APC Symmetra
Power Array

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Power Array Overview

Symmetra Power Array designed for the changing IT environment

Symmetra has achieved widespread acceptance by companies in the service provider, financial, retail, and government sectors. It is being used to provide higher power availability to entire small data centers, specific high availability applications in larger data centers, and mid-size application servers. Its redundancy and serviceability are perfect for branch locations for financial and retail companies. IT managers utilizing the total solution that Symmetra Power Array provides them, have the peace of mind that their power protection solution was designed with their mission critical needs in mind.

Symmetra Power Array was designed to fit all these customer expectations. It is the world's first redundant, scalable, user-serviceable, and manageable power protection solution. APC's vast array of software and accessories make Symmetra a total High Availability solution. Its time-tested, reliable, proven, power sharing technology makes it a must-have for any IT user utilizing other High Availability solutions. Symmetra Power Array's' scalability and user-serviceability give it a total cost of ownership significantly less than legacy UPS solutions.

Rack-mount (2-6 kVA)

MasterFrame (8-16 kVA)

MiniFrame (4-8 kVA)

Implementing a Symmetra Power Array solution means an immediate decrease in the risk of systems downtime and tremendous cost-savings based on increased uptime.

Redundancy

N + 1 and higher Redundancy ensures maximum uptime and continuous availability.

Symmetra Power Array achieves N+1 redundancy and higher through proven power sharing technology. Power sharing means that all of the power modules in a Power Array run in parallel and share the load evenly. N+1 redundancy means running one extra module than will support your full load. In this way, all of the modules support one another.

For example, if your computer load is 15kVA, you achieve N+1 with five 4kVA Power Modules. If a module fails or is removed, the other modules instantaneously begin supporting the full load. It does not matter which module fails because all of the modules are always running and supporting your load.

N+1 redundancy is used today in disk arrays, in processor power supplies, and in processors themselves. Symmetra allows IT managers using these products to apply the same N+1 redundancy strategy to their power protection. As critical applications and databases are moved to smaller machines, the Symmetra Power Array brings glass house reliability to the mid-sized power protection range. Symmetra tower units can acheive up to N+4 redundancy, while Symmetra RM can acheive up to N+3 redundancy.

What is N+1 Redundancy ?

Just as a RAID distributes data across multiple drives, Symmetra's unique power sharing technology allows multiple Power Modules to share the Power Array's connected load. (Figure 1)

Fig. 1

Fig. 2

If any module fails or is removed, the other modules take over the load. (Figure 2)

Individual Power Modules are easily installed or removed to manage redundancy.
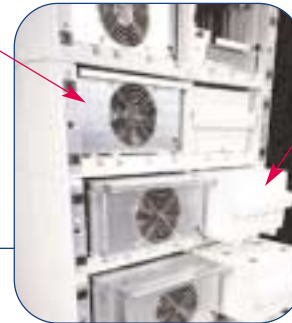
Battery Modules can be quickly shifted to other Power Arrays or Battery Frames to manage runtime.
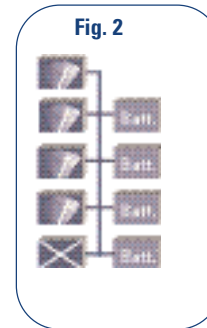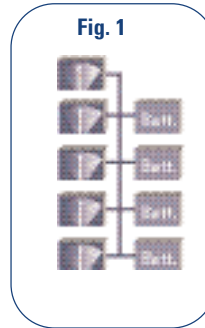
Scalability

Protect your investment: scalable kVA, runtime, and redundancy ensure that Symmetra will meet your power needs now and in the future.

IS Managers want to be able to "pay as they grow" to meet the computing demands of the future. Changes in datacenter power requirements can make cost-effective power protection planning difficult. The Symmetra Power Array provides the flexibility to adapt and grow UPS power and runtime without complete reinvestment.

The Symmetra Power Array is comprised of load-sharing modules so you can easily build and reconfigure your array. If you add computing power to your data center, you can add Power Modules (in increments of 4kVA, or 2 or 4kVA for rack-mount models) to expand your power capacity. If you need more battery run time, you can add Battery Modules. And if you re-deploy systems to different locations, you can move modules from one Power Array to another. All changes can be made while your systems are running and protected. Additional Battery Frames can be added to tower models for unlimited runtime.

Scalable Power
The Symmetra Power Array integrates load-sharing modules for easy custom configuration. Additional 4kVA modules, or 2kVA for rack-mount models, expand power capacity.

Scalable Runtime
Additional Battery Modules increase runtime. Modules are added or moved while systems are running and protected.

Scalable Redundancy
Additional power modules increase redundancy up to N+4, depending on configuration.

Intelligent Extended Battery Frames
Additional Extended Battery Frames can be daisy-chained for extended runtime. Models include: the 4-Bay Battery Cabinet, which can hold up to four Battery Modules; the 12-Bay Battery Cabinet, which can hold up to twelve Battery Modules; and the 4-Bay Rack-mount Cabinet, which can hold up to 4 RM Battery Modules.

Symmetra Power Array "One Minute Maintenance™" lowers your cost of ownership.

Service Made Easy

Symmetra Power Array's "One-Minute Maintenance™" lowers your cost of ownership. Service contracts can double the cost of ownership because few of these highly specialized technicians are available around the world.

Symmetra's serviceability makes maintenance easy. Its components are modular, hot swappable and user-replaceable. Service costs are decreased since the unit can be self-serviced. All this adds up to "One-Minute Maintenance™", the ability to quickly swap out modules without disrupting up time. Service can be performed by your current computer room service provider, by an in-house technician, or by choosing any of APC's convenient service plans. You can choose as much or as little support as you feel is necessary to meet your needs.

Additionally, Symmetra is self-diagnosing and automatically gives early-warning problem notification. All batteries feature Intelligent Battery Management, providing predictive failure analysis through periodic self-testing and proactive notification. Symmetra Power Array Frames and Extended Battery Frames can pinpoint the location of failed modules, allowing the user to quickly hot-swap individual modules without bringing down the load.

Symmetra's redundancy keeps the system up, running and protected during the entire service process.

Symmetra Tower

Intelligence Modules *are the brain of the Symmetra™. The Main Intelligence Module communicates with the outside world and synchronizes the modules. The Redundant Intelligence Module is the back-up brain and ensures fault-tolerance.*

Battery Modules *provide the runtime you need. Like Power Modules, Battery Modules are hot-swappable and user-replaceable. By physically isolating the Battery Modules from the heat-producing Power Modules, the Power Array maximizes both battery runtime and life.*

N+1 Redundancy Bay *provides space for additional Power Modules to create a truly N+1 unit. Also, empty Power Module bays may be populated with Power Modules to provide up to N+4 of redundancy.*

Power Modules *(PM's): 2 or 4kVA UPS "building blocks" contain the electronics of a 2 or 4kVA UPS, including the inverter, rectifier, and charger.*

Power View

N+1 Redundancy Bay

Intelligence Modules

Power Modules

Battery Modules

Frame

N+1 Redundancy Bay

Intelligence Modules

Battery Modules

Frame

Power Modules
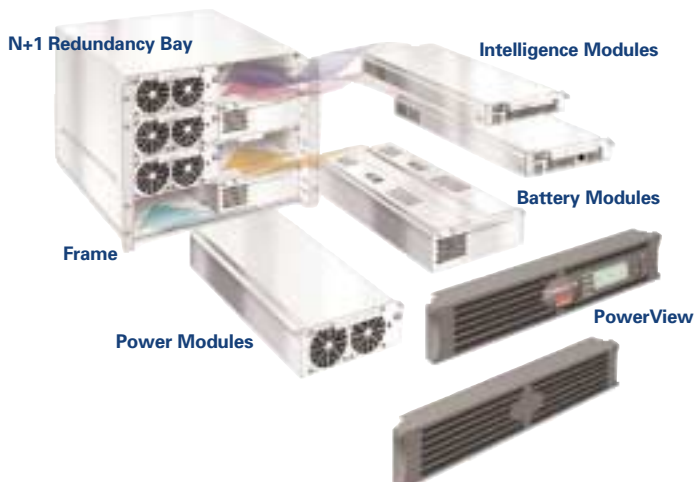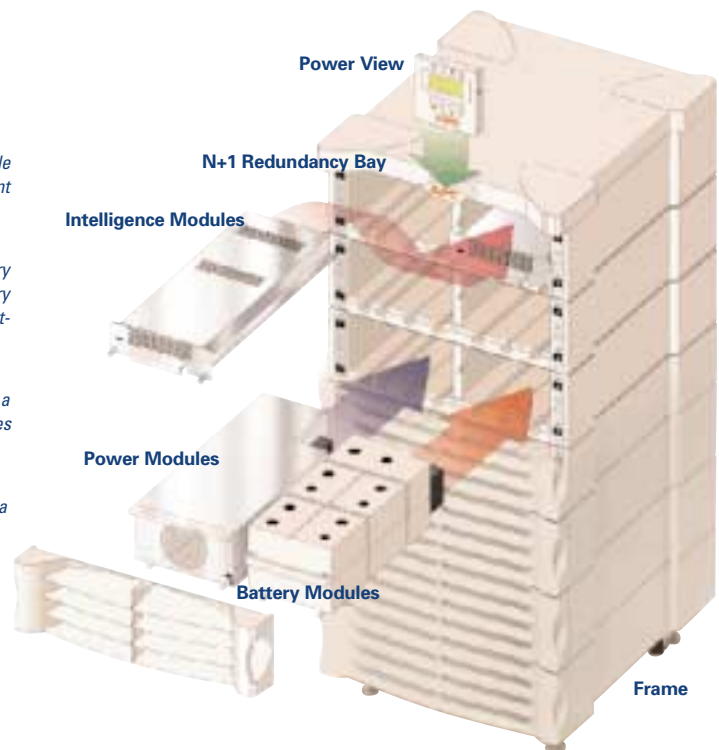
PowerView

Symmetra Rack-mount

The **Frame** *holds the Power Array™ modules. It has no active components and a minimum of mechanical components, most of which (fans, for example) are user-replaceable.*

The **Power View** *is a multi-lingual display console that puts monitoring and control at your fingertips. The PowerView attaches to the nose of Symmetra or can be extended up to 15 feet to a monitoring station or administrator's desk.*

Manageability

Build a customized UPS management strategy with hot-swappable Symmetra accessories.

Symmetra will do more than protect your investment; it will protect your career. Optional accessories and power management software provide the ability to manage your network from anywhere in your datacenter or anywhere in the world, and can be hot-swapped, as needed.

PowerView (included)

Symmetra's remote display puts all power and UPS information at a system administrator's fingertips in a menu-based format available in several languages. With monitoring and control parameters such as input voltage, level of redundancy, temperature and humidity, the display helps manage Symmetra. Four LED indicators report the operational status of the Symmetra indicating whether the unit is operating on-line, on-battery, on-bypass or experiencing an internal fault condition. The Isolated Extension Cable (AP9825) can be used with Tower models to manage the Symmetra at a monitoring station up to 300 feet (100 meters) away.
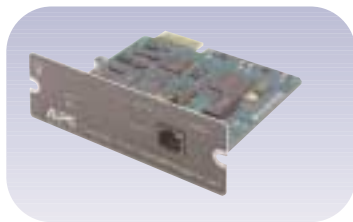
Built-in Web, SNMP, and Telnet manageability (included)

APC's Web/SNMP Management Card, which ships with Symmetra products, provides full remote monitoring, control, and configuration of the unit via open standards protocols including HTTP, SNMP, and Telnet. In the event of an extended power outage, it can command a virtually unlimited number of systems running PowerChute Network Shutdown to gracefully shut down, while all communications occur over the network.
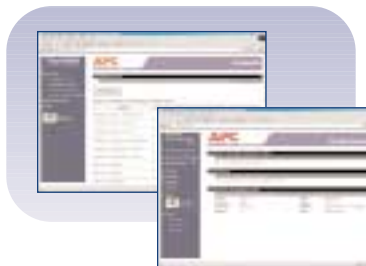
PowerChute® Network Shutdown (included)

PowerChute Network Shutdown provides reliable, graceful, unattended shutdown of multiple computer systems over a network, upon low battery warning. It communicates across the network via the included Web/SNMP Management Card and can be quickly and easily configured via a Web browser. The included CD contains support for Microsoft Windows NT, Windows 2000, Novell NetWare, IBM AIX, Sun Solaris, HP-UX, and Linux. Other operating systems are available for download at APC's website.

MasterSwitch Power Management

APC MasterSwitch Series provides complete remote power management to connected devices. All MasterSwitch products have the following features: remote on/off/reboot of connected equipment, Web, SNMP, and Telnet management interfaces, outlet groupings, MD-5 security, and flash upgradeability. The MasterSwitch (part # AP9211, or AP9212, or AP9217) also has a WAP management interface, event configuration, and e-mail notification. The MasterSwitch plus (part # AP9225 or AP9225EXP) has the capability to gracefully shut down equipment and load shed in order to maximize UPS run-time. The final product line in the MasterSwitch Series is the MasterSwitch Vertical Mount (VM) (part # AP9221, or AP9221EXPB, or AP9222, or AP9222EXPB). This unit has all the standard features of this series as well as current monitoring and user-definable thresholds to help avoid over-loaded circuits.

SmartSlot™ Accessories provide custom management.

Symmetra comes equipped with four SmartSlots, the unique accessory bays that allow you to slide various accessory cards into place without needing external communication or power supply connections. These four SmartSlots (two on Symmetra RM) give you the scalability to expand network power management capabilities and build a custom power management strategy to serve any computing environment.

Out-of-Band Management Card (Part# AP9608)

The Out-of-band Management Card works with an external modem to provide out-of-band UPS management for Symmetra, allowing you to reboot a distant locked-up device through an out-of-band modem link. You can also determine UPS status, diagnose power problems and configure UPS settings even when LAN communications are not available. The Out-of-Band Management Card can even page you when UPS power alerts occur.

Environmental Monitoring Card (Part# AP9612TH)

Symmetra supports the Environmental Monitoring Card, which works with the Web/SNMP Management Card to provide environmental information such as ambient temperature and humidity, and to provide four user-definable contact closures for external alerts. By adding the additional Temperature and Humidity Probe (part #AP9512TH), you can monitor the temperature and humidity in two different locations with one Environmental Monitoring card.

Relay I/O Card (Part# AP9610)

Allows you to control and monitor power through a simple dry-contact interface, a communication format favored by manufacturers of PBXs, telecom devices and alarm management systems.
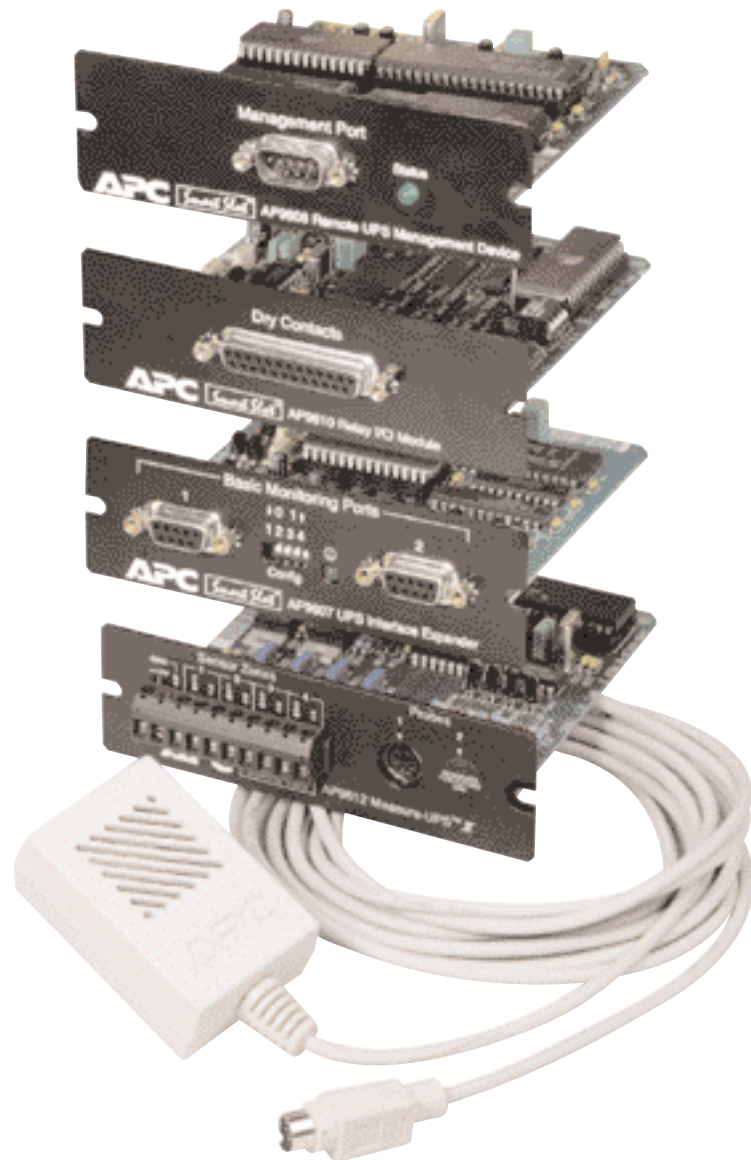
APC's line of award-winning SmartSlot accessories slide right into the back of Symmetra, and integrate with PowerChute products or PowerNet SNMP management software to communicate necessary information and commands.

Symmetra™ Tower Product Specifications

	Symmetra Mini-Frame 120; 208 or 240 VAC (Output)		Symmetra Master Frame 120; 208 or 240 VAC (Output)		
System Part No. (Hardwire) (Installed PDU & Hardwire)	SY4KEX SY4KEX-PD	SY8K SY8K-PD	SY8KEX SY8KEX-PD	SY12KEX SY12KEX-PD	SY16K SY16K-PD
Output					
Capacity	4kVA/2.8kW	8kVA/5.6kW	8kVA/5.6kW	12kVA/8.4kW	16kVA/11.2kW
Output Voltage	120; 208; 240				
Max Configurable Power with additional Power Modules	8kVA/5.6kW		16kVA/11.2kW		
Output Connections (Hardwire)	(1) hardwire				
(-PD units only)	(1) hardwire plus (2) 5-15R (1) L6-30R (1) L14-30R		(1) hardwire plus (4) 5-15R (3) L6-30R (3) L14-30R		
Efficiency at full load	87%				
By pass	Internal Bypass (Automatic&Manual)				
Output voltage Distortion	typically <5% at full load (linear or non-linear)				
Output frequency (synched to mains)	57-63 Hz				
Output frequency (not synched)	60 Hz				
Crest Factor	up to 5:1				
Input					
Nominal input Voltage	208; 240 (user configurable)				
Input Frequency	50/60 Hz +/- 5 Hz (auto-sensing)				
Input Connection	Hardwire (3-wire)				
Input Voltage range	155-276 V at 100% load				
Input Power Factor at full load	0.98				
Battery Type	Maintenance-free, sealed lead-acid battery with suspended electrolyte; leakproof.				
Typical recharge time	<3 hours				
Replacement Battery Module	(1) SYBATT	(2) SYBATT	(2) SYBATT	(3) SYBATT	(4) SYBATT
Interface port	DB-9; RS-232; Smart-Slot Card (4)				
Management Software included	PowerChute Network Shutdown; Web/SNMP Management Card built into unit				
Control panel	Multi-function LCD status & control console in multiple languages				
Audible Alarm	Alarm when on battery; distinctive low battery alarm; configurable delays				
Emergency Power Off (EPO)	Yes				
Power Module Bays (total/filled)	3/1	3/2	5/2	5/3	5/4
Battery Module Bays (total/filled)	2/1	2/2	4/2	4/3	4/4
Dimensions HxWxD (in/cm)(all)	31x24x27in /78.7x61x68.6cm		52x24x27in/132.1x61x68.6cm		
Weight net (lbs/kg) (hardwire)	407lb/184.8kg	502lb/227.9kg	731lbs/331.9kg	826lbs/375kg	921lb/418.1kg
Weight shipping (hardwire)	491lb/222.9kg	600/272.4kg	833lbs/378.2kg	942lbs/427.7kg	1051lb/477.2kg
Weight net (lbs/kg) (-PD)	425lb/193kg	520lb/236kg	759lb/345kg	864lb/388kg	949lb/431kg
Weight shipping (-PD)	512lb/233kg	621lb/282kg	858lb/390kg	967lb/440kg	1076lb/489kg
Operating Temperature	0-40 C/ 32-104 F				
Operating Relative humidity	0-95%				
Operating Elevation	0-10000 feet/ 0-3000m				
Storage Temperature	-15 to 45C/ 5 to 113F				
Storage Relative Humidity	0-95%				
Storage Elevation	0-50,000 feet/0-15,000m				
Audible noise at 3 feet (1 m)	62dBA				
On-line thermal dissipation (BTU/hr)	1427	2855	2855	4282	5710
Approvals	CSA; FCC A; UL 1778				
Warranty	2 years, repair or replace				
"T" level for Service Option pricing	T6	T6	T7	T7	T7

Symmetra™ Tower Product Specifications

	Symmetra Mini-Frame 220; 230; 240 VAC (Output)		Symmetra Master Frame 220; 230; 240 VAC (Output)		
System Part No. Single phase in/out (1:1)	SY4KEXI	SY8KI	SY8KEXI	SY12KEXI	SY16KI
3-phase in/single phase out (3:1)	n/a	n/a	SY8KEX3I	SY12KEX3I	SY16K3I
Output					
Capacity	4kVA/2.8kW	8kVA/5.6kW	8kVA/5.6kW	12kVA/8.4kW	16kVA/11.2kW
Output Voltage	220; 230; 240				
Max Configurable Power with additional Power Modules	8kVA/5.6kW		16kVA/11.2kW		
Output Connections	(1) hardwire				
Efficiency at full load	91%				
By pass	Internal Bypass (Automatic&Manual)				
Output voltage Distortion	typically <5% at full load (linear or non-linear)				
Output frequency (synched to mains)	47-63 Hz				
Output frequency (not synched)	60; 50 Hz				
Crest Factor	up to 5:1				
Input					
Nominal input Voltage (1:1)	220; 230; 240				
Nominal input Voltage (3:1)	n/a	n/a	380; 400; 415V (3-phase)		
Input Frequency	50/60Hz +/-5 Hz (auto-sensing)				
Input Connection	Hardwire (3-wire)		Hardwire (3-wire) (5-wire for 3:1 unit)		
Input Voltage range (1:1)	155-276 V at 100% load				
Input Voltage range (3:1)	n/a	n/a	290-480V		
Input Power Factor at full load	0.98		0.98 (.95 for the 3:1)		
Battery Type	Maintenance-free, sealed lead-acidbattery with suspended electrolyte; leakproof.				
Typical recharge time	<3 hours				
Replacement Battery Module	(1) SYBATT	(2) SYBATT	(2) SYBATT	(3) SYBATT	(4) SYBATT
Interface port	DB-9; RS-232; Smart-Slot Card (4)				
Management Software included	PowerChute Network Shutdown;Web/SNMP Management Card built into unit				
Control panel	Multi-function LCD status & control console in multiple languages				
Audible Alarm	Alarm when on battery; distinctive low battery alarm; configurable delays				
Emergency Power Off (EPO)	Yes				
Power Module Bays (total/filled)	3/1	3/2	5/2	5/3	5/4
Battery Module Bays (total/filled)	2/1	2/2	4/2	4/3	4/4
Dimensions HxWxD (in/cm) 1:1	33x24x27in /84x61x69cm		47.2x24x27in/120x61x69cm		
Weight net (lbs/kg) 1:1	273lb/124kg	367lb/167kg	431lbs/196kg	526lbs/239kg	620lb/282kg
Weight shipping 1:1	363lb/166.5kg	477/217kg	543lbs/247kg	654.5lbs/297.5kg	765.6lb/348kg
Dimensions HxWxD (in/cm) 3:1	n/a	n/a	47.2x24x30.3in/120x61x77cm		
Weight net (lbs/kg) 3:1	n/a	n/a	439lbs/199.5kg	533.5lbs/242.5kg	628lb/285.5kg
Weight shipping 3:1	n/a	n/a	557lbs/253kg	667.7lbs/303.5kg	779lb/354kg
Operating Temperature	0-40 C/ 32-104 F				
Operating Relative humidity	0-95%				
Operating Elevation	0-10000 feet/ 0-3000m				
Storage Temperature	-15 to 45C/ 5 to 113F				
Storage Relative Humidity	0-95%				
Storage Elevation	0-50,000 feet/0-15,000m				
Audible noise at 3 feet (1 m)	62dBA				
On-line thermal dissipation (BTU/hr)	945	1890	1890	2834	3779
Approvals	C-tick; CE: EN 50091-2; VDE				
Warranty	2 year; repair or replace (1 year for Battery Modules in India)				
"T" level for Service Option pricing	T8	T8	T9	T9	T9

Symmetra™ Tower Product Specifications

	Symmetra Mini-Frame 100; 200 VAC (Output)		Symmetra Master Frame 100; 200 VAC (Output)		
System Part No.	SY4KEXJ	SY8KJ	SY8KEXJ	SY12KEXJ	SY16KJ
Output					
Capacity	4kVA/2.8kW	8kVA/5.6kW	8kVA/5.6kW	12kVA/8.4kW	16kVA/11.2kW
Output Voltage	100; 200				
Max Configurable Power with additional Power Modules	8kVA/5.6kW		16kVA/11.2kW		
Output Connections	(1) hardwire				
Efficiency at full load	87%				
By pass	Internal Bypass (Automatic&Manual)				
Output voltage Distortion	typically <5% at full load (linear or non-linear)				
Output frequency (synched to mains)	57-63, 47-53 Hz				
Output frequency (not synched)	60; 50 Hz				
Crest Factor	up to 5:1				
Input					
Nominal input Voltage	200				
Input Frequency	50/60Hz +/- 5 Hz (auto-sensing)				
Input Connection	Hardwire (3-wire)				
Input Voltage range	155-276 V at 100% load				
Input Power Factor at full load	0.98				
Batteries					
Battery Type	Maintenance-free, sealed lead-acidbattery with suspended electrolyte; leakproof.				
Typical recharge time	<3 hours				
Replacement Battery Module	(1) SYBATTJ	(2) SYBATTJ	(2) SYBATTJ	(3) SYBATTJ	(4) SYBATTJ
Interface port	DB-9; RS-232; Smart-Slot Card (4)				
Management Software included	PowerChute Network Shutdown; Web/SNMP Management Card built into unit				
Control panel	Multi-function LCD status & control console in multiple languages				
Audible Alarm	Alarm when on battery; distinctive low battery alarm; configurable delays				
Emergency Power Off (EPO)	Yes				
Power Module Bays (total/filled)	3/1	3/2	5/2	5/3	5/4
Battery Module Bays (total/filled)	2/1	2/2	4/2	4/3	4/4
Dimensions HxWxD (in/cm)	31x24x27in /78.7x61x68.6cm		52x24x27in/132.1x61x68.6cm		
Weight net (lbs/kg)	407lb/184.8kg	502lb/227.9kg	731lbs/331.9kg	826lbs/375kg	921lb/418.1kg
Weight shipping	491lb/222.9kg	600/272.4kg	833lbs/378.2kg	942lbs/427.7kg	1051lb/477.2kg
Operating Temperature	0-40 C/ 32-104 F				
Operating Relative humidity	0-95%				
Operating Elevation	0-10000 feet/ 0-3000m				
Storage Temperature	-15 to 45C/ 5 to 113F				
Storage Relative Humidity	0-95%				
Storage Elevation	0-50,000 feet/0-15,000m				
Audible noise at 3 feet (1 m)	62dBA				
On-line thermal dissipation (BTU/hr)	1427	2855	2855	4282	5710
Approvals	VCCI; CSA; FCC A: UL 1778				
Warranty	2 years; repair or replace				
"T" level for Service Option pricing	T8	T8	T9	T9	T9

Symmetra 4–16kVA Configuration Guide

Step 1

Use your input and output requirements to determine the correct Symmetra product family.

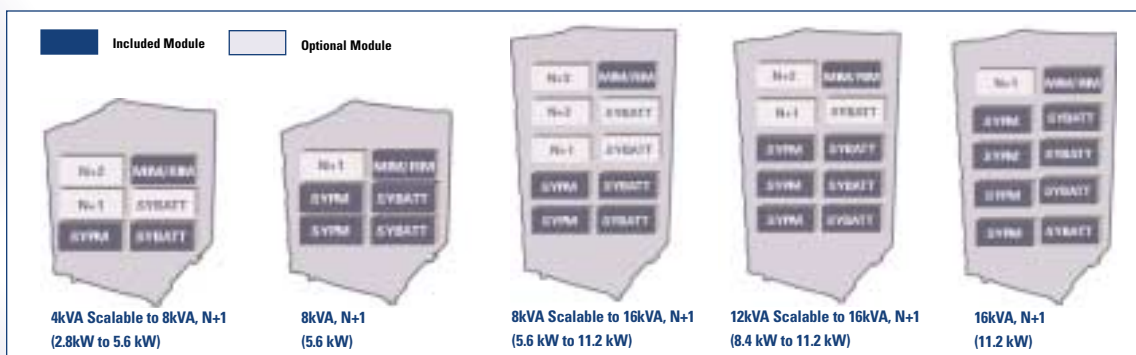| Input/Output considerations					
Input voltage	208/240VAC		230VAC	400VAC (3-phase)	200VAC
Output voltage	120/208/240VAC		230VAC	230VAC	100/200VAC
Input/Output frequency	60 Hz		50/60 Hz	50/60 Hz	50/60 Hz
Output connections	Hardwire and outlets	Hardwire only	Hardwire only	Hardwire only	Hardwire only

Step 2

Determine the part number based on your current and future load requirements.

Current kVA	Future kVA					
4	8	SY4KEX-PD	SY4KEX	SY4KEXI	n/a	SY4KEXJ
8	8	SY8K-PD	SY8K	SY8KI	n/a	SY8KJ
8	16	SY8KEX-PD	SY8KEX	SY8KEXI	SY8KEX3I	SY8KEXJ
12	16	SY12KEX-PD	SY12KEX	SY12KEXI	SY12KEX3I	SY12KEXJ
16	16	SY16K-PD	SY16K	SY16KI	SY16K3I	SY16KJ
For more info see page		10	10	11	11	12

Step 3

Add redundancy (N+1): Purchase an additional Power Module (SYPM).

■ Included Module   □ Optional Module

4kVA Scalable to 8kVA, N+1
(2.8kW to 5.6 kW)

8kVA, N+1
(5.6 kW)

8kVA Scalable to 16kVA, N+1
(5.6 kW to 11.2 kW)

12kVA Scalable to 16kVA, N+1
(8.4 kW to 11.2 kW)

16kVA, N+1
(11.2 kW)

Step 4   Select the appropriate runtime for your application.

	Unit → scalable to	Load kVA/kW	Standard configuration	Std + (1) SYXR4B4 or (1) SYXR4B12*	Std + (1) SYXR8B12*	Std + (1) SYXR12B12*	Std + (2) SYXR12B12*	Std + (3) SYXR12B12*	Std +(4) SYXR12B12*
MiniFrame	4 → 8kVA	2/1.4	15m	2.1h	4.3h	6.6h	14.2h	22.5h	31.3h
	(2.8 → 5.6kW)	4/2.8	5m	56m	1.9h	3h	6.6h	10.5h	14.6h
	8kVA	4/2.8	15m	1.1h	2.1h	3.2h	6.7h	10.5h	14.5h
	(5.6kW)	6/4.2	8m	42m	1.3h	2h	4.3h	6.7h	9.3h
		8/5.6	5m	29m	56m	1.4h	3.1h	4.8h	6.7h
	8 → 16kVA	4/2.8	15m	1.1h	2.1h	3.1h	6.6h	10.3h	14.3h
	(5.6 → 11.2kW)	6/4.2	8m	41m	1.3h	2h	4.2h	6.6h	9.2h
		8/5.6	5m	29m	56m	1.4h	3h	4.8h	6.6h
	12 → 16kVA	6/4.2	15m	49m	1.5h	2.1h	4.3h	6.7h	9.2h
	(8.4 → 11.2kW)	8/5.6	10m	34m	1h	1.5h	3.1h	4.9h	6.7h
		10/7	6m	26m	47m	1.1h	2.4h	3.8h	5.2h
		12/8.4	5m	20m	38m	56m	1.9h	3.1h	4.2h
MasterFrame	16kVA	8/5.6	15m	40m	1.1h	1.6m	3.2h	4.9h	6.7h
	(11.2kW)	10/7	11m	30m	52m	1.3h	2.5h	3.8h	5.2h
		12/8.4	8m	24m	42m	1h	2h	3.1h	4.3h
		16/11.2	5m	16m	29m	42m	1.5h	2.2h	3.1h

*See page 9 for correct extended run model number based on input voltage.

Step 5

Determine Manageability and Accessory requirements (see page 9)

_____ SmartSlot Accessories (up to 3 additional)

_____ Other Options   _____ PDUs

Step 6

Determine Serviceability requirements (see page 19)

_____ Extended Warranty   _____ On-Site Service

_____ System Start-up   _____ Network Integration