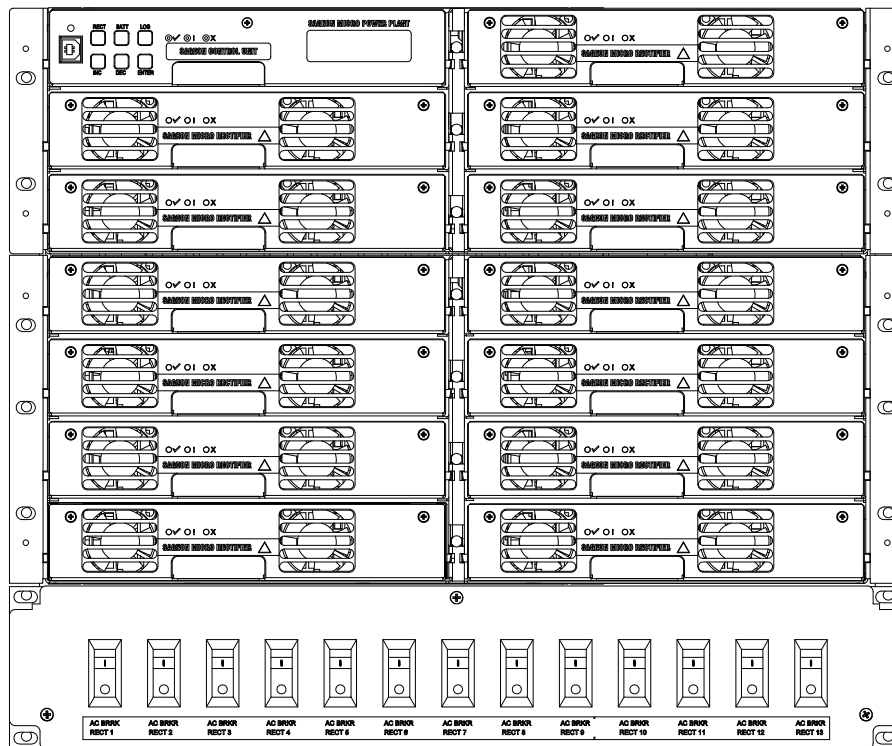




Sageon® II Bulk Product Manual

SAGEON



RECEIVING INSTRUCTIONS

and

GENERAL EQUIPMENT INFORMATION

Please Note: For your protection, this product manual should be read and thoroughly understood before unpacking, installing, using, or servicing the described equipment.

UNIPOWER, LLC presents all equipment to the delivering carrier securely packed and ready for transport. Upon acceptance of the equipment from us, the delivering carrier assumes responsibility for its safe delivery to you. Once you receive the equipment, it is your responsibility to document any damage to the equipment that was sustained during transport to you and to file your claim with the carrier promptly and accurately.

PACKAGE INSPECTION

Examine the shipping container for any visible damage: punctures, dents, and any other signs of possible internal damage.

Describe any damage or shortage on the receiving documents and have the carrier's representative sign his/her full name.

If you're receiving freight bill notes that a Tip-N-Tell is attached to your freight, locate the indicator and note the color of the arrow. If the Tip-N-Tell arrow has turned even partially blue, this means the freight has been tipped in transport. Make sure the carrier notes this on your receipt before you sign for the freight.

EQUIPMENT INSPECTION

Promptly upon receipt of shipment, open the container and inspect the contents for damage. If it is necessary to move or otherwise handle the shipment, refer to the next section, Handling, for instructions and warnings.

Unpack the shipment carefully to avoid scratching or otherwise marring the exterior finish. Be careful not to discard any included equipment, parts, or manuals. If damage is detected, call the delivering carrier to determine appropriate action. The carrier may require an inspection.

IMPORTANT: If damage is detected, save all shipping material for the carrier's representative!

If damage is detected, also notify UNIPOWER; contact information is in the Product Support section. UNIPOWER will determine if the equipment should be returned for repair. If it is determined that the equipment should be returned to UNIPOWER, ask the delivering carrier to send the packages back to UNIPOWER at the delivering carrier's expense. Be sure that the equipment is properly packaged for shipment.

If repair is necessary, UNIPOWER will invoice you for the repair so that you may submit the bill to the delivering carrier with your claim form.

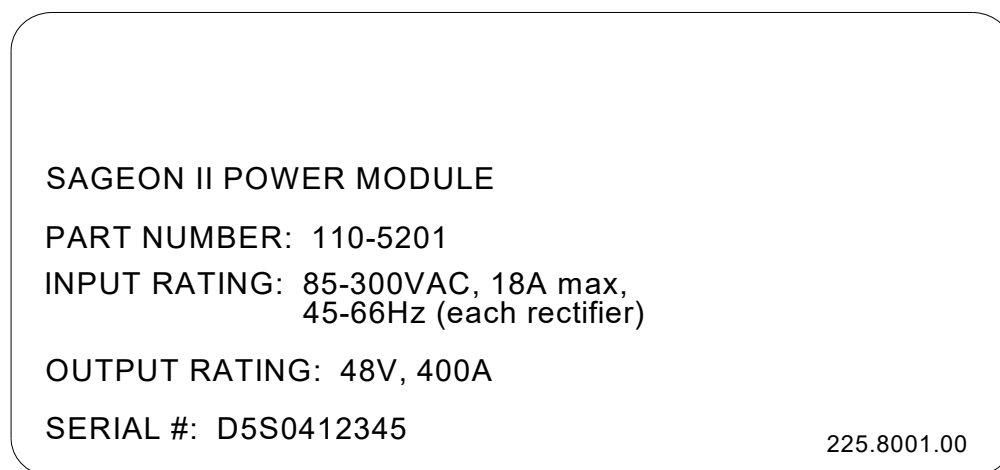
It is your responsibility to file a claim with the delivering carrier. Failure to properly file a claim for shipping damages may void warranty service for any physical damages later reported for repair.

HANDLING

The Sageon II Bulk is moderate in weight. Use sufficient personnel and power equipment to ensure safe handling. Use extreme care in handling and unpacking the Sageon II Bulk. Refer to section 3.1 for mounting the Power Module.

NAMEPLATE

A nameplate that includes model number, part number, and serial number information, as appropriate, identifies a UNIPOWER product. Please include this information, shown in *italic* in the label drawing below, in all correspondence with UNIPOWER. A sample nameplate is shown below.



INITIAL SETTINGS

All equipment is shipped from the factory *fully inspected and adjusted*. Read the technical reference or product manual before installing or making any adjustments.

REVISION HISTORY

Rev	Description	Checked & Approved by / Date
7	SEE PCO 45402	CJM / 8-8-19
8	SEE ECN 46140	JPR/1-3-24

DOCUMENT SUMMARY

Thank you for purchasing the Sageon II Bulk. We at UNIPOWER are proud of the quality of our products and welcome any suggestions to further improve our designs to fit your needs.

This product manual provides general warning, installation, commissioning, operation, and troubleshooting instructions for the Sageon II Bulk and its optional components. It consists an Appendix A- Setting Up Network Interfaces and Specifications for 110.7670.4850 as well as a drawing packet located in the back of the manual. The drawings supplement the provided descriptions and procedures.

PROPRIETARY AND CONFIDENTIAL

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DISCLAIMER

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Throughout the remainder of this manual, "UNIPOWER" will mean "UNIPOWER, LLC."

PERSONNEL REQUIREMENTS

Installation, setup, operation, and servicing of this equipment should be performed by qualified persons thoroughly familiar with this Product Manual and Applicable Local and National Codes. A copy of this manual is included with the equipment shipment.

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1. GENERAL WARNING

1. This equipment has been designed to be used only in restricted access areas.
2. This equipment must only be serviced by authorized and qualified service personnel.
3. Operators should not attempt to repair faulty units. There are no operator serviceable parts inside. All fuses are only replaced as part of a repair procedure in a repair facility by authorized personnel and not as a maintenance procedure on site.
4. The power Module magazine should be mounted in a rack that satisfies the requirements for electrical enclosures and fire enclosures according to IEC60950 or equivalent standard. For open rack use, the back of the magazine must be fully enclosed by its covers and the AC wiring terminations must be protected by either a grounded casing or an enclosure that provides double insulation.
5. The power shelves must be used with sufficient ventilation. After mounting, the air flow paths into and out of the rectifiers must be unrestricted. Allow adequate flow for exhaust air out of the rack.
6. Rectifiers are live at all times when the rectifier is plugged into the backplane connector. The input AC disconnection device is the rectifier backplane connector.
7. When removing modules, especially if the ambient temperature is high and the unit has been operating at maximum load, avoid skin contact with the metal casing, as it may be too hot to touch. Pull the unit halfway out of the magazine and let cool for 2-3 minutes before handling.

1.1 PRODUCT SUPPORT

Product support can be obtained using the following addresses and telephone numbers.

Manufacturing facility:

UNIPOWER, LLC
65 Industrial Park Rd
Dunlap, TN 37327
United States

Phone: +1-954-346-2442

Toll Free: 1-800-440-3504

Web site – www.unipowerco.com

When contacting UNIPOWER, please be prepared to provide:

1. The product model number, spec number, S build number, and serial number - see the equipment nameplate on the front panel
2. Your company's name and address
3. Your name and title
4. The reason for the contact
5. If there is a problem with product operation:
 - Is the problem intermittent or continuous?
 - What revision is the firmware?
 - What actions were being performed prior to the appearance of the problem?
 - What actions have been taken since the problem occurred?

2. CONFIGURATION

2.1 GENERAL DESCRIPTION

Sageon II Bulk is turn-key DC uninterruptible power supply solutions (DC UPS) for powering 48VDC telecommunications and industrial equipment. The Power Module provides integrated battery management functions for a range of battery types (VRLA, flooded Lead-acid, NiCad, Ni-MH, Li-polymer) to enable easy commissioning of a DC UPS or it can be used as a standalone DC source when no batteries are used.

The Power Module provides the following integrated features:

- Bulk power
- battery charge current limiting (opt)
- battery temperature sensing(opt)
- accurate temperature compensated Float and Equalization voltages (opt)
- optional modules for monitoring AC power and battery cell voltages
- optional AC breakers
- N+1 redundant rectifiers
- short circuit and reverse polarity protection
- a monitoring and control module (Controller)
- super capacitor backed real-time system clock
- optional remote communication capability, including web-based protocols
- all rectifiers and the controller are hot-swap and plug-and-play capable

2.2 SYSTEM DESCRIPTION

2.2.1 Front View

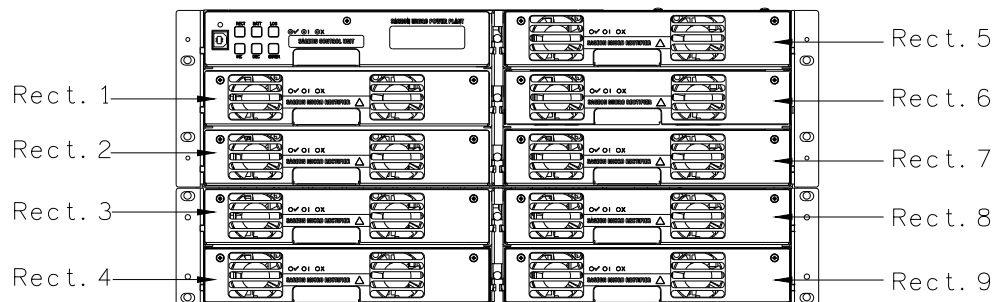


Figure 2-1 400A Bulk Power

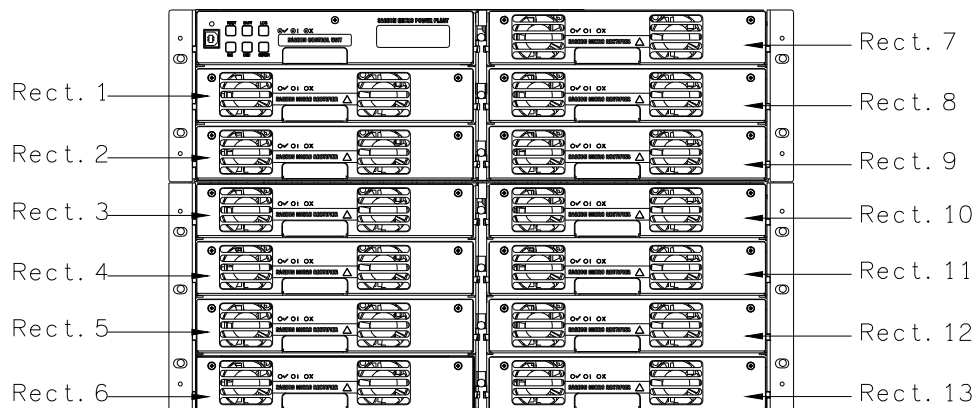


Figure 2-2 600A Bulk Power

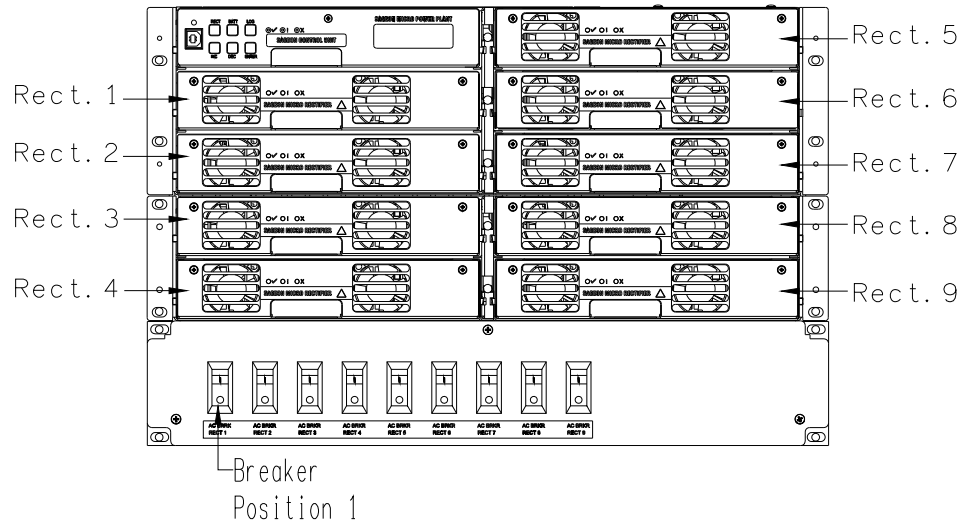


Figure 2-3 400A Bulk Power with AC Breakers

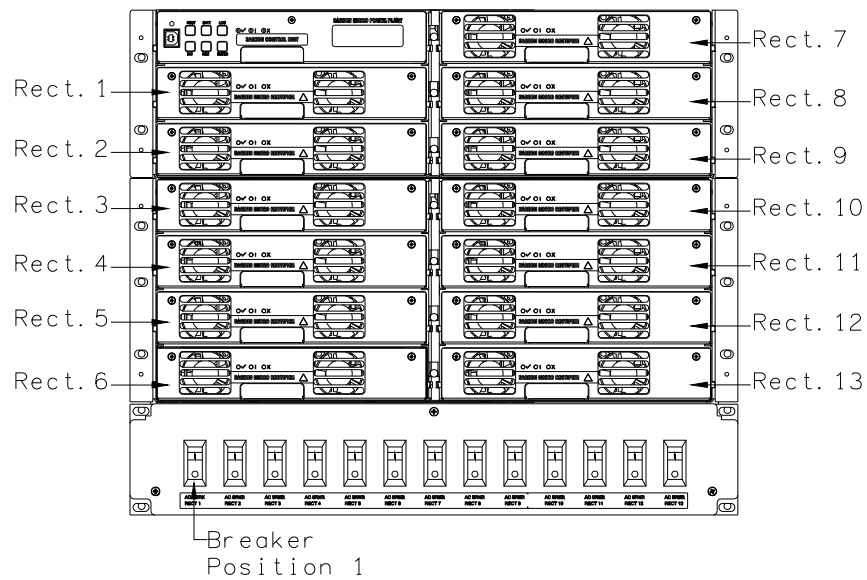


Figure 2-4 600A Bulk Power with AC Breakers

2.2.2 Rear View

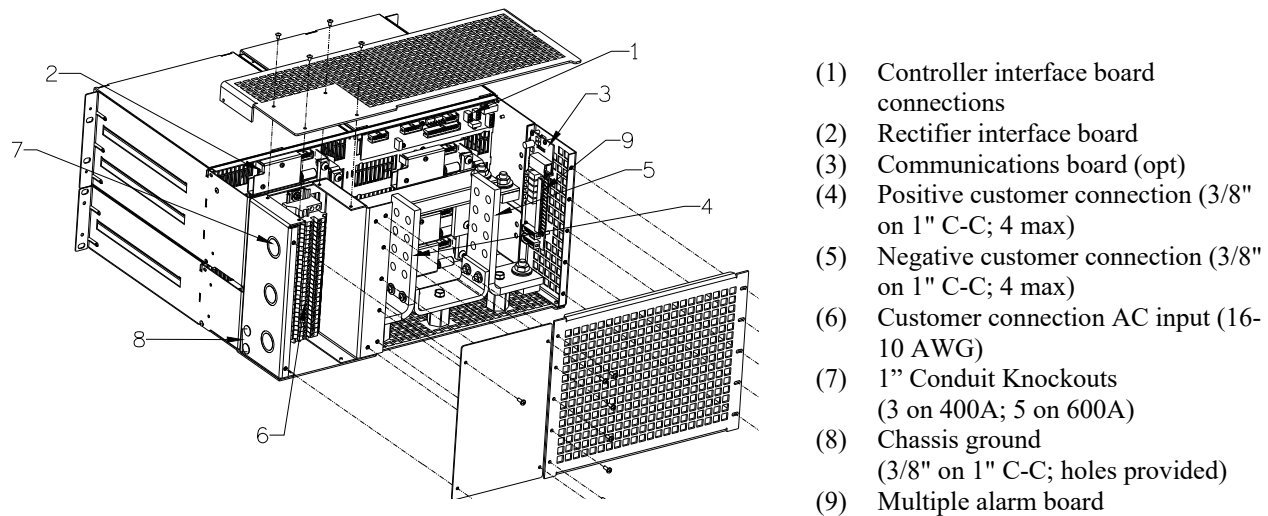


Figure 2-5 Rear view of connections

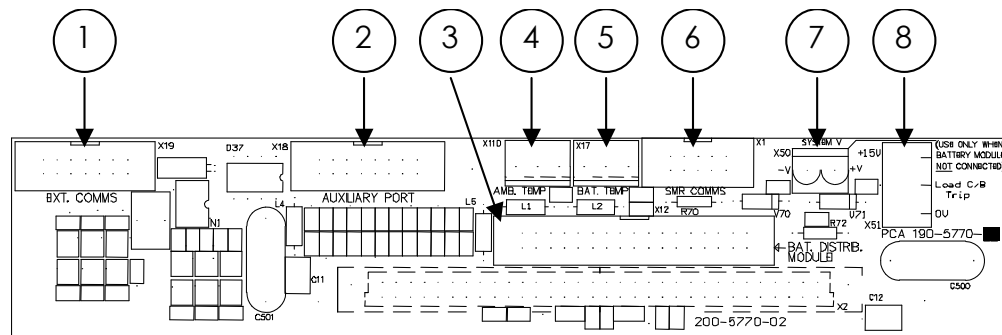


Figure 2-6 Connections on Controller interface board

- (1) Remote communications module connection (14-way ribbon)
- (2) Auxiliary peripheral module (relays, battery cell monitor, etc) connection (16-way ribbon)*
- (3) Battery (& load) distribution module connection** (34-way ribbon)
- (4) Ambient temperature sensor connection
- (5) Battery temperature sensor connection
- (6) Rectifier isolated communications connection (10-way ribbon)*
- (7) Standalone system voltage connection (Controller power and voltage sensing)
- (8) Load circuit breaker trip detection circuitry connection

Notes:

* Devices and cable connections are pre-wired as part of the supplied and tested Power Module

** This connection can be left unused if the system has no requirement for control and maintenance of batteries (i.e. standalone DC power supply)

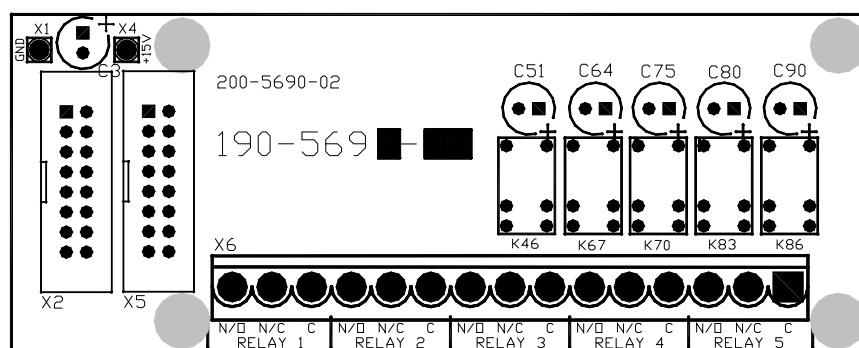


Figure 2-7 Alarm relay board connections

The alarm relay board is installed on the side of the Power module such that Relay 5 is on the top when viewed from the rear of the metalwork. Each alarm is user programmable through the Controller using the Sageview PC software.

3. INSTALLATION

3.1 MOUNTING THE POWER MODULE

The Power module is mounted into a standard 19" rack using 12-24 screws. A minimum of eight screws are required to secure the Power Module into the rack. It is recommended to initially install the Power Module into the rack without either the Controller or the rectifiers in place.

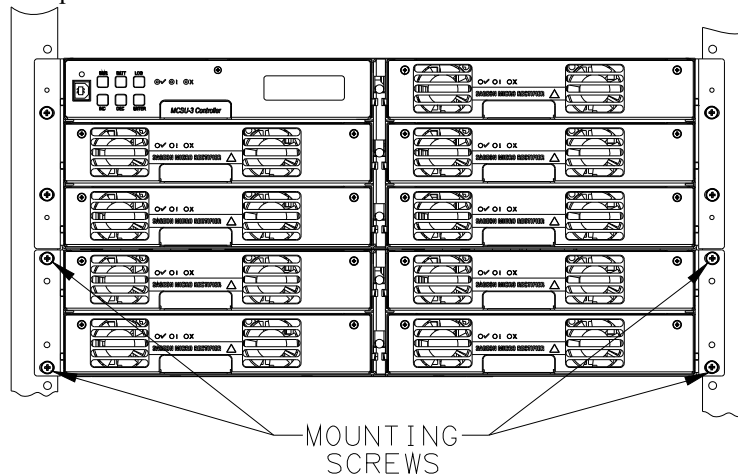


Figure 3-1 Mount points for securing Power Module in a rack

Wiring for the standard Power Module is rear access only.

3.1.1 Tools Required for Installation

- No. 2 screwdriver (for tightening rack bolts)
- No. 1 screwdriver
- Insulated socket set wrench
- Small flat-blade screwdriver (for tightening DIN rail terminal screws)

3.1.2 Gaining Access to Rear Wiring

NOTE: Access to the rear wiring should be limited to qualified service personnel. It is recommended to remove the AC power before gaining access to the rear wiring due to the safety hazard present inside the electrical enclosure. Similarly, the energy hazard associated with the batteries connected to the DC bus must be addressed with appropriately insulated tools and other measures to prevent accidental short circuits to the DC bus.

To open the top rear cover, remove the rear M3 screws securing the Lexan cover to the top.

To gain further access to the wiring, remove the rear cover grill by removing the ten screws holding the Lexan grill. (See Figure 2.5)

3.2 OVERVIEW OF EXTERNAL WIRING CONNECTIONS

SD-SAGEON2.LXX drawings, located in the back of the manual, show the internal and interface schematic for the Sageon II Bulk. For indicating how a system is connected, the same schematic applies to other Power Module products. The system shown is for a -48V system where the positive side of the DC bus is tied to ground, usually on the common return bar. It is also possible to float the output, but under these conditions, there is no guarantee that all voltages on the DC bus will stay below the Safety Extra-Low Voltage (SELV) limits with respect to ground during fault conditions.

The bulk DC output connections are shown in Figure 2.5. The positive terminal bus is located on the left side, looking from the back.

The AC input connections are located on the left side of the module. There are three (3) 400A & five (5) 600A 1" conduit knockouts located along the left side, looking from the back, for the electrician. The AC feed should be wired as individually protected feeds for each rectifier (recommended and preferred) to provide discrimination of fault protection devices. Where the AC breaker option is integrated into the Power Module, each rectifier feed is individually protected and the installer is only required to connect a single AC supply (1 phase) to the AC DIN rail terminations.

3.3 MAINS CONNECTIONS

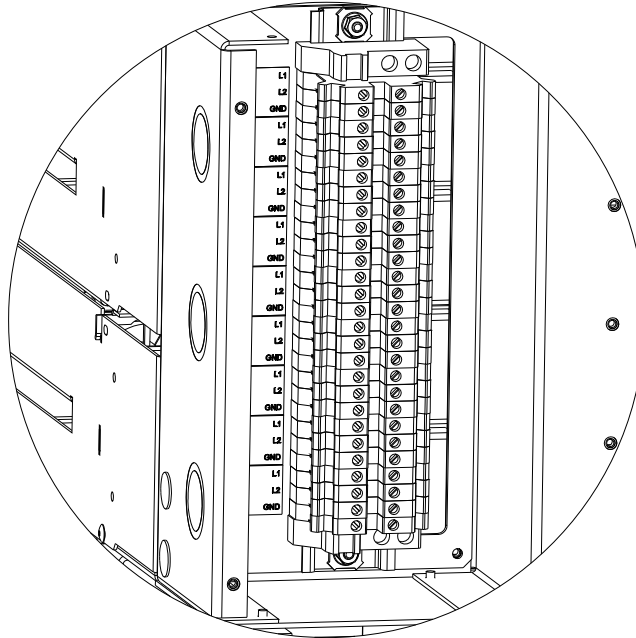


Figure 3-2 AC Feed Terminations

3.3.1 Factory Supplied Configurations

Power shelves internal AC distribution, are configured with each rectifier hot line (L1) and neutral (L2), being terminated in an individual DIN rail terminal block (beige). The grounding wire connects to the green/yellow terminal block (GND).

3.3.2 Single phase – individual protected external feeds

Connect each of the circuit breaker protected hot wires (L1) to the individual terminal blocks that feed each rectifier. Connect the neutral wires to the respective neutral terminals (L2).

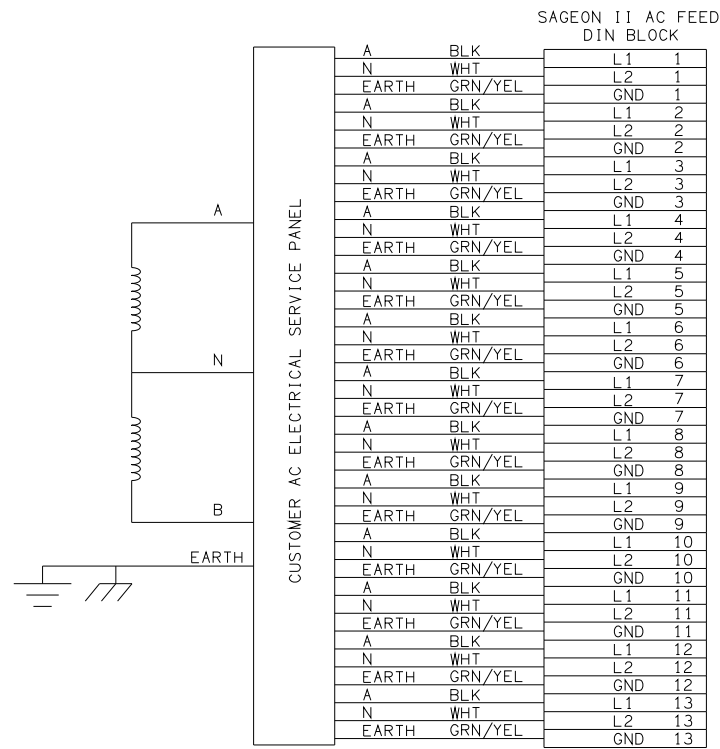


Figure 3-3 Single Phase feed (phase to neutral)

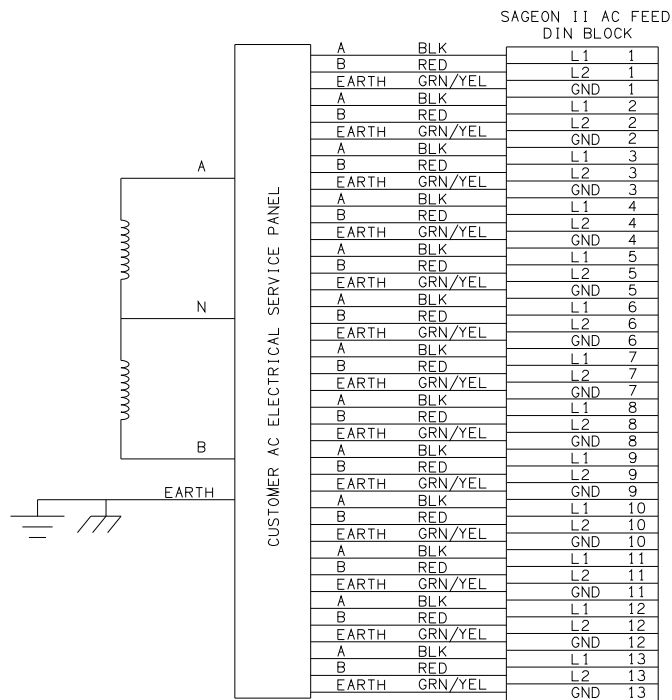


Figure 3-4 Single Phase feed (phase to phase)

NOTE: PHASE "A" WILL BE UNBALANCED.

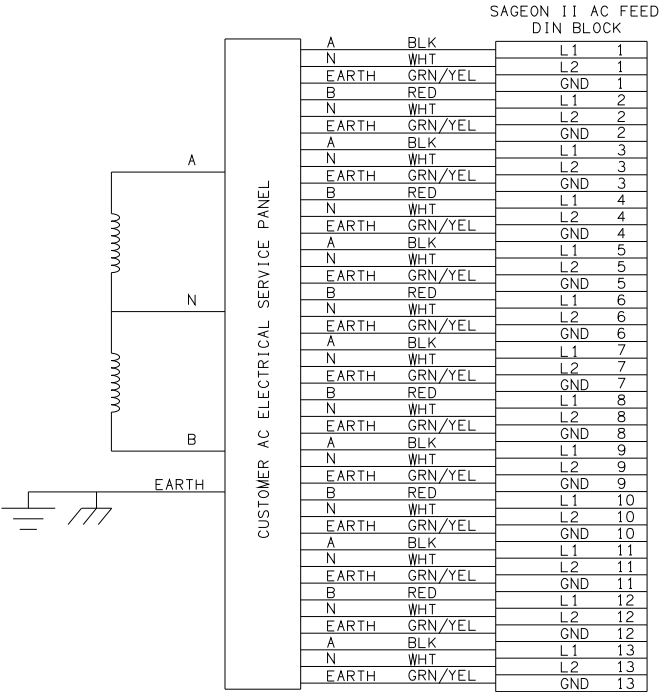


Figure 3-5 split Single Phase feed (phase to neutral)

NOTE: PHASE "A" WILL BE UNBALANCED.

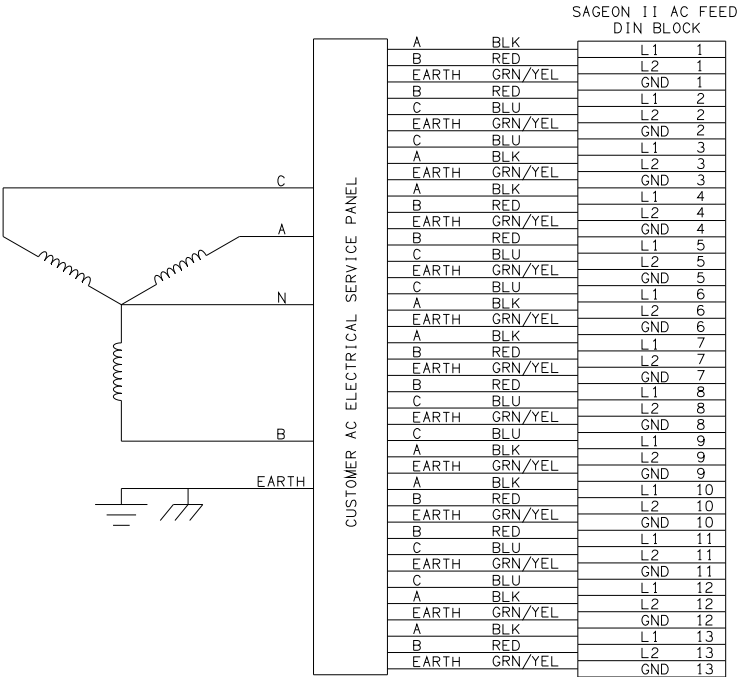


Figure 3-6 Y-Three Phase feed Δ -connected rectifiers (phase to phase)

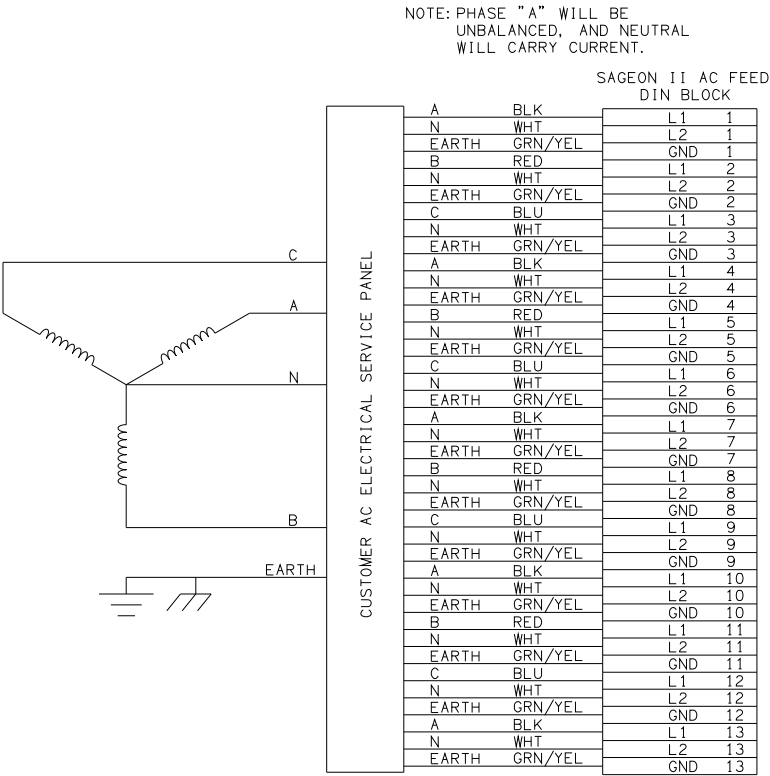


Figure 3-7 Y-three Phase feed (phase to neutral)

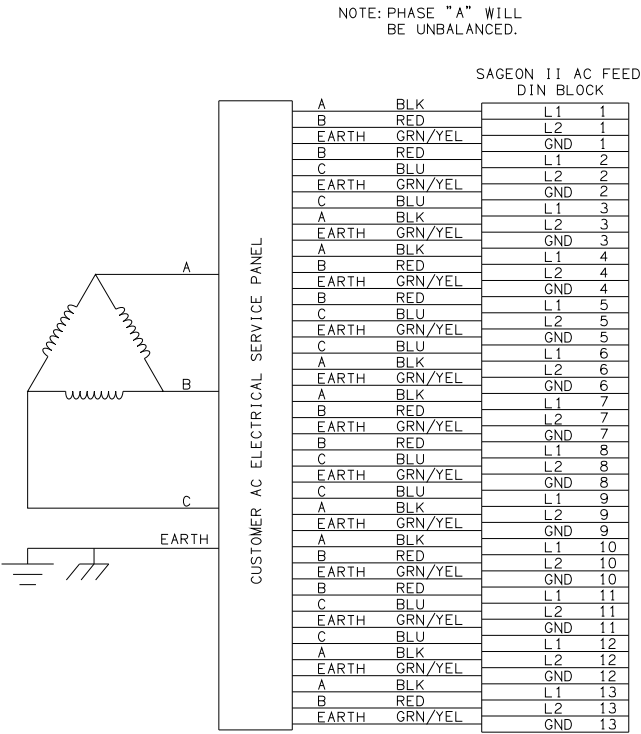


Figure 3-8 Δ-three Phase feed (phase to phase)

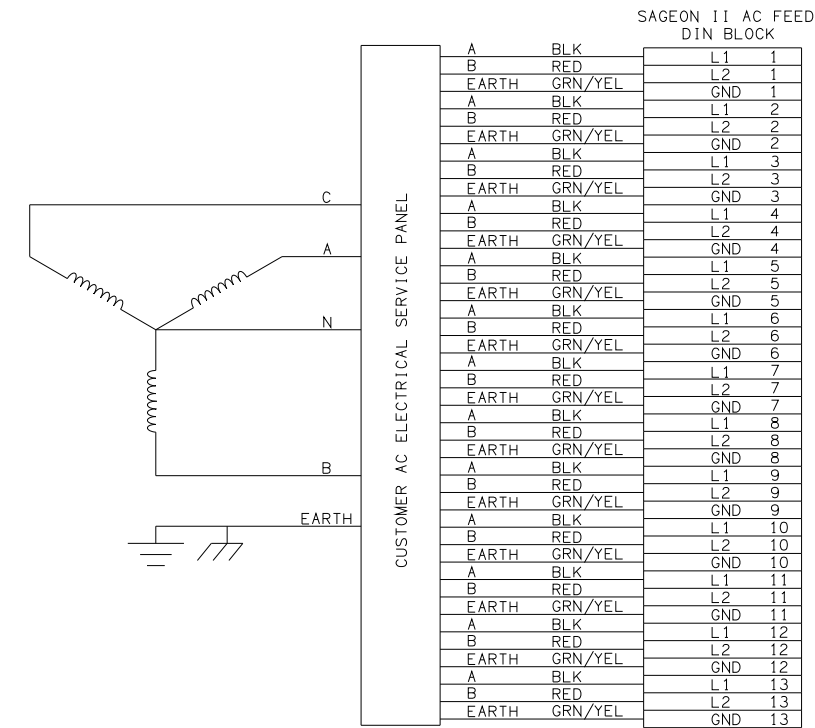


Figure 3-9 Y-three phase feed; Single Phase to rectifiers (phase to phase)

NOTE: PHASE "A" WILL BE
UNBALANCED, AND NEUTRAL
WILL CARRY CURRENT.

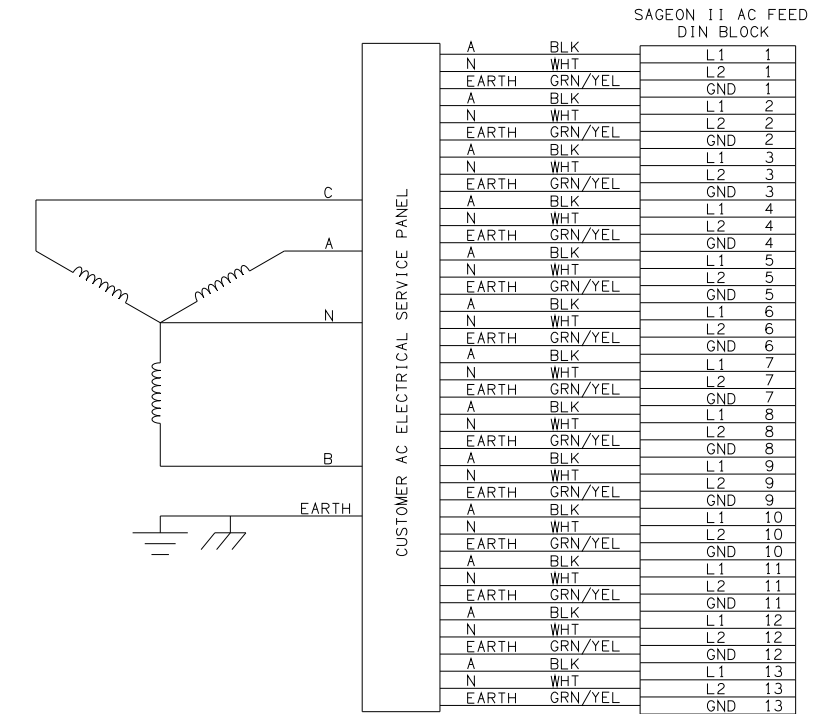


Figure 3-10 Y-Three Phase Feed; Single Phase to Rectifiers (phase to neutral)

3.3.3 Surge protection requirements

The rectifiers are internally protected for surges up to 6kV/3kA. For higher levels of protection, particularly for sites with high incidence of lightning or switching surges, additional surge protection is required on the AC feed to the Power Module. Typically, surge arrestors with a 10kA-40kA rating are required with the highest level of protection being provided when arrestors are connected between phase-neutral (x3 phases) and between phase/neutral-earth (x 3 phases).

Other arrangements (for 3-phase “Y”) with similar levels of protection are also possible as shown below. The voltage rating of the arrestor should be selected based on the maximum AC voltage likely to appear on the line. The arrestor should limit the voltage to <1200V – 1400V at the rated maximum pulse current.

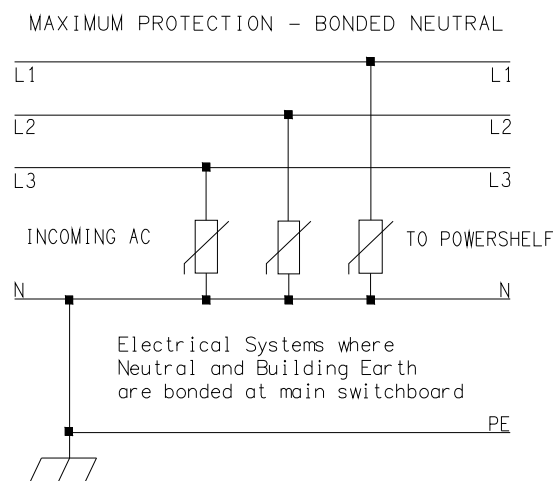


Figure 3-11 Surge Protection

3.4 BULK LOAD CONNECTIONS

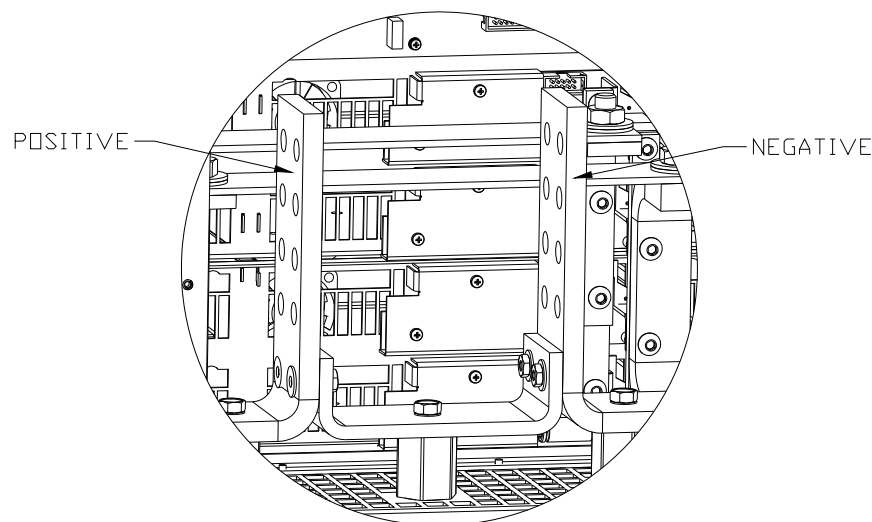


Figure 3-12 Bulk Load Connections

A bulk load can be either a single large load, or a cable connection to an additional, external DC distribution unit. There are four 3/8” holes located on 1” centers available for securing four cables, with double-hole lugs.

3.5 BATTERY CONNECTIONS

The cables can be either brought out through the cut out adjacent to the return bar, or through the breakout slot in the top cover.

This cable must be sized accordingly to carry the battery short circuit current for the time required to clear the battery protection devices.

Note: Ensure the battery circuit breakers are open before connecting the batteries. Connect the switched cable connections first, followed by the common return cable connections.

3.6 TEMPERATURE SENSORS

The optional sensors for measuring ambient and battery temperature are the same device (Part No. 385-5941-03, -06, -15, -30). The system auto-detects if the sensor is plugged into one of the positions (4) or (5) shown in Figure 26. If no sensor is installed, the Controller will show “Not Available” in the menu items for the temperature measurements. Locate the ambient sensor close to the intake air zone of the Power Module. Locate the battery sensor on a battery block in the middle Module of the battery bank (likely hot zone).

3.7 AUXILIARY RELAY CONNECTIONS

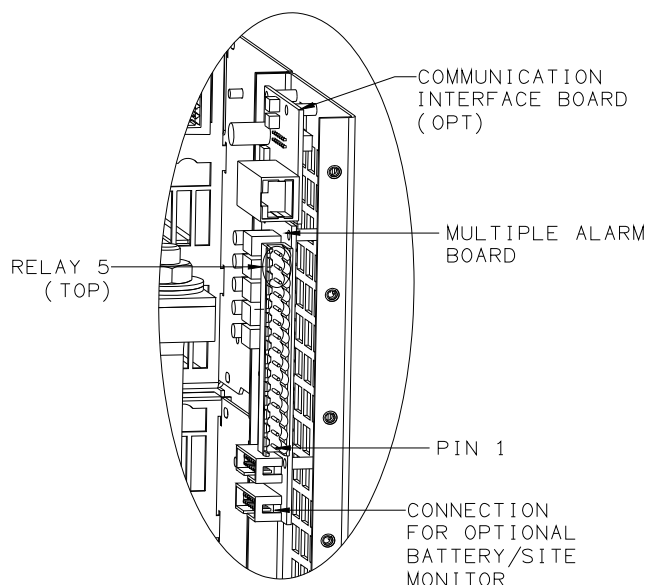


Figure 3-13 Communication Interface Board (opt) & Multiple Alarm Board

The user configurable auxiliary relays contacts are shown above. The contacts are rated for 1A 250VAC or 1A 32VDC and have >1kV isolation to the coils.

The pin configuration is: (Pin 1 location in Figure 3.8)

Relay #	Pin #	Pin function
1	1	N.O. (normally open)
	2	N.C. (normally closed)
	3	C (common)
2	4	N.O.
	5	N.C.
	6	C
3	7	N.O.
	8	N.C.
	9	C
4	10	N.O.
	11	N.C.
	12	C
5	13	N.O.
	14	N.C.
	15	C

The relays, being user configurable, can be arranged to activate for multiple alarm conditions or a single alarm only. The logic can be inverted for individual relays so that one becomes a controller failure indicator (use the normally closed contact as this will also indicate if the relay power has failed).

3.8 CONTROLLER POWER CONNECTIONS

Power for the Controller and its peripherals is derived from the DC bus. No additional user connections are required to power the Controller or provide system voltage regulation.

3.9 FRONT PANEL USB COMMUNICATIONS CONNECTION

The front USB port on the Controller is configured as USB-slave and has a B-type connector. A standard USB A-to-B cable is required. The Controller can only communicate via the USB port to a PC running the Sageview software.

The USB connection requires that a USB driver be installed on the PC. The first time the Controller is plugged into the PC via the USB port, a Microsoft® Windows dialogue box will appear asking the user to install the Controller USB Interface drivers. The Microsoft® Windows operating system should be able to find the drivers automatically on the Sageview CD-ROM, assuming it is in the CD-ROM drive of the PC.

If Sageview is running when the unit is plugged in, a Windows dialogue box will appear asking the user if they wish to connect to the unit immediately. Otherwise, the user will need to select the Controller from the available controller USB devices in USB section in the Connection Setup.

3.10 REMOTE COMMUNICATION CONNECTION

The optional remote communications modules can be one of the following:

<i>P/N</i>	<i>Description</i>	
103.4014.00	TCP/IP Interface Card	
103.4015.00	Ethernet TCP/IP Interface Card w/SNMP	{Superseded by 103.4036.00
103.4036.00	Ethernet TCP/IP Interface Card w/SNMP v3	

The following sections describe the interfaces in more detail and cover some of the set up requirements for the more advanced interfaces.

Due to the slow data rate (9600bps), termination of the line with resistors generally is not required. However, if high rate of data corruption is experienced (slow data update in monitoring program), line termination resistors should be installed at both ends of the network. The value of the resistors depends on the gauge of the twisted pair and should be equal (or closest) to line characteristic impedance. I.e. for a twisted pair of 24AWG wires characteristic impedance of 100ohm – use a 100-ohm resistor.

3.10.1 TCP/IP and Sageview Interfaces

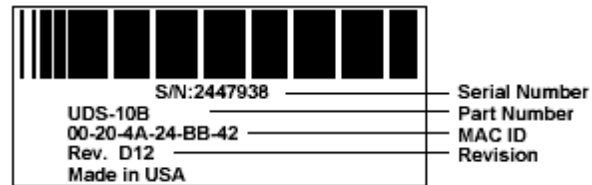
The interface is a 10/100BASE-T Ethernet adaptor. The TCP/IP port sends Controller data over a network to a PC running Sageview control and monitoring software. The Sageview interface provides this function for up to 2 PCs on the network simultaneously as well as providing SNMP traps on alarms, system time synchronization to a global clock if access to the internet is available, and a simplified system status Webpage (HTTP). Both units have the same footprint and connections. If direct connection to a PC network port is required, a crossover network cable should be used. To set up Sageview, follow the instructions on the installation CD.

To enable network access on the TCP/IP port, an IP address must be assigned to the port. If access over the Internet is considered, the gateway address must be programmed as well. There are several methods to do that, two are recommended and are described in Appendix A. Other operating parameters of the interface are pre-programmed and should not be changed.

To be able to assign a network address, the Ethernet address (referred to also as hardware address or MAC ID) of the interface must be known. A small label indicating the MAC ID similar to one shown below. The factory default IP address is 192.168.10.251.

Note: The interface IP address cannot be changed until the Power Module has been commissioned and the Controller is operational.

The MAC ID can have format
00-20-4A-24-BB-42 or
00:20:4A:24:BB:52.



3.11 AC OPTION BOX (LIST 41 & 61)

Lists 41 and 61 come pre-wired with individual AC Breaker, Battery Distribution Module (BDM), and Multi-Input Battery Temperature Board. The AC breakers provide protection to the rectifier. The battery distribution module allow for battery current monitoring via current transducers (opt). Up to four battery strings can be monitored. The BDM can also monitor up to four external battery circuit breakers. The battery temperature board allows monitoring with optional temperature sensors. All boards are factory wired and allow for easy customer connection access.

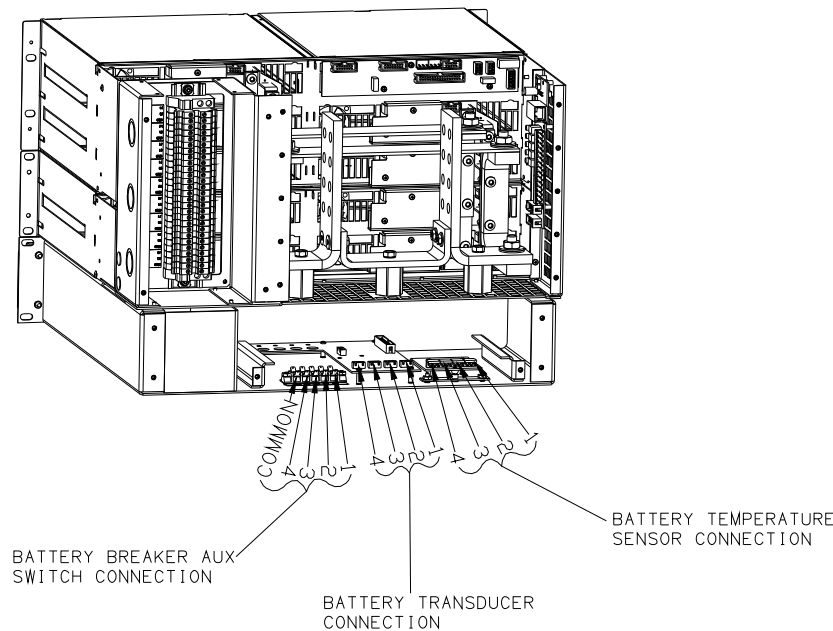


Figure 3-14 AC Option Box Rear View (screens removed for clarity)

3.12 ADDING AUXILIARY EXPANSION MODULES

Modules such as the Sageon Battery Monitor, AC monitor, and site monitor are daisy chained from the unused ribbon cable connection provided on the Auxiliary programmable relay board. All of these expansion modules are required to be mounted external to the Power Module, and a single 16-way ribbon cable connected to the available box-header.

For more detailed installation information for each of these modules, refer to the Sageon Battery Monitor Operation Manual (PM990-4209-00) and the Sageon Site Monitor Application Note (AN103-4012-00).

4. COMMISSIONING

With all the batteries, load and AC cabling wired, and checked for correct polarity, the system is commissioned by the following steps:

- Ensure no rectifiers are installed in the Power Module and no load is applied.
- Plug in the Controller – it should power up off the battery. If not, it is possible that the battery polarity is reversed.
- Set up the Controller menu items for:
 - number of batteries and size (Ah),
 - number of rectifiers,
 - set the required float and equalize voltages,
 - set BLVDS option to Auto and set the BLVDS Aux to “Normally Open”
 - set the Battery Switch to “Normally Open”
 - set the Cct Switch to “Normally Open”
 - set the Battery Transducer FS as 400 Amps
 - set the amount of battery temperature compensation voltage adjustment if used and after confirming that the battery temperature is being measured
 - set the battery charging current limit to 10% of the Ah rating (i.e. if 150Ah battery is used, set the limit to 15A) – this value can be adjusted later to meet your specific charging requirements.

In many cases, these values are set up in the factory and will only require modification if the particular battery is being used requires a different set up.
- Close the remaining battery circuit breakers if more than one string is used.
- Insert a switch-mode rectifier in position 1 and apply the AC power. The rectifier unit should power up and begin charging the battery bank/s.
- Insert all the remaining rectifiers and apply AC power to them.
- Check that the bus voltage is increasing toward the float voltage.
- Close the load circuit breakers and check that the loads power up.
- Wait for 1 minute and check that the rectifiers are all sharing the load current to within +/-2A of the average rectifier current.
- The system is up and operational. Adjust any operational monitoring or setup details as required (see the next section on Operation or refer to the Controller Operation Manual on the CD for a detailed explanation of the functions).

5. OPERATION

System operation is controlled by the Controller system controller. As a result, operation information for the system is directly related to the operation of the Controller as described in this section.

5.1 SUMMARY OF CONTROLLER FRONT PANEL CONTROLS

There are four Menus that can be viewed using the INC or DEC buttons:

- a) The default or "Home" menu that contains general system information;
- b) RECTIFIER menu - contains all the parameters relating to the switch-mode rectifiers (RECTIFIER);
- c) Battery menu - contains all the parameters relating to the batteries;
- d) Alarms log - which is a chronological record of the last 100 alarms.

Moving from one menu to another

If no button has been pressed for two minutes, the display will revert back to the Home screen. This shows the output voltage and load current.

To move from any menu to any other menu, press the corresponding button. e.g. to move to the Battery Menu from any other menu, momentarily press the BATT button.

To move to the Home menu from any other menu, press the button of the current menu. e.g. if in the RECTIFIER menu, press RECTIFIER button to return to the Home menu.

Scrolling through the Menus:

To scroll through any menu from the first screen to the last, press the INC button;

To scroll to the last (bottom) screen first, then upwards through the menu to the first screen, press the DEC button.

Incrementing and decrementing programmable parameters

To change a programmable parameter press ENTER; the value will flash on and off. To increase the number, press INC; to decrease the number press DEC. When the desired number is on the screen, press ENTER again.

To change parameters when the security function is activated

If an attempt is made to alter any parameter when the security function is activated, the display will show the message "Enter Password".

To change a parameter, enter a valid password. Then proceed to change the parameter in the normal way.

When scrolling through the Alarms log

To observe the date and time of a given alarm, do not press any button for at least two seconds. The date and time will display for two seconds and then the alarm name will be displayed for two seconds. The display will alternate between the two screens in this manner until a button is pressed.

5.2 CONTROLLER COMPONENTS

5.2.1 Alpha-numeric Display

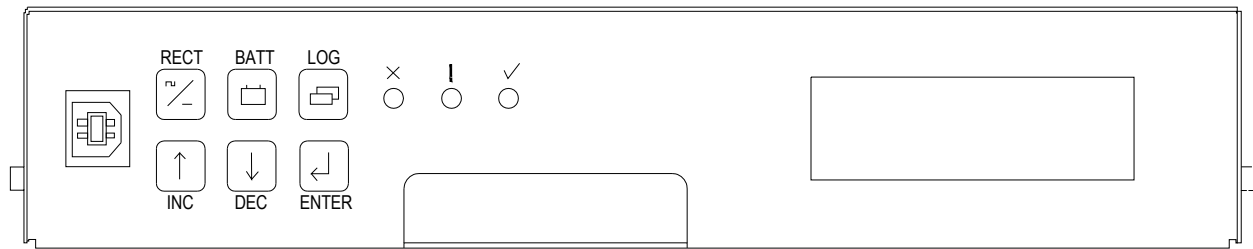
The user interface is a two-line by 16 character alphanumeric LED display. The 5mm high characters normally display output voltage and current as well as the system status - Float (FL) or Equalize (EQ). This is the default or "home" screen. If an activity such as battery discharge testing is being performed, the current and voltage are always displayed, while the second line alternates between the system status (FL/EQ) and the activity status, for example "BDT in progress".

104A 54.5V
FL

Whenever there is no push-button activity for more than one minute, the display always reverts to this home screen. Note: the examples shown are for 48V systems.

5.2.2 Front Panel Pushbuttons

There are six pushbuttons associated with the LED screen for entering different Menus and for scrolling through the menus. The layout of the pushbuttons is shown below:



Apart from the base menu (system parameters), there are three other menus that can be accessed by momentarily pressing the relevant pushbuttons:

- RECTIFIER** menu, which includes the rectifier related programmed parameters as well as the output current and heat-sink temperature for each rectifier;
- BATTERY** menu in which all the parameters relating to the batteries are found;
- LOG** which stores the individual alarm event information together with date and time starting with the most recent alarm. A total of 100 alarms are stored.

5.2.3 Status Indicating LEDs (Controller)

SYSTEM OK	✓	Green LED	All LEDs off, indicates the unit is off due to either DC power not present, or there is an internal failure of Controller
ALARM	!	Amber LED	The amber LED indicates any alarm condition, either system or rectifier related.
RECTIFIER SHUTDOWN	×	Red LED	The red LED indicates that one or more of the rectifiers in the system is shut down.

5.3 CONTROLLER SECURITY & ALARMS

5.3.1 Password security

Controller features password security for setting of parameter. A valid password is an alphanumerical code having minimum three and maximum eight characters.

Units leave the factory without a pre-programmed password and the security function is not active. To activate the security, a password must be programmed. Once that is done, security can be enabled.

5.3.1.1 Entering a password to gain access to parameters change

When the security function is active, any changes to the system settings can be done only after a valid password was entered. When the ENTER key is pressed to change a parameter, the display will show a message “Enter Password” on the top line and a blinking cursor on the right hand side of the bottom line. Using INC and DEC keys scroll to the first character of the password and press ENTER. The character will be substituted by an asterisk (*) displayed to the left of the cursor. Enter all characters of the password the same way. If the password is less than eight characters long press ENTER again after last character. If the entered password was correct, the display will return to the selected parameter ready for modification. If the entry was incorrect, the following will be displayed.

**Wrong Password
Panel Locked**

There is no limit on password entry re-tries. To abort password entry any of the top row buttons should be pressed. The display will return to the selected parameter. Once unlocked, the security is disabled until there is no keypad activity for >1 minute.

5.3.2 When an alarm condition exists

If one or more alarm conditions exist at any time, the following message will alternate with the “home” screen for 2 seconds every six seconds in addition to warning LED indicators:

3 Alarms
Press ENTER

In this case, the message indicates that there are three alarms present and they can be observed by pressing the ENTER button.

When the ENTER button is pressed the most recent alarm name, such as the one shown below will appear on the display.

Alarm 1
Amb Temp High

If no button is pressed again for one minute, the display will revert to the “home” screen and the sequence begins again. To view the remaining alarms, use INC and DEC buttons. Pressing the ENTER button will return the display to the “home” screen. The time and date of any given alarm can be obtained by entering the ALARM LOG menu.

5.3.3 Controller Alarms

A list of all the possible alarms that can be enunciated is shown in the following table.

Alarm Name	Comments	LED
RECTIFIER Alarm	Combination of one or more RECTIFIER alarms	A
RECTIFIER Urgent	One or more RECTIFIERS have shut down	A+R
RECTIFIER HVSD	RECTIFIER shut down due to output over-voltage	A+R
UNIT OFF	RECTIFIER is off	A+R
No Response	A particular RECTIFIER is not responding to the Controller	A
Power Limit	RECTIFIER is in Power Limit	A
No Load	RECTIFIER output current less than minimum for RECTIFIER type used	A
Current Limit	RECTIFIER in current limit	A
Voltage High	Voltage measured by RECTIFIER too high	A
Voltage Low	Voltage measured by RECTIFIER too low	A
UNCAL RECTIFIER	RECTIFIER Internal Adjustment for current sharing out of limits	A
EEPROM Fail	EEPROM failed (CSU or RECTIFIER)	A
Fan Fail	RECTIFIER Internal Fan failure alarm	A
Relay Fail	RECTIFIER output relay contact failure	A
No Demand	Control loop in RECTIFIER not in normal state	A
H/S Temp High	RECTIFIER heatsink temperature too high (where available)	A
Temp Sensor Fail	Temp sensor in RECTIFIER faulty - S/C or O/C (where available)	A+R
Vref Fail	Voltage reference in RECTIFIER microprocessor circuit faulty	A+R
HVDC not OK	DC/DC converter (boost) voltage in RECTIFIER not OK	A+R
AC Volt Fault – detected by RECTIFIERS	All RECTIFIERS are reporting AC fault. Available only on some RECTIFIER models.	A+R
AC Volt Fault – detected by Controller	None of RECTIFIERS are responding (AC fail assumed), or if AC monitor is used, AC voltage is out of limits set (When no AC monitoring module is used, this comes together with “RECTIFIER Comms Fault”)	A
AC Freq Fault	AC frequency lower or higher than preset value	A
Battery Switch	One or more battery switches open	A
Cct Breaker	Fuse or CB in load distribution open	A
LVDS Open	Low Voltage Disconnect switch open	A
Sys Volts High	System output volts too high	A
Sys Volts Low	System output volts too low	A
System V Clamp	CSU cannot reach desired system voltage. This can be due to possible excessive voltage drop along bus bars or “System V Drop” parameter has value too low.	A
Cell V High	One or more cells being monitored by BCM is too high in voltage	A
Cell V Low	One or more cells being monitored by BCM is too low in voltage	A
Cell %dev High	One or more cells being monitored by BCM is too high % deviation from the mean battery cell voltage	A
Cell %dev Low	One or more cells being monitored by BCM is too low % deviation from the mean battery cell voltage	A
Range RECTIFIER	RECTIFIER parameter range error. Controller could not overwrite values	A
Site Monitor	Alarm present from the site monitor module. See site monitor menu for details of alarm channel.	A

Alarm Name	Comments	LED
Battery Disch	Batteries are discharging	A
Disch Tst Fail	Battery discharge test failed to reach a programmed end point	A
Bat Disch Low	Alarm flags only if the system voltage falls below Discharge Alarm level while the battery is discharging	A
Lo Electrolyte	Alarm generated for NiCad batteries using special sensor and software	A
RECTIFIER Comms Fail	One or more of RECTIFIERS are not responding	A
Amb Temp High	Ambient temperature higher than preset limit	A
Batt Temp High	Battery temperature higher than preset limit	A
Batt Temp Sens	Battery temperature sensor not connected or failure	A
Batt I-Limit	Battery charging current is being limited to preset value	A
Bat Sym Alarm	Battery discharge currents from battery strings not sharing load equally	A
Earth Leak Alarm	Earth leakage current greater than the limit set	A
Equalize	System is in equalize mode	A *

R = red LED on

A = amber LED flashing

* not flashing

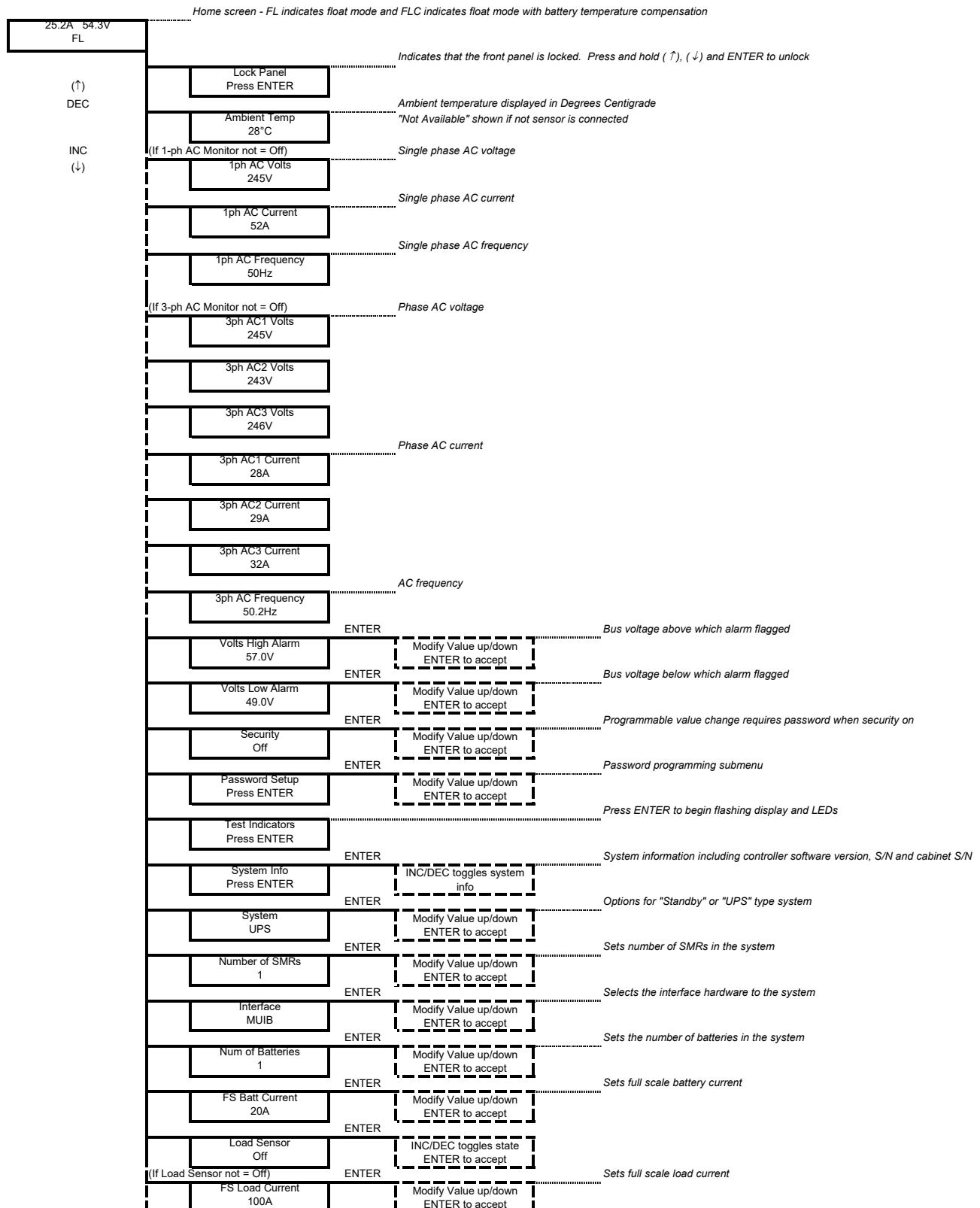
5.3.4 User programmable relay functions

Units are shipped with factory default relay assignments (see below). The relay logic of the default settings is contact closure on an active alarm. Relay functions can be re-assigned only from a PC running monitoring program Sageview (either through the front panel USB or remote communications port). Refer to Sageview Help for instructions.

<i>Relay Default Assignments</i>				
1	2	3	4	5
Not Assigned	Not Assigned	HV Shutdown	General Alarm	RECTIFIER Shutdown
<i>Customer Relay Assignments (User to complete)</i>				

5.4 NAVIGATING CONTROLLER FUNCTIONS

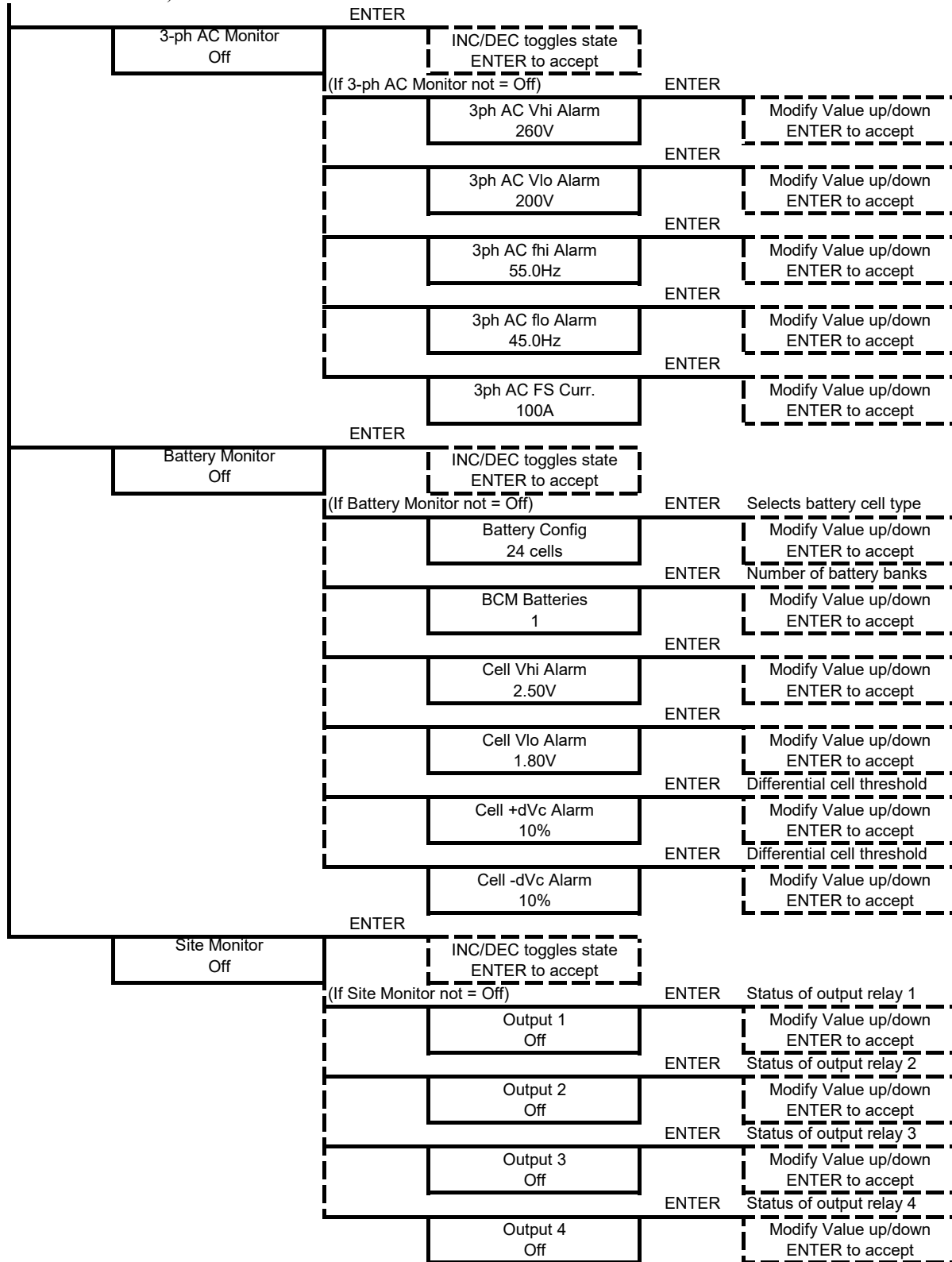
5.4.1 Base Menu (System Level Functions)



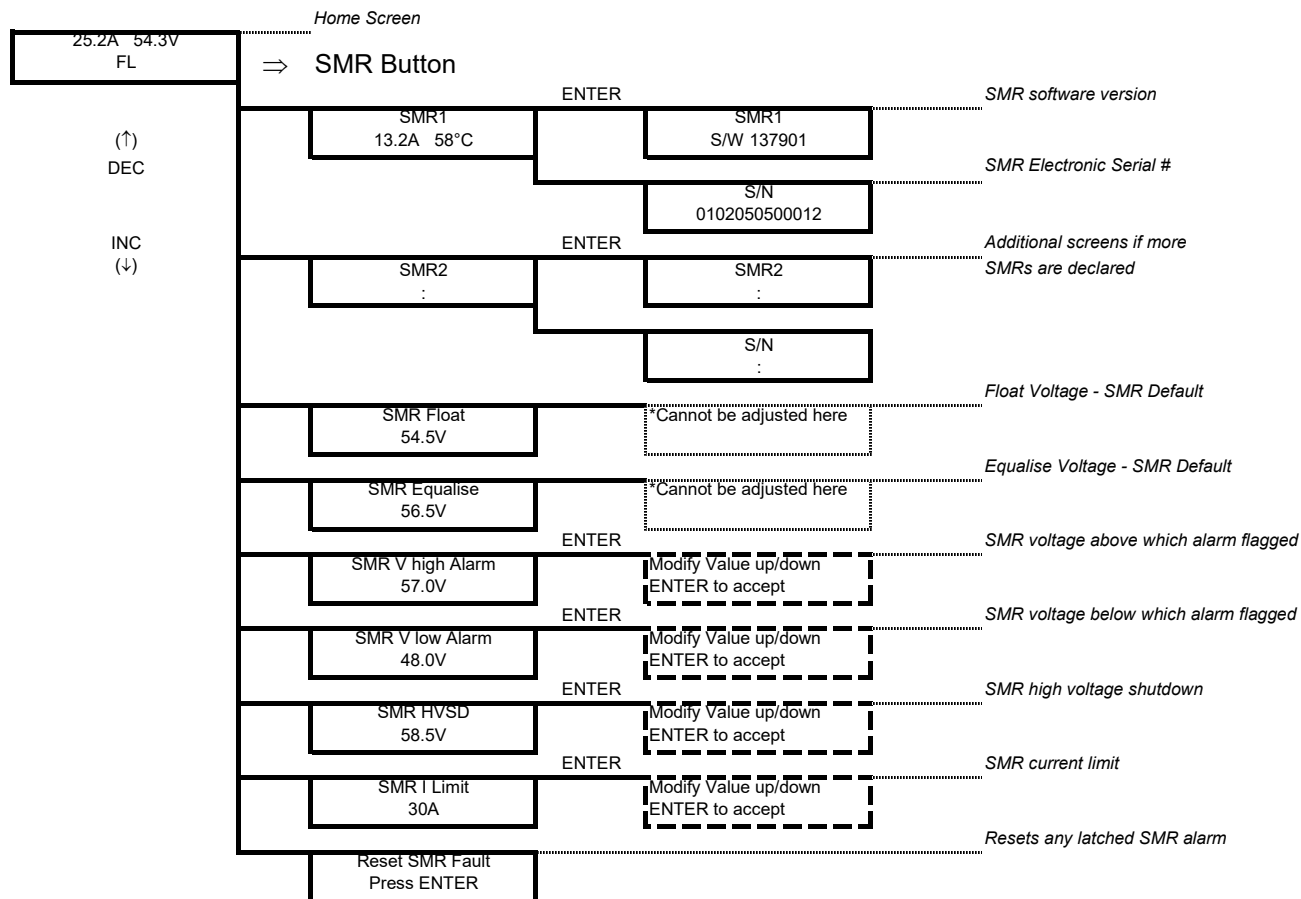
(Base Menu continued)

Access Code 0000000		ENTER	Modify Value up/down ENTER to accept	Sets MiniCSU-3 access code address
Date Format DD/MM/YYYY		ENTER	Modify Value up/down ENTER to accept	
Date 25/12/2005 Time 01:11:11		ENTER	ENTER selects hours, minutes, day, month or year INC/DEC modifies value	
Alarm Report Off		ENTER	INC/DEC toggles state ENTER to accept	
Daily Report Off		ENTER	INC/DEC toggles state ENTER to accept	
(If Daily Rep not = Off)		ENTER		
Daily Rep Time 15:15		ENTER	INC/DEC toggles state ENTER to accept	
Modem Off		ENTER	INC/DEC toggles state ENTER to accept	
(If Modem not = Off)		ENTER		
Country Code 61		ENTER	Modify Value up/down ENTER to accept	
Cust Init String None		ENTER	Modify Value up/down ENTER to accept	External modem initialisation string
Phone 1 0398887788		ENTER	Modify Value up/down ENTER to accept	
Phone 1 Cont 2323		ENTER	Modify Value up/down ENTER to accept	
Phone 2 0398887788		ENTER	Modify Value up/down ENTER to accept	
Phone 2 Cont 2323		ENTER	Modify Value up/down ENTER to accept	
Phone 3 0398887788		ENTER	Modify Value up/down ENTER to accept	
Phone 3 Cont 2323		ENTER	Modify Value up/down ENTER to accept	
Audio Alarm Off		ENTER	INC/DEC toggles state ENTER to accept	
Cct Input Not Used		ENTER	INC/DEC toggles state ENTER to accept	Circuit breaker auxiliary contact circuit input configuration
Batt Switch Input Not Used		ENTER	INC/DEC toggles state ENTER to accept	Battery circuit breaker auxiliary contact circuit input configuration
LVDS Input Not Used		ENTER	INC/DEC toggles state ENTER to accept	Battery low voltage disconnect switch auxiliary circuit input configuration
Auxiliary Units Press ENTER		ENTER		
1-ph AC Monitor Off		ENTER	INC/DEC toggles state ENTER to accept	
(If 1-ph AC Monitor not = Off)		ENTER		
1ph AC Vhi Alarm 260V		ENTER	Modify Value up/down ENTER to accept	
1ph AC Vlo Alarm 200V		ENTER	Modify Value up/down ENTER to accept	
1ph AC fhi Alarm 55.0Hz		ENTER	Modify Value up/down ENTER to accept	
1ph AC flo Alarm 45.0Hz		ENTER	Modify Value up/down ENTER to accept	
1ph AC FS Curr. 100A		ENTER	Modify Value up/down ENTER to accept	

(Base Menu continued)

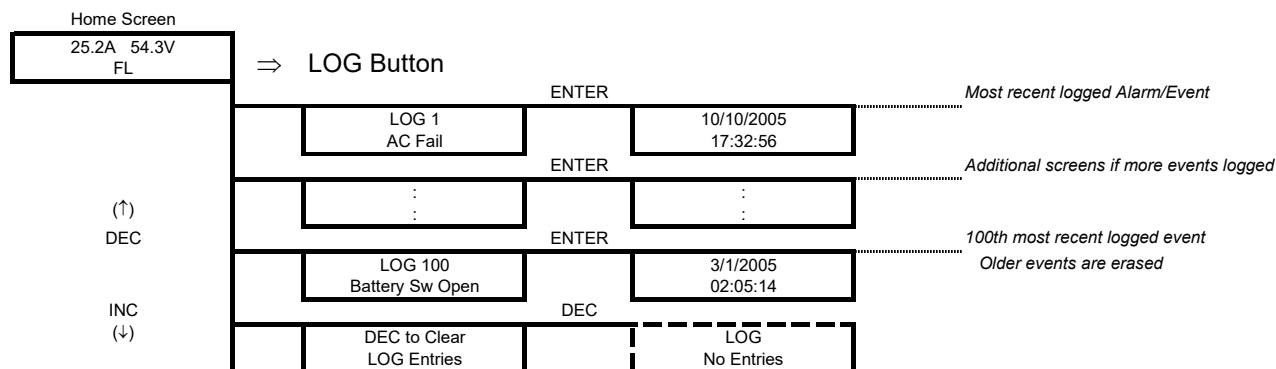


5.4.2 RECTIFIER Menu (Rectifier Specific Functions)

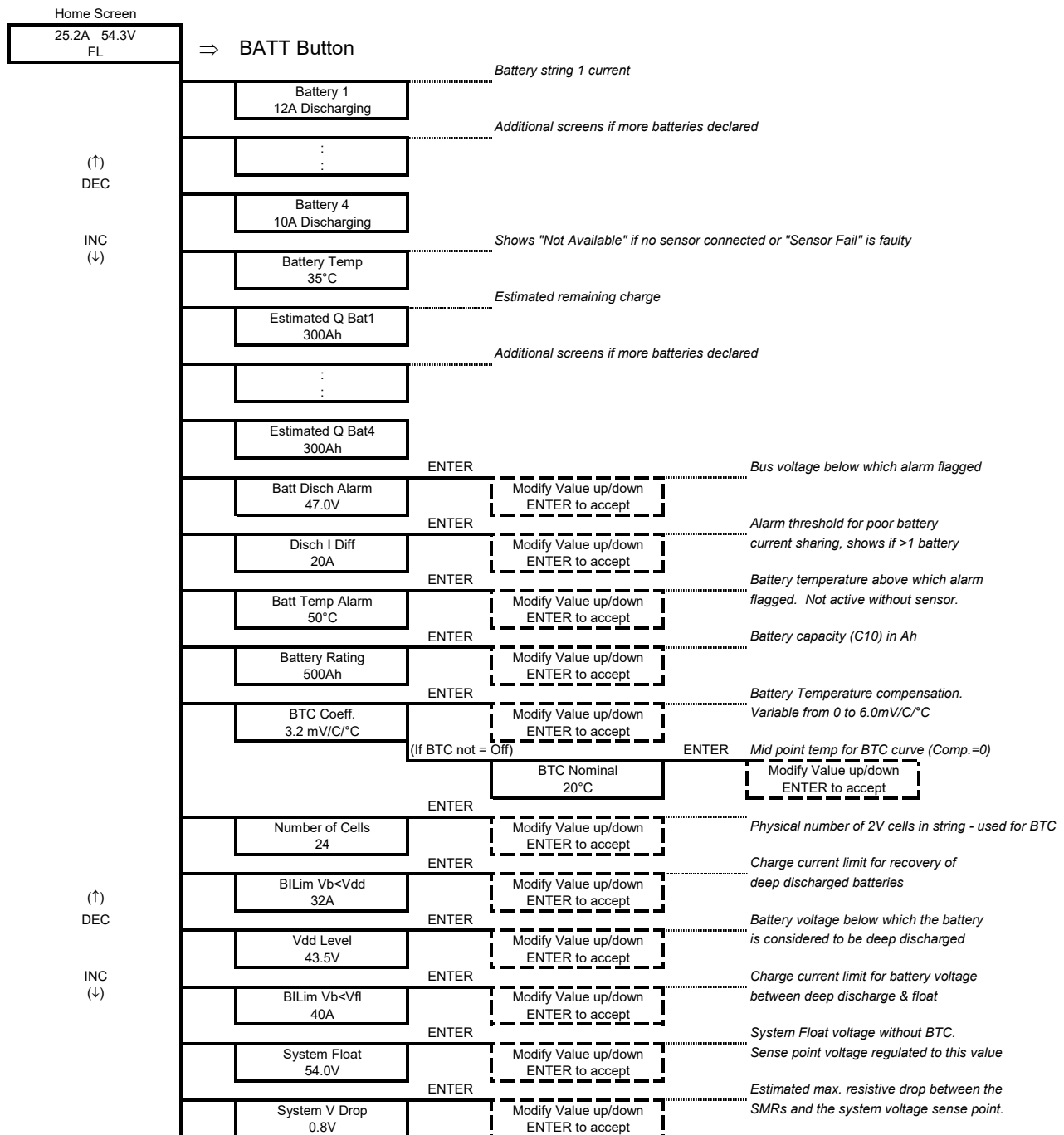


The RECTIFIER Float and Equalize voltages are the default values set in the rectifier that will be used if the Controller fails to operate. They are a copy of the raw values set in the BATTERY menu without battery temperature compensation and system drop adjustments.

5.4.3 Alarm Log



5.4.4 Battery Menu (Battery Specific Functions)



(Battery Menu continued)

(↑) DEC INC (↓)	ENTER		Equalisation On	ENTER	ENTER toggles state Off / On	Enable/disable Equalisation charging
	ENTER		BILim Vb>Vfi 20A	ENTER	Modify Value up/down ENTER to accept	Charge current limit for battery voltage between float & equalise
	ENTER		System Equalise 56.5V	ENTER	Modify Value up/down ENTER to accept	System Equalise voltage without BTC. Sense point voltage regulated to this value
	ENTER		Volts Start Eq On	ENTER	ENTER toggles state Off / On	Enable/disable bus voltage discharge triggering of equalisation charging
	ENTER			ENTER	Volts Eq Trigger 46.0V	Threshold below which Eq is triggered
	ENTER			ENTER	Modify Value up/down ENTER to accept	Modify Value up/down ENTER to accept
	ENTER		Q Start Eq On	ENTER	ENTER toggles state Off / On	Enable/disable battery capacity loss triggering of equalisation charging
	ENTER			ENTER	Q Loss Trigger 25Ah	Threshold below which Eq is triggered
	ENTER			ENTER	Modify Value up/down ENTER to accept	Modify Value up/down ENTER to accept
	ENTER		EQ End Current 15A	ENTER	Modify Value up/down ENTER to accept	Battery charging current below which equalisation charging terminates
	ENTER			ENTER		Maximum duration of equalisation
	ENTER		EQ Duration 3 hours	ENTER	Modify Value up/down ENTER to accept	Maximum duration of equalisation
	ENTER			ENTER		Periodic equalisation charging trigger
	ENTER		EQ Period 12 Weeks	ENTER	Modify Value up/down ENTER to accept	Set to zero to disable
	ENTER			ENTER		Manual control of equalisation
	ENTER		Manual Start Eq Press ENTER	ENTER	ENTER toggles state Start / Stop	Manual control of equalisation
	ENTER			ENTER		Battery voltage below which the LVDS opens when in Auto mode.
	ENTER		LVDS Trip 43.0V	ENTER	Modify Value up/down ENTER to accept	Battery voltage below which the LVDS opens when in Auto mode.
	ENTER			ENTER		LVDS (where used) operation mode.
	ENTER		LVDS Mode Auto	ENTER	Modify Value up/down ENTER to accept	[Auto, Open, or Closed]
	ENTER			ENTER		Enable/disable battery overtemperature alarm - set to off if no sensor used.
	ENTER		Temp Sen Alarm On	ENTER	ENTER toggles state Off / On	Enable/disable battery overtemperature alarm - set to off if no sensor used.
	ENTER			ENTER		Periodic battery discharge test trigger
	ENTER		BDT Period 14 Days	ENTER	Modify Value up/down ENTER to accept	Set to zero to disable
	ENTER			ENTER		Time of day to begin automatic discharge testing
	ENTER		BDT Time 21:35	ENTER	Modify Value up/down ENTER to accept	Time of day to begin automatic discharge testing
	ENTER			ENTER		Maximum duration of a discharge test
	ENTER		BDT Duration 1h30min	ENTER	Modify Value up/down ENTER to accept	Maximum duration of a discharge test
	ENTER			ENTER		Discharge test current (controlled)
	ENTER		BDT Current 50A	ENTER	Modify Value up/down ENTER to accept	Load must be > the value programmed
	ENTER			ENTER		Battery voltage below which the BDT terminates.
	ENTER		BDT End V 46.5V	ENTER	Modify Value up/down ENTER to accept	Battery voltage below which the BDT terminates.
	ENTER			ENTER		Battery loss of capacity below which the BDT terminates.
	ENTER		BDT End Q 150Ah	ENTER	Modify Value up/down ENTER to accept	Battery loss of capacity below which the BDT terminates.
	ENTER			ENTER		Result of the Last discharge test
	ENTER		Last BDT Passed	ENTER		Result of the Last discharge test

More detailed explanations of all the menu items are available in the Controller Operation PDF on the Manual CD.

6. TROUBLESHOOTING

<i>Symptom</i>	<i>Likely Causes</i>	<i>Action</i>
Rectifiers do not power up – no LEDs lit on front panel	AC power is not connected or internal fuse blown or rectifier not properly plugged in.	Re-insert rectifier(s) and make sure the rear connections are good. Confirm that AC power is available to the rectifier backplanes. Replace the rectifier module if the unit is suspected to have failed.
No output current from rectifiers and the Green LED on each rectifier blinks occasionally	AC power either <70VAC or >320VAC. An internal relay will be heard open and close periodically if the AC voltage is excessive.	Check that the AC supply voltage and connection arrangement are correct and match the expected system supply wiring.
Over-temperature alarm or fan failure alarm present	High ambient temperature. Fan air intake/exhaust vents are blocked or a fan is jammed with a foreign object or excessive dust.	Check the ambient temperature and improve site cooling if possible. Check and remove obstructions from the air vents. Replace the module or remove and replace the fan assemblies in the module (requires only that the rectifier lid be removed)
BLVD will not close	One or more batteries are reverse polarity. No battery is connected to the battery distribution module. Fuse link blown in the battery distribution module (BDM). Controller setting for LVDS is “Open”. Controller setting for LVDS is “Auto” and the DC bus voltage was < LVDS trip threshold and has not increased to the float voltage.	Check battery wiring polarity. Connect a battery. Check that the Controller is powered up even when no rectifier is operational. If not, service the fuses in the BDM. Change the Controller LVDS setting to “Closed” or “Auto”. Power up the rectifiers and reduce the load until the bus voltage increases to the float voltage.
Load or Battery circuit breaker alarm does not set when the breaker is opened or is incorrectly alarmed as battery switch instead of load trip or visa-versa.	No battery or load is connected to the circuit breaker connection. Alarm link in BDM is incorrectly configured.	Check load and battery connections to the BDM and that the alarm links are correctly configured.
Battery or Ambient temperature sensor reading is indicated as “Not Available”	Sensor / cable faulty. Sensor connector reversed. No sensor installed.	Turn cable connector around and reconnect. Replace faulty sensor assembly.
Battery current indicated does not match independent measurement.	Full-scale current of the DC hall effect current transducer is incorrectly set and will result in an error larger than +/- 5% at more than 50% full-scale current.	Change the setting of the “FS Batt Curr” value in the Base Menu of Controller to the correct full-scale value.
Battery current indicates 0A when more than 5A is flowing in the battery or is inaccurate at low currents (<5A)	DC hall effect transducer or wiring is faulty. Current transducer sensitivity is too low for 1A measurement	Service the DC current transducer in the BDM – check the wiring is intact and still connected properly, or replace the DC CT is suspected to be faulty Revise size of DC CT full-scale value for the size of the load and battery charging requirements.
Load current indicates 0A when known to be >5A	Number of RECTIFIERS is incorrectly set too low or the battery current FS is set too high. The load current is calculated from the sum of the RECTIFIER currents minus the measured battery currents	Check that the number of RECTIFIERS in the Controller Base menu matches the actual number of rectifier modules installed. Check the Battery DC CT rated full-scale value is correctly set in the Base menu.

<i>Symptom</i>	<i>Likely Causes</i>	<i>Action</i>
One unit is alarmed as HVSD (high voltage shutdown) and is latched off.	The unit has developed a fault that causes it to output a voltage above the HVSD protection limit and has been supplying load current while above this voltage limit. A random event on the DC bus has occurred that forced a unit into HVSD.	Replacing the rectifier module is recommended. However, a random event may have triggered the HVSD and to determine if the unit has a real fault, the HVSD latched alarm can be reset using the “Reset Latched Alarm” function in the Controller RECTIFIER Menu. (If the system does not have any batteries, cycling the AC power will have the same effect). If the unit does not recover by latching off again, it is faulty.
“RECTIFIER Urgent” alarm activated	One or many RECTIFIERS are off due to AC power failure, internal faults, incorrect command signal from Controller or all rectifiers are in current limit	Check the AC power and restore. Replace faulty rectifier modules. Check for DC bus overload faults.
All units are latched off as HVSD	Absolute Overvoltage shutdown protection activated. The system is likely to have no load and without a battery. An event on the DC bus has caused the voltage to exceed 70V for 48V systems or 35V for 24V systems. The event could be caused either by a faulty rectifier or other equipment connected to the bus.	Add a small amount of load (>2A per rectifier) to the system and check for a faulty rectifier. Check for other faulty equipment connected to the bus that could cause the overvoltage transient. Use the “Reset Latched Alarm” from the Controller to reset the system.
A rectifier is indicating “RECTIFIER Off” or “No Response” on the Controller RECTIFIER display CONTINUE: A rectifier is indicating “RECTIFIER Off” or “No Response” on the Controller RECTIFIER display	An AC failure to the rectifier is the most likely cause. While the rectifier internal power rails are still available, the unit will communicate with “RECTIFIER Off” if the AC has failed on its input. Once the internal power dies, the unit will no longer communicate and Controller will indicate “No Response”. “No Response” all the time and the RECTIFIER is known to have AC power indicates a communications wiring problem.	Check the AC feed to the rectifier for a tripped circuit breaker, blown fuse or faulty connection. Check the RECTIFIER communications 10-way ribbon cable for broken connections and replace cable if necessary.
One or more rectifiers has a current limit or power limit alarm activated	Total load, including battery-charging current is equal to the output limits of the rectifiers. (System overload) One rectifier in current limit only indicates a likely calibration problem with the module. The Controller can usually compensate for an out of calibration unit in a system and will take a few minutes to adjust the unit to correctly share the load.	Revise the load level on the system and expand the number of rectifiers as required to remove the overload condition.
One rectifier has an “UNCAL RECTIFIER” alarm	The Controller has not been able to make the unit share the load with the other units. Either the RECTIFIER is faulty (excessive internal voltage drop) and cannot be adjusted to share load, or it is too far out of calibration.	Replace the rectifier module. Send the unit for repair and re-calibration.
“System Voltage Clamp” alarm activated	Controller cannot reach the desired system voltage. This can be due to possible excessive voltage drop along the DC bus bars, inside one or more rectifiers or “System V Drop” parameter has been	Increase “Sys V Drop” parameter. Replace faulty rectifier (unlikely to current share as well). Check that the number of RECTIFIERS in the system is correctly set (more

<i>Symptom</i>	<i>Likely Causes</i>	<i>Action</i>
	set too low. If this alarm comes up during equalize, the maximum output voltage from the rectifier may not be high enough to overcome the system drops to the sense point and allow the system to regulate at the desired high equalize voltage.	RECTIFIERs than declared can generate this problem). Revise the requirements for high equalize voltage level.
RECTIFIER “EEPROM Fail” alarm is activated as indicated at the RECTIFIER Menu for a particular RECTIFIER.	Corrupted data found on the EEPROM inside the rectifier that is outside the allowable data range. The rectifier software has attempted to over-write and has failed due to the memory cell being damaged. Note: excessive electrical noise can corrupt the read data transfer, which can lead to the same alarm being generated.	Replace the faulty rectifier if the memory cell is confirmed to have failed. This can be done by, modifying each of the RECTIFIER parameters on the Controller and checking to see if the alarm clears. (EEPROM corrects the data). Check for EMC problems and remove/reduce the source of electrical interference where possible.
“EEPROM Fail” alarm for the Controller is activated.	Corrupted data found on the backplane EEPROM that is outside the allowable data range. (similar to RECTIFIER corruption above)	Replace the faulty backplane if the memory cell is confirmed to have failed.
“Range RECTIFIER” alarm for the rectifier is activated.	Corrupted data found on the EEPROM inside the rectifier that is inside the allowable data range but does not match the value programmed.	Try adjusting the RECTIFIER parameters to see if the EEPROM cells can be updated. If not, replace the faulty rectifier.

6.1 TO REMOVE A RECTIFIER MODULE OR A CONTROLLER

Lift the securing latch in the centre divider adjacent to the module and pull the module out of the Power Module.

When removing modules, especially if the ambient temperature is high and the unit has been operating at maximum load, avoid skin contact with the metal casing as it may be too hot to touch. Pull the unit halfway out of the magazine and let cool for 2-3 minutes before handling.

6.2 TO INSERT A RECTIFIER MODULE OR A CONTROLLER

Insert the module into the slot and ensure alignment with the fold-out rails in the magazine. Push the module all the way in so the rear connector fully mates and the securing latch spring clicks back down into place.

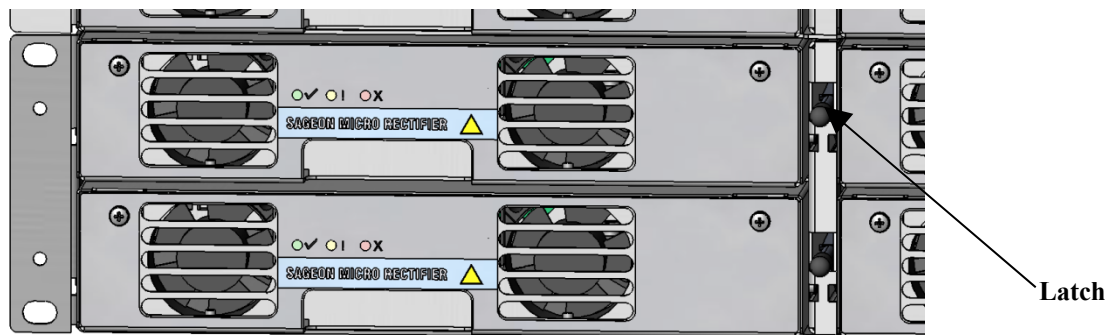


Figure 6-1 Removing Rectifier Module or Controller

7. APPENDIX A – SETTING UP NETWORK INTERFACES

7.1 PROGRAMMING IP ADDRESSES USING DEVICE INSTALLER SOFTWARE

This is the simplest way of programming the interface operating parameters; no high level of computer skills is required. Device Installer is a software utility package developed by Lantronix. It includes a number of handy tools making programming of various parameters and firmware update very easy. The installation package is available for free download from Lantronix. At the time of publication it was located at following Web address:

<http://www.lantronix.com/support/utlils/dst/index.html>

Run DeviceInstaller.exe. You will be guided through the installation process.

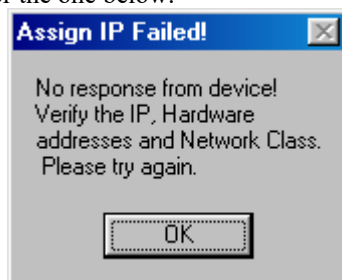
7.1.1 Preparations for local address set up

- From your network administrator obtain the new IP address. Also ask for your network class.
- Connect PC to the controller's network interface (directly or via a network).
- Power-up the controller.
- Start Device Installer program.

7.1.2 Local IP address set up procedure

- On Device Installer tool bar click "IP" button. A new window "Assign IP Address" will open.
- Enter the unit Ethernet address/MAC ID as stated on information label.
- Enter assigned new IP address.
- Select correct network class.
- Click "Set IP Address" button.

The process takes several seconds to complete and the progress is indicated below IP address field. When completed, a dialog box will pop-up showing a success message, or the one below.



Often it is a false alarm. To verify if the unit has in fact been programmed, do following:

- On Device Installer tool bar click "Search Network" button (first on the left hand side). A new window "Search Network for Devices" will open
- In the new window check selection of the network class, then click "Start Search" button. After search is completed, check the window for address you just tried to program (there may be many addresses listed).
- If the new address is listed, click "Save" button. Details of new device will be added to the Device Installer data base.
- If the new address is NOT listed, repeat the programming procedure.

7.1.3 Preparations for gateway address set up

- From your network administrator obtain the gateway IP address
- Connect a PC to the controller's network interface (directly or via a network).
- Power-up the controller.
- Start Device Installer program.

7.1.4 Gateway IP address set up procedure

- In Device Installer device list select the address of the unit you want to configure.
- On Device Installer tool bar click "Manage device configuration button". A new window "Device Management" will open.
- Click "Telnet to Device" button.
- Telnet window will open, showing a message similar to the one below:

*** Lantronix Cobox Universal Device Server ***
 Serial Number 1297-041 Software Version V03.9 (000211)

Press Enter to go into Setup Mode

Note: If Enter is not pressed within 3 seconds the connection will be terminated.

- If Enter was pressed within time-out window, a message similar to the sample below will be printed to Telnet window:

```
*** basic parameters
Hardware: Ethernet Autodetect
IP addr 192.168.000.098, no gateway set

***** Channel 1 *****
Baudrate 09600, I/F Mode 4C, Flow 00
Port 10001
Remote IP Addr: --- none ---, Port 00000
Connect Mode: C0 Disconn Mode: 00
Flush Mode: 00
```

```
Change Setup : 0 Server configuration
                1 Channel 1 configuration
                7 Factory defaults
                8 Exit without save
                9 Save and exit          Your choice ?
```

Type 0 followed by Enter.

The first item in server configuration is local IP address. That has been programmed already, but it is necessary to go through all bytes. Information in brackets shows current setting, which can be modified by typing new entry followed by Enter key.

Next item after IP address reads:

Set gateway IP address (N) [or (Y)]

If value is (Y) – just press Enter, if (N) – press ‘Y’ followed by enter. Next item will be:

Gateway IP address (nnn)

Enter assigned gateway address, then press Enter at each item until set up menu is shown again. Terminate Telnet session by typing 8 or 9.

7.2 PROGRAMMING IP ADDRESSES USING ARP AND TELNET ACCESS

Procedure described below is recommended for advanced users with understanding of operation of networks.

7.2.1 Preparations for local address set up

- From your network administrator obtain new IP address. Also ask for your network class.
- Connect PC to the controller’s network interface (directly or via a network).
- Power-up the controller

7.2.2 Local IP address set up procedure

The following section is excerpted from Lantronix "Embedded Integration Kit" Revision D 06/03/02, Part Number 900-226.

The unit’s IP address must be configured before a network connection is available. If the unit has no IP address, you can use Address Resolution Protocol (ARP) method from Windows-based systems to assign a temporary IP address. If you want to initially configure the unit through the network, follow these steps:

1. On a Windows-based host, create an entry in the host's ARP table using the intended IP address and the hardware address of the unit, which is found on the product label on the bottom of the unit.

```
arp -s 191.12.3.77 00-20-4A-xx-xx-xx
```

Notes:

- i. *The IP address used here is an example and a value within the range of allowable IP addresses in your network may need to be used. The DOS command ipconfig with display the IP address of the Windows-based host machine.*
 - ii. *For the ARP command to work on Windows 95, the ARP table on the PC must have at least one IP address defined other than its own.*
2. If you are using Windows 95, type ARP -A at the DOS command prompt to verify that there is at least one entry in the ARP table. If the local machine is the only entry, ping another IP address on your network to build a new entry in the ARP table; the IP address must be a host other than the machine on which you are working. Once there is at least one additional entry in the ARP table, use the following command to ARP an IP address to the unit:

```
arp -s 192.168.0.97 00-20-4a-xx-xx-xx
```

3. Open a Telnet connection to port 1. The connection will fail quickly, but the unit will temporarily change its IP address to the one designated in this step.

```
telnet 192.168.0.97 1
```

4. Finally, open a Telnet connection to port 9999, and press Enter within three seconds to go into Setup Mode. If you wait longer than three seconds, the unit will reboot.

```
telnet 192.168.0.97 9999
```

5. Set all required parameters

Note: The IP address you just set is temporary and will revert to the default value when the unit's power is reset unless you log into the unit and store the changes permanently. Refer to the chapter on configuration for instructions on permanently configuring the IP address.

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7.2.3 Configuring the Unit

The following section is excerpted from Lantronix "Embedded Integration Kit" Revision D 06/03/02, Part Number 900-226.

You must configure the Lantronix Interface so that it can communicate on a network with WinCSU-2 and communicate with the Sageon II Bulk Controllers unit via the serial port.

The unit's configuration is stored in nonvolatile memory (NVRAM) and is retained without power. You can change the configuration at any time. The unit performs a reset after the configuration has been changed and stored.

7.2.3.1 Using a Telnet Connection

To configure the unit over the network, establish a Telnet connection to port 9999.

1. From the Windows Start menu, click **Run** and type the following command, where x.x.x.x is the IP address and 9999 is the unit's fixed network configuration port number.

```
telnet x.x.x.x 9999 (Example: telnet 192.168.100.123 9999)
```

Note: Be sure to include a space between the IP address and 9999.

2. Click **OK**.

3. The Lantronix Universal Device Server window displays.

```
*** Lantronix Cobox Universal Device Server ***
```

```
Serial Number 1297-041 Software Version V03.9 (000211)
```

Press Enter to go into Setup Mode

4. To enter the Setup Mode, you must press Enter within 3 seconds.

```

*** basic parameters
Hardware: Ethernet Autodetect
IP addr 192.168.000.098, no gateway set

***** Channel 1 *****
Baudrate 09600, I/F Mode 4C, Flow 00
Port 10001
Remote IP Addr: --- none ---, Port 00000
Connect Mode: C0 Disconn Mode: 00
Flush Mode: 00

Change Setup : 0 Server configuration
                1 Channel 1 configuration
                7 Factory defaults
                8 Exit without save
                9 Save and exit          Your choice ?

```

5. Select an option on the menu by entering the number of the option in the **Your choice ?** field and pressing **Enter**.
6. To enter a value for a parameter, type the value and press **Enter**, or to confirm a current value, just press **Enter**.
7. When you are finished, save the new configurations (option **9**). The unit will reboot.

7.2.4 Server Configuration (Network Configuration)

These are the unit's basic network parameters. The following parameters are displayed when you select login into the unit:

```

*** basic parameters
Hardware: Ethernet Autodetect
IP addr 192.168.000.098, no gateway set

```

Select 0 and press Enter to configure the Lantronix Interface Server's basic parameters

IP Address

The IP address must be set to a unique value in your network.

Note: Lantronix Interface cannot connect to the network if the assigned IP address is already in use by another device.

Gateway Address

The gateway address, or router, allows communication to other LAN segments. The gateway address should be the IP address of the router connected to the same LAN segment as the *Lantronix Interface*.

Note: The gateway address must be within the local network.

Subnet Mask

A netmask defines the number of bits taken from the IP address that are assigned for the host section.

Note: Class A: 24 bits; Class B: 16 bits; Class C: 8 bits.

The *Lantronix Interface* prompts for the number of host bits to be entered, then calculates the netmask, which is displayed in standard decimal-dot notation when the saved parameters are displayed (for example, 255.255.255.0).

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8. SPECIFICATIONS FOR 110-7670-4850

Input AC

Voltage	Universal AC 85-300VAC (L-N. 1ph, 3ph-delta [option]. Fully protected up to 440VAC (L-N)
Inrush Current	<9A RMS per rectifier
Maximum Current	16A
THD	Line Harmonics meet EN61000-3-2
Power Factor	>0.98 for >50% output power

Output DC

Voltage	-48VDC systems, adjustable range 42.0V to 59.5V
Current Limit	50A per 48V rectifier module. Fully adjustable
Power Limit	2400W per rectifier module
Efficiency	>90% at 100% output power for 48VDC systems
Regulation	+/- 1% or better over line, load and temperature
Noise	<1mV RMS Psophometrically weighted <32dBnC Voiceband <10mV RMS and <100mV peak-to-peak (10kHz-100MHz)

Protection

Short Circuit	Can sustain short circuit at output terminals indefinitely
Reverse Battery Polarity	Internal fuse at output of RECTIFIER,
High Voltage Shutdown	Rectifier shuts down if output exceeds programmed overvoltage limit
Electrostatic Discharge (ESD)	IEC 61000-4-2 (Level 4: Air 15kV, Contact 8kV)
AC Surge	IEC 61000-4-4 (EFT), Level 4 IEC 61000-4-5 (Impulse), Level X: 6kV/3kA IEC 61000-4-12 (Ringwave), Level X: 6kV/500A
RF Immunity	IEC 61000-4-3 (Radiated), Level 4 IEC 61000-4-6 (Conducted), Level 3
RF Emissions	CISPR 22 Class B, (Conducted & Radiated)

Environmental

Operating	-40°C to +70°C
Full Power	-40°C to +55°C
Derated Operation	50% power at +70°C
Storage/Transport	-40°C to +70°C
Humidity	0 to 100% relative humidity, condensing
Acoustic Noise	< 60dB (A weighting)

Mechanical Dimensions

Width	483mm (19")
Depth	355mm (14")
Height*	5RU - 9RU (8.75" – 15.75") *depending on configuration




Agency Compliances

Safety	IEC 60950, UL/CSA 60950
EMC	ETSI EN 300 386 V1.3.2 (2002-12)
Environmental	ETSI EN 300 019

TABLE A EQUIPMENT ORDERING								
COL	A	B	C	D	E	F	G	H
CKTS AND FIGS EQUIPPED								
	EQUIPMENT	NOTES	RATING	LIST	CIRCUIT DRAWING	FIG	VRG	APP
	-48VDC 400A (N+1) 19" BULK POWER INCLUDES: CONTROLLER, MULTI-ALARM BOARD. 5RU POWER SHELF SET UP TO ACCOMMODATE 9 RECTIFIERS WITH 9 AC FEEDS		400A	SAGEON2.L40		1		
	SAME AS SAGEON2L40, EXCEPT 7RU WITH BATTERY DISTRIBUTION BOARD, EXPANDED BATTERY TEMPERATURE MODULE, 9 AC CIRCUIT BREAKERS		400A	SAGEON2.L41		2		
	-48VDC 400A (N+1) 19" POWER SYSTEM INCLUDES: 20 AM1 BREAKER POSITIONS, CONTROLLER, MULTI-ALARM BOARD, BATTERY DISTRIBUTION BOARD, EXPANDED BATTERY TEMPERATURE MODULE. 11RU POWER SHELF SET UP TO ACCOMMODATE 9 RECTIFIERS WITH 9 AC FEEDS		400A	SAGEON2.L44		5		
	SAME AS SAGEON2L44, EXCEPT 13RU WITH 9 AC CIRCUIT BREAKERS		400A	SAGEON2.L45		6		
	-48VDC 400A (N+1) 19" POWER SYSTEM INCLUDES: 40 AM1 BREAKER POSITIONS, CONTROLLER, MULTI-ALARM BOARD, BATTERY DISTRIBUTION BOARD, EXPANDED BATTERY TEMPERATURE MODULE. 15RU POWER SHELF SET UP TO ACCOMMODATE 9 RECTIFIERS WITH 9 AC FEEDS		400A	SAGEON2.L46		9		
	SAME AS SAGEON2L46, EXCEPT 17RU WITH 9 AC CIRCUIT BREAKERS		400A	SAGEON2.L47		10		
	-48VDC 600A (N+1) 19" BULK POWER INCLUDES: CONTROLLER, MULTI-ALARM BOARD. 7RU POWER SHELF SET UP TO ACCOMMODATE 13 RECTIFIERS WITH 13 AC FEEDS		600A	SAGEON2.L60		3		
	SAME AS SAGEON2L60, EXCEPT 9RU WITH BATTERY DISTRIBUTION BOARD, EXPANDED BATTERY TEMPERATURE MODULE, 13 AC CIRCUIT BREAKERS		600A	SAGEON2.L61		4		
	-48VDC 600A (N+1) 19" POWER PLANT INCLUDES: 20 AM1 BREAKER POSITIONS, CONTROLLER, MULTI-ALARM BOARD, BATTERY DISTRIBUTION BOARD, EXPANDED BATTERY TEMPERATURE MODULE. 13RU POWER SHELF SET UP TO ACCOMMODATE 13 RECTIFIERS WITH 13 AC FEEDS		600A	SAGEON2.L64		7		
	SAME AS SAGEON2L64, EXCEPT 15RU WITH 13 AC CIRCUIT BREAKERS		600A	SAGEON2.L65		8		
	-48VDC 600A (N+1) 19" POWER PLANT INCLUDES: 40 AM1 BREAKER POSITIONS, CONTROLLER, MULTI-ALARM BOARD, BATTERY DISTRIBUTION BOARD, EXPANDED BATTERY TEMPERATURE MODULE. 17RU POWER SHELF SET UP TO ACCOMMODATE 13 RECTIFIERS WITH 13 AC FEEDS		600A	SAGEON2.L66		11		
	SAME AS SAGEON2L66, EXCEPT 19RU WITH 13 AC CIRCUIT BREAKERS		600A	SAGEON2.L67		12		

TABLE B ASSOCIATED DOCUMENTS	
NAME	NUMBER
SCHEMATIC & WIRING DIAGRAMS	SD-SAGEON2.LXX
SAGEON II BULK SYSTEM MANUAL	PM 990-5201-00
SAGEON II PLANT SYSTEM MANUAL	PM 990-5202-00

TABLE C DRAWING CONTENT	
SHEET	CONTENT DESCRIPTION
A1	SHOP & INSTALLATION NOTES TABLE A: EQUIPMENT ORDERING TABLE B: ASSOCIATED DRAWINGS TABLE C: DRAWING CONTENTS
A2	TABLE D: OPTION ORDERING TABLE E: BATT. CURRENT TRANSDUCER WIRE LIST TABLE F: TYP "AM1" BULLET CIRCUIT BRKR KITS
A3	TABLE H: POWER PLANT CABLING REFERENCES TABLE J: STD 19" FLOOR MTG RELAY RACKS TABLE K: STD 23" FLOOR MTG RELAY RACKS TABLE L: WIRE SIZING TABLE
A4	ENGINEERING NOTES
B1	FIG. 1: L40; 400A, BULK PLANT, SHOWN IN 19" RACK FIG. 2: L41; 400A, BULK PLANT W/ AC BREAKERS, SHOWN IN 19" RACK FIG. 3: L60; 600A, BULK PLANT W/ 385.5202.6023 KIT, SHOWN IN 23" RACK FIG. 4: L61; 600A, BULK PLANT W/ AC BREAKERS, SHOWN IN 19" RACK
B2	FIG. 5: L44; 400A, 1 TIER DISTR. W/ 385.5202.4419 KIT, SHOWN IN 19" RACK FIG. 6: L45; 400A, 1 TIER DISTR. W/ 385.5202.4523 KIT, SHOWN IN 23" RACK FIG. 7: L64; 600A, 1 TIER DISTR. W/ 385.5202.6419 KIT, SHOWN IN 19" RACK FIG. 8: L65; 600A, 1 TIER DISTR. W/ 385.5202.6519 KIT, SHOWN IN 19" RACK
B3	FIG. 9: L46; 400A, 2 TIER DISTR. W/ 385.5202.4623 KIT, SHOWN IN 23" RACK FIG. 10: L47; 400A, 2 TIER DISTR. W/ 385.5202.4719 KIT, SHOWN IN 19" RACK FIG. 11: L66; 600A, 2 TIER DISTR. W/ 385.5202.6619 KIT, SHOWN IN 19" RACK FIG. 12: L67; 600A, 2 TIER DISTR. W/ 385.5202.6723 KIT, SHOWN IN 23" RACK
B4	FIG. 13: TYPICAL AC INPUT & BATTERY CONNECTION FOR BULK SYSTEMS (L41 SHOWN) FIG. 14: TYPICAL AC INPUT & BATTERY CONNECTION FOR PLANT SYSTEMS (L66 SHOWN) FIG. 15: POWER DISTRIBUTION (L46 SHOWN)
B5	FIG. 16: POWER DISTRIBUTION (2 TIER SHOWN) FIG. 17: 2 POLE CIRCUIT BREAKER ADAPTER PLATE FIG. 18: 2 POLE CIRCUIT BREAKER ADAPTER (209.5626.00) & 2 POLE RETURN BUS ADAPTER (209.5625.00)
B6	FIG. 19: BREAKER LOCATION FIG. 20: INSIDE DOOR/ BREAKER ID FIG. 21: 600A DISTRIBUTION TOP VIEW (2 TIER SHOWN)
B7	FIG. 22: SAGEON II BATTERY MONITOR FIG. 23: SAGEON II SITE MONITOR FIG. 24: BATTERY SENSE WIRE FIG. 25: BATTERY POST PIG TAIL

ISSUES																																																														
ISSUE #	DESCRIPTION	ISS. BY ISS. DATE																																																												
7	UPDATED UNIPOWER LOGO. SEE PCO# 44417.	WD 6/12/17																																																												
<table><tr><td colspan="2">UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES ± TOLERANCES ON:</td><td>APPROVALS</td><td>DATE</td></tr><tr><td>HOLES</td><td>+0.004 -0.002</td><td>DRAWN WD</td><td>10/8/09</td></tr><tr><td>FRACTIONS</td><td>±1/32</td><td>CHECKED MCM</td><td>10/9/09</td></tr><tr><td>DECIMALS (xx)</td><td>±0.020</td><td>APPROVED CJM</td><td>10/8/9</td></tr><tr><td>DECIMALS (xxx)</td><td>±0.010</td><td>APPROVED</td><td></td></tr><tr><td>ANGLES</td><td>±1/2°</td><td></td><td></td></tr><tr><td colspan="4">SQUARE CORNERS AND ANGLES ARE 90° UNLESS OTHERWISE SPECIFIED.</td></tr><tr><td colspan="4">WORKMANSHIP: PER SPEC ENG032</td></tr><tr><td colspan="4">MATERIAL:</td></tr><tr><td colspan="4">FINISH:</td></tr><tr><td colspan="4">PROPRIETARY INFORMATION NOT TO BE COPIED, USED, TRANSMITTED, OR DISCLOSED WITHOUT PRIOR WRITTEN PERMISSION FROM UNIPOWER, LLC.</td></tr><tr><td colspan="4"></td></tr><tr><td colspan="4">SAGEON II POWER SYSTEM</td></tr><tr><td>SIZE B</td><td>DOC TYPE / NUMBER J SAGEON2.LXX</td><td colspan="2">ISSUE 7</td></tr><tr><td>SCALE: N/A</td><td>SHEET: A1 OF</td><td colspan="2">FILE NAME: J-SAGEON2.LXX_SHT_A1_ISS_7</td></tr></table>			UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES ± TOLERANCES ON:		APPROVALS	DATE	HOLES	+0.004 -0.002	DRAWN WD	10/8/09	FRACTIONS	±1/32	CHECKED MCM	10/9/09	DECIMALS (xx)	±0.020	APPROVED CJM	10/8/9	DECIMALS (xxx)	±0.010	APPROVED		ANGLES	±1/2°			SQUARE CORNERS AND ANGLES ARE 90° UNLESS OTHERWISE SPECIFIED.				WORKMANSHIP: PER SPEC ENG032				MATERIAL:				FINISH:				PROPRIETARY INFORMATION NOT TO BE COPIED, USED, TRANSMITTED, OR DISCLOSED WITHOUT PRIOR WRITTEN PERMISSION FROM UNIPOWER, LLC.								SAGEON II POWER SYSTEM				SIZE B	DOC TYPE / NUMBER J SAGEON2.LXX	ISSUE 7		SCALE: N/A	SHEET: A1 OF	FILE NAME: J-SAGEON2.LXX_SHT_A1_ISS_7	
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SH NO	A1	A2	A3	A4	B1	B2	B3	B4	B5	B6	B7
ISSUE	7	5	2	4	3	2	2	2	2	3	2

SHEET INDEX NOTE:
THE ISSUE OF SHEET A1 REFLECTS THE LATEST ISSUE OF THE DRAWING SET. WHEN THE DRAWING SET IS REVISED, ONLY THE ISSUE NUMBERS OF MODIFIED SHEETS ARE CHANGED. THE ISSUE NUMBERS OF UNMODIFIED SHEETS ARE NOT CHANGED.

SHOP	INST	SHOP & INST NOTES
✓	✓	1. [] INFORMATION FOR REFERENCE ONLY -NOT TO BE STAMPED.
✓	✓	2. REFER TO APPLICABLE ENGINEERING NOTES.
✓		3. APPLY STD BUS BAR IDENTIFICATION LABELS.
✓	✓	4. ENTER BREAKER RATING AND LOAD INFO ON DIST, LOG SHEET INSIDE AUX PANEL FRONT DOOR

TABLE D													
OPTION ORDERING													
EQUIPMENT: ORDER BY PART NUMBER	NOTES	RATING	PART NUMBER	LIST 40	LIST 41	LIST 44	LIST 45	LIST 46	LIST 47	LIST 60	LIST 61	LIST 64	LIST 65
RACK MOUNTING													
19" RACK FLUSH MOUNT													
SAGEON2.L40		STD		X									
SAGEON2.L41		STD			X								
SAGEON2.L60		STD								X			
SAGEON2.L61		STD									X		
19" RACK MID MOUNT													
SAGEON2.L44		OPT	385.5202.4419			X							
SAGEON2.L45		OPT	385.5202.4519				X						
SAGEON2.L46		OPT	385.5202.4619					X					
SAGEON2.L47		OPT	385.5202.4719						X				
SAGEON2.L64		OPT	385.5202.6419									X	
SAGEON2.L65		OPT	385.5202.6519										X
SAGEON2.L66		OPT	385.5202.6619										X
SAGEON2.L67		OPT	385.5202.6719										X
23" RACK FLUSH MOUNT													
SAGEON2.L40		OPT	385.5202.4023	X									
SAGEON2.L41		OPT	385.5202.4123		X								
SAGEON2.L60		OPT	385.5202.6023							X			
SAGEON2.L61		OPT	385.5202.6123								X		
23" RACK MID MOUNT													
SAGEON2.L44		OPT	385.5202.4423			X							
SAGEON2.L45		OPT	385.5202.4523				X						
SAGEON2.L46		OPT	385.5202.4623					X					
SAGEON2.L47		OPT	385.5202.4723						X				
SAGEON2.L64		OPT	385.5202.6423									X	
SAGEON2.L65		OPT	385.5202.6523										X
SAGEON2.L66		OPT	385.5202.6623										X
SAGEON2.L67		OPT	385.5202.6723										X
RECTIFIERS Up to 9 rectifiers on List 40, 41, 42, 44, 45, 46, 47 and up to 13 rectifiers on List 60, 61, 62, 64, 65, 66, 67													
48V 2400W @ 208-240Vac	54	OPT	100.7675.4850	X	X	X	X	X	X	X	X	X	X
BLANK COVERS	55	REQ	124.0073.00	X	X	X	X	X	X	X	X	X	X
BATTERY CURRENT TRANSDUCERS (UP TO 4)													
200 amps Closed Window (EXTERNAL)	73	OPT	385.5971.200		X	X	X	X	X		X	X	X
200 amps Split Window (EXTERNAL)	73	OPT	385.5972.200		X	X	X	X	X		X	X	X
400 amps Closed Window (EXTERNAL)	73	OPT	385.5971.400		X	X	X	X	X		X	X	X
400 amps Split Window (EXTERNAL)	73	OPT	385.5972.400		X	X	X	X	X		X	X	X
600 amps Closed Window (EXTERNAL)	73	OPT	385.5971.600		X	X	X	X	X		X	X	X
800 amps Split Window (EXTERNAL)	73	OPT	385.5972.800		X	X	X	X	X		X	X	X
LOW VOLTAGE BATTERY DISCONNECT (LVBD)													
600 AMP CONTACTOR	71	OPT	385.5202.11			X	X	X	X			X	X
COMMUNICATIONS													
Ethernet TCP/IP	57	OBS	385.4014.00	X	X					X	X		
Ethernet TCP/IP/SNMP	57	OPT	385.4015.00	X	X					X	X		
Ethernet TCP/IP/SNMP v3	57	OPT	385.4036.00	X	X					X	X		
Ethernet TCP/IP	57	OBS	385.4014.25			X	X	X	X			X	X
Ethernet TCP/IP/SNMP	57	OPT	385.4015.25			X	X	X	X			X	X
Ethernet TCP/IP/SNMP v3	57	OPT	385.4036.25			X	X	X	X			X	X
TEMPERATURE SENSORS													
LISTS 40 & 60 CAN ACCOMMODATE 1AMB, 1BAT; LISTS 41-47 & 61-67 CAN ACCOMMODATE 1AMB, 4BAT													
10' (3m) CABLE LENGTH	72	OPT	385.5941.03	X	X	X	X	X	X	X	X	X	X
20' (6m) CABLE LENGTH	72	OPT	385.5941.06	X	X	X	X	X	X	X	X	X	X
50' (15m) CABLE LENGTH	72	OPT	385.5941.15	X	X	X	X	X	X	X	X	X	X
100' (30m) CABLE LENGTH	72	OPT	385.5941.30	X	X	X	X	X	X	X	X	X	X
BATTERY MONITOR													
(REQUIRES BOTH BATTERY WIRE & POST ADAPTOR)	75	OPT	385.5202.20	X	X	X	X	X	X	X	X	X	X
BATTERY SENSE WIRE SUPPORTS UP TO 24 CELLS													
BATTERY SENSE length 10'	72	OPT	350.7812.10	X	X	X	X	X	X	X	X	X	X
BATTERY SENSE length 25'	72	OPT	350.7812.25	X	X	X	X	X	X	X	X	X	X
BATTERY SENSE length 50'	72	OPT	350.7812.50	X	X	X	X	X	X	X	X	X	X
BATTERY SENSE length 100'	72	OPT	350.7812.100	X	X	X	X	X	X	X	X	X	X
BATTERY POST LUG SIZE SUPPORTS UP TO 24 CELLS													
BATTERY POST ADAPTOR KIT #10	72	OPT	385.6151.03	X	X	X	X	X	X	X	X	X	X
BATTERY POST ADAPTOR KIT 1/4" (6mm)	72	OPT	385.6151.04	X	X	X	X	X	X	X	X	X	X
BATTERY POST ADAPTOR KIT 5/16" (8mm)	72	OPT	385.6151.05	X	X	X	X	X	X	X	X	X	X
BATTERY POST ADAPTOR KIT 3/8 (10mm)	72	OPT	385.6151.06	X	X	X	X	X	X	X	X	X	X
BATTERY POST ADAPTOR KIT 1/2" (12mm)	72	OPT	385.6151.07	X	X	X	X	X	X	X	X	X	X
SITE MONITOR (external panel)	76	OPT	385.5202.21	X	X	X	X	X	X	X	X	X	X

TABLE E		Number of Wires that fit in the window									
BATTERY Current Transducers	Window	500 MCM	350 MCM	4/0	2/0	1/0	2 AWG	4 AWG	6 AWG	8 AWG	10 AWG
200 amps Closed Window (EXTERNAL)	1.25" dia	1	1	1	1	1	3	5	7	11	19
200 amps Split Window (EXTERNAL)	0.84" dia	0	0	1	1	1	1	1	2	4	8
400 amps Closed Window (EXTERNAL)	1.25" dia	1	1	1	1	1	3	5	7	11	19
400 amps Split Window (EXTERNAL)	0.84" dia	0	0	1	1	1	1	1	2	4	8
600 amps Closed Window (EXTERNAL)	0.82" x 2.5"	0	0	3	3	4	5	7	12	18	28
800 amps Split Window (EXTERNAL)	1.57" x 4.0"	3	4	9	11	12	21	26	33	56	90

TABLE F		
TYPE "AM1" BULLET CIRCUIT		
AMP RATING	PART NUMBER	# OF POSITIONS REQUIRED
1	274-3840-01	1
3	274-3840-03	1
5	274-3840-05	1
10	274-3840-10	1
15	274-3840-15	1
20	274-3840-20	1
25	274-3840-25	1
30	274-3840-30	1
40	274-3840-40	1
50	274-3840-50	1
60	274-3840-60	1
70	274-3840-70	1
80	274-3840-80	1
90	274-3840-90	1
100	274-3841-100	1
125*	274-3841-125	2
150*	274-3841-150	2
200*	274-3841-200	2

*INCLUDES CIRCUIT BREAKER ADAPTERS.
PROVIDE 3/8"-16 X 1" CC LANDING BUS
SEE FIG. 18
KITS INCLUDE BREAKER, BUS

SEE NOTE 64

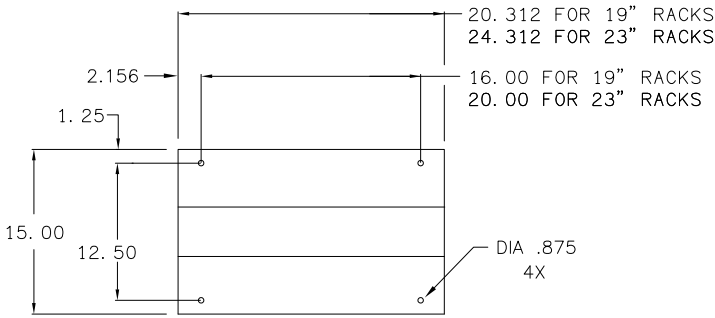
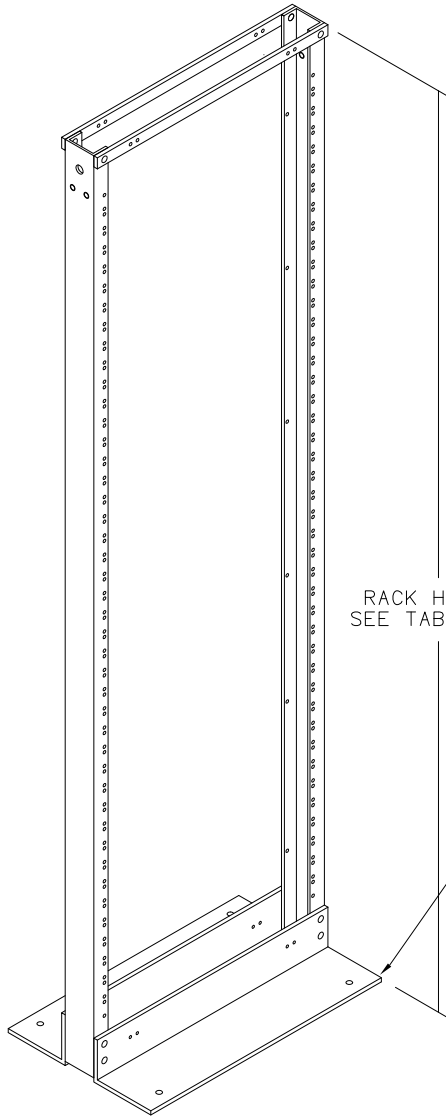
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TABLE H					
POWER PLANT CABLING REFERENCE					
LUG INFORMATION			CABLE INFORMATION		
C&D P/N	MG. & P/N	LUG TYPE	GAGE	*AMPS	WHERE USED
253-0210-00	HW R4115B	22-16, INS, RG, LUG	18 GA	3A	TYPICAL WIRE AND LUGS FOR LIGHT DISTRIBUTION LOADS
253-0410-01	MR R4170F	16-14, INS, RG, LUG	16 GA	8A	
253-0410-01	MR R4170F	16-14, INS, RG, LUG	14 GA	15A	
253-0310-03	MR R4161F	12-10, INS, RG, LUG	12 GA	20A	
253-0940-00	T&B 54123	2-HOLE LUG 1/4" ON 5/8" cc	10 GA	30A	TYPICAL WIRE AND LUGS FOR MEDIUM DISTRIBUTION LOADS
253-0944-00	T&B 54204		8 GA	45A	
253-0945-00	T&B 54205		6 GA	65A	
253-0950-00	T&B 54206		4 GA	85A	
253-0952-00	T&B 54207	2-HOLE LUG 3/8" ON 1" cc	2 GA	115A	TYPICAL CABLE AND LUGS FOR BATTERY CONNECTIONS. LARGE RESERVE CAPACITIES WILL REQUIRE MULTIPLE CABLE RUNS
253-0956-00	T&B 54209		1/0 GA	150A	
253-0958-00	T&B 54210		2/0 GA	175A	
253-0960-00	T&B 54212		4/0 GA	230A	
253-0961-00	T&B 54213		250 MCM	290A	
253-0962-00	T&B 54215		350 MCM	310A	
253-0964-00	T&B 54218		500 MCM	380A	

TABLE J			
STANDARD 19" FLOOR MOUNTING RELAY RACKS (TELCO GRAY)			
PART NUMBER	HEIGHT	1.75" MOUNTING SPACES	
170-0010-10A	7'0"	44	
170-0011-10A	7'6"	47	
170-0012-10A	8'0"	50	

TABLE K			
STANDARD 23" FLOOR MOUNTING RELAY RACKS (TELCO GRAY)			
PART NUMBER	HEIGHT	1.75" MOUNTING SPACES	
170-0023-10A	7'0"	44	
170-0022-10A	7'6"	47	
170-0020-10A	8'0"	50	

TABLE L				
2005 NEC CABLE RATING (90 C WIRE)				
	FREE AIR	FREE AIR	ENCLOSED	ENCLOSED
SIZE	30 C RATING	50 C RATING	30 C RATING	50 C RATING
14	35	29	25	21
12	40	33	30	25
10	55	45	40	33
8	80	66	55	45
6	105	86	75	62
4	140	115	95	78
2	190	156	130	107
1/0	260	213	170	139
2/0	300	246	195	160
3/0	350	287	225	185
4/0	405	332	260	213
250 MCM	455	373	290	238
300 MCM	505	414	320	262
350 MCM	570	467	350	287
400 MCM	615	504	380	312
500 MCM	700	574	430	353
(TABLE 310-17)			(TABLE 310-16)	



FLOOR MOUNTING DETAIL

STANDARD FLOOR MOUNT RELAY RACK (TYP)

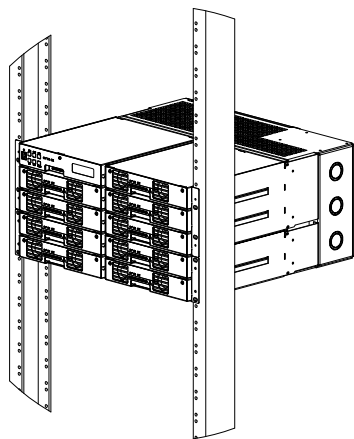
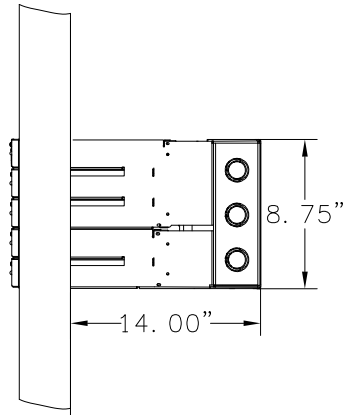
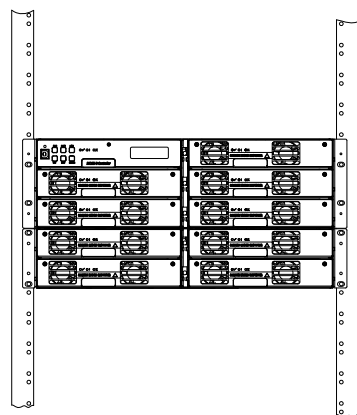
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ENGINEERING NOTES:

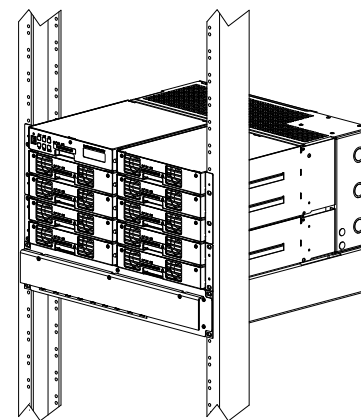
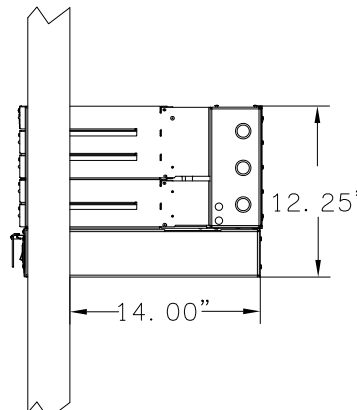
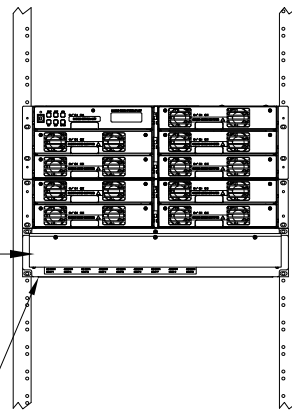
51. ORDER EQUIPMENT PER TABLES A, D, F, J, AND K.
52. THIS PRODUCT IS AVAILABLE IN ANSI-61 GRAY.
53. TO ALLOW FOR MAXIMUM VERSATILITY, SYSTEMS DO NOT INCLUDE A SPECIFIC RELAY RACK. RELAY RACKS MUST BE ORDERED FROM TABLE J OR K AS SEPARATE LINE ITEMS.
54. SAGEON II LIST SYSTEMS ARE DESIGN WITH N+1 RECTIFIER REDUNDANCY. RECTIFIERS MUST BE ORDER AS LINE ITEMS FROM TABLE D.
55. BLANK RECTIFIER COVERS MUST BE ORDERED TO COVER ALL UNUSED RECTIFIER POSITIONS. COVERS MUST BE ORDER AS A LINE ITEM FROM TABLE D.
56. ALL LIST SYSTEMS INCLUDE A CONTROLLER AND A MULTIPLE ALARM RELAY BOARD.
57. ALL LIST SYSTEMS INCLUDE A MOUNTING LOCATION FOR AN OPTIONAL COMMUNICATION BOARD. 103.4015.xx HAS BEEN SUPERCEDED BY 103.4036.xx. BOARD MUST BE ORDER AS A SEPARATE LINE ITEM FROM TABLE D. SNMP v3 IS COVERED BY MANUAL 990.4036.00.
58. LIST 40 & 41 ARE 400 AMP BULK POWER SYSTEMS (NO DISTRIBUTION).
59. LIST 44 & 45 ARE 400 AMP SYSTEMS WITH 20 POSITION AM1 STYLE BREAKERS. ORDER BREAKERS AS SEPARATE LINE ITEMS PER TABLE F.
60. LIST 46 & 47 ARE 400 AMP SYSTEMS WITH 40 POSITION AM1 STYLE BREAKERS. THE BREAKER CAPACITY SHOULD BE SPLIT BETWEEN THE TWO TIERS. ORDER BREAKERS AS SEPARATE LINE ITEMS PER TABLE F.
61. LIST 60 & 61 ARE 600 AMP BULK POWER SYSTEMS (NO DISTRIBUTION).
62. LIST 64 & 65 ARE 600 AMP SYSTEMS WITH 20 POSITION AM1 STYLE BREAKERS. ORDER BREAKERS AS SEPARATE LINE ITEMS PER TABLE F.
63. LIST 66 & 67 ARE 600 AMP SYSTEMS WITH 40 POSITION AM1 STYLE BREAKERS. THE BREAKER CAPACITY SHOULD BE SPLIT BETWEEN THE TWO TIERS. ORDER BREAKERS AS SEPARATE LINE ITEMS PER TABLE F.
64. LIST 46, 47, 66, & 67: TOP DISTRIBUTION TIER (TIER 2) LIMITED TO 100 AMP RATED BREAKER AND 300 AMP TOTAL CAPACITY.
65. LIST 40, 41, 60, 61: MOUNT FLUSH IN A STANDARD 19" RELAY RACK.
66. LIST 44, 45, 46, 47, 64, 65, 66, 67 GROUPS: MUST BE ORDERED WITH RELAY RACK MOUNTING BRACKETS AS A SEPARATE LINE ITEM FROM TABLE D.
67. LIST 40, 44, 46 INCLUDE NINE (9) INDIVIDUAL AC RECTIFIER INPUT TERMINAL BLOCKS. THE BLOCKS WILL ACCEPT 26-10 AWG WIRE. THREE (3) 1" CONDUIT KNOCKOUTS ARE LOCATED ON THE RIGHT BACK SIDE OF THE RECTIFIER SHELF.
68. LIST 41, 45, 47 INCLUDE NINE (9) INDIVIDUAL AC BREAKERS (20A) AND RECTIFIER INPUT TERMINAL BLOCKS. THE BLOCK WILL ACCEPT 26-10 AWG WIRE. THREE (3) 1" CONDUIT KNOCKOUTS ARE LOCATED ON THE RIGHT BACK SIDE OF THE RECTIFIER SHELF.

69. LIST 60, 64, 66 INCLUDE INDIVIDUAL AC RECTIFIER INPUT TERMINAL BLOCKS. THE BLOCKS WILL ACCEPT 26-10 AWG WIRE. FIVE (5) 1" CONDUIT KNOCKOUTS ARE LOCATED ON THE RIGHT BACK SIDE OF THE RECTIFIER SHELF.
70. LIST 61, 65, 67 INCLUDE THIRTEEN (13) INDIVIDUAL AC BREAKERS (20A) AND RECTIFIER INPUT TERMINAL BLOCKS. THE BLOCKS WILL ACCEPT 26-10 AWG WIRE. FIVE (5) 1" CONDUIT KNOCKOUTS ARE LOCATED ON THE RIGHT BACK SIDE OF THE RECTIFIER SHELF.
71. LIST 44, 45, 46, 47, 64, 65, 66, 67 WILL SUPPORT AN OPTIONAL 600 AMP BATTERY DISCONNECT ORDER AS A SEPARATE LINE ITEM FROM TABLE D.
72. LIST 40 AND 60 WILL SUPPORT ONE AMBIENT TEMPERATURE AND ONE BATTERY TEMPERATURE SENSOR. LIST 41, 44, 45, 46, 47, 61, 64, 65, 66, 67 WILL SUPPORT ONE AMBIENT TEMPERATURE AND UP TO FOUR BATTERY TEMPERATURE SENSORS. EACH TEMPERATURE SENSOR MUST BE ORDER AS A SEPARATE LINE ITEM FROM TABLE D.
73. LIST 41, 44, 45, 46, 47, 61, 64, 65, 66, 67 INCLUDE A BATTERY DISTRIBUTION MODULE THAT ALLOWS MONITORING UP TO 4 BATTERY CURRENT TRANSDUCERS AND BATTERY BREAKER AUXILIARY SWITCH INPUTS. CLOSED AND SPLIT WINDOW TRANSDUCERS. REFER TO TABLE E FOR THE NUMBER OF WIRES THAT CAN FIT THROUGH THE WINDOW. EACH BATTERY TRANSDUCER MUST BE ORDERED AS A SEPARATE LINE ITEM FROM TABLE D.
74. THE SAGEON II MUST HAVE ACCESS TO THE REAR FOR INSTALLATION AND SERVICING.
75. SAGEON BATTERY MONITOR IS AN EXTERNAL UNIT THAT CONNECTS TO THE SAGEON II POWER SYSTEM VIA A RIBBON CABLE. EACH BATTERY MONITOR CAN MEASURE UP TO 24 INDIVIDUAL CELLS. EACH BATTERY MONITOR REQUIRES A BATTERY SENSE CABLE AND A BATTERY POST (PIG-TAIL) KIT. BATTERY MONITOR, BATTERY SENSE CABLE, AND BATTERY POST KIT MUST BE ORDERED AS SEPARATE LINE ITEMS PER TABLE D.
76. SAGEON SITE MONITOR IS AN EXTERNAL BOX THAT CONNECTS TO THE SAGEON II POWER SYSTEM VIA A RIBBON CABLE. THE SITE MONITOR CAN MEASURE 12 DIGITAL AND 8 ANALOG INPUTS. ORDER AS A SEPARATE LINE ITEM PER TABLE D.
77. LIST 46, 47, 66, 67 REQUIRE A MINIMUM OF 3" ABOVE THE DISTRIBUTION PANEL FOR CABLE ROUTING.

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SAGEON2. L40

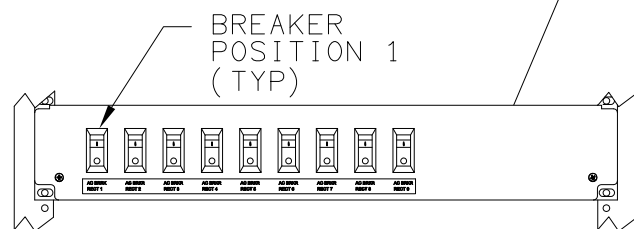
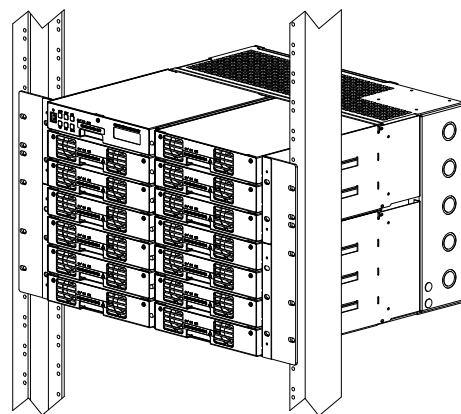
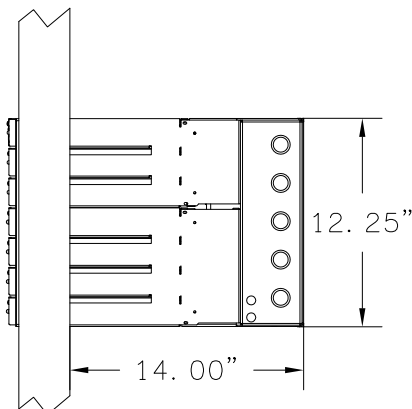
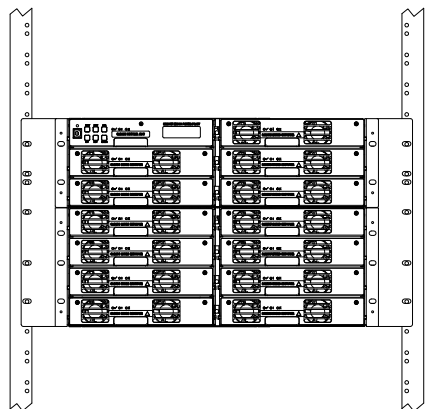
PLASTIC
BREAKER
COVER
(TYP)

SAGEON2. L41

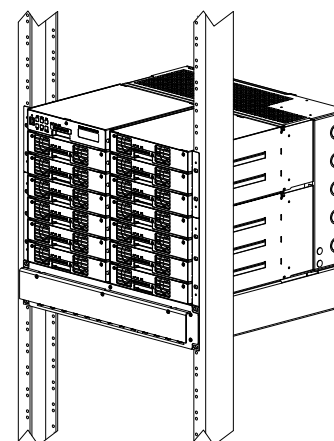
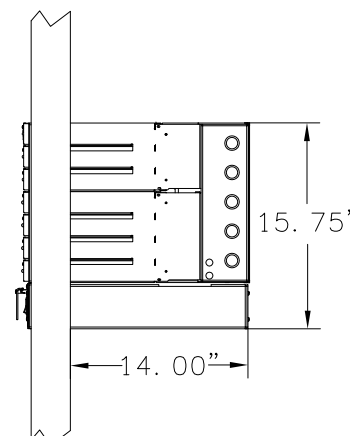
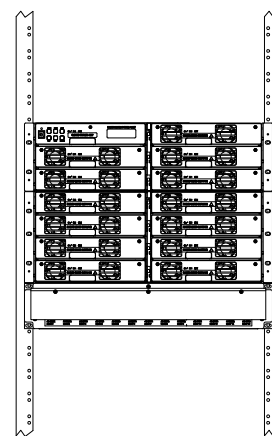
FIG 1

SAGEON II: 400A, BULK PLANT
SHOWN IN 19" RACK

FIG 2

SAGEON II: 400A, BULK PLANT
WITH AC BREAKERS; SHOWN IN 19" RACKBREAKER
POSITION 1
(TYP)

SAGEON2. L60



SAGEON2. L61

FIG 3

SAGEON II: 600A, BULK PLANT
WITH 385.5202.6023 KIT; SHOWN IN 23" RACK

FIG 4

SAGEON II: 600A, BULK PLANT
WITH AC BREAKERS; SHOWN IN 19" RACK

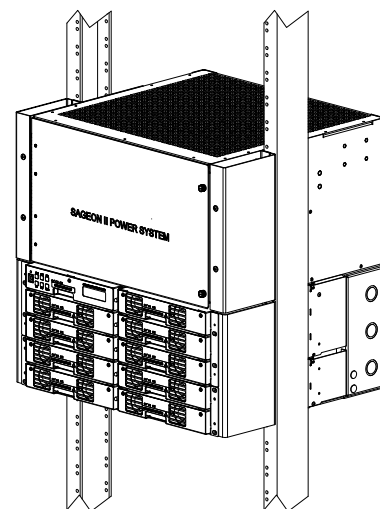
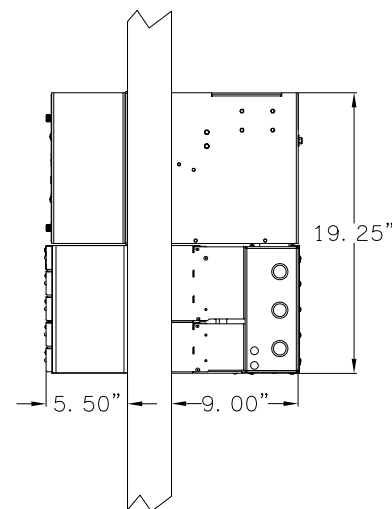
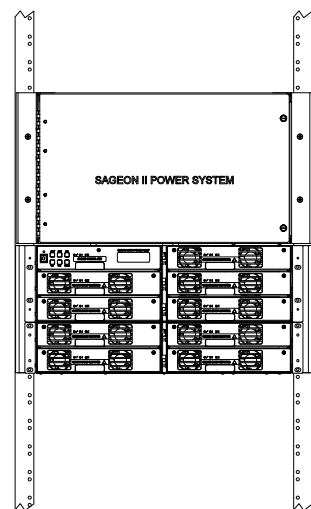
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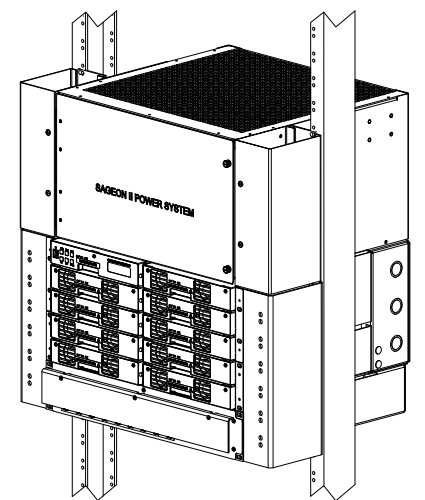
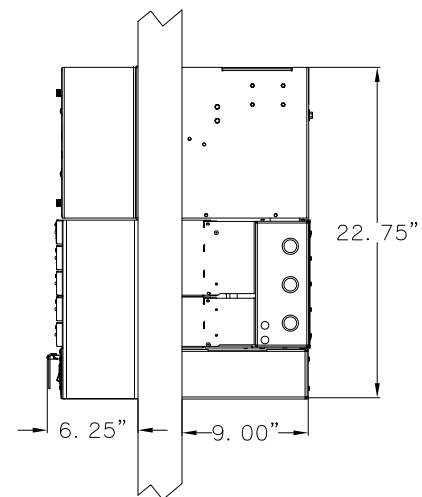


SAGEON2. L44

FIG 5

SAGEON II: 400A, 1 TIER DISTRIBUTION
WITH 385.5202.4419 KIT; SHOWN IN 19" RACK

B



SAGEON2. L45

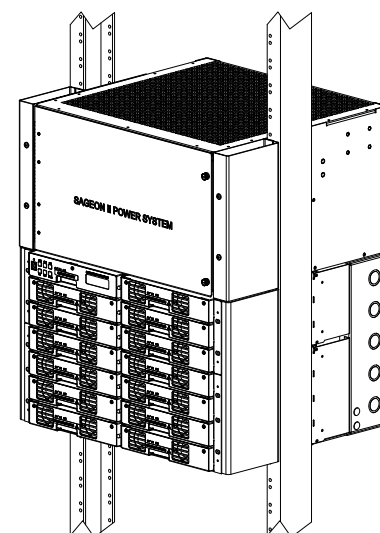
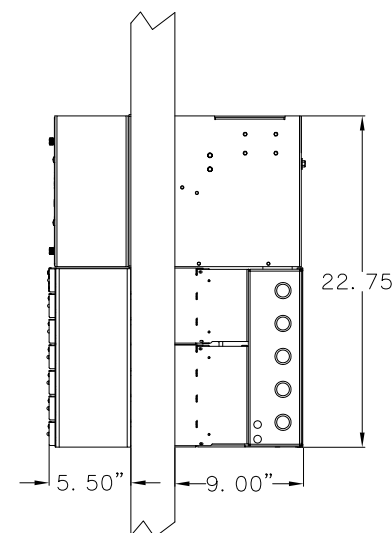
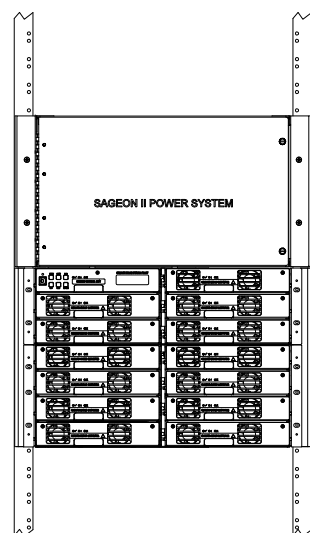
FIG 6

SAGEON II: 400A, 1 TIER DISTRIBUTION
WITH 385.5202.4523 KIT; SHOWN IN 23" RACK

A

B

C

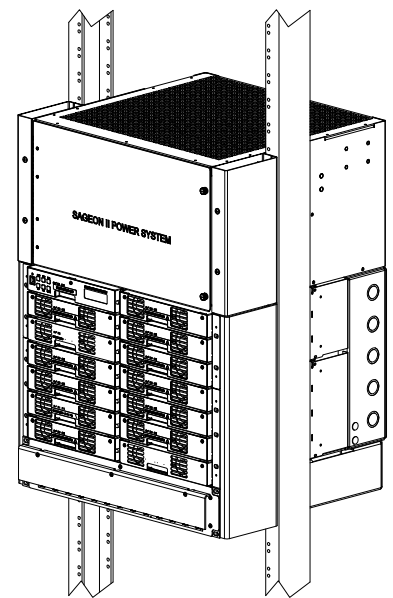
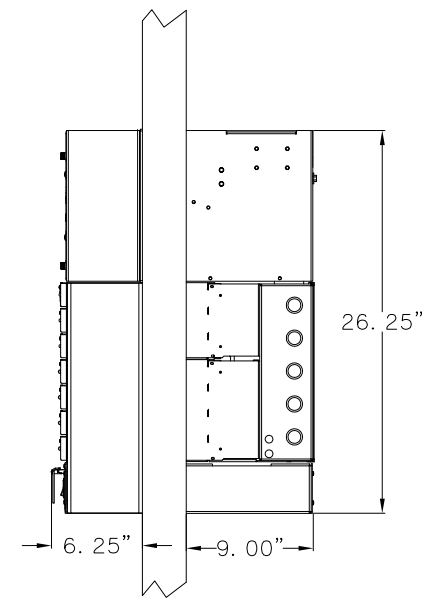
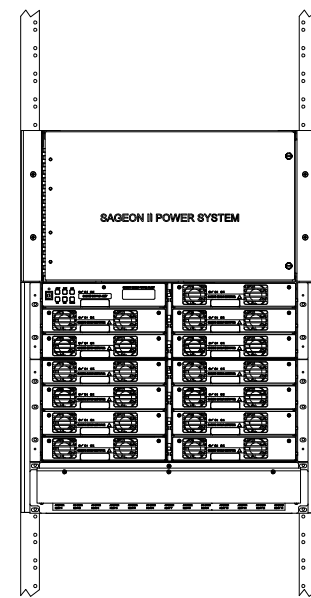


SAGEON2. L64

FIG 7

SAGEON II: 600A, 1 TIER DISTRIBUTION
WITH 385.5202.6419 KIT; SHOWN IN 19" RACK

D



SAGEON2. L65

FIG 8

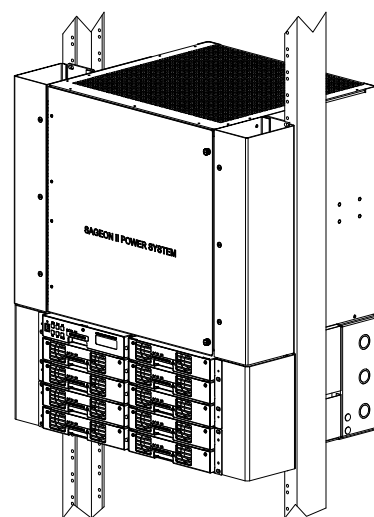
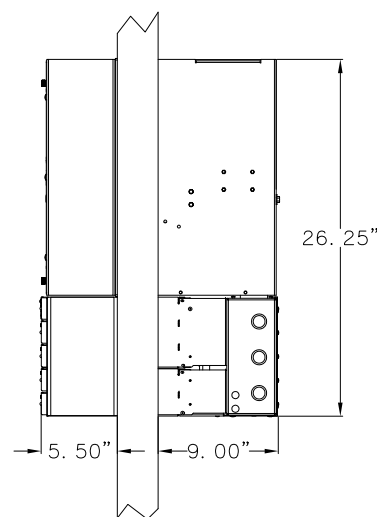
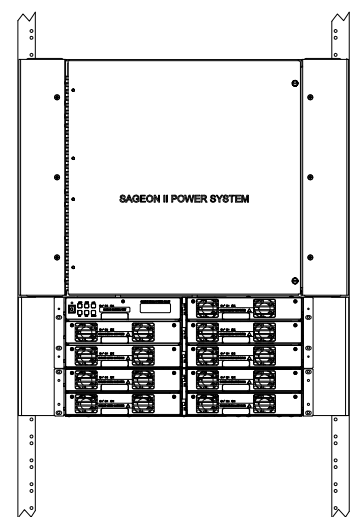
SAGEON II: 600A, 1 TIER DISTRIBUTION
WITH 385.5202.6519 KIT; SHOWN IN 19" RACK

C

D

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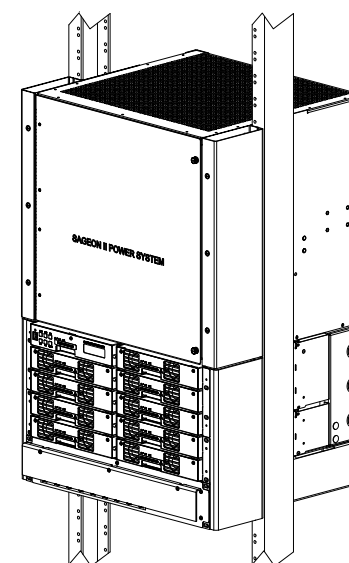
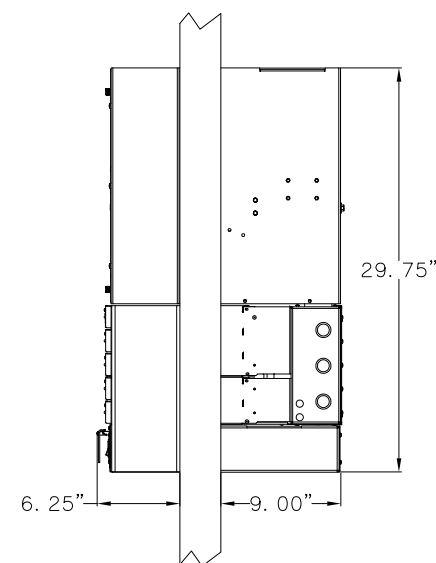
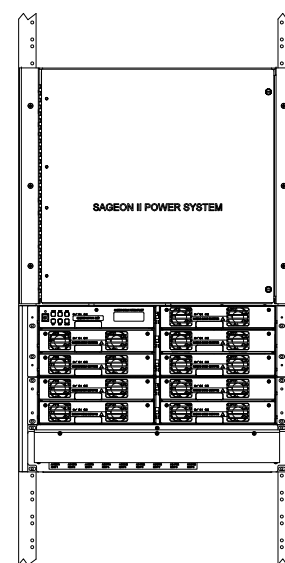
A



SAGEON2. L46

FIG 9

SAGEON II: 400A, 2 TIER DISTRIBUTION
WITH 385.5202.4623 KIT; SHOWN IN 23" RACK



SAGEON2. L47

FIG 10

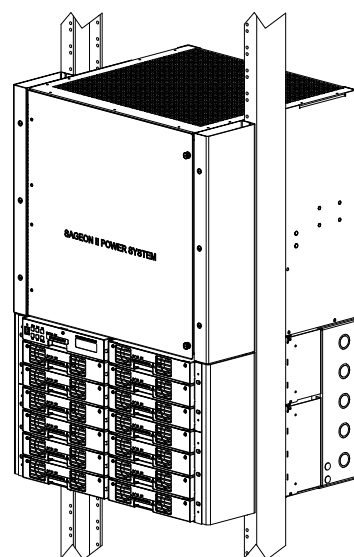
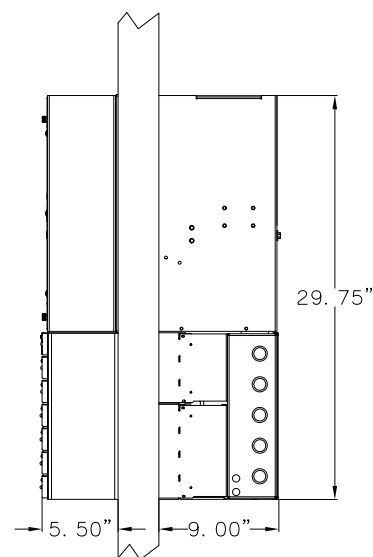
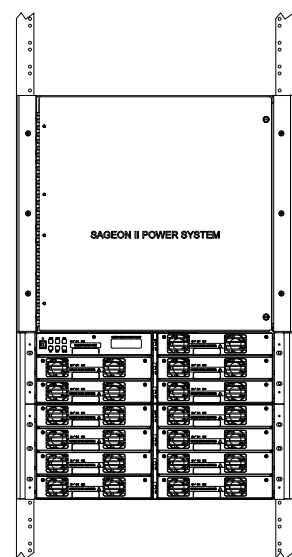
SAGEON II: 400A, 2 TIER DISTRIBUTION
WITH 385.5202.4719 KIT; SHOWN IN 19" RACK

B

B

C

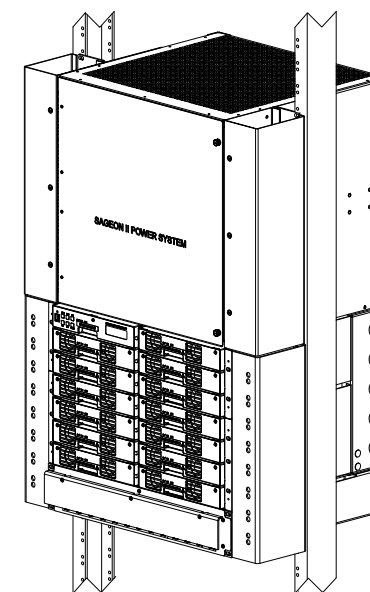
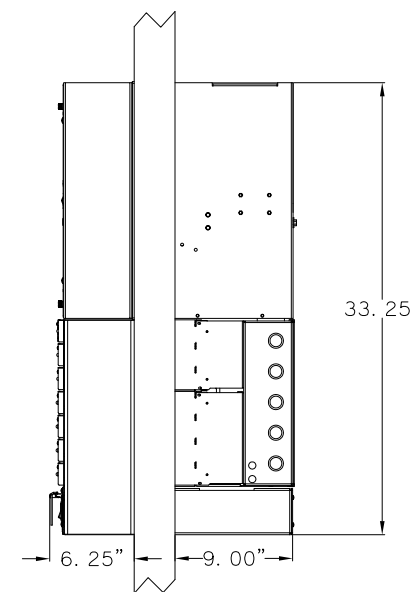
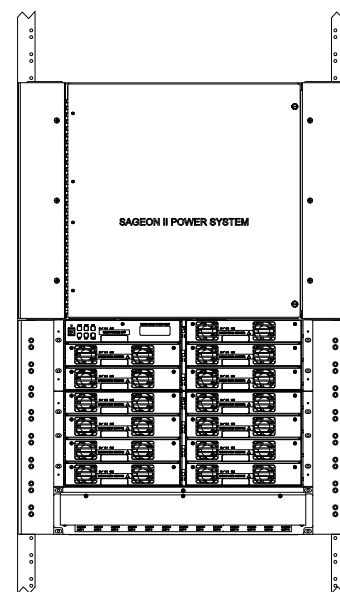
C



SAGEON2. L66

FIG 11

SAGEON II: 600A, 2 TIER DISTRIBUTION
WITH 385.5202.6619 KIT; SHOWN IN 19" RACK



SAGEON2. L67

FIG 12

SAGEONII: 600A, 2 TIER DISTRIBUTION
WITH 385.5202.6723 KIT; SHOWN IN 23" RACK

D

D

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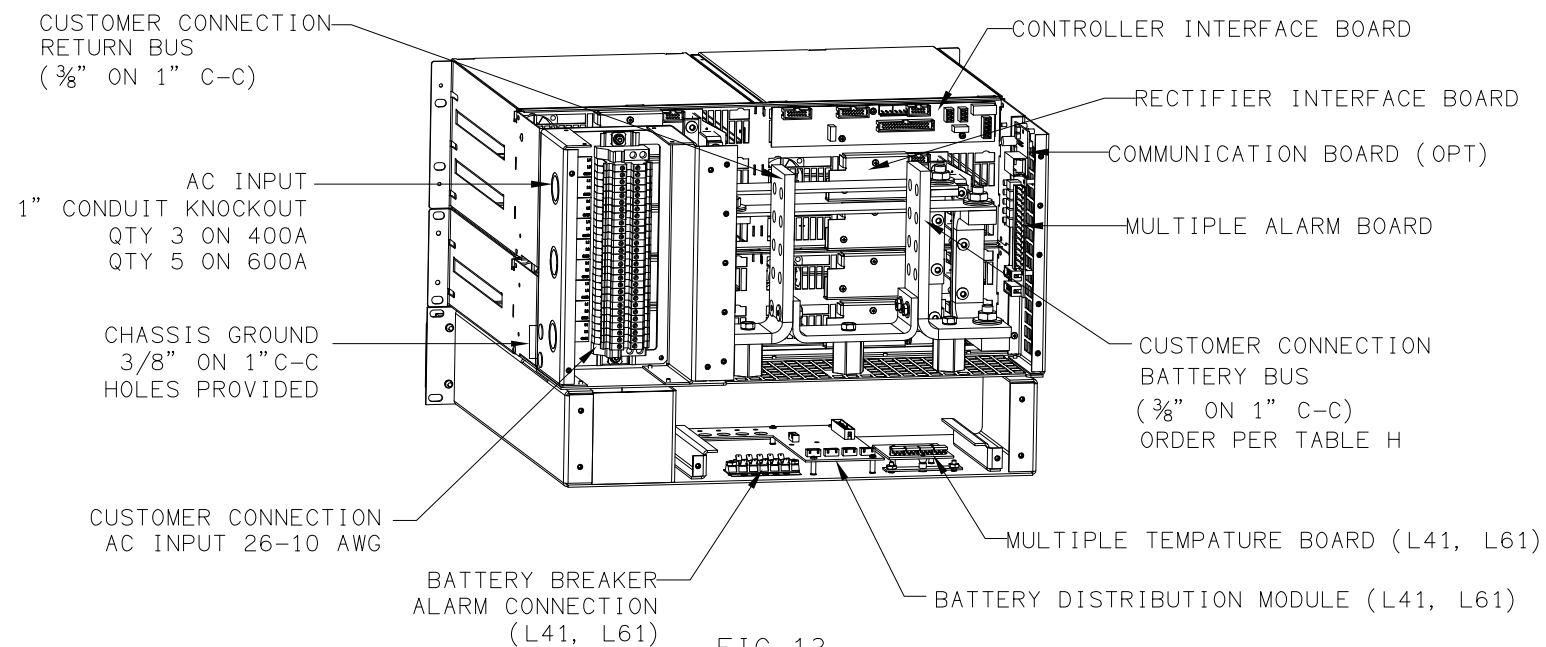


FIG 13

TYPICAL AC INPUT & BATTERY CONNECTION
FOR BULK SYSTEMS
L41 SHOWN

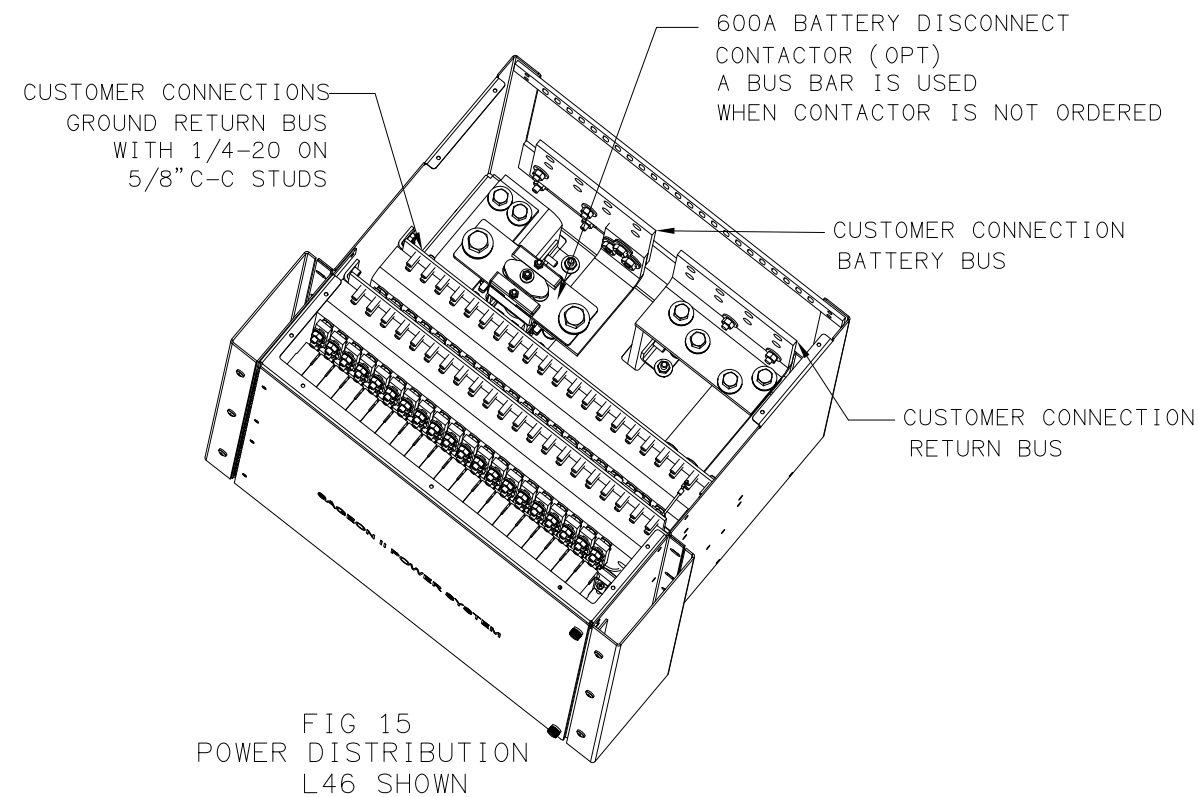


FIG 15
POWER DISTRIBUTION
L46 SHOWN

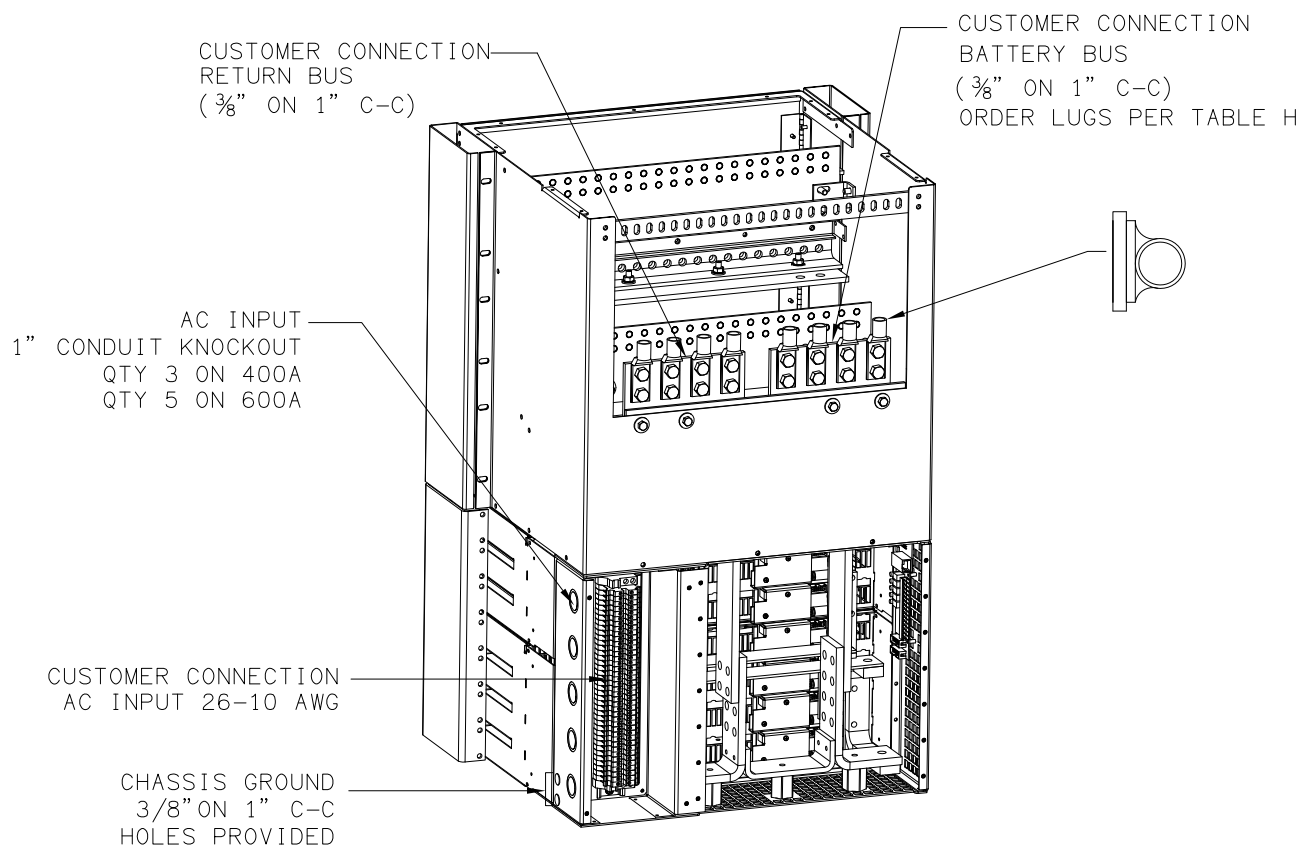


FIG 14

TYPICAL AC INPUT & BATTERY CONNECTION
FOR PLANT SYSTEMS
L66 SHOWN

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SCALE: NONE	SHEET: B4 OF -	FILE NAME: J-SAGE0N2. LXX_SHT_B4_ISS_2

*HARDWARE INCLUDED
IN BREAKER KITS;
ORDER PER TABLE F

BATTERY BREAKER
ALARM CONNECTION

BATTERY DISTRIBUTION
MODULE

CURRENT TRANSDUCER
CONNECTION (OPT)

MULTIPLE TEMPERATURE
BOARD

MULTIPLE ALARM
BOARD

FUSE ALARM(FA)
PC BOARD

COMMUNICATION
BOARD (OPT)

FIG 16
POWER DISTRIBUTION
2 TIER SHOWN

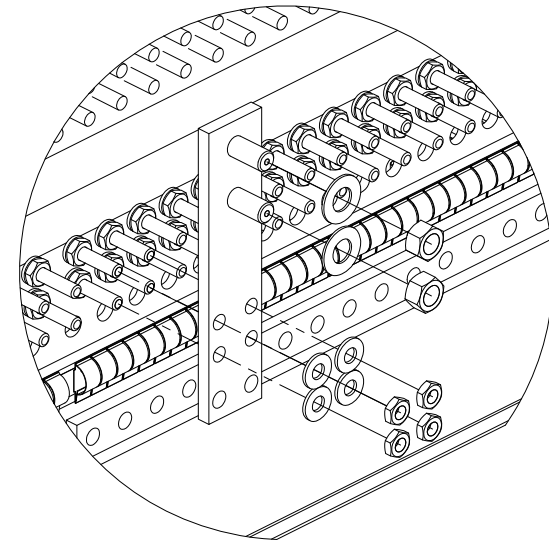


FIG 17
2 POLE
CIRCUIT BREAKER
ADAPTER PLATE

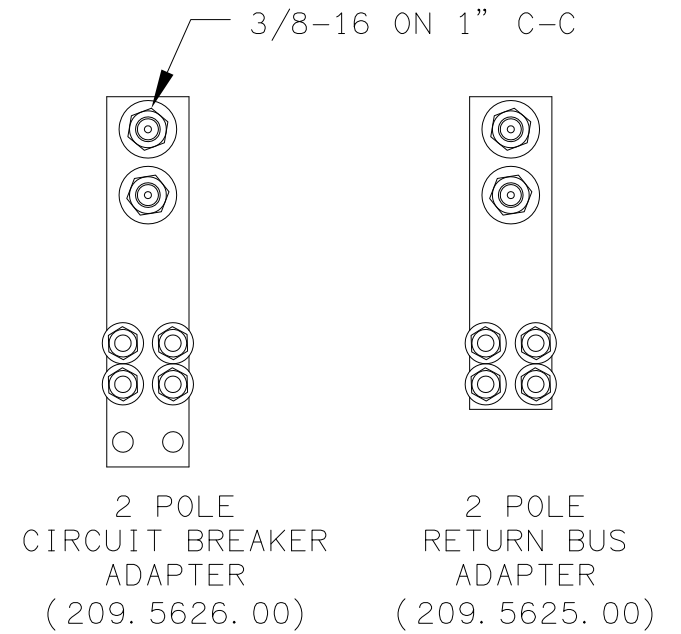


FIG 18
ADAPTOR BUS BARS FOR 125A
TO 200A BRAKERS

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SCALE: NONE	SHEET: B5 OF -	FILE NAME: J-SAGE0N2. LXX_SHT_B5_ISS_2

A

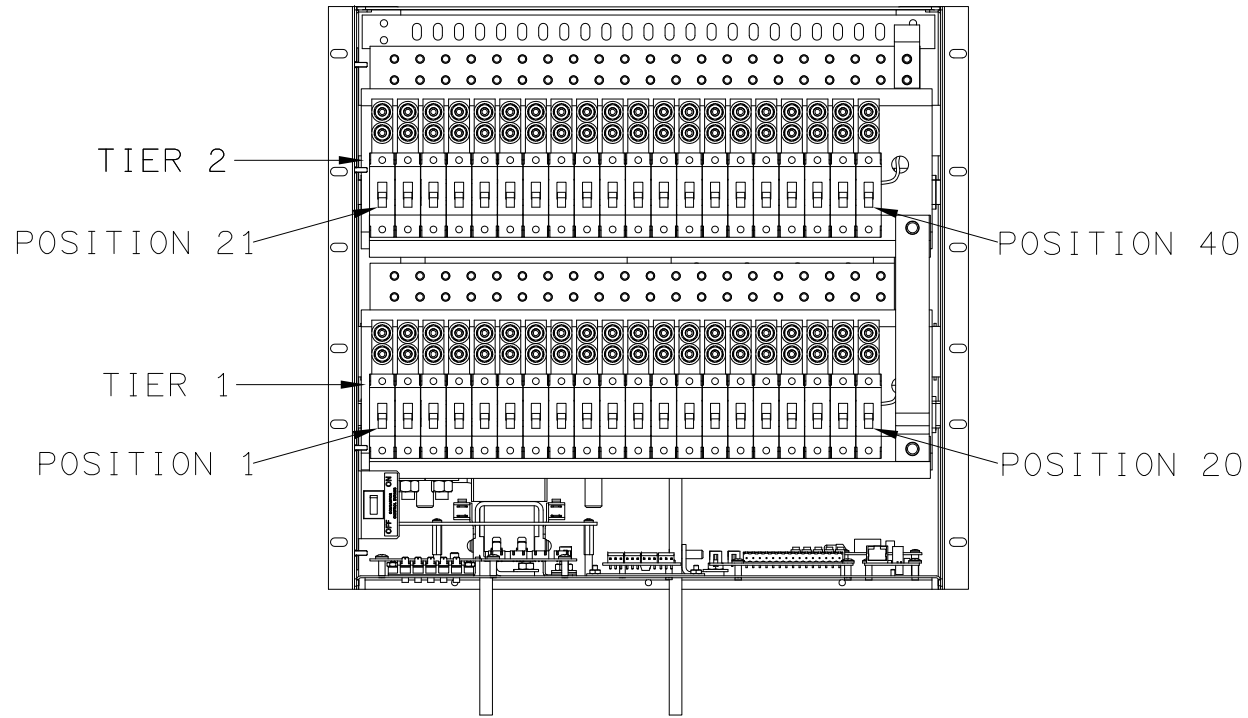


FIG 19
BREAKER LOCATION

B

C

D

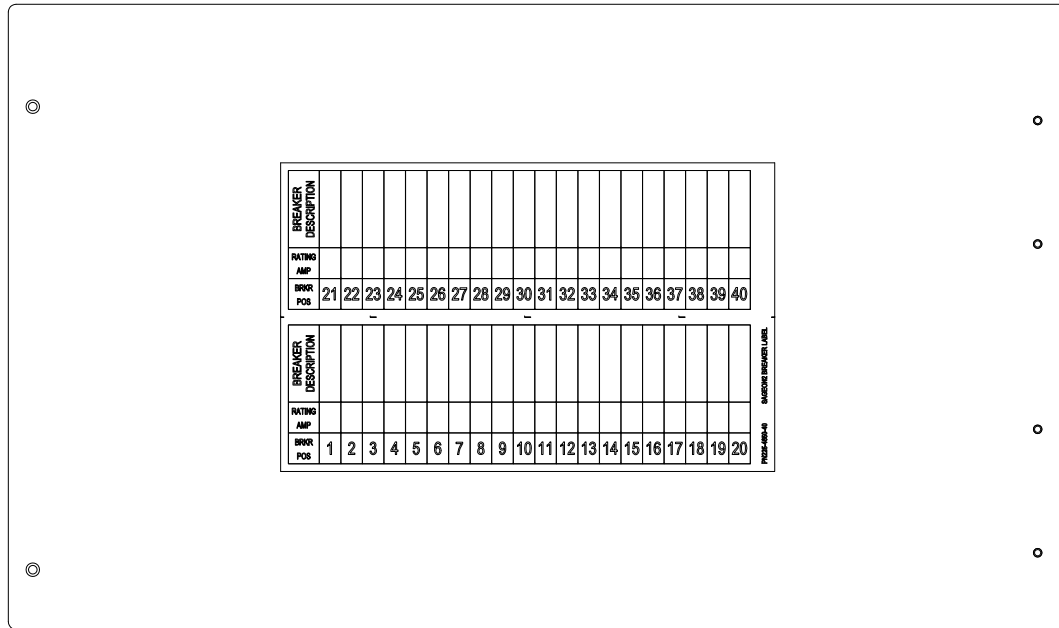


FIG 20
INSIDE DOOR W/BREAKER ID

A

B

C

D

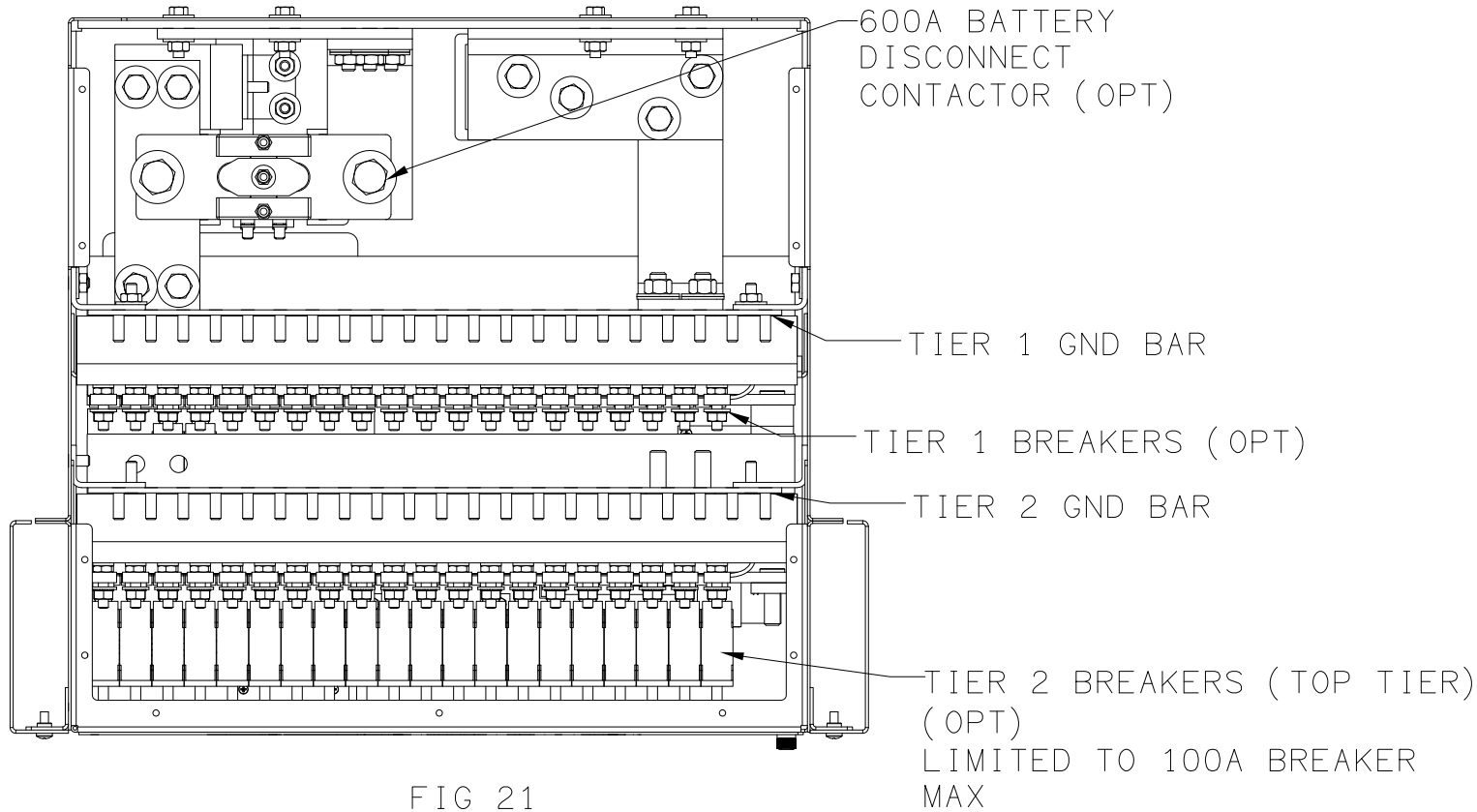


FIG 21
600A DISTRIBUTION TOP VIEW
2 TIER SHOWN

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SIZE B	DOC TYPE / NUMBER J SAGE0N2. LXX	ISSUE 3
SCALE: NONE	SHEET: B6 OF -	FILE NAME: J-SAGE0N2. LXX_SHT_B6_ISS_3

A

A

B

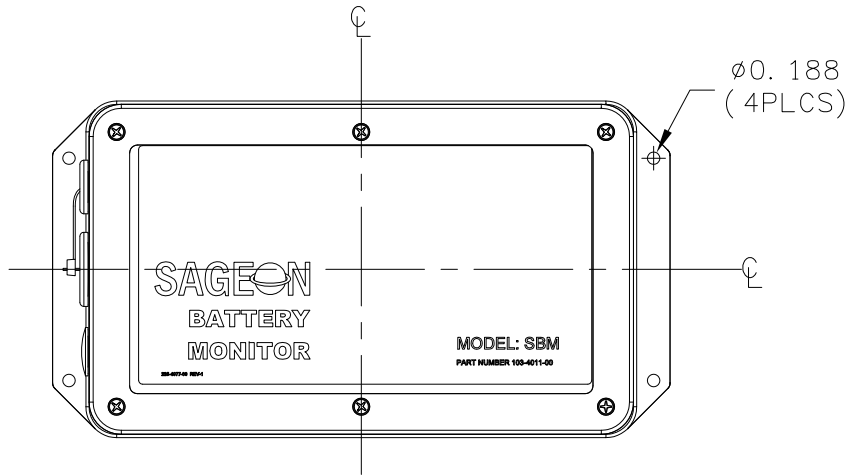
B

C

C

D

D



NOTE: DIMENSIONS ARE THE SAME ON BOTH MONITORS.

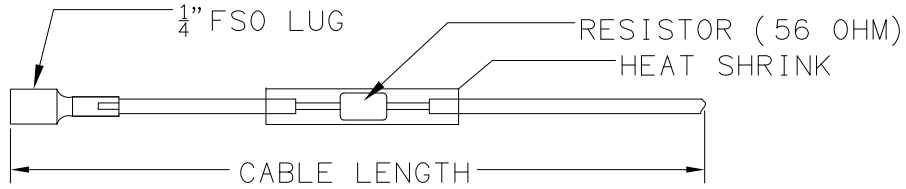
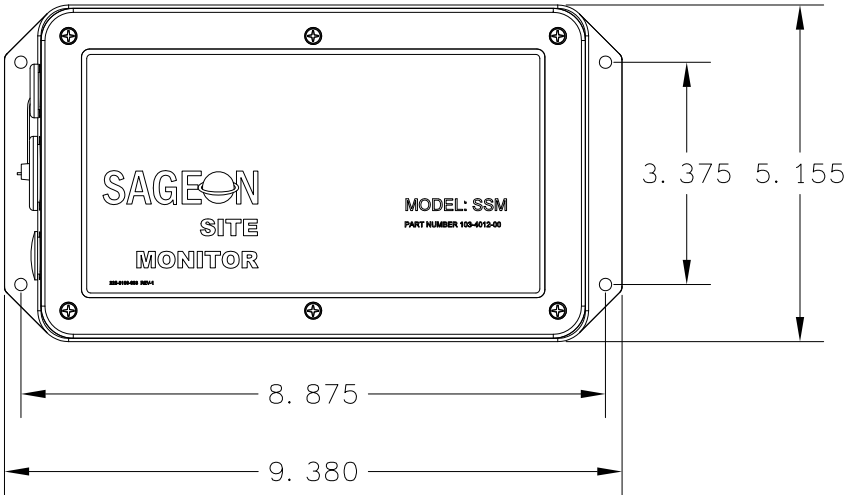


FIG 24
BATTERY SENSE WIRE



FIG 25
BATTERY POST PIG TAIL



FIG 22
SAGEON II BATTERY MONITOR

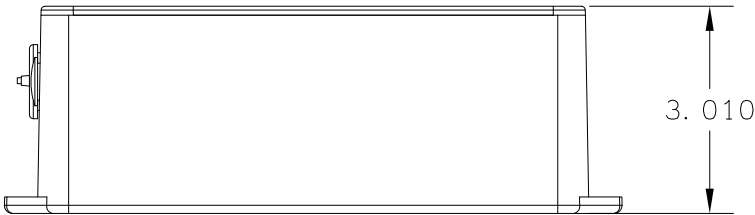


FIG 23
SAGEON II SITE MONITOR

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SCALE: NONE	SHEET: B7 OF -	FILE NAME: J-SAGEON2. LXX_SHT_B7_ISS_2

ED991-5001-B1 Issue 3

1

2

3

4

ISSUES

ISSUE #	DESCRIPTION	ISS. BY ISS. DATE
11	UPDATED UNIPower LOGO. SEE PCO# 44417.	WD 6/12/17

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:

Holes	+0.004 -0.002	DRAWN WD	9/28/09
FRACTIONS	±1/32	CHECKED MCM	9/29/09
DECIMALS (XX)	±0.020	APPROVED DBW	9/30/09
DECIMALS (XXX)	±0.010	APPROVED	
ANGLES	±1/2°		

SQUARE CORNERS AND ANGLES ARE 90° UNLESS OTHERWISE SPECIFIED.


WORKMANSHIP:
PER SPEC ENG032

MATERIAL:

FINISH:

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UNIPower
POWERING TECHNOLOGY

SCHEMATIC DIAGRAM
SAGEON II
POWER SYSTEM

SIZE B	DOC TYPE / NUMBER SD SAGEON2.LXX	ISSUE 11
SCALE: 1=1	SHEET: 1 OF 7	FILE NAME: SD-SAGEON2.LXX_SHT_1_ISS_11

NOTES:

1. ALARM CONTACTS ARE RATED 2 AMP RESISTIVE AT 48 VDC.

2. ALL WIRES ARE 20 GA MINIMUM UNLESS OTHERWISE NOTED.

3. CURRENT TRANSDUCER OPTIONS: L41-47, L61-67 SELECT UP TO 4 EXTERNAL INDIVIDUAL BATTERY STRING CURRENT TRANSDUCERS.

4. L40 & L60 SUPPORT 1 AMBIENT AND 1 BATTERY TEMPERATURE SENSOR. ALL OTHER SYSTEMS SUPPORT 1 AMBIENT TEMPERATURE SENSOR AND UP TO 4 BATTERY TEMPERATURE SENSORS. ORDER SENSORS PER J-SAGEON2.LXX TABLE D.

5. INDIVIDUAL 20AMP AC BREAKERS INCLUDED IN L41, L45, L47, L61, L65, L67.

6. DASHED LINES DENOTE CUSTOMER CONNECTIONS OR EXTERNAL PANEL CONNECTIONS.

7. DASH-DOT LINES DENOTE COMPONENTS INTERNAL TO SAGEON II OR AC BREAKER SHELF.

8. BATTERY DISCONNECT PANELS ARE NOT INCLUDED AND MUST BE ORDERED AS A SEPARATE LINE ITEM. SHOWN HERE FOR ILLUSTRATION OF TYPICAL APPLICATION ONLY.

9. BATTERIES ARE NOT INCLUDED AND MUST BE ORDERED SEPARATELY. SHOWN HERE FOR ILLUSTRATION OF TYPICAL APPLICATION ONLY.

10. SHEET 2 SHOWS L40 & L60.
SHEETS 3 & 4 SHOWS L41 & L61.
SHEETS 5, 6, & 7 SHOWS L44, L45, L46, L47, L64, L65, L66, & L67

SHEET INDEX NOTE:

THE ISSUE OF SHEET 1 REFLECTS THE LATEST ISSUE OF THE DRAWING SET. WHEN THE DRAWING SET IS REVISED, ONLY THE ISSUE NUMBERS OF MODIFIED SHEETS ARE CHANGED. THE ISSUE NUMBERS OF UNMODIFIED SHEETS ARE NOT CHANGED.

SH NO	1	2	3	4	5	6	7
ISSUE	11	5	5	7	6	8	2

A

B

C

D

A

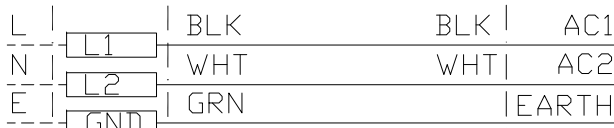
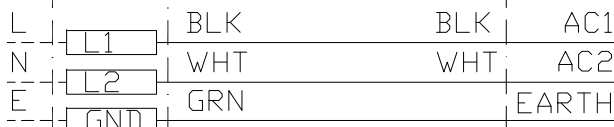
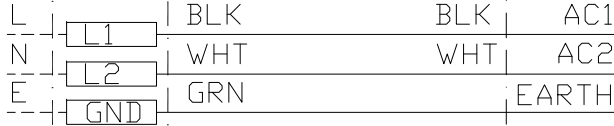
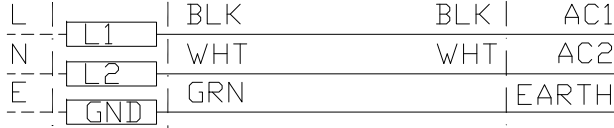
B

C

D

CUSTOMER AC CONNECTIONS

AC FEED BOX
ACCEPTS 14-10 AWG



PLANT SIZE	MAX # RECTS.
400A	9
600A	13

SAGEON II BULK SYSTEM

RECTIFIER BACKPLANE

RECTIFIER
48V / 50A
100-7675-4850_#1

RECTIFIER BACKPLANE

RECTIFIER
48V / 50A
100-7675-4850_#2

RECTIFIER BACKPLANE

RECTIFIER
48V / 50A
100-7675-4850_#N

RECTIFIER BACKPLANE

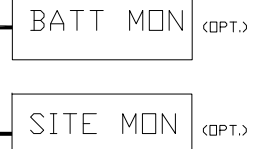
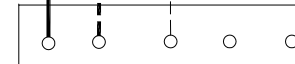
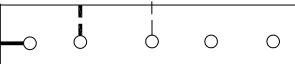
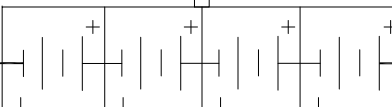
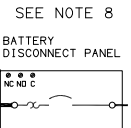
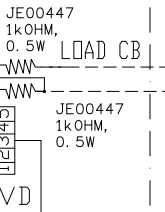
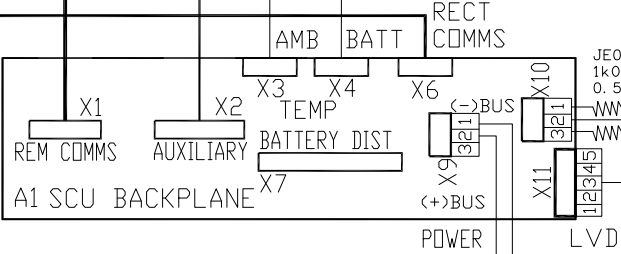
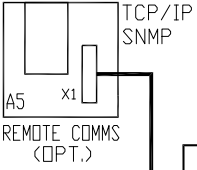
RECTIFIER
48V / 50A
100-7675-4850_#N+1

RECTIFIER COMMS

RECTIFIER BUS (+)

RECTIFIER BUS (-)

L40, 60



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SIZE B	DOC TYPE / NUMBER SD SAGEON2. LXX	ISSUE 5
SCALE: NONE	SHEET: 2 OF 7	FILE NAME: SD-SAGEON2. LXX_SHT_2_ISS_5

A

B

C

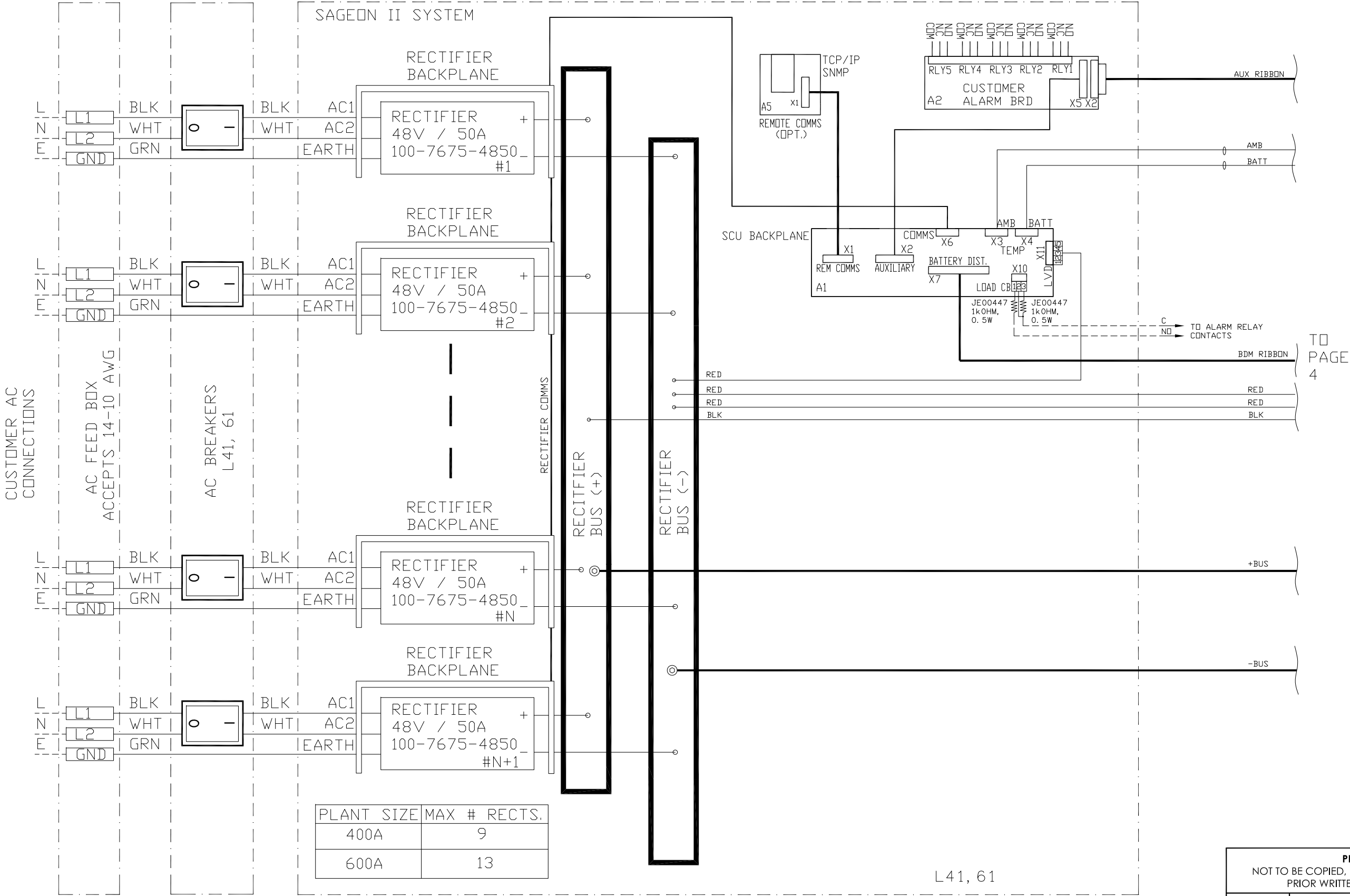
D

A

B

C

D



TO
PAGE
4

L41, 61

PLANT SIZE	MAX # RECTS.
400A	9
600A	13

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SCALE: NONE	SHEET: 3 OF 7	FILE NAME: SD-SAGEON2. LXX_SHT_3_ISS_5

A

A

B

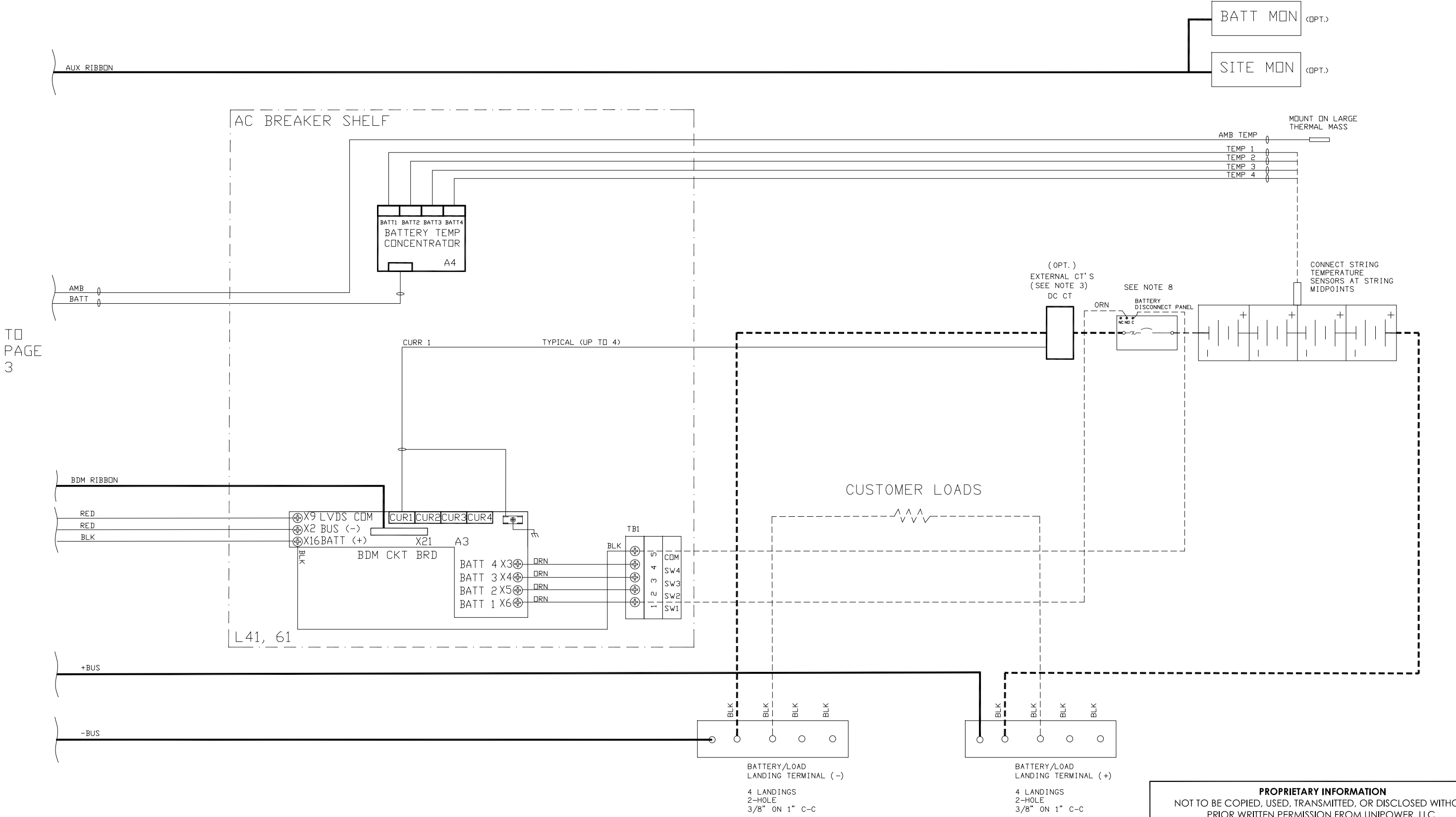
B

C

C

D

D



TO
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3

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SCALE: NONE	SHEET: 4 OF 7	FILE NAME: SD-SAGEON2. LXX_SHT_4_ISS_7

A

B

C

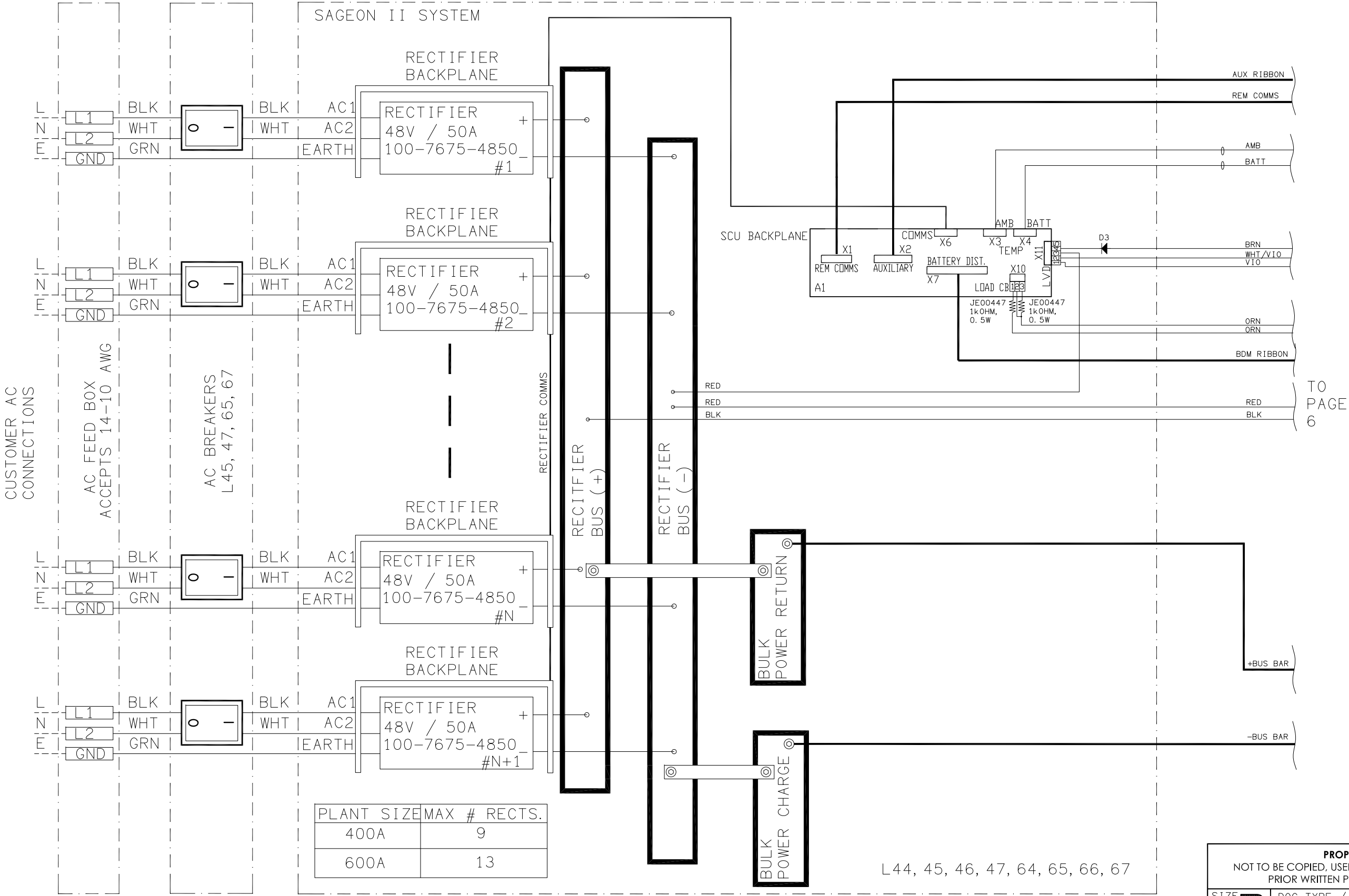
D

A

B

C

D



PLANT SIZE	MAX # RECTS.
400A	9
600A	13

L44, 45, 46, 47, 64, 65, 66, 67

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SIZE B	DOC TYPE / NUMBER SD SAGEON2. LXX	ISSUE 6
SCALE: NONE	SHEET: 5 OF 7	FILE NAME: SD-SAGEON2. LXX_SHT_5_ISS_6

A

A

B

B

C

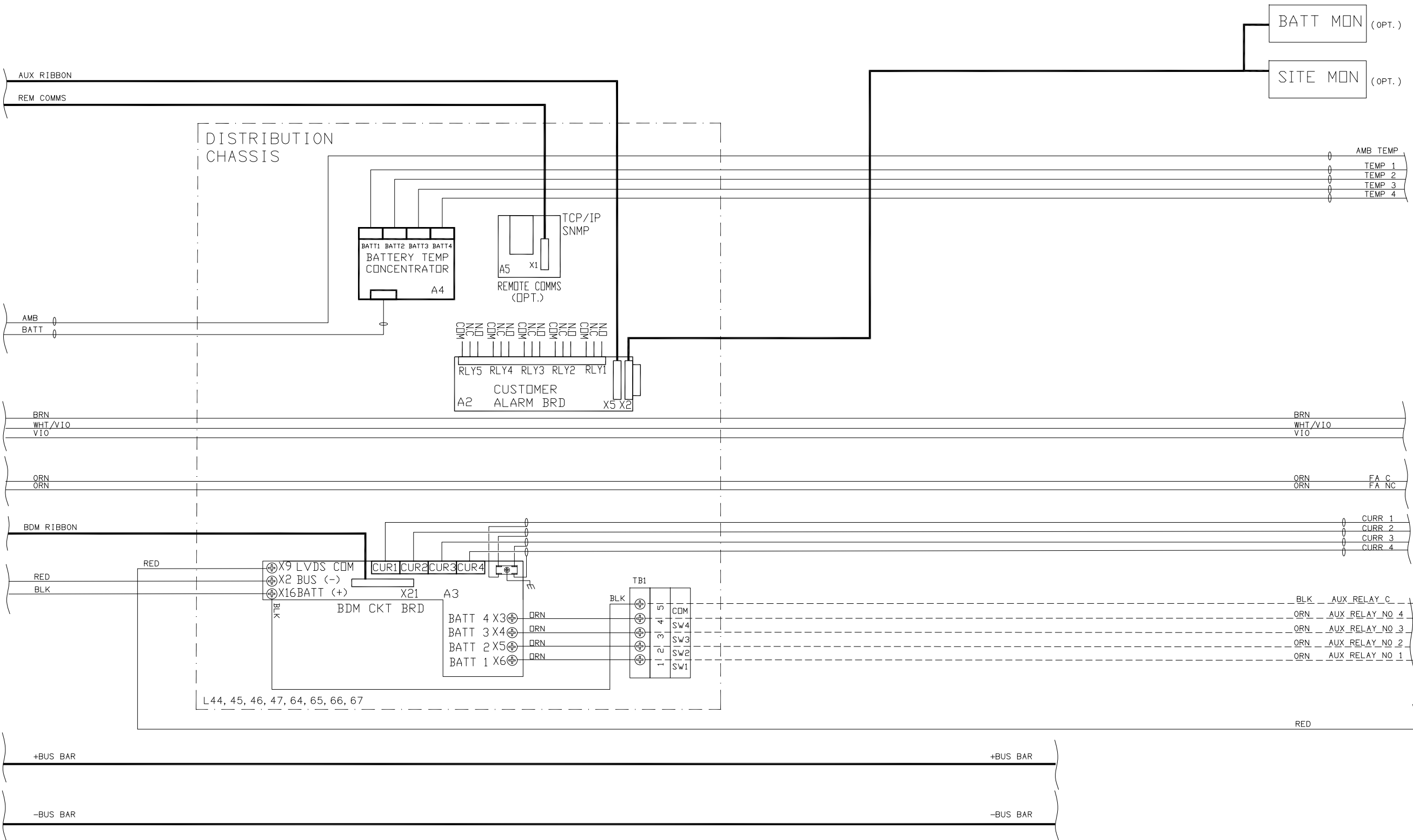
C

D

D

TO
PAGE
5

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PAGE
7



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SIZE B	DOC TYPE / NUMBER SD SAGE0N2. LXX	ISSUE 8
SCALE: NONE	SHEET: 6 OF 7	FILE NAME: SD-SAGE0N2. LXX_SHT_6_ISS_8

A

B

C

D

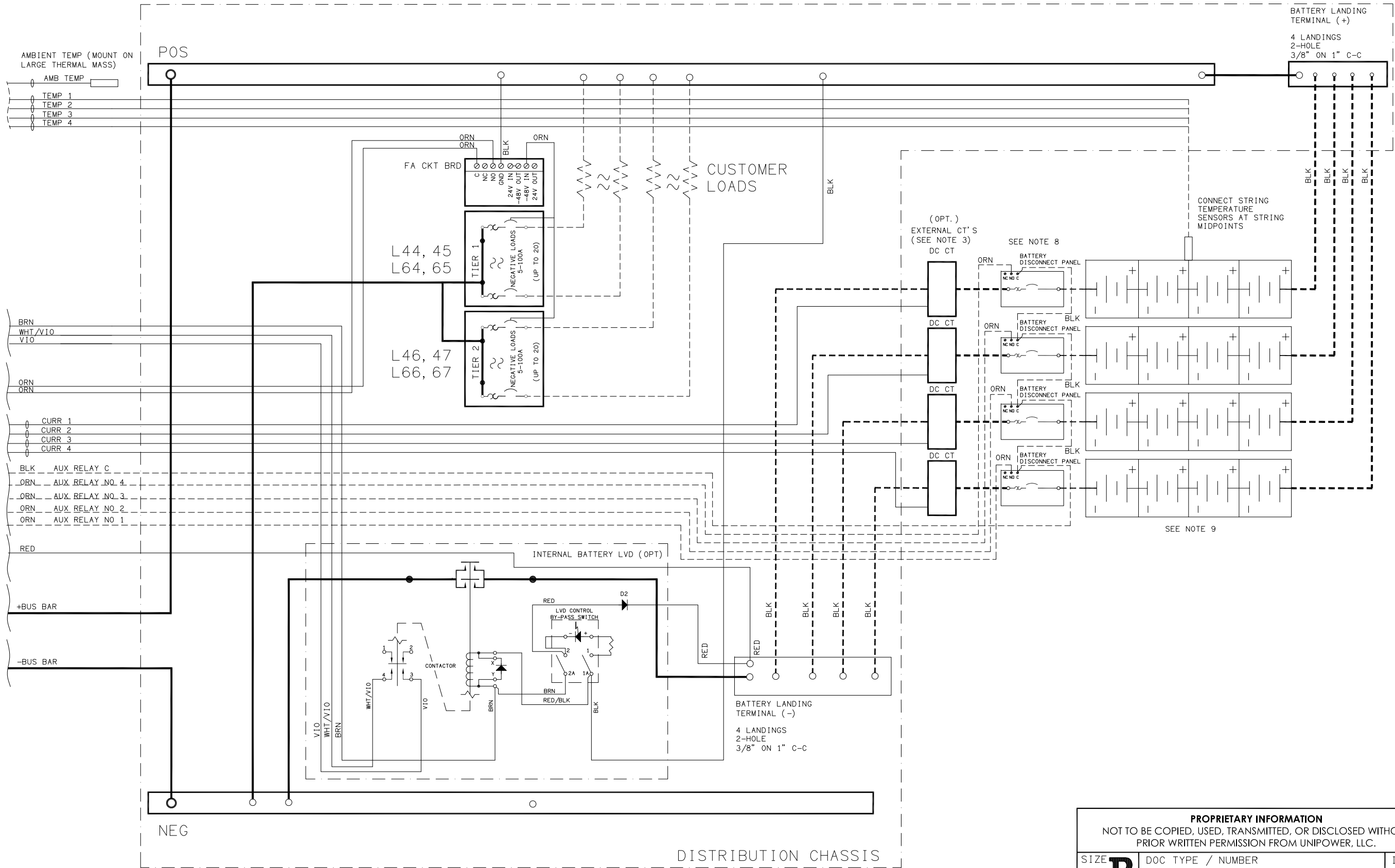
A

B

C

D

TO
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SCALE: NONE	SHEET: 7 OF 7	FILE NAME: SD-SAGEON2. LXX_SHT_7_ISS_2