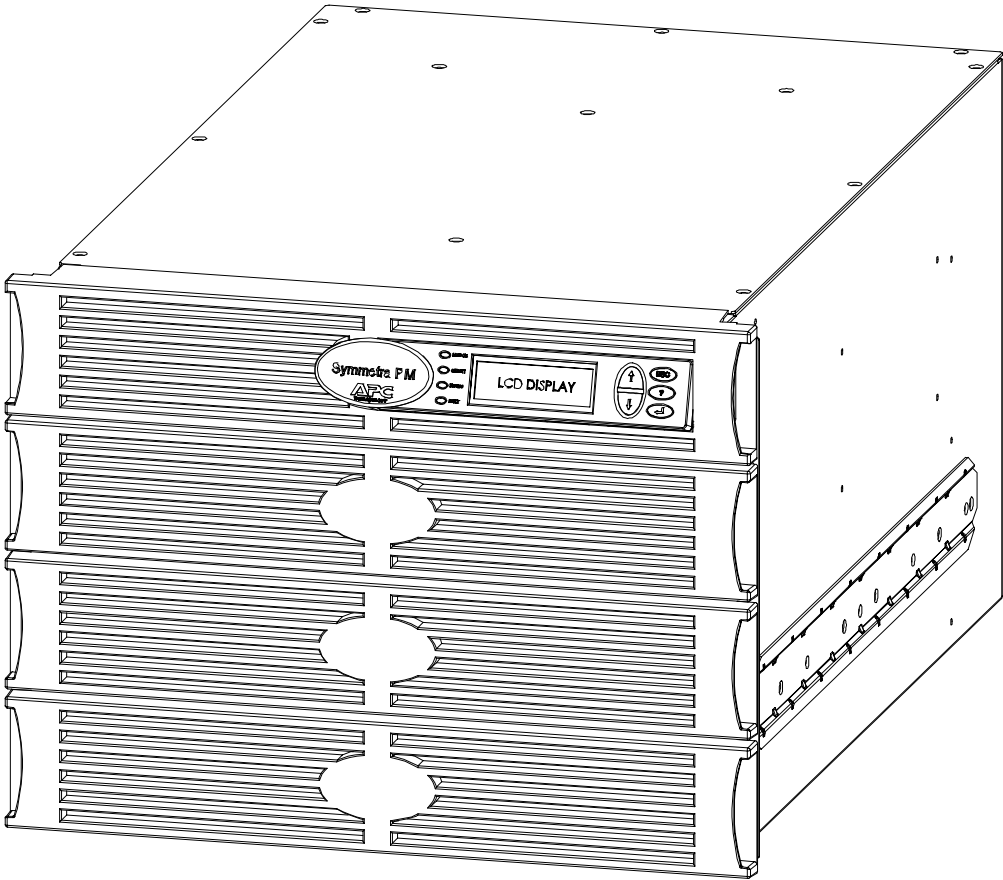


APC Symmetra RM

Operation Manual

English



www.apcc.com

Limited Warranty

American Power Conversion (APC) warrants its products to be free from defects in materials and workmanship for a period of two years from the date of purchase, except in India where the period is one year for battery module(s). Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. To obtain service under warranty you must obtain a Returned Material Authorization (RMA) number from customer support (*Service*, page 17). Products must be returned with transportation charges prepaid and must be accompanied by a brief description of the problem encountered and proof of date and place of purchase. This warranty does not apply to equipment which has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser who must have properly registered the product within 10 days of purchase.

EXCEPT AS PROVIDED HEREIN, AMERICAN POWER CONVERSION MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

EXCEPT AS PROVIDED ABOVE, IN NO EVENT WILL APC BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS PRODUCT, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Life Support Policy

As a general policy, American Power Conversion (APC) does not recommend the use of any of its products in life support applications where failure or malfunction of the APC product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. APC does not recommend the use of any of its products in direct patient care. APC will not knowingly sell its products for use in such applications unless it receives in writing assurances satisfactory to APC that (a) the risks of injury or damage have been minimized, (b) the customer assumes all such risks, and (c) the liability of American Power Conversion is adequately protected under the circumstances.

Examples of devices considered to be life support devices are neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), autotransfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators for both adults and infants, anesthesia ventilators, infusion pumps, and any other device designated as "critical" by the U.S.F.D.A.

Hospital grade wiring devices and leakage current may be ordered as options on many APC UPS systems. APC does not claim that units with this modification are certified or listed as Hospital Grade by APC or any other organization. Therefore these units do not meet the requirements for use in direct patient care.

Entire contents copyright © 2000 by American Power Conversion Corporation. All rights reserved.
Reproduction in whole or in part without permission is prohibited.

APC and PowerChute are registered trademarks of American Power Conversion Corporation. All other trademarks are the property of their respective owners.

Table of Contents

Chapter 1: Operation	1
PowerView User Interface	1
Features of PowerView RM	1
Front Panel	2
LED Indicators	2
Navigation Keys	3
LCD Screens	4
Startup Screen.....	4
Monitoring Screen	4
Default Monitoring Information.....	4
Main Menu	5
Submenu Functions	5
Control Menu	7
Status Menu.....	7
Setup Menu.....	8
Accessories Menu.....	8
Logging Menu	9
Display Menu	10
Diagnostics Menu.....	10
Help Menu	10
Changing the Language of the PowerView RM	11
Chapter 2: Maintenance and Troubleshooting	13
Storage	13
Storage Conditions	13
Extended Storage.....	13
Replacing Modules.....	13
Replacing a Power Module	14
How to Replace a Battery Module	15
Replacing an Intelligence Module.....	16
Replacing the System Fan	16
Troubleshooting	17
Service.....	21
Transporting the Symmetra RM.....	22
Appendix A: Specifications	23

List of Figures

- Figure 1: PowerView RM 1
- Figure 2: PowerView RM Interface 2
- Figure 3: PowerView RM Startup Screen 4
- Figure 4: PowerView RM Monitoring Screen 4
- Figure 5: PowerView RM Main Menu 5
- Figure 6: Removing the PowerView RM Bezel 11
- Figure 7: Connect the PowerView RM Programming Cable 11

PowerView User Interface

PowerView RM is the primary user interface for the Symmetra RM. Shown in Figure 1, the PowerView RM comes installed in the top bezel of Symmetra RM but can be detached for mounting higher in the rack (additional mounting hardware required).

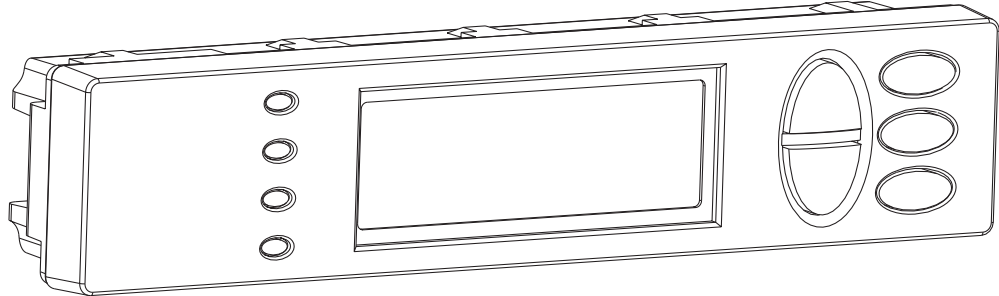


Figure 1: PowerView RM

Features of PowerView RM

The functions of PowerView RM are listed and described below. For a more detailed description, see *Submenu Functions*, page 5.

Alarms and Alarm Thresholds: In the event of a power disturbance, loss of a system component, or other configurable alarm condition, PowerView RM issues an alarm—both an audible alarm and a message on the LCD screen. For example, you can configure a Symmetra RM with N + 1 redundancy to issue an alarm if the system incurs the loss of a redundant power module (typically due to an additional load or a power module failure).

System Function Settings: You can change settings of the Symmetra RM.

PowerView RM Settings: Several functions of the PowerView RM itself are configurable.

On-Demand Control of System Output: You can send power control commands to the system.

Event Logging: The 64 most recent power and user events are recorded into the PowerView RM interface.

View Status and Diagnostics: Input voltage, output voltage, available run time, load size, present operating mode, and the status of every module in the Symmetra RM frame are available for review.

Testing: You can perform a system self-test and simulate a power failure.

Help: Pressing the Help [?] key launches context-sensitive help.

Front Panel

The PowerView RM interface includes an alphanumeric liquid crystal display (LCD) screen, five navigation keys, four light-emitting diode (LED) indicators, and an audible alarm beeper. Figure 2 shows the front panel of PowerView RM.

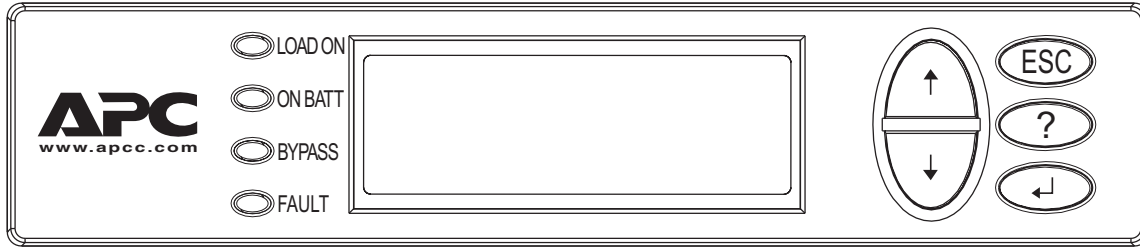


Figure 2: PowerView RM Interface

LED Indicators

Four LED indicators report the operational status of the Symmetra RM. Table 1 describes their appearance and function.

Table 1: PowerView RM LED Indicators

LED	Color	Status
LOAD ON	Green	The Symmetra RM is in online mode: the system is receiving power from the mains power source and is supplying conditioned power to the load equipment.
ON BATT	Yellow	A mains power failure has occurred, and the battery modules are supplying power to the load equipment.
BYPASS	Yellow	Power to the load is being supplied directly by the mains power source. The Symmetra RM has, in effect, been removed from the circuit.
FAULT	Red	The Symmetra RM has detected an internal fault condition. An alarm message will appear on the PowerView RM display.



All four LED indicators are on when the PowerView is being reset.

Navigation Keys

The five navigation keys on the PowerView RM interface are used to select and open menu items, to access information, to change system settings, and to change language program files. A small selection arrow at left on the display screen indicates the menu item or setting that is selected. The navigation keys are described in Table 2.

Table 2: PowerView RM Navigation Keys

Symbol	Name	Sound	Function
↑	UP	Short beep	Moves the selection arrow upward.
↓	DOWN	Short beep	Moves the selection arrow downward.
ESC	ESCAPE	Short beep	Exits the current screen and returns to the previous screen. Programming mode only: when pressed until a short beep (up to one second) occurs, it exits the programming mode.
?	HELP	Short beep	Opens context-sensitive help.
↵	ENTER	Short beep	Opens the selected menu item or setting.
ESC + ? + ↵	ESCAPE + HELP + ENTER	Two short beeps	When pressed simultaneously for about 1 second, resets the PowerView RM interface.
		One long beep	When pressed simultaneously for about 3 seconds, puts the interface in programming mode for installing new language program files.

LCD Screens

Startup Screen

When the System Enable switch is placed in the On position, the Startup screen appears on the LCD.

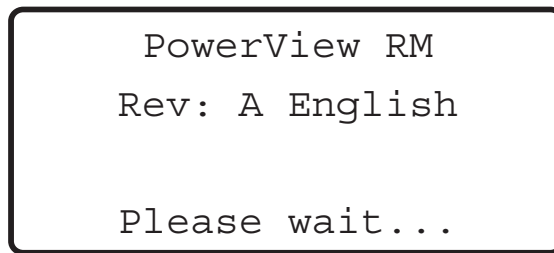


Figure 3: PowerView RM Startup Screen

Monitoring Screen

After the PowerView RM interface has established communication with the Symmetra RM, the Monitoring screen appears on the LCD. Figure 4 shows the factory default Monitoring screen. (You can configure the Monitoring screen to display other information by going to the Display submenu and selecting Config.)

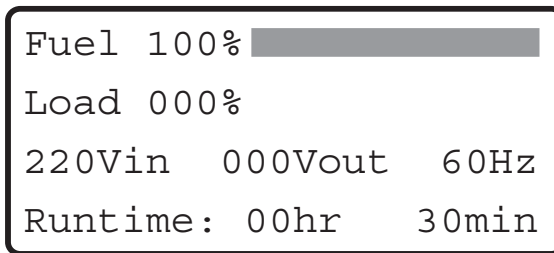


Figure 4: PowerView RM Monitoring Screen



After the PowerView RM has been inactive for some time (specified by the password timeout setting under the Display submenu), the interface will revert to the Monitoring screen.

Default Monitoring Information

The factory default Monitoring screen displays the following status information.

Fuel Percentage: The percentage of battery capacity (fuel) that is available.

Load Percentage: The percentage of system capacity that is being used to supply conditioned power to the load equipment.

Voltage and Input Frequency: The input voltage from mains power, the output voltage supplied to the load equipment, and the frequency of the input (mains) power.

Run Time: The run time that can be expected of the batteries. The intelligence module calculates the run time based on both the amount of power required by the load equipment and the capacity of the battery modules in the system frame.

Main Menu

At the Monitoring screen, press any navigation key to open the Main menu. This menu contains items that access eight submenus. Figure 5 shows the Main menu.

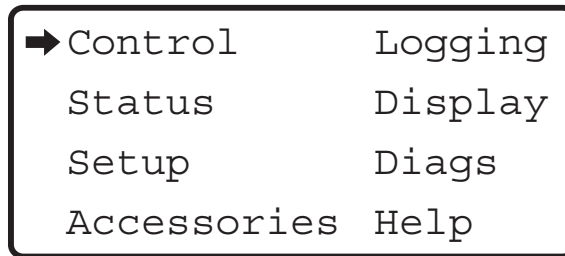


Figure 5: PowerView RM Main Menu

The Main menu is similar to a menu bar at the top of a computer interface. To open a submenu or the help feature, move the selection arrow to its item and press the ENTER key.

Submenu Functions

The functions of the seven submenu items and the Help feature are listed below.

Control

- Power up and power down the load equipment
- Simulate a power failure
- Conduct a graceful reboot
- Conduct a graceful turnoff
- Start run-time calibration
- Put system into or out of bypass mode

Status

- Determine the input/output voltage and frequency
- Determine the percentage load—with no redundancy
- Determine the percentage load—with redundancy
- Review the input/output frequencies
- Review the status of the battery modules
- Review the status of the power modules
- Review the alarm thresholds
- Determine the current operation mode
- Review the status of the main intelligence module (MIM)
- Review the status of the redundant intelligence module (RIM)

Setup

- Set the system shutdown parameters
- Set the alarm thresholds
- Set the synchronization range of the input/output voltage frequency
- Set whether the system goes into bypass mode when the voltage frequency is outside the synchronization range during a power module failure
- Set whether the system runs a self-test when it powers on
- Set the system ID
- Set the output voltage to the local standard
- Copy the system settings to another PowerView RM

Accessories

- Monitors APC peripherals if they are present

Logging

- View the event log — the last 64 power events or user events
- Select the events that are to be recorded in the event log
- Clear the event log
- View a statistical representation of the log data
- View logged event by group

Display

- Configure the date and time
- Set a password
- Display the About System information
- Change the audible alarm and volume settings
- Set the screen contrast
- Select the types of information that appear on the Startup screen

Diagnostics

- Display the reason for a failure, change, or alarm that has occurred
- Review the status of the main intelligence module (MIM)
- Review the status of the redundant intelligence module (RIM)
- Review the status of the power modules
- Review the status of the battery modules

Help

Displays the online help feature.



Context-sensitive help is available for most screens. Press the Help button (?) to access the help feature.

Control Menu

Use the Control menu and its submenus to control how power flows to and from the Symmetra RM.

Menu Item	Function
Turn Load On/Off	Controls the delivery of output power to connected equipment.
Do Self Test	Initiates a system of self-testing and diagnostics. An error message is displayed when a problem is detected.
Simulate Power Fail(ure)	Simulates a power failure/return to test server's recognition of failure event.
Graceful Reboot	<i>Note: Symmetra RM must be connected to PowerChute software.</i> Initiates a signal for the server to shutdown. After user-defined "Low-Battery Duration," the output power is switched off for the duration of the user-defined "Return Delay." Then the output power is switched on again. See Setup-Shutdown to set these time delays.
Graceful Turn Off/On	<i>Note: Symmetra RM must be connected to PowerChute software.</i> Initiates a signal for the server to shut down. After the user-defined "Low-Battery Duration," the output power is switched off. Use the Setup-Shutdown menu to set these times.
Start/Stop Runtime Cal(ibration)	Calculates an accurate battery runtime measurement. Delivers load output power from battery source. Discharges battery to 50% of capacity.
UPS into/out of Bypass	Controls the bypass function. When in the bypass mode, power is delivered directly from utility source to load equipment.

Status Menu

The Status menu displays information regarding load, battery and power modules, voltage, and electrical current.

Menu Item	Function
Ø Vin Vout Iout	Displays input voltage, output voltage, and output current information.
% load assuming no redundancy	Compares the current load to the total capacity of all power modules.
% load allowing for n+ redundancy	Compares the current load to the total capacity of all power modules except the power modules that are set aside by the "Fault Tolerance" alarm threshold. For example, if there are four power modules installed, and the fault tolerance alarm threshold is set to "1," this percentage of load uses only 3 power modules for the calculation. See Setup-Alarms to set the redundancy level.
Frequencies	Displays the measured input and output frequencies.
Battery Status Screen	Displays battery module source capacity, runtime, and status information.
Power Module Status Screen	Displays power module source capacity, fault tolerance, and status information.
Alarm Thresholds Status Screen	Displays the user-defined alarm settings. See Setup-Alarms to set these alarm thresholds.
Miscellaneous Status Screen	Displays the summary result of self test, the reason for the last system transfer, the current operating mode, and the status of the main intelligence and redundant intelligence modules.

Setup Menu

The Setup menu lets the user customize the Symmetra RM functionality.

Menu Item	Function	Options
Shutdown	Sets the shutdown parameters in the event of a utility power failure.	None
Low Batt(ery) Dur(ation)	Sets the number of minutes an audible alarm sounds before the Symmetra RM shuts down due to battery exhaustion.	2, 5, 7, or 10 minutes
Shutdown Delay	Sets the additional runtime for computer issuing shutdown command if it needs additional time to shut itself down.	20, 180, or 300 seconds
Return Delay	Sets the delay interval that allows utility power to stabilize before the system goes back online after a utility power failure.	0, 60, 180, or 300 seconds
Return Battery Capacity	Sets the minimum battery capacity necessary before repowering load when returning from an extended utility power failure.	0, 15, 50, or 90%
Defaults	Sets all settings to factory defaults.	
Output Freq(ueency)	The Symmetra RM output will phase lock to the input within this range.	50 or 60 Hz \pm 3 Hz, Full Range Tracking
Alarms	Sets the alarm thresholds.	None
Redundancy	An audible alarm sounds if the redundancy falls below this level.	0, 1, or 2
Load	An audible alarm sounds when the load exceeds this limit.	1 kVA to 6 kVA, Never
Runtime	An audible alarm sounds if the available runtime falls below this level.	0, 1, or 2
Bypass	In the unlikely event that both the Symmetra RM fails and the input voltage or line frequency is outside of normal range, this option lets you choose to go into Bypass mode or drop the load.	Go to Bypass or Drop Load
Copy	Not used with Symmetra RM.	
Other	Remaining user-defined settings.	
Self Test	The Symmetra RM can automatically test itself at this user-specified interval.	At Power On, 7 days, 14 days, or Disabled
UPS ID	Assigns a seven-character text string to a system.	
Output	Sets output voltage regardless of input voltage, depending on the position of the input select switch.	220V, 230V, or 240V
Vout Reporting	Reports the most significant output voltage. (200/208 (L1-L2-G) systems only.)	208V, 240V, or Auto

Accessories Menu

The Accessories menu is only used when the PowerView is connected to the computer interface port at the back of the Symmetra RM frame.

Logging Menu

The Logging menu lets you customize the Symmetra RM log.

Menu Item	Function
View Log	Tracks the most recent of 64 events. Point to an entry and press the ENTER key for more information on that event.
View Statistics	Records the total number of transfers to battery, low battery, faults, and on-battery runtime events.
Configure Logging	Sets the type of events that are recorded in the log.
Power Events: On/Off	
UPS Controls: On/Off	
UPS Faults: On/Off	
User Activity: On/Off	
List Event Groups	Allows for specific event listing.
Power Events	
UPS Control Events	
User Activities	
UPS Fault Events	
MeasureUPS Events	
Clear Log	Clears the view log. Does not clear the active event lists.

Display Menu

The Display menu lets the user customize the PowerView RM display.

Display	Function	Options
Date/Time	Sets the correct date and time.	dd:mm:yy (day:month:year) and hh:mm (hour:minute)
Password	Protects against unauthorized configuration changes.	None
Password	Sets a password.	A-Z, 0-9, ' _ ' = end
Timeout	Sets the inactivity timer.	1, 2, 5, 10, or 30 minutes, 1, 2, or 4 Hours, or Forever
Invalidate	Puts password into effect. Prevents unauthorized changes to Symmetra RM configuration.	
Information	Displays PowerView RM model number, serial number, date of manufacture and revision information.	
Beeper	Sets audible alarm (beeper) criteria.	
At UPS	Not used with Symmetra RM.	
At Display	Sets parameters for the audible alarm in the PowerView.	Power Failure, Power Failure +30 seconds, Low Battery, Never
Volume	Sets audible alarm volume.	Off, Low, Medium, High
Click	Sets click sound when pressing display buttons.	On, Off
Contrast	Sets LCD screen contrast.	1, 2, 3, 4, 5
Configure	Customizes the information displayed on the startup screen.	Use factory defaults when possible.

Diagnostics Menu

The Diagnostics menu provides information for use in troubleshooting.

Menu Item	Function
Fault and Diagnostics	Displays current system fault and diagnostic information of that fault.
(Main) Intelligence Module	Displays detailed intelligence module status and information.
Redundant Intelligence Module	Displays detailed redundant intelligence module status and information.
Power Modules	Displays detailed power module status and information.
Batteries	Displays detailed battery module status and information.

Help Menu

To access PowerView RM online help screens, press the Scroll Up and Scroll Down keys simultaneously to access context sensitive help.

Changing the Language of the PowerView RM

The factory default language of the interface is English. You can change the language by downloading new firmware into the PowerView RM interface. French, German, Italian, and Spanish are available on the enclosed CD. Support for additional languages may be available on the CD or at the APC Web site (at <http://www.apcc.com/support>). Product documentation in these languages also appears on the CD or at the APC Web site.

To change the language of the interface, perform the following steps in the order given.

1. Remove the top bezel-PowerView RM assembly from the front of the Symmetra RM.

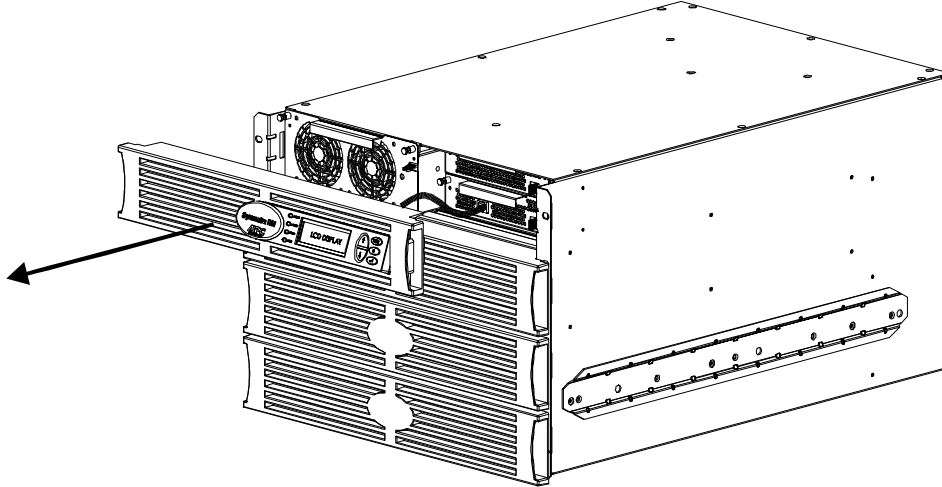


Figure 6: Removing the PowerView RM Bezel

2. Disconnect the Symmetra RM cable from the RJ-45 port of the PowerView RM interface.
3. Connect the programming cable (included, APC part number 940-0082) between PowerView and the Symmetra RM cable. To connect the programming cable, refer to steps a–c and Figure 7.
 - a. Attach the RJ-45 connector to the port on the rear of the PowerView RM interface.
 - b. Connect the female DB-9 connector of the programming cable to a serial port on the computer. The downloading computer must have access either to the files on the CD provided with PowerView RM or to the APC Web site.
 - c. Attach the Symmetra RM cable to the female RJ-45 connector on the programming cable.

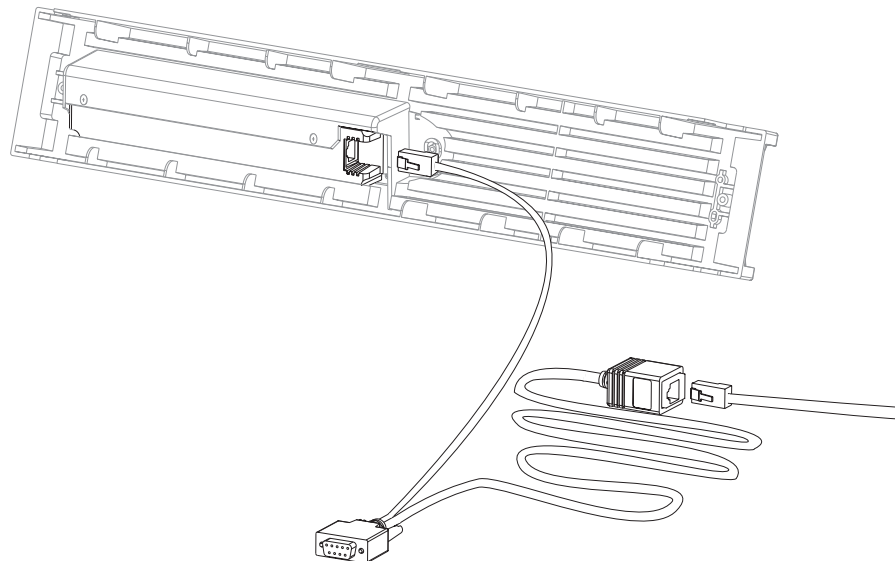


Figure 7: Connect the PowerView RM Programming Cable

4. Locate the language program file to be downloaded into PowerView RM. Each language program file appears on the CD under the folder of its language (français, español, etc.) with a **.bin** extension. Program files for additional language support or code updates may be available on the APC Web site.
5. Place the PowerView interface in programming mode by pressing simultaneously the three keys on the right (ESCAPE, HELP, and ENTER) for about three seconds, until the interface emits a long beep. The LCD will display the Programming screen. To leave the Programming screen before starting a file transfer (step 6), press Esc until it beeps (about one second).
6. Start HyperTerminal or another terminal emulation program on the computer. Set the communication parameters to 8 bits, no parity, no flow control, 1 stop bit, and 19,200 bps. After establishing a connection, use the Xmodem protocol to transfer the language program file from the CD or your download folder to PowerView RM. When the file transfer is complete, the PowerView RM interface will reset itself and display the Startup screen in the new language.



If the file transfer fails, the interface will reset itself. Retry the file transfer by repeating steps 5 and 6.

7. Quit the terminal session. Disconnect the programming cable and reconnect the Symmetra RM cable to the PowerView interface. Replace the bezel on the front of the Symmetra RM.

Storage

Storage Conditions

Store the UPS covered and flat (rack mount orientation) in a cool, dry location, with its battery fully charged and the battery module(s) removed (see *Replacing Module*, page 13, for instructions on removing battery modules). Disconnect any cables connected to the computer interface port to avoid unnecessarily draining the battery.

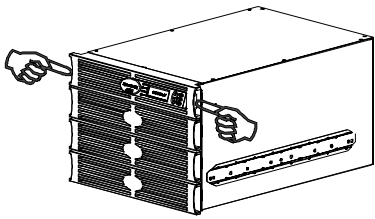
Extended Storage

At -15 to $+30$ °C ($+5$ to $+86$ °F), charge the battery modules every six months.

Shelf life—battery modules have finite shelf life. Contact APC for instructions on storing battery modules beyond six months. Store battery modules in a cool, dry location.

Replacing Modules

The battery, power, and intelligence modules are all user replaceable. The first step to replacing a module is to remove the bezel.



1. To remove the bezel, face the front of the Symmetra Power Array and, using both hands, insert each index finger behind the lip of the curved section of the front bezel and pull towards you. The front bezel will unsnap.
2. To replace the bezel, position the bezel over the bay and snap into place.



Do not force the bezel. If the bezel does not fit easily onto the frame, check the orientation. Ventilation openings should slant upward.

Replacing a Power Module

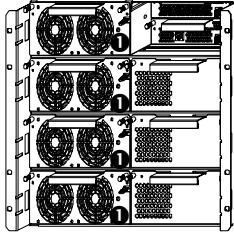


Only qualified service personnel should replace power modules.

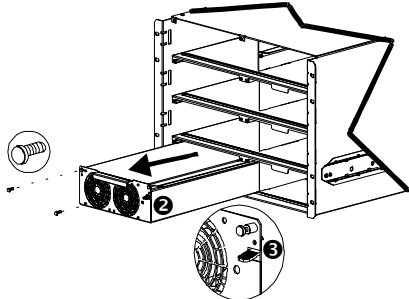


If your Symmetra RM includes a “redundant” power module, the failed module can be replaced without interrupting power to the connected equipment.

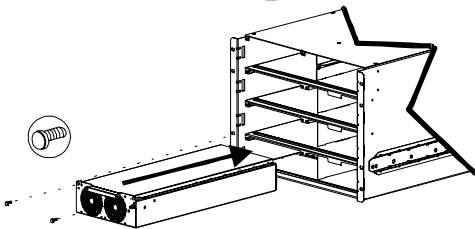
Replacement Power Module End Item SKU = SYPM2KU



1. Remove the front panel bezel(s) as described above. The figure to the left shows all bays ❶ that can house a power module; your Symmetra RM unit may not have four power modules.



2. Use a Phillips head screwdriver to loosen the two (2) retaining screws ❷.
3. Press the release lever ❸ and slide the power module out of the frame.



4. Insert the new module by sliding the module along the rails until the front panel is flush with the frame.
5. Tighten the two (2) retaining screws. **Do not** overtighten.
6. Position the bezel over the power bay and firmly snap it into place.

How to Replace a Battery Module



- Only qualified service personnel should replace battery modules.
- Do not install the battery module(s) in the frame until you are ready to power up the Symmetra RM. Failure to do so can result in a deep discharge of the batteries, which may cause permanent damage.
- Store the battery module(s) in a cool ambient temperature of $< 25^{\circ}\text{C}$.



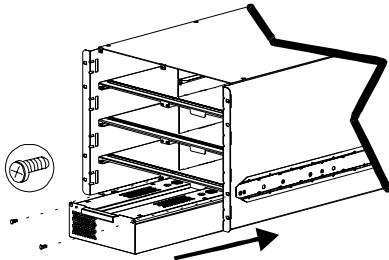
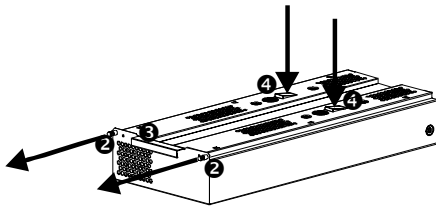
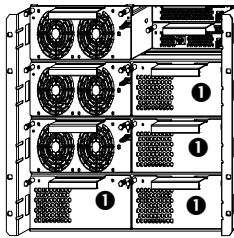
Please read the **Safety Information** in the SYMMETRA RM INSTALLATION MANUAL, before replacing battery module(s).

The Symmetra RM has an easy to replace hot-swappable battery modules. You may leave the Symmetra RM and the protected equipment on for the following procedure. See your dealer or APC (refer to **How to Contact APC** in the SYMMETRA RM INSTALLATION MANUAL) to order replacement battery modules.

Replacement Battery Module End Item SKU = SYBT2



Verify that the Symmetra RM is operating in the on-line mode before replacing a battery module. If the unit is operating in the on-battery mode, power to the connected equipment may be interrupted while the battery is replaced.



1. Remove the front panel bezel(s) as described in **Replacing Modules**, page 13. The figure to the left shows all bays ❶ that can house a battery module; your Symmetra RM unit may not have four battery modules.
2. Use a Phillips head screwdriver to loosen the two (2) retaining screws ❷ that secure the battery module.
3. Position each person on the side of the Symmetra RM and using the battery module handle ❸, slide the module out two-thirds of the way. Two safety stops ❹ will prevent the module from sliding further.
4. Simultaneously press down on the two (2) safety stops and slide the module out completely.
5. Return the battery module to APC. (Refer to **How to Contact APC** in the SYMMETRA RM INSTALLATION MANUAL, for information.)
6. Have two people hold the replacement battery module, one on either side, and slide the module into the bay. The guide in the middle of the battery module will align the connector on the battery module with the connector in the bay.
7. Tighten the two (2) retaining screws.
8. Position the bezel over the battery bay and firmly snap it into place.
9. Repeat steps 2 through 8 to replace the remaining battery modules.

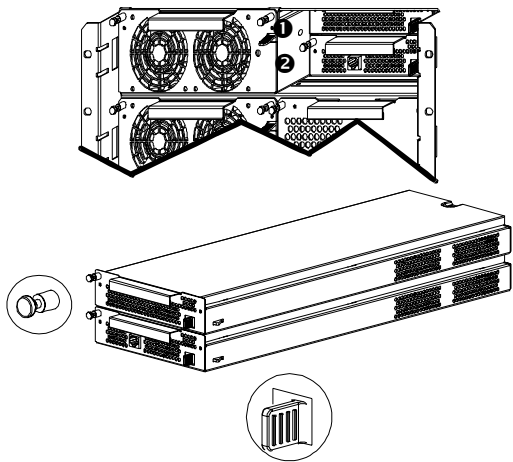
Replacing an Intelligence Module

The main intelligence module (MIM) and the redundant intelligence module (RIM) are installed in the same manner. The intelligence modules are located in the upper right bay of the Symmetra RM frame. The MIM is always installed in the bottom rack in this bay, and the RIM is always installed in the top rack.

Replacement Module	End Item SKU
Main Intelligence Module (MIM)	SYMIM3
Redundant Intelligence Module (MIM)	SYRIM3



A redundant intelligence module (RIM) can be replaced without interrupting power to the connected equipment provided a functioning main intelligence module (MIM) is installed.



1. Remove the front panel bezel as described in *Replacing Modules*, page 13. The figure to the left shows the RIM ❶ and MIM ❷ locations.
2. Use a Phillips head screwdriver to loosen the retaining screw.
3. Press the release lever ❸ and slide the intelligence module out of the bay.
4. Insert the new module by aligning the installation rail on the intelligence module with the track that runs along the inside of the bay.
5. Slide the intelligence module into the bay. The RIM occupies the top slot; the MIM occupies the bottom slot.
6. Tighten the retaining screw. **Do not** overtighten.

Replacing the System Fan

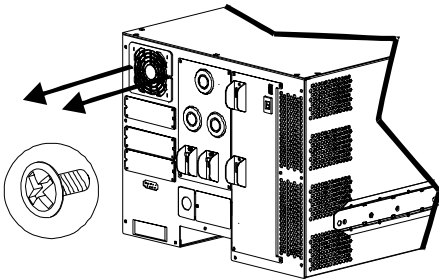
The system fan cools the Symmetra RM unit. The fan is encased in a plastic housing unit installed in the rear panel.



Only a qualified electrician should replace the system fan.



The fan is hot-swappable when the maintenance bypass switch is in the “On” position. Refer to *Rear View Component Identification* in the SYMMETRA RM INSTALLATION MANUAL, for information.



1. Use a Phillips head screwdriver to remove the two (2) screws that hold the plastic housing unit in place.
2. Remove the plastic housing unit.
3. Detach the connector that connects the fan’s cables to the power supply by pressing the release latch.
4. Remove the fan.
5. Connect the new fan by attaching the fan’s cables to the power supply.
6. Replace the plastic housing unit.
7. Install and tighten the screws.

Troubleshooting

The PowerView RM reports various messages on the display, including alarm status and changes in system configuration. This section lists all the PowerView RM display messages, what each means, and an appropriate corrective action. Contact APC Technical Support Staff for assistance with complex UPS problems. See *How to Contact APC* in the SYMMETRA RM INSTALLATION MANUAL, for a location near you.



More than one of these messages may occur at one time. If this happens, be sure to review all of the messages for a better understanding of the system condition

	PowerView Message	Meaning	Corrective Action
Start-Up	#Pwr modules changed since last ON.	At least one power module has been added or removed from the Symmetra since the last time the Pwr ON command was issued.	No corrective action necessary. Proceed with the startup.
	#Batteries changed since last ON.	At least one battery module has been added or removed from the Symmetra since the last time the Pwr ON command was issued.	No corrective action necessary. Proceed with the startup.
	No Redundant Intelligence Module.	There is no RIM installed.	Proceed with the startup or abort the startup and install a RIM. <i>Note: Without a functioning RIM, there is no redundancy in the event of a MIM failure.</i>
	Batt capacity less than Return Batt Cap.	The battery capacity of the Symmetra is less than the user specified minimum battery capacity required to turn on the load.	Option 1: Abort the startup and allow batteries to recharge. Option 2: Continue startup, with less than minimum battery capacity.
	Input Freq outside configured range.	The input frequency to the Symmetra is outside the configured range. The output frequency will not synchronize with the input frequency. Normal bypass is not available. The system will start on-battery.	Option 1: Improve the frequency of the incoming voltage. Option 2: Widen the range of the acceptable incoming frequency with the PowerView. (Startup>Setup>OutputFreq) Option 3: Proceed with startup. Normal bypass is not available and system may start on battery power.
	AC adequate for UPS but not for bypass.	The Symmetra will function on-line with the input voltage, but in the event that bypass is required, the input voltage is not adequate to power the load equipment.	Option 1: Improve the incoming voltage. Option 2: Proceed with startup. Normal bypass is not available.
	Low/No AC input, startup on battery.	Input voltage is not adequate to start the Symmetra. If startup proceeds, Symmetra will function from battery.	Option 1: Abort startup until acceptable input voltage is present. Option 2: Proceed with startup. Battery will be discharged.

	PowerView Message	Meaning	Corrective Action
General Status	# of batteries increased.	At least one battery module has been added to the system.	No corrective action necessary.
	# of batteries decreased.	At least one battery has been removed from the system.	No corrective action necessary.
	# of Pwr Modules increased.	At least one power module has been removed from the system.	No corrective action necessary.
	Intelligence Module inserted.	A MIM has been installed into the Symmetra.	No corrective action necessary.
	Intelligence Module removed.	A MIM has been removed from the Symmetra.	No corrective action necessary.
	Redundant Intelligence Module inserted.	A RIM has been installed into the Symmetra.	No corrective action necessary.
	Redundant Intelligence Module removed.	A RIM has been removed from the Symmetra.	No corrective action necessary.
	# of External Battery Cabinets increased.	At least one external battery cabinet has been connected to the frame.	No corrective action necessary.
	# of External Battery Cabinets decreased.	At least one external battery cabinet has been disconnected from the Symmetra.	No corrective action necessary.
	Redundancy Restored.	A loss of power module redundancy occurred and has been restored. Either additional modules have been installed or the load has been reduced.	No corrective action necessary.
	Load is No Longer above Alarm Threshold.	The load exceeded the load alarm threshold. The situation has been corrected either because the load decreased or the threshold was increased.	No corrective action necessary.
	Min Runtime restored.	The system runtime dropped below the configured minimum and has been restored. Additional battery modules were installed, the existing battery modules were recharged, the load was reduced, or the threshold was raised.	No corrective action necessary.
Module Failure	Bad Battery Module.	A battery module failed and requires replacement.	Refer to module replacement procedure.
	Bad Power Module.	A power module failed and requires replacement.	Refer to module replacement procedure.
	Intelligence Module is installed and failed.	The main intelligence module failed and requires replacement.	Refer to module replacement procedure.
	Redundant Intelligence Module is installed and failed.	The redundant intelligence module failed and requires replacement.	Refer to module replacement procedure.

	PowerView Message	Meaning	Corrective Action
Threshold Alarm	Load is above kVA alarm threshold.	The load has exceeded the user specified load alarm threshold.	Option 1: Reduce the load. Option 2: Use the PowerView interface to raise the alarm threshold.
	Redundancy has been lost.	Symmetra no longer detects redundant power modules. Either power module(s) failed or the load increased.	Option 1: If possible, install additional power modules. Option 2: Decrease the load. Option 3: Disable the redundancy alarm by setting redundancy to zero. (Startup>Setup>Alarms>Redundancy>Zero)
	Redundancy is below alarm threshold.	Actual power module redundancy has fallen below the user specified redundancy alarm threshold. Either power module(s) failed or the load has increased.	Option 1: If possible, install additional power modules. Option 2: Decrease the load. Option 3: Use the PowerView to decrease the redundancy alarm threshold. (Startup>Setup>Alarms>Redundancy)
	Runtime is below alarm threshold.	The predicted runtime is lower than the user specified minimum runtime alarm threshold. Either the battery capacity has decreased or the load increased.	Option 1: Allow the battery modules to recharge. Option 2: If possible, increase the number of battery modules. Option 3: Decrease the load. Option 4: Use the PowerView to decrease the minimum runtime alarm threshold. (Startup>Setup>Alarms>Runtime)
Bypass	Bypass is not in range (either freq or voltage).	The frequency and/or voltage is out of acceptable range for bypass. This message occurs when Symmetra is online and indicates that the bypass mode may not be available if required. The system may start on-battery.	Option 1: Decrease the sensitivity to input frequency. (Startup>Setup>OutputFreq) Option 2: Correct input voltage to provide acceptable voltage and/or frequency.
	Bypass contactor stuck in bypass position.	Symmetra is stuck in the bypass position and cannot go on-line.	Call your contract service provider or APC Technical Support.
	Bypass contactor stuck in on-line position.	Symmetra is stuck in the on-line position and cannot go to bypass.	Call your contract service provider or APC Technical Support.
	UPS in bypass due to internal fault.	Symmetra has transferred to bypass mode because a fault has occurred.	Call your contract service provider or APC Technical Support.
	UPS in bypass due to overload.	The load exceeded the system power capacity. The Symmetra has switched to bypass mode.	Option 1: Decrease the load. Option 2: If possible, add power modules to the system.

	PowerView Message	Meaning	Corrective Action
Bypass (continued)	System is in Maintenance Bypass.	The Symmetra is in bypass because the maintenance bypass switch is in the On position.	No corrective action necessary.
General Fault	On Battery.	The Symmetra is in the on-battery mode. The battery modules are being discharged.	No corrective action is necessary. Note: Runtime is limited in duration. Prepare to shutdown the Symmetra™ and the load equipment or restore incoming voltage.
	Need Bat Replacement.	One or more battery modules are in need of replacement.	Refer to module replacement procedure.
	UPS Fault.	A fault occurred in a power module. The UPS Fault message will always occur with a bad power module failure message.	Call your contract service provider or APC Technical Support.
	Shutdown or unable to transfer to Batt due to overload.	Symmetra has shutdown because an overload occurred and bypass is not available.	Option 1: Reduce the load to eliminate overload. Option 2: If possible, add power modules to eliminate overload. Option 3: Replace failed power modules to eliminate overload. Note: If bypass is not available because of a power failure, wait for power to be restored. If there is a utility problem, have it corrected.
	Load Shutdown from Bypass. Input Freq/Volts outside limits.	Symmetra shut the load down while it was on bypass, because the input power went out of acceptable range.	Correct the input voltage problem.
	Fault, Battery Charger Failure.	The battery charger in one or more power module(s) failed.	Refer to module replacement procedure.
	Fault, Bypass Relay Malfunction.	The bypass relay has malfunctioned.	Call your contract service provider or APC Technical Support.
	Fault, Internal Temp exceeded normal limits.	The temperature of one or more battery modules is too hot.	Replace overheated module. Refer to module replacement procedure.
	Input circuit breaker tripped open.	The input circuit breaker on the Symmetra tripped open. Input voltage is disconnected to the Symmetra.	Option 1: If this occurs in conjunction with an overload condition, decrease the load and reset the breaker. Option 2: If no overload condition exists, reset breaker. If it trips open again, call your contract service provider or APC Technical Support.
	System level fan failed.	A cooling fan in Symmetra frame failed.	Call your contract service provider or APC Technical Support.

	PowerView Message	Meaning	Corrective Action
General Fault (continued)	The Redundant Intelligence Module is in control.	The main intelligence module failed, and the RIM is functioning as the primary intelligence module.	Replace the intelligence module. Refer to module replacement procedure.
	IIC inter-module communications failed.	The communications between the MIM and at least one other module failed.	Call your contract service provider or APC Technical Support.

Service

If the UPS requires service do not return it to the dealer! Follow these steps:

1. Review the problems discussed in *Troubleshooting*, page 17, to eliminate common problems.
2. Verify that no circuit breakers are tripped. A tripped circuit breaker is the most common UPS problem!
3. If the problem persists, call customer service or visit the APC Internet Website (www.apcc.com).
 - Note the model number of the UPS, the serial number, and the date purchased. A technician will ask you to describe the problem and try to solve it over the phone, if possible. If this is not possible the technician will issue a Returned Material Authorization Number (RMA#).
 - If the UPS is under warranty, repairs are free. If not, there is a repair charge.
4. Pack the UPS in its original packaging. If the original packing is not available, ask customer service about obtaining a new set. Refer to *How to Contact APC* in the SYMMETRA RM INSTALLATION MANUAL, for instructions.

Pack the UPS properly to avoid damage in transit. Never use polystyrene beads for packaging. Damage sustained in transit is not covered under warranty.



Please refer to *Transporting the Symmetra RM*, page 22, for important shipping instructions.

5. Mark the RMA# on the outside of the package.
6. Return the UPS by insured, prepaid carrier to the address given to you by Customer Service.

Transporting the Symmetra RM

Follow these guidelines if you need to ship the Symmetra RM to another location. These guidelines apply whether you are transporting the unit alone, rack mounted in an equipment cabinet, or installed in a system.



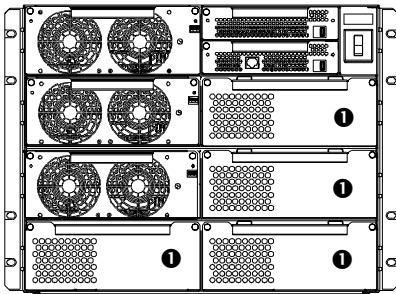
Always **DISCONNECT THE BATTERIES** before shipping the Symmetra RM to avoid damage during transport. (U.S. Federal Regulation *requires* that batteries be disconnected during shipment.)

This requirement applies whether the Symmetra RM is moved indoors or out, alone or installed in an equipment rack or system.

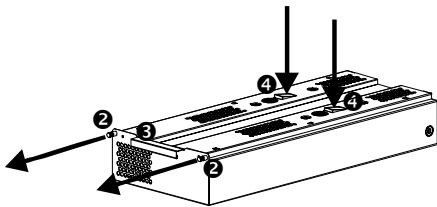


Graphics are not drawn to scale. They are shown for reference only.

Remove all battery and power modules before transporting the Symmetra RM.



1. Remove the front panel bezel(s) as described in *Replacing Modules*, page 13. The figure to the left shows all bays ❶ that can house a battery module; your Symmetra RM unit may not have four battery modules.
2. Use a Phillips head screwdriver to loosen the two (2) retaining screws ❷ that secure the battery module.
3. Position each person on the side of the Symmetra RM and using the battery module handle ❸, slide the module out two-thirds of the way. Two safety stops ❹ will prevent the module from sliding further.
4. Simultaneously press down on the two (2) safety stops and slide the module out completely.
5. Package the battery tray for shipping.



Remember to re-install the battery and power modules once the Symmetra RM has arrived at its destination.

APPENDIX A: SPECIFICATIONS

Operation	
System	Power Array with hot-swappable modules that are redundant, scalable self-diagnosing, and fault-tolerant
Topology	On-line, double conversion with input power factor correction
Power Capacity	2 – 6 kVA N+1
Battery Type	hot-swappable, sealed, maintenance-free, lead acid, 3 to 5 years life
Battery Charger	automatic float, equalize high frequency PWM charger
Inverter	IGBT, high frequency PWM, microprocessor controlled
Battery Recharge Time	< 4 hours with standard supplied packs in the frame
Extended Battery Option	Yes
Ambient Temperature	0 – 40 °C
Relative Humidity	95% non-condensing
Elevation	0 – 10,000 ft

Input Specifications	
Nominal Input Voltage	208, 220, 230, 240 Vac; 60 or 50 Hz, 1 phase, 3 wire
Input Voltage Range	155 to 276 Vac with batteries charging & supporting full load
Input Frequency Range	47 – 63 Hz
Input Power Factor	approx. 0.98 @ full load
Input Current THD	approx. 6% @ full load
Input Inrush Current	approx. equal to full load current; maximum 150% of full load current
Input Generator Sizing	1.5 x frame capacity – feeder friendly, no significant oversizing, just allow for battery charging and system efficiency

Output Specifications	
Nominal Output Voltage	200, 208, 220, 230, 240 Vac; 50 or 60 Hz, 1 phase, 3 wire
Output Power kVA	2 – 6 kVA with N+1
Output Power kW	1.4 – 4.2 kW with N+1
Load Power Factor	0 – 1
Output Frequency	60 or 50 Hz nominal
Output Voltage Regulation Steady State	< ± 3% for no load to full load, min ac input to max ac, min dc to max dc, linear or non-linear load or any combination
Output Voltage Regulation Transient/Dynamic	< ± 5% for 100% load application or removal, linear or non-linear load
Recovery Time	< 10 milliseconds (i.e. half cycle to steady state)
Total Harmonic Distortion	< 2% for linear loads
Load Crest Factor Supported	< 5% for 100% non-linear loads up to 5:1
Overload Capacity	130% for 10 minutes. With N+1
Efficiency	approximately 91% @ full load—linear or non-linear loads

Physical Specifications	
Audible Noise – Fully Loaded (6 kVA N+1)	< 60 dBA
Dimensions (H x W x D) (6 kVA N+1 with 10 minutes. battery)	14 in x 19 in x 28.75 in (with bezel) (28.75 cm x 48.3 cm x 73.0 cm)
Weight – Fully Loaded	Approximately 294 lb (133.6 kg)
Heat Dissipation – Max with Batteries Charging	Typical 1290 BTUs at Full Load 3300 BTU Maximum with Batteries Charging

Compliance Specifications	
VDE-GS Certifications	EN 60950, EN 50091, IEC 950, VDE 0805
UL Listing	UL 1778
CSA Certification	CSA 107.1