

Sageon Tower Retrofit Kit

Guardian upgrade to Sageon Tower Systems
-48VDC @ 375A to 1375A N+1

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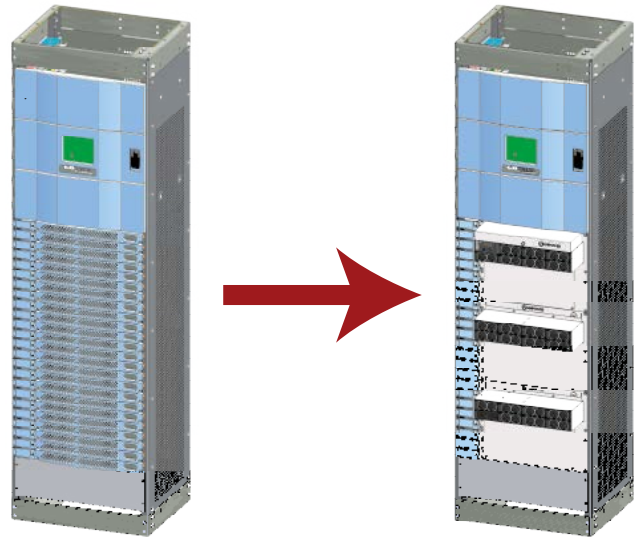
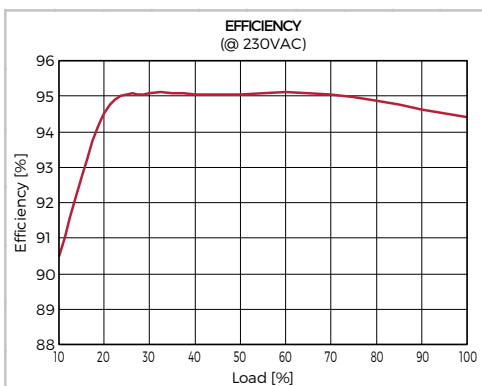
KEY FEATURES

- ◆ Replaces Power Section for Legacy Sageon Tower Systems
- ◆ >96% Efficiency Rectifiers
- ◆ 375A to 1375A N+1 Capacity
- ◆ Remote Monitoring & Control
- ◆ Field Replaceable Controller
- ◆ Ethernet Comm. with SNMPv3
- ◆ 3 LED Alarm/Status Indicators
- ◆ 10 Form-C Relay Alarms
- ◆ LCD Display/Touchpad
- ◆ Easy Installation

SAFETY COMPLIANCE

UL60950-1 2nd Ed.
CSA22.2 No. 60950-1 2nd Ed.
EN60950-1 2nd Ed.

THREE YEAR WARRANTY



DESCRIPTION

The Guardian Sageon Retrofit Kits replace the legacy power section in existing Sageon power systems.

The RFK1A is 8RU high and contains two rectifier/controller power shelves incorporating up to 7 Guardian family high efficiency hot-swap rectifier modules along with an ACX Advanced system controller plus an alarm module. A maximum total current of 375A N+1 is available. The rectifiers are internally fan cooled with speed control which is a function of load and temperature, keeping acoustic noise to a minimum.

RFK1B and RFK1C are 8RU expansion kits that increase the overall capacity in increments of 500A to a total of 1375A N+1.

The ACX Advanced controller monitors system parameters, controls rectifier output, and provides alarms for system failures. The controller is hot-pluggable for easy field replacement in case of failure. There are 2 LED alarm indicators which indicate failures, (RED) Alarm and (YELLOW) Message. A third green LED indicates the controller is working properly. As standard ten form-C relay outputs provide the alarms for remote use. Two digital inputs and outputs are also provided as well as an SD card with sufficient capacity for more than 20 years data logging.

The system can be programmed by means of a remote PC web page display. Communication is by Ethernet LAN with SNMPv3 including alarm trapping. It also has provision for temperature compensated charging of an external battery using a supplied TC probe. An LCD Display/Touchpad is included for local metering, status, and setup.

The Guardian RFK-1 Retrofit Kit is compatible with UNIPOWER's free [PowCom™ software](#) which offers local and remote management through an advanced Windows GUI.

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SYSTEM SPECIFICATION & CAPABILITY GUIDE

SYSTEM DESIGNATION	SAGEON RFK1 RETROFIT KIT	
OUTPUT		
System Voltage	-48VDC nominal 53.5VDC float (factory default, user adjustable via controller)	
Maximum Load Capacity	RFK1A RFK1A + RFK1B RFK1A + RFK1B + RFK1C	375A N+1 875A N+1 1375A N+1
No. Rectifier Slots	RFK1A RFK1B & RFK1C	7 8
DC CONNECTIONS		
Bus Bars & Lugs	Kit includes hardware to connect to existing Sageon installation	
INPUT		
Voltage (rectifier module)	1-phase 180-275VAC	
AC Supply Configurations	1-phase 230/240VAC (L-N-PE) 2-phase 240VAC (L1-L2-PE) 3-phase (3-wire Wye) - 190/200/216/208/220/240VAC (L1-L2-PE / L2-L3-PE / L3-L1-PE) 3-phase (4-wire Delta) - 200/210/220/230/240VAC (L1-N-PE / L2-N-PE / L3-N-PE)	
Frequency	47-63Hz	
Maximum Input Current	see rectifier module capacity table below	
Rectifier Power Factor	>0.98 (typical)	
AC CONNECTIONS		
Terminals Blocks	L/N or L1/L2 per rectifier position - accepting wire gauge 24-10AWG	
MONITORING & CONTROL (ACX Advanced Controller)		
Alarm Relays	10	
Local Interface	4 x 20 LCD, 4-key menu, USB / RS232, microSD card slot for data logging	
Remote Interface	Ethernet / Modem using PowCom™ software package Ethernet port allows monitoring and control over a TCP/IP network. Web browser support + SNMPv3	
LED Indications	Green - System ON; Yellow - Message(s); Red LED - Alarm(s)	
External Digital I/O	2 x Inputs, 2 x Outputs (Open Collector)	
BATTERY MANAGEMENT		
Symmetry Inputs	6 or 12 (can be redefined as analog inputs up to 100VDC)	
Temperature Compensated Charging	Optional: Programmable via system controller	
COMPLIANCE		
EMC	EN 300 386 ; EN61000-6-3 (Emission) ; EN61000-6-2 (Immunity)	
Safety	IEC60950-1:2005 2 Ed. +A1:2009	
ENVIRONMENTAL		
Operating Temperature	-40°C to +65°C, derated above +55°C (see manual and rectifier datasheets)	
Storage Temperature	-40°C to +85°C	

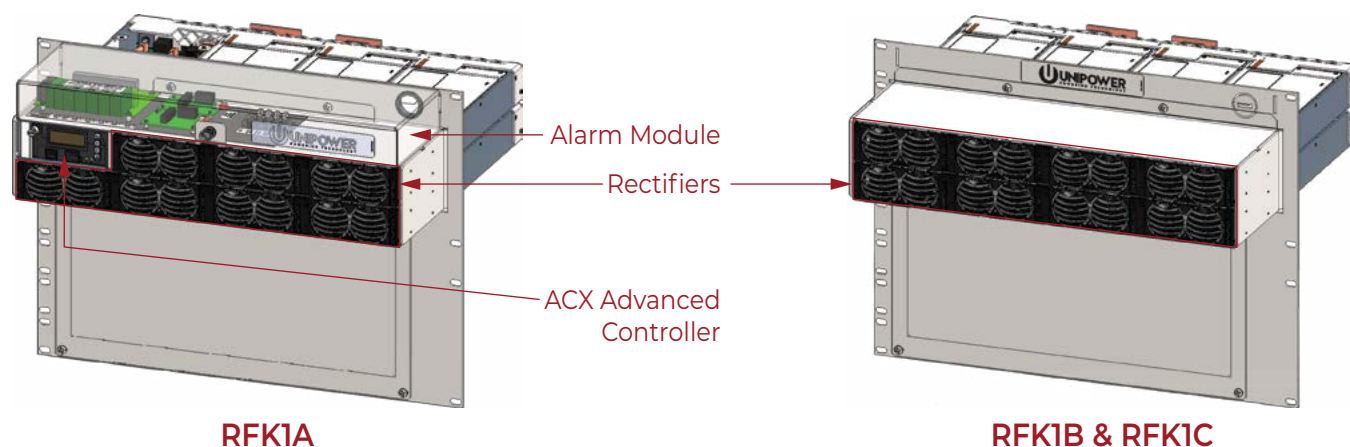
RECTIFIER MODULE CAPACITIES

RECTIFIER MODULES						
MODEL NUMBER	EFFICIENCY ¹	INPUT VOLTAGE ²	INPUT CURRENT ²	OUTPUT POWER	OUTPUT CURRENT	
					Vnom	Vfloat ³
FMPe30.48J	96.2% peak	180-275VAC	17.5A	3000W	62.5A	56.1A

Notes:

1. When operating at 230VAC.
2. Input currents shown are expected maximums at 180VAC.
3. Factory set to 53.5V. Adjustable via system controller.

KIT COMPONENTS



Note:

1. The alarm module cover is shown transparent in the above image so as to show the alarm board and connection detail within.
2. Each kit is supplied with all the necessary hardware to install the system and make electrical connections.
3. Sufficient existing hardware will need to be removed to create the 8RU rack space required by each kit to be installed.

ORDERING GUIDE

To order, determine the capacity of the system that is to be upgraded and select kits and modules as appropriate.

MODEL	SHELF CURRENT FMPe30.48G FMPe30.48J	TOTAL CURRENT FMPe30.48G FMPe30.48J	MAX. # RECTIFIERS	KIT PART NUMBER	CHECK IF REQUIRED
RFK1A	362A N+1 375A N+1	362A 375A N+1	7	385.6300.RFK1A	
RFK1B	483A 500A	845A 875A N+1	8	385.6300.RFK1B	
RFK1C	483A 500A	1328A 1375A N+1	8	385.6300.RFK1C	

Note: RFK1B and RFK1C are identical with the exception of internal bus address settings.

MODULE POWER	RECTIFIER MODEL #	QUANTITY (one rectifier only)
3000W	FMPe30.48J	
BLANK	XGB-01-C	

Guidance notes:

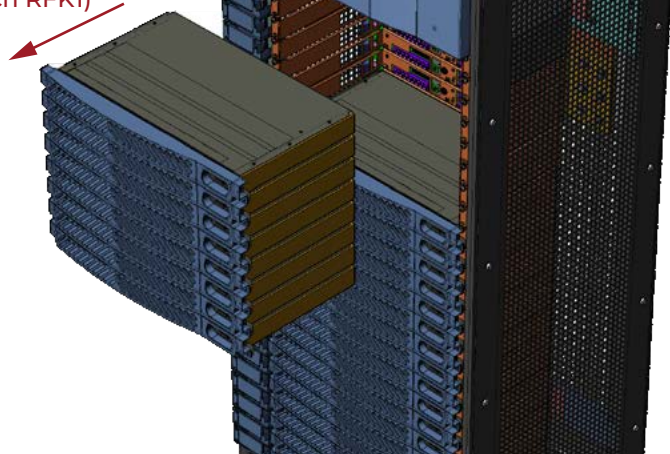
If required system capacity is 375A or less order 1 x RFK1A with up to 7 rectifier modules.
 For capacities between 375A and 875A order 1 x RFK1A plus 1 x RFK1B with up to 15 rectifier modules.
 For capacities above 875A order 1 x RFK1A plus 1 x RFK1B plus 1 x RFK1C with up to 23 rectifier modules.
 In all cases, remember to order sufficient Blank Modules to fill any empty module positions.

INSTALLATION GUIDE

(all cabling removed to improve clarity)

Remove Existing Rectifiers

Remove Rectifier Modules
(8 x for each RFK1)

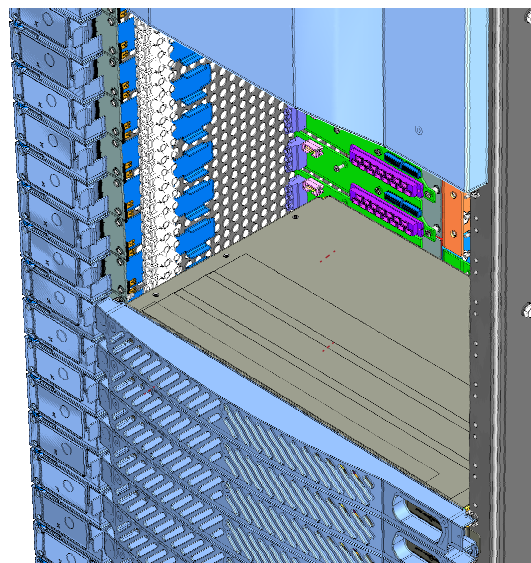


1. Open the AC breaker cover to unlatch the rectifier modules to be removed and set the breaker to OFF.
2. Remove the rectifier modules from the system as required.

Note: It is not essential to remove rectifiers from unused positions, but they must be isolated from the AC supply before the RFK1 system is switched on. Any that are removed should be set aside for recycling.

Remove Rectifier Magazines

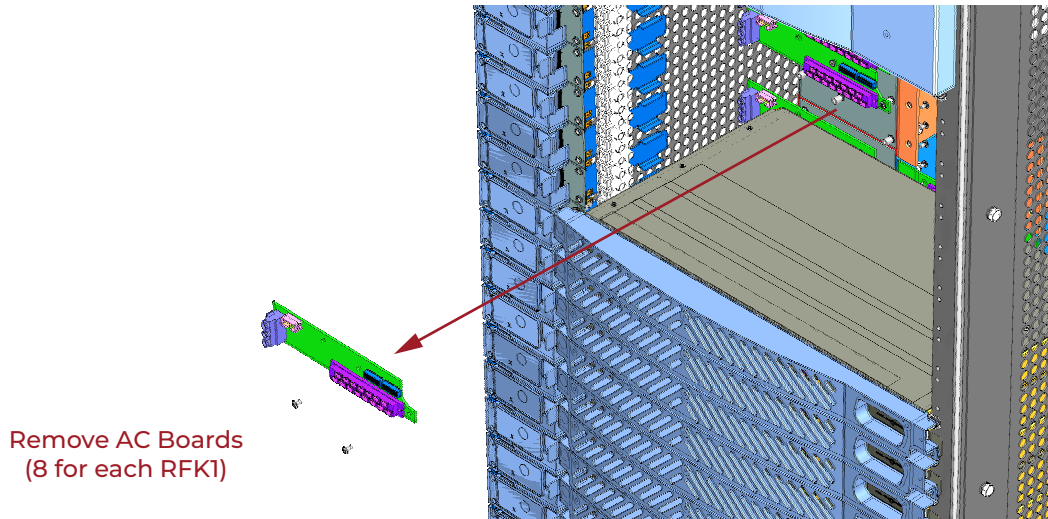
Remove Rectifier Magazines
(8 x for each RFK1)



3. Using a suitable Pozidrive screwdriver, remove the three screws holding the magazine in position and loosen the captive screws which secure the DC backplane board to the positive and negative vertical bus bars. Withdraw the magazine assembly from the cabinet. (The DC backplane board will remain secured to the magazine assembly.)
4. Repeat this operation for the number of magazines that need to be removed: RFK1A x 8 total, RFK1A + RFK1B x 16, RFK1A + RFK1B + RFK1C x 24.

Note: The removed parts can be set aside for recycling.

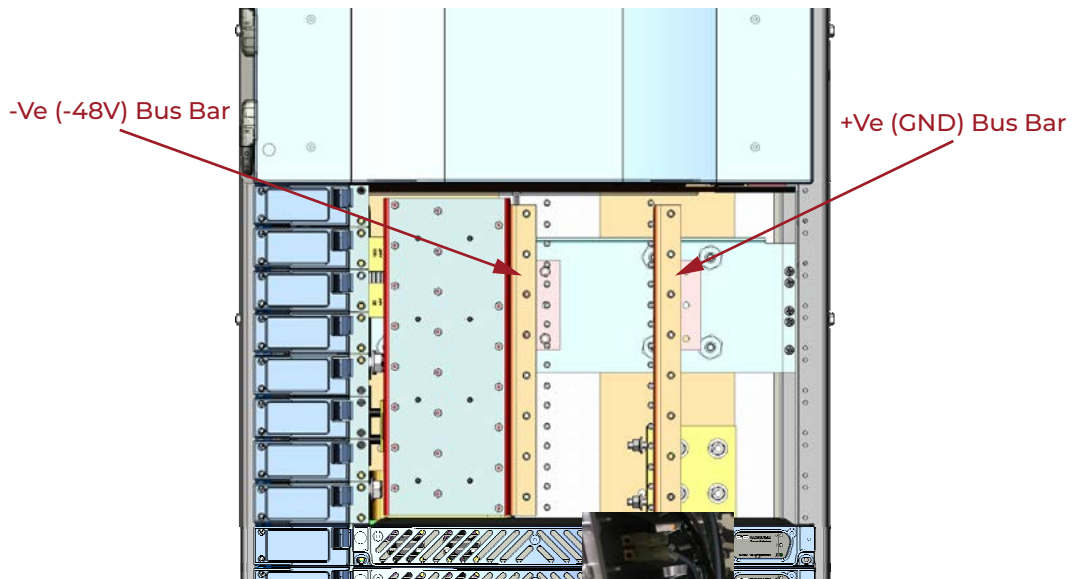
Remove the AC Connection Boards



5. Remove the AC supply cables (L, N) from the AC input breaker by disengaging the spade-lug terminals from the load side and also remove the associated GND cable from the adjacent terminal block. (Note: Insulate and secure unterminated GND cables to prevent inadvertent contact with the system negative bus.)
6. Unscrew and remove the AC connection board.
7. Repeat these operations for the 8, 16 or 24 sets that need to be removed.

Note: The removed parts can be set aside for recycling.

Connect new AC input cables

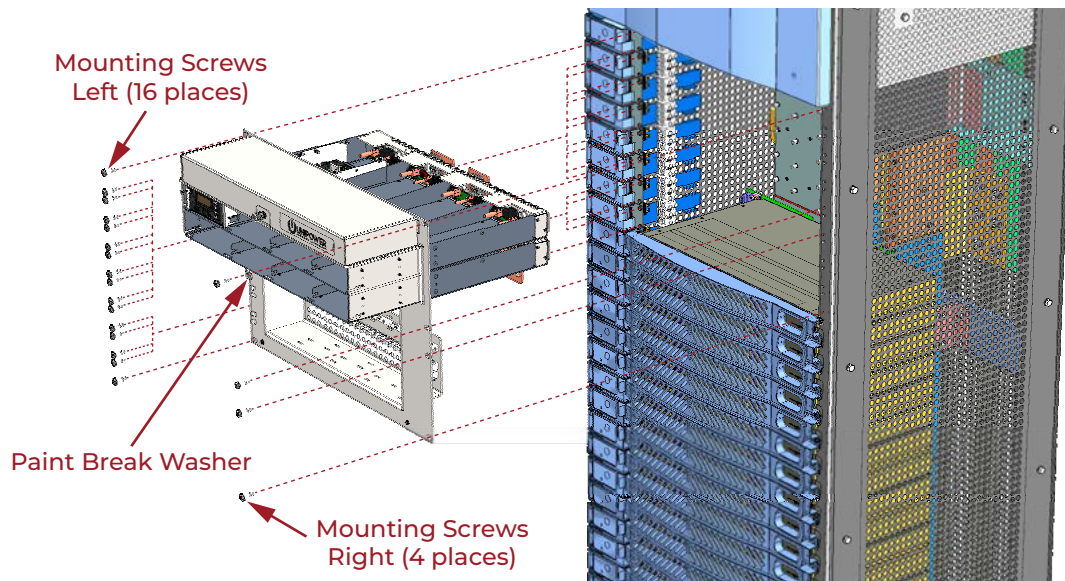


The above shows a front view of the system following removal of the rectifiers and associated hardware. Note the locations of the DC Bus Bars.

Note: The AC breaker covers may be optionally removed and set aside for recycling.

8. Starting at position #2, connect the replacement AC cables supplied with the RFK1 kit to the AC input breakers (L, N) and the adjacent terminal block (GND).

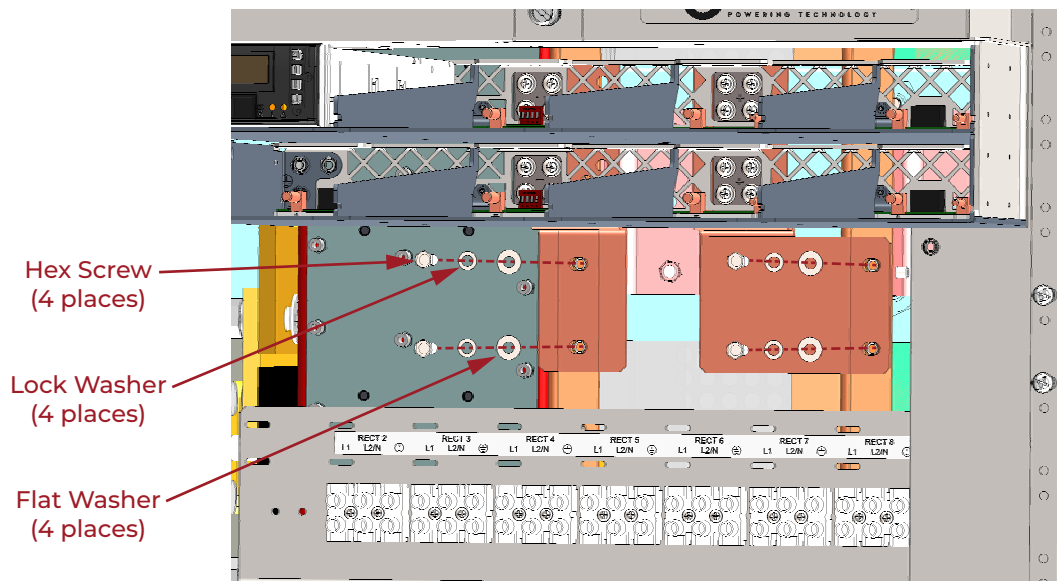
Install the RFK1 System Unit



9. Install the RFK1 system unit into the cabinet using the 20 rack-mount screws supplied. Ensure that the paint break washer also supplied is installed under the top right side screw.

Note: The bottom section cover-plate should be removed first to ease handling during the installation process.

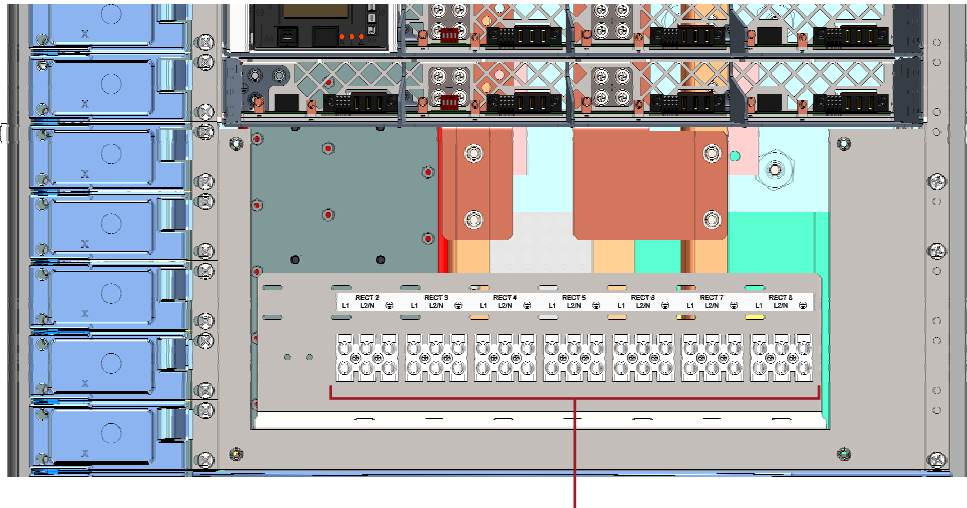
Connect the DC Bus Bars



10. Using the supplied set of four Hex Screws, lock washers and flat washers, connect the bus bars on the rear of the RFK1 module to the existing bus bars in the cabinet.

Note: Tighten to 41 in lbs.

Connect the AC Input Cables



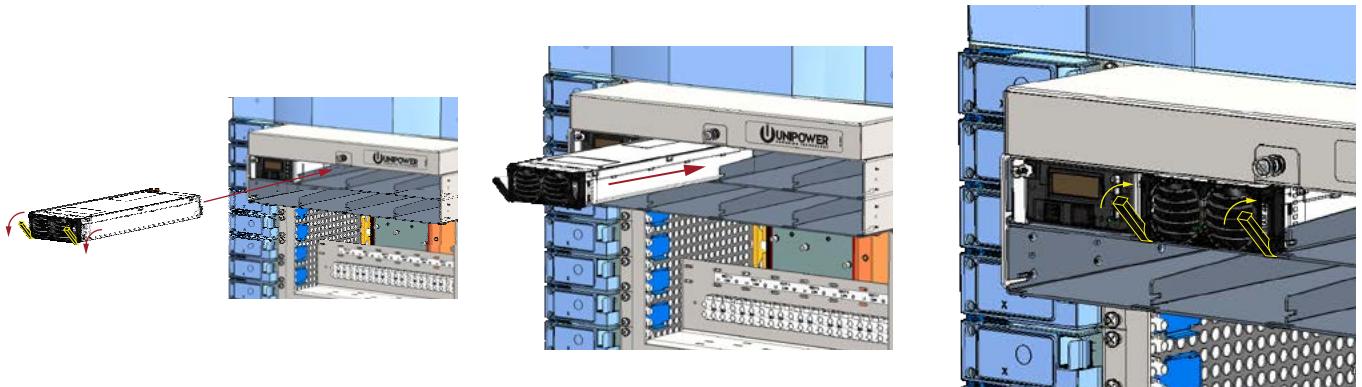
AC Input Connections
(7 for RFK1A, 8 for RFK1B & RFK1C)

11. Using the cable sets that are hanging from the AC Input breakers, connect the L, N and GND wires as labelled to the terminal blocks in the bottom section of the RFK1 module.

Note: For RFK1A use the cables labelled 2 - 8. For RFK1B use cables 9-16 and for RFK1C use cables 17 - 24.

12. Once all connections have been made and checked, refit the lower cover plate.

Install the Rectifiers

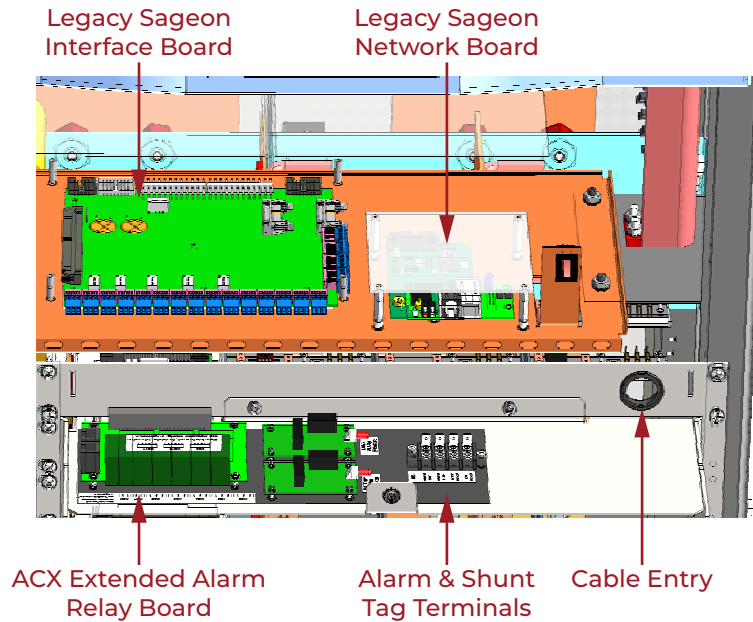


13. Install the rectifiers or blanking modules in the same way:

- a) Rotate the locking handles forward 45°.
- b) Insert the module into the rectifier slot and push firmly until it is fully seated.
- c) Rotate the locking handles back until they are flush with the front face of the module and lock it into place.
- d) Repeat for the remaining positions.

Note: For safety reasons, always fill empty slots with blank modules.

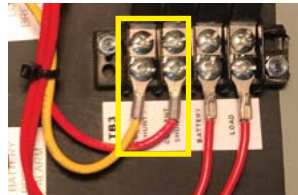
Connect Sageon System Alarm & Signal Cables



14. Open the access door immediately above the newly installed RFK1A to access the Legacy Sageon Interface and Network boards.
15. Remove the RFK1A Alarm Box cover to access the Alarm and Signal connection points in the RFK1A.
Note: Several cables not shown above will already be in place as these are internal to the RFK1A unit.
16. Alarm and signal connections can now be made as described below using the supplied extension cable harness routed into the RFK1 Alarm box via the cable entry grommet. Ensure that the end which has cables terminated with ring tags is towards you.

a) Connect the shunt sense

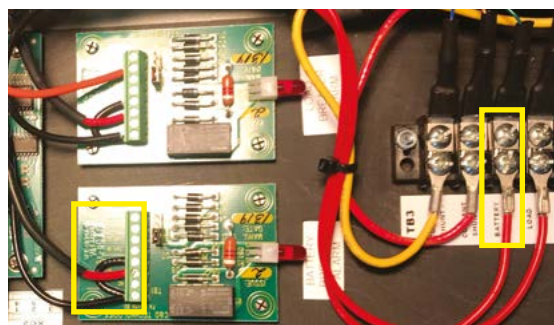
Splice to the shunt sense cables +Ve (YEL) and -Ve (R/Y) behind to the Sageon interface board terminals J27-2 and J27-1 respectively. Fit the ring end to the tag terminals marked 'CURRENT SHUNT +' (YEL) and 'CURRENT SHUNT -' (R/Y).



b) Connect the battery breaker alarm

Splice one black cable from the extension harness to the black cable connected to the Sageon interface board terminal J27-6. Fit the other end into the battery alarm board terminal 1 along with one of the supplied short tails. Fit the other end of the tail to terminal 4.

Take one of the supplied red wires with insulated resistor and fit one end to terminal 3 of the battery alarm board. Fit the other end with the ring terminal to the tag terminal marked 'BATTERY'.



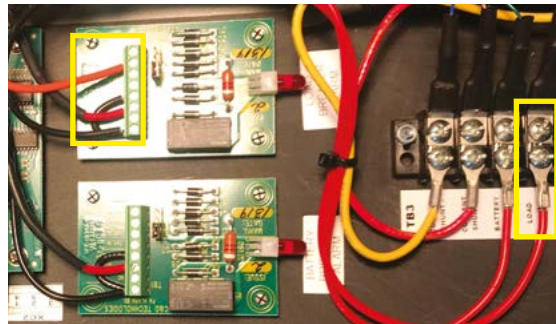
Note: Terminal 7 on the RFK1A battery alarm board is where the battery breaker alarm sense input should be connected. This may either be done by splice a cable (not supplied) into the orange cable connected to the Sageon interface board terminal J28-8 and then fitting the other end to terminal 7 on the RFK1 Battery Breaker board or by bringing a remote breaker alarm signal directly to terminal 7 on the RFK1 Battery Breaker board.

c) Connect the load breaker alarm

Splice the other black cable from the extension harness to the black cable connected to the Sageon interface board terminal J28-5. Fit the other end into the RFK1A load alarm board terminal 1 along with one of the supplied short tails. Fit the other end of the tail to terminal 4.

Splice the orange cable from the extension harness to the orange cable connected to the Sageon interface board terminal J28-6. Fit the other end into the RFK1A load alarm board terminal 7.

Take the remaining supplied red wire with insulated resistor and fit one end to terminal 3 of the load alarm board. Fit the other end with the ring terminal to the tag terminal marked 'LOAD'.

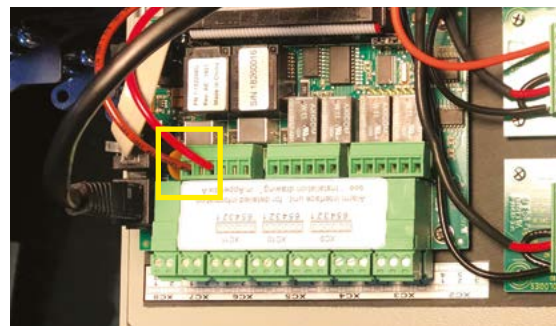


d) Connect the Low Voltage Disconnect

Splice the remaining red cable from the extension harness to the red cable connected to the Sageon interface board terminal J27-7. Fit the other end into the terminal 3 of XC11 on the ACX Alarm Relay board.

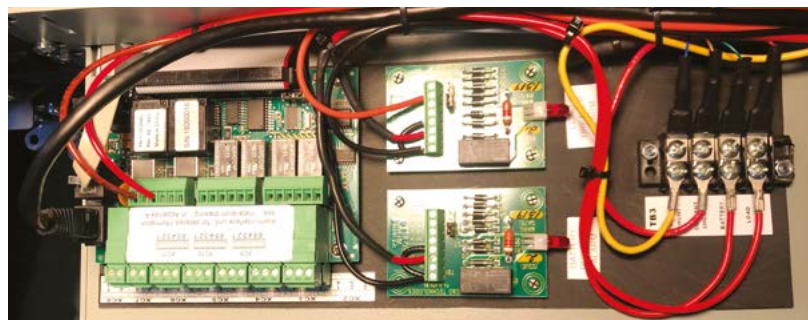
Cut and insulate the brown cable connected to J27-10 on the Sageon interface board.

Splice the brown cable from the extension harness to the free end of the brown. Fit the other end into the terminal 1 of XC11 on the ACX Alarm Relay board.



Note: The controller supplied with the RFK1A is pre-programmed to support these essential functions. For additional features and to take advantage of the available additional alarms please consult the [ACX Advanced User Manual](#).

When all connections have been made the RFK1 Alarm Box should look similar to the below.



e) Isolate the Sageon Controller

To isolate the existing system controller and other existing alarm function, unplug J27 from the Sageon interface board.

Note: In some circumstances it may be desirable to retain the battery monitoring functionality of the existing controller; in which case it is not necessary to unplug J27 as described above.

f) Reposition the LAN cable

If there is a LAN cable plugged into the Sageon Network board it will need to be relocated to the LAN port on the front panel of the ACX Advanced controller in the top left slot of the RFK1A.

This is best achieved by pulling the cable out through the top of the cabinet and dropping it down in front. Alternatively, if there is enough spare cable, by drilling an additional access hole into the side of the RFK1A Alarm Box cover and feeding the cable through.

17. Replace the Alarm Box cover and close the access door.
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Powering Up the System

Note: Please read the [ACX Advanced User Manual](#) before attempting to power up the system.

18. Ensure that all AC Input, Load and Battery Breakers are in the OFF position.
19. Unlatch and partially withdraw all installed rectifier modules with the exception of the module in position 2 adjacent to the ACX Advance controller in the RFK1A.
20. Apply AC power to the one rectifier by switching ON the AC input breaker #2.
21. When the display on the controller indicates that the DC voltage has stabilized to 53.5V, re-insert the remaining rectifier modules and then apply AC power in sequence starting at position 3 in the RFK1A and working left to right and the down until all rectifiers have been switched on.
22. Visually scan all rectifiers to ensure the LED status is as it should be, check that the controller is still indicating an output voltage and that no alarms LEDs are lit and the switch on any Battery Breakers followed by any Load Breakers to connect the batteries and load to the system.

Each RFK1 kit is supplied with all necessary hardware and set of schematics to carry out the above installation procedure.

In the event that you experience any difficulties with installation or powering up the system, please contact Applications Engineering for support on +1 (954) 346 2442 and select option 2. Alternatively, e-mail dunlapae@unipowerco.com.