SYSTEM OVERVIEW

Description: -48VDC @ up to 10,000 amperes power system.

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

The Vertiv™ NetSure™ 702NBDB DC Power System is an integrated power system containing rectifiers, intelligent control, metering, monitoring, and a bulk DC output panel. This power system consists of the following components.

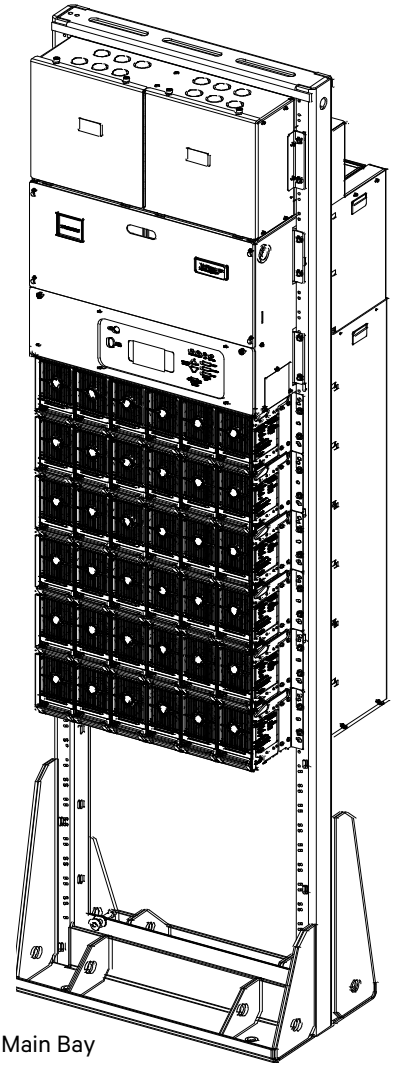
- **Power Bays**

  The system consists of one (1) Main Power Bay and up to four (4) optional Supplemental Power Bays.

  The Main and Supplemental Power Bays are equipped with six (6) Rectifier Module Mounting Shelves, each of which houses up to six (6) Rectifier Modules. Each Power Bay can be equipped with up to thirty-six (36) Rectifier Modules. Refer to PD588705000 for Rectifier Shelf and Rectifier Module information. The PD can be accessed via the CD (Electronic Documentation Package) furnished with your system.

  Each Power Bay contains a Monitor and Control Panel. In the Main Power Bay, this panel houses the Meter-Control-Alarm (MCA) assembly. This panel in the Main Power Bay also houses the LMS Main CPU circuit card of the integrated LMS Monitoring System. In a Supplemental Power Bay, this panel can be equipped with an optional LMS Expansion CPU circuit card. (The LMS Monitoring System provides a higher level of monitoring and controlling capabilities to the power system.)

  The Monitor and Control Panel in both Main and Supplemental Power Bays contain a seven-slot card cage to house MCA alarm relay circuit cards, optional MCA input/output (I/O) circuit cards, and optional LMS I/O circuit cards. (If a Supplemental Power Bay is to be equipped with optional LMS I/O circuit cards, it must also be equipped with the LMS Expansion CPU circuit card.)



Main Bay

- **Rectifier Modules**

  The Rectifier Modules provide load power, battery float current, and battery recharge current during normal operating conditions. Refer to the rectifier User Instructions for Rectifier Module information. The document can be accessed via the CD (Electronic Documentation Package) furnished with your system.

- **MCA (Meter-Control-Alarm)**

  The MCA controls the operation of the Rectifier Modules and provides power system control, metering, monitoring, and alarm functions.

  MCA Local Control Panel: This panel is located on the front of the Main Power Bay and contains a keypad, display, and indicators for local MCA user interface.

  MCA Relay Circuit Card: Each MCA relay circuit card provides six (6) sets of Form-C relay contacts for customer external alarms. These relays are user programmable for various power system alarms. The MCA can interface with up to sixteen (16) MCA relay circuit cards.

  MCA I/O Circuit Cards: The MCA I/O circuit cards provide analog inputs/outputs and binary inputs. The MCA can interface with up to sixteen (16) MCA I/O circuit cards.

- **Integrated LMS Monitoring System**

  The LMS Monitoring System consists of an LMS Main CPU circuit card, optional LMS Expansion CPU circuit card, optional LMS I/O circuit cards, optional LMS Expansion Cabinets, and optional LMS Expansion Assemblies.

  The LMS Main CPU circuit card is mounted in the Main Power Bay. The 582126100 List 11 Customized Main Bay is factory equipped with one (1) LMS 4-input analog circuit card (586505500 List 20), two (2) LMS 8-input binary circuit cards (586505500 List 31), and three (3) LMS 4-output relay circuit cards (586505500 List 40). The 582126100 List 13 Main Bay comes with (2) 514348 6-output Form C relay cards. If a Supplemental Power Bay is to be equipped with optional LMS I/O circuit cards, it must contain an LMS Expansion CPU circuit card. LMS Expansion Cabinets and LMS Expansion Assemblies are available that mount into customer racks and equipment.

  The LMS Monitoring System is factory integrated within each Power Bay, and requires no additional customer interconnections within the Power Bay. Simple cable connections between Power Bays complete the interbay connections required. Separate analog, binary, and relay circuit cards do not have to be supplied for power system monitoring. Analog, binary, relay, and temperature circuit cards can be provided to monitor equipment external to the power system.

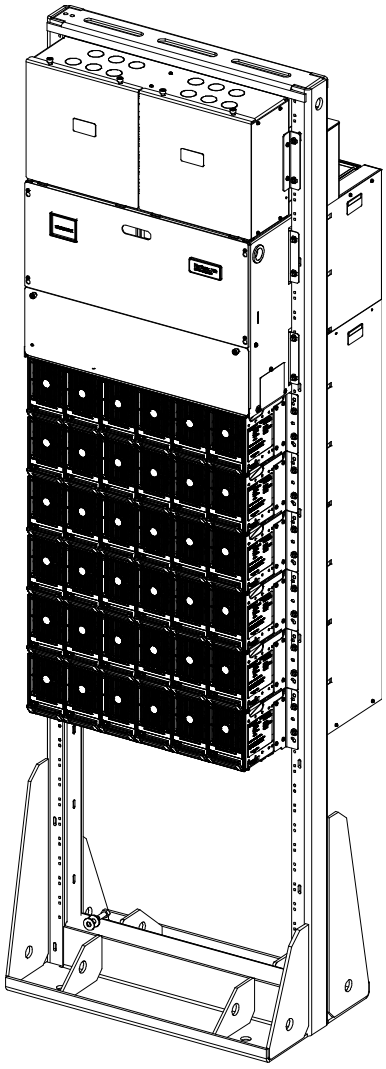
  The LMS input circuit cards monitor a variety of analog, binary, and temperature points external to the system. An LMS relay output circuit card is also available which provides programmable relays. These relays may be used for external alarms, or to control other equipment.

  The LMS Monitoring System can be accessed via a local port, a modem port, an optional TL1 port, and an Ethernet port (for Telnet access, Web access, SNMP access, optional TL1 access, and Email alarm reporting).

  The LMS Monitoring System collects data from the power system and the input circuit cards monitoring external points. The data collected is used for alarm processing and reporting, and to provide statistics.

  The LMS Monitoring System is capable of reporting alarm conditions to a remote terminal, pager, Email address, via SNMP traps over Ethernet, or via TL1 (over Ethernet) when the 'TL1 over Ethernet' option is ordered. TL1 is also available via a serial connection in 'direct mode'. For remote terminal or pager notification, the LMS Main CPU circuit card is equipped with a modem. Two types of alarm reporting mechanisms are provided, System Alarm Reporting and Individual User Alarm Reporting.

  Refer to SAG586505000/SAG586505500 for further LMS information. The SAG can be accessed via the CD (Electronic Documentation Package) furnished with your system.



Supplemental Bay

- **Bulk DC Output Panel**

  The Bulk DC Output Panel provides landing points for connection of customer power leads.

- **Applications**

  The Vertiv™ NetSure™ 702NBDB Power Bay is capable of interfacing with Vertiv™ NetSure™ 801NL-B Distribution Bays (Spec. No. 582140001).

  The Vertiv™ NetSure™ 702NBDB Power Bay is capable of interfacing with Vortex® Power Systems (VPS).

  The Vertiv™ NetSure™ 702NBDB is capable of interfacing with legacy power systems.

  Refer to the wiring diagrams in the Installation Instructions (Section 6027). Refer also to Dual MCA Option Cable in the ACCESSORY DESCRIPTION section.

General Specifications

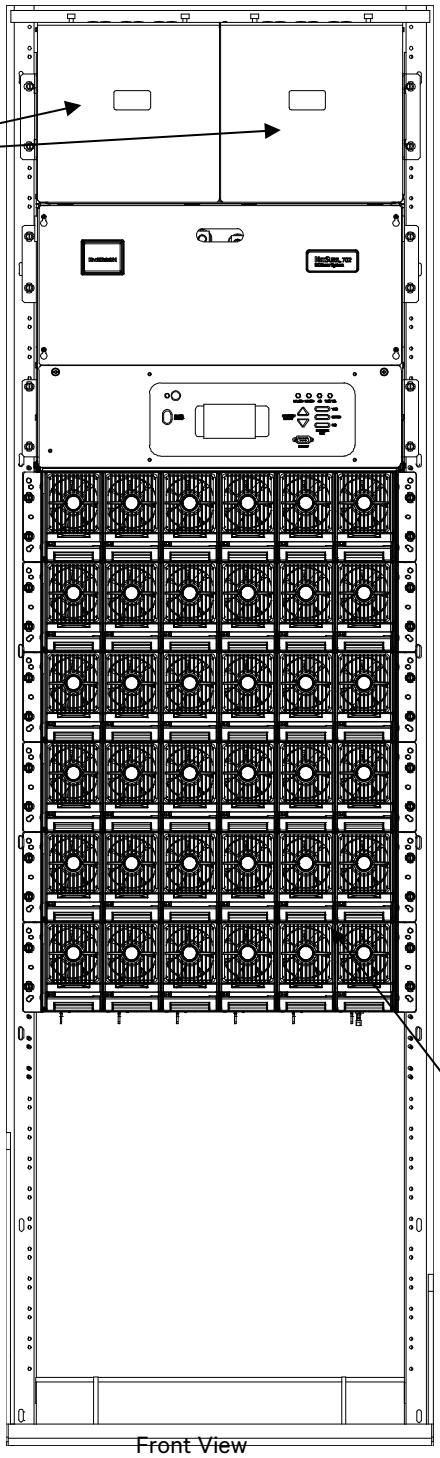
See detailed specifications on page 22.

Family:	Vertiv™ NetSure™
Spec. No.:	582126100
Model:	702NBDB
Power Bay Input Voltage	The power bay requires twelve (12) nominal 208/240 volts AC, three phase, 50/60 Hz, inputs. Each input supplies three (3) single-phase rectifier modules.
Rectifier Input Voltage	Nominal 208/240 volts AC, single phase, 50/60 Hz, with an operating range of 176 to 264 volts. Acceptable input frequency range is 45 to 65 Hz.
Output Voltage:	-48 Volts DC, adjustable
Output Capacity:	
System:	10,000 Amperes, maximum
Power Bay:	2,000 Amperes, maximum
Rectifier Module (PCU)	
1R483200 and 1R483200e:	55.2A @ -58VDC to 66.6A @ -48VDC
Agency Approval:	Listed UL 1950
Framework Type:	7’ x 23” Relay Rack, Seismic Zone 4
Mounting Width:	23 Inches, nominal
Mounting Depth:	17.50 Inches
Access:	Front Access for Installation, Operation, and Maintenance.
Supplemental Bay(s) Available:	Four (4)
Control:	Microprocessor
Color:	Bay and Rectifier Module Faceplates: Textured Gray (Spec. M500-147)
	Rectifier Shelf and Rectifier Modules Bodies: Bright Zinc Plating (Spec. M500-53)
Environment:	-40°C to +40°C (-40°F to +104°F)

TABLE OF CONTENTS

MAIN COMPONENTS ILLUSTRATIONS

582126100 Power Bay Diagram



List 11: Customized Main Power Bay

List 12: Supplemental Power Bay

List 13: Main Power Bay

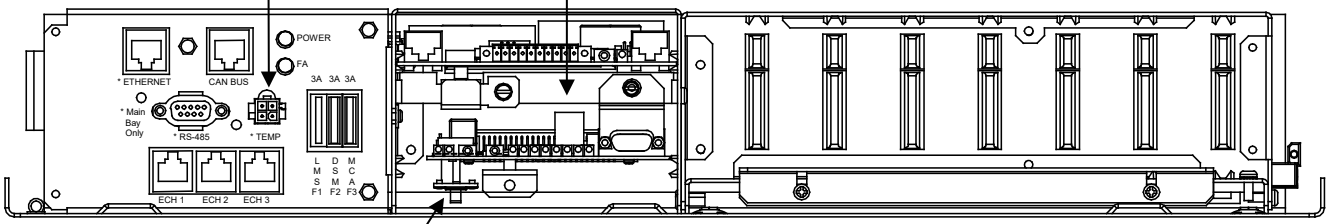
582126100 Power Bay Monitor and Control Diagram

P/O List 11: MCA/ROUTER Circuit Card (Main Power Bay)

P/O List 12: ROUTER Circuit Card (Supplemental Power Bay)

P/O List 13: MCA/ROUTER Circuit Card (Main Power Bay, Customizable)

Battery Charge Temperature Compensation Probe Connector



Front View

Available MCA Input/Output (I/O) Circuit Cards

MCA Customer Alarm Relay Circuit Card (Six [6] Form-C Contacts)

MCA Analog Input/Output and Binary Input Circuit Card

LMS Main CPU Circuit Card
(P/O List 11, Customized Main Power Bay),
(P/O List 13, Main Power Bay)
or
Optional LMS Expansion CPU Circuit Card (Supplemental Power Bay)

Refer to SAG586505000/SAG586505500 for additional LMS options.

LIST DESCRIPTIONS

List 11: Main Power Bay, Customized

Features

- Provides common equipment for one (1) Main Power Bay rated for up to 2000 amperes.
- Mounted in a 7'H x 23"W seismic rated (Zone 4) relay rack (P/N 543160).
- Provides six (6) 58870500003 Rectifier Module Mounting Shelves.
- Provides thirty-six (36) Rectifier Module mounting positions.
- Provides pre-wired top mounted AC input termination panels that accept twelve (12) three-phase AC input branch circuits, one (1) per three Rectifier Module mounting positions. AC input termination panels accept (12) 3/4" conduit fittings (six per side).
- Provides the MCA/Router Assembly and Local MCA Control Panel.
- Provides the LMS Main CPU circuit card equipped with dual MCA (586505500 List 78), WEB Interface (586505500 List 81), LMS Rectifier Sequencing (586505500 List 82), and SNMP Option (586505500 List 89).
- Provides a seven-slot card cage for mounting MCA customer alarm relay circuit cards, optional MCA I/O circuit cards, and/or optional LMS I/O circuit cards. The 582126100 List 11 Bay is factory equipped with one (1) LMS 4-input analog circuit card (586505500 List 20), two (2) LMS 8-input binary circuit cards (586505500 List 31), and three (3) LMS 4-output relay circuit cards (586505500 List 40).
- Provides the LMS Modem Assembly (586505500 List 70).
- Provides a digital temperature compensation probe, P/N 107021.
- Provides custom software configuration. Refer to drawing C58212610011 for detail.

Restrictions

Only one (1) Main Power Bay per power system required.

Ordering Notes

1) Order up to thirty-six (36) Rectifier Modules per bay, P/N 1R483200 or P/N 1R483200e, as described in the ACCESSORY DESCRIPTIONS section.
2) If desired, order a Rectifier Module Mounting Position Blank Cover Panel, P/N 21140440, for each empty rectifier module mounting position in the system, as described in the ACCESSORY DESCRIPTIONS section.
3) Order optional MCA customer alarm relay circuit card(s) as required, P/N 514348, as described in the ACCESSORY DESCRIPTIONS section.
4) Order optional MCA Analog Input/Output and Binary Input circuit card(s) as required, P/N 524550, as described in the ACCESSORY DESCRIPTIONS section.
5) Order LMS options as required, as described in the ACCESSORY DESCRIPTIONS section and per SAG586505000/SAG586505500.
6) Refer to DC Output Connections, AC Input Connections, and Relay Rack Frame Grounding Connections in the ACCESSORY DESCRIPTIONS section's "Wiring Notes" and "Wiring Illustrations" for wiring requirements.
7) If the system is to be connected to an existing Vortex system with an MCA, order a Dual MCA Option Cable as described in the ACCESSORY DESCRIPTION section.

List 12: Supplemental Power Bay

Features

- Provides common equipment for one (1) Supplemental Power Bay rated for up to 2000 amperes.
- Mounted in a 7'H x 23"W seismic rated (Zone 4) relay rack (P/N 543160).
- Provides six (6) 58870500003 Rectifier Module Mounting Shelves.
- Provides thirty-six (36) Rectifier Module mounting positions.
- Provides pre-wired top mounted AC input termination panels that accept twelve (12) three-phase AC input branch circuits, one (1) per three Rectifier Module mounting positions. AC input termination panels accept (12) 3/4" conduit fittings (six per side).
- Includes a Router Assembly for bay communication to the MCA in the Main Power Bay.
- Provides mounting for optional LMS Expansion CPU circuit card.
- Provides a seven-slot card cage for mounting MCA customer alarm relay circuit cards, optional MCA I/O circuit cards, and/or optional LMS I/O circuit cards.
- MCA Network bay interconnect cable provided (Qty. 1 P/N 524726).

Restrictions

The system supports up to four (4) Supplemental Power Bays.

Ordering Notes

1) Order up to thirty-six (36) Rectifier Modules per bay, P/N 1R483200 or P/N 1R483200e, as described in the ACCESSORY DESCRIPTIONS section.
2) If desired, order a Rectifier Module Mounting Position Blank Cover Panel, P/N 21140440, for each empty rectifier module mounting position in the system, as described in the ACCESSORY DESCRIPTIONS section.
3) Order optional MCA customer alarm relay circuit card(s) as required, P/N 514348, as described in the ACCESSORY DESCRIPTIONS section.
4) Order optional MCA Analog Input/Output and Binary Input circuit card(s) as required, P/N 524550, as described in the ACCESSORY DESCRIPTIONS section.
5) Order optional LMS Expansion CPU circuit card, P/N 506153, and LMS options as required, as described in the ACCESSORY DESCRIPTIONS section and per SAG586505000/SAG586505500. Also order additional LMS Network cables as required per Replacement/Additional LMS Network Cables.
6) Refer to DC Output Connections, AC Input Connections, and Relay Rack Frame Grounding Connections in the ACCESSORY DESCRIPTIONS section's "Wiring Notes" and "Wiring Illustrations" for wiring requirements.
7) If a different length LMS and/or MCA Network cable is required, order per Replacement/Additional LMS Network Cables and/or Replacement/Additional MCA Network Cables. Refer to the Installation Instructions (Section 6027) for Network cabling requirements.

List 13: Main Power Bay

Features

- Provides common equipment for one (1) Main Power Bay rated for up to 2000 amperes.
- Mounted in a 7'H x 23"W seismic rated (Zone 4) relay rack (P/N 543160).
- Provides six (6) 58870500003 Rectifier Module Mounting Shelves.
- Provides thirty-six (36) Rectifier Module mounting positions.
- Provides pre-wired top mounted AC input termination panels that accept twelve (12) three-phase AC input branch circuits, one (1) per three Rectifier Module mounting positions. AC input termination panels accept (12) 3/4" conduit fittings (six per side).
- Provides the MCA/Router Assembly and Local MCA Control Panel.
- Provides the LMS Main CPU circuit card equipped with WEB Interface (586505500 List 81), and SNMP Option (586505500 List 89).
- Provides a seven-slot card cage for mounting MCA customer alarm relay circuit cards, optional MCA I/O circuit cards, and/or optional LMS I/O circuit cards. The 582126100 List 13 Main Bay comes with (2) 514348 6-output Form C relay cards.

Restrictions

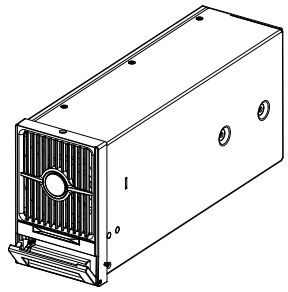
Only one (1) Main Power Bay per power system required.

Ordering Notes

1) Order up to thirty-six (36) Rectifier Modules per bay, P/N 1R483200 or P/N 1R483200e, as described in the ACCESSORY DESCRIPTIONS section.
2) If desired, order a Rectifier Module Mounting Position Blank Cover Panel, P/N 21140440, for each empty rectifier module mounting position in the system, as described in the ACCESSORY DESCRIPTIONS section.
3) Order optional MCA customer alarm relay circuit card(s) as required, P/N 514348, as described in the ACCESSORY DESCRIPTIONS section.
4) Order optional MCA Analog Input/Output and Binary Input circuit card(s) as required, P/N 524550, as described in the ACCESSORY DESCRIPTIONS section.
5) Order LMS options as required, as described in the ACCESSORY DESCRIPTIONS section and per SAG586505000/SAG586505500.
6) Order a Battery Charge Temperature Compensation Probe as required per Optional Battery Charge Temperature Compensation Probe in the ACCESSORY DESCRIPTIONS section.
7) Refer to DC Output Connections, AC Input Connections, and Relay Rack Frame Grounding Connections in the ACCESSORY DESCRIPTIONS section's "Wiring Notes" and "Wiring Illustrations" for wiring requirements.
8) If the system is to be connected to an existing Vortex system with an MCA, order a Dual MCA Option Cable as described in the ACCESSORY DESCRIPTION section. The system should also be equipped with the dual MCA software option (586505500 List 78).

ACCESSORY DESCRIPTIONS

Rectifier Module, High-Efficiency (P/N 1R483200E)



Features

- Model R48-3200e, Spec. No. 1R483200E, 3200 watt / 48 volt high-efficiency rectifier module.
- Refer to the rectifier User Instructions (UM1R483500E) for Rectifier Module specifications.

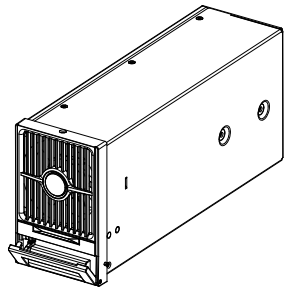
Restrictions

For use in Spec. No. 588705000 Rectifier Module Mounting Shelf(s).

Ordering Notes

1) Order as required. Each bay can be equipped with up to thirty-six (36) Rectifier Modules.

Rectifier Module (P/N 1R483200)



Features

- Model R48-3200, Spec. No. 1R483200, 3200 watt / 48 volt rectifier module.
- Refer to the rectifier User Instructions (UM1R483500E) for Rectifier Module specifications.

Restrictions

For use in Spec. No. 588705000 Rectifier Module Mounting Shelf(s).

Ordering Notes

1) Order as required. Each bay can be equipped with up to thirty-six (36) Rectifier Modules.

Rectifier Module Mounting Position Blank Cover Panel (P/N 21140440)

Features

- Covers one (1) unused Rectifier Module mounting position.

Ordering Notes

1) If desired, order a Rectifier Module Mounting Position Blank Cover Panel, P/N 21140440, for each empty rectifier module mounting position in the system.

Distribution Bays (P/N 58214000116)

Ordering Notes

- When DC Load Distribution is required, order Distribution Bay 58214000116. Refer to SAG582140001 for information.

Main Battery Termination Bars (MBTB's)

Ordering Notes

1) Plant is designed for centralized configuration with customer supplied Main Battery Termination Bars (MBTB's). Vertiv has standard MBTB'S in 4000, 6000, 10000, and 16000 ampere capacities. The ultimate plant capacity is determined by the capacity of the MBTB'S. Refer to the EA3434-41xx Series MBTB's drawings.

Optional Battery Charge Temperature Compensation Probe (P/Ns 107021 and 106824)

Note: *The P/N 107021 probe is factory provided with the 582126100 List 11 bay.*

Features

- This system can be used with a Battery Charge Temperature Compensation Probe. This probe must be mounted near the battery to sense battery ambient temperature. The probe connects to and allows the MCA to automatically increase or decrease the output voltage of the system to maintain battery float current as battery ambient temperature decreases or increases, respectively. Battery life can be extended when an optimum charge voltage to the battery with respect to temperature is maintained. See "Overall Dimensions - Optional Digital Battery Charge Temperature Compensation Probes P/N 107021 and P/N 106824" under PHYSICAL SIZE INFORMATION for a dimensional drawing.
- Allows Rectifier Module Battery Charge Temperature Compensation.
- Temperature Curve: Refer to Figure 1.

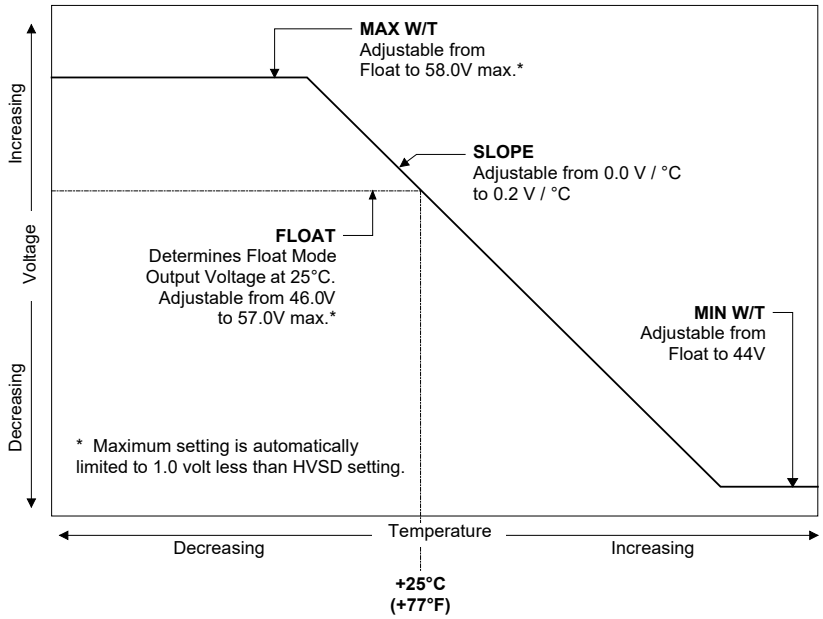


Figure 1
Typical Float Charge Thermal Characteristics
Using Optional Battery Charge Digital Temperature Compensation Probe
(Indicated parameters are user-adjustable via the associated MCA.)

Ordering Notes

1) Order one Battery Charge Temperature Compensation Probe per power system, as required. Two probes are available. P/N 107021 has a 25-foot long cord and P/N 106824 has a 100 foot-long cord.

Optional LMS Expansion CPU Circuit Card (Supplemental Power Bays) (P/N 506153)

Features

- Allows LMS I/O cards to be installed in Supplemental Power Bays.

Restrictions

The LMS Monitoring System Expansion CPU circuit cards are mounted in Supplemental Power Bays (required only if LMS I/O circuit cards are to be installed in the same bay).

Ordering Notes

1) Order the LMS Expansion CPU circuit card for Supplemental Power Bays that are to be equipped with LMS I/O circuit cards, P/N 506153.
2) Also order an LMS Network cable P/N 514640 per Replacement/Additional LMS Network Cables.

Optional MCA Six (6) Output Form-C Relay Circuit Card (P/N 514348)

Features

- Provides six relays each with one set of Form-C relay contacts.
- These relays are used for alarm applications and can be programmed by the user.
- Refer to the "Specifications" section of this document for further information.
- Plugs into any slot in 7-position card cage in Main and Supplemental Power Bays.
- User maps relay to any or multiple programmable alarm functions.

Restrictions

Relay contacts rated for 2A at 30 volts DC.

The system may contain up to sixteen (16) MCA Relay circuit cards.

Ordering Notes

1) Order one (1) MCA Relay Circuit Card P/N 514348 for every six (6) sets of Form-C relay contacts to be provided by the MCA for customer external alarms.

Optional MCA Analog Input/Output and Binary Input Circuit Card (P/N 524550)

Features

- Provides 1 analog input, 1 analog output (for remote plant output current monitoring), and 4 binary inputs.
- Refer to the "Specifications" section of this document for further information.
- Plugs into any slot in 7-position card cage in Main and Supplemental Power Bays.

Restrictions

The system may contain up to sixteen (16) MCA I/O circuit cards.

Only one (1) P/N 524550 card can be installed per bay.

Analog input and output rating = 0-50mv DC.

Binary input rating = dry contact.

Analog inputs should be protected by a 49.9 ohm resistor.

Recommended to use current limiting resistors to protect binary input wiring.

Ordering Notes

1) Order optional MCA Analog Input/Output and Binary Input Circuit Card P/N 524550 as required.

LMS Options

Features

- The LMS provides software options and I/O cards.

Restrictions

Note that the LMS WEB Interface (586505500 List 81), LMS Rectifier Sequencing (586505500 List 82), and SNMP Option (586505500 List 89) are factory provided with List 11. 586505500 List 81 and List 89 are provided with List 13.

Ordering Notes

1) Refer to SAG586505000/SAG586505500 for ordering.

Replacement/Additional MCA Network Cable

Features

- MCA bay-to-bay interconnect cable. Connects between bay expansion ports located on the bay's MCA/Router (Main Power Bay) and Router (Supplemental Power Bays) circuit cards.
- Cable identification color is **yellow**.

Restrictions

Maximum combined cable length must not exceed 125 feet.

Ordering Notes

1) For a replacement or additional cable, order the proper length cable from those listed below.

   P/N 524726 (15 feet) (factory provided with List 12)
   P/N 514645 (25 feet)
   P/N 514646 (50 feet)
   P/N 514647 (100 feet)

Replacement/Additional LMS Network Cable

Features

- LMS bay-to-bay interconnect cable. Connects between the bay's LMS Echelon expansion ports. Also connects the LMS System to LMS Expansion Cabinets and Assemblies, if furnished.
- Cable identification color is **blue**.

Restrictions

Refer to SAG586505000/SAG586505500 (LMS System Application Guide) for maximum LMS network cabling length.

Ordering Notes

1) For a replacement or additional cable, order the proper length cable from those listed below.

   P/N 514640 (25 feet) (required when LMS Expansion CPU Card installed in Supplemental Power Bay)
   P/N 514641(150 feet)

Dual MCA Option Cable

Features

- This system can be connected to systems with an existing MCA as described in the Installation Instructions (Section 6027) and also the LMS documentation.

Restrictions

Connections to systems with an existing MCA require that the LMS Dual MCA Software Option be installed. Refer to SAG586505000/SAG586505500.

Ordering Notes

1) To connect the two MCAs (via the LMS), order a proper length Dual MCA Option Cable from those listed below.

   P/N 526842 (25 feet)
   P/N 526843 (50 feet)

2) The existing Vortex system MCA must be equipped with the RS485 option, or the LMS1000 in the Vortex system must be equipped with the expansion CPU option. Refer to the Vortex and/or LMS1000 system documentation for information.

Replacement Control Fuses

Features

- Control fuses are located on the fuseblock mounted in the 'Monitor and Control' section of the bay. These fuses are not available for customer connected loads.

Ordering Notes

1) Order replacement fuses as required per the following table.

Desig.	Function	Size (Amperes)	Type	Part No.
F1	LMS CPU Circuit Card Input Power	3	SAN-O AX-1	248609200
F2	--	--	--	--
F3	MCA/Router Circuit Card Input Power	3	SAN-O AX-1	248609200
--	Safety Fuse Cover	--	SAN-O SAX-1	248898600

Table 1
Replaceable Control Fuses

Replacement Components

Ordering Notes

1) Refer to the following table.

Item	Part Number
Rectifier Module	1R483200
eSure Rectifier Module, High-Efficiency	1R483200e
MCA/Router Circuit Card (Main Power Bay)	509478
Router Circuit Card (Supplemental Power Bay)	509509
LMS Primary CPU Circuit Card (Main Power Bay)	545558
LMS Expansion CPU Circuit Card (Supplemental Power Bay)	506153
MCA Customer Alarm Relay Circuit Card	514348
MCA Analog Input/Output and Binary Input Circuit Card	524550
Temperature Probes	107021 (25') 106824 (100')

Table 2
Replaceable Components

Wiring Notes

Refer also to the next section, Wiring Illustrations.

DC Output Connections

Features

- 3/8-16 captive fasteners on 1" centers are provided for installation of customer provided DC output cables terminated in two-hole lugs. These are accessed from the front of each Power Bay.
- Refer to DC Output Connections under WIRING ILLUSTRATIONS for a diagram.

Restrictions

DC output cable size varies depending on power requirements, therefore no specific information is provided for cable size. Refer to the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NPFA) National Electrical Code (NEC), applicable local codes, and your specific site requirements.

All lugs for customer connections must be ordered separately.

Customer needs to supply lug mounting bolts and hardware.

Maximum size of wire to be connected to a single lug position is 750 kcmil.

Maximum lug width is 1.88 inches.

AC Input Connections

Features

- Pre-wired top mounted AC input termination panels are provided that accept twelve (12) three-phase AC input branch circuits, one (1) per three Rectifier Module mounting positions. The AC input termination panels accepts (12) 3/4" conduit fittings (six per side).
- Refer to AC Input Connections under WIRING ILLUSTRATIONS for a diagram.

Restrictions

Each power bay requires twelve (12) nominal 208/240 volts AC, three phase, 50/60 Hz, inputs. Each input supplies three (3) single-phase rectifier modules.

Ordering Notes

1) Refer to the following table for recommended wire sizes and branch circuit protection.

AC INPUT (to Top Mount AC Input Termination Panels) Connection Points for Two 3-Phase AC Input Feeds per Shelf are Provided				
Operating Ambient Temperature (1)	**Recm Branch Circuit Protection (2, 3)**	**Recm 90°C Wire Size (1)**	**AC Input Terminals**	
			Capacity	**Type**
30°C	40 Amperes, 3-Pole	8 AWG	6 to 14 AWG	Screw Clamp
40°C				
AC INPUT GROUND (to Top Mount AC Input Termination Panels) A Ground Bar is Provided in each AC Input Termination Panel				
Operating Ambient Temperature (1)	**Recm 90°C Wire Size (5)**		**Ground Bar Terminals (4)**	
			Capacity	**Type**
30°C	10 AWG		10 to 14 AWG	Screw Clamp
40°C				

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 310-16 for copper wire at **90°C** conductor temperature, operating in ambients of **30°C** and **40°C** was used. For operation in other ambients, apply derating factors listed in Table 310-16 of the NEC. For operation in countries where the NEC is not recognized, follow applicable codes.

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

3 Recommendations based on Nominal Line Full Load Input Current of 29.3 Amperes.

4 Equipment grounding conductors must be provided with the AC input conductors supplied to the panel. Frame ground terminals must be connected to earth ground, not power system neutral.

5 Equipment grounding conductor size based on recommendations of the NEC Table 250-122 for copper wire. If aluminum or copper clad aluminum grounding conductor is used, refer to Table 250-122 for increased conductor size. For operation in countries where the NEC is not recognized, follow applicable codes.

Table 3
Recommended AC Input Branch Circuit Protection and Wire Size

Relay Rack Frame Grounding Connections

Features

- At the top of the relay rack is a set of 1/4” clearance holes on 5/8" centers for installation of a customer grounding lead terminated in a two-hole lug.
- Refer to Relay Rack Frame Grounding Connections under WIRING ILLUSTRATIONS for a diagram.

Restrictions

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

All lugs for customer connections must be ordered separately.

Customer needs to supply lug mounting bolts and hardware.

External Alarm, Reference, and Control Connections

Features

- External Alarm, Reference, and Control connections are made to TB1 on the MCA circuit card and TB1 on the MCA Customer Alarm Relay circuit cards.
- External Alarm, Reference, and Control connections are also made to the optional LMS I/O circuit cards installed in the system.
- Refer to External Alarm, Reference, and Control Connections under WIRING ILLUSTRATIONS for a diagram.

Restrictions

Refer to the system’s Installation Instructions (Section 6027) for MCA circuit card and MCA Customer Alarm Relay Circuit Card connection details.

Refer to the LMS Installation Instructions (Section 5879) or the separate LMS I/O circuit card instructions (Section 5944) for LMS I/O circuit card connection details.

Ordering Notes

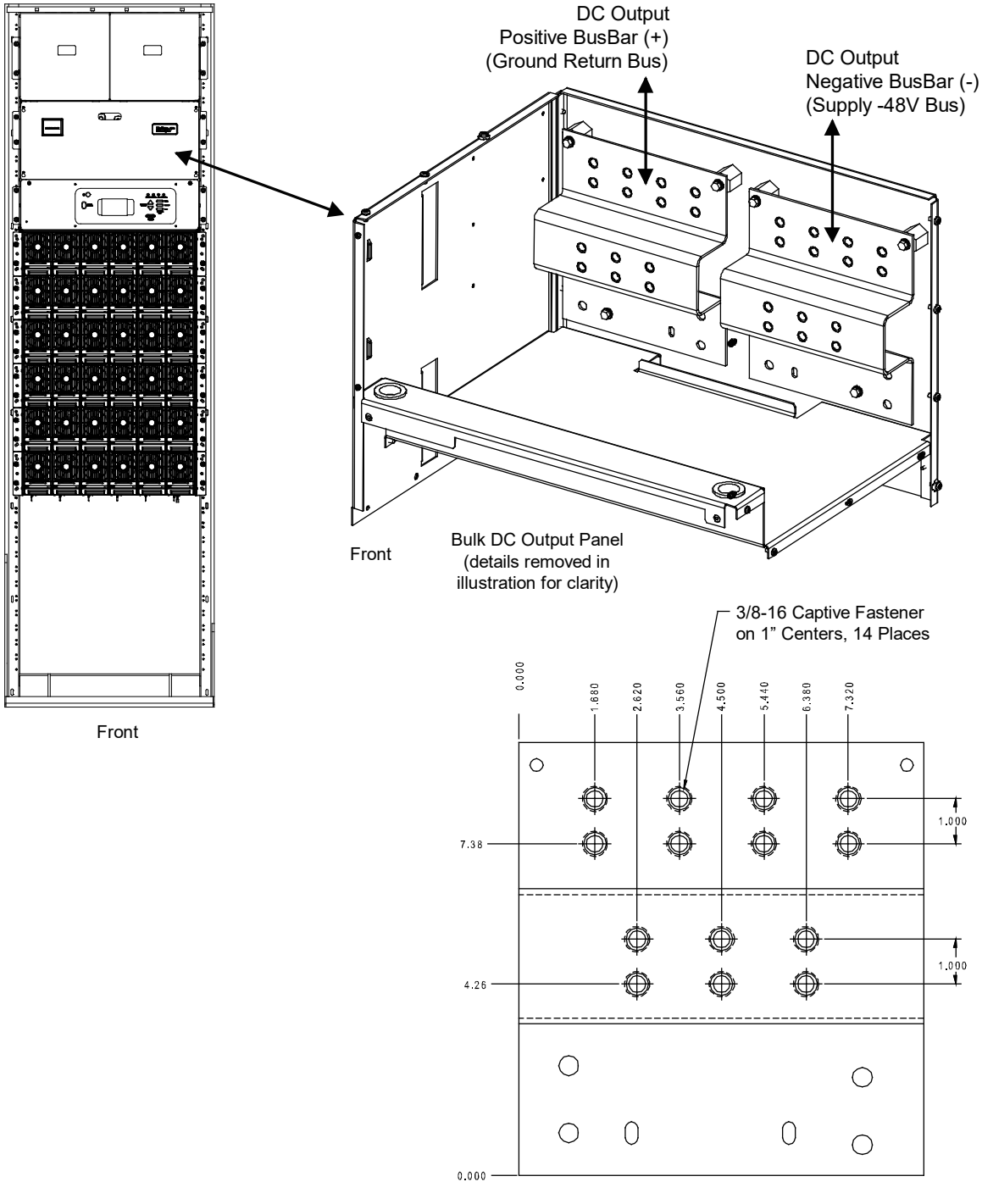
1) Refer to the following table for recommended wire sizes.

Terminals		Recm Wire Size
Capacity	Type	
28 to 16 AWG	Screw Clamp	22 AWG for Loop Lengths Up to 200 ft. 18-20 AWG for Loop Lengths Over 200 ft.

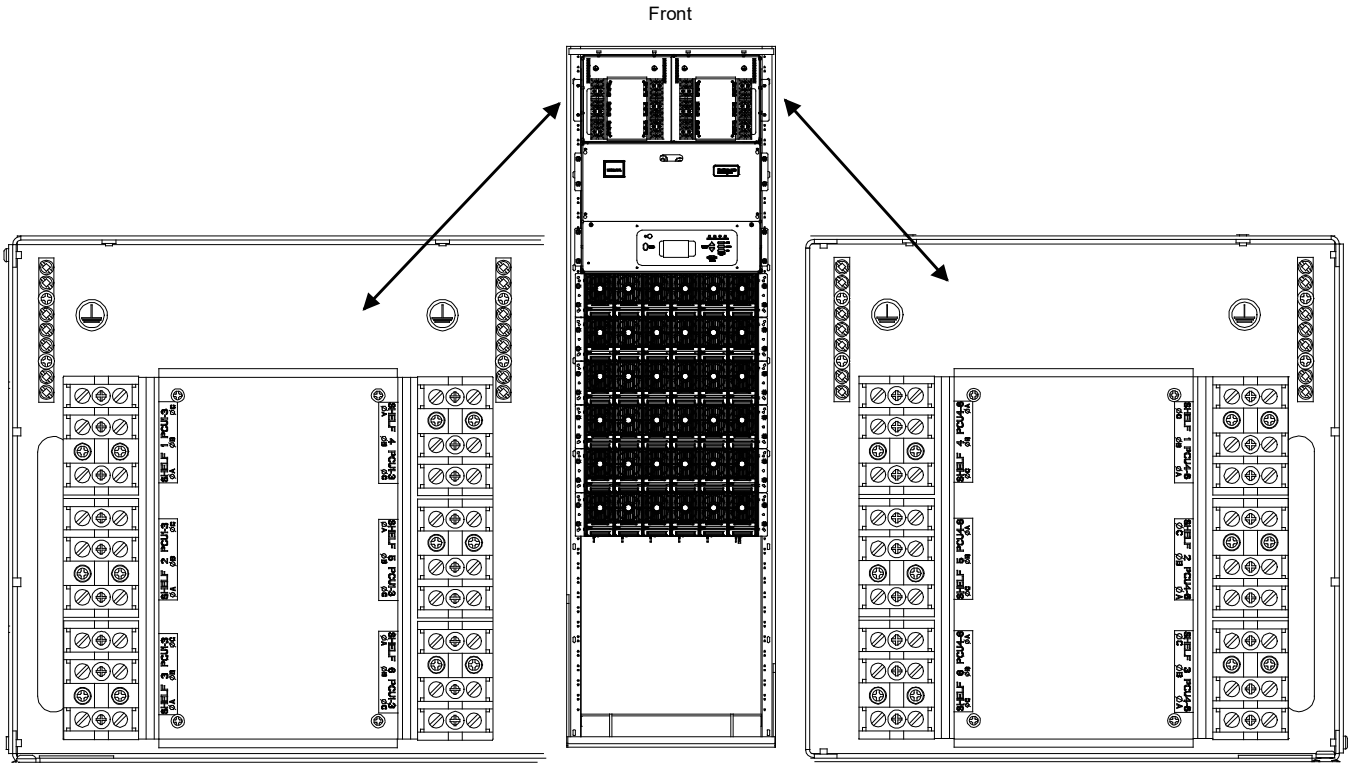
Table 4
Recommended Alarm, Reference, and Control Wire Size
(TB1 on MCA Circuit Card)
(TB1 on MCA Customer Alarm Relay Circuit Card)

Wiring Illustrations

DC Output Connections



AC Input Connections

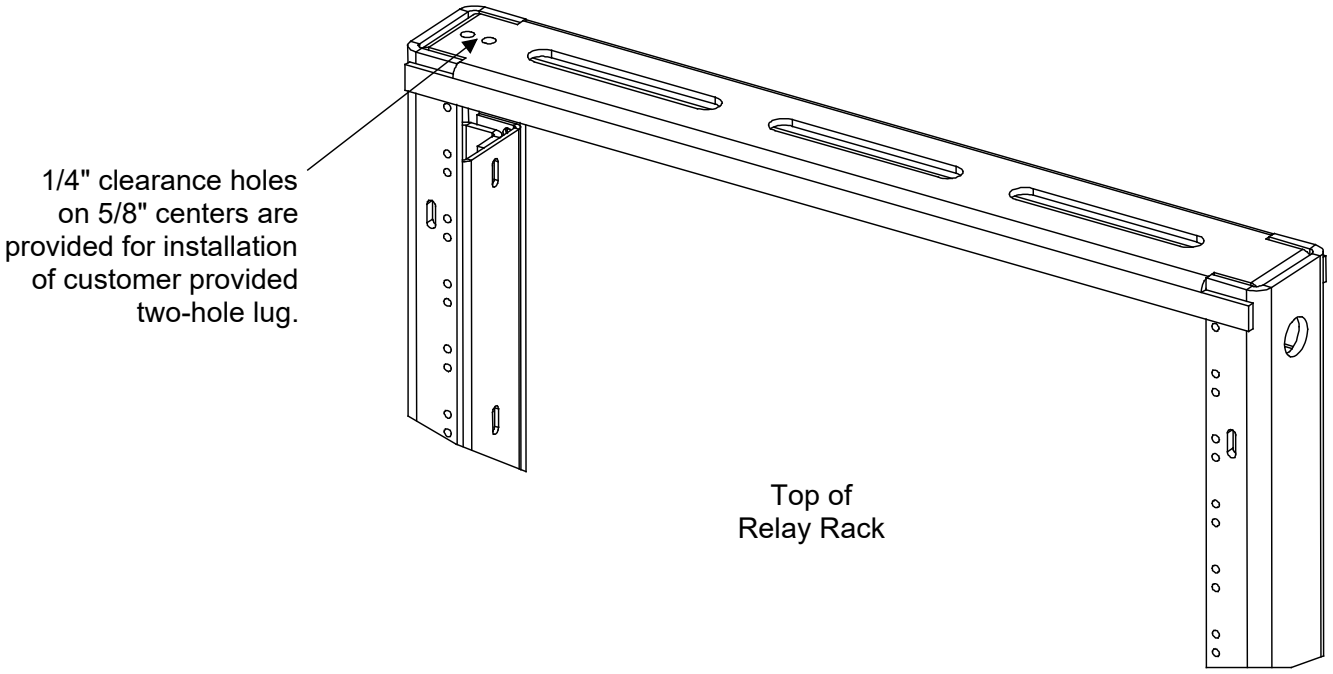


Cover removed in illustration for clarity

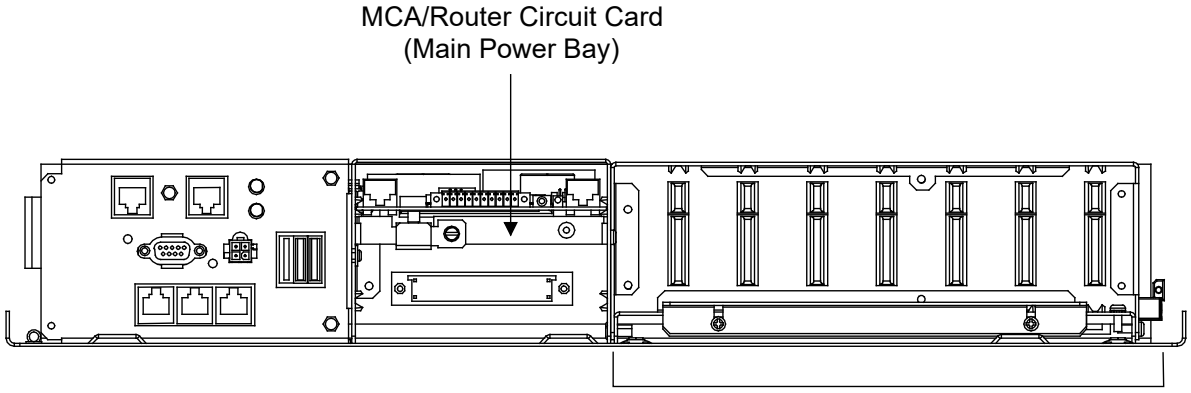
Rectifier Shelves are Numbered from 1 to 6, from Top to Bottom.

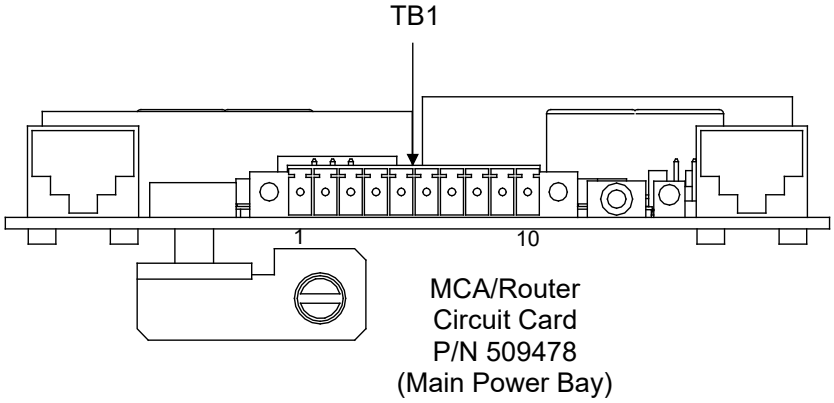
Rectifier Slots are numbered from 1 to 6, from left to right as viewed from the front. The rectifier slot position numbers are not related to the rectifier identification numbers provided by the MCA.

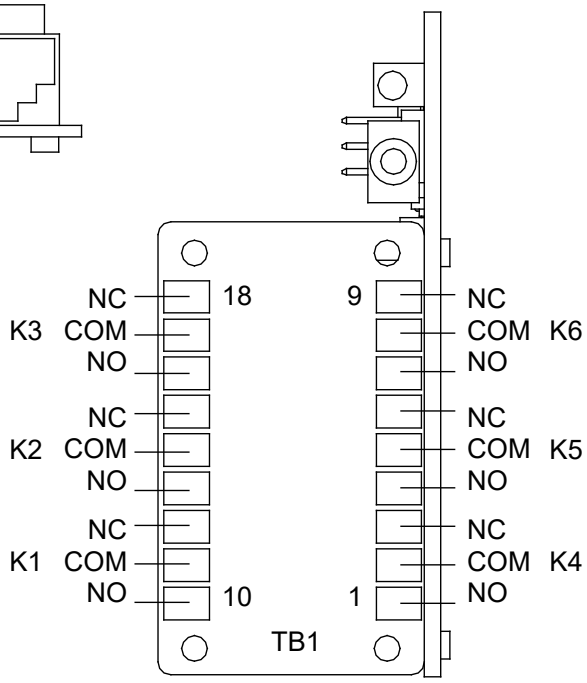
Relay Rack Frame Grounding Connections



External Alarm, Reference, and Control Connections







MCA Customer Alarm
Relay Circuit Card P/N 514348
(Main and/or Supplemental Power Bays)

SPECIFICATIONS

Note: *For Rectifier Shelf specifications, refer to PD588705000.*
For Rectifier Module specifications, refer to UM1R483500E (Rectifier User Instructions).
For LMS Monitoring System specifications, refer to SAG586505000/SAG586505500.

1. SYSTEM
   - 1.1 Environmental Ratings
     - 1.1.1 Operating Ambient Temperature Range: -40°C to +40°C (-40°F to +104°F).
     - 1.1.2 Storage Ambient Temperature Range: -40°C to +85°C (-40°F to +185°F).
     - 1.1.3 Humidity: This Power System is capable of operating in an ambient relative humidity range of 0% to 95%, non-condensing.
     - 1.1.4 Altitude: See PD588705000.
     - 1.1.5 Mounting: This equipment is intended only for installation in a Restricted Access Location on or above a non-combustible surface. Clearance requirements are:
       - (A) Recommended minimum aisle space clearance for the front of the relay rack is 2' 6".
       - (B) Recommended minimum aisle space clearance for the rear of the relay rack is that which is specified for proper Rectifier Mounting Shelf ventilation. Refer to Rectifier Mounting Shelf Power Data Sheet PD588705000 for ventilation spacing requirements.

         Note: *Minimum spacing specified for ventilation may not permit replacement of certain components such as busbars or Rectifier Mounting Shelves.*
     - 1.1.6 Heat Dissipation: 402.6 watts per square foot / foot. Special equipment room cooling may be required.
   - 1.2 Compliance Information
     - (A) Safety Compliance: This unit meets the requirements of UL 60950, Standard for Information Technology Equipment, and is UL Listed as a power supply for use in Telephone, Electronic Data Processing or Information Processing Equipment.
   - 1.3 Local Controls and Indicators
     - 1.3.1 MCA Component Identification Indicator: Each MCA component (i.e. Bay Router Circuit Card, MCA Relay Circuit Card) contains an ID LED Indicator. The ID indicator illuminates Green when the component is OK, Red when the component has failed, and flashing yellow when the component is identified by the MCA.
     - 1.3.2 See also 'Local Status and Alarm Indicators' in the MCA section of this document.
     - 1.3.3 Refer to the "Operating Procedures" chapter in the Power System User Instructions (Section 6028) for a complete description of the Controls and Indicators.
2. MCA
   - 2.1 Standard Features
     - 2.1.1 MCA Interface: A User can access the MCA locally via the MCA Control Panel located on the outside of the Main Power Bay.

       A User can also access the MCA via the LMS.

       Note: *Option switches are provided to lockout changing adjustment/configuration/calibration settings via the MCA control panel and/or via the LMS.*
     - 2.1.2 Float Charging Output Mode: In this mode of operation, system output voltage is constant and output current does not exceed the current limit setting. During normal operation, the battery is not required to furnish load current and remains in a fully charged condition.

       Note: *If the current demanded by the load exceeds the current limit setting of the system, the battery is required to furnish the difference in load current and begins discharging.*

       Note: *If the system is used with a digital battery charge temperature compensation probe or TXM, the MCA automatically adjusts system output. This ensures proper voltage to the battery as battery ambient temperature fluctuates.*
     - 2.1.3 Test/Equalize Charging Output Mode: This mode of operation is used if higher output voltage is required for equalizing the charge on all battery cells of a conventional flooded cell battery, or for recharging the battery following a commercial power failure.

       If the installation site does not require system equalize mode of operation, the equalize feature can be used as a test feature. System equalize voltage can be adjusted to a test voltage value. Placing the system into the test/equalize mode causes system output voltage to increase or decrease to this test voltage value.

Note: *If the system is used with a battery charge digital temperature compensation probe or TXM, typical equalize mode of operation is not used.*

2.1.4 Output Mode of Operation Selection: There are four methods of placing the system from the float mode to the test/equalize mode.

(A) Method 1 (Manual Test/Equalize): A user manually places the system into the test/equalize mode via the MCA interface. A user must manually return the system to the float mode via the MCA interface.

(B) Method 2 (Manually Initiated Timed Test/Equalize): A user manually places the system into the test/equalize mode via the MCA interface. The system automatically returns to the float mode after a preset programmable time period (1-99 hours, in increments of one hour).

(C) Method 3 (Automatic Test/Equalize):

THE AUTOMATIC EQUALIZE FEATURE IS INTENDED FOR USE ONLY WITH WET CELL BATTERIES. USING THIS FEATURE WITH VALVE REGULATED BATTERIES IS NOT RECOMMENDED.

This feature can be enabled or disabled by a user via the MCA. The default state is disabled.

The Automatic Equalize feature is a time based function that is controlled by a customer selectable multiplier and by the Battery On Discharge (BOD) alarm setpoint. The MCA's default setting is for a multiplier of zero, which disables the Automatic Equalize feature.

When the Automatic Equalize feature is enabled, if system voltage drops to less than the BOD alarm setpoint, the MCA initiates a timing cycle to measure the discharge time period. The MCA requires at least 15 minutes of continuous BOD alarm in order to prevent nuisance equalization cycles. When system voltage rises to above the BOD alarm setpoint, the MCA ends the discharge timing cycle and (assuming a minimum of 15 minutes has elapsed) places the Rectifier Modules into the equalize mode for a customer selectable multiple of the discharge time period (the discharge time period includes the initial 15 minutes).

The equalize time period can be set for 0 to 15 times the discharge time period, up to a maximum of 300 hours. A zero (0) setting disables the feature.

(D) Method 4 (External Test/Equalize): A user (or external equipment) places the system into the test/equalize mode by applying an external signal to the system. The system returns to the float mode when the external signal is removed. This method overrides the other three methods.

2.1.5 MCA Local Display: Provides digital metering of system load voltage and current, individual Rectifier Module output, and individual load shunts. Also displays system alarm messages and adjustment information, as detailed in Paragraph 2.1.13 (*MCA Display*).

2.1.6 MCA Meter Accuracy: ±0.01 V, ±0.005% / °C

2.1.7 MCA Remote Sense Maximum Voltage Drop Compensation: The maximum voltage drop that the Remote Sense can compensate is 400mV for 48V systems and 200mV for 24V systems.

2.1.8 MCA Universal Adjustment Circuit: Provides single point control of float output voltage, test/equalize output voltage, high voltage shutdown, and current limit adjustments.

Note: *If the MCA should fail, the Rectifier Modules remember the float and high voltage shutdown settings last delivered by the MCA. The current limit setting of each Rectifier Module goes to 66 amperes.*

Provides adjustments for all MCA alarm and control circuits. Adjustment ranges and factory settings as follows.

All adjustments can be performed locally via the MCA Control Panel, and most can be performed remotely via the LMS.

(A) Rectifier Module Output Voltage

(1) Without Battery Charge Temperature Compensation: Float voltage is adjustable from 47.00 to 58.00 volts DC. Test/equalize voltage is adjustable from 44.00 to 58.00 volts DC. The output voltage temperature coefficient does not exceed 0.01% per degree centigrade from -40°C to +65°C. Float voltage is factory set at 52.80 volts, unless otherwise specified. Equalize voltage is factory set at 53.50 volts, unless otherwise specified.

(2) With Battery Charge Digital Temperature Compensation Probe: With an optional battery charge digital temperature compensation probe installed, the MCA automatically increases or decreases the output voltage as battery ambient temperature decreases or increases, respectively. The float and test/equalize voltage range is the same as without battery charge digital temperature compensation. Float voltage is factory set at 52.80 volts, at 25°C battery ambient.

Using battery and equipment manufacturers' recommendations, the user selects the following temperature compensation curve parameters via the MCA. Refer to the Temperature Compensation Probe Curve provided in Figure 1.

a) The temperature compensation slope in volts/°C. Adjustable from zero to 200 millivolts/°C. Factory set at 0V/°C (DIGITAL TC OFF).

b) The maximum voltage limit in volts DC. Adjustable from float up to 58.00 volts DC, but automatically limited to 1.0 volt below the High Voltage Shutdown setting. Factory set at 56.50 volts.

c) The minimum voltage limit in volts DC. Adjustable from float down to 44.00 volts DC, but automatically limited to 1.0 volt above the Low Voltage Disconnect Reconnect setting. Factory set at 52.00 volts.

(B) Rectifier Module Current Limit: Adjustable from 10% to 121% of total system rated capacity at maximum rated output voltage. Factory set at 100% of rated capacity, unless otherwise specified.

The MCA automatically adjusts the current limit circuit on each Rectifier Module so that this value is not exceeded. If a Rectifier Module fails, the MCA automatically resets each remaining Rectifier Module's current limit point to maintain this value. The MCA also insures that the current limit circuit on any Rectifier Module is not set above 121% of its capacity. The default current limit setting is the sum of each installed Rectifier Modules output rating. If an additional Rectifier Module is added to the system, the system current limit is automatically increased by the rating of the new Rectifier Module and the new current limit value is displayed.

(C) Rectifier Module High Voltage Shutdown: Adjustable from 48.00 to 59.00 volts DC. Factory set at 56.00 volts, unless otherwise specified.

(D) System High Voltage #1 Alarm: Adjustable from 48.00 to 59.00 volts DC. Factory set at 53.30 volts, unless otherwise specified.

(E) System High Voltage #2 Alarm: Adjustable from 48.00 to 59.00 volts DC. Factory set at 54.00 volts, unless otherwise specified.

(F) Battery On Discharge Alarm: Adjustable from 40.00 to 56.00 volts DC. Factory set at 52.00 volts, unless otherwise specified.

(G) Very Low Voltage Alarm: Adjustable from 40.00 to 56.00 volts DC. Factory set at 47.00 volts, unless otherwise specified.

(H) Total Load Current Alarm: Adjustable from 0 to 60000 amperes. Factory set at 2000 amperes, unless otherwise specified.

(I) Distribution Group A Load Alarm: Adjustable from 0 to 60000 amperes. Factory set at 2000 amperes, unless otherwise specified.

(J) Distribution Group B Load Alarm: Adjustable from 0 to 60000 amperes. Factory set at 2000 amperes, unless otherwise specified.

(K) High Battery Ambient Temperature #1 Alarm (if battery charge digital temperature compensation probe installed): Adjustable from -50°C to +99°C. You disable the feature by selecting the setting above +99°C. Factory set to 40°C, unless otherwise specified.

(L) High Battery Ambient Temperature #2 Alarm (if battery charge digital temperature compensation probe installed): Adjustable from -50°C to +99°C. You disable the feature by selecting the setting above +99°C. Factory set to off, unless otherwise specified.

(M) Low Battery Ambient Temperature #1 Alarm (if battery charge digital temperature compensation probe installed): Adjustable from -49°C to +100°C. You disable the feature by selecting the setting below -49°C. Factory set to off, unless otherwise specified.

(N) Low Battery Ambient Temperature #2 Alarm (if battery charge digital temperature compensation probe installed): Adjustable from -49°C to +100°C. You disable the feature by selecting the setting below -49°C. Factory set to off, unless otherwise specified.

(O) Audible Alarm Cutoff Reset Feature: Adjustable from 0 to 15 minutes, in one minute intervals. A zero setting disables the feature. Factory set to off (disabled), unless otherwise specified.

(P) Rectifier Module Sequencing: The time delay between turning individual Rectifier Modules on is adjustable from 1 to 20 seconds, or feature disabled. The Rectifier Module Sequencing feature is factory set to 15 seconds.

(Q) Timed Test/Equalize Period (also enables/disables the manually initiated timed test/equalize feature): Adjustable from 1 to 99 hours, in one hour intervals. When a value is set, the feature is enabled. You disable the feature by selecting the setting above 99. Factory set at 1 (one) hour, unless otherwise specified.

(R) Automatic Test/Equalize Period (also enables/disables the automatic test/equalize feature): Adjustable from 0 to 15 times the discharge time period, up to a maximum of 300 hours. A zero (0) setting disables the feature. Factory set at zero (0), unless otherwise specified.

(S) Relay Test Seconds: Adjustable from 5 to 120 seconds, in one second intervals. Factory set at 45 seconds, unless otherwise specified.

2.1.9 MCA Audible Alarm and Audible Alarm Cutoff: The MCA contains an Audible Alarm, which is located on the MCA Control Panel. The audible alarm sounds when any alarm condition monitored by the MCA occurs. The alarm can be manually silenced (cutoff) by pressing a local pushbutton. A local indicator illuminates when the audible alarm has been cutoff. The alarm remains silenced for the current alarm condition only. If another alarm condition occurs, the audible alarm again sounds.

A programmable audible alarm cutoff reset feature is provided. Once an audible alarm has been cutoff, it automatically resets (and sounds if the alarm condition is still present) after the time period programmed expires. If another alarm condition occurs, the audible alarm again sounds.

2.1.10 Load Sharing: Digital active load sharing circuitry in each Rectifier Module balances the load proportionately among all rectifiers in a bay. The MCA provides a load sharing feature that automatically balances the load among multiple bays.

2.1.11 MCA Load Share Alarm: If Rectifier Modules fail to share the load the MCA turns on a Load Share Alarm. This alarm can be enabled or disabled by the customer. The factory default setting is to have the MCA Load Share Alarm 'enabled'.

2.1.12 Remote On/Off (TR): The operation of any or all Rectifier Modules can be inhibited (TR) via the MCA Control Panel or from the LMS. A Rectifier Module fail alarm is NOT issued.

2.1.13 MCA Alarm Logging: The MCA logs (with a date/time stamp) up to 500 recordable events.

2.1.14 Rectifier Module Sequencing: The MCA can be set to provide Rectifier Module Sequencing. When the MCA senses an “AC Power is OFF to All Rectifier Modules” alarm, it turns off all Rectifier Modules. When the “AC Power is OFF to All Rectifier Modules” alarm clears, the MCA turns on Rectifier Module #1, then turns on the other Rectifier Modules starting with Rectifier Module #2 every *n* seconds (*n* is user programmable from 1 to 20 seconds). If the MCA fails or the communication link is broken during a Rectifier Module Sequencing routine, all Rectifier Modules turn on immediately.

2.1.15 MCA Power Share Feature: The MCA Power Share feature allows you to connect the Spec. No. 582126100 Power System to an existing DC power system instead of extending or completely replacing the existing power system. The MCA Power Share feature provides for the sharing of the total load in a controlled manner. When Power Share is programmed, the MCA in the 582126100 Power System adjusts PCU output voltage per load demands to ensure proper sharing between the two systems. For further information, request Application Note AN38.

2.1.16 MCA Alternate Current Limit Feature: The MCA Alternate Current Limit feature provides a means to limit the output current of all rectifiers based on the state of an external signal. The rectifiers output current is limited to a percentage of rectifier output capacity as configured by the user. A binary input on an installed MCA I/O circuit card is used to monitor the external signal that triggers the current limiting action.

2.1.17 Local Controls: Refer to the "Operating Procedures" chapter in the Power System User Instructions (Section 6028) for a complete description.

Location	NAME / Description	Type
MCA Control Panel	Function Select Up	Pushbutton Switch
	Function Select Down	Pushbutton Switch
	Function Set Enter / Move Left / Move Right	Pushbutton Switch
	Function Set Yes / + / i	Pushbutton Switch
	Function Set No / -	Pushbutton Switch
	Alarm Cutoff	Pushbutton Switch

2.1.18 Local Status and Alarm Indicators: Refer to the "Operating Procedures" chapter in the Power System User Instructions (Section 6028) for a complete description.

Location	NAME / Description	Type
MCA Control Panel	Message Display, Shows... • Active Alarms or "SYSTEM OK" • Various Measurement Items and Values • Various Inventory Items • Various Adjustment Items and Values • Various Operation Items • Various Configuration Items and Settings See Paragraph 2.1.13 "*MCA Display*".	---
	Alarm Cutoff	LED - yellow
	Major	LED - flashing red
	Minor	LED - red
	AC	LED - green/red
	Test/EQ	LED - yellow

2.1.19 MCA Numbering Scheme: The MCA identifies (numbers) the components of the system as follows.

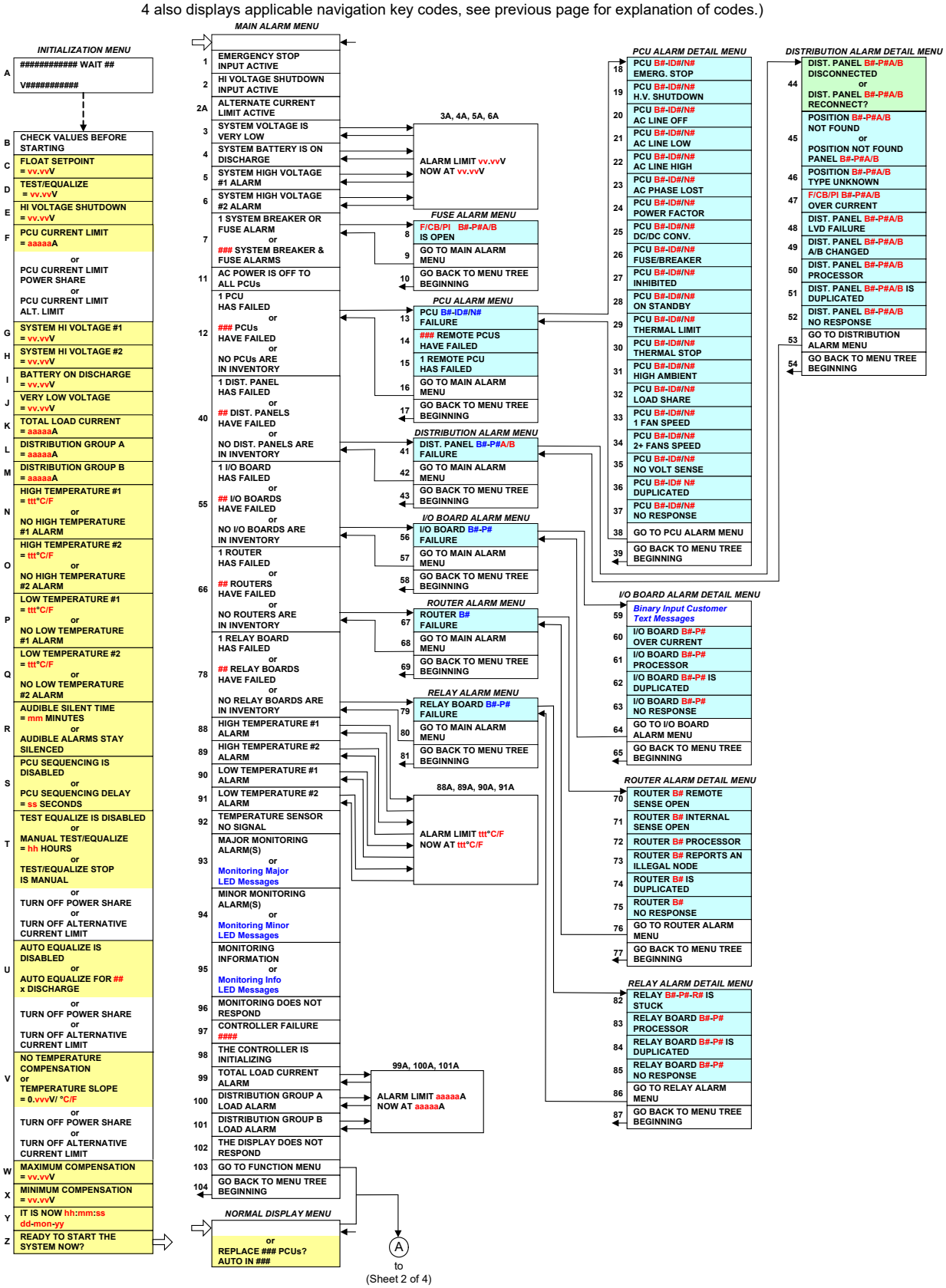
COMPONENT	MCA IDENTIFICATION NUMBER		
	MCA NUMBERING SCHEME (note that each line shown below is separated with a dash in the MCA display)	**NOTES**	**EXAMPLE**
MCA/Router	Bay #	Main Power Bay is #1, other bays are numbered consecutively, following the bay-to-bay cabling scheme.	Main Power Bay **1** Second Bay **2** Fifth Bay **5**
Rectifier (PCU)	Bay # MCA Rectifier ID# within the Bay / # of Rectifiers Installed in System	Main Power Bay is #1, other bays are numbered consecutively, following the bay-to-bay cabling scheme. Rectifiers are identified from 1 to 36, as they are powered-up and recognized by the MCA.	Main Power Bay, First Recognized Rectifier (w/ 36 rectifiers installed) **1-01/36** Second Power Bay, Third Recognized Rectifier (w/ 24 rectifiers installed) **2-03/24** Fifth Power Bay, Tenth Recognized Rectifier (w/ 12 rectifiers installed) **5-10/12**

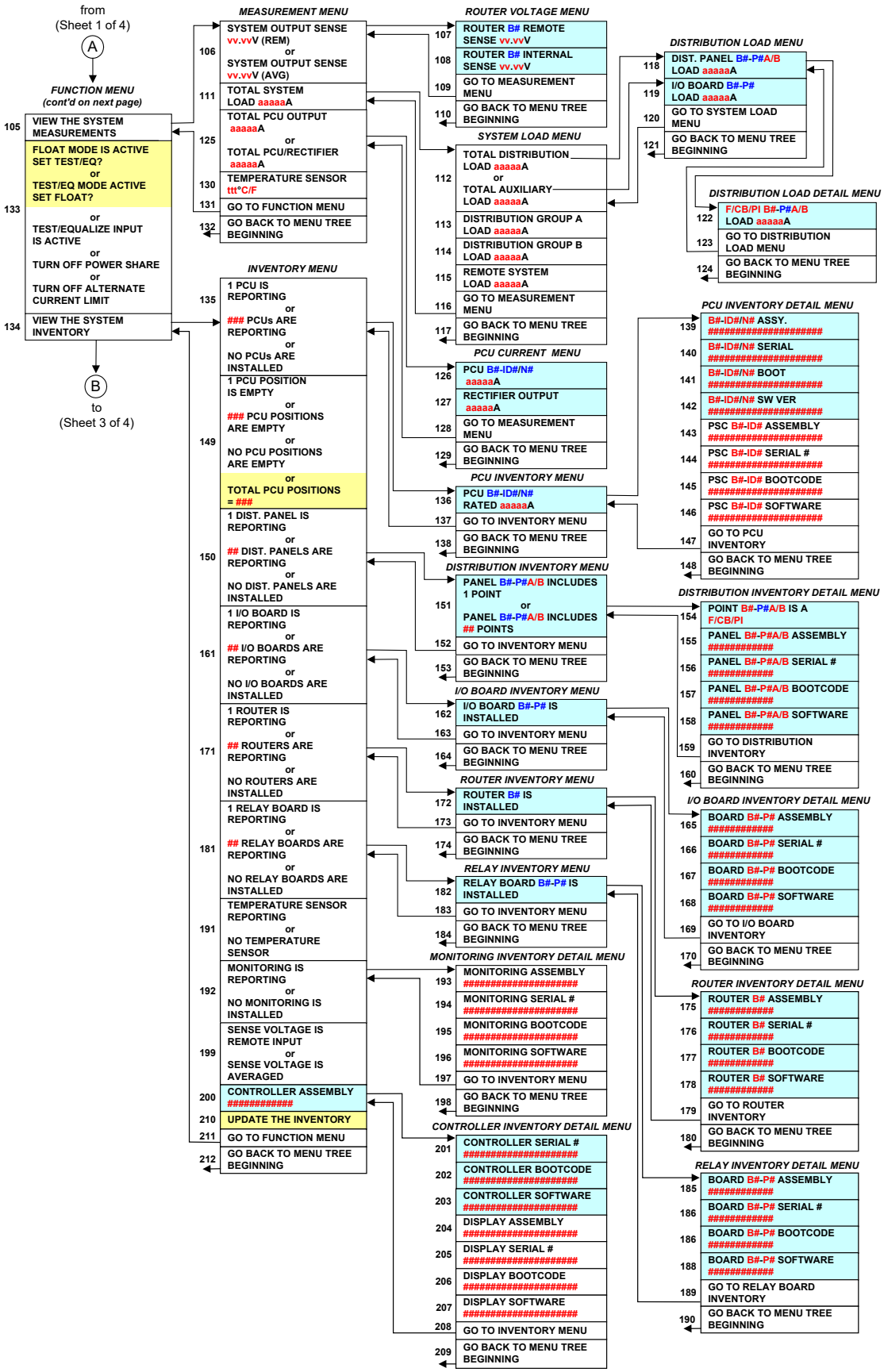
COMPONENT	MCA IDENTIFICATION NUMBER		
	MCA NUMBERING SCHEME (note that each line shown below is separated with a dash in the MCA display)	**NOTES**	**EXAMPLE**
MCA Relay Circuit Card	Bay # Card Position # w/in Bay Relay # w/in Card	Main Power Bay is #1, other bays are numbered consecutively, following the bay-to-bay cabling scheme. Card #1 = left slot, Card #7 = right slot. Relay # (see External Alarm, Reference, and Control Connections under WIRING ILLUSTRATIONS)	Main Power Bay, Relay Card in First Slot, Relay One on Card **1-1-1** Second Power Bay, Relay Card in Third Slot, Relay Four on Card **2-3-4** Fifth Power Bay, Relay Card in Seventh Slot, Relay Six on Card **5-7-6**
MCA I/O Circuit Card	Bay # Card Position # w/in Bay	Main Power Bay is #1, other bays are numbered consecutively, following the bay-to-bay cabling scheme. Card #1 = left slot, Card #7 = right slot.	Main Power Bay, I/O Card in First Slot **1-1** Second Power Bay, I/O Card in Third Slot **2-3** Fifth Power Bay, I/O Card in Seventh Slot **5-7**
Companion Distribution Bay's Distribution Bus (582140001)	Bay # Distribution Bus # w/in Bay (A or B Designation)	Main Power Bay is #1, other bays are numbered consecutively, following the bay-to-bay cabling scheme. Distribution Bus #1 = Top Left, Distribution Bus #2 = Top Right, Distribution Bus #3 = Bottom Left, Distribution Bus #4 = Bottom Right, A or B as set by jumper on MCA Distribution Bus Monitoring Circuit Card.	Fifth Bay, Top Left Bus, Set for B Designation **5-1B** Sixth Bay, Top Right Bus, Set for B Designation **6-2B** Seventh Bay, Bottom Left Bus, Set for B Designation **7-3B** Seventh Bay, Bottom Right Bus, Designation Not Set **7-4**

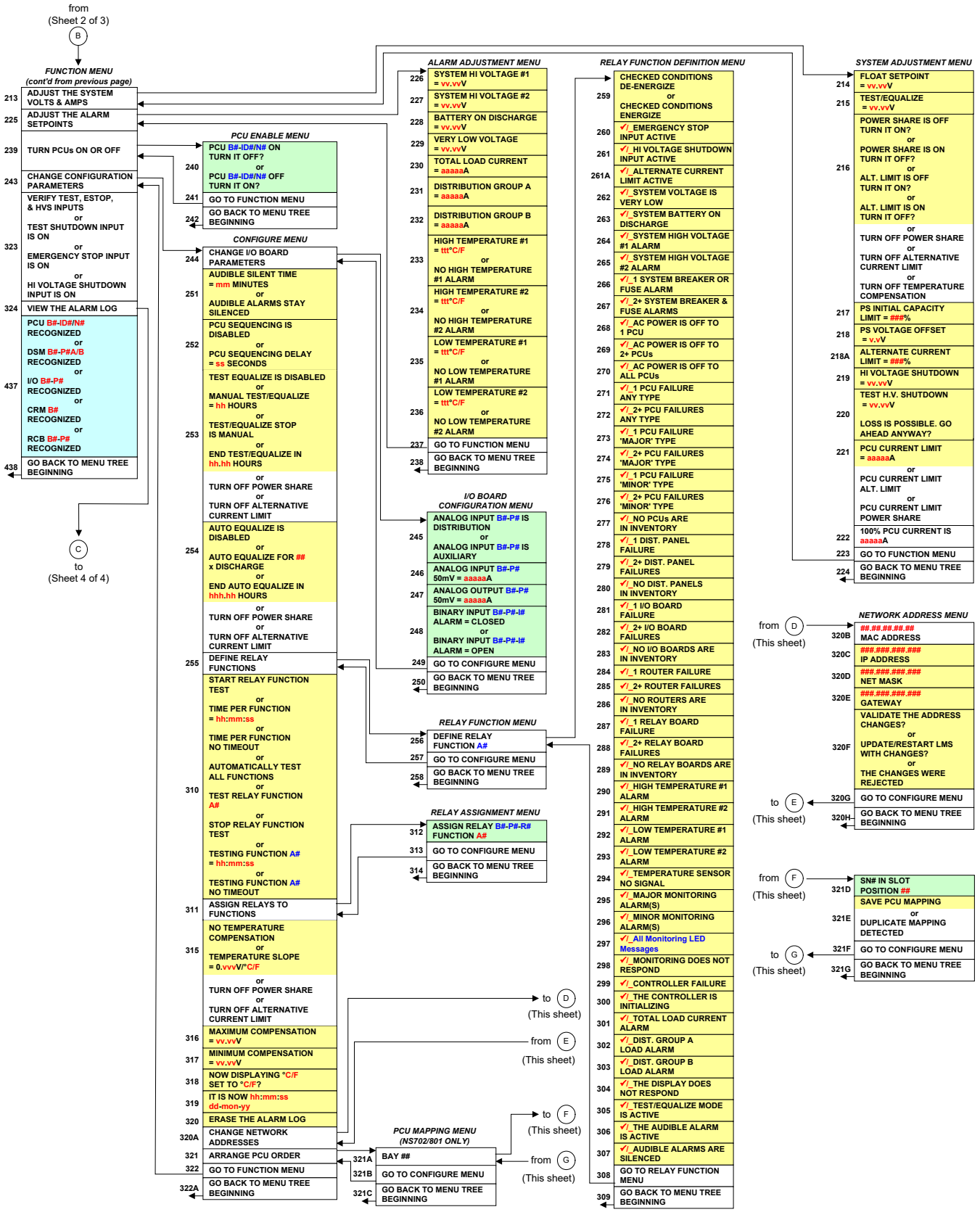
COMPONENT	MCA IDENTIFICATION NUMBER		
	MCA NUMBERING SCHEME (note that each line shown below is separated with a dash in the MCA display)	**NOTES**	**EXAMPLE**
Companion Distribution Bay's Distribution Device (582140001)	Type Bay # Distribution Point # w/in Bay	Type = Breaker or Fuse or MISC 50-73. Main Power Bay is #1, other bays are numbered consecutively, following the bay-to-bay cabling scheme. Distribution Point = 1-12 (bottom - top, Top Left Bus, Bus #1). 13-24 (top - bottom, Top Right Bus, Bus #2). 25-36 (bottom - top, Bottom Left Bus, Bus #3). 37-48 (top - bottom, Bottom Right Bus, Bus #4). Note that distribution components may take more than one mounting position, designation number is the left most mounting position. ***Note:*** *The optional bullet-device fuse panel is displayed as MISC 50-73.*	Fifth Bay, Circuit Breaker Mounted in Position One, Bus 1 Set for A Designation **Breaker 5-01A** Sixth Bay, Fuse Mounted in Position Thirteen, Bus 2 Designation Not Set **Fuse 6-13**

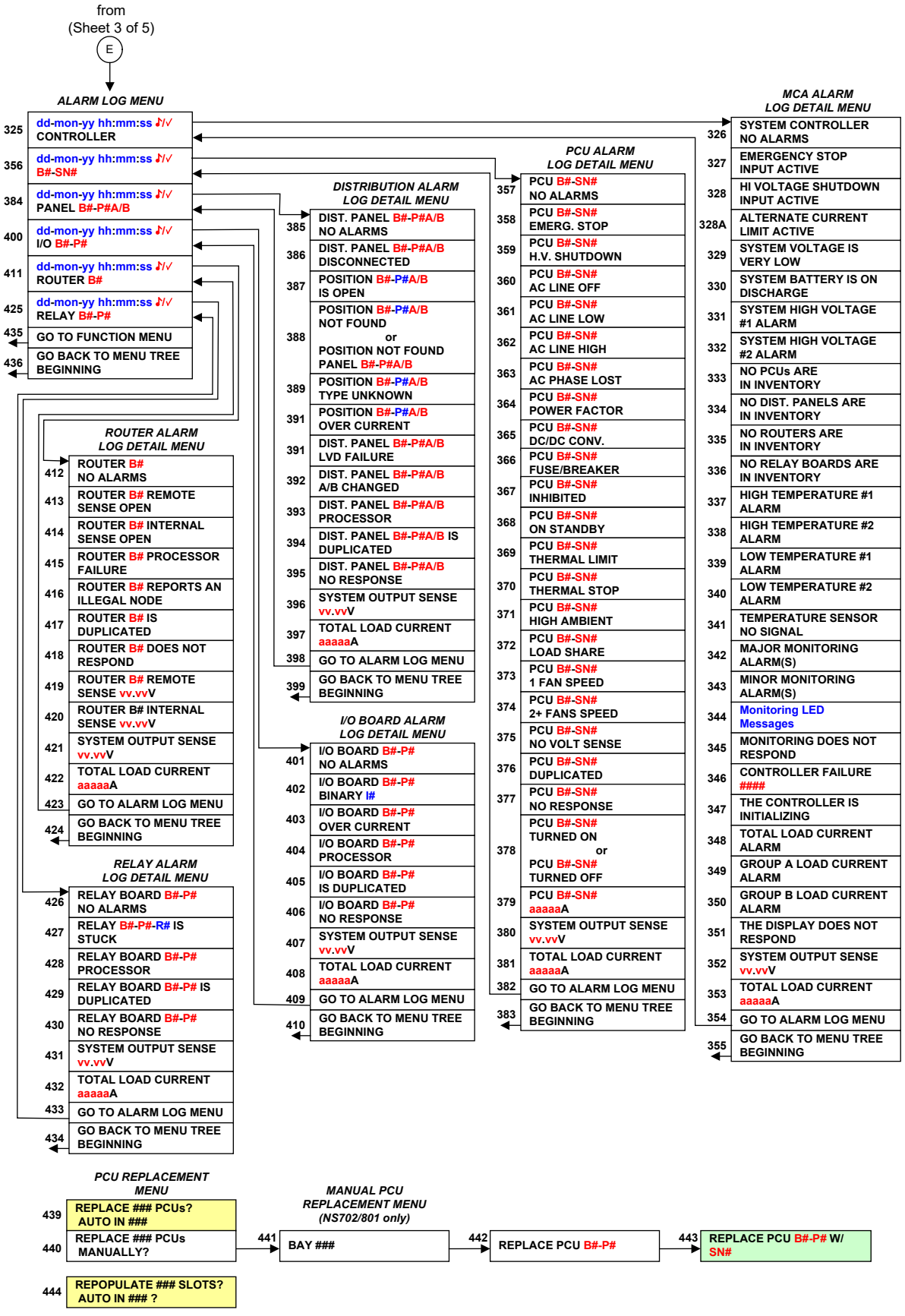
2.1.20 **MCA Display:** Presented next are illustrations from the MCA Menu Tree (Section 5886). Refer to the latest version of Section 5886 for the most recent MCA Menu Tree. Refer to the Power System User Instructions (Section 6028) for a complete description of menu items.

The User navigates **Lines 3 and 4** of the MCA Display using the Keypad on the MCA Control Panel. (The following indicates the actual text shown on each line of Lines 3 and 4 of the MCA Display, Line 4 also displays applicable navigation key codes, see previous page for explanation of codes.)




from
(Sheet 1 of 4)
A
FUNCTION MENU
(cont'd on next page)
105 VIEW THE SYSTEM MEASUREMENTS
FLOAT MODE IS ACTIVE
SET TEST/EQ?
or
TEST/EQ MODE ACTIVE
SET FLOAT?
133
or
TEST/EQUALIZE INPUT IS ACTIVE
or
TURN OFF POWER SHARE
or
TURN OFF ALTERNATE CURRENT LIMIT
134 VIEW THE SYSTEM INVENTORY
B
to
(Sheet 3 of 4)
MEASUREMENT MENU
106 SYSTEM OUTPUT SENSE vv.vvV (REM)
or
SYSTEM OUTPUT SENSE vv.vvV (AVG)
111 TOTAL SYSTEM LOAD aaaaaA
125 TOTAL PCU OUTPUT aaaaaA
or
TOTAL PCU/RECTIFIER aaaaaA
130 TEMPERATURE SENSOR ttt°C/F
131 GO TO FUNCTION MENU
132 GO BACK TO MENU TREE BEGINNING
INVENTORY MENU
135 1 PCU IS REPORTING
or
PCUs ARE REPORTING
or
NO PCUs ARE INSTALLED
149 1 PCU POSITION IS EMPTY
or
PCU POSITIONS ARE EMPTY
or
NO PCU POSITIONS ARE EMPTY
or
TOTAL PCU POSITIONS = ###
150 1 DIST. PANEL IS REPORTING
or
DIST. PANELS ARE REPORTING
or
NO DIST. PANELS ARE INSTALLED
161 1 I/O BOARD IS REPORTING
or
I/O BOARDS ARE REPORTING
or
NO I/O BOARDS ARE INSTALLED
171 1 ROUTER IS REPORTING
or
ROUTERS ARE REPORTING
or
NO ROUTERS ARE INSTALLED
181 1 RELAY BOARD IS REPORTING
or
RELAY BOARDS ARE REPORTING
or
NO RELAY BOARDS ARE INSTALLED
191 TEMPERATURE SENSOR REPORTING
or
NO TEMPERATURE SENSOR
192 MONITORING IS REPORTING
or
NO MONITORING IS INSTALLED
199 SENSE VOLTAGE IS REMOTE INPUT
or
SENSE VOLTAGE IS AVERAGED
200 CONTROLLER ASSEMBLY ############
210 UPDATE THE INVENTORY
211 GO TO FUNCTION MENU
212 GO BACK TO MENU TREE BEGINNING
ROUTER VOLTAGE MENU
107 ROUTER B# REMOTE SENSE vv.vvV
108 ROUTER B# INTERNAL SENSE vv.vvV
109 GO TO MEASUREMENT MENU
110 GO BACK TO MENU TREE BEGINNING
SYSTEM LOAD MENU
112 TOTAL DISTRIBUTION LOAD aaaaaA
or
TOTAL AUXILIARY LOAD aaaaaA
113 DISTRIBUTION GROUP A LOAD aaaaaA
114 DISTRIBUTION GROUP B LOAD aaaaaA
115 REMOTE SYSTEM LOAD aaaaaA
116 GO TO MEASUREMENT MENU
117 GO BACK TO MENU TREE BEGINNING
PCU CURRENT MENU
126 PCU B#-ID#/N# aaaaaA
127 RECTIFIER OUTPUT aaaaaA
128 GO TO MEASUREMENT MENU
129 GO BACK TO MENU TREE BEGINNING
PCU INVENTORY MENU
136 PCU B#-ID#/N# RATED aaaaaA
137 GO TO INVENTORY MENU
138 GO BACK TO MENU TREE BEGINNING
DISTRIBUTION INVENTORY MENU
151 PANEL B#-P#A/B INCLUDES 1 POINT
or
PANEL B#-P#A/B INCLUDES ## POINTS
152 GO TO INVENTORY MENU
153 GO BACK TO MENU TREE BEGINNING
I/O BOARD INVENTORY MENU
162 I/O BOARD B#-P# IS INSTALLED
163 GO TO INVENTORY MENU
164 GO BACK TO MENU TREE BEGINNING
ROUTER INVENTORY MENU
172 ROUTER B# IS INSTALLED
173 GO TO INVENTORY MENU
174 GO BACK TO MENU TREE BEGINNING
RELAY INVENTORY MENU
182 RELAY BOARD B#-P# IS INSTALLED
183 GO TO INVENTORY MENU
184 GO BACK TO MENU TREE BEGINNING
MONITORING INVENTORY DETAIL MENU
193 MONITORING ASSEMBLY ####################
194 MONITORING SERIAL # ####################
195 MONITORING BOOTCODE ####################
196 MONITORING SOFTWARE ####################
197 GO TO INVENTORY MENU
198 GO BACK TO MENU TREE BEGINNING
CONTROLLER INVENTORY DETAIL MENU
201 CONTROLLER SERIAL # ####################
202 CONTROLLER BOOTCODE ####################
203 CONTROLLER SOFTWARE ####################
204 DISPLAY ASSEMBLY ####################
205 DISPLAY SERIAL # ####################
206 DISPLAY BOOTCODE ####################
207 DISPLAY SOFTWARE ####################
208 GO TO INVENTORY MENU
209 GO BACK TO MENU TREE BEGINNING
DISTRIBUTION LOAD MENU
118 DIST. PANEL B#-P#A/B LOAD aaaaaA
119 I/O BOARD B#-P# LOAD aaaaaA
120 GO TO SYSTEM LOAD MENU
121 GO BACK TO MENU TREE BEGINNING
DISTRIBUTION LOAD DETAIL MENU
122 F/CB/PI B#-P#A/B LOAD aaaaaA
123 GO TO DISTRIBUTION LOAD MENU
124 GO BACK TO MENU TREE BEGINNING
PCU INVENTORY DETAIL MENU
139 B#-ID#/N# ASSY. ####################
140 B#-ID#/N# SERIAL ####################
141 B#-ID#/N# BOOT ####################
142 B#-ID#/N# SW VER ####################
143 PSC B#-ID# ASSEMBLY ####################
144 PSC B#-ID# SERIAL # ####################
145 PSC B#-ID# BOOTCODE ####################
146 PSC B#-ID# SOFTWARE ####################
147 GO TO PCU INVENTORY
148 GO BACK TO MENU TREE BEGINNING
DISTRIBUTION INVENTORY DETAIL MENU
154 POINT B#-P#A/B IS A F/CB/PI
155 PANEL B#-P#A/B ASSEMBLY ############
156 PANEL B#-P#A/B SERIAL # ############
157 PANEL B#-P#A/B BOOTCODE ############
158 PANEL B#-P#A/B SOFTWARE ############
159 GO TO DISTRIBUTION INVENTORY
160 GO BACK TO MENU TREE BEGINNING
I/O BOARD INVENTORY DETAIL MENU
165 BOARD B#-P# ASSEMBLY ############
166 BOARD B#-P# SERIAL # ############
167 BOARD B#-P# BOOTCODE ############
168 BOARD B#-P# SOFTWARE ############
169 GO TO I/O BOARD INVENTORY
170 GO BACK TO MENU TREE BEGINNING
ROUTER INVENTORY DETAIL MENU
175 ROUTER B# ASSEMBLY ############
176 ROUTER B# SERIAL # ############
177 ROUTER B# BOOTCODE ############
178 ROUTER B# SOFTWARE ############
179 GO TO ROUTER INVENTORY
180 GO BACK TO MENU TREE BEGINNING
RELAY INVENTORY DETAIL MENU
185 BOARD B#-P# ASSEMBLY ############
186 BOARD B#-P# SERIAL # ############
186 BOARD B#-P# BOOTCODE ############
188 BOARD B#-P# SOFTWARE ############
189 GO TO RELAY BOARD INVENTORY
190 GO BACK TO MENU TREE BEGINNING


from (Sheet 2 of 3)
B
FUNCTION MENU (cont'd from previous page)
213 ADJUST THE SYSTEM VOLTS & AMPS
225 ADJUST THE ALARM SETPOINTS
239 TURN PCUs ON OR OFF
243 CHANGE CONFIGURATION PARAMETERS
VERIFY TEST, ESTOP, & HVS INPUTS or TEST SHUTDOWN INPUT IS ON or 323 EMERGENCY STOP INPUT IS ON or HI VOLTAGE SHUTDOWN INPUT IS ON
324 VIEW THE ALARM LOG
PCU B#-ID#/N# RECOGNIZED or DSM B#-P#A/B RECOGNIZED or 437 I/O B#-P# RECOGNIZED or CRM B# RECOGNIZED or RCB B#-P# RECOGNIZED
438 GO BACK TO MENU TREE BEGINNING
C
to (Sheet 4 of 4)
PCU ENABLE MENU
240 PCU B#-ID#/N# ON TURN IT OFF? or PCU B#-ID#/N# OFF TURN IT ON?
241 GO TO FUNCTION MENU
242 GO BACK TO MENU TREE BEGINNING
CONFIGURE MENU
244 CHANGE I/O BOARD PARAMETERS
AUDIBLE SILENT TIME = mm MINUTES or 251 AUDIBLE ALARMS STAY SILENCED
PCU SEQUENCING IS DISABLED or 252 PCU SEQUENCING DELAY = ss SECONDS
TEST EQUALIZE IS DISABLED or MANUAL TEST/EQUALIZE = hh HOURS or TEST/EQUALIZE STOP IS MANUAL or 253 END TEST/EQUALIZE IN hh.hh HOURS
or TURN OFF POWER SHARE or TURN OFF ALTERNATIVE CURRENT LIMIT
AUTO EQUALIZE IS DISABLED or 254 AUTO EQUALIZE FOR ## x DISCHARGE or END AUTO EQUALIZE IN hhh.hh HOURS
or TURN OFF POWER SHARE or TURN OFF ALTERNATIVE CURRENT LIMIT
255 DEFINE RELAY FUNCTIONS
START RELAY FUNCTION TEST or TIME PER FUNCTION = hh:mm:ss or TIME PER FUNCTION NO TIMEOUT or AUTOMATICALLY TEST ALL FUNCTIONS or 310 TEST RELAY FUNCTION A# or STOP RELAY FUNCTION TEST or TESTING FUNCTION A# = hh:mm:ss or TESTING FUNCTION A# NO TIMEOUT
311 ASSIGN RELAYS TO FUNCTIONS
NO TEMPERATURE COMPENSATION or 315 TEMPERATURE SLOPE = 0.vvvV/°C/F
or TURN OFF POWER SHARE or TURN OFF ALTERNATIVE CURRENT LIMIT
316 MAXIMUM COMPENSATION = vv.vvV
317 MINIMUM COMPENSATION = vv.vvV
318 NOW DISPLAYING °C/F SET TO °C/F?
319 IT IS NOW hh:mm:ss dd-mon-yy
320 ERASE THE ALARM LOG
320A CHANGE NETWORK ADDRESSES
321 ARRANGE PCU ORDER
322 GO TO FUNCTION MENU
322A GO BACK TO MENU TREE BEGINNING
ALARM ADJUSTMENT MENU
226 SYSTEM HI VOLTAGE #1 = vv.vvV
227 SYSTEM HI VOLTAGE #2 = vv.vvV
228 BATTERY ON DISCHARGE = vv.vvV
229 VERY LOW VOLTAGE = vv.vvV
230 TOTAL LOAD CURRENT = aaaaaA
231 DISTRIBUTION GROUP A = aaaaaA
232 DISTRIBUTION GROUP B = aaaaaA
HIGH TEMPERATURE #1 = ttt°C/F or 233 NO HIGH TEMPERATURE #1 ALARM
HIGH TEMPERATURE #2 = ttt°C/F or 234 NO HIGH TEMPERATURE #2 ALARM
LOW TEMPERATURE #1 = ttt°C/F or 235 NO LOW TEMPERATURE #1 ALARM
LOW TEMPERATURE #2 = ttt°C/F or 236 NO LOW TEMPERATURE #2 ALARM
237 GO TO FUNCTION MENU
238 GO BACK TO MENU TREE BEGINNING
I/O BOARD CONFIGURATION MENU
ANALOG INPUT B#-P# IS DISTRIBUTION or 245 ANALOG INPUT B#-P# IS AUXILIARY
246 ANALOG INPUT B#-P# 50mV = aaaaaA
247 ANALOG OUTPUT B#-P# 50mV = aaaaaA
BINARY INPUT B#-P#-I# ALARM = CLOSED or 248 BINARY INPUT B#-P#-I# ALARM = OPEN
249 GO TO CONFIGURE MENU
250 GO BACK TO MENU TREE BEGINNING
RELAY FUNCTION MENU
256 DEFINE RELAY FUNCTION A#
257 GO TO CONFIGURE MENU
258 GO BACK TO MENU TREE BEGINNING
RELAY ASSIGNMENT MENU
312 ASSIGN RELAY B#-P#-R# FUNCTION A#
313 GO TO CONFIGURE MENU
314 GO BACK TO MENU TREE BEGINNING
PCU MAPPING MENU (NS702/801 ONLY)
321A BAY ##
321B GO TO CONFIGURE MENU
321C GO BACK TO MENU TREE BEGINNING
to D (This sheet)
from E (This sheet)
to F (This sheet)
from G (This sheet)
RELAY FUNCTION DEFINITION MENU
259 CHECKED CONDITIONS DE-ENERGIZE or CHECKED CONDITIONS ENERGIZE
260 /_EMERGENCY STOP INPUT ACTIVE
261 /_HI VOLTAGE SHUTDOWN INPUT ACTIVE
261A /_ALTERNATE CURRENT LIMIT ACTIVE
262 /_SYSTEM VOLTAGE IS VERY LOW
263 /_SYSTEM BATTERY ON DISCHARGE
264 /_SYSTEM HIGH VOLTAGE #1 ALARM
265 /_SYSTEM HIGH VOLTAGE #2 ALARM
266 /_1 SYSTEM BREAKER OR FUSE ALARM
267 /_2+ SYSTEM BREAKER & FUSE ALARMS
268 /_AC POWER IS OFF TO 1 PCU
269 /_AC POWER IS OFF TO 2+ PCUs
270 /_AC POWER IS OFF TO ALL PCUs
271 /_1 PCU FAILURE ANY TYPE
272 /_2+ PCU FAILURES ANY TYPE
273 /_1 PCU FAILURE 'MAJOR' TYPE
274 /_2+ PCU FAILURES 'MAJOR' TYPE
275 /_1 PCU FAILURE 'MINOR' TYPE
276 /_2+ PCU FAILURES 'MINOR' TYPE
277 /_NO PCUs ARE IN INVENTORY
278 /_1 DIST. PANEL FAILURE
279 /_2+ DIST. PANEL FAILURES
280 /_NO DIST. PANELS IN INVENTORY
281 /_1 I/O BOARD FAILURE
282 /_2+ I/O BOARD FAILURES
283 /_NO I/O BOARDS ARE IN INVENTORY
284 /_1 ROUTER FAILURE
285 /_2+ ROUTER FAILURES
286 /_NO ROUTERS ARE IN INVENTORY
287 /_1 RELAY BOARD FAILURE
288 /_2+ RELAY BOARD FAILURES
289 /_NO RELAY BOARDS ARE IN INVENTORY
290 /_HIGH TEMPERATURE #1 ALARM
291 /_HIGH TEMPERATURE #2 ALARM
292 /_LOW TEMPERATURE #1 ALARM
293 /_LOW TEMPERATURE #2 ALARM
294 /_TEMPERATURE SENSOR NO SIGNAL
295 /_MAJOR MONITORING ALARM(S)
296 /_MINOR MONITORING ALARM(S)
297 /_All Monitoring LED Messages
298 /_MONITORING DOES NOT RESPOND
299 /_CONTROLLER FAILURE
300 /_THE CONTROLLER IS INITIALIZING
301 /_TOTAL LOAD CURRENT ALARM
302 /_DIST. GROUP A LOAD ALARM
303 /_DIST. GROUP B LOAD ALARM
304 /_THE DISPLAY DOES NOT RESPOND
305 /_TEST/EQUALIZE MODE IS ACTIVE
306 /_THE AUDIBLE ALARM IS ACTIVE
307 /_AUDIBLE ALARMS ARE SILENCED
308 GO TO RELAY FUNCTION MENU
309 GO BACK TO MENU TREE BEGINNING
SYSTEM ADJUSTMENT MENU
214 FLOAT SETPOINT = vv.vvV
215 TEST/EQUALIZE = vv.vvV
POWER SHARE IS OFF TURN IT ON? or POWER SHARE IS ON TURN IT OFF? or 216 ALT. LIMIT IS OFF TURN IT ON? or ALT. LIMIT IS ON TURN IT OFF?
or TURN OFF POWER SHARE or TURN OFF ALTERNATIVE CURRENT LIMIT or TURN OFF TEMPERATURE COMPENSATION
217 PS INITIAL CAPACITY LIMIT = ###%
218 PS VOLTAGE OFFSET = v.vV
218A ALTERNATE CURRENT LIMIT = ###%
219 HI VOLTAGE SHUTDOWN = vv.vvV
TEST H.V. SHUTDOWN = vv.vvV 220 LOSS IS POSSIBLE. GO AHEAD ANYWAY?
221 PCU CURRENT LIMIT = aaaaaA
or PCU CURRENT LIMIT ALT. LIMIT or PCU CURRENT LIMIT POWER SHARE
222 100% PCU CURRENT IS aaaaaA
223 GO TO FUNCTION MENU
224 GO BACK TO MENU TREE BEGINNING
NETWORK ADDRESS MENU
from D (This sheet)
320B ##.##.##.##.## MAC ADDRESS
320C ###.###.###.### IP ADDRESS
320D ###.###.###.### NET MASK
320E ###.###.###.### GATEWAY
VALIDATE THE ADDRESS CHANGES? or 320F UPDATE/RESTART LMS WITH CHANGES? or THE CHANGES WERE REJECTED
to E (This sheet)
320G GO TO CONFIGURE MENU
320H GO BACK TO MENU TREE BEGINNING
from F (This sheet)
321D SN# IN SLOT POSITION ##
SAVE PCU MAPPING or 321E DUPLICATE MAPPING DETECTED
to G (This sheet)
321F GO TO CONFIGURE MENU
321G GO BACK TO MENU TREE BEGINNING


from
(Sheet 3 of 5)
E
ALARM LOG MENU
325 dd-mon-yy hh:mm:ss ♪/√ CONTROLLER
356 dd-mon-yy hh:mm:ss ♪/√ B#-SN#
384 dd-mon-yy hh:mm:ss ♪/√ PANEL B#-P#A/B
400 dd-mon-yy hh:mm:ss ♪/√ I/O B#-P#
411 dd-mon-yy hh:mm:ss ♪/√ ROUTER B#
425 dd-mon-yy hh:mm:ss ♪/√ RELAY B#-P#
435 GO TO FUNCTION MENU
436 GO BACK TO MENU TREE BEGINNING
ROUTER ALARM LOG DETAIL MENU
412 ROUTER B# NO ALARMS
413 ROUTER B# REMOTE SENSE OPEN
414 ROUTER B# INTERNAL SENSE OPEN
415 ROUTER B# PROCESSOR FAILURE
416 ROUTER B# REPORTS AN ILLEGAL NODE
417 ROUTER B# IS DUPLICATED
418 ROUTER B# DOES NOT RESPOND
419 ROUTER B# REMOTE SENSE vv.vvV
420 ROUTER B# INTERNAL SENSE vv.vvV
421 SYSTEM OUTPUT SENSE vv.vvV
422 TOTAL LOAD CURRENT aaaaaA
423 GO TO ALARM LOG MENU
424 GO BACK TO MENU TREE BEGINNING
RELAY ALARM LOG DETAIL MENU
426 RELAY BOARD B#-P# NO ALARMS
427 RELAY B#-P#-R# IS STUCK
428 RELAY BOARD B#-P# PROCESSOR
429 RELAY BOARD B#-P# IS DUPLICATED
430 RELAY BOARD B#-P# NO RESPONSE
431 SYSTEM OUTPUT SENSE vv.vvV
432 TOTAL LOAD CURRENT aaaaaA
433 GO TO ALARM LOG MENU
434 GO BACK TO MENU TREE BEGINNING
DISTRIBUTION ALARM LOG DETAIL MENU
385 DIST. PANEL B#-P#A/B NO ALARMS
386 DIST. PANEL B#-P#A/B DISCONNECTED
387 POSITION B#-P#A/B IS OPEN
388 POSITION B#-P#A/B NOT FOUND or POSITION NOT FOUND PANEL B#-P#A/B
389 POSITION B#-P#A/B TYPE UNKNOWN
391 POSITION B#-P#A/B OVER CURRENT
391 DIST. PANEL B#-P#A/B LVD FAILURE
392 DIST. PANEL B#-P#A/B A/B CHANGED
393 DIST. PANEL B#-P#A/B PROCESSOR
394 DIST. PANEL B#-P#A/B IS DUPLICATED
395 DIST. PANEL B#-P#A/B NO RESPONSE
396 SYSTEM OUTPUT SENSE vv.vvV
397 TOTAL LOAD CURRENT aaaaaA
398 GO TO ALARM LOG MENU
399 GO BACK TO MENU TREE BEGINNING
I/O BOARD ALARM LOG DETAIL MENU
401 I/O BOARD B#-P# NO ALARMS
402 I/O BOARD B#-P# BINARY I#
403 I/O BOARD B#-P# OVER CURRENT
404 I/O BOARD B#-P# PROCESSOR
405 I/O BOARD B#-P# IS DUPLICATED
406 I/O BOARD B#-P# NO RESPONSE
407 SYSTEM OUTPUT SENSE vv.vvV
408 TOTAL LOAD CURRENT aaaaaA
409 GO TO ALARM LOG MENU
410 GO BACK TO MENU TREE BEGINNING
PCU ALARM LOG DETAIL MENU
357 PCU B#-SN# NO ALARMS
358 PCU B#-SN# EMERG. STOP
359 PCU B#-SN# H.V. SHUTDOWN
360 PCU B#-SN# AC LINE OFF
361 PCU B#-SN# AC LINE LOW
362 PCU B#-SN# AC LINE HIGH
363 PCU B#-SN# AC PHASE LOST
364 PCU B#-SN# POWER FACTOR
365 PCU B#-SN# DC/DC CONV.
366 PCU B#-SN# FUSE/BREAKER
367 PCU B#-SN# INHIBITED
368 PCU B#-SN# ON STANDBY
369 PCU B#-SN# THERMAL LIMIT
370 PCU B#-SN# THERMAL STOP
371 PCU B#-SN# HIGH AMBIENT
372 PCU B#-SN# LOAD SHARE
373 PCU B#-SN# 1 FAN SPEED
374 PCU B#-SN# 2+ FANS SPEED
375 PCU B#-SN# NO VOLT SENSE
376 PCU B#-SN# DUPLICATED
377 PCU B#-SN# NO RESPONSE
378 PCU B#-SN# TURNED ON or PCU B#-SN# TURNED OFF
379 PCU B#-SN# aaaaaA
380 SYSTEM OUTPUT SENSE vv.vvV
381 TOTAL LOAD CURRENT aaaaaA
382 GO TO ALARM LOG MENU
383 GO BACK TO MENU TREE BEGINNING
MCA ALARM LOG DETAIL MENU
326 SYSTEM CONTROLLER NO ALARMS
327 EMERGENCY STOP INPUT ACTIVE
328 HI VOLTAGE SHUTDOWN INPUT ACTIVE
328A ALTERNATE CURRENT LIMIT ACTIVE
329 SYSTEM VOLTAGE IS VERY LOW
330 SYSTEM BATTERY IS ON DISCHARGE
331 SYSTEM HIGH VOLTAGE #1 ALARM
332 SYSTEM HIGH VOLTAGE #2 ALARM
333 NO PCUs ARE IN INVENTORY
334 NO DIST. PANELS ARE IN INVENTORY
335 NO ROUTERS ARE IN INVENTORY
336 NO RELAY BOARDS ARE IN INVENTORY
337 HIGH TEMPERATURE #1 ALARM
338 HIGH TEMPERATURE #2 ALARM
339 LOW TEMPERATURE #1 ALARM
340 LOW TEMPERATURE #2 ALARM
341 TEMPERATURE SENSOR NO SIGNAL
342 MAJOR MONITORING ALARM(S)
343 MINOR MONITORING ALARM(S)
344 Monitoring LED Messages
345 MONITORING DOES NOT RESPOND
346 CONTROLLER FAILURE ####
347 THE CONTROLLER IS INITIALIZING
348 TOTAL LOAD CURRENT ALARM
349 GROUP A LOAD CURRENT ALARM
350 GROUP B LOAD CURRENT ALARM
351 THE DISPLAY DOES NOT RESPOND
352 SYSTEM OUTPUT SENSE vv.vvV
353 TOTAL LOAD CURRENT aaaaaA
354 GO TO ALARM LOG MENU
355 GO BACK TO MENU TREE BEGINNING
PCU REPLACEMENT MENU
439 REPLACE ### PCUs? AUTO IN ###
440 REPLACE ### PCUs MANUALLY?
444 REPOPULATE ### SLOTS? AUTO IN ### ?
MANUAL PCU REPLACEMENT MENU (NS702/801 only)
441 BAY ###
442 REPLACE PCU B#-P#
443 REPLACE PCU B#-P# W/ SN#

2.1.21 External Control Circuits

(A) Remote Test/Equalize: All Rectifiers can be placed into the test/equalize mode by applying a loop closure signal. The Rectifiers operate in the float mode when the loop closure signal is absent.

(B) Remote High Voltage Shutdown: The high voltage shutdown circuit on all Rectifiers, as described in PD588705000, can be activated by applying a loop closure signal.

(C) Rectifier Emergency Shutdown and Fire Alarm Disconnect: The Rectifiers can be inhibited by applying a loop closure signal. Manual restart is required.

(D) External "System Voltage" Meter Reading: Leads can be extended from the MCA to an external voltage source. This is the voltage source the MCA monitors for system alarms and displays as "System Output Voltage".

(E) Test Input: The High Voltage Shutdown and/or Rectifier Emergency Stop circuits can be tested without affecting the system by applying a test loop closure signal before applying the Remote High Voltage Shutdown or Rectifier Emergency Shutdown loop closure signal.

2.1.22 Optional MCA Relay Circuit Card, P/N 514348: Each circuit card adds six (6) Form-C external alarm relay contacts to the system. Plugs into seven-slot card cage provided in each bay for optional MCA and LMS I/O cards.

(A) Contact Rating: 2A at 30 VDC.

(B) Description of Operation: The MCA provides 25 programmable function channels. Program each function channel to alarm for selected conditions, then program each external alarm relay to activate if a specific function channel alarms.

MCA relays can also be programmed to activate if an LMS LED channel activates.

2.1.23 Optional MCA Input/Output (I/O) Circuit Card, P/N 524550: This I/O card provides capability for monitoring of external shunts and binary signals. Plugs into seven-slot card cage provided in each bay for optional MCA and LMS I/O cards. Provides 1 analog input, 1 analog output (for remote plant output current monitoring), and 4 binary inputs.

(A) One analog input with a range of 0-50mV can be used to provide monitoring of additional load shunt or a plant load shunt.

(B) Four binary inputs can be used to monitor dry contact closures. When the “Alternate Current Limit” feature is used, binary input #4 is assigned to monitor the signal used to trigger the MCA to place the rectifiers in the Alternate Current Limit mode.

(C) One analog output with a 50mV full scale output provides a value to indicate the “Total Load Current” parameter of the NPS system.

The reading displayed for the NPS system parameter “Total Load Current” is derived from one of two algorithms using multiple data sources. The algorithm and its data sources used are determined by the presence and configuration of CAN I/O card(s) in the system.

1) Algorithm #1: This source is used when there are no CAN I/O cards installed OR when the configuration of all installed CAN I/O cards is set to “Distribution” mode.

“Distribution” Mode Operation:

“Total Load Current” =
NPS bay distribution node current readings,
+ CAN I/O card analog input readings,
+ LMS function channel 63 reading.

The VPS ‘*Total System Current*’ reading (LMS channel A9002) will be passed to the NPS through LMS function channel sixty-three. The function channel configuration will default to provide the reading of the associated LMS channel for the VPS Total System Current. The NPS controller will include the value of LMS function channel sixty-four when summing the distribution load currents to determine its Total Load Current reading to display. (associated LMS channel A9903).

Channel F63 program line is ‘F63 = A9002’ (Vortex Total Load Current).

2) Algorithm #2: This source is used when the configuration of at least one installed CAN I/O card is set to “Auxiliary” mode.

“Auxiliary” Mode Operation:

“Total Load Current” =
Sum of CAN I/O card analog input readings (only input readings of cards configured for “Auxiliary” operation are summed),
+ LMS function channel 63 reading.

The reading displayed for the NPS system parameter “Total Auxiliary Load” is derived from the sum of all analog input readings of CAN I/O cards configured for “Auxiliary” mode operation

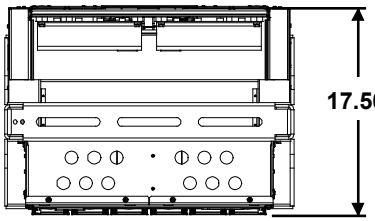
3. RECTIFIER MODULE, HIGH EFFICIENCY (MODEL R48-3200E, SPEC. NO. 1R483200E)
   Refer to UM1R483500E.
4. RECTIFIER MODULE (MODEL R48-3200, SPEC. NO. 1R483200)
   Refer to UM1R483500E.
5. LMS MONITORING SYSTEM
   Refer to SAG586505000/SAG586505500

MECHANICAL SPECIFICATIONS

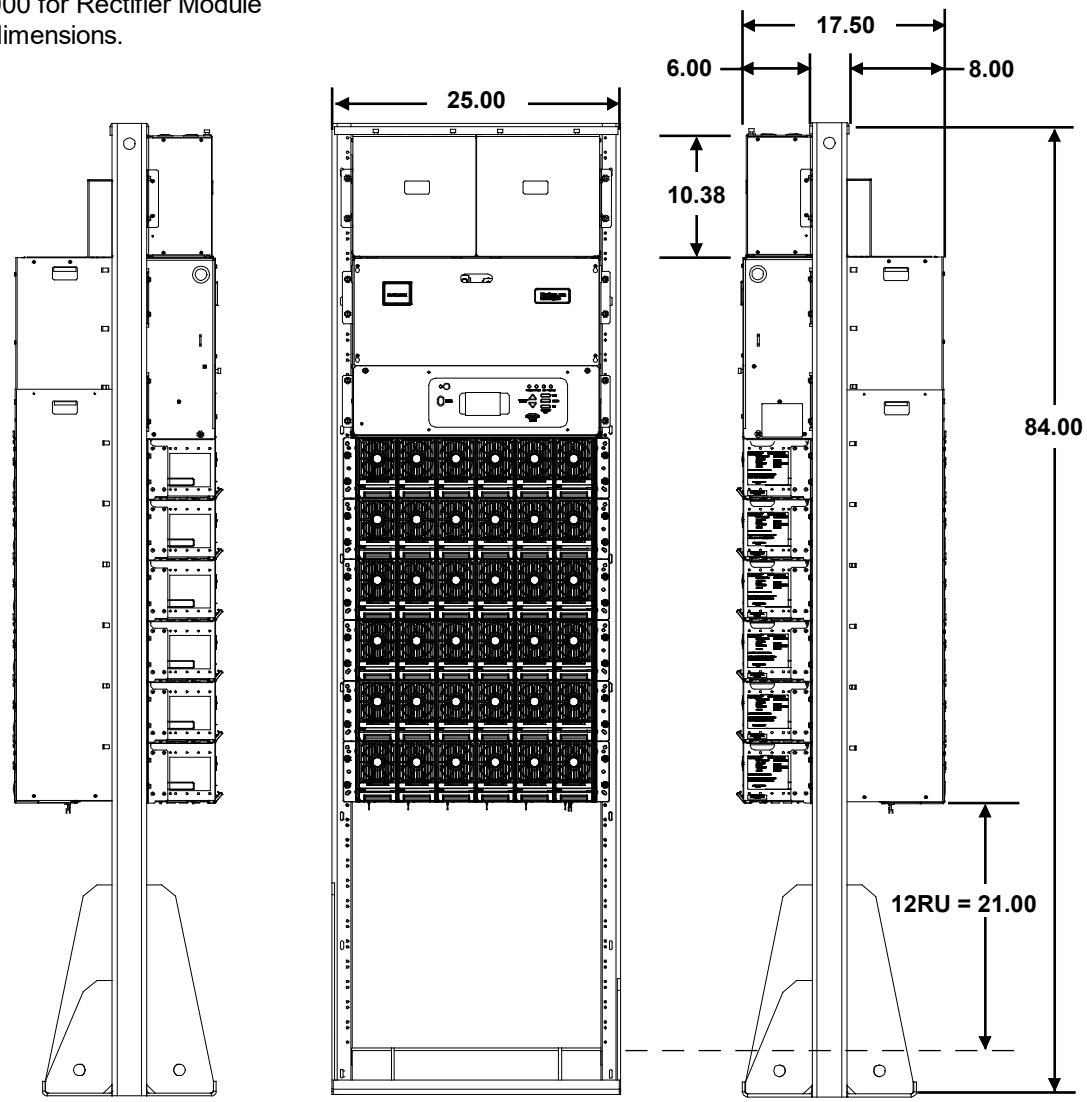
Overall Dimensions - Main and Supplemental Power Bays

Refer to PD588705000 for Rectifier Module Mounting Shelf dimensions.

Notes:
1. All dimensions are in inches, unless otherwise specified.
2. Weight in LBS.
   (including relay rack)
   Net:
   Shipping:
3. Finish: Textured Gray (M500-147), except Rectifier Shelf and Rectifier Module Bodies are Bright Zinc Plating (M500-53).
4. See PD588705000 for Rectifier Module Mounting Shelf dimensions.

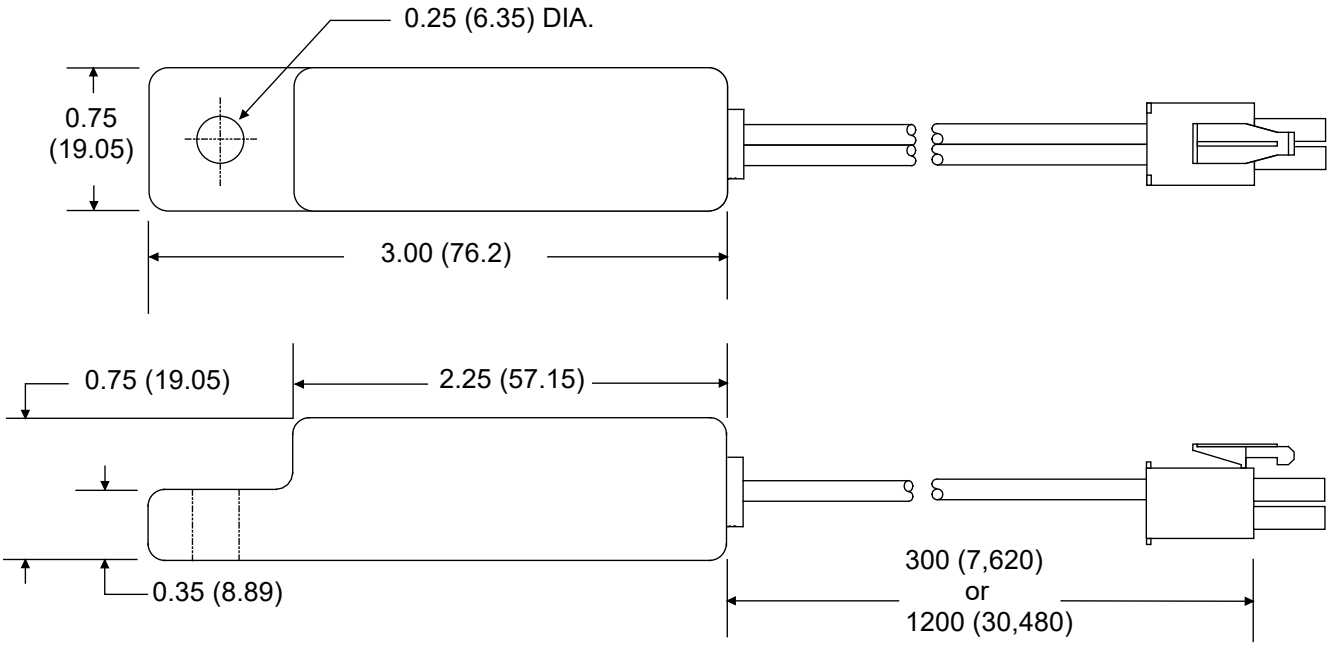


Top View



Left Side View | Front View | Right Side View

Overall Dimensions - Optional Digital Battery Charge Temperature Compensation Probes P/N 107021 (25 feet) and P/N 106824 (100 feet)



Part No. 107021 (25 foot)
Part No. 106824 (100 foot)

Note: All dimensions are in inches and (millimeters).

RELATED DOCUMENTATION

Power Data Sheets:	PD588705000 (Model PSS4850-23GV Rectifier Module Mounting Shelf, includes all Rectifier Module data)
Schematic Diagrams:	SD582126100 (Vertiv™ NetSure™ Power System) SD588705000 (Model PSS4850-23GV Rectifier Module Mounting Shelf)
Wiring Diagrams:	T582126100 (Vertiv™ NetSure™ Power System) T588705000 (Model PSS4850-23GV Rectifier Module Mounting Shelf)
Color MCA Menu Tree:	Section 5886
Instructions:	Section 6027, System Installation Instructions (Vertiv™ NetSure™ Power System, Spec. No. 582126100) Section 6028, System User Instructions (Vertiv™ NetSure™ Power System, Spec. No. 582126100) UM1R483500E, Rectifier User Instructions (Vertiv™ NetSure™ Rectifiers, Spec. No. 1R3200 and 1R3200E)
LMS Monitoring System	Section 5879, Installation Instructions (Spec. No. 586505000/586505500) Section 5847, User Instructions (Spec. No. 586505000/586505500) SAG586505000/SAG586505500 (System Application Guide) Section 5944, LMS I/O Circuit Cards Instructions 520538, LMS I/O Circuit Card Label Sheet SD507606, LMS Expansion Assembly Schematic Diagram

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