / (4) Bullet Type Load Circuit Breakers (with LVBD)
Relay Racks		
559817	51	Relay Rack
559818	103	Relay Rack
559819	156	Relay Rack
559820	113	Relay Rack
559821	81	Relay Rack
559822	123	Relay Rack
559823	167	Relay Rack
559824	93	Relay Rack
562353	229	Relay Rack
563922	219	Relay Rack
Battery Trays		
See "58213800093 (23" W Battery Tray)" on page 65 and "58213800094 (19" W Battery Tray)" on page 66.		

BATTERY MANUFACTURER INFORMATION

Some equipment described in this System Application Guide is designed to accommodate batteries from various manufacturers. The following are referenced in this document.

C&D: C&D Technologies, Inc., Powercom Div., 1400 Union Meeting Road, Blue Bell, PA 19422-0858

Deka®: East Penn Mfg. Co., Inc., Lyon Station, PA 19536-0147

Fiamm: FIAMM T.I, 23880 Industrial Park Drive, Farmington Hills, Detroit, MI 48335

Northstar: NorthStar Battery Co. LLC, 4000 Continental Way, Springfield, MO 65803

PowerSafe EnerSys™: EnerSys Inc., Reading, PA, 196212-4145

RELATED DOCUMENTATION

System Installation Instructions:	IM582138000
System User Instructions:	UM582138000
NetSure Mini Control Unit Instructions:	UM1M831ANA
Rectifier Instructions:	UM1R481000e3
SM-Temp Instructions:	UM547490
Battery Cabinet Spec. No. 541434 Installation and User Instructions:	Section 6023
Battery Cabinet Spec. No. 545534 Installation and User Instructions:	Section 6033
Battery Cabinet Spec. No. 545506 Installation and User Instructions:	Section 6036
Battery Asymmetry Unit Instructions:	UM541649
Main Schematic Diagrams:	SD582138000
Main Wiring Diagrams:	T582138000

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