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Thank you for recommending and specifying the InfraStruXure™ solution. Our hope is that this binder will give you all of the information that you need to easily specify the power, cooling, and rack needs of any IT room.

The InfraStruXure™ system is designed to minimize up-front costs associated with building out the entire power and cooling infrastructure on day one. The InfraStruXure™ system, which combines components (Air, Rack, Power, Management, and Services) that easily integrate with one another, provides you with the ability to scale your power and/or cooling needs. We hope by making our components pre-engineered, modular, and manageable, you will be able to scale this into any of your installations with little effort.

I hope you find the InfraStruXure™ Advanced Technical Handbook useful. If you have any comments or questions concerning this binder, please contact your local account representative, call APC at 800-800-4272, or visit our Web site at **www.apc.com**.

We look forward to strengthening our relationship with you as we introduce products that allow you to do your job easier and faster.

Sincerely,

Michael Proffitt
Director of Marketing

White Papers and Application Notes

Overview

APC generates a number of white papers and application notes that customers may find useful in relation to InfraStruXure systems and products. This section lists the currently released documents, which are available in their entirety on the APC Web site (www.apc.com). Due to the fact that APC constantly releases new white papers and application notes throughout the year, refer to the Web site for the most updated list of these resources.

White Papers

Number	Title and Description
1	The Different Types of UPS Systems Explains the different types of UPS systems and their characteristics, provides block diagrams.
4	Essential Power System Requirements for Next Generation Data Centers Presents a categorized and prioritized collection of data center powering needs and problems as gathered from systematic user interviews.
5	Essential Cooling System Requirements for Next Generation Data Centers Presents a categorized and prioritized collection of data center cooling needs and problems as gathered from systematic user interviews.
6	Determining Total Cost of Ownership for Data Center and Network Room Infrastructure Describes an improved method for measuring Total Cost of Ownership of data center and network room physical infrastructure. Describes how to relate these costs to the overall Information Technology infrastructure.
7	<i>Essential Rack System Requirements for Next Generation Data Centers</i> Presents a categorized and prioritized collection of rack enclosures needs and problems as gathered from systematic user interviews.
10	Preventing Data Corruption in the Event of an Extended Power Outage Discusses power management software that when used with UPSs can help prevent data corruption after extended power outages.
13	Experts Speak on UPS output Watt, VA, and Power Factor Ratings Presents testimonials from experts on the subject of UPS output ratings, and how the use of a UPS with an output power factor rating of 1 reduces the uncertainty of overloading the power system.
15	Watts and Volt-Amps: Powerful Confusion Explains the difference between Watts and Volt-Amps and how the terms are used correctly and incorrectly in specifying power protection equipment.
17	Understanding Power Factor, Crest Factor, and Surge Factor Explains the technical terms of power factor, crest factor, and surge factor and the use of these terms in specifying UPS.
19	Re-examining the Suitability of the Raised Floor for Data Center Applications Examines the circumstances that gave rise to the development and use of the raised floor in the data center environment. Discusses the problems associated with the raised floors and why their widespread use is no longer justified or desirable for many applications.
21	Neutral Wire Facts and Mythology Discusses many common misunderstandings about the function of the neutral wire and its relation to power problems.
22	Understanding Emergency Power Off (EPO) Describes the use of EPO for protecting data centers and small IT equipment rooms containing UPS systems.

Number	Title and Description
23	Reliability Models for Electric Power Systems Explains the sources of downtime in electric power systems and provides an explanation for site-to-site variations in power availability.
24	Effect of UPS on System Availability Explains how system availability and uptime are affected by AC power outages and provides quantitative data regarding uptime in real-world environments, including the effect of a UPS on uptime.
25	Equipment Heat Output and Cooling Requirements Describes how to estimate heat output from Information Technology equipment and other devices in a data center such as a UPS, for the purposes of sizing air conditioning systems. Includes a number of common conversion factors and design guidelines.
26	Hazards of Harmonics and Neutral Overloads Provides an overview of problems related to harmonic currents with a specific focus on information technology equipment.
27	Use of 208V vs. 120V for Servers Explores the voltage connection options of 208-volt and 120-volt for servers in North America. This same discussion applies to the use of 200-volt versus 100-volt in Japan.
29	Rack Powering Options for High Density Describes the methods and requirements for providing electrical power to rack enclosures for information technology equipment.
30	Battery Technology for the Data Centers and Network Rooms: Battery Options Discusses the advantages and disadvantages of three battery technologies.
31	Battery Technology for the Data Centers and Network Rooms: Safety Codes Reviews fire safety regulations and their application to UPS battery installations.
3	Battery Technologies for the Data Centers and Network Rooms: Environmental Regulations Outlines the environmental regulatory requirements for batteries when the thresholds are met and reviews the filing requirements.
33	Battery Technology for the Data Centers and Network Rooms: Site Planning Discusses battery technologies and how they impact site requirements.
34	Battery Technology for Data Centers and Network Rooms: Ventilation Summarizes some of the factors and codes to consider when selecting and sizing a ventilation system for a facility in which stationary batteries are installed.
35	Battery Technology for the Data Centers and Network Rooms: Lifecycle Costs Compares the lifecycle cost of different UPS battery technologies.
37	Avoiding Costs from Over-sizing Data Center and Network Room Infrastructure Discusses the fundamental reasons why over-sizing occurs and describes an architecture and method for avoiding over-sizing.
38	Harmonic Currents in the Data Center: A Case Study Provides an overview of how problems related to harmonic and neutral currents are mitigated by load diversity.

Number	Title and Description
39	Battery Technology for Data Centers and Network Rooms: VRLA Reliability and Safety Examines the expected performance, life cycle factors, and failure mechanisms of VRLA batteries.
43	Dynamic Power Variations in the Data Centers and Network Rooms Discusses the power requirement of data centers and the problems relating to availability and data center management.
44	Improving Rack Cooling Performance Using Blanking Panels Explains and quantifies the effects of blanking panels on cooling system performance.
46	Power and Cooling for Ultra-High Density Racks and Blade Servers Describes planning strategies to cope with ultra-high power racks and practical solutions for both new and existing data centers.
48	Comparing Availability of Various Rack Power Redundancy Configurations Examines various electrical architectures for redundancy that are implemented in today's mission-critical environments. Identifies which approach provides the best overall performance, and how alternatives compare in performance and value.
49	Avoidable Mistakes that Compromise Cooling Performance in Data Centers and Network Rooms Examines avoidable mistakes that are routinely made when installing cooling systems and racks in data centers or network rooms, explains their principles, quantifies their impacts, and describes simple remedies.
54	Cooling Options for Small Data Centers Describes how focusing the cooling design of a data center on the IT rack increases cooling efficiencies and decreases costs.
55	Air Distribution Architecture for Mission Critical Facilities Describes and lists the advantages of the nine basic ways to use air to cool equipment in data centers and network rooms.
58	Humidification Strategies for Data Centers and Network Rooms Explains how humidity affects equipment and why humidity control is required. Describes and contrasts alternative methods to achieve desired humidity.
60	Avoiding AC Capacitor Failures in Large UPS Systems Explains AC capacitor failure mechanisms and demonstrates how UPS designers and specifiers can avoid most common AC capacitor failures and the associated consequences.
63	AC vs. DC for Data Centers and Network Rooms Describes the considerations for the use of DC and why APC will be the dominant choice for data center and network room power.
64	Alternative Power Generation Technologies for Data Centers and Network Rooms Discusses the various modes of operation of Fuel Cells and Micro Turbines and examines the benefits and drawbacks of these systems when contrasted with conventional alternatives such as standby generators.
69	Power and Cooling for VoIP and IP Telephony Applications Explains how to plan for VoIP power and cooling needs and describes simple, fast, reliable, and cost effective strategies for upgrading old facilities and building new facilities.

Number	Title and Description
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| 73 | Reducing the Hidden Costs Associated with Upgrades of Data Center Power Capacity
Describes the drawbacks of Legacy UPS Systems and how scalable rack-based systems address these drawbacks. Also describes and compares the cost factors of both methods. |
| 81 | Site Selection for Mission Critical Facilities
Establishes guidelines for selecting a new site or assessing an existing one. Defines common risks that affect the availability of a business and presents techniques for minimizing these risks. |
| 82 | Physical Security in Mission Critical Facilities
Recommends systems for providing secure facilities and and explains the best practices for physical security. |
| 83 | Mitigating Fire Risks in Mission Critical Facilities
Provides a clear understanding of the creation, detection, suppression, and prevention of fire within mission critical facilities. Discusses fire codes for Information Technology environments and provides the best practices for increasing availability. |
| 100 | Management Strategy for Network-Critical Physical Infrastructure
Describes how management of individual devices is necessary in order to have visibility to the many data points required for the reliable operation of network-critical physical infrastructure and how element management solutions offer the optimum approach because they manage a particular type of device and have the ability to assimilate and make manageable the large volume of data necessary for network availability. |
| 111 | Reliability Analysis of the APC InfraStruXure Power System
Provides a detailed analysis of the reliability of 40kW UPS and InfraStruXure PDU and shows that the when compared to other products, InfraStruXure is significantly less likely to suffer failure of all loads in the data center and slightly less likely to experience failure in any one piece of IT equipment. |
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Application Notes

Number	Title and Description
24	Access Floor Loading for Type B Provides basic information about access floor (raised floor) loading and the steps to take for a InfraStruXure power solution.
25	Installation of InfraStruXure for Small, Medium, and Large Data Centers with an Emergency Power Off Circuit Discusses the requirement of an Emergency Power Off (EPO) circuit to disconnect power from a room or apparatus in some installations and how InfraStruXure systems meet this requirement.
26	EMI and InfraStruXure Presents how the InfraStruXure Architecture addresses the potential issue of EMI.
30	InfraStruXure Agency Listings Describes the safety agency testing that has been done on APC's InfraStruXure line of products. It explains the thought process behind a particular standard that applies to a product. It also explains the benefits of such testing.
32	Application Summary of InfraStruXure in Dell Racks Provides an application summary for integrating InfraStruXure systems with Dell racks and equipment.
37	Worldwide Terms Contains the entire range of terms, acronyms, abbreviations, synonyms, etc. related to American Power Conversion UPS business.
38	Application Summary of InfraStruXure in HP Racks Provides an application summary for integrating InfraStruXure systems with HP racks and equipment.
46	Distributed Generator System Synchronization Provides an overview of generator synchronization in a distributed generation system for critical power applications. Distributed generation is commonly used with distributed redundant Uninterruptible Power Supply designs.
47	How APC Designs AC Power Capacitors into Large UPS Systems Explains how APC's Silcon and InfraStruXure UPS systems are designed with regard to maximizing the lifetime of its AC power capacitors.
48	Ventilation and Cooling Requirements for the Symmetra PX UPS Describes why data centers are an excellent location for Symmetra PX UPS solutions.
49	InfraStruXure Battery Safety in the IT Environment: What Happens When the Ventilation Fails Examines the cause of some past battery incidents and demonstrates why many layers of safeguards built into the InfraStruXure design are intended to prevent the build-up of hydrogen gas to a dangerous level.
53	Using APC InfraStruXure Three Phase Whips and RM PDU's for Nonlinear Loads Describes test methods and provides the test results that conclude that whips and rack-mount PDUs can be safely used in the worst nonlinear load environment.

Installation Sites

Overview

This section provides a list of companies with InfraStruXure components installed.

A & A Drug	BMC Health Net Plan	Core Support Systems
AK-Chin Indian Community	Backus Hospital	Countrywide Home Loans
AOL	Bankers Bank	Cox Communications Inc.
AT & T	Bank of America	Cox Enterprises
AT & T-Bedminster	Beauregard Exhibits	CPO Operations Center
AT & T Solutions	Behr Process Corp	Crystal Run Health Care
AT & T Wireless	Bell Mobility	Cyphermint
Abington Savings Bank	Bloomington Hospital	D & B Power Associates
Ace Asphalt	Booz Allen & Hamilton	Dcsim
Acis	Blue Cross Blue Shield of Florida	Defense Manpower
Administrative Offices of US Court	Btezold Research & Trading	Datacenter
Activcard Inc.	CCC Communications	Delta Air Lines, Inc.
Adapco	C-Cornet	Democracy Data and Communications
Aetna	CDW Computer Centers Inc.	Department of Transportation, Dist 4
Agilent Technologies	Cadmus Communications	Drive Financial.com
Agricore Coop Ltd	California Assoc-Research In Astronomy	Dscyf
Alaska Department of Transportation	Cambridge Health Alliance	EDS
Allegiance Telecom	Care Factor Computer Services	EMC
Anheuser-Busch Brewery	Carteret General Hospital	Effron Enterprises
Anteon	Cascade Investments	Emac Whse
Amcomp Insurance	Charter Communications	Equitech
American Museum of Natural History	Chesapeake Gen. Hospital	Execpro Services Inc.
American Power Conversion	Citizens National Bank	Exhibit A
American Power Conversion Brazil	Classified Ventures	Feather River College
American Power Conversion Singapore	Cm Tel-USA	Fellows Manufacturing
Arizona Department of Education	Comedy Central	Fidelity Investments
Arrow Ess	Commander	First Southwest
Assa Compañia De Seguros	Computer Tech Services, Inc.	Florida Credit Union
	Con Edison Communications	Freddie Mac
	Consumer Research Services	FTI Consulting

Gardner, Cartin & Douglas	Ing Financial Services	Morrison & Hecker
Gates Arrow	Injured Workers Insurance Fund	Naval Special Warfare
Gear	International Bonded Carriers	Naval War College
General Dynamics	Isye	Nawcad
General Services Administration	Jack of All Games	Neurome, Inc.
George Mason Mortgage	Joliet Junior College	Newport Beach Police Department
Gibson Electric	JState Street	Network Integration Services
Google	Kaiser Permanente Chr	Nissan Motor Mfg. Corp
Great Works Internet	King Pharmaceutical	Nova Southeastern University
Grc International	Lac-Department of Mental Health	NY City Economic Development Corporation
Group Health Assoc	Learning Info Tech Service	Occupational Health & Rehabilitation
Gtsi Wh	Legal AID Society	Olin College of Engineering
H & S Ventures	Liberty Mutual	One Beacon Insurance
Harley Davidson	Lifespan New England	On-Line Marketing
Healthfirst	Loehmann	Orlando Sentinel
Hewitt Associates	Lunardi Electric	Pacific Service Credit Union
Hewlett Packard	Mactell Communications Inc.	Parrish Medical Center
Holmans of Nevada	Mako Global	Painewebber
Houlihan's Restaurant Group	Maryland Department of Housing & Community Development	Paypal Inc.
Holy Spirit Hospital	Maryland Procurement Office	Pharmacyclics Inc.
Huntington Hospital	Marine Corps Systems	Philadelphia Coca-Cola Bottling Co
IBM	Mass Department of Medical Assistance	Pioneer Credit Recovery, Inc.
Ickler Electric Corp	McCain Foods Ltd	Pomona Valley Hospital Medical Center
Icos Group	McDermott, Will & Emery	Preston, Gates & Ellis LLP
Idaho State Tax Commission	Medical Manager R & D	Project Support Activity
Igloo Products Corp	Medline	Qualcomm
Illinois Department of Employment Security	Medpoint	Rachel Castillo
	Mercy Hospital	Raytheon E-Systems Inc.
	Metron	Reshapecom
	Microsoft Technology Center	Rhode Island College
	Molecular Staging	Rigel (Tech Workers)

Roomstore	Tadlp	United States Air Force
Sacramento Computer Power	Tech Data	United States Army-Ft McCoy
Sara Lee Coffee & Tea	Tech Rx	United States Dept. of Justice
Sepracor Inc.	Teletech	United States District Court
Seasilver	Teva Neuro Science	United States Marshalls
Shore Group	Tri Counties Bank Data Processing	University of Lethbridge
Sirote & Permutt	Time Warner Cable	University of Maryland-Patuxent Bldg.
Societe D'Habitation Du PQ	Time Warner Telecom	University of Michigan-Dearborn
Smith Aerospace Inc.	Traci Network at Cyberlynx	University of New Haven
Sordoni Office	Transcore	University of Texas Health Center
Southcentral Foundation	Trans Montaigne	Up Network
Southwest Whlse	Tadlp	VA Headquarters Silver Spring
Spectrum Brands	Tech Data	Van-Rob Stampings
Spraying Systems	Tech Rx	Veterans Health Administration
State of California	Teletech	Virginia Tech University
State System of Higher Education	Teva Neuro Science	Wave Electronics
State of Kentucky Administrative Office of The Courts	Tri Counties Bank Data Processing	Webeo
Stinson, Mag Fizzell/Morrison	Time Warner Cable	Webresellernet
Stradley Ronon	Time Warner Telecom	Wfyi
Sulzer Orthopedics Inc.	Traci Network at Cyberlynx	Winchester Hospital
SunTrust Bank	Transcore	Worcester Polytech Institute
Super H	Trans Montaigne	WorldCom (Ryebrook)
Stanfield Capital Partners	Transportation Security Admin	Xoma
Sti Knowledge	Trigen Energy	Zoot Enterprises
Systems and Software	Tyco	1-800-Flowers.com
	Ues Inc	
	UPS	
	USDA Headquarters	
	UVA Medical College	
	Unicare	

Quick Reference

Overview

Use this section to quickly look up the technical specifications for the products covered in this handbook. The following specifications can also be found on the APC Web site (www.apc.com) by performing a search for the SKU number of the product. The following list is of the products with technical specifications provided in this section.

Rack.

- NetShelter VX Enclosures
- NetShelter 4-Post Racks
- Rack Automatic Transfer Switch
- KVM Switches
- Single-Branch Basic Rack PDUs
- Multi-Branch Basic Rack PDUs
- Single-Branch Switched Rack PDUs
- Multi-Branch Switched Rack PDUs
- Single-Branch Metered Rack PDUs
- Multi-Branch Metered Rack PDUs

Power.

- Symmetra RM UPS
- InfraStruXure 20kW System
- Symmetra PX UPS
- XR Battery Enclosure
- 80kW Battery Frame
- Symmetra MW UPS
- Smart-UPS
- 40kW InfraStruXure PDU
- 60kW InfraStruXure PDU
- 80kW InfraStruXure PDU
- Rack Distribution Panel
- Emergency Power Off (EPO) System

Air.

- NetworkAIR Air Distribution Unit
- NetworkAIR Air Removal Unit
- NetworkAIR FM Series
- NetworkAIR PA 4000

Management.

- InfraStruXure Manager
- Building Management Integration Card
- Environmental Management System
- Environmental Monitoring Unit
- Network Management Card
- Management Card w/ Environmental Monitor
- Management Card w/ Environmental Monitoring and Modem

NetShelter VX Enclosures

AR2100BLK

Product Overview

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance

Weight Capacity	
Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Physical

Dimensions (H × W × D)	
Enclosure	81.5 × 23.5 × 42 in (2070 × 597 × 1067 mm)
Shipping	87 × 29.5 × 47 in (2210 × 749 × 1194 mm)
Weight	
Enclosure (empty)	359 lb (163.18 kg)
Shipping	397 lb (180 kg)
Equipment Mounting Space	42 U (73.5 in/ 1867 mm)
Paint	
Finish	Powder Coat
Color	Black
Construction Metal	Cold rolled steel
Adjustable Mounting Rails	Front and rear

Physical

Doors

Front Door Construction	Curved, vented
Reversible Front Door	Yes
Doors Open 180°	Yes
Quick Release Doors	Yes

Keys Same key for doors and sides

Overhead Cable Access 4, 2-inch round and 2, 4 × 8- inch rectangular

Clearance

Side Wiring	2.25 in (57 mm)
Front Wiring	3.3 in (84 mm)

Quick Release Side Panels Yes

Number of Casters Four

Number of Leveling Feet Four

Metal Thickness

Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Front Door	16 gauge
Rear Door	16 gauge
Rear Cabling Channel	16 gauge
Side Panel	20 gauge
Roof	18 gauge

Ventilation

Front Door	830 in ² (535 483 mm ²)
Rear Door	839 in ² (541 289 mm ²)
Roof	156 in ² (100 645 mm ²)
Warranty	5 years repair or replace

Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

Options

Stabilization	Sold separately
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AR2101BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance

Weight Capacity	
Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Physical

Dimensions (H × W × D)	
Enclosure	81.5 × 23.5 × 42.2 in (2070 × 597 × 1067 mm)
Shipping	87 × 29.5 × 47.5 in (2210 × 749 × 1194 mm)
Weight	
Enclosure (empty)	282 lb (128.18 kg)
Shipping	320 lb (145 kg)
Equipment Mounting Space	42 U (73.5 in/ 1867 mm)
Paint	
Finish	Powder Coat
Color	Black
Construction Metal	Cold rolled steel
Adjustable Mounting Rails	Front and rear
Doors	
Front Door Construction	Curved, vented
Reversible Front Door	Yes
Doors Open 180°	Yes
Quick Release Doors	Yes

Physical

Keys	Same key for doors and sides
Overhead Cable Access	4, 2-inch round and 2, 4 × 8- inch rectangular
Clearance	
Side Wiring	2.25in (57 mm)
Front Wiring	3.3 in (84 mm)
Quick Release Side Panels	Sold Separately
Number of Casters	Four
Metal Thickness	
Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Front Door	16 gauge
Rear Door	16 gauge
Rear Cabling Channel	16 gauge
Roof	18 gauge
Ventilation	
Front Door	830 in ² (535 483 mm ²)
Rear Door	839 in ² (541 289 mm ²)
Roof	156 in ² (100 645 mm ²)
Warranty	5 years repair or replace

Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

Options

Side Panel	Sold separately
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AR2102BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance**Weight Capacity**

Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Physical**Dimensions (H × W × D)**

Enclosure	81.5 × 23.5 × 42.2in (2070 × 597 × 1067 mm)
Shipping	87 × 29.5 × 47.5 in (2210 × 749 × 1194 mm)

Weight

Enclosure (empty)	204lb (92.7 kg)
Shipping	250lb (113.64 kg)

Equipment Mounting Space 42 U (74 in/ 1867 mm)

Paint

Finish	Powder Coat
Color	Black

Construction Metal Cold rolled steel

Adjustable Mounting Rails Front and rear

Overhead Cable Access 4, 2-inch round and 2, 4 × 8- inch regular

Side Wiring Clearance 2.25in (57 mm)

Number of Casters Four

Number of Leveling Feet Four

Physical

Metal Thickness

Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Rear Cabling Channel	16 gauge
Roof	18 gauge

Ventilation

Front Door	N/A
Rear Door	N/A
Roof	156 in ² (100 645 mm ²)

Warranty	5 years repair or replace
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Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

Options

Front Door	Sold separately
Rear Door	Sold separately
Side Panels	Sold separately
Stabilization	Sold separately

AR2802BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance

Weight Capacity

Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Physical

Dimensions (H × W × D)

Enclosure	81.5 × 23.5 × 42.2in (2070 × 597 × 1067 mm)
Shipping	87 × 29.5 × 47.5 in (2210 × 749 × 1194 mm)

Weight

Enclosure (empty)	163lb (74.1 kg)
Shipping	209lb (95 kg)

Equipment Mounting Space 42 U (74 in/ 1867 mm)

Paint

Finish	Powder Coat
Color	Black

Construction Metal Cold rolled steel

Adjustable Mounting Rails Front and rear

Overhead Cable Access 4, 2-inch round and 2, 4 × 8- inch rectangular

Side Wiring Clearance 2.25in (57 mm)

Number of Casters Four

Number of Levelling Feet Four

Physical

Metal Thickness

Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Rear Cabling Channel	16 gauge
Roof	18 gauge

Ventilation

Front Door	N/A
Rear Door	N/A
Roof	156 in ² (100 645 mm ²)

Warranty	5 years repair or replace
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Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

Options

Front Door	Sold separately
Rear Door	Sold separately
Side Panels	Sold separately
Stabilization	Sold separately

AR2103BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance

Weight Capacity	
Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Physical

Dimensions (H × W × D)	
Enclosure	90.25 × 23.5 × 42.2in (2292 × 597 × 1071 mm)
Shipping	96.0 × 29.5 × 47.5 in (2438 × 749 × 1207 mm)
Weight	
Enclosure (empty)	386 lb (175 kg)
Shipping	438 lb (199 kg)
Equipment Mounting Space	47 U (82.25 in/2089 mm)
Paint	
Finish	Powder Coat
Color	Black
Construction Metal	Cold rolled steel
Adjustable Mounting Rails	Front and rear
Doors	
Front Door Construction	Curved, vented
Reversible Front Door	Yes
Doors Open 180°	Yes
Quick Release Doors	Yes
Keys	Same key for doors and sides

Physical

Overhead Cable Access	4, 2-inch round and 2, 4 × 8- inch rectangular
Clearance	
Side Wiring	2.25 in (57 mm)
Front Wiring	3.3 in (84 mm)
Quick Release Side Panels	Yes
Number of Casters	Four
Number of Levelling Feet	Four
Metal Thickness	
Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Front Door	16 gauge
Rear Door	16 gauge
Rear Cabling Channel	16 gauge
Side Panel	20 gauge
Roof	18 gauge
Ventilation	
Front Door	875 in ² (564 515 mm ²)
Rear Door	889 in ² (573 547 mm ²)
Roof	156 in ² (100 645 mm ²)
Warranty	5 years repair or replace

Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

Options

Stabilization	Sold separately
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AR2104BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance

Weight Capacity	
Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Physical

Dimensions (H × W × D)	
Enclosure	90.25 × 23.5 × 42.2in (2292 × 597 × 1072 mm)
Shipping	96.0 × 29.5 × 47.5 in (2438 × 749 × 1207 mm)
Weight	
Enclosure	291 lb (132kg)
Shipping	343 lb (156kg)
Equipment Mounting Space	47 U (82 in/ 2089 mm)
Paint	
Finish	Powder Coat
Color	Black
Construction Metal	Cold rolled steel
Adjustable Mounting Rails	Front and rear
Doors	
Front Door Construction	Curved, vented
Reversible Front Door	Yes
Doors Open 180°	Yes
Quick Release Doors	Yes
Keys	Same key for doors and sides

Physical

Overhead Cable Access	4, 2-inch round and 2, 4 × 8- inch rectangular
Clearance	
Side Wiring	2.25 in (57 mm)
Front Wiring	3.3 in (84 mm)
Number of Casters	Four
Number of Levelling Feet	Four
Metal Thickness	
Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Front Door	16 gauge
Rear Door	16 gauge
Rear Cabling Channel	16 gauge
Roof	18 gauge
Ventilation	
Front Door	875 in ² (564 515 mm ²)
Rear Door	889 in ² (573 547 mm ²)
Roof	156 in ² (100 645 mm ²)
Warranty	5 years repair or replace

Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

Options

Stabilization	Sold separately
Quick Release Side Panels	Sold separately
Side Panel	Sold separately

AR2105BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance

Weight Capacity	
Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Physical

Dimensions (H × W × D)	
Enclosure	51.70 × 23.5 × 42.2 in (1313 × 597 × 1072 mm)
Shipping	57.30 × 29.5 × 47.5 in (1455 × 749 × 1207 mm)
Weight	
Enclosure	255.0lb (115.9kg)
Shipping	301.0lb (136.8kg)
Equipment Mounting Space	25U
Paint	
Finish	Powder Coat
Color	Black
Construction Metal	Cold rolled steel
Adjustable Mounting Rails	Front and rear
Doors	
Front Door Construction	Curved, vented
Reversible Front Door	Yes
Doors Open 180°	Yes
Quick Release Doors	Yes
Keys	Same key for doors and sides

Physical

Clearance	3.30 in (84 mm), for wiring between front door and vertical rail
Number of Casters	Four
Number of Levelling Feet	Four
Metal Thickness	
Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Front Door	16 gauge
Rear Door	16 gauge
Side Panel	20 gauge
Roof	18 gauge
Ventilation	
Front Door	507.93 in ² (327 696 mm ²)
Rear Door	480.03 in ² (309 696 mm ²)
Warranty	5 years repair or replace

Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

AR2144BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance

Weight Capacity	
Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Physical

Dimensions (H × W × D)	
Enclosure	81.5 × 23.5 × 42.2 in (2070 × 597 × 1072 mm)
Shipping	87.0 × 29.5 × 47.5 in (2210 × 749 × 1207 mm)
Weight	
Enclosure	518.0lb (235.5kg)
Shipping	556.0lb (252.7kg)
Equipment Mounting Space	42U
Paint	
Finish	Powder coat
Color	Black
Construction Metal	Cold rolled steel
Adjustable Mounting Rails	Front and rear
Doors	
Front Door Construction	Curved, vented
Reversible Front Door	Yes
Doors Open 180°	Yes
Quick Release Doors	Yes
Keys	Same key for doors and sides
Number of Casters	Four

Physical

Number of Levelling Feet	Four
Metal Thickness	
Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Front Door	16 gauge
Rear Door	16 gauge
Side Panel	20 gauge
Roof	18 gauge
Ventilation	
Front Door	830in ² (535 483mm ²)
Rear Door	839in ² (541 289mm ²)
Roof	156in ² (100 645mm ²)
Warranty	5 years repair or replace

Compliance

Approvals	NEBS GR-63-CORE (Seismic Zone 4)
Standards	EIA-310-D
Protection Class	IP 20

AR2145BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance

Weight Capacity	
Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Physical

Dimensions (H × W × D)	
Enclosure	81.5 × 23.5 × 42.2in (2070 × 597 × 1072mm)
Shipping	87.0 × 29.5 × 47.5in (2210 × 749 × 1207mm)
Weight	
Enclosure	432.0lb (196.36kg)
Shipping	470.0lb (213.64kg)
Equipment Mounting Space	42U
Paint	
Finish	Powder coat
Color	Black
Construction Metal	Cold rolled steel
Adjustable Mounting Rails	Front and rear
Doors	
Front Door Construction	Curved, vented
Reversible Front Door	Yes
Doors Open 180°	Yes
Quick Release Doors	Yes
Keys	Yes

Physical

Number of Casters	Four
Number of Levelling Feet	Four
Metal Thickness	
Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Front Door	16 gauge
Rear Door	16 gauge
Roof	18 gauge
Ventilation	
Front Door	830in ² (535 483mm ²)
Rear Door	839in ² (541 289mm ²)
Roof	156in ² (100 645mm ²)
Warranty	5 years repair or replace

Compliance

Approvals	NEBS GR-63-CORE (Seismic Zone 4)
Standards	EIA-310-D
Protection Class	IP 20

AR2310BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance

Weight Capacity	
Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Physical

Dimensions (H × W × D)	
Enclosure	81.5 × 29.5 × 42.2in (2070 × 749 × 1072 mm)
Shipping	87.0 × 35.5 × 47.5 in (2210 × 902 × 1207 mm)
Weight	
Enclosure (empty)	372lb (169 kg)
Shipping	427lb (194 kg)
Equipment Mounting Space	42 U (74 in/ 1867 mm)
Paint	
Finish	Powder Coat
Color	Black
Construction Metal	Cold rolled steel
Adjustable Mounting Rails	Front and rear
Doors	
Front Door Construction	Curved, vented
Reversible Front Door	Yes
Doors Open 180°	Yes
Quick Release Doors	Yes
Keys	Same key for doors and sides

Physical

Overhead Cable Access	4, 2-inch round and 2, 4 × 8- inch rectangular
Base Cable Access	2, 4 × 8-inch rectangular
Clearance	
Side Wiring	2.25 in (57 mm)
Front Wiring	3.3 in (83 mm)
Quick Release and Side Panels	Yes
Number of Casters	Four
Number of Leveling Feet	Four
Metal Thickness	
Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Front Door	16 gauge
Rear Door	16 gauge
Rear Cabling Channel	16 gauge
Side Panel	20 gauge
Roof	18 gauge
Ventilation	
Front Door	1056 in ² (681 289 mm ²)
Rear Door	1079 in ² (696 128 mm ²)
Roof	156 in ² (100 645 mm ²)
Warranty	5 years repair or replace

Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

Options

Stabilization	Sold separately
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AR2311BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance

Weight Capacity	
Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

Options

Stabilization	Sold separately
Quick Release Side Panels	Sold separately

Physical

Dimensions (H × W × D)	
Enclosure	81.5 × 23.5 × 42.2 in (2070 × 597 × 1072 mm)
Shipping	87.0 × 29.5 × 47.5 in (2210 × 749 × 1207 mm)
Weight	
Enclosure	518.0lb (235.5kg)
Shipping	556.0lb (252.7kg)
Equipment Mounting Space	42U
Paint	
Finish	Powder coat

Physical

Color	Black
Construction Metal	Cold rolled steel
Adjustable Mounting Rails	Front and rear
Doors	
Front Door Construction	Curved, vented
Reversible Front Door	Yes
Doors Open 180°	Yes
Quick Release Doors	Yes
Keys	Same key for doors and sides
Number of Casters	Four
Number of Levelling Feet	Four
Metal Thickness	
Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Front Door	16 gauge
Rear Door	16 gauge
Side Panel	20 gauge
Roof	18 gauge
Ventilation	
Front Door	830in ² (535 483mm ²)
Rear Door	839in ² (541 289mm ²)
Roof	156in ² (100 645mm ²)
Warranty	5 years repair or replace

Compliance

Approvals	NEBS GR-63-CORE (Seismic Zone 4)
Standards	EIA-310-D
Protection Class	IP 20

AR2312BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Performance

Weight Capacity	
Static Load	2000lb (909kg)
Dynamic Load	2000lb (909kg)

Physical

Dimensions (H × W × D)	
Enclosure	81.5 × 29.5 × 42.2in (2070 × 749 × 1072mm)
Shipping	87.0 × 35.5 × 47.5in (2210 × 902 × 1207mm)
Weight	
Enclosure	372.0lb (169.09kg)
Shipping	427.0lb (194.09kg)
Equipment Mounting Space	42U
Paint	
Finish	Powder coat
Color	Black
Construction Metal	Cold rolled steel
Adjustable Mounting Rails	Front and rear
Doors	
Front Door Construction	Curved, vented
Reversible Front Door	Yes
Doors Open 180°	Yes
Quick Release Doors	Yes
Keys	Same key for doors and sides

Physical

Number of Casters	Four
Number of Levelling Feet	Four
Metal Thickness	
Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge
Front Door	16 gauge
Rear Door	16 gauge
Side Panel	20 gauge
Roof	18 gauge
Ventilation	
Front Door	830 in ² (535 483 mm ²)
Rear Door	839 in ² (541 289 mm ²)
Roof	156 in ² (100 645 mm ²)
Warranty	5 years repair or replace

Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

AR2313BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Physical

Dimensions (H × W × D)	
Enclosure	81.5 × 29.5 × 42.2 in (2070 × 749 × 1072 mm)
Shipping	87.0 × 35.5 × 47.5 in (2210 × 902 × 1207 mm)
Weight	
Enclosure	294.0 lb (133.64 kg)
Shipping	351.0 lb (159.55 kg)
Equipment Mounting Space	42 U
Paint	
Finish	Powder coat
Color	Black
Construction Metal	Cold rolled steel
Adjustable Mounting Rails	Front and rear
Doors	
Front Door Construction	Curved, vented
Reversible Front Door	Yes
Doors Open 180°	Yes
Quick Release Doors	Yes
Keys	Same key for doors and sides
Number of Casters	Four
Number of Levelling Feet	Four
Metal Thickness	
Vertical Posts	16 gauge
EIA Mounting Rails	14 gauge

Physical

Front Door	16 gauge
Rear Door	16 gauge
Side Panel	20 gauge
Roof	18 gauge
Ventilation	
Front Door	830 in ² (535 483 mm ²)
Rear Door	839 in ² (541 289 mm ²)
Roof	156 in ² (100 645 mm ²)
Warranty	5 years repair or replace

Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

AR2314BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Physical

Dimensions (H × W × D)

Enclosure 81.5 × 29.5 × 42.2 in (2070 × 749 × 1072 mm)

Shipping 87.0 × 35.5 × 47.5 in (2210 × 902 × 1207 mm)

Weight

Enclosure 372.0 lb (169.09 kg)

Shipping 427.0 lb (194.09 kg)

Equipment Mounting Space 42 U

Paint

Finish Powder coat

Color Black

Construction Metal Cold rolled steel

Adjustable Mounting Rails Front and rear

Doors

Front Door Construction Curved, vented

Reversible Front Door Yes

Doors Open 180° Yes

Quick Release Doors Yes

Keys Same key for doors and sides

Number of Casters Four

Number of Levelling Feet Four

Metal Thickness

Vertical Posts 16 gauge

EIA Mounting Rails 14 gauge

Physical

Front Door	16 gauge
Rear Door	16 gauge
Side Panel	20 gauge
Roof	18 gauge
Ventilation	
Front Door	830 in ² (535 483 mm ²)
Rear Door	839 in ² (541 289 mm ²)
Roof	156 in ² (100 645 mm ²)
Warranty	5 years repair or replace

Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

AR2315BLK**Product Overview**

Description	APC's leading-edge enclosure solution. NetShelter VX addresses many of the emerging trends and issues IT managers face today by incorporating new features and benefits that allow customers to create a more effective IT environment.
Features	Adjustable mounting depth; guaranteed compatibility; lockable doors and side panels; multi-vendor equipment compatibility; numbered U positions; optimized depth; optimized width; powder coat paint finish; protective grounding provisions; quick-release doors; quick-release side panels; rear cable management channels; reversible doors; rolls through a 2.1 meter doorway; roof and base cable access; ships fully assembled; split rear doors; UBC Zone 4 stabilization provisions
Includes	Casters, doors, key(s), leveling feet, roof, side panels, user manual, 60 sets of M6 combo head screws, plastic washers, caged nuts

Physical

Dimensions (H × W × D)

Enclosure 81.5 × 29.5 × 42.2 in (2070 × 749 × 1072 mm)

Shipping 87.0 × 35.5 × 47.5 in (2210 × 902 × 1207 mm)

Weight

Enclosure 294.0 lb (133.64 kg)

Shipping 351.0 lb (159.55 kg)

Equipment Mounting Space 42U

Paint

Finish Powder coat

Color Black

Construction Metal Cold rolled steel

Adjustable Mounting Rails Front and rear

Doors

Front Door Construction Curved, vented

Reversible Front Door Yes

Doors Open 180° Yes

Quick Release Doors Yes

Keys Yes

Number of Casters Four

Number of Levelling Feet Four

Metal Thickness

Vertical Posts 16 gauge

EIA Mounting Rails 14 gauge

Physical

Front Door	16 gauge
Rear Door	16 gauge
Roof	18 gauge
Ventilation	
Front Door	830 in ² (535 483 mm ²)
Rear Door	839 in ² (541 289 mm ²)
Roof	156 in ² (100 645 mm ²)
Warranty	5 years repair or replace

Compliance

Standards	EIA-310-D, 19-inch rack
Protection Rating	IP20

NetShelter 4-Post Racks

AR203

Product Overview

Description	APC 4-Post Open Frame Racks provide simple, low cost mounting means for rack-mount equipment in IT environments. Ideal for rack-mount servers, networking, and telcommunication equipment where security at the individual rack level is not required, open frame racks provide unobstructed airflow and fast, easy access to installed equipment.
Features	Bolts to the floor; ships unassembled; supports 24 inch floor tile spacing; supports 600mm floor tile spacing; vertical mounting rails with square holes
Includes	User Manual

Performance

Weight Capacity Static Load 1000lb (453.59kg)

Physical

Dimensions (H×W×D)

Rack	80.90 × 20.60 × 29.50 in (2055 × 523 × 749 mm)
Shipping	82.00 × 10.00 × 7.40in (2083 × 254 × 188 mm)
Weight	
Rack	92lb (41.82 kg)
Shipping	102lb (41.82 kg)
Rack Height	43U
Warranty	2 years repair or replace

Compliance

Standards	EIA-310-D
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AR204

Product Overview

Description	APC 4-Post Open Frame Racks provide simple, low cost mounting means for rack-mount equipment in IT environments. Ideal for rack-mount servers, networking, and telcommunication equipment where security at the individual rack level is not required, open frame racks provide unobstructed airflow and fast, easy access to installed equipment.
Features	Bolts to the floor; ships unassembled; supports 24 inch floor tile spacing; supports 600mm floor tile spacing; vertical mounting rails with square holes
Includes	User Manual

Performance

Weight Capacity Static Load 1000lb (453.59kg)

Physical

Dimensions (H×W×D)

Rack	80.90 × 20.60 × 29.50 in (2055 × 523 × 749 mm)
Shipping	82.00 × 10.00 × 7.40in (2083 × 254 × 188 mm)
Weight	
Rack	92lb (41.82 kg)
Shipping	102lb (41.82 kg)
Rack Height	43 U
Warranty	2 years repair or replace

Compliance

Standards	EIA-310-D
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Rack Automatic Transfer Switch

AP7701

Product Overview

Description	A high availability switch that has two input power cords, one for each AC line, which provide redundant power to connected equipment. It is designed to supply power to the connected load from a primary AC source. If the primary source becomes unavailable, the Rack ATS will automatically begin sourcing power from the secondary source. The transfer time from one source to the other is seamless to the connected equipment. The networked units have built in connectivity, which allows for remote management through Web, SNMP, or Telnet interfaces.
Features	19 inch rack-mountable, Remote management capabilities
Includes	Rack Mounting Brackets

Electrical

Input	
Nominal Input Voltage	208 V (3PH)
Acceptable Input Voltage	100–120 VAC
Nominal Input Frequency	50/60 Hz
Max. Line Current per Phase	16 A
Connection Type	(2) NEMA L21-20
Cord Length	3 ft (0.91 m)
Output	
Connection Type	(1) attached L21-20R line cord
Cord Length	3 ft (0.91 m)
Maximum Total Current Draw	16 A per phase

Physical

Dimensions (H × W × D)	
ATS	1.75 × 17.00 × 12.00 in (44 × 432 × 305 mm)
Shipping	2.75 × 23.5 × 24.25 in (70 × 597 × 616 mm)
Weight	
ATS	15.0 lb (6.82 kg)
Shipping	21.0 lb (9.55 kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149° F (-25 to 65° C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000 m)

Compliance

Approvals	UL 60950 Listed, CSA 22.2 No. 60950-00, FCC Part 15 Class A
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KVM Switches

AP9254

Product Overview

Description	Provides the ability to manage up to 8 servers with just one keyboard, monitor, and mouse. This consolidation greatly reduces hardware costs since only one keyboard, monitor, and mouse are required to access multiple servers. Less hardware means valuable space saving in the rack and less heat generation. Cascading multiple APC KVM switches enables one centralized point of control for up to 64 servers, easing the manageability of attached servers.
Features	Automatic scanning feature, cascading capabilities, hot pluggable operation, keep alive function, Microsoft intellimouse support, mouse reset function, on-screen display (OSD) capability, password security, PC mouse/keyboard/video support, push button or keyboard switching, scanning capabilities, status indicator LED's, universal input voltage range, video modes up to 1600 × 1200 at 72Hz
Includes	Rack mounting brackets, user manual

Electrical

Input	
Nominal Voltage	100, 120, 208, 230, 240 V
Frequency	50/60 Hz
Connection Type	NEMA 5-15P, IEC-320 C14
Cord Length	8 ft (2.44 m)

Physical

Dimensions (H × W × D)	
KVM Switch	1.69 × 17 × 6.50in (43 × 437 × 165mm)
Shipping	3.5 × 19 × 10.5in (89 × 476 × 267mm)
Rack Height	1U
Weight	
KVM Switch	4.2lb (1.91kg)
Shipping	9.5lb (4.32kg)
Keyboard Type	PS/2, 104 key, keyboard
Trackball Type	PS/2 mouse
Warranty	2 years repair or replace

Environmental

Temperature

Operating 41 to 104°F (5 to 40° C)

Storage -4 to 122°F (-20 to 50° C)

Humidity

Operating 0-95%, non-condensing

Storage 0-95%, non-condensing

Compliance

Approvals CSA 22.2 No. 950-95, FCC Part 15 Class A, UL 1950

AP9258**Product Overview**

Description	Provides the ability to manage up to 8 servers with just one keyboard, monitor, and mouse. This consolidation greatly reduces hardware costs since only one keyboard, monitor, and mouse are required to access multiple servers. Less hardware means valuable space saving in the rack and less heat generation. Cascading multiple APC KVM switches enables one centralized point of control for up to 64 servers, easing the manageability of attached servers.
Features	Automatic scanning feature, cascading capabilities, hot pluggable operation, keep alive function, Microsoft intellimouse support, mouse reset function, on-screen display (OSD) capability, password security, PC mouse/keyboard/video support, push button or keyboard switching, scanning capabilities, status indicator LED's, universal input voltage range, video modes up to 1600 × 1200 at 72Hz
Includes	Rack mounting brackets, user manual

Electrical

Input

Nominal Voltage	100, 120, 208, 230, 240 V
Frequency	50/60 Hz
Connection Type	NEMA 5-15P, IEC-320 C14
Cord Length	8 ft (2.44 m)

Physical

Dimensions (H × W × D)

KVM Switch	1.69 × 17 × 6.50in (43 × 437 × 165mm)
Shipping	3.5 × 19 × 10.5in (89 × 476 × 267mm)
Rack Height	1U
Weight	
KVM Switch	4.2lb (1.91kg)
Shipping	9.5lb (4.32kg)
Keyboard Type	PS/2, 104 key, keyboard
Trackball Type	PS/2 mouse
Warranty	2 years repair or replace

Environmental

Temperature

Operating	41 to 104°F (5 to 40° C)
Storage	-4 to 122°F (-20 to 50° C)

Humidity

Environmental

Operating	0–95%, non-condensing
Storage	0–95%, non-condensing

Compliance

Approvals	CSA 22.2 No. 950-95, FCC Part 15 Class A, UL 1950
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AP9278**Product Overview**

Description	Provides the ability to manage up to 8 servers with just one keyboard, monitor, and mouse. This consolidation greatly reduces hardware costs since only one keyboard, monitor, and mouse are required to access multiple servers. Less hardware means valuable space saving in the rack and less heat generation. Cascading multiple APC KVM switches enables one centralized point of control for up to 64 servers, easing the manageability of attached servers.
Features	Automatic scanning feature, cascading capabilities, hot pluggable operation, keep alive function, Microsoft intellimouse support, mouse reset function, on-screen display (OSD) capability, password security, PC mouse/keyboard/video support, push button or keyboard switching, scanning capabilities, status indicator LED's, universal input voltage range, video modes up to 1600 × 1200 at 72Hz
Includes	Rack mounting brackets, user manual

Electrical**Input**

Nominal Voltage	100, 120, 208, 230, 240 V
Frequency	50/60 Hz
Connection Type	NEMA 5-15P, IEC-320 C14
Cord Length	8 ft (2.44 m)

Physical**Dimensions (H × W × D)**

KVM Switch	1.69 × 17 × 6.50in (43 × 437 × 165mm)
Shipping	3.5 × 19 × 10.5in (89 × 476 × 267mm)
Rack Height	1U
Weight	
KVM Switch	4.2lb (1.91kg)
Shipping	9.5lb (4.32kg)
Keyboard Type	PS/2, 104 key, keyboard
Trackball Type	PS/2 mouse
Warranty	2 years repair or replace

Environmental**Temperature**

Operating	41 to 104°F (5 to 40° C)
Storage	-4 to 122°F (-20 to 50° C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Compliance

Approvals

CSA 22.2 No. 950-95, FCC Part 15 Class A, UL 1950

Single-Branch, Basic, Rack PDUs

AP7530

Product Overview

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input

Nominal Voltage	120 V
Frequency	50/60Hz
Connection Type	NEMA L5-20P (20A Twist-Lock)
Cord Length	10 ft (3.05 m)
Acceptable Voltage	100–120 VAC
Max. Current	20.0 A per phase
Load Capacity	2400

Output

Max. Total Current Draw	20.0 A per phase
Connection Type	(24) NEMA 5-20R
Overload Protection	No

Physical

Dimensions (H × W × D)

PDU	63.75 × 2.19 × 1.73 in (1619 × 56 × 44 mm)
Shipping	84 × 6 × 5 in (2134 × 152 × 127 mm)

Weight

PDU	10.7 lb (4.9 kg)
Shipping	12.7 lb (5.8 kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating 32 to 113°F (0 to 45°C)

Storage -13 to 149°F(-25 to 65°C)

Humidity

Operating 0-95%, non-condensing

Storage 0-95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, cUL Recognized, UL1363 Recognized

AP7540**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	208 V
Frequency	50/60Hz
Connection Type	NEMA L6-20P (20A Twist-Lock)
Cord Length	10 ft (3.05 m)
Max. Current	20.0A per phase
Load Capacity	4160
Output	
Voltage	208 V (main only)
Max. Total Current Draw	20.0A per phase
Connection Type	(20) IEC 320 C13; (4) IEC 320 C19

Physical

Dimensions (H × W × D)	
PDU	63.75 × 2.19 × 1.73 in (1619 × 56 × 44 mm)
Shipping	84 × 6 × 5 in (2134 × 152 × 127 mm)
Weight	
PDU	10.7 lb (4.9 kg)
Shipping	12.7 lb (5.8 kg)
Warranty	2 years repair or replace

Environmental

Temperature	
Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, cUL Recognized, UL1363 Recognized

AP7580**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input

Nominal Voltage	208 V
Frequency	50/60Hz
Connection Type	NEMA L14-30P (30A Twist-Lock)
Cord Length	28 ft (8.53m)
Max. Current	24.0A per phase
Load Capacity	4992

Output

Voltage	120V (main only)
Max. Total Current Draw	24.0A per phase
Connection Type	(4) NEMA L5-20R

Physical

Dimensions (H × W × D)

PDU	3.5 × 17.2 × 3.5 in (89 × 437 × 89mm)
Shipping	6.0 × 20.5 × 20.5 in (152 × 520 × 520mm)

Weight

PDU	14.0lb (6.36kg)
Shipping	16.0lb (7.27kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating 32 to 113°F (0 to 45°C)

Storage -13 to 149°F(-25 to 65°C)

Humidity

Operating 0-95%, non-condensing

Storage 0-95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, cUL Listed, UL 1778 Listed

AP7581**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	208 V
Frequency	50/60Hz
Connection Type	NEMA L14-30P
Cord Length	28 ft (8.5m)
Max. Current	24 A per phase
Load Capacity	4992
Output	
Nominal Voltage	208 V
Max. Current Draw	24 A per phase
Connection Type	(4) NEMA L6-20R

Physical

Dimensions (H × W × D)	
PDU	3.5 × 17.2 × 3.5 in (88.9 × 437 × 88.9mm)
Shipping	6.0 × 20.5 × 20.5 in (150 × 520.7 × 520.7mm)
Weight	
PDU	14 lb (6kg)
Shipping	16 lb (7kg)
Warranty	2 years repair or replace

Environmental

Temperature	
Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals

FCC Part 15 Class A, cUL Listed, UL Listed

AP7582**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	208 V
Frequency	50/60 Hz
Connection Type	NEMA L14-30P
Cord Length	28 ft (8.5 m)
Max. Current	24 A per phase
Load Capacity	4,992
Output	
Nominal Voltage	120 V
Max. Total Current Draw	24 A per phase
Connection Type	(12) NEMA 5-20R

Physical

Dimensions (H × W × D)	
PDU	3.5 × 17.2 × 3.5 in (88.9 × 437 × 88.9 mm)
Shipping	6 × 20.5 × 20.5 in (150 mm × 521 × 521 mm)
Weight	
PDU	14 lb (6 kg)
Shipping	16 lb (7 kg)
Warranty	2 years repair or replace

Environmental

Temperature	
Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F (-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals

FCC Part 15 Class A, cUL Listed, UL Listed

AP7583**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	208 V
Connection Type	NEMA L14-30P
Cord Length	28 ft (8.5m)
Max Input Current	24 A per phase
Load Capacity	4,992
Output	
Nominal Voltage	120 V
Max. Total Current Draw	24 A per phase
Connection Type	(5) NEMA L5-30R

Physical

Dimensions (H × W × D)	
PDU	3.5 × 17.2 × 3.5 in (88.9 × 437 × 88.9 mm)
Shipping	6 × 20.5 × 20.5 in (150 × 521 × 521 mm)
Weight	
PDU	14 lb (6 kg)
Shipping	16 lb (7 kg)
Warranty	2 years repair or replace

Environmental

Temperature	
Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F (-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, cUL Listed, UL Listed

AP7584**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	208 V
Frequency	50/60Hz
Connection Type	NEMA L14-30P
Cord Length	28 ft (8.5m)
Max. Current	24 A per phase
Load Capacity	4,992
Output	
Nominal Voltage	208 V
Max. Total Draw Current	24 A per phase
Connection Type	(4) NEMA L6-30R

Physical

Dimensions (H × W × D)	
PDU	3.5 × 17.2 × 3.5 in (88.9 × 437 × 88.9mm)
Shipping	6 × 20.5 × 20.5 in (150 × 521 × 521 mm)
Weight	
PDU	14lb (6kg)
Shipping	16lb (7kg)
Warranty	2 years repair or replace

Environmental

Temperature	
Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, cUL Listed, UL Listed

AP9559**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	120, 208, 230 V
Frequency	50/60 Hz
Connection Type	IEC 320 C20
Cord Length	8.2 ft (2.5 m)
Acceptable Input Voltage	90–250 VAC
Max. Line Current	16.0 A per phase
Max. Input Current	16.0 A per phase
Load Capacity	3680
Output	
Voltage	120, 208, 230 V (main only)
Max. Total Current Draw	16.0 A per phase
Connection Type	(10) IEC 320 C13; (2) IEC 320 C19
Always On Outlets	12
Overload Protection	Yes

Physical

Dimensions (H × W × D)	
PDU	1.75 × 17.6 × 2.25 in (45 × 447 × 57 mm)
Shipping	6.5 × 19.0 × 6.0 in (165 × 483 × 152 mm)
Weight	
PDU	2.15 lb (0.98 kg)
Shipping	5.20 lb (2.36 kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, cUL Listed, UL 1950 Listed
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AP9562**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	120 V
Frequency	50/60Hz
Connection Type	NEMA 5-15P
Cord Length	12 ft (3.7m)
Max. Input Current	15 A per phase
Load Capacity	1,800
Output	
Nominal Voltage	120 V
Max. Total Current Draw	15 A per phase
Connection Type	(10) NEMA 5-15R

Physical

Dimensions (H × W × D)	
PDU	1.75 × 17.6 × 2.25 in (44.5 × 44.7 × 57.2mm)
Shipping	2.75 × 18.25 × 9.0in (70 × 464 × 230mm)
Weight	
PDU	5.5lb (2.5kg)
Shipping	8.0lb (4kg)
Warranty	2 years repair or replace

Environmental

Temperature	
Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, cUL Recognized, UL1363 Recognized

AP9563**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	120 V
Frequency	50/60Hz
Connection Type	NEMA 5-20P
Cord Length	12 ft (3.66 m)
Max. Current	20.0 A per phase
Load Capacity	2400
Output	
Voltage	120 V (main only)
Max. Total Current Draw	20.0 A per phase
Connection Type	(10) NEMA 5-20R

Physical

Dimensions (H × W × D)	
PDU	1.75 × 17.60 × 2.25 in (45 × 447 × 57 mm)
Shipping	2.75 × 18.25 × 9.00 in (70 × 464 × 229 mm)
Weight	
PDU	5.5 lb (2.5 kg)
Shipping	8.0 lb (3.64 kg)
Warranty	2 years repair or replace

Environmental

Temperature	
Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F (-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, cUL Recognized, UL1363 Recognized

AP9566**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input

Nominal Voltage	208 V
Frequency	50/60Hz
Connection Type	NEMA L6-20P (20A Twist-Lock)
Cord Length	12 ft (3.66m)
Max. Current	16.0A per phase
Load Capacity	3328

Output

Voltage	208 V (main only)
Max. Total Current Draw	16.0A per phase
Connection Type	(12) IEC 320 C13

Physical

Dimensions (H × W × D)

PDU	1.75 × 17.6 × 2.25 in (45 × 447 × 57mm)
Shipping	2.75 × 18.25 × 9.0 in (70 × 463 × 229mm)

Weight

PDU	5.5lb (2.5kg)
Shipping	8.0lb (3.64kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Environmental

Approvals

FCC Part 15 Class A, cUL Recognized, UL1950

AP9567**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	120 V
Frequency	50/60Hz
Connection Type	NEMA 5-15P
Cord Length	12 ft (3.66 m)
Acceptable Input Voltage	100–125 VAC
Max. Input Current per Phase	15.0 A
Load Capacity	1800
Output	
Voltage	120 V (main only)
Max. Total Current Draw per Phase	15 A
Connection Type	(14) NEMA 5-15R
Overload Protection	Yes

Physical

Dimensions (H × W × D)	
PDU	24 × 1.75 × 1.75 in (610 × 44 × 44 mm)
Shipping	25.5 × 7 × 6 in (648 × 178 × 154 mm)
Weight	
PDU	4.8 lb (2.2 kg)
Shipping	6.4 lb (2.9 kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, cUL Recognized, UL1363 Recognized
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AP9568**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	208, 230 V
Input Frequency	50/60Hz
Connection Type	IEC-320 C14
Cord Length	1.98m
Max. Input Current	16 A per phase
Overload Capacity	20 at nominal rated input voltage
Output	
Voltage	208, 230 V
Max. Total Current Draw	10 A per phase
Connection Type	(15) IEC 320 C13
Overload Protection	Yes

Physical

Dimensions (H × W × D)	
PDU	24 × 1.73 × 1.73 in (610 × 44 × 44mm)
Shipping	26 × 7.0 × 6.0 in (648 × 178 × 152mm)
Weight	
PDU	4.4lb (2.0kg)
Shipping	6.0lbs (2.7kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, cUL Listed, UL1950 Listed
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Multi-Branch, Basic, Rack PDUs

AP7562

Product Overview

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input

Nominal Voltage	208 V (3PH)
Frequency	50/60Hz
Connection	NEMA L21-20
Cord Length	3 ft (0.91 m)
Max. Current	16.0 A per phase
Load Capacity	5700

Output

Voltage	120 V (main only)
Max. Total Current Draw	16.0 A per phase
Connection Type	(42) NEMA 5-20R

Physical

Dimensions (H × W × D)

PDU	70 × 2.2 × 1.73 in (1778 × 56 × 44 mm)
Shipping	84 × 6 × 5 in (2134 × 152 × 127 mm)

Weight

PDU	12 lb (5.5 kg)
Shipping	14 lb (6.4 kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, UL 60950 Listed, CSA22.2 No. 60950-00
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AP7563**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	208 V (3PH)
Frequency	50/60Hz
Connection Type	NEMA L21-20
Cord Length	3 ft (0.91 m)
Max. Current	16.0A per phase
Load Capacity	5700
Output	
Voltage	120, 208 V (main only)
Max. Total Current Draw	16.0A per phase
Connection Type	(21) NEMA 5-20R, (6) NEMA L6-20R

Physical

Dimensions (H × W × D)	
PDU	70 × 2.2 × 1.73 in (1778 × 56 × 44mm)
Shipping	84 × 6 × 5 in (2134 × 152 × 127 mm)
Weight	
PDU	12 lb (5.5 kg)
Shipping	14 lb (6.4 kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating 32 to 113°F (0 to 45°C)

Storage -13 to 149°F(-25 to 65°C)

Humidity

Operating 0-95%, non-condensing

Storage 0-95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals

FCC Part 15 Class A, UL 60950 Listed, CSA22.2 No. 60950-00

AP7564**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input	
Nominal Voltage	208 V (3PH)
Frequency	50/60Hz
Connection Type	NEMA L21-20
Cord Length	3 ft (0.91 m)
Max. Current	16.0A per phase
Load Capacity	5700
Output	
Voltage	208 V (main only)
Max. Total Current Draw	16.0A
Connection Type	(36) IEC 320 C13; (6) IEC 320 C19

Physical

Dimensions (H × W × D)	
PDU	70 × 2.2 × 1.73 in (1778 × 56 × 44 mm)
Shipping	84 × 6 × 5 in (2134 × 152 × 127 mm)
Weight	
PDU	12lb (5.5 kg)
Shipping	14lb (6.4 kg)
Warranty	2 years repair or replace

Environmental

Temperature	
Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals

FCC Part 15 Class A, UL 60950 Listed, CSA22.2 No. 60950-00

AP7630**Product Overview**

Description	APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power outlets to rack-mount equipment. Horizontal and vertical units are available as well as a variety of power inputs and outputs to fit most power environments. APC now offers Basic Rack PDUs that are InfraStruXure Certified and mount vertically, without tools in the rear channel of a NetShelter VX.
Features	Low cost power distribution; toolless mounting capabilities; vertical mounting capabilities
Includes	Installation Guide, Rack Mounting Brackets, Toolless Mounting Kit

Electrical

Input

Nominal Voltage	200, 208, 240V
Frequency	50/60Hz
Connection Type	NEMA L6-30P (30A Twist-Lock)
Cord Length	28 ft (8.53m)
Acceptable Input Voltage	200–240VAC
Max. Line Current	24.0A per phase
Max. Input Current	24.0A per phase
Load Capacity	4992

Output

Max. Total Current Draw	24.0A per phase
Connection Type	(4) NEMA L6-20R; (1) NEMA L6-30R
Overload Protection	Yes

Physical

Dimensions (H × W × D)

PDU	2.45 × 17.12 × 5.11 in (62 × 435 × 130mm)
Shipping	8.5 × 22.0 × 10.5 in (216 × 56 × 267mm)

Weight

PDU	12.0lb (5.45kg)
Shipping	19.4lb (8.82kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, cUL Listed, UL 1778 Listed
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Single-Branch, Metered, Rack PDUs

AP7622

Product Overview

Description	APC's Metered Rack Power Distribution Units (PDUs) provide power distribution as well as equip on-site installers with the ability to monitor the aggregate current draw as equipment is connected to the unit. These Metered Rack PDUs also have alarm thresholds that when exceeded provide alarms to alert users of potential problems. These features help eliminate the possibility of an overloaded circuit.
Features	Alarm thresholds, toolless mounting capabilities, vertical mounting , Local Current Monitoring display, remote management capabilities
Includes	Installation guide, toolless mounting kit, user manual, vertical mounting brackets

Electrical

Input

Nominal Voltage	208 V
Frequency	50/60Hz
Connection Type	NEMA L6-20P (20A Twist-Lock)
Cord Length	10 ft (3.05 m)
Acceptable Voltage	200–250 VAC
Max. Line Current	16.0 A per phase
Max. Input Current	16.0 A per phase
Load Capacity	3328

Output

Voltage	208 V (main only)
Max. Total Current Draw	16.0 A per phase
Connection Type	(6) NEMA L6-20R
Always on Outlets	6
Overload Protection	No

Physical

Dimensions (H×W×D)

PDU	48 × 3.5 × 1.75 in (1219 × 89 × 44 mm)
Shipping	60 × 5.0 × 3.75 in (1524 × 127 × 95 mm)

Weight

PDU	14 lb (6.4 kg)
Shipping	15.5 lb (7.0 kg)

Physical

Warranty 2 years repair or replace

Environmental

Temperature

Operating 32 to 113°F (0 to 45°C)

Storage -13 to 149°F(-25 to 65°C)

Humidity

Operating 0-95%, non-condensing

Storage 0-95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, UL 60950 Listed, CSA 22.2 No. 60950-00

AP7830**Product Overview**

Description	APC's Metered Rack Power Distribution Units (PDUs) provide power distribution as well as equip on-site installers with the ability to monitor the aggregate current draw as equipment is connected to the unit. These Metered Rack PDUs also have alarm thresholds that when exceeded provide alarms to alert users of potential problems. These features help eliminate the possibility of an overloaded circuit.
Features	Alarm thresholds, toolless mounting capabilities, vertical mounting , Local Current Monitoring display, remote management capabilities
Includes	Installation guide, toolless mounting kit, user manual, vertical mounting brackets

Electrical

Input

Nominal Voltage	120 V
Frequency	50/60Hz
Connection Type	NEMA L5-20P (20A Twist-Lock)
Cord Length	10ft (3.05m)
Max. Input Current	20.0A per phase
Load Capacity	2400

Output

Voltage	120 V (main only)
Max. Total Current Draw	20.0A per phase
Connection Type	(24) NEMA 5-20R

Physical

Dimensions (H × W × D)

PDU	63.75 × 2.19 × 1.73 in (1619 × 56 × 44mm)
Shipping	84.00 × 6.00 × 5.00 in (2134 × 152 × 127mm)

Weight

PDU	15.0lb (6.82kg)
Shipping	17.0lb (7.73kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, UL60950, cUL Recognized

AP7840**Product Overview**

Description	APC's Metered Rack Power Distribution Units (PDUs) provide power distribution as well as equip on-site installers with the ability to monitor the aggregate current draw as equipment is connected to the unit. These Metered Rack PDUs also have alarm thresholds that when exceeded provide alarms to alert users of potential problems. These features help eliminate the possibility of an overloaded circuit.
Features	Alarm thresholds, toolless mounting capabilities, vertical mounting , Local Current Monitoring display, remote management capabilities
Includes	Installation guide, toolless mounting kit, user manual, vertical mounting brackets

Electrical

Input

Nominal Voltage	208 V
Frequency	50/60Hz
Connection Type	NEMA L6-20P (20A Twist-Lock)
Cord Length	10ft (3.05m)
Max. Input Current	20.0A per phase
Load Capacity	4160

Output

Voltage	208 V (main only)
Max. Total Current Draw	20.0A per phase
Connection Type	(20) IEC 320 C13; (4) IEC 320 C19

Physical

Dimensions (H × W × D)

PDU	63.75 × 2.19 × 1.73 in (1619 × 56 × 44mm)
Shipping	84.00 × 6.00 × 5.00 in (2134 × 152 × 127mm)

Weight

PDU	10.0lb (4.55 kg)
Shipping	17.0lb (7.73 kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, UL60950, cUL Recognized

Multi-Branch, Metered, Rack PDUs

AP7610

Product Overview

Description	APC's Metered Rack Power Distribution Units (PDUs) provide power distribution as well as equip on-site installers with the ability to monitor the aggregate current draw as equipment is connected to the unit. These Metered Rack PDUs also have alarm thresholds that when exceeded provide alarms to alert users of potential problems. These features help eliminate the possibility of an overloaded circuit.
Features	19-inch rack-mountable, alarm thresholds, information displays, multi-branch power input
Includes	User manual

Electrical

Input

Nominal Voltage	208 V (3PH)
Connection Type	NEMA L21-20
Cord Length	3 ft (0.91 m)
Acceptable Voltage	100–125/ 200–250 VAC
Max. Input Current	16.0 A per phase
Load Capacity	5700

Output

Voltage	120, 208 V (main only)
Max. Total Current Draw	16.0 A per phase
Connection Type	(3) NEMA L5-20R; (3) NEMA L6-20R
Always on Outlets	6

Physical

Dimensions (H × W × D)

PDU	3.5 × 17.6 × 6 in (89 × 447 × 152 mm)
Shipping	7.75 × 21 × 9.25 in (197 × 533 × 235 mm)

Weight

PDU	7.85 lb (3.57 kg)
Shipping	10.5 lb (4.77 kg)

Warranty	2 years repair or replace.
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Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, UL1950, UL60950, CSA 22.2 No. 950-00, CSA 22.2 No. 60950-00
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AP7862**Product Overview**

Description	APC's Metered Rack Power Distribution Units (PDUs) provide power distribution as well as equip on-site installers with the ability to monitor the aggregate current draw as equipment is connected to the unit. These Metered Rack PDUs also have alarm thresholds that when exceeded provide alarms to alert users of potential problems. These features help eliminate the possibility of an overloaded circuit.
Features	19-inch rack-mountable, alarm thresholds, information displays, multi-branch power input
Includes	User manual

Electrical

Input

Nominal Voltage	208 V (3PH)
Frequency	50/60Hz
Connection Type	NEMA L21-20
Cord Length	3 ft (0.91 m)
Max. Input Current	16.0 A per phase
Load Capacity	5700

Output

Voltage	120 V (main only)
Max. Total Current Draw	16.0 A per phase
Connection Type	(42) NEMA 5-20R

Physical

Dimensions (H × W × D)

PDU	70.0 × 2.19 × 1.73 in (1778 × 46 × 44 mm)
Shipping	84.0 × 6.00 × 5.00 in (2134 × 152 × 127 mm)

Weight

PDU	12.0 lb (5.45 kg)
Shipping	19.5 lb (8.86 kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, UL 60950, CSA 22.2 No. 60950-00
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AP7863**Product Overview**

Description	APC's Metered Rack Power Distribution Units (PDUs) provide power distribution as well as equip on-site installers with the ability to monitor the aggregate current draw as equipment is connected to the unit. These Metered Rack PDUs also have alarm thresholds that when exceeded provide alarms to alert users of potential problems. These features help eliminate the possibility of an overloaded circuit.
Features	19-inch rack-mountable, alarm thresholds, information displays, multi-branch power input
Includes	User manual

Electrical

Input

Nominal Voltage	208 V (3PH)
Frequency	50/60Hz
Connection Type	NEMA L21-20
Cord Length	3 ft (0.91 m)
Max. Input Current	16.0 A per phase
Load Capacity	5700

Output

Voltage	120, 208 V (main only)
Max. Total Current Draw	16.0 A per phase
Connection Type	(21) NEMA 5-20R; (6) NEMA L6-20R

Physical

Dimensions (H × W × D)

PDU	70.0 × 2.19 × 1.73 in (1778 × 46 × 44 mm)
Shipping	84.0 × 6.00 × 5.00 in (2134 × 152 × 127 mm)

Weight

PDU	12.0 lb (5.45 kg)
Shipping	19.5 lb (8.86 kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating 32 to 113°F (0 to 45°C)

Storage -13 to 149°F(-25 to 65°C)

Humidity

Operating 0-95%, non-condensing

Storage 0-95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals

FCC Part 15 Class A, UL 60950, CSA 22.2 No. 60950-00

AP7864**Product Overview**

Description	APC's Metered Rack Power Distribution Units (PDUs) provide power distribution as well as equip on-site installers with the ability to monitor the aggregate current draw as equipment is connected to the unit. These Metered Rack PDUs also have alarm thresholds that when exceeded provide alarms to alert users of potential problems. These features help eliminate the possibility of an overloaded circuit.
Features	19-inch rack-mountable, alarm thresholds, information displays, multi-branch power input
Includes	User manual

Electrical

Input

Nominal Voltage	208 V (3PH)
Frequency	50/60Hz
Connection Type	NEMA L21-20
Cord Length	3 ft (0.91 m)
Max. Input Current	16.0 A per phase
Load Capacity	5700

Output

Voltage	208 V(main only)
Max. Total Current Draw	16.0 A per phase
Connections	(36) IEC 320 C13; (6) IEC 320 C19

Physical

Dimensions (H × W × D)

PDU	70.0 × 2.19 × 1.73 in (1778 × 46 × 44 mm)
Shipping	84.0 × 6.00 × 5.00 in (2134 × 152 × 127 mm)

Weight

PDU	12.0 lb (5.45 kg)
Shipping	19.5 lb (8.86 kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, UL 60950, CSA 22.2 No. 60950-00

Single-Branch, Switched, Rack PDUs

AP7900

Product Overview

Description	APC's Switched Rack Power Distribution Units (PDUs) are premium solutions to many of the power management problems seen in today's IT environments. Some of the problems are unauthorized use of power outlets, locked-up equipment, in-rush current, overloaded circuits and the need for remote access to power outlets in the rack. The Switched Rack PDU addresses these problems through individual outlet control, power on and off delays, current monitoring, alarm thresholds, and network management.
Features	19-inch rack-mountable, alarm thresholds, definable outlet control, flash upgradeable, power sequencing, remote management capabilities, local current monitoring display, power delays, remote current monitoring, remote individual outlet control
Includes	Installation Guide, rack-mount brackets, user manual

Electrical

Input	
Nominal Voltage	120 V
Frequency	50/60Hz
Connection Type	NEMA 5-15P
Output	
Voltage	120 V (main only)
Max. Total Current	15.0 A per phase
Connection Type	(8) NEMA 5-15 R

Physical

Dimensions (H × W × D)	
PDU	1.73 × 17.5 × 4.25 in (44 × 445 × 108 mm)
Shipping	2.75 × 18.5 × 13.5 in (70 × 470 × 343 mm)
Weight	
PDU	5 lb (2.26 kg)
Shipping	7.6 lb (3.4 kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating 32 to 113°F (0 to 45°C)

Storage -13 to 149°F(-25 to 65°C)

Humidity

Operating 0-95%, non-condensing

Storage 0-95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, UL 60950, CSA 22.2 No. 60950-00

AP7901**Product Overview**

Description	APC's Switched Rack Power Distribution Units (PDUs) are premium solutions to many of the power management problems seen in today's IT environments. Some of the problems are unauthorized use of power outlets, locked-up equipment, in-rush current, overloaded circuits and the need for remote access to power outlets in the rack. The Switched Rack PDU addresses these problems through individual outlet control, power on and off delays, current monitoring, alarm thresholds, and network management.
Features	19-inch rack-mountable, alarm thresholds, definable outlet control, flash upgradeable, power sequencing, remote management capabilities, local current monitoring display, power delays, remote current monitoring, remote individual outlet control
Includes	Installation Guide, rack-mount brackets, user manual

Electrical

Input	
Nominal Voltage	120V
Frequency	50/60Hz
Connection Type	NEMA L5-20P (20A Twist-Lock)
Cord Length	12 ft (3.66m)
Max. Input Current	20.0A per phase
Load Capacity	2400
Output	
Max. Total Current Draw	20.0A per phase
Connection Type	(8) NEMA 5-20R

Physical

Dimensions (H × W × D)	
PDU	1.73 × 17.5 × 4.25 in (44 × 445 × 108 mm)
Shipping	2.75 × 18.5 × 13.5 in (70 × 470 × 343 mm)
Weight	
PDU	5.0 lb (2.3 kg)
Shipping	7.6 lb (3.4 kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating 32 to 113°F (0 to 45°C)

Storage -13 to 149°F(-25 to 65°C)

Humidity

Operating 0-95%, non-condensing

Storage 0-95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, UL 60950, CSA 22.2 No. 60950-00

AP7920**Product Overview**

Description	APC's Switched Rack Power Distribution Units (PDUs) are premium solutions to many of the power management problems seen in today's IT environments. Some of the problems are unauthorized use of power outlets, locked-up equipment, in-rush current, overloaded circuits and the need for remote access to power outlets in the rack. The Switched Rack PDU addresses these problems through individual outlet control, power on and off delays, current monitoring, alarm thresholds, and network management.
Features	19-inch rack-mountable, alarm thresholds, definable outlet control, flash upgradeable, power sequencing, remote management capabilities, local current monitoring display, power delays, remote current monitoring, remote individual outlet control
Includes	Installation Guide, rack-mount brackets, user manual

Electrical

Input	
Nominal Voltage	208, 230V
Frequency	50/60Hz
Connection Type	IEC 320 C14
Cord Length	6.5 ft (1.98m)
Max. Input Current	12.0A per phase
Load Capacity	2760
Output	
Voltage	208, 230V (main only)
Max. Total Current Draw	12.0A per phase
Connection Type	(8) IEC 320 C13

Physical

Dimensions (H × W × D)	
PDU	1.73 × 18 × 4.2in (44 × 445 × 108mm)
Shipping	2.8 × 19 × 14in (70 × 470 × 343mm)
Weight	
PDU	5.0lb (2.27kg)
Shipping	7.6lb (3.45kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating 32 to 113°F (0 to 45°C)

Storage -13 to 149°F(-25 to 65°C)

Humidity

Operating 0-95%, non-condensing

Storage 0-95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals FCC Part 15 Class A, UL 60950, CSA 22.2 No. 60950-00

AP7921**Product Overview**

Description	APC's Switched Rack Power Distribution Units (PDUs) are premium solutions to many of the power management problems seen in today's IT environments. Some of the problems are unauthorized use of power outlets, locked-up equipment, in-rush current, overloaded circuits and the need for remote access to power outlets in the rack. The Switched Rack PDU addresses these problems through individual outlet control, power on and off delays, current monitoring, alarm thresholds, and network management.
Features	19-inch rack-mountable, alarm thresholds, definable outlet control, flash upgradeable, power sequencing, remote management capabilities, local current monitoring display, power delays, remote current monitoring, remote individual outlet control
Includes	Installation Guide, rack-mount brackets, user manual

Electrical

Input	
Nominal Voltage	208, 230 V
Frequency	50/60 Hz
Connection Type	IEC 320 C20
Cord Length	8.2 ft (2.5 m)
Max. Input Current	16.0 A per phase
Output	
Voltage	208, 230 V (main only)
Max. Total Current Draw	16.0 A per phase
Connection Type	(8) IEC 320 C13

Physical

Dimensions (H × W × D)	
PDU	1.73 × 18 × 4.2 in (44 × 445 × 108 mm)
Shipping	2.8 × 18.5 × 13.5 in (70 × 470 × 343 mm)
Weight	
PDU	5.0 lb (2.27 kg)
Shipping	7.6 lb (3.45 kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, UL 60950, CSA 22.2 60950-00
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AP7930**Product Overview**

Description	APC's Switched Rack Power Distribution Units (PDUs) are premium solutions to many of the power management problems seen in today's IT environments. Some of the problems are unauthorized use of power outlets, locked-up equipment, in-rush current, overloaded circuits and the need for remote access to power outlets in the rack. The Switched Rack PDU addresses these problems through individual outlet control, power on and off delays, current monitoring, alarm thresholds, and network management.
Features	19-inch rack-mountable, alarm thresholds, definable outlet control, flash upgradeable, power sequencing, remote management capabilities, local current monitoring display, power delays, remote current monitoring, remote individual outlet control
Includes	Installation Guide, rack-mount brackets, user manual

Electrical

Input	
Nominal Voltage	120V
Frequency	47–63, 50/60Hz
Connection Type	NEMA L5-20P
Cord Length	10ft (3.7m)
Acceptable Input Voltage	100–120VAC
Max. Line Current	20A per phase
Output	
Nominal Voltage	120V
Max. Total Current Draw	20A per phase
Connection Type	(24) NEMA 5-20R
Overload Protection	No

Physical

Dimensions (H × W × D)	
PDU	63.75 × 2.19 × 4.39 in (1619 × 55.6 × 111.5mm)
Shipping	84 × 6 × 5 in (2130 × 150 × 130 mm)
Weight	
PDU	13lb (6kg)
Shipping	15lb (7kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, UL 60950, CSA 22.2 60950-00
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AP7940**Product Overview**

Description	APC's Switched Rack Power Distribution Units (PDUs) are premium solutions to many of the power management problems seen in today's IT environments. Some of the problems are unauthorized use of power outlets, locked-up equipment, in-rush current, overloaded circuits and the need for remote access to power outlets in the rack. The Switched Rack PDU addresses these problems through individual outlet control, power on and off delays, current monitoring, alarm thresholds, and network management.
Features	19-inch rack-mountable, alarm thresholds, definable outlet control, flash upgradeable, power sequencing, remote management capabilities, local current monitoring display, power delays, remote current monitoring, remote individual outlet control
Includes	Installation Guide, rack-mount brackets, user manual

Electrical

Input	
Nominal Voltage	208 V
Frequency	47–63 Hz
Connection Type	NEMA L6-20P
Cord Length	10 ft (3.6 m)
Acceptable Input Voltage	200–250 VAC
Max. Line Current	20 A per phase
Max. Input Current	20 A per phase
Output	
Nominal Voltage	208 V
Max. Total Current Draw	20 A per phase
Connection Type	(21) IEC 320 C13 (3) IEC 320 C19
Overload Protection	No

Physical

Dimensions (H × W × D)	
PDU	63.75 × 2.19 × 1.73 in (1619 × 56 × 44 mm)
Shipping	
Weight	84.00 × 6.00 × 5.00 in (2134 × 152 × 127 mm)
PDU	13.0 lb (5.9 kg)
Shipping	15.0 lb (6.8 kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, UL 60950, CSA 22.2 60950-00
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Multi-Branch, Switched, Rack PDU

AP7960

Product Overview

Description	APC's Switched Rack Power Distribution Units (PDUs) are premium solutions to many of the power management problems seen in today's IT environments. Some of the problems are unauthorized use of power outlets, locked-up equipment, in-rush current, overloaded circuits and the need for remote access to power outlets in the rack. The Switched Rack PDU addresses these problems through individual outlet control, power on and off delays, current monitoring, alarm thresholds, and network management.
Features	19-inch rack-mountable, alarm thresholds, definable outlet control, flash upgradeable, power sequencing, remote management capabilities, local current monitoring display, power delays, remote current monitoring, remote individual outlet control
Includes	Installation Guide, rack-mount brackets, user manual

Electrical

Input

Nominal Voltage	208 V (3PH)
Frequency	50/60Hz
Connection Type	NEMA L21-20
Cord Length	3 ft (0.91 m)
Max. Input Current	16.0 A per phase
Load Capacity	5700

Output

Voltage	120 V (main only)
Max. Total Current Draw	16.0 A per phase
Connection Type	(24) NEMA 5-20R

Physical

Dimensions (H × W × D)

PDU	63.75 × 2.19 × 1.73 in (1619 × 56 × 44 mm)
Shipping	84 × 6 × 5 in (2134 × 152 × 127 mm)

Weight

PDU	13 lb (5.9 kg)
Shipping	15 lb (6.8 kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, UL 60950, CSA 22.2 No. 60950-00
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AP7961**Product Overview**

Description	APC's Switched Rack Power Distribution Units (PDUs) are premium solutions to many of the power management problems seen in today's IT environments. Some of the problems are unauthorized use of power outlets, locked-up equipment, in-rush current, overloaded circuits and the need for remote access to power outlets in the rack. The Switched Rack PDU addresses these problems through individual outlet control, power on and off delays, current monitoring, alarm thresholds, and network management.
Features	19-inch rack-mountable, alarm thresholds, definable outlet control, flash upgradeable, power sequencing, remote management capabilities, local current monitoring display, power delays, remote current monitoring, remote individual outlet control
Includes	Installation Guide, rack-mount brackets, user manual

Electrical

Input	
Nominal Voltage	208 V (3PH)
Frequency	50/60Hz
Connection Type	NEMA L21-20
Cord Length	3 ft (0.91 m)
Max. Input Current	16.0 A per phase
Load Capacity	5700
Output	
Voltage	208 V (main only)
Max. Total Current Draw	16.0 A per phase
Connection Type	(21) IEC 320 C13; (3) IEC 320 C19

Physical

Dimensions (H × W × D)	
Unit	63.75 × 2.19 × 1.73 in (1619 × 56 × 44 mm)
Shipping	84.00 × 6.00 × 5.00 in (2134 × 152 × 127 mm)
Weight	
Unit	13.0 lb (5.91 kg)
Shipping	15.0 lb (6.82 kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating	32 to 113°F (0 to 45°C)
Storage	-13 to 149°F(-25 to 65°C)

Humidity

Operating	0-95%, non-condensing
Storage	0-95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000ft (0 to 15 000m)

Compliance

Approvals	FCC Part 15 Class A, UL 60950, CSA 22.2 No. 60950-00
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Power

Symmetra RM UPS

SYH2K6RM, SYH6K6RMT, SYH2K6RMT-P1, SYH4K6RMT-P1, SYH6K6RMT-P, SYH2K6RMT-TF3, SYH4K6RMT-TF3, SYH6K6RMT-TF3

Product Overview

Description	Symmetra's modular design provides redundancy, scalability, manageability, and serviceability, delivering high availability power protection. Symmetra is ideal for protecting small data centers, network rooms, enterprise IT equipment, PBX, and industrial applications. Symmetra is available as rack-optimized 2–6kVA and 4–12kVA systems and tower 4–8kVA and 4–16kVA systems.
Features	Audible Alarms, Automatic Self Test, battery modules connected in parallel, built-in automatic bypass, built-in manual bypass, built-in SmartSlot, built-in Web/SNMP management, double conversion on-line, EPO, hot swap batteries, hot swap electronics, input power factor correction, intelligent battery management, LCD alphanumeric display, N+1 redundancy, overload indicator, rack mount, replace battery indicator, scalable power capacity, scalable run time, software, user replaceable batteries, wide input voltage range
Includes	CD with software, Rack Mounting Brackets, Rack Mounting Support Rails, User Manual

Performance

Recovery Time	0 milliseconds
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Electrical	SYH2K6RMT	SYH6K6RMT	SYH2K6RMT-P1/ STH2K6RMT-TF3	SYH4K6RMT-P1/ SYH4K6RMT-TF3	SYH6K6RMT-P1/ SYH6K6RMT-TF3
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Input

Bypass	Internal Bypass (Automatic and Manual)
Nominal Voltage	208 V
Frequency	50/60 Hz ± 5 Hz (auto sensing)
Connection Type	NEMA L6-30P (30A Twist-Lock); Hard Wire 3-wire (1PH + 1PH + G)
Cord Length	6 ft (1.83 m)
Voltage Range	155 to 276 V (for main operations)

Output

Power Capacity	2000 VA	6000 VA	2000 VA	4000 VA	6000 VA
Power Capacity (kW)	1.4 to 4.2kW				
Max. Configurable Power	6000 VA/ 4200 W				
Nominal Voltage	208 V	208 V	120, 208 V	120, 208 V	120, 208 V
Frequency	57 to 63 Hz for 60 Hz nominal				
Voltage Distortion	< 5% at full load				
Crest Factor	up to 5:1				
Waveform Type	Sinewave				
Connection Type(s)	(2) NEMA L6-20R, (1) NEMA L6-30R		(12) NEMA 5-20R; (2) NEMA L6-20R		

Battery

Battery Type	Maintenance-free sealed lead-acid battery with suspended electrolytes
Replacement Cartridge	SYBT2
Battery Charger	Automatic float, equalize high frequency PWM charger
Battery Recharge Time	< 4 hours with standard supplied packs in the frame
Extended Battery Option	Yes

Communication and Management

Interface Port	DB-9 RS-232, RJ-45 10 Base-T Ethernet for Web/SNMP/Telnet Management
Available SmartSlot Interface Quantity	Two
Pre-Installed SmartSlot Cards	AP9617
Control Panel	Multi-function LCD status and control console
Audible Alarm	Alarm when on battery, distinctive low battery alarm, configurable delays
Emergency Power Off	Yes
Included Software	PowerChute Symmetra Bundle

Physical **SYH2K6RMT** **SYH6K6RMT** **SYH2K6RMT-P1/ STH2K6RMT-TF3** **SYH4K6RMT-P1/ SYH4K6RMT-TF3** **SYH6K6RMT-P1/ SYH6K6RMT-TF3**

Dimensions (H × W × D)					
UPS	14 × 19 × 28.75 in (356 × 483 × 730 mm)		18 × 19 × 29 in (457 × 483 × 737mm)		
Shipping	20 × 23 × 31 in (508 × 584 × 787mm)		20 × 23 × 31 in (508 × 584 × 787mm)		
Weight					
UPS	164lb (74.5kg)	294lb (134kg)	259lb (118kg)	324lb (147kg)	389lb (177kg)
Shipping	185lb (84.1kg)	327lb (149kg)	295lb (134kg)	366lb (166kg)	437lb (199kg)
Warranty	2 years repair or replace, optional on-site and extended warranties available				

Environmental **SYH2K6RMT** **SYH6K6RMT** **SYH2K6RMT-P1/ STH2K6RMT-TF3** **SYH4K6RMT-P1/ SYH4K6RMT-TF3** **SYH6K6RMT-P1/ SYH6K6RMT-TF3**

Temperature					
Operating	32 to 104° F (0 to 40° C)				
Storage	5 to 113° F (-15 to 45° C)				
Humidity					
Operating	0–95%, non-condensing				
Storage	0–95%, non-condensing				
Elevation					
Operating	0 to 10 000 ft (0 to 3000m)				
Storage	0 to 50 000 ft (0 to 15 000m)				
Audible Noise	<62dBA				
Online Thermal Dissipation	430BTU/hr	1,771BTU/hr	843BTU/hr	1,686BTU/hr	2,529BTU/hr

Compliance

Approvals	CSA 107.1, FCC Part 15 Class A, UL 1778
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Options

Automatic Transfer Switches	SU045-1, SU045X163
Batteries	SYBT2, SYRMXR2B4, SYRMXR4B4
Battery Cables	SY0PT3, SY0PT4
Hard Wire Kits	SYPD6
Internal Back Plate Kits	SYPD7
Management Devices	AP9600, AP9604, AP9608, AP9610, AP9612TH, AP9617, AP9618, AP9618U, AP9619, AP9619U
Outlet Strips	AP7540, AP7622, AP7840, AP9510L620, AP9561, AP9566, AP9570, AP9886
Mounting Kits	SY0PT1, SY0PT11, SY0PT2
Power Cords	AP9871, SU052-1, SU052-2
Power Modules	SYPM2KU
Service Bypass Panels	SYP6KRMT2U
Services	SYXR41RFSH, SYXR4RFSH, WASSEMUPS-3R-SY-00, WEXTWAR14R-SY-12, WEXTWAR3YR-SY-12, WMT-SY, WONSITE4HR-SY-12, WONSITEBE-SY-12, WONSITENBD-SY-12, WONSITEND-SY-12, WPMV5X8-SY-12, WPMV7X24-SY-12, WSTRTUP5X8-SY-12, WSTRTUP7X24-SY-12, WUPGONSITEFW-SY-12
Software	AP9013, AP9401, AP9420, AP9420U, AP9421, AP9421U, AP9422, AP9423, AP9423U
Step Down Transformers	SURT004, SUTF3, SYTF2, SYTF2J, SYTF2X215, SYTF3, SYTF3J, SYTF4

SYP8K12RMT, SYP12K12RMT, SYP8K12RMT-P1, SYP12K12RMT-P1, SYP8K12RMT-2TF3, SYP12K12RMT-2TF3

Product Overview

Description	Symmetra’s modular design provides redundancy, scalability, manageability, and serviceability, delivering high availability power protection. Symmetra is ideal for protecting small data centers, network rooms, enterprise IT equipment, PBX, and industrial applications. Symmetra is available as rack-optimized 2–6kVA and 4–12kVA systems and tower 4–8kVA and 4–16kVA systems.
Features	Audible Alarms, Automatic Self Test, battery modules connected in parallel, built-in automatic bypass, built-in manual bypass, built-in SmartSlot, built-in Web/SNMP management, double conversion on-line, EPO, hot swap batteries, hot swap electronics, input power factor correction, intelligent battery management, LCD alphanumeric display, N+1 redundancy, overload indicator, rack mount, replace battery indicator, scalable power capacity, scalable run time, software, user replaceable batteries, wide input voltage range
Includes	CD with software, Rack Mounting Brackets, Rack Mounting Support Rails, User Manual

Performance

Recovery Time	< 10 milliseconds (i.e. half cycle to steady state)
Load Crest Factor Supported	< 5% for 100% non-linear loads up to 5:1
Overload Capacity	130% for 10 minutes with N + 1

Electrical	SYP8K12RMT	SYP12K12RMT	SYP8K12RMT-P1	SYP12K12RMT-P1	SYP8K12RMT-2TF3/ SYP12K12RMT-2TF3
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Input					
Bypass	Internal Bypass (Automatic and Manual)				
Nominal Voltage	200, 208, 220, 230, 240V				
Frequency	50/60 Hz ± 5 Hz (manual switch)				
Connection Type	Hard Wire 3 wire (1PH+1PH+G)				
Voltage Range	155 to 276 V				
Power Factor	Approximately 0.98% at full load				
Current THD	Approximately 6% at full load				
Inrush Current	Maximum 150% of full load current				
Generator Sizing	1.5 × UPS capacity				
Output					
Power Capacity	8,000 VA	12,000 VA	8,000 VA	12,000 VA	8,000 VA/ 12,000 VA
Power Capacity	5.6kW	8.4kW	5.6kW	8.4kW	5.6kW/ 8.4kW
Max. Config. Power	12 000 VA/ 8400 W				
Nominal Voltage	Configurable for 208 or 240V	120, 208V	120, 208V	120, 208V	120, 208V
Frequency	57 to 63 Hz for 60 Hz nominal				
Voltage Distortion	< 5% at full load				
Crest Factor	up to 5:1				
Waveform Type	Sinewave				

Electrical	SYP8K12RMT	SYP12K12RMT	SYP8K12RMT-P1	SYP12K12RMT-P1	SYP8K12RMT-2TF3/ SYP12K12RMT-2TF3
Connection Type(s)	(6)NEMA L6-20R (3)NEMA L6-30R (1)Hard Wire 3-wire		(12) NEMA 5-20R (6) NEMA L6-20R (2) NEMA L6-30R (1) Hard Wire 3-wire		(8) NEMA L5-20R (6) NEMA L6-20R (1) NEMA L6-30R (1) Hard Wire 3-wire
Voltage Regulation	<± 3% for no load to full load, minimum AC input to maximum AC, minimum DC to maximum DC, linear or non-linear load or any combination (Steady State)				
Voltage Regulation	<± 5% for 100% load application or removal, linear or non-linear load (Transient State)				
THD	< 2% for linear loads; < 5% for non-linear loads				

Battery

Type	Maintenance-free sealed lead-acid battery with suspended electrolytes
Replacement Cartridge	SYBT3
Charger	Automatic float, equalize high frequency PWM charger
Recharge Time	< 4 hours with standard supplied packs in the frame
Extended Option	Yes

Communication and Management

Pre-Installed SmartSlot Cards	AP9617
Control Panel	Multi-function LCD status and control console
Audible Alarm	Alarm when on battery, distinctive low battery alarm, configurable delays
Emergency Power Off	Yes
Included Software	PowerChute Symmetra Bundle

Physical	SYP8K12RMT	SYP12K12RMT	SYP8K12RMT-P1	SYP12K12RMT-P1	SYP8K12RMT-2TF3/ SYP12K12RMT-2TF3
Dimensions (H × W × D)					
UPS	26 × 19 × 29 in (670 × 480 × 740 mm)		30 × 19 × 29 in (760 × 480 × 740 mm)		
Weight					
UPS	358 lb (163 kg)	452 lb (205 kg)	453 lb (206 kg)	547 lb (249 kg)	548 lb (249 kg)/ 642 lb (292 kg)
Shipping	398 lb (181 kg)	492 lb (224 kg)	503 lb (229 kg)	597 lb (271 kg)	613 lb (279 kg)/ 692 lb (315 kg)
Warranty	2 years repair or replace, optional on-site and extended warranties available				

Compliance

Approvals	CSA 107.1, FCC Part 15 Class A, UL 1778
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Options

Automatic Transfer Switches	SU045-1, SU045X163
Batteries	SYPT3, SYRMXR2B4, SYRMXR4B4
Battery Cables	SYOPT3, SYOPT4
Internal Back Plate Kit	SYPD7
Management Devices	AP9600, AP9604, AP9608, AP9610, AP9612TH, AP9617, AP9618U, AP9619U
Outlet Strips	AP7540, AP7622, AP7630, AP7840, AP9510L620, AP9561, AP9566, AP9570, AP9886
Mounting Kits	SYOPT11
Power Cords	AP9871, SU052-1, SU052-2
Power Modules	SYPM4KU
Service Bypass Panels	SBP16KP
Services	SY12KIRFSH, SY12KRFSH, SY6KIRFSH, SY16K NIRFSH, SY16KNRFSH, SY16KRFSH, WASSEMUPS-3R-SY-00, WEXTWAR1YR-SY-15, WEXTWAR3YR-SY-15, WMT-SY, WONSITE4HR-SY-15, WONSITEBE-SY-15, WONSITENBD-SY-15, WONSITEND-SY-15, WPMV5X8-SY-15, WSTRTUP5X8-SY-15, WSTRTUP7X24-SY-15, WUPGONSITEFW-SY-15
Software	AP9013, AP9420, AP9420U, AP9421, AP9421U, AP9422, AP9423, AP9423U
Step Down Transformers	SURT004, SUTF3, SYTF2, SYTF2X215, SYTF3, STYF3J, SYTF4

Smart-UPS

SU5000R5T-TF3

Product Overview

Description	APC Smart-UPS [®] protects your data by supplying reliable, network-grade power in either traditional Tower or Rack-optimized form factors for space constrained business critical applications. Award winning APC Smart-UPS [®] is the perfect UPS for protecting business critical file servers (Intel or UNIX based), minicomputers, network switches and hubs, Point of Sale, retail/bank back office and ATM's. Rack Mount versions are the choice for rack optimized servers, server appliances, blade servers, other blade devices and rack-mounted network switches and hubs.
Features	Automatic self test; Automatic Voltage Regulation (AVR); built-in SmartSlot; hot swap batteries; intelligent battery management; load meter; network-grade line conditioning; overload indicator; rack mount; replace battery indicator; sine-wave output; software; status indicator LED's; USB connectivity; user replaceable batteries; wide input voltage range; EPO; web management
Includes	CD with software; rack mounting support rails; Smart UPS signalling RS-232 cable; USB cable; user manual

Electrical

Input

Nominal voltage	208 V
Frequency	50/60Hz ±5Hz autosensing
Connection type	NEMA L6-30P
Cord length	8 feet (2.44m)
Voltage range for main operations	157–255 V
Voltage adjustable range for main op.	151–268 V

Output

Power capacity	4500 VA/3375 Watts
Nominal voltage	120,208 V
Connections	(2) NEMA 5-15R (4) NEMA L5-20R (2) NEMA L6-20R

Battery

Type	Maintenance free sealed Lead Acid battery with suspended electrolyte, leakproof
Replacement battery cartridge	(2) RBC12

Communication and Management

Interface port	DB-9 RS-232, RJ-45 10/100 Base-T, SmartSlot
Available SmartSlot interface qty.	1
Pre-installed SmartSlot cards	AP9617
Control panel	LED status display with load and battery bar graphs and on line, on battery, replace battery, and overload indicators
Audible alarm	Alarm when on battery, distinctive low battery alarm, configurable delays
Emergency Power Off (EPO)	optional
Included software	PowerChute Smart-UPS Bundle

Physical

Dimensions (H × W × D)	
Smart-UPS	127 × 432 × 660mm (5 × 17 × 26in)
Shipping	356 × 610 × 991 mm (14 × 24 × 39 in)
Weight	
Smart-UPS	55kg
Shipping	64kg
Warranty	2 years repair or replace, optional on-site warranties available, optional extended warranties available

Environmental

Temperature	
Operating	0 to 40 °C
Storage	-20 to 50 °C
Humidity	
Operating	0 to 95%, non-condensing
Storage	0 to 95%, non-condensing
Elevation	
Operating	0 to 3000m
Storage	0 to 15 000m

Compliance

Approvals	CSA, FCC Part 15 Class A, UL1778
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Options

Automatic Transformer Switches	SU043, SU044-1
Batteries	SURT192XLBP
Management Devices	AP9600, AP9604, AP9607CB, AP9608, AP9610, AP9612TH, AP9617, AP9618, AP9619, AP9623, AP9830
Master Switches/Outlet Strips	AP7552, AP7621, AP7852, AP7920, AP7921, AP9229, AP95103202, AP9553, AP9554, AP9559, AP9568
Mounting Kits	SURTRK2
Power Cords	AP9870, AP9871, AP9872, AP9873, AP9874, AP9875, AP9876, AP9877
Service Bypass Panels	SBP5000RMI2U
Services	EXTWAR-1Y-19, EXTPWAR-1Y-20, EXTPWAR-1Y-28, EXTPWAR-1Y-29, EXTPWAR-1Y-30, SYXR4IRFSH, SYXR4RFSH, WEXTWAR1YR-SY-12, WEXTWAR3YR-SY-12, WMT-SY, WONSITE4HR-SY-12, WONSITEBE-SY-12, WONSITENBD-SY-12, WONSITEND-SY-12, WPMV5X8-SY-12, WPMV7X24-SY-12, WSTRUP5X8-SY-12, WSTRUP7X24-SY-12, WUPGONSITEFW-SY-12
Software	AP9013, AP9409J, AP9410

SU5000R5TBX120**Product Overview**

Description	APC Smart-UPS® protects your data by supplying reliable, network-grade power in either traditional Tower or Rack-optimized form factors for space constrained business critical applications. Award winning APC Smart-UPS® is the perfect UPS for protecting business critical file servers (Intel or UNIX based), minicomputers, network switches and hubs, Point of Sale, retail/bank back office and ATM's. Rack Mount versions are the choice for rack optimized servers, server appliances, blade servers, other blade devices and rack-mounted network switches and hubs.
Features	Automatic self test; Automatic Voltage Regulation (AVR); built-in SmartSlot; hot swap batteries; intelligent battery management; load meter; network-grade line conditioning; overload indicator; rack mount; replace battery indicator; sine-wave output; software; status indicator LED's; USB connectivity; user replaceable batteries; wide input voltage range; EPO; web management
Includes	CD with software; rack mounting support rails; Smart UPS signalling RS-232 cable; USB cable; user manual

Electrical

Input

Nominal voltage	208 V
Frequency	50/60Hz ±5Hz autosensing
Connection type	NEMA L6-30P
Cord length	8 feet (2.44m)
Voltage range for main operations	157–255 V
Voltage adjustable range for main op.	151–268 V

Output

Power capacity	4500 VA/3375 Watts
Nominal voltage	120,208 V
Connections	(2) NEMA 5-15R (4) NEMA L5-20R (2) NEMA L6-20R

Battery

Type	Maintenance free sealed Lead Acid battery with suspended electrolyte, leakproof
Replacement battery cartridge	(2) RBC12

Communication and Management

Interface port	DB-9 RS-232, RJ-45 10/100 Base-T, SmartSlot
Available SmartSlot interface qty.	1
Pre-installed SmartSlot cards	AP9617
Control panel	LED status display with load and battery bar graphs and on line, on battery, replace battery, and overload indicators
Audible alarm	Alarm when on battery, distinctive low battery alarm, configurable delays
Emergency Power Off (EPO)	optional
Included software	PowerChute Smart-UPS Bundle

Physical

Dimensions (H × W × D)	
Unit	12.3 × 19.0 × 25.0in (312 × 483 × 635mm)
Shipping	25.0 × 24.0 × 30.0in (635 × 610 × 762mm)
Rack height	7U
Weight	
Unit	320lb (145.45kg)
Shipping	355lb (161.36kg)
Warranty	2 years repair or replace, optional on-site warranties available, optional extended warranties available

Environmental

Temperature	
Operating	0 to 40 °C
Storage	-20 to 50 °C
Humidity	
Operating	0 to 95%, non-condensing
Storage	0 to 95%, non-condensing
Elevation	
Operating	0 to 3000m
Storage	0 to 15 000m

Compliance

Approvals	CSA, FCC Part 15 Class A, UL1778
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Options

Automatic transformer switches	SU042X163, SU045-1
Management Devices	AP9600,AP9607CB, AP9608,AP9610, AP9612TH, AP9617, AP9618, AP9619
MasterSwitch/Outlet Strips	AP7530, AP7540, AP7622, AP7830, AP7840, AP7901, AP9228, AP9510520, AP9510L620, AP9551, AP9558, AP9564, AP9566
Mounting kits	SU032A
Power cords	AP9871, AP9874, SU052-1
Replacement battery cartridges	CURK12, CURK12X, RBC12
Service Bypass Panels	SBP5000RMT2U
Services	WEXTWAR1YR-SB-14, WEXTWAR3YR-SB-14, WMT-SB, WONSITEBE-SB-14, WONSITENBD-SB-14, WONSITEND-SB-14, WSTRTUP5X8-SB-14, WSTRTUP7X24-SB-14
Software	AP9013, AP9401, AP9410U, AP9411, AP9420, AP9420U, AP9421, AP9421U, AP9422, AP9423, AP9423U
Step Down Transformers	SUTF3

SUM1500RMXL2U**Product Overview**

Description	APC Smart-UPS® protects your data by supplying reliable, network-grade power in either traditional Tower or Rack-optimized form factors for space constrained business critical applications. Award winning APC Smart-UPS® is the perfect UPS for protecting business critical file servers (Intel or UNIX based), minicomputers, network switches and hubs, Point of Sale, retail/bank back office and ATM's. Rack Mount versions are the choice for rack optimized servers, server appliances, blade servers, other blade devices and rack-mounted network switches and hubs.
Features	Automatic self test; Automatic Voltage Regulation (AVR); built-in SmartSlot; hot swap batteries; intelligent battery management; load meter; network-grade line conditioning; overload indicator; rack mount; replace battery indicator; sine-wave output; software; status indicator LED's; USB connectivity; user replaceable batteries; wide input voltage range; EPO; web management
Includes	CD with software; rack mounting support rails; Smart UPS signalling RS-232 cable; USB cable; user manual

Electrical

Input

Nominal voltage	120 V
Frequency	50/60Hz ±3Hz (auto sensing)
Connection type	NEMA 5-15P
Cord Length	10 ft (3.05m)
Voltage range for main operations	82–147V
Voltage adjustable range for main op	75–154 V

Output

Power capacity	1440 VA/1425 Watts
Nominal voltage	120 V
Connections	(8) NEMA 5-15R

Battery

Type	VRLA
RBC quantity	1

Communication and Management

Interface port	DB-9 RS-232, RJ-45 10/100 Base-T, SmartSlot
Available SmartSlot interface qty.	1
Pre-installed SmartSlot cards	AP9617

Communication and Management

Control panel	LED status display with load and battery bar graphs and on line, on battery, replace battery, and overload indicators
Audible alarm	Alarm when on battery, distinctive low battery alarm, configurable delays
Emergency Power Off (EPO)	optional
Included software	PowerChute Smart-UPS Bundle

Physical

Dimensions (H × W × D)

Unit	3.40 × 17.0 × 26.7in (86 × 432 × 678mm)
Shipping	9.84 × 23.5 × 38.6in (250 × 596 ×
Rack height	2U

Weight

Unit	103lb (46.82kg)
Shipping	125.0lb (56.82kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating	0 to 40 °C
Storage	-20 to 50 °C

Humidity

Operating	0 to 95%, non-condensing
Storage	0 to 95%, non-condensing

Elevation

Operating	0 to 3000m
Storage	0 to 15 000m

Compliance

Approvals	CSA, FCC Part 15 Class A, UL 1778
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Options

Software	AP9013, AP9410U, AP9411, AP9420, AP9420U, AP9421, AP9421U, AP9422, AP9423, AP9423U
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SUM3000RMXL2U**Product Overview**

Description	APC Smart-UPS® protects your data by supplying reliable, network-grade power in either traditional Tower or Rack-optimized form factors for space constrained business critical applications. Award winning APC Smart-UPS® is the perfect UPS for protecting business critical file servers (Intel or UNIX based), minicomputers, network switches and hubs, Point of Sale, retail/bank back office and ATM's. Rack Mount versions are the choice for rack optimized servers, server appliances, blade servers, other blade devices and rack-mounted network switches and hubs.
Features	Automatic self test; Automatic Voltage Regulation (AVR); built-in SmartSlot; hot swap batteries; intelligent battery management; load meter; network-grade line conditioning; overload indicator; rack mount; replace battery indicator; sine-wave output; software; status indicator LED's; USB connectivity; user replaceable batteries; wide input voltage range; EPO; web management
Includes	CD with software; rack mounting support rails; Smart UPS signalling RS-232 cable; USB cable; user manual

Electrical**Input**

Nominal voltage	120 V
Frequency	50/60Hz ±3Hz (auto sensing)
Connection type	NEMA L5-30P (30A Twist-Lock)
Cord Length	10 ft (3.05m)
Voltage range for main operations	82–147V
Voltage adjustable range for main op	75–154 V

Output

Power capacity	3000 VA/2850 Watts
Nominal voltage	120 V
Connections	(6) NEMA 5-15R (2) NEMA 5-20R

Battery

Type	VRLA
RBC quantity	1

Communication and Management

Interface port	DB-9 RS-232, RJ-45 10/100 Base-T, SmartSlot
Available SmartSlot interface qty.	1
Pre-installed SmartSlot cards	AP9617

Communication and Management

Control panel	LED status display with load and battery bar graphs and on line, on battery, replace battery, and overload indicators
Audible alarm	Alarm when on battery, distinctive low battery alarm, configurable delays
Emergency Power Off (EPO)	optional
Included software	PowerChute Smart-UPS Bundle

Physical

Dimensions (H × W × D)

Unit	3.40 × 17.0 × 26.7in (86 × 43 × 68mm)
Shipping	9.84 × 23.46 × 38.58in (250 × 60 × 98mm)
Rack height	2U

Weight

Unit	103lb (46.82kg)
Shipping	125lb (56.82kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating	0 to 40 °C
Storage	-20 to 50 °C

Humidity

Operating	0 to 95%, non-condensing
Storage	0 to 95%, non-condensing

Elevation

Operating	0 to 3000m
Storage	0 to 15 000m

Compliance

Approvals	CSA, FCC Part 15 Class A, UL 1778
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Options

Software	AP9013, AP9410U, AP9411, AP9420, AP9420U, AP9421, AP9421U, AP9422, AP9423, AP9423U
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SU5000R5XLT-TF3**Product Overview**

Description	APC Smart-UPS® protects your data by supplying reliable, network-grade power in either traditional Tower or Rack-optimized form factors for space constrained business critical applications. Award winning APC Smart-UPS® is the perfect UPS for protecting business critical file servers (Intel or UNIX based), minicomputers, network switches and hubs, Point of Sale, retail/bank back office and ATM's. Rack Mount versions are the choice for rack optimized servers, server appliances, blade servers, other blade devices and rack-mounted network switches and hubs.
Features	Automatic self test; Automatic Voltage Regulation (AVR); built-in SmartSlot; hot swap batteries; intelligent battery management; load meter; network-grade line conditioning; overload indicator; rack mount; replace battery indicator; sine-wave output; software; status indicator LED's; USB connectivity; user replaceable batteries; wide input voltage range; EPO; web management
Includes	CD with software; rack mounting support rails; Smart UPS signalling RS-232 cable; USB cable; user manual

Electrical**Input**

Nominal voltage	208 V
Frequency	50/60Hz ±5Hz (auto-sensing)
Connection type	NEMA L6-30P
Cord Length	10 ft (3.05m)
Voltage range for main operations	157–255 V
Voltage adjustable range for main op	151–208 V

Output

Power capacity	4500 VA/3600 Watts
Nominal voltage	120, 208 V
Connections	(4) NEMA L5-20R (2) NEMA L6-20R

Battery

Type	Maintenance free sealed Lead-Acid battery with suspended electrolyte: leakproof
RBC quantity	(2) RBC12

Communication and Management

Interface port	DB-9 RS-232, RJ-45 10/100 Base-T, SmartSlot
Available SmartSlot interface qty.	1

Communication and Management

Pre-installed SmartSlot cards	AP9617
Control panel	LED status display with load and battery bar graphs and on line, on battery, replace battery, and overload indicators
Audible alarm	Alarm when on battery, distinctive low battery alarm, configurable delays
Emergency Power Off (EPO)	optional
Included software	PowerChute Smart-UPS Bundle

Physical

Dimensions (H × W × D)

Unit	12.25 × 19.00 × 25.00in (311 × 483 × 635mm)
Shipping	14.00 × 22.00 × 27.00in (356 × 559 × 686mm)
Rack height	7.00U

Weight

Unit	320.00lb (145.45kg)
Shipping	355.00lb (161.36kg)

Warranty	2 years repair or replace, optional on-site warranties available, optional extended warranties available
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Environmental

Temperature

Operating	0 to 40 °C
Storage	-20 to 50 °C

Humidity

Operating	0 to 95%, non-condensing
Storage	0 to 95%, non-condensing

Elevation

Operating	0 to 3000m
Storage	0 to 15 000m

Compliance

Approvals	CSA, FCC Part 15 Class A, UL 1778
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Options

Automatic Transformer Switches	SU042X163, SU045-1
Batteries	SU48R3XLBP

Options

Management Devices	AP9600, AP9607CB, AP9608, AP9610, AP9612TH, AP9617, AP9618, AP9619
MasterSwitches/Outlet Strips	AP7530, AP7530J, AP7540, AP7622, AP7830, AP7830J, AP7840, AP7901, AP9228, AP9510520, AP9510L620, AP9551, AP9558, AP9564, AP9566
Mounting Kits	SU032A
Power Cords	AP9871, AP9874, SU052-1
Replacement Battery Cartridges	CURK12, CURK12X, RBC12
Service Bypass Panels	SBP5000RMT2U
Services	WASSEMUPS-3R-SB-00, WEXTWAR1YR-SB-14, WEXTWAR3YR-SB-14, WMT-SB, WONSITEBE-SB-14, WONSITENBD-SB-14, WONSITEND-SB-14, WSTRTUP5X8-SB-14, WSTRTUP7X24-SB-14
Software	AP9004J, AP9005J, AP9007J, AP9009J, AP9013, AP9401, AP9409J, AP9410J, AP9410U, AP9411, AP9420, AP9420U, AP9421, AP9421U, AP9422, AP9423, AP9423U
Step Down Transformers	SUTF3, SYTF3J

SU5000RMXL5U**Product Overview**

Description	APC Smart-UPS® protects your data by supplying reliable, network-grade power in either traditional Tower or Rack-optimized form factors for space constrained business critical applications. Award winning APC Smart-UPS® is the perfect UPS for protecting business critical file servers (Intel or UNIX based), minicomputers, network switches and hubs, Point of Sale, retail/bank back office and ATM's. Rack Mount versions are the choice for rack optimized servers, server appliances, blade servers, other blade devices and rack-mounted network switches and hubs.
Features	Automatic self test; Automatic Voltage Regulation (AVR); built-in SmartSlot; hot swap batteries; intelligent battery management; load meter; network-grade line conditioning; overload indicator; rack mount; replace battery indicator; sine-wave output; software; status indicator LED's; USB connectivity; user replaceable batteries; wide input voltage range; EPO; web management
Includes	CD with software; rack mounting support rails; Smart UPS signalling RS-232 cable; USB cable; user manual

Electrical

Input

Nominal voltage	208 V
Frequency	50/60Hz ±5Hz (auto-sensing)
Connection type	NEMA L6-30P (30A Twist-Lock)
Cord Length	10 ft (3.05m)
Voltage range for main operations	157–255 V
Voltage adjustable range for main op	151–268 V

Output

Power capacity	5000 VA/4000 Watts
Nominal voltage	208 V
Connections	(2) NEMA L6-20R (1) NEMA L6-30R

Battery

Type	Maintenance-free sealed Lead Acid battery with suspended electrolyte: leakproof.
RBC quantity	(2) RBC12

Communication and Management

Interface port	DB-9 RS-232, RJ-45 10/100 Base-T, SmartSlot
Available SmartSlot interface qty.	1

Communication and Management

Pre-installed SmartSlot cards	AP9617
Control panel	LED status display with load and battery bar graphs and on line, on battery, replace battery, and overload indicators
Audible alarm	Alarm when on battery, distinctive low battery alarm, configurable delays
Emergency Power Off (EPO)	optional
Included software	PowerChute Smart-UPS Bundle

Physical

Dimensions (H × W × D)

Unit	8.75 × 19.00 × 25.00in (222 × 483 × 635mm)
Shipping	25.00 × 24.00 × 30.00in (635 × 610 × 762 mm)
Rack height	5.00U
Weight	
Unit	225lb (102.27kg)
Shipping	245lb (111.36kg)
Warranty	2 years repair or replace, optional on-site warranties available, optional extended warranties available

Environmental

Temperature	
Operating	0 to 40 °C
Storage	-20 to 50 °C
Humidity	
Operating	0 to 95%, non-condensing
Storage	0 to 95%, non-condensing
Elevation	
Operating	0 to 3000m
Storage	0 to 15 000m

Compliance

Approvals	CSA, FCC Part 15 Class A, UL 1778
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Options

Automatic Transformer Switches	SU045-1, SU045X163
Batteries	SU48R3XLBP

Options

Management Devices	AP9600, AP9604, AP9607CB, AP9608, AP9610, AP9612TH, AP9617, AP9618, AP9619
MasterSwitches/Outlet Strips	AP7540, AP7622, AP7840, AP9510L620, AP9558, AP9561, AP9566, AP9570
Mounting Kits	SU032A
Power Cords	AP9871, SU052-1, SU052-2
Replacement Battery Cartridges	CURK12, CURK12X, RBC12
Service Bypass Panels	SBP5000RMT2U
Services	SBP5000RMT2U, WEXTWAR1YR-SB-14, WEXTWAR3YR-SB-14, WMT-SB, WONSITEBE-SB-14, WONSITENBD-SB-14, WONSITEND-SB-14, WSTRUP5X8-SB-14, WSTRUP7X24-SB-14
Software	AP9004J, AP9005J, AP9007J, AP9009J, AP9013, AP9401, AP9409J, AP9410J, AP9410U, AP9411, AP9420, AP9420U, AP9421, AP9421U, AP9422, AP9423, AP9423U
Step Down Transformers	SURT004, SUTF3

InfraStruXure 20kW System

ISX-20KF

Product Overview

Description	The InfraStruXure 20kW System is both a PDU and a UPS in one footprint. This combination saves space and speeds deployment. In addition, the N + 1 redundancy increases availability and scalable power capacity lowers cost.
Features	Adapt and expand UPS power; battery modules connected in parallel; built-in manual bypass; built-in static bypass switch; built-in Web/SNMP management; easy maintenance; full-rated power with kVA equaling kW; hot swappable Components; input line cord; input power factor correction; LCD alphanumeric display; modular fault-tolerant Design; N+1 redundancy; scalable run time; temperature compensated battery charging
Includes	Installation Guide, User Manual, Web/SNMP Management Card

Performance

Efficiency	
AC-AC at Nominal Mains	91.5%; minimum from 75% to full load when configured as 20kVA n + 0
DC-AC at Nominal Battery	94%, minimum from 75% to full load when configured as 20kVA n + 0
Dynamic Load Response	±5%, for load step 0% to 100% or 100% to 0%
Recovery Time	<60 ms (back to steady state)
Total Harmonic Distortion	<2% at 100% resistive load

Electrical

Input	
Nominal Current	61.3 A
Maximum Current	70.9 A
Current Limit	89.4 A
Overload Current	115 A, for 30s, based on 150% overload on output
Walk in Duration	15 s
Power Factor	0.99 at full load
Current THD	<6% at full load
Nominal Voltage	208 V
Minimum Voltage	166 V, at less than full load, the UPS operates from mains power to lower voltages
Maximum	240 V, above 240 V, the UPS operates from battery power
Minimum Voltage (Static Bypass)	183 V
Maximum Voltage (Static Bypass)	233 V
Frequency	40–70 Hz, outside of this range, the UPS operates from battery power
Connection Type	3P + N + G

Electrical

Output

Power Capacity	20kVA/20kW
Current	55.5A at full load
Current Overload	83.3A, 150% for 30s
Crest Factor	2.7, no limit on applied crest factor, UPS holds output regulation specs to 2.1
Load Power Factor	0.5 to 1.0
Current (Static Bypass)	69.4A, 125% continuous (overload 1); 555.1A, 1000% for 500ms (overload 2)
Nominal Voltage	208V
Minimum Voltage	206V; -1%
Maximum Voltage	210V, + 1%
Frequency Normal Operation	Synchronized to bypass input, frequency is synchronized to mains over the range of 57 to 63Hz, optional ± 0.1 Hz and ± 10 Hz setting from front panel
Frequency Battery Operation	60Hz
Slew Rate	1 Hz/s

Battery

Type	Maintenance-free, sealed, lead-acid battery with suspended electrolyte; leakproof
Nominal Voltage	± 192 VDC
Float Voltage	± 219 VDC
End of Discharge Voltage	± 160 VDC, May be higher at less than full load
Temperature Compensation	-320mV per °C, For temperatures greater than or equal to 68°F (20°C) 0mV per °C, For temperatures less than 68°F (20°C)
Charging Power	2kW, N system—2 power modules
Maximum Charging Power	3kW, N+1 system—3 power modules
Battery Runtime	
Two Shelves at 1.0PF Load	4.5 minutes
Two Shelves at 0.7PF Load	8 minutes
Four Shelves at 1.0PF Load	13 minutes
Four Shelves at 0.7PF Load	21 minutes
Re-Charge Time	3 hours, To 90% capacity after full discharge
DC Ripple Current	< 0.05C, In normal operation at fully charged batteries
External Battery	Up to four Symmetra XR Battery Enclosures can be added
External Battery Input	
Full Load DC Input Current	55.4A, At ± 192 V
Maximum DC Input Current	66.5A, At ± 160 V

Communication and Management

Interface Port	DB-9 RS-232, RJ-45 10 Base-T Ethernet for Web/SNMP,
Card Slots	2
Management Software Included	PowerChute Symmetra Bundle

Communication and Management

Control Panel	Multi-function LCD status and control console
Audible Alarm	Alarm when on battery, distinctive low battery alarm, configurable delays
Emergency Power Off (EPO)	Yes—primary wiring (dry contact closure or applied 24Vdc)

Physical

Dimensions (H × W × D)

Unit	81.5 × 23.5 × 35.6 in (2068 × 597 × 905 mm)
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Weight

Fully Loaded Enclosure	1803 lb (818 kg)
Without Power or Battery Modules	665 lb (301 kg)
Approximate Shipping Weight	715 lb (324 kg)
One Power Module	58 lb (26 kg)
One Battery Unit	52 lb (23.5 kg)
Static Switch Module	70 lb (32 kg)

Environmental

On-Line Thermal Dissipation	Batteries Fully Charged*	Batteries Charging*
100% Load	6,345 BTU/hr	9,346 BTU/hr.
75% Load	4,759 BTU/hr.	7,946 BTU/hr.
50% Load	3,172 BTU/hr.	6,360 BTU/hr.
Temperature		
Operating	32 to 104°F (0 to 40°C)	
Storage	5 to 113° F (–15 to 45°C) with batteries	
	–22 to 158° F (–30 to 70°C) without batteries	
Cooling	Front to rear airflow; 12 inches (minimum) required behind system for exhaust airflow	
Audible noise at 1m		
1 to 2 power modules	< 58 dBA, < 70% load	
1 to 2 power modules	< 64 dBA, > 70% load	
Humidity		
Operating	0—95%	
Storage	0—95%	
Elevation		
Operating	0 to 10 000 ft (0 to 3000m)	
Storage	0 to 50 000ft (0 to 15 000m)	

* Batteries fully charged is a continuous rating; batteries charging is for 3 hours maximum. Charging losses are based on 3000 W, 90% charger electronic efficiency and 80% battery charging efficiency.

Compliance

Approvals	UL listed, per UL1778, CSA Certified, per standard CSA 107.1 FCC Verified Class A, per standard FCC 47 CFR Part 15
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Options

Optional Management Devices	AP9607: 2-Port Interface Expander AP9615: 5-Port 10Base-T Hub SmartSlot Card AP9319: Environmental Monitoring Unit AP9610: Relay I/O SmartSlot Card AP9618: APC Network Management Card
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Symmetra PX 40kW UPS

SY10K40F, SY20K40F, SY30K40F, SY40K40F

Product Overview

Description	Symmetra PX is a single unit composed of modular components. This modular architecture provides the foundation of building and scaling near continuous availability power systems with a flexible range of power capacity. The Symmetra PX packages the high availability requirements of easy power and runtime scalability into a very small footprint. Combined with the complete line of APC data center protection software and accessories, it provides the four most critical elements of total data center protection.
Features	N+1 redundancy, extendable runtime, built-in static bypass switch, full-rated power with kVA equaling kW, temperature compensated battery charging, scalable power capacity, automatic self-test, hot-swap batteries, modular-level repair, front-access servicing, built-in Web/SNMP management, intelligent battery management, multiple system shutdown, SmartSlot
Includes	Web/SNMP Management Card

Performance

Efficiency at Full Load	91.5%
Max. Configurable Power	40 000 VA/40 000 W

Electrical	SY10K40F	SY20K40F	SY30K40F	SY40K40F
Input				
Nominal Voltage	120/208 V, 3-phase			
Voltage Range	±15% for normal operation, ±10% for static bypass operation			
Voltage Range	177–240 V (main operations)			
Frequency	50 or 60 Hz			
Frequency Synch Tolerance	40–70 Hz			
Slew Rate Range (Default)	0.25–4 Hz/s (1 Hz/s)			
Soft Start Ramp Time Range	15 seconds			
Current Distortion	< 6% THD			
Power Factor	> 0.93, unity at full load			
Nominal Current	122.6 A			
Nominal Current + Battery Charge	139.5 A			
Current Limit	162.2 A			
Recommended Feeder Breaker Size	175 AT			
Minimum Conductor Size	1 × 2/0 AWG			
Termination Stud Size	M8			

Electrical	SY10K40F	SY20K40F	SY30K40F	SY40K40F
Torque Rating	133 in-lbs			
Short Circuit Withstand Rating	30 000 Symmetrical Amperes			
Connection Type	Hard-wire, 5-wire (3PH + N + G)			
Output				
Capacity	10kW	20kW	30kW	40kW
Full Load Capacity	40kVA/40kW, N+1			
Nominal Voltage	120/208V, 3-phase			
Connections	Hard-wire, 5-wire, (3PH + N +G), (1) Screw Terminals			
Bypass	Built-in static bypass			
Voltage Distortion	Less than 2% for 100% linear load			
Maximum Voltage Distortion	3% for linear load; 5% for non-linear load			
Voltage Regulation	± 1% for balanced, ±3% for unbalanced linear or non-linear load			
Dynamic Voltage Regulation	±5% at 100% load step			
Frequency	57–63 Hz, synchronized to mains			
Frequency Regulation	Input Tracking when within ±3% of nominal 0.1% of nominal while in battery reserve			
Crest Factor	Unlimited			
Slew Rate Range (Default)	0.25–4Hz/s (1 Hz/s)			
Overload Levels	< 105% Continuous, 125% for 10m in normal operation, 150% for 30s in battery operation, 125% continuous in static bypass operation			
Nominal Current	111.0A			

Battery

Battery Type	Maintenance-free sealed lead-acid battery with suspended electrolytes
Typical Recharge Time	Three Hours
Nominal Voltage	2 × 192 V
Float Charge Voltage Range (Default)	2 × 219 V
Low Battery Warning Range (Default)	2 × 173 V
Low Battery Shutdown	2 × 155 V
DC–AC Efficiency	
25% Linear Load	91.2%
50% Linear Load	93.8%
75% Linear Load	94.3%
100% Linear Load	94.2%
Nominal Discharge Current	110.6A
Maximum Discharge Current	128.0A
Nominal Recharge Current	10.4A
Recommended Circuit Breaker	2 × 125 AT
Minimum Conductor Size	1 × 2AWG
Connection Type	Hardwire 2 × Pos + 2 × Neg + 2 × PE
Replacement Battery Module	SYBT4

Communication and Management

Interface Port	Contact closure, RJ-45 10BaseT ethernet for Web/SNMP/Telnet Management/SmartSlot
Card Slots	Three
Control Panel	Multi-function LCD status and control console
Audible Alarm	Alarm when on battery; distinctive low battery alarm; configurable setting
Emergency Power Off (EPO)	Yes—Primary wiring

Physical	SY10K40F	SY20K40F	SY30K40F	SY40K40F
Dimensions (H × W × D)				
UPS	82 × 48 × 35.5 in (2082 × 1220 × 902mm)	82 × 24 × 36 in (2082 × 610 × 902mm)		
Shipping	91 × 59 × 42 in (2311 × 1499 × 4054mm)	91 × 30 × 42 in (2311 × 750 × 1066mm)		
Weight				
UPS	865 lb (393 kg)	1165 lb (530 kg)	1,435 lb (652 kg)	1705 lb (775 kg)
Shipping	997 lb (453.18 kg)	1291 lb (586 kg)	1585 lb (720 kg)	1879 lb (854 kg)
Warranty	2 years parts, optional on-site warranties available, optional extended warranties available			

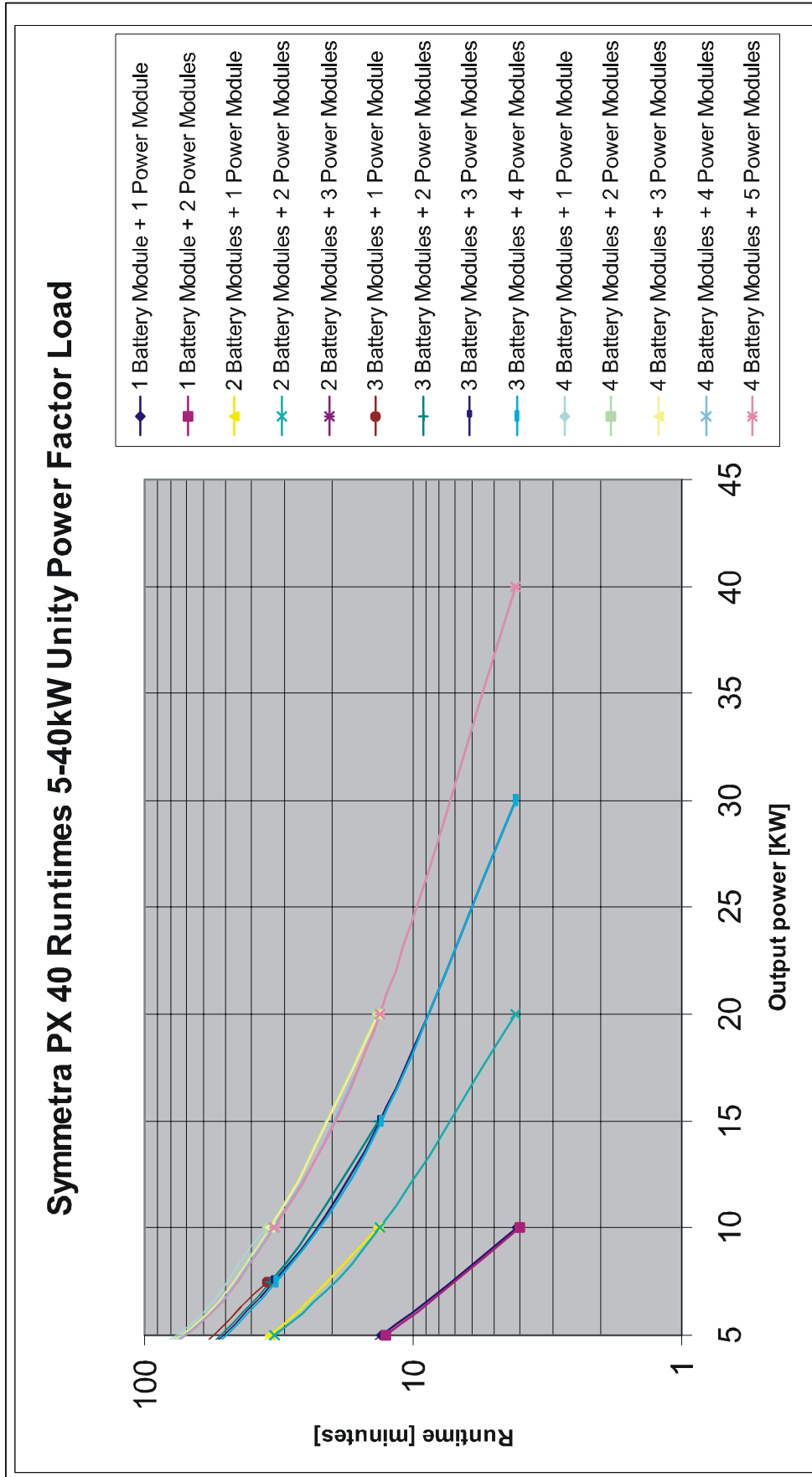
Environmental

Temperature	
Operating	32 to 104° F (0 to 40° C)
Storage	-58 to 104° F (-50 to 40° C)
Humidity	
Operating	0–95%, non-condensing
Storage	0–95%, non-condensing
Elevation	
Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000 m)
Audible Noise at 1 M from Unit	
At 70% Load	58 dBA
At 100% Load	64 dBA
Online Thermal Dissipation	11,611 BTU/hr

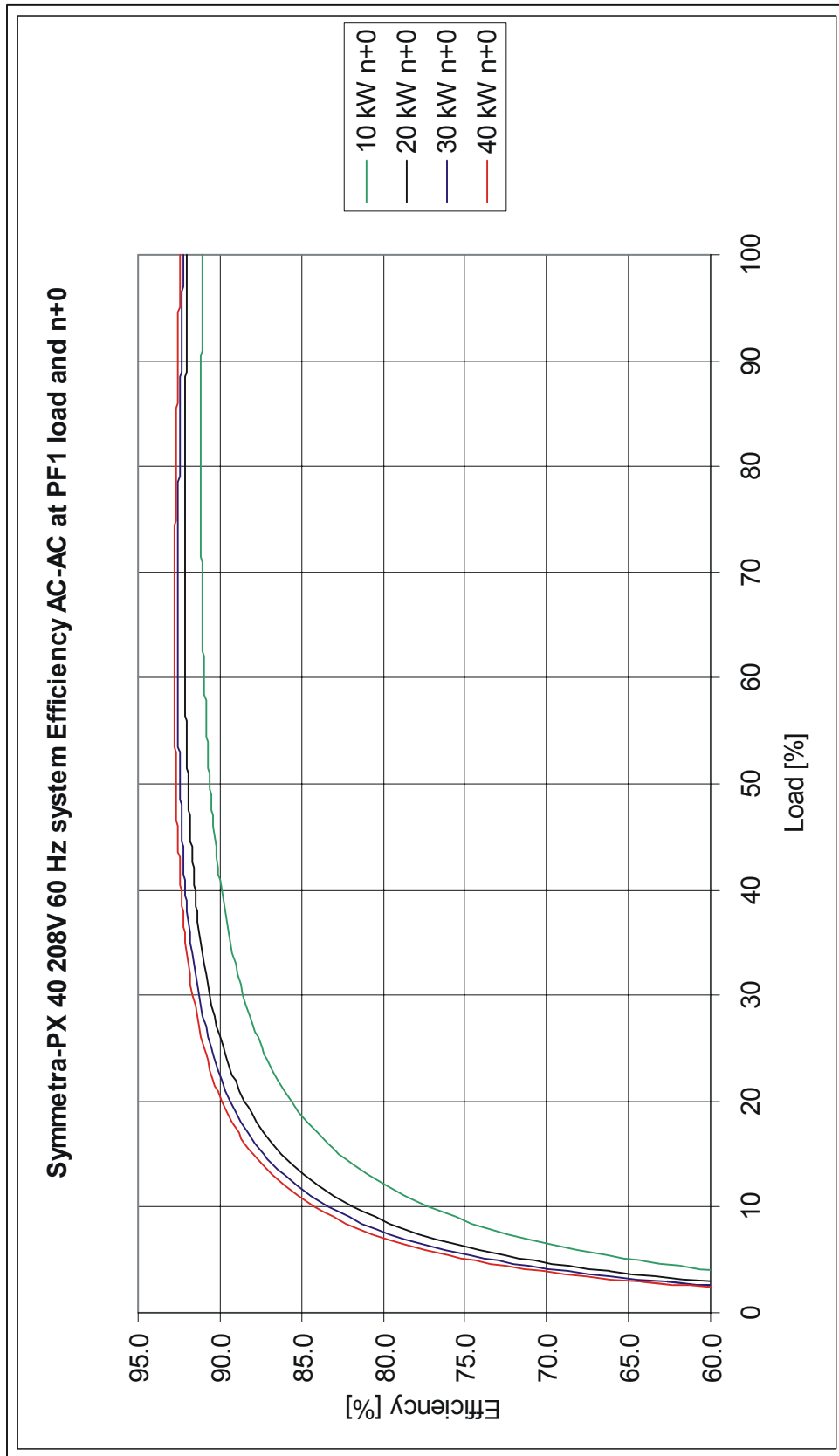
Compliance

Approvals	FCC Part 15 Class A, UL 60950, UL listed per UL1778, CSA 107.1
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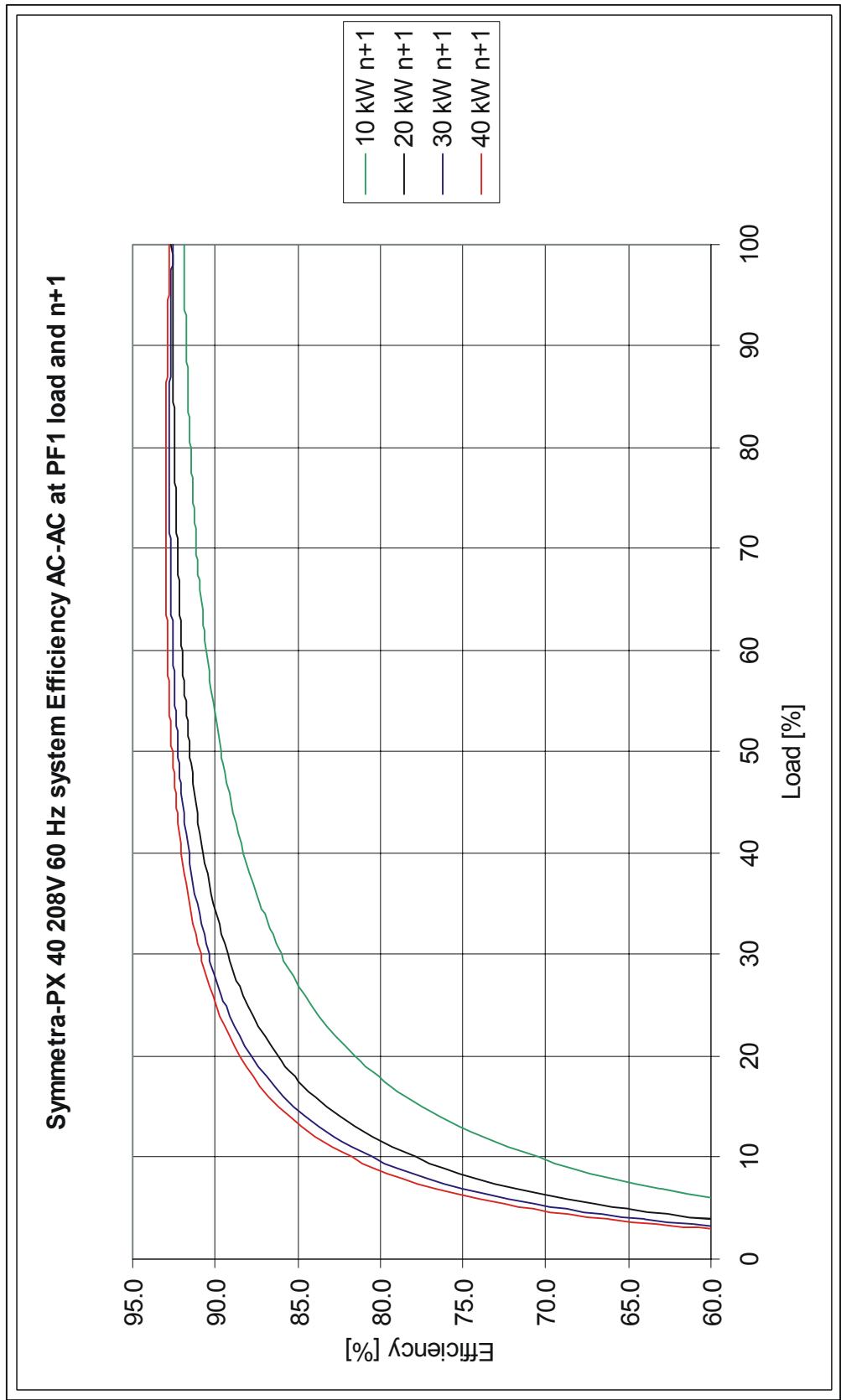
Runtimes 5–40kW unity power factor load



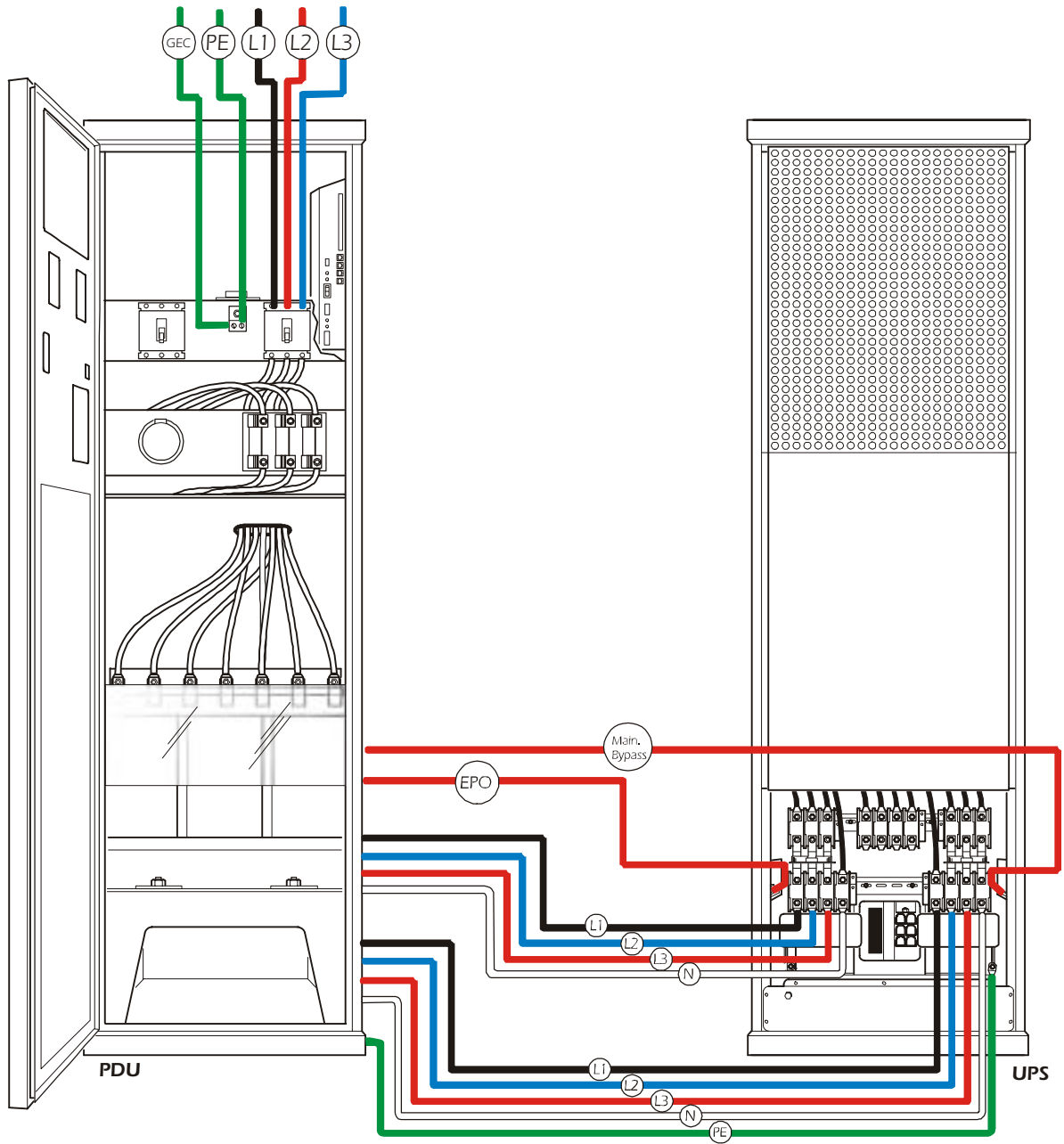
System efficiency AC-AC at PF1 load and n + 0



System efficiency AC-AC at PF1 load and n + 1



PDU and UPS interconnect diagram



Symmetra PX XR Premium Battery Cabinet

SYCFXR8

Product Overview

Description	Adds additional runtime to the 40kW Symmetra PX UPS. Holds up to eight battery modules, providing approximately 30 minutes of additional run-time at a full 40kW load.
Features	Hot swap batteries, intelligent battery management

Battery

Nominal Battery Voltage	± 192V
Battery Current (at full load)	115A at ± 192V (at full load)
Maximum Current	137A at ± 160V (at end of discharge)

Note: If external batteries are customer-supplied, refer to product-specific data.

Physical

Dimensions (H × W × D)	
Enclosure	82 × 24 × 34in (2083 × 610 × 864mm)
Shipping	82 × 30 × 40in (2083 × 762 × 1016mm)
Weight	
Enclosure	551lb (250.00kg)
Enclosure Maximum	2100lb (952.54kg)
Shipping	601lb (272.73kg)

Environmental

Temperature	
Operating	32 to 104°F (0 to 40° C)
Storage	5 to 113°F (–15 to 45° C)
Humidity	
Operating	0—95%, non-condensing
Storage	0—95%, non-condensing
Elevation	
Operating	0–3333 ft (0—1000m)
Storage	10 000m (for aircraft transportation)

Compliance

Approvals	UL60950
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Battery runtimes at 0.8 PF

# of XR Frames	# of Battery Strings	5kW	10kW	15kW	20kW	25kW	30kW	35kW	40kW
0	1	16	5	-	-	-	-	-	-
	2	41	17	8	5	-	-	-	-
	3	69	29	17	11	7	5	-	-
	4	99	42	24	17	12	8	6	5
1	5	131	56	34	23	17	12	11	10
	6	163	71	42	29	22	17	14	13
	7	197	86	52	36	26	20	17	17
	8	232	102	61	42	31	25	20	19
	9	268	118	71	49	37	29	24	23
	10	304	134	80	56	42	34	28	26
	11	342	151	91	64	48	38	31	29
	12	380	168	102	71	54	42	35	32
2	13	419	185	112	79	59	47	38	36
	14	457	203	122	86	65	52	42	40
	15	497	221	134	95	71	56	47	42
	16	538	239	145	102	77	61	50	46
	17	578	257	156	110	83	66	54	49
	18	620	275	168	119	90	72	59	53
	19	661	294	179	126	96	77	62	56
	20	704	313	191	134	102	82	67	60
3	21	746	331	203	143	108	86	72	64
	22	790	350	214	151	115	92	76	68
	23	833	371	226	160	121	97	80	72
	24	876	390	238	169	128	102	84	76
	25	920	409	250	178	134	108	89	79
	26	965	430	263	186	142	113	94	83
	27	1010	450	275	194	148	119	97	86
	28	1056	470	287	204	155	124	102	90
4	29	1112	495	302	215	163	131	107	95
	30	1170	521	318	226	172	138	113	100
	31	1232	549	335	238	181	146	119	105
	32	1296	578	352	250	190	155	125	110
	33	1365	608	371	264	200	164	132	116
	34	1437	640	390	278	211	174	139	122
	35	1512	674	411	292	222	184	146	129
	36	1592	709	432	307	233	194	154	136

* all numbers in minutes

Battery runtimes at 1.0 PF

# of XR Frames	# of Battery Strings	5kw	10kW	15kW	20kW	25kW	30kW	35kW	40kW
0	1	13	4	-	-	-	-	-	-
	2	33	14	7	4	-	-	-	-
	3	56	24	14	9	6	4	-	-
	4	80	35	20	14	10	7	5	4
1	5	105	47	28	19	14	10	8	6
	6	132	59	35	24	18	14	11	9
	7	160	72	42	30	22	17	14	11
	8	188	85	50	35	26	20	16	14
	9	217	98	59	41	31	24	19	16
	10	246	112	67	48	35	28	22	19
	11	276	126	75	53	40	31	26	21
	12	307	140	84	59	44	35	29	24
2	13	338	154	93	66	49	39	32	27
	14	370	169	92	72	54	43	35	30
	15	402	184	110	78	59	47	39	32
	16	435	199	120	85	64	51	42	35
	17	468	214	129	91	69	55	45	38
	18	501	229	138	98	74	60	49	41
	19	535	245	148	105	80	63	52	44
	20	569	261	157	110	85	68	56	47
3	21	603	272	169	118	90	72	60	50
	22	639	288	177	125	95	76	63	53
	23	674	304	186	132	101	81	66	56
	24	709	320	196	140	106	85	70	59
	25	745	336	206	147	111	90	74	63
	26	781	353	216	154	117	94	77	66
	27	817	369	227	161	122	98	81	69
	28	854	385	237	168	128	103	85	72
4	29	891	403	247	176	134	107	89	75
	30	928	419	256	184	140	112	92	79
	31	965	436	268	191	145	117	96	82
	32	1003	453	279	198	151	121	100	85
	33	1041	471	289	206	157	126	104	88
	34	1079	488	300	213	163	131	108	92
	35	1117	505	311	221	168	135	112	95
	36	1156	523	321	229	174	140	116	99

* all numbers in minutes

Symmetra PX 80kW UPS

SY10K80F, SY20K80F, SY30K80F, SY40K80F, SY50K80F, SY60K80F, SY70K80F, SY80K80F

Product Overview

Description	Symmetra PX is a single unit composed of modular components. This modular architecture provides the foundation of building and scaling near-continuous availability power systems with a flexible range of power capacity. The Symmetra PX packages the high availability requirements of easy power and runtime scalability into a very small footprint. Combined with the complete line of APC data center protection software and accessories, it provides the four most critical elements of total data center protection.
Features	N+1 redundancy, extendable run time, built-in static bypass switch, full rated power with kVA equaling kW, temperature compensated battery charging, scalable power capacity, automatic self-test, hot swap batteries, modular level repair, front access servicing, built-in Web/SNMP management, intelligent battery management, multiple system shutdown, SmartSlot
Includes	Installation Guide, User Manual, Web/SNMP Management Card

Electrical

	SY10K40F	SY20K40F	SY30K40F	SY40K40F	SY50K80F	SY60K80F	SY70K80F	SY80K80F
Output								
Capacity	10kW	20kW	30kW	40kW	50kW	60kW	70kW	80kW
Nominal Voltage	120/208V, 3-phase							
Nominal Current	222.0A							
Full Load Capacity	80kVA/80kW, N+1							
Connections	(1) Hard Wire 5-wire (3PH + N + G), (1) Screw Terminals							
Bypass	Built-in static bypass							
Voltage Distortion	Less than 3% for 100% linear load							
Max. Voltage Distortion	3% for linear load, 5% for non-linear load							
Frequency	57–63Hz, synchronized to mains							
Frequency Regulation	Input tracking when within $\pm 3\%$ of nominal; 0.1% of nominal while in battery reserve							
Slew Rate Range (Default)	0.25–4Hz/s (1 Hz/s)							
Voltage Regulation	$\pm 1\%$ for balanced load, $\pm 3\%$ for unbalanced load							
Dyn. Voltage Regulation	$\pm 5\%$ at 100% load step							
Crest Factor	Unlimited							
Overload Levels	< 105% continuous, 125% for 10m in normal operation, 150% for 30s in battery operation, 125% continuous in static bypass operation							
Breaker Size	300 AT							
Minimum Conductor Size	1 \times 400kcmil							
Termination Stud Size	M12							
Input								
Nominal Voltage	120/208V, 3-phase							
Voltage Range	$\pm 15\%$ for normal operation, $\pm 10\%$ for static bypass operation							
Frequency	50 or 60Hz							

Electrical	SY10K40F SY20K40F SY30K40F SY40K40F SY50K80F SY60K80F SY70K80F SY80K80F
Frequency Tolerance	40–70Hz
Slew Rate Range (Default)	0.25–4Hz/s (1Hz/s)
Soft Start Ramp Time (Default)	1–40s (10s)
Current Distortion	< 5% THD
Power Factor	>0.93, unity at full load
Nominal Current	233.4A
Nominal Current + Battery Charge	257.0A
Current Limit	288.6A
Recommended Feeder Breaker Size	350AT
Minimum Conductor Size	1 × 400kcmil
Connection Type	Hard-wire, 5-wire (3PH + N + G)
Voltage Range for Main Operations	177–240 (208)V, -20% to +15%

Battery

Type	No internal battery, uses external battery system
Nominal Voltage	2 × 192V
Float Charge Voltage Range (Default)	2 × 205–230V (2 × 219V)
Equalize Charge Voltage (Default)	2 × 219–230V (2 × 219V)
Low Battery Warning (Default)	2 × 168V–192V (2 × 173V)
Low Battery Shutdown	2 158–168V (2 × 163V)
DC–AC Efficiency	
25% Linear Load	89.1%
50% Linear Load	92.4%
75% Linear Load	93.3%
100% Linear Load	93.6%
Nominal Discharge Current	220A
Max Discharge Current	258A
Nominal Recharge Current	20.8A
Circuit Breaker	2 × 250AT
Minimum Conductor Size	1 × 4/0AWG
Connection Type	Hardwire 2 × Pos + 2 × Neg + 2 × PE
Typical Recharge Time	2.65 hours

Communication and Management

Interface Port	DB-9 RS-232, SRJ45 10 Base-T Ethernet for Web/SNMP
Card Slots	Three
Control Panel	Multi-function LCD status and control console
Audible Alarm	Alarm when on battery; distinctive low battery alarm; configurable setting
Emergency Power Off	Yes—Primary wiring

Physical

SY10K40F SY20K40F SY30K40F SY40K40F SY50K80F SY60K80F SY70K80F SY80K80F

Dimensions (H × W × D)

UPS	82 × 48 × 34 in (2083 × 1219 × 902mm)
Shipping	91 × 59 × 41 in (2311 × 1499 × 4054 mm)

Weight

UPS	1457 lb	1714 lb	1971 lb	2228 lb	2485 lb	2742 lb	2999 lb	3256 lb
	(660.8 kg)	(779.09kg)	(629kg)	(1012.7kg)	(1129.5 kg)	(1246.3 kg)	(1363.2 kg)	(1480 kg)
Shipping	1582 lbs	1839.2 lb	2096.6 lb	2354lb	2611 lb	2868.2 lb	3125.4 lb	3382.6 lb
	(719.09kg)	(836 kg)	(953kg)	(854kg)	(1186.8 kg)	(1303.7 kg)	(1420.6 kg)	(1537.6 kg)

Warranty	2 years parts
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Environmental

Temperature

Operating	32 to 104° F (0 to 40° C)
Storage	-58 to 104° F (-50 to 40° C)

Humidity

Operating	0–95%, non-condensing
Storage	0–95%, non-condensing

Elevation

Operating	0 to 10 000ft (0 to 3000 m)
Storage	0 to 50 000ft (0 to 15 000 m)

Audible Noise	71 dBA
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Compliance

Approvals	CSA, FCC Part 15 Class A, UL 1778 Listed
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Symmetra PX 80kW Battery Frame

SYCF8BF

Product Overview

Description	Adds runtime to the Symmetra PX UPS. Holds up to eight battery modules
Features	Hot swap batteries, intelligent battery management

Battery

Nominal Battery Voltage	±192 V
Battery Current	115 A at ±192 V (at full load)
Maximum Current	137 A at ±160 V (at end of discharge)

Physical

Dimensions (H × W × D)

Enclosure	82 × 24 × 36 in (2083 × 610 × 902mm)
Shipping	82 × 30 × 41 in (2083 × 762 × 1054mm)

Weight

Enclosure	551 lb (250.00kg)
Shipping	2100 lb (952.54kg)

Environmental

Temperature

Operating	32 to 104°F (0 to 40° C)
Storage	5 to 113°F (–15 to 45° C)

Humidity

Operating	0–95%, non-condensing
Storage	0–95%, non-condensing

Elevation

Operating	0–3333 ft (0–1000m)
Storage	10 000m (for aircraft transportation)

Compliance

Approvals	EN50091-1-1 / IEC62040-1-1, EN/IEC62040-2
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Battery runtimes at 0.8 PF

# of XR Frames	# of Battery Strings	10kW	20kW	30kW	40kW	50kW	60kW	70kW	80kW
1	1	5	-	-	-	-	-	-	-
	2	15	6	-	-	-	-	-	-
	3	26	11	6	-	-	-	-	-
	4	38	17	10	6	-	-	-	-
	5	50	23	14	9	6	-	-	-
	6	63	29	18	12	9	6	-	-
	7	76	35	22	15	11	8	7	-
	8	89	42	26	18	13	10	8	7
2	9	102	49	30	21	16	12	10	8
	10	130	62	39	28	21	16	13	11
	11	145	69	44	31	23	18	15	12
	12	159	76	48	34	26	20	17	14
	13	174	84	53	37	29	23	19	15
	14	189	91	57	41	31	25	20	17
	15	204	98	62	44	34	27	22	19
	16	219	106	67	48	37	29	24	20
3	17	234	113	72	51	39	31	26	22
	18	250	121	77	55	42	34	28	23
	19	266	128	82	58	45	36	30	25
	20	281	136	87	62	48	38	32	27
	21	288	139	89	64	49	39	32	28
	22	297	144	92	66	50	41	34	29
	23	313	152	97	69	53	43	35	30
	24	329	160	102	73	56	45	37	32
4	25	346	168	107	77	59	48	39	33
	26	362	176	112	81	62	50	41	35
	27	379	184	117	84	65	52	43	37
	28	395	192	122	88	68	55	45	39
	29	412	200	128	92	71	57	47	40
	30	429	208	133	96	74	60	49	42
	31	445	216	138	100	77	62	52	44
	32	462	225	144	104	80	64	54	46

* all numbers in minutes

Battery runtimes at 1.0 PF

# of XR Frames	# of Battery Strings	10kW	20kW	30kW	40kW	50kW	60kW	70kW	80kW
1	1	3	-	-	-	-	-	-	-
	2	11	4	-	-	-	-	-	-
	3	20	8	4	-	-	-	-	-
	4	30	13	7	4	-	-	-	-
	5	39	17	10	6	4	-	-	-
	6	49	22	13	9	6	4	-	-
	7	60	27	16	11	8	6	4	-
	8	70	32	20	13	10	7	6	4
2	9	81	38	23	16	12	9	7	6
	10	92	43	26	18	13	10	8	7
	11	104	48	30	21	15	12	10	8
	12	115	54	33	23	17	14	11	9
	13	127	59	37	26	19	15	12	10
	14	138	65	41	29	21	17	14	11
	15	150	71	44	31	24	19	15	13
	16	162	77	48	34	26	20	16	14
3	17	175	82	52	37	28	22	18	15
	18	187	88	55	39	30	24	19	16
	19	199	94	59	42	32	25	21	17
	20	212	100	63	45	34	27	22	19
	21	224	106	67	48	36	29	24	20
	22	237	112	71	50	39	31	25	21
	23	250	119	75	53	41	33	27	23
	24	263	125	79	56	43	34	28	24
4	25	276	131	83	59	45	36	30	25
	26	289	137	87	62	47	38	31	27
	27	302	144	91	65	50	40	33	28
	28	315	150	95	68	52	42	35	29
	29	329	157	99	71	54	44	36	31
	30	342	163	103	74	57	46	38	32
	31	356	170	107	77	59	47	39	33
	32	370	176	111	80	61	49	41	35

* all numbers in minutes

Symmetra MW 400kW UPS

SY400K400G

Product Overview

Description	The Symmetra MW, the first ever fault-tolerant modular UPS redefines high-power UPS technology in the 400–1600kW power range, including paralleling features to handle even larger load requirements.
Features	Modular design, adapt and expand UPS power, top and bottom cable entry (standard), modular fault-tolerant design, early-warning problem notification, paralleling features for capacity and redundancy, distributed inverter technology for fault containment, self-diagnosing, self-testing, front-access servicing, modular-level repair, component-level predictive failure analysis, menu-driven repair instructions, monitor power attributes for entire management solution, intelligent battery management, advanced 10-inch color LCD touch screen, single-interface management of multiple products, configurable display layout, menu-driven operating instructions, monitoring through network and web, state-of-the-art topology, rated for power-factor corrected loads, temperature compensated battery charging, full-rated power with kVA equaling kW
Includes	User Manual

Performance

AC–AC Efficiency	97% (at full load)
Load Power Factor	0.9 lead to 0.8 lag
Overload Capacity	
Utility Operation	125% for 10 minutes, 200% for 60 secs
Battery Operation	150% for 30 secs
Heat Dissipation	42 246BTU/hr. (12.37kW)

Electrical

Input	
Nominal Voltage	480V
Voltage Range	±15% for normal operation, ±10% for static bypass operation
Nominal Current	496A
Nominal Current + Battery Charge	546A
Current Limit	625.5A
Voltage Tolerance	±15%
Frequency	60Hz, ±0.5–8% (programmable)
Frequency Synch Tolerance (Default)	±0.5%–8.0% (6%)

Electrical

Slew Rate Range (Default)	0.25–4Hz/s (1 Hz/s)
Soft Start Ramp Time Range	1–40s (10s)
Current Distortion	< 5% THD
Power Factor	~1
Backfeed Protection	Built-in
Max. Input Short Circuit Level	200kAIC
Feeder Breaker Size	700AT (Recommended)
Minimum Conductor Size	2 × 500kcmil
Connection Type	Hard Wire 4-wire (3PH + G)
Termination Bolt Size	M12
Torque Rating	433 in-lbs
Short Circuit Withstand Rating	200 000 Symmetrical Amperes
Output	
Capacity	400kW/kVA at full load
Nominal Voltage	480V
Nominal Current	481 A
Voltage Distortion	Max 3% linear load
Frequency	60 Hz (mains synchronized); 60 Hz ± 0.1% (free-running)
Frequency Range (Default)	50, 60Hz (60Hz)
Frequency Regulation	Input tracking, 0.1% of nominal while in battery reserve
Voltage Tolerance	± 1% static, sym. load 0–100%, ± static, asym. load 0–100%, ±5% after 2 ms and ±1% after 50 ms dynamic, sym load 0–100%
Slew Rate Range (Default)	0.25–4Hz/s (1 Hz/s)
Voltage Regulation	±1% for balanced load; ±3% for unbalanced load
Dynamic Voltage Regulation	±5% at 100% load step
Maximum Voltage Distortion	3% for linear load, 5% for non-linear load
Overload Levels	200% for 60s in normal operation, 125% for 10m in normal operation, 150% for 30s in battery operation, 125% continuous in static bypass operation
Connection Type	(1) Hard Wire 4-wire (3PH + G)
Recommended Breaker Size	700AT
Minimum Conductor Size	2 × 500kcmil
Termination Bolt Size	212
Torque Rating	433 in-lbs

Battery

Nominal Voltage	2 × 384V
Number of Battery Cells	2 × 192 pcs.

Battery

Float Charge Voltage Range (Default)	2 × 410–460 V (2 × 438 V)
Equalize Charge Voltage Range (Default)	2 × 438–460 V (2 × 438 V)
Low Battery Warning Range (Default)	2 × 336–384 V (2 × 346 V)
Low Battery Shutdown	2 × 310–336 V (2 × 321 V)
DC–AC Efficiency	
25% Linear Load	96%
50% Linear Load	97%
75% Linear Load	97%
100% Linear Load	96%
Full Load (P)	417kW
Nominal Discharge Current	543 A
Maximum Discharge Current	650 A
Nominal Recharge Current	54.3 A
Recommended Circuit Breaker Size	2 × 1000AT
Minimum Conductor Size	3 × 400kcmil
Connection Type	Hardwire 2 × Pos + 2 × Neg + 2 × PE

Communication and Management

Interface Port	RJ-45 10/100BaseT
Control Panel	Advanced 10" Color LCD Touch Screen User Interface
Audible Alarm	Audible and visual alarms prioritized by severity
Emergency Power Off (EPO)	Yes
Emergency Module Off (EMO)	Yes

Physical

Dimensions (H × W × D)	
UPS	80 × 83 × 42 in (2032 × 2110 × 1067 mm)
Shipping	86 × 98 × 46 in (2184 × 2489 × 1168 mm)
Weight	
UPS	5511 lb (2500 kg)
Shipping	5711 lb (2596 kg)
Warranty	1 year parts, optional on-site warranties available

Environmental

Temperature	
Operating	32 to 104° F (0 to 40°C)
Storage	-58 to 104° F (-50 to 40° C)
Humidity	
Operating	0–95%, non-condensing
Storage	0–95%, non-condensing
Elevation	
Operating	0 to 3333 ft (0 to 1000m) (without derating)
Storage	0 to 50 000ft (0 to 15 000m)
Audible Noise	72 dBA at 3 ft from Surface of Unit
Protection Class	NEMA 1 with NEMA 12 optional

Compliance

Approvals	UL1778, cUL1778, FCC Part 15 Class A
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Options

Bypass Static Switch	SYSWT1000KG, SYSWB1000KG, SYSWT3000KG, SYSWB3000KG, SYSWT4000KG, SYSWB4000KG
Maintenance Bypass Panel	SYMBP400C1G12L100
Battery Cabinets	SYB400K1000GXR-2C
Battery Breaker Box	SYSBB400K600G

Symmetra MW 600kW UPS

SY600K600G

Product Overview

Description	The Symmetra MW, the first ever fault-tolerant modular UPS redefines high-power UPS technology in the 400–1600kW power range, including paralleling features to handle even larger load requirements.
Features	Modular design, adapt and expand UPS power, top and bottom cable entry (standard), modular fault-tolerant design, early-warning problem notification, paralleling features for capacity and redundancy, distributed inverter technology for fault containment, self-diagnosing, self-testing, front-access servicing, modular-level repair, component-level predictive failure analysis, menu-driven repair instructions, monitor power attributes for entire management solution, intelligent battery management, advanced 10-inch color LCD touch screen, single-interface management of multiple products, configurable display layout, menu-driven operating instructions, monitoring through network and web, state-of-the-art topology, rated for power-factor corrected loads, temperature compensated battery charging, full-rated power with kVA equaling kW
Includes	User Manual

Performance

AC–AC Efficiency	97% (at full load)
Load Power Factor	0.9 lead to 0.8 lag
Overload Capacity	
Utility Operation	125% for 10 minutes, 200% for 60 secs
Battery Operation	150% for 30 secs
Heat Dissipation	63 386BTU/hr. (18.56kW)

Electrical

Input	
Nominal Voltage	480 V
Voltage Range	±15% for normal operation, ±10% for static bypass operation
Nominal Current	818 A
Current Limit	938 A
Voltage Tolerance	±15%
Frequency (programmable)	60Hz, ±0.5–8%
Frequency Range (Default)	50, 60Hz (60Hz)
Frequency Synch Tolerance Range	±0.5%–8.0% (6%)

Electrical

Slew Rate Range (Default)	0.25–4Hz/s (1 Hz/s)
Soft Start Ramp Time Range	1–40s (10s)
Current Distortion	<5% THD
Power Factor	~1
Backfeed Protection	Built-in
Maximum Short Circuit Level	200kAIC
Feeder Breaker Size	200 000AT (Recommended)
Minimum Conductor Size	3 × 400kcmil
Termination Bolt Size	M12
Torque Rating	433 in-lbs
Short Circuit Withstand Rating	100 000 Symmetrical Amperes
Connection Type	Hard Wire 4-wire (3PH+ G)
Output	
Capacity	600kW/kVA
Nominal Voltage	480V
Nominal Current	722A
Voltage Distortion	Max 3% linear load
Frequency	60Hz (mains synchronized); 60Hz ± 0.1% (free-running)
Frequency Range (Default)	Input tracking, 0.1% of nominal while in battery operation
Slew Rate Range (Default)	0.25–4Hz/s (1 Hz/s)
Voltage Regulation	±1% for balanced load, ±3% for unbalanced load
Dynamic Voltage Regulation	±5% at 100% load step
Maximum Voltage Distortion	3% for linear load, 5% for non-linear load
Voltage Tolerance	± 1% static, sym. load 0–100%, ± static, asym. load 0–100%, ±5% after 2 ms and ±1% after 50 ms dynamic, sym load 0–100%
Overload Levels	200% for 60s in normal operation, 125% for 10m in normal operation, 150% for 30s in battery operation, 125% continuous in static bypass operation
Connection Type	(1) Hard Wire 4-wire (3PH + G)
Recommended Breaker Size	1000AT
Minimum Conductor Size	3 × 400AT
Termination Bolt Size	M12
Torque Rating	433 in-lbs

Battery

Nominal Voltage	2 × 384V
Number of Battery Cells	2 × 192pcs
Float Charge Voltage Range (Default)	2 × 410–460V (2 × 438V)

Battery

Equalize Charge Voltage Range (Default)	2 × 438–460V (2 × 438V)
Low Battery Warning Range (Default)	2 × 336–384V (2 × 346V)
Low Battery Shutdown	2 × 310–336V (2 × 321V)
DC–AC Efficiency	
25% Linear Load	96.0%
50% Linear Load	97.0%
75% Linear Load	97.0%
100% Linear Load	96.0%
Full Load (P)	625
Nominal Discharge Current	814A
Maximum Discharge Current	975A
Nominal Recharge Current	81A
Recommended Circuit Breaker	2 × 1000A
Minimum Conductor Size	3 × 400kcmil
Connection Type	Hardwire 2 × Pos + 2 × Neg + 2 × PE
Termination Bolt Size/ Torque Rating	M12/ 433 in-lbs

Communication and Management

Interface Port	RJ-45 10/100BaseT
Control Panel	Advanced 10" Color LCD Touch Screen User Interface
Audible Alarm	Audible and visual alarms prioritized by severity
Emergency Power Off (EPO)	Yes
Emergency Module Off (EMO)	Yes

Physical

Dimensions (H × W × D)	
UPS	80 × 83 × 42in (2032 × 2110 × 1067mm)
Shipping	86 × 98 × 46in (2184 × 2489 × 1168mm)
Weight	
UPS	5511 lb (2500kg)
Shipping	5711 lb (2596kg)
Warranty	1 year parts, optional on-site warranties available

Environmental

Temperature	
Operating	32 to 104° F (0 to 40°C)
Storage	-58 to 104° F (-50 to 40° C)
Humidity	
Operating	0–95%, non-condensing
Storage	0–95%, non-condensing
Elevation	
Operating	0 to 3333 ft (0 to 1000m) (without derating)
Storage	0 to 50 000ft (0 to 15 000m)
Audible Noise	72 dBA at 3 ft from Surface of Unit
Protection Class	NEMA 1 with NEMA 12 optional

Compliance

Approvals	UL1778, cUL1778, FCC Part 15 Class A
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Options

Bypass Static Switch	SYSWT1000KG, SYSWB1000KG, SYSWT3000KG, SYSWB3000KG, SYSWT4000KG, SYSWB4000KG
Bypass Panel	SYMBP600C1G12L100
Battery Cabinets	SYB400K1000GXR-2C
Battery Breaker Box	SYSBB400K600G

Symmetra MW 800kW UPS

SY800K800G

Product Overview

Description	The Symmetra MW, the first ever fault-tolerant modular UPS redefines high-power UPS technology in the 400–1600kW power range, including paralleling features to handle even larger load requirements.
Features	Modular design, adapt and expand UPS power, top and bottom cable entry (standard), modular fault-tolerant design, early-warning problem notification, paralleling features for capacity and redundancy, distributed inverter technology for fault containment, self-diagnosing, self-testing, front-access servicing, modular-level repair, component-level predictive failure analysis, menu-driven repair instructions, monitor power attributes for entire management solution, intelligent battery management, advanced 10-inch color LCD touch screen, single-interface management of multiple products, configurable display layout, menu-driven operating instructions, monitoring through network and web, state-of-the-art topology, rated for power-factor corrected loads, temperature compensated battery charging, full-rated power with kVA equaling kW
Includes	User Manual

Performance

AC–AC Efficiency	97% (at full load)
Load Power Factor	0.9 lead to 0.8 lag
Overload Capacity	
Utility Operation	125% for 10 minutes, 200% for 60 secs
Battery Operation	150% for 30 secs
Heat Dissipation	84 492BTU/hr. (24.74kW)

Electrical

Input	
Nominal Voltage	480V
Voltage Range	±15% for normal operation, ±10% for static bypass operation
Nominal Current	992A
Nominal Current + Battery Charge	1091A
Current Limit	1251A
Voltage Tolerance	±15%
Frequency (programmable)	60Hz, ±0.5–8%
Frequency Synch Tolerance Range	±0.5%–8.0% (6%)

Electrical

Slew Rate Range (Default)	0.25–4Hz/s (1 Hz/s)
Soft Start Ramp Time Range (Default)	1–40s (10s)
Current Distortion	< 5% THD
Power Factor	~1
Backfeed Protection	Built-in
Maximum Short Circuit Level	200kAIC
Recommended Feeder Breaker Size	1200AT
Minimum Conductor Size	4 × 350kcmil
Termination Bolt Size/ Torque Rating	M12
Torque Rating	433 in-lbs
Short Circuit Withstand Rating	200 000 Symmetrical Amperes
Connection Type	Hard Wire 4-wire (3PH + G)
Output	
Capacity	800kW/kVA
Nominal Voltage	480V
Voltage Distortion	Max 3% linear load
Frequency	60Hz (mains synchronized); 60Hz ± 0.1% (free-running)
Frequency Range (Default)	50, 60Hz (60Hz)
Frequency Regulation	Input Tracking, 0.1% of nominal while in battery reserve
Slew Rate Range (Default)	0.25–4Hz/s (1 Hz/s)
Voltage Tolerance	± 1% static, sym. load 0–100%, ± static, asym. load 0–100%, ±5% after 2 ms and ±1% after 50 ms dynamic, sym load 0–100%
Voltage Regulation	±1% balanced load, ±3% unbalanced load
Dynamic Voltage Regulation	±5% at 100% load step
Maximum Voltage Distortion	3% linear, 5% non-linear
Overload Levels	200% for 60s in normal operation, 125% for 10m in normal operation, 150% for 30s in battery operation, 125% continuous in static bypass operation
Connection Type	Hard Wire 4-wire (3PH + G)
Recommended Breaker Size	1200AT
Minimum Conductor Size	4 × 350kcmil
Termination Bolt Size/Torque Rating	M12
Torque Rating	433 in-lbs

Battery

Nominal Voltage	2 × 384V
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Battery

Number of Battery Cells	2 × 192 pcs
Float Charge Voltage Range (Default)	2 × 410–460V (2 × 438V)
Equalize Charge Voltage Range (Default)	2 × 438–460V (2 × 438V)
Low Battery Warning Range (Default)	2 × 336–384V (2 × 346V)
Low Battery Shutdown	2 × 310–336V (2 × 321V)
Full Load (P)	833
DC–AC Efficiency	
25% Linear Load	96%
50% Linear Load	97%
75% Linear Load	97%
100% Linear Load	96%
Nominal Discharge Current	1085 A
Nominal Recharge Current	109 A
Recommended Circuit Breaker	2 × 1600 AT
Minimum Conductor Size	5 × 500 kcmil
Connection Size	Hardwire 2 × Pos + 2 × Neg + 2 × PE
Termination Stud Size/ Torque Rating	M 12/ 433 in-lbs

Communication and Management

Interface Port	RJ-45 10/100BaseT
Control Panel	Advanced 10" Color LCD Touch Screen User Interface
Audible Alarm	Audible and visual alarms prioritized by severity
Emergency Power Off (EPO)	Yes
Emergency Module Off (EMO)	Yes

Physical

Dimensions (H × W × D)	
UPS	80 × 146 × 42 in (2032 × 3709 × 1067 mm)
Shipping	86 × 161 × 46 in (2184 × 4089 × 1168 mm)
Weight	
UPS	9284 lb (4220 kg)
Shipping	9446 lb (4294 kg)

Environmental

Temperature	
Operating	32 to 104° F (0 to 40°C)
Storage	-58 to 104° F (-50 to 40° C)
Humidity	
Operating	0-95%, non-condensing
Storage	0-95%, non-condensing
Elevation	
Operating	0 to 3333 ft (0 to 1000m) (without derating)
Storage	0 to 50 000ft (0 to 15 000m)
Audible Noise	72 dBA at 3 ft from Surface of Unit
Protection Class	NEMA 1 with NEMA 12 optional

Compliance

Approvals	UL1778, cUL1778, FCC Part 15 Class A
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Options

Bypass Static Switch	SYSWT1000KG, SYSWB1000KG, SYSWT2000KG, SYSWB2000KG, SYSWT3000KG, SYSWB3000KG, SYSWT4000KG, SYSWB4000KG
Maintenance Bypass Panel	SYMBP800C1G12L100
Battery Cabinets	SYB400K1000GXR-2C
Battery Breaker Box	SYSBB800K800G

Symmetra MW 1 MW UPS

SY1000K1000G

Product Overview

Description	The Symmetra MW, the first ever fault-tolerant modular UPS redefines high-power UPS technology in the 400–1600kW power range, including paralleling features to handle even larger load requirements.
Features	Modular design, adapt and expand UPS power, top and bottom cable entry (standard), modular fault-tolerant design, early-warning problem notification, paralleling features for capacity and redundancy, distributed inverter technology for fault containment, self-diagnosing, self-testing, front-access servicing, modular-level repair, component-level predictive failure analysis, menu-driven repair instructions, monitor power attributes for entire management solution, intelligent battery management, advanced 10-inch color LCD touch screen, single-interface management of multiple products, configurable display layout, menu-driven operating instructions, monitoring through network and web, state-of-the-art topology, rated for power-factor corrected loads, temperature compensated battery charging, full-rated power with kVA equaling kW
Includes	User Manual

Performance

AC–AC Efficiency	97% (at full load)
Load Power Factor	0.9 lead to 0.8 lag
Overload Capacity	
Utility Operation	125% for 10 minutes, 200% for 60 secs
Battery Operation	150% for 30 secs
Heat Dissipation	105 631 BTU/hr. (30.93 kW)

Electrical

Input	
Nominal Voltage	480 V 3 ϕ + G
Voltage Range	\pm 15% for normal operation, \pm 10% for static bypass operation
Nominal Current	1240 A
Nominal Current + Battery Charge	1364 A
Current Limit	1564 A
Voltage Tolerance	\pm 15%
Input Frequency	60 Hz, \pm 0.5–8% (programmable)
Frequency Range (Default)	50, 60 Hz (60 Hz)

Electrical

Frequency Synch Tolerance (Default)	±0.5%–8.0% (6%)
Slew Rate Range (Default)	0.25–4Hz/s (1Hz/s)
Soft Start Ramp Time Range (Default)	1–40s (10s)
Current Distortion	<5% THD
Input Power Factor	~1
Backfeed Protection	Built-in
Max. Short Circuit Level	200kAIC
Connection Type	Hard Wire 4-wire (3PH + G)
Feeder Breaker Size	1600AT (Recommended)
Termination Bolt Size	M12
Torque Rating	433 in-lbs
Short Circuit Withstand Rating	200 000 Symmetrical Amperes
Minimum Conductor Size	5 × 500kcmil
Output	
Capacity	1000kW/kVA
Nominal Voltage	480V
Nominal Current	1203A
Voltage Distortion	Max 3% linear load
Frequency	60Hz (mains synchronized); 60Hz ± 0.1% (free-running)
Frequency Range (Default)	50, 60Hz (60Hz)
Frequency Regulation	Input tracking, 0.1% of nominal while in battery reserve
Slew Rate Range (Default)	0.25–4Hz/s (1Hz/s)
Voltage Tolerance	± 1% static, sym. load 0–100%, ± static, asym. load 0–100%, ±5% after 2 ms and ±1% after 50 ms dynamic, sym load 0–100%
Voltage Regulation	±1% for balanced load, ±3% for unbalanced load
Dynamic Voltage Regulation	±5% at 100% load step
Maximum Voltage Distortion	3% for linear load, 5% for non-linear load
Overload Levels	200% for 60s in normal operation, 125% for 10m in normal operation, 150% for 30s in battery operation, 125% continuous in static bypass operation
Connection Type	Hard Wire 4-wire (3PH + G)
Recommended Breaker Size	1600AT
Minimum Conductor Size	5 × 500AT
Termination Bolt Size	M12
Torque Rating	433 in-lbs

Battery

Nominal Voltage	2 × 384V
Number of Battery Cells	2 × 192pcs
Float Charge Voltage Range (Default)	2 × 410–460V (2 × 438V)
Equalize Charge Voltage Range (Default)	2 × 438–460V (2 × 438V)
Low Battery Warning Range (Default)	2 × 336–384V (2 × 346V)
Low Battery Shutdown	2 × 310–336V (2 × 321V)
Full Load (P)	1042
DC–AC Efficiency	
25% Linear Load	96.0%
50% Linear Load	97.0%
75% Linear Load	97.0%
100% Linear Load	96.0%
Nominal Discharge Current	1357A
Maximum Discharge Current	1623A
Nominal Recharge Current	2 × 1600AT
Recommended Circuit Breaker	135.6A
Minimum Conductor Size	5 × 500kcmil
Connection Type	Hardwire 2 × Pos + 2 × Neg + 2 × PE
Termination Bolt Size/ Torque Rating	M12/ 433 in-lbs

Communication and Management

Interface Port	RJ-45 10/100BaseT
Control Panel	Advanced 10” Color LCD Touch Screen User Interface
Audible Alarm	Audible and visual alarms prioritized by severity
Emergency Power Off (EPO)	Yes
Emergency Module Off (EMO)	Yes

Physical

Dimensions (H × W × D)	
UPS	80 × 163 × 42 in (2032 × 4141 × 1067mm)
Shipping	86 × 198 × 46 in (2180 × 5030 × 1170mm)
Weight	
UPS	11 111lb (5040kg)
Shipping	11 250lb (5114kg)

Environmental

Temperature	
Operating	32 to 104° F (0 to 40°C)
Storage	-58 to 104° F (-50 to 40° C)
Humidity	
Operating	0–95%, non-condensing
Storage	0–95%, non-condensing
Elevation	
Operating	0 to 3333 ft (0 to 1000m) (without derating)
Storage	0 to 50 000ft (0 to 15 000m)
Audible Noise	72 dBA at 3 ft from Surface of Unit
Protection Class	NEMA 1 with NEMA 12 optional

Compliance

Approvals	UL1778, cUL1778, FCC Part 15 Class A
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Options

Bypass Static Switch	SYSWT1000KG, SYSWB1000KG, SYSWT2000KG, SYSWB2000KG, SYSWT3000KG, SYSWB3000KG, SYSWT4000KG, SYSWB4000KG
Maintenance Bypass Panel	SYMBP1000C1G12L100
Battery Cabinets	SYB400K1000GXR-2C
Battery Breaker Box	SYSBB800K1000G

Symmetra MW 1.6MW UPS

SY1600K1600G

Product Overview

Description	The Symmetra MW, the first ever fault-tolerant modular UPS redefines high-power UPS technology in the 400–1600kW power range, including paralleling features to handle even larger load requirements.
Features	Modular design, adapt and expand UPS power, top and bottom cable entry (standard), modular fault-tolerant design, early-warning problem notification, paralleling features for capacity and redundancy, distributed inverter technology for fault containment, self-diagnosing, self-testing, front-access servicing, modular-level repair, component-level predictive failure analysis, menu-driven repair instructions, monitor power attributes for entire management solution, intelligent battery management, advanced 10-inch color LCD touch screen, single-interface management of multiple products, configurable display layout, menu-driven operating instructions, monitoring through network and web, state-of-the-art topology, rated for power-factor corrected loads, temperature compensated battery charging, full-rated power with kVA equaling kW
Includes	User Manual

Performance

AC–AC Efficiency	97% (at full load)
Load Power Factor	0.9 lead to 0.8 lag
Overload Capacity	
Utility Operation	125% for 10 minutes, 200% for 60 secs
Battery Operation	150% for 30 secs
Heat Dissipation	168 983 BTU/hr. (49.48kW)

Electrical

Input	
Nominal Voltage	480 V 3 ϕ + G
Voltage Range	\pm 15% for normal operation, \pm 10% for static bypass operation
Nominal Current	2182 A
Nominal Current + Battery Charge	1364 A
Current Limit	1564 A
Voltage Tolerance	\pm 15%
Input Frequency	60Hz, \pm 0.5–8% (programmable)

Electrical

Frequency Range (Default)	50, 60Hz (60Hz)
Frequency Synch Tolerance (Default)	$\pm 0.5\%$ – 8.0% (6%)
Slew Rate Range (Default)	0.25–4Hz/s (1Hz/s)
Soft Start Ramp Time Range (Default)	1–40s (10s)
Current Distortion	<5% THD
Input Power Factor	~ 1
Backfeed Protection	Built-in
Max. Short Circuit Level	200kAIC
Connection Type	Hard Wire 4-wire (3PH + G)
Feeder Breaker Size	1600AT (Recommended)
Termination Bolt Size	M12
Torque Rating	433 in-lbs
Short Circuit Withstand Rating	200 000 Symmetrical Amperes
Minimum Conductor Size	5 × 500kcmil
Output	
Capacity	1600kW/kVA
Nominal Voltage	480 V
Nominal Current	1925 A
Voltage Distortion	Max 3% linear load
Frequency	60Hz (mains synchronized); 60Hz $\pm 0.1\%$ (free-running)
Frequency Range (Default)	50, 60Hz (60Hz)
Frequency Regulation	Input tracking, 0.1% of nominal while in battery reserve
Slew Rate Range (Default)	0.25–4Hz/s (1Hz/s)
Voltage Tolerance	$\pm 1\%$ static, sym. load 0–100%, \pm static, asym. load 0–100%, $\pm 5\%$ after 2 ms and $\pm 1\%$ after 50 ms dynamic, sym load 0–100%
Voltage Regulation	$\pm 1\%$ for balanced load, $\pm 3\%$ for unbalanced load
Dynamic Voltage Regulation	$\pm 5\%$ at 100% load step
Maximum Voltage Distortion	3% for linear load, 5% for non-linear load
Overload Levels	200% for 60s in normal operation, 125% for 10m in normal operation, 150% for 30s in battery operation, 125% continuous in static bypass operation
Connection Type	Hard Wire 4-wire (3PH + G)
Recommended Breaker Size	1600AT
Minimum Conductor Size	5 × 500AT
Termination Bolt Size	M12
Torque Rating	433 in-lbs

Battery

Nominal Voltage	2 × 384V
Number of Battery Cells	2 × 192 pcs
Float Charge Voltage Range (Default)	2 × 410–460 V (2 × 438 V)
Equalize Charge Voltage Range (Default)	2 × 438–460 V (2 × 438 V)
Low Battery Warning Range (Default)	2 × 336–384 V (2 × 346 V)
Low Battery Shutdown	2 × 310–336 V (2 × 321 V)
Full Load (P)	1667
Nominal Discharge Current	2171 A

Communication and Management

Interface Port	RJ-45 10/100BaseT
Control Panel	Advanced 10" Color LCD Touch Screen User Interface
Audible Alarm	Audible and visual alarms prioritized by severity
Emergency Power Off (EPO)	Yes
Emergency Module Off (EMO)	Yes

Physical

Dimensions (H × W × D)	
UPS	80 × 216 × 42 in (2030 × 5486 × 1079 mm)
Shipping	86 × 246 × 46 in (2180 × 6250 × 1170 mm)
Weight	
UPS without power module	18 093 lb (8207 kg)
UPS with power module	22 359 lb (10 142 kg)
Warranty	1 year parts, optional on-site warranties available

Environmental

Temperature	
Operating	32 to 104° F (0 to 40°C)
Storage	–58 to 104° F (–50 to 40° C)
Humidity	
Operating	0–95%, non-condensing
Storage	0–95%, non-condensing
Elevation	
Operating	0 to 3333 ft (0 to 1000 m) (without derating)
Storage	0 to 50 000 ft (0 to 15 000 m)

Environmental

Audible Noise	72 dBA at 3 ft from Surface of Unit
Protection Class	NEMA 1 with NEMA 12 optional

Compliance

Approvals	UL1778, cUL1778, FCC Part 15 Class A
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Options

Bypass Static Switch	SYSWT2000KG, SYSWB2000KG, SYSWT300KG, SYSWB3000KG, SYSWT4000KG, SYSWB4000KG
Battery Cabinets	SYB1200K1600GXR-2C
Battery Breaker Box	SYSBB1200K1600G

Bypass Static Switches

SYSWT1000KG, SYSWB1000KG

Product Overview

Description	APC Symmetra MW: 100 000W; 480V 3-phase input; 480V 3-phase output
Features	200% overload capability; audible alarms; automatic self test; delta conversion on-line technology; designed and manufactured under ISO9001 / ISO14001 certification; downloadable firmware; environmental protection; EPO; event logging; full-rated power with kVA equaling kW; hot swappable components; input power factor correction; LCD alphanumeric display; N+1 redundancy; overload indicator; paralleling capability; scalable power capacity; status indicator LED's; web management
Includes	User Manual

Performance

Power Range	1 MVA/1MW
Overload	125% continuous

Electrical

Output	
Voltage Output	3 × 480V
Tolerance	Programmable ±4%, ±6%, ±8%, ±10%, Standard ±10% (in bypass operation)
Input	
Voltage Input	3 × 480V
Tolerance	Programmable ±4%, ±6%, ±8%, ±10%, Standard ±10%

Communication and Management

Control Panel	Advanced 10" Color LCD Touch Screen
Audible Alarm	Audible and visual alarms prioritized by severity
Emergency Power Off (EPO)	Yes

Physical	SYSWT1000KG	SYSWB1000KG
Cable Entry	Top	Bottom
Dimensions (H × W × D)	32 × 16 × 16in (800 × 400 × 400mm)	
Weight	1450lbs (659kg)	
Warranty	1 year parts, optional on-site warranties available	

Compliance

Approvals

cUL Listed, FCC Part 15 Class A, UL 1778 Listed

SYSWT2000KG, SYSWB2000KG**Product Overview**

Description	APC Symmetra MW: 2 000 000W, 480V 3-phase input, 480V 3-phase output
Features	200% overload capability; audible alarms; automatic self test; delta conversion on-line technology; designed and manufactured under ISO9001 / ISO14001 certification; downloadable firmware; environmental protection; EPO; event logging; full-rated power with kVA equaling kW; hot swappable components; input power factor correction; LCD alphanumeric display; N+1 redundancy; overload indicator; paralleling capability; scalable power capacity; status indicator LED's; web management
Includes	User Manual

Performance

Power Range	2MVA/2MW
Overload	125% continuous

Electrical

Output	
Voltage Output	3 × 480V
Tolerance	Programmable ±4%, ±6%, ±8%, ±10%, Standard ±10% (in bypass operation)
Input	
Voltage Input	3 × 480V
Tolerance	Programmable ±4%, ±6%, ±8%, ±10%, Standard ±10%

Communication and Management

Control Panel	Advanced 10" Color LCD Touch Screen
Audible Alarm	Audible and visual alarms prioritized by severity
Emergency Power Off (EPO)	Yes

Physical	SYSWT2000KG	SYSWB2000KG
Cable Entry	Top	Bottom
Dimensions (H × W × D)	32 × 16 × 16 in (800 × 400 × 400 mm)	
Weight	1450 lbs (659 kg)	
Warranty	1 year parts, optional on-site warranties available	

Compliance

Approvals	cUL Listed, FCC Part 15 Class A, UL 1778 Listed
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SYSWT3000KG, SYSWB3000KG

Product Overview

Description	APC Symmetra MW: 3 000 000W; 480V 3-phase input, 480V 3-phase output
Features	200% overload capability; audible alarms; automatic self test; delta conversion on-line technology; designed and manufactured under ISO9001 / ISO14001 certification; downloadable firmware; environmental protection; EPO; event logging; full-rated power with kVA equaling kW; hot swapable components; input power factor correction; LCD alphanumeric display; N+1 redundancy; overload indicator; paralleling capability; scalable power capacity; status indicator LED's; web management
Includes	User Manual

Performance

Power Range	3 MVA/3MW
Overload	125% continuous

Electrical

Output	
Voltage Output	3 × 480V
Tolerance	Programmable ±4%, ±6%, ±8%, ±10%, Standard ±10% (in bypass operation)
Input	
Voltage Input	3 × 480V
Tolerance	Programmable ±4%, ±6%, ±8%, ±10%, Standard ±10%

Communication and Management

Control Panel	Advanced 10" Color LCD Touch Screen
Audible Alarm	Audible and visual alarms prioritized by severity
Emergency Power Off (EPO)	Yes

Physical	SYSWT3000KG	SYSWB3000KG
Cable Entry	Top	Bottom
Dimensions (H × W × D)	32 × 25 × 16 in (800 × 630 × 410mm)	
Weight	2650lb (1205kg)	
Warranty	1 year parts, optional on-site warranties available	

Compliance

Approvals	cUL Listed, FCC Part 15 Class A, UL 1778 Listed
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SYSWT4000KG, SYSWB4000KG**Product Overview**

Description	APC Symmetra MW: 4 000 000 W; 480V input; 480V output
Features	200% overload capability; audible alarms; automatic self test; delta conversion on-line technology; designed and manufactured under ISO9001 / ISO14001 certification; downloadable firmware; environmental protection; EPO; event logging; full-rated power with kVA equaling kW; hot swappable components; input power factor correction; LCD alphanumeric display; N+1 redundancy; overload indicator; paralleling capability; scalable power capacity; status indicator LED's; web management
Includes	User Manual

Performance

Power Range	4MVA/4MW
Overload	125% continuous

Electrical

Output	
Voltage Output	3 × 480V
Tolerance	Programmable ±4%, ±6%, ±8%, ±10%, Standard ±10% (in bypass operation)
Input	
Voltage Input	3 × 480V
Tolerance	Programmable ±4%, ±6%, ±8%, ±10%, Standard ±10%

Communication and Management

Control Panel	Advanced 10" Color LCD Touch Screen
Audible Alarm	Audible and visual alarms prioritized by severity
Emergency Power Off (EPO)	Yes

Physical	SYSWT4000KG	SYSWB4000KG
Cable Entry	Top	Bottom
Dimensions (H × W × D)	32 × 25 × 16 in (800 × 630 × 410mm)	
Weight	2650lb (1205kg)	
Warranty	1 year parts, option on-site warranties available	

Compliance

Approvals	cUL Listed, FCC Part 15 Class A, UL 1778 Listed
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Maintenance Bypass Panels

SYMBP800C1G12L100

Product Overview

Description	Facilitates the transfer of power from the Symmetra MW UPS to bypass operation in the event of power loss or to allow maintenance to be performed on the UPS.
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Performance

Power Range	800kW
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Electrical

Input

Power Range	1 MW
Nominal Current	962 A
Supply Voltage	3 × 480 VAC/60 Hz 3-wire system
Max. Short Circuit Current	100kAIC Direct on AC Input
Shunt Trip	24 VDC

Output

Max. Short Circuit Current	100kAIC Direct on AC Output
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Physical

Dimensions (H × W × D)	80 × 152 × 42 in (2032 × 3861 × 1067 mm)
Weight	6200 lb (2818 kg)

Compliance

Approvals	UL891 and cUL891, UL1778 and cUL1778, NEMA 1, NEMA 12 optional
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SYMBP1000C1G12L100

Product Overview

Description	Facilitates the transfer of power from the Symmetra MW UPS to bypass operation in the event of power loss or to allow maintenance to be performed on the UPS.
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Performance

Power Range	1000kW
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Electrical

Input

Nominal Current	1203 A
Supply Voltage	3 × 480VAC/60Hz 3-wire system
Max. Short Circuit Current	100kA Direct on AC Input
Shunt Trip	24VDC

Output

Max. Short Circuit Current	100kAIC Direct on AC Output
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Physical

Dimensions (H × W × D)	80 × 152 × 42in (2032 × 3861 × 1067mm)
Weight	6200lb (2818kg)

Compliance

Approvals	UL891 and cUL891, UL1778 and cUL1778, NEMA 1, NEMA 12 optional
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Battery Cabinets

SYB400K1000GXR-2C

Product Overview

Description	A battery back-up system for the Symmetra MW
Includes	Battery Breaker(s) and Cables, Installation Guide

Battery

Type	VRLA		
Volt-Amp-Hour-Capacity	150 for 400kW–1MW; 250 for 1.6MW		
Expected Battery Life	3–5 years		
Battery Run Times		PF 1.0	PF 0.8
400kW	1 cabinet	3 min	5 min
	2 cabinets	13 min	18 min
	3 cabinets	23 min	32 min
	4 cabinets	32 min	45 min
600kW	1 cabinet	N/A	
	2 cabinets	6 min	9 min
	3 cabinets	13 min	18 min
	4 cabinets	20 min	27 min
800kW	1 cabinet	N/A	N/A
	2 cabinets	N/A	N/A
	3 cabinets	7 min	11 min
	4 cabinets	13 min	18 min
1 MW	1 cabinet	N/A	N/A
	2 cabinets	N/A	N/A
	3 cabinets	4 min	7 min
	4 cabinets	9 min	13 min

Physical

Dimensions (H × W × D)	80 × 66 × 38in (2032 × 1667 × 965mm)
Weight (full string)	8400lb (3818kg)

Environmental

Temperature	
Operating	68 to 77° F (20 to 25° C)
Storage	68 to 77° F (20 to 25° C)
Humidity	

Environmental

Operating	0–95%, non-condensing
Storage	0–95%, non-condensing
Elevation	
Operating	0 to 10 000 ft (0 to 3000m)

Compliance

Approvals	UL1778 and cUL1778, NEMA1 NEMA 12 optional
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Battery Breaker Boxes

SYBB800K1000G

Performance

Power Range 800kW to 1MW

Electrical

Nominal Current 1097A; 1371A

Maximum Current 1291A; 1612A

Voltage 2 × 384 VDC nominal, max voltages 2 × 475 VDC, min voltages 2 × 326VDC

Physical

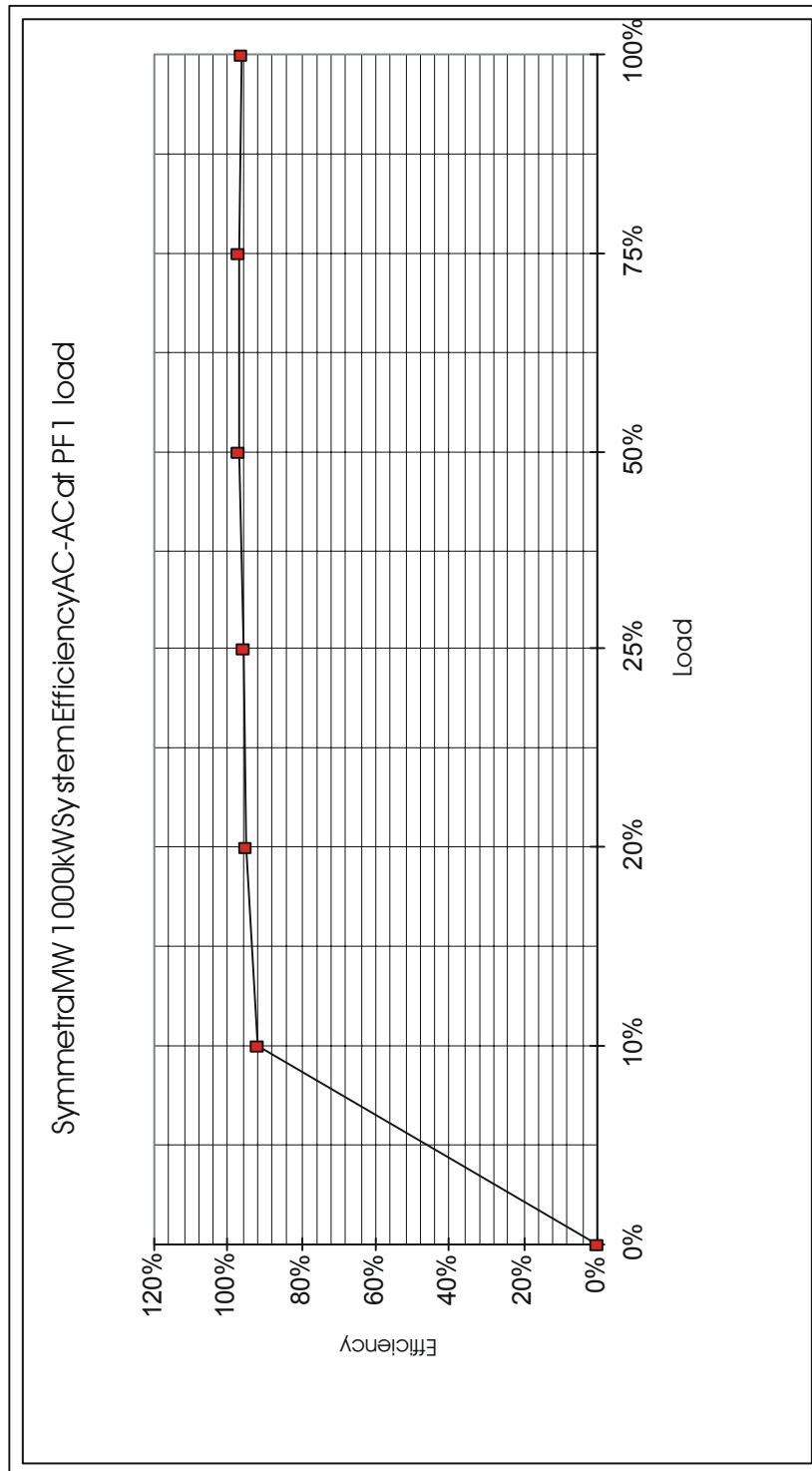
Dimensions (H × W × D) 80 × 46 × 38in (2032 × 1168 × 965mm)

Weight 1400lb (635kg)

Compliance

Approvals UL891 and cUL891, UL1778 and cUL1778, NEMA 1, NEMA 12 optional

Symmetra MW 1000kW system efficiency AC-AC at PF1 load



40kW InfraStruXure PDU

PD40F6FK1-M, PD40G6FK1-M, PD40L6FK1-M

Product Overview

Description	Configured to order, factory assembled power distribution for Information Technology equipment in medium to large data centers. The Configure-To-Order process allows for the pre-installation of pre-tested breakers, cut-to-size power whips, load-test ports, and branch circuit monitoring boards.
Features	Small footprint, circuit breaker panel, system mobility, transformer for step-down or step-up availability, wrap around system bypass, load test port, alarm thresholds, wide range of applications, local and web-based monitoring, front access servicing, alarm thresholds, most subfeed breakers per service area, top and bottom entry, two 42-position power panels.
Includes	Installation guide, user manual

Electrical	PD40F6FK1-M	PD40G6FK1-M	PD40L6FK1-M
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Input

Nominal Voltage Requirements	208/120V	480/277V	600/346V
Nominal Current	125 A	54 A	43 A
Frequency	57–63 Hz	57–63 Hz	57–63 Hz
Voltage Configuration			
Transformer	3W + G + GEC		
Without Transformer	4W + G		
Upstream Circuit Breaker ††	175 AT	80 AT	60 AT
Main Input Conductor Size ‡	3/0 AWG	#3 AWG	#4 AWG
UPS Breaker Size	175 AT	175 AT	175 AT
Maximum Continuous Current	155 A	67 A	54 A
Grounding	PE node (from AC or floor grid)		

Output

Voltage AC	3-phase 4-wire PE		
Nominal Voltage	208:120V WYE		
UPS Breaker Size	150 AT	150 AT	150 AT
Max. Distribution Breaker Size	150 AT	150 AT	150 AT
Number of Distribution Panels	2 × 225 A, 42- position		
Full Load Rating	40 kW	40 kW	40 kW
Max. Contin Current + 125% overload	139 A	139 A	139 A
Nominal Current	111 A	111 A	111 A

Electrical	PD40F6FK1-M	PD40G6FK1-M	PD40L6FK1-M
Internal Static Switch Fuses [†]	175 A		
Over-current Protection			
PDU Current	Determined by UPS		
Grounding	Separately derived neutral/ground bond		
Wiring			
UPS to PDU	3W + G (1/0 AWG)		
PDU to Distribution Panels	4W + G (1/0 AWG)		
Distribution Panels to Racks/Power Strips	4W + G (12 AWG)		
Power Cable Connections	L21-20 connector system		
Power Cable Lengths	various		
Recommended Wire Sizing [‡]			
L1, L2, L3, N	3/0 AWG	6 AWG	6 AWG
G	6 AWG	8 AWG	8 AWG
GEC	4 AWG	8 AWG	8 AWG
Power Cable—top	Accommodates 28, 3-phase power cables (42 knock outs)		
Power Cable—bottom	Accommodates 28, 3-phase power cables (48 knock outs)		
Panel Boards			
Panel Style	3-phase		
Number of Panels per PDU	2 maximum		
Positions per Panel	42		
3-Phase Breakers per Panel	14 maximum		
1-Phase Breakers per Panel	42 maximum		
Panel Rating	240V/225 A (per phase)		
Breaker Pitch	3/4 in		
Accessibility	Through front of the unit		
Physical			
PD40F6FK1-M PD40G6FK1-M PD40L6FK1-M			
Dimensions (H×W×D)			
PDU	81×24×36 in. (2057 × 610 × 914 mm)		
Shipping	86 × 36 × 48 in (2184 × 914 × 1219 mm)		
Weight			
PDU	1580lb (718.18kg)		
Shipping	1680lb (763.6kg)		
Heat Output With Transformer	4645BTU	4617BTU	3425BTU
Transformer (if installed)			
Type	Isolation	Step-down	Step-down
Configuration	Delta to WYE		

Physical	PD40F6FK1-M	PD40G6FK1-M	PD40L6FK1-M
Maximum Power Rating	60kVA		
Maximum Current Rating	166 A	72 A	58 A
Construction	Cu windings, open core		
Temperature Rating	220° C (Class H)		
Maximum Temperature Rise	150°C		
Efficiency	97–98%		
Environmental			
Operating Environment	Protected from water and conductive contaminants		
Temperature			
Operating	32 to 104° F (0 to 40°C)		
Storage	32 to 113° F (0 to 45°C)		
Class	Class H (220°C)		
Humidity			
Operating	0 to 95%, non-condensing		
Storage	0 to 95%, non-condensing		
Elevation			
Storage	10 000 m		
Acoustic Noise Emission	Maximum 50dB(A) at 1 m		
Heat Rejection at Full Load	5194BTU/hr. (1.5kW)		
Compliance			
Approvals	UL 60950, cUL		

† Transformerless units only.

†† Provided by the customer.

‡ The specifications are recommendations. Consult the NEC and local codes for requirements specific to your installation.

60kW InfraStruXure PDU

PD60F6FK1, PD60G6FK1, PD60L6FK1

Product Overview

Description	Configured to order, factory assembled power distribution for Information Technology equipment in medium to large data centers. The Configure-To-Order process allows for the pre-installation of pre-tested breakers, cut-to-size power whips, load-test ports, and branch circuit monitoring boards.
Features	Small footprint, circuit breaker panel, system mobility, transformer for step-down or step-up availability, wrap around system bypass, load test port, alarm thresholds, wide range of applications, local and web-based monitoring, front access servicing
Includes	Installation guide, user manual

Electrical	208V	480V	600V	208V (transformerless)
Input				
Nominal Voltage	208/120V	480/277V	600/346V	208/120V
Frequency	57–63Hz	57–63Hz	57–63Hz	57–63Hz
Voltage AC	3-phase, 3-wire			3-phase, 4-wire plus ground
Nominal Current	167A	72A	58A	180A
Disconnect	225A molded case switch			N/A
Main Conductor Size	#4/0AWG	#3/0AWG	#4/0AWG	#4/0AWG
Output				
Voltage AC	3-phase 4-wire plus ground (208/120V)			
Full Load Rating	60kVA	60kVA	60kVA	N/A
Nominal Current	167A	167A	167A	180A
Distribution Panels	2 × 225 A, 42-position			
Distribution Breaker Size	150AT (maximum size)			
Main Breaker	175A MCCB, 100% rated			225A MCCB
Physical				
Dimensions (H×W×D)				
PDU	85×24×34 in (2159 × 610 × 864 mm)			
Weight				
PDU	1500lb (681.8kg)	1205lb (547.7kg)	765lb (347kg)	450lb (204kg)
Shipping	1600lb (727.3kg)	1305lb (593.2)	865lb (393.2kg)	775lb (351 kg)

Physical	208 V	480 V	600 V	208 V (transformerless)
Transformer				
Type	Isolation	Step-down	Step-down	N/A
Configuration	Delta to WYE			N/A
Environmental				
Operating Environment	Protected from water and conductive contaminants			
Humidity				
Operating	0–95%, non-condensing			
Storage	0–95%, non-condensing			
Temperature Class	Class H (220°C)			
Storage Elevation	10 000 m (for aircraft transportation)			
Heat Rejection at Full Load	6339BTU/hr. (1.9kW) for transformer models			
Compliance				
Approvals	UL 60950			

80kW InfraStruXure PDU

PD80F6FK1-M, PD80G6FK1-M, PD80L6FK1-M

Product Overview

Description	Configured to order, factory assembled power distribution for Information Technology equipment in medium to large data centers. The Configure-To-Order process allows for the pre-installation of pre-tested breakers, cut-to-size power whips, load-test ports, and branch circuit monitoring boards.
Features	Small footprint, circuit breaker panel, system mobility, transformer for step-down or step-up availability, wrap around system bypass, load test port, alarm thresholds, wide range of applications, local and web-based monitoring, front access servicing, alarm thresholds, most subfeed breakers per service area, top and bottom entry, two 42-position power panels.
Includes	Installation guide, user manual

Performance

Transformer Efficiency (if installed)	97%
System Full Load Output Rating	80kW
System Monitoring	
Of Current	Distribution branch monitoring (optional), subfeed
Of Voltage	AC main input, bypass input, output at distribution panels, output of fuses
Of Bypass	Bypass breaker positions, bypass lamp cue/feedback
Switches/ Breakers Status	Bypass breaker positions, input switch positions, cross tie output switch position
Transformer Temperature Sensor	180°C (triggers a warning through the PDU monitoring unit)
Branch Current Monitoring	
Parameters	Maximum current (RMS): 95 A Maximum current (peak): 135 A Maximum crest factor: 3 Minimum current: 0.5 A Measurement accuracy: ± 0.5 A or 5% of reading (whichever is greater) Maximum wire size: 0.35 in (8.89mm)

Electrical	PD80F6FK1-M	PD80G6FK1-M	PD80L6FK1-M
Input			
Nominal Voltage	208V Delta	480V Delta	600 V Delta
Nominal Bypass Voltage	208V WYE		

Electrical	PD80F6FK1-M	PD80G6FK1-M	PD80L6FK1-M
Nominal Current	251A	109A	87A
Max. Current	350A	150A	125A
Output			
Nominal Voltage	208:120V WYE		
Frequency	57–63 Hz		
Max. Continuous Nominal Current	277.5A		
Nominal Current	222A		
Wiring			
PDU to UPS	4W + G (AC mains input) 4W (Bypass input)		
UPS to PDU	4W	4W	4W
PDU to Distribution Panels	4W + G	4W + G	4W + G
Power Cables to Enclosures/ Rack PDUs	4W + G	4W + G	4W + G
Power Cable Connections	L21-20	L21-20	L21-20
Power Cable Lengths	Various	Various	Various
Power Cable Wiring (Top Exit)	Accommodates 10 + cables		
Power Cable Wiring (Bottom Exit)	Accommodates 10 + cables		
Subfeed			
Subfeed Wiring (3 -phase)	4W + G	4W + G	4W + G
Subfeed Connector System	100A, pin and sleeve		
Subfeed Voltage	208:120V	208:120V	208:120V
Subfeed Current	80A	80A	80A
Panels			
Panel Style	3-phase	3-phase	3-phase
Number of Panels (per PDU)	1 maximum	1 maximum	1 maximum
Positions per Panel	42	42	42
3-phase Breakers per Panel	10 (with 4 subfeeds)		
3-phase Subfeeds per Panel	4 maximum	4 maximum	4 maximum
1-phase Breakers per Panel	30 (with 4 subfeeds)		
Panel Rating	240V/400A per phase		
Panel Board Accessibility	Through rear of unit		
Physical	PD80F6FK1-M	PD80G6FK1-M	PD80L6FK1-M
Dimensions (H × W × D)			
PDU	81 × 29 × 36 in (2057 × 737 × 914 mm)		
AC Power Trough	7.5 × 4.0 × 29.0 in (190 × 100 × 740 mm)		
Ramp (L × W)	45 × 6 in (1143 × 150 mm)		
Weight			

Physical	PD80F6FK1-M	PD80G6FK1-M	PD80L6FK1-M
PDU with a Transformer	2100 lbs (953 kg)		
PDU without a Transformer	1284 lbs (583 kg)		
Shipping with a Transformer	2200 lbs (1000 kg)		
Shipping without a Transformer	1384 lbs (628 kg)		
Service			
Access	Front and rear		
Clearance	208 V: Greater than or equal to 36 in (914mm) 480 V: Greater than or equal to 42 in (1067mm)		
Transformer (if installed)			
Type	Isolation	Isolation/Step-Down	
Configuration	Delta to WYE		
Maximum Power Rating	112.5 kVA		
Maximum Current Rating	312A	135A	108A
Construction	Cu. windings, open core		
Temperature Rating	180°C (Class H)		
Maximum Temperature Rise	302°F (150°C)		
Main AC Power Feeds	Top or bottom feed, lugs sized for 600 mcm		
Environmental			
Operating Environment	Indoor use only; protect from water and conductive contaminants		
Temperature			
Operating	32 to 104° F (0 to 40°C)		
Storage	5 to 113° F (-15 to 45°C)		
Humidity			
Operating	0–95%, non-condensing		
Storage	0–95%, non-condensing		
Acoustic Noise Emission	Less than or equal to 50 dBA		
Compliance			
Approvals	UL, cUL		

Rack Distribution Panel

PDRDPF10U-R

Performance

System Specification	Single-feed, 5 wires
RDP Power Rating	28.8 kVA

Electrical

Input

Voltage	208/120V WYE
Maximum Current	80 A
Main Circuit Breaker	80 A
Subfeed Breaker	80A/10kAIC (3-phase)
Main AC Feed	IEC309

Output

Voltage	208/120V WYE
Operating Frequency	60 Hz
Distribution Breakers	20A/10kAIC (1-phase and 3-phase)

Wiring

Main AC Feed Wiring	3W + N + G
Power Cables to Rack PDUs	3W + N + G (12AWG)
Power Cable Connections	L21-20 connector system
Power Cable Wiring	Knock-outs accommodate all pole positions

Panels

Panel Style	3-phase
Number of Panels	1 per RDP
Positions per Panel	42
Three-phase Breakers	13 per panel
Single-phase Breakers	39 per panel
Panel Rating	240V/225 A
Breaker Pitch	3/4 in

Physical

Dimensions (H × W × D)

RDP	81 × 29 × 36 in (2057 × 736 × 914mm)
Shipping	89 × 36 × 48 in (2261 × 914 × 1219 mm)
Ramp (L × W)	45 × 27 in (1143 × 686 mm)

Weight

RDP	600 lb (272 kg)
Shipping	650 lb (295 kg)

Accessibility

Unit	Through locked front and rear doors of the enclosure
Distribution Breaker	Through locked RDP front door
Service	Front and rear
Clearance	Greater than or equal to 36 in (914 mm)

Environmental

Operating Environment	Indoor use only
Temperature	
Operating	32 to 104° F (0 to 40° C)
Storage	5 to 113° F (-15 to 45° C)
Humidity	
Operating	0–95%, non-condensing
Storage	0–95%, non-condensing

Compliance

Approvals	UL, cUL
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Emergency Power Off (EPO) System

EPW/9

Product Overview

Description	The Emergency Power Off (EPO) System consists of one or more wall-mounted, push-button EPO boxes. Each EPO box provides a single point of equipment shutdown for up to eight APC InfraStruXure devices and one third-party device (such as an upstream breaker), using normally open (NO) contact closure connections.
Features	Heavy duty design
Includes	User Manual

Electrical

Input/Output	
Voltage	24 VDC (InfraStruXure circuits) 48 VDC/240 VDC (External circuit)
Current	1 A at 24 VDC (InfraStruXure circuits) 1 A at 48 VDC (External circuit)
Frequency	50/60Hz
Circuits Qty.	9
Contact State	normally open (NO)

Physical

Dimensions (H × W × D)	
EPO	8.9 × 9.9 × 2.6 in (226 × 251 × 66 mm)
Shipping	12 × 12 × 5.5 in (305 × 305 × 140 mm)
Weight	
EPO	6.4 lb (2.9 kg)
Shipping	6.9 lb (3.1 kg)
Mounting	Surface mount
Connection	Removable panels in rear, ½-in and ¾-in knockouts on top and bottom.
Push Button	Standard, 22-mm metallic body; 40-mm mushroom head; push/pull
Wire connections	#24 to 18 AWG wire ground stud for #8 ring lug.

Environmental

Temperature

Operating 23 to 113° F (-5 to 45° C)

Storage 23 to 113° F (-5 to 45° C)

Humidity

Operating 5–95%, RH, non-condensing

Storage 5–95%, RH, non-condensing

Elevation

Operating 0–10 000 ft (0–3000m)

Storage 0–10 000 ft (0–3000m)

Compliance

Approvals UL, cUL

Standards NFPA 70, NFPA 75, NEC Article 645, 29 CFR1910.306

NetworkAIR Rack Air Distribution Unit

ACF001

Product Overview

Description	The Rack Air Distribution Unit is a 2U fan unit that works with an existing precision air conditioning system to deliver cool air to the equipment contained in a rack enclosure. The Rack ADU connects into the raised floor and pulls supply air directly into the enclosure. This prevents the conditioned air from mixing with warmer room air before reaching the equipment. The ADU minimizes temperature difference between the top and bottom of the enclosure. It also prevents hot exhaust air from recirculating to the inlet of the enclosure.
Features	Minimizes air mixing, improves air circulation, dual A–B power inputs, air filtration, promotes proper airflow, adjustable design
Includes	Rack mounting brackets; user manual

Performance

Airflow

Without Filter and Finger Guards Installed	<u>Raised floor</u> * 656CFM	<u>Non-raised floor</u> 504 CFM
With Filter and Finger Guards Installed	* 505CFM	425CFM

* When installed over standard raised floor at 0.5 in. w.g.

Electrical

Input

Voltage	120V
Frequency	60Hz; ±1 Hz
Amp Draw Nominal	2
Power	240 Watts
Rated Current (both fans)	2.0A

Physical

Dimensions (H × W × D)

ADU	3.5 × 16.5 × 29.0 in (89 × 419 × 737 mm)
Shipping	10.0 × 33.0 × 33.0 in (254 × 838 × 838 mm)

Weight

ADU	41lb (18.64 kg)
Shipping	59lb (16.82 kg)
Warranty	2 years repair or replace

Environmental

Sound Level with Both Fans Running	73dB at 1 m
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Compliance

Approvals	UL recognized
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NetworkAIR Rack Air Removal Unit

ACF101BLK

Product Overview

Description	The Air Removal Unit (ARU) captures exhaust heat, ducting it to the return of air plenum and eliminating hot spots. Through automatic fan speed adjustment based on temperature or power consumption, a desired temperature can be set and fans will self-adjust for optimal energy efficiency. The ARU provides fan redundancy in the event of fan failure, and power redundancy through dual corded input. This space saving product mounts to the back of the enclosure—requiring zero U space.
Features	Redundancy, ducted exhaust system, power or temperature controlled fans, zero “U” solution, dual A–B power inputs.
Includes	Installation guide, rack mounting brackets, user manual

Performance

Airflow	
At 2kW (non-ducted)	320 CFM
At 3kW (non-ducted)	400 CFM
At 5kW (non-ducted)	800 CFM
At 7kW (non-ducted)	1120 CFM

Electrical

Input	
Nominal Voltage	120V
Frequency	60Hz, ±3Hz
Power	720 Watts
Amp Draw Nominal	6
Rated Current	6.5A

Communication and Management

Control Panel	Multi-function LCD status and control console
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Physical

Dimensions (H × W × D)

ARU 72.25 × 23.0 × 7.0 in (1835 × 584 × 178 mm)

Shipping 81 × 29.5 × 23.5 in (2057 × 749 × 597 mm)

Weight

ARU 145 lb (65.91 kg)

Shipping 210 lb (95.45 kg)

Warranty 2 years repair or replace

Compliance

Approvals UL Recognized

NetworkAIR FM Precision Air Conditioning

FM 50kW Glycol Cooled 208V with Multicool

Product Overview

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	190 000 BTU/hr. (55.6 kW)	164 000 BTU/hr. (47.9 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	174 000 BTU/hr. (50.9 kW)	160 000 BTU/hr. (46.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	178 000 BTU/hr. (52.0 kW)	178 000 BTU/hr. (52.0 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	166 000 BTU/hr. (48.6 kW)	155 000 BTU/hr. (45.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	170 000 BTU/hr. (49.9 kW)	170 000 BTU/hr. (49.9 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	160 000 BTU/hr. (46.9 kW)	151 000 BTU/hr. (44.4 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	165 000 BTU/hr. (48.3 kW)	165 000 BTU/hr. (48.3 kW)
Multicool Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	254 000 BTU/hr. (74.3 kW)	196 000 BTU/hr. (57.3 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	205 000 BTU/hr. (60.0 kW)	181 000 BTU/hr. (52.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	200 000 BTU/hr. (58.3 kW)	191 000 BTU/hr. (55.9 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	179 000 BTU/hr. (52.6 kW)	167 000 BTU/hr. (48.9 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	168 000 BTU/hr. (49.3 kW)	168 000 BTU/hr. (49.3 kW)

Performance

70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	162 000 BTU/hr. (47.6 kW)	156 000BTU/hr. (45.6 kW)
70F DB, 57.2F WB (21.1C DB,14.0C WB) 45% RH	154 000 BTU/hr. (45.3 kW)	154 000 BTU/hr. (45.3 kW)

Coolant Requirements

THR	271 000 MBH (79.6 kW)
105F (40.6 C) Glycol In	40.1 GPM (2.5 L/s)
105F (40.6 C) Glycol In Pressure Drop with HX and Drycoolers	5.8 psig (46.8 kPa)
105F (40.6 C) Glycol In Pressure Drop with HX, Drycooler, PC Coil	21.6 psig (148.9 kPa)

Multicool Requirements

Chilled Water, 45F (7.2C) EWT Water In	44.0 GPM (2.8 L/s)
Chilled Water, 45F (7.2C) Pressure Drop	15.2 psig (104.8 kPa)

Reheat Electric Equally Loaded
3-Phase Finned Tubular, Low-Watt Density

Capacity	32 400 BTU/hr. (9.5 kW)
Stages	One

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps	100.9
Wire Size Amps	132.2
Max. Overcurrent Protection	150.0

Mechanical

Water Regulating Valves Size 1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)

Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Mechanical

Compressor

Tandem Scroll EER	13.2
Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)

Evaporator Coil

Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)

Humidification

Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW

Filters

Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

Physical

Dimensions (H × W × D)

FM35-50	76 × 70.9 × 35 in (1930 × 1800 × 889 mm)
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Weight

FM35-50	1350 lb (612 kg)
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Physical

Connection Sizes

Glycol In/Out	1½ in
Humidifier Supply Line	¼ in
Condensate Drain Line	7/8 in
Multicool Supply Line	1½ in
Multicool Return Line	1½ in

Compliance

Approvals	ASHRAE 52.1, CSA, MEA, UL Listed
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FM 50kW Glycol Cooled 460V with Multicool

Product Overview

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	190 000 BTU/hr. (55.6 kW)	164 000 BTU/hr. (47.9 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	174 000 BTU/hr. (50.9 kW)	160 000 BTU/hr. (46.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	178 000 BTU/hr. (52.0 kW)	178 000 BTU/hr. (52.0 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	166 000 BTU/hr. (48.6 kW)	155 000 BTU/hr. (45.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	170 000 BTU/hr. (49.9 kW)	170 000 BTU/hr. (49.9 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	160 000 BTU/hr. (46.9 kW)	151 000 BTU/hr. (44.4 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	165 000 BTU/hr. (48.3 kW)	165 000 BTU/hr. (48.3 kW)
Multicool Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	254 000 BTU/hr. (74.3 kW)	196 000 BTU/hr. (57.3 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	205 000 BTU/hr. (60.0 kW)	181 000 BTU/hr. (52.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	200 000 BTU/hr. (58.3 kW)	191 000 BTU/hr. (55.9 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	179 000 BTU/hr. (52.6 kW)	167 000 BTU/hr. (48.9 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	168 000 BTU/hr. (49.3 kW)	168 000 BTU/hr. (49.3 kW)

Performance

70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	162 000 BTU/hr. (47.6 kW)	156 000BTU/hr. (45.6 kW)
70F DB, 57.2F WB (21.1C DB,14.0C WB) 45% RH	154 000 BTU/hr. (45.3 kW)	154 000 BTU/hr. (45.3 kW)

Coolant Requirements

THR	271 000 MBH (79.6 kW)
105F (40.6 C) Glycol In	40.1 GPM (2.5 L/s)
105F (40.6 C) Glycol In Pressure Drop with HX and Drycoolers	5.8 psig (46.8 kPa)
105F (40.6 C) Glycol In Pressure Drop with HX, Drycooler, PC Coil	21.6 psig (148.9 kPa)

Multicool Requirements

Chilled Water, 45F (7.2C) EWT Water In	44.0 GPM (2.8 L/s)
Chilled Water, 45F (7.2C) Pressure Drop	15.2 psig (104.8 kPa)

Reheat Electric Equally Loaded
3-Phase Finned Tubular, Low-Watt Density

Capacity	32 400 BTU/hr. (9.5 kW)
Stages	One

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps	47.1
Wire Size Amps	65.9
Max. Overcurrent Protection	70.0

Mechanical

Water Regulating Valves Size 1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)

Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Compressor

Mechanical

Tandem Scroll EER	13.2
Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)

Evaporator Coil

Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)

Humidification

Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW

Filters

Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

Physical

Dimensions (H × W × D)

FM35-50	76 × 70.9 × 35 in (1930 × 1800 × 889 mm)
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Weight

FM35-50	1350 lb (612 kg)
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Connection Sizes

Glycol In/Out	1½ in
Humidifier Supply Line	¼ in
Condensate Drain Line	7/8 in

Physical

Multicool Supply Line 1½ in

Multicool Return Line 1½ in

Compliance

Approvals ASHRAE 52.1, CSA, MEA, UL Listed

FM 50kW Glycol Cooled 575V with Multicool

Product Overview

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	190 000 BTU/hr. (55.6 kW)	164 000 BTU/hr. (47.9 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	174 000 BTU/hr. (50.9 kW)	160 000 BTU/hr. (46.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	178 000 BTU/hr. (52.0 kW)	178 000 BTU/hr. (52.0 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	166 000 BTU/hr. (48.6 kW)	155 000 BTU/hr. (45.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	170 000 BTU/hr. (49.9 kW)	170 000 BTU/hr. (49.9 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	160 000 BTU/hr. (46.9 kW)	151 000 BTU/hr. (44.4 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	165 000 BTU/hr. (48.3 kW)	165 000 BTU/hr. (48.3 kW)
Multicool Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	254 000 BTU/hr. (74.3 kW)	196 000 BTU/hr. (57.3 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	205 000 BTU/hr. (60.0 kW)	181 000 BTU/hr. (52.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	200 000 BTU/hr. (58.3 kW)	191 000 BTU/hr. (55.9 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	179 000 BTU/hr. (52.6 kW)	167 000 BTU/hr. (48.9 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	168 000 BTU/hr. (49.3 kW)	168 000 BTU/hr. (49.3 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	162 000 BTU/hr. (47.6 kW)	156 000 BTU/hr. (45.6 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	154 000 BTU/hr. (45.3 kW)	154 000 BTU/hr. (45.3 kW)

Performance

Coolant Requirements

THR	271 000 MBH (79.6 kW)
105F (40.6 C) Glycol In	40.1 GPM (2.5 L/s)
105F (40.6 C) Glycol In Pressure Drop with HX and Drycoolers	5.8 psig (46.8 kPa)
105F (40.6 C) Glycol In Pressure Drop with HX, Drycooler, PC Coil	21.6 psig (148.9 kPa)

Multicool Requirements

Chilled Water, 45F (7.2C) EWT Water In	44.0 GPM (2.8 L/s)
Chilled Water, 45F (7.2C) Pressure Drop	15.2 psig (104.8 kPa)

Reheat Electric Equally Loaded
3-Phase Finned Tubular, Low-Watt Density

Capacity	32 400 BTU/hr. (9.5 kW)
Stages	One

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps	38.3
Wire Size Amps	51.1
Max. Overcurrent Protection	60.0

Mechanical

Water Regulating Valves Size 1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)

Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Compressor

Tandem Scroll EER	13.2
Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)

Mechanical

Evaporator Coil

Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)

Humidification

Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW

Filters

Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

Physical

Dimensions (H × W × D)

FM35-50	76 × 70.9 × 35 in (1930 × 1800 × 889 mm)
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Weight

FM35-50	1350 lb (612 kg)
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Connection Sizes

Glycol In/Out	1½ in
Humidifier Supply Line	¼ in
Condensate Drain Line	7/8 in
Multicool Supply Line	1½ in
Multicool Return Line	1½ in

Compliance

Approvals	ASHRAE 52.1, CSA, MEA, UL Listed
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FM 50kW Glycol Cooled 208V without Multicool

Product Overview

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	190 000 BTU/hr. (55.6 kW)	164 000 BTU/hr. (47.9 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	174 000 BTU/hr. (50.9 kW)	160 000 BTU/hr. (46.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	178 000 BTU/hr. (52.0 kW)	178 000 BTU/hr. (52.0 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	166 000 BTU/hr. (48.6 kW)	155 000 BTU/hr. (45.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	170 000 BTU/hr. (49.9 kW)	170 000 BTU/hr. (49.9 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	160 000 BTU/hr. (46.9 kW)	151 000 BTU/hr. (44.4 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	165 000 BTU/hr. (48.3 kW)	165 000 BTU/hr. (48.3 kW)
Coolant Requirements		
THR	271 000 MBH (79.6 kW)	
105F (40.6 C) Glycol In	40.1 GPM (2.5 L/s)	
105F (40.6 C) Glycol In Pressure Drop	5.8 psig (46.8 kPa) with HX and Drycoolers	
105F (40.6 C) Glycol In Pressure Drop	21.6 psig (148.9 kPa) with HX, Drycoolers, and PC Coil	
Reheat Electric Equally Loaded 3-phase Finned Tubular, Low-Watt Density		
Capacity	32 400 BTU/hr.(9.5 kW)	
Stages	One	

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps	100.9
Wire Size Amps	132.2
Max. Overcurrent Protection	150.0

Mechanical

Water Regulating Valves Size 1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)

Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Compressor

Tandem Scroll EER	13.2
Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)

Evaporator Coil

Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)

Humidification

Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW

Filters

Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

Physical

Dimensions (H × W × D)

FM35-50	76 × 70.9 × 35 in (1930 × 1800 × 889 mm)
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Weight

FM35-50	1350 lb (612 kg)
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Connection Sizes

Glycol In/Out	1½ in
Humidifier Supply Line	¼ in
Condensate Drain Line	7/8 in

Compliance

Approvals	ASHRAE 52.1, CSA, MEA, UL Listed
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FM 50kW Glycol Cooled 460V without Multicool

Product Overview

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	190 000 BTU/hr. (55.6 kW)	164 000 BTU/hr. (47.9 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	174 000 BTU/hr. (50.9 kW)	160 000 BTU/hr. (46.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	178 000 BTU/hr. (52.0 kW)	178 000 BTU/hr. (52.0 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	166 000 BTU/hr. (48.6 kW)	155 000 BTU/hr. (45.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	170 000 BTU/hr. (49.9 kW)	170 000 BTU/hr. (49.9 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	160 000 BTU/hr. (46.9 kW)	151 000 BTU/hr. (44.4 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	165 000 BTU/hr. (48.3 kW)	165 000 BTU/hr. (48.3 kW)
Coolant Requirements		
THR	271 000 MBH (79.6 kW)	
105F (40.6 C) Glycol In	40.1 GPM (2.5 L/s)	
105F (40.6 C) Glycol In Pressure Drop	5.8 psig (46.8 kPa) with HX and Drycoolers	
105F (40.6 C) Glycol In Pressure Drop	21.6 psig (148.9 kPa) with HX, Drycoolers, and PC Coil	
Reheat Electric Equally Loaded 3-phase Finned Tubular, Low-Watt Density		
Capacity	32 400 BTU/hr.(9.5 kW)	
Stages	One	

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps	47.1
Wire Size Amps	65.9
Max. Overcurrent Protection	70.0

Mechanical

Water Regulating Valves Size 1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)

Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Compressor

Tandem Scroll EER	13.2
Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)

Evaporator Coil

Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)

Humidification

Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW

Filters

Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

FM 50 Glycol Cooled 575V without Multicool

Product Overview

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	190 000 BTU/hr. (55.6 kW)	164 000 BTU/hr. (47.9 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	174 000 BTU/hr. (50.9 kW)	160 000 BTU/hr. (46.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	178 000 BTU/hr. (52.0 kW)	178 000 BTU/hr. (52.0 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	166 000 BTU/hr. (48.6 kW)	155 000 BTU/hr. (45.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	170 000 BTU/hr. (49.9 kW)	170 000 BTU/hr. (49.9 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	160 000 BTU/hr. (46.9 kW)	151 000 BTU/hr. (44.4 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	165 000 BTU/hr. (48.3 kW)	165 000 BTU/hr. (48.3 kW)
Coolant Requirements		
THR	271 000 MBH (79.6 kW)	
105F (40.6 C) Glycol In	40.1 GPM (2.5 L/s)	
105F (40.6 C) Glycol In Pressure Drop	5.8 psig (46.8 kPa) with HX and Drycoolers	
105F (40.6 C) Glycol In Pressure Drop	21.6 psig (148.9 kPa) with HX, Drycoolers, and PC Coil	
Reheat Electric Equally Loaded 3-phase Finned Tubular, Low-Watt Density		
Capacity	32 400 BTU/hr.(9.5 kW)	
Stages	One	

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps 38.3

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Wire Size Amps	51.1
Max. Overcurrent Protection	60.0

Mechanical

Water Regulating Valves Size	1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)
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Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Compressor

Tandem Scroll EER	13.2
Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)

Evaporator Coil

Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)

Humidification

Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW

Filters

Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

Physical

Dimensions (H × W × D)

FM35-50 76 × 70.9 × 35 in (1930 × 1800 × 889 mm)

Weight

FM35-50 1350 lb (612 kg)

Connection Sizes

Glycol In/Out 1½ in

Humidifier Supply Line ¼ in

Condensate Drain Line 7/8 in

Compliance

Approvals ASHRAE 52.1, CSA, MEA, UL Listed

FM 50kW Water Cooled 208V with Multicool**Product Overview**

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	209 000 BTU/hr. (61.3 kW)	172 000 BTU/hr. (50.5 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	193 000 BTU/hr. (56.3 kW)	169 000 BTU/hr. (49.6 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	188 000 BTU/hr. (55.3 kW)	183 000 BTU/hr. (53.6 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	184 000 BTU/hr. (53.6 kW)	165 000 BTU/hr. (48.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	187 000 BTU/hr. (54.6 kW)	187 000 BTU/hr. (54.6 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	178 000 BTU/hr. (52.0 kW)	160 000 BTU/hr. (46.9 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	181 000 BTU/hr. (48.3 kW)	181 000 BTU/hr. (48.3 kW)
Multicool Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	254 000 BTU/hr. (74.3 kW)	196 000 BTU/hr. (57.3 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	205 000 BTU/hr. (60.0 kW)	181 000 BTU/hr. (52.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	200 000 BTU/hr. (58.3 kW)	191 000 BTU/hr. (55.9 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	179 000 BTU/hr. (52.6 kW)	167 000 BTU/hr. (48.9 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	168 000 BTU/hr. (49.3 kW)	168 000 BTU/hr. (49.3 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	162 000 BTU/hr. (47.6 kW)	156 000 BTU/hr. (45.6 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	154 000 BTU/hr. (45.3 kW)	154 000 BTU/hr. (45.3 kW)

Performance

Coolant Requirements

THR	263 000 MBH (77.0 kW)
65F (18.3 C) Water In	13.2 GPM (2.5 L/s)
105F (40.6 C) Water In Pressure Drop	0.3 psig (2.1 kPa)
75F (23.9 C) Water In	20.3 GPM (1.3 L/s)
75F (23.9 C) Water In Pressure Drop	0.8 psig (4.9 kPa)
85F (29.4 C) Water In	47.9 GPM (3.0 L/s)
85F (29.4 C) Water In Pressure Drop	3.9 psig (26.9 kPa)

Multicool Requirements

Chilled Water, 45F (7.2C) EWT Water In	44.0 GPM (2.8 L/s)
Chilled Water, 45F (7.2C) Pressure Drop	15.2 psig (104.8 kPa)

Reheat Electric Equally Loaded 3-phase Finned Tubular, Low-Watt Density

Capacity	32 400 BTU/hr. (9.5 kW)
Stages	One

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps	93.2
Wire Size Amps	132.2
Max. Overcurrent Protection	150.0

Mechanical

Water Regulating Valves Size 1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)

Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Compressor

Tandem Scroll EER	13.2
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Mechanical

Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)

Evaporator Coil

Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)

Humidification

Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW

Filters

Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

Physical

Dimensions (H × W × D)

FM35-50	76 × 70.9 × 35 in (1930 × 1800 × 889 mm)
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Weight

FM35-50	1340 lb (608 kg)
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Connection Sizes

Water In/Out	1½ in
Humidifier Supply Line	¼ in
Condensate Drain Line	7/8 in
Multicool Supply Line	1½ in
Multicool Return Line	1½ in

Compliance

Approvals

ASHRAE 52.1, CSA, MEA, UL Listed

FM 50kW Water Cooled 460V with Multicool

Product Overview

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	209 000 BTU/hr. (61.3 kW)	172 000 BTU/hr. (50.5 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	193 000 BTU/hr. (56.3 kW)	169 000 BTU/hr. (49.6 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	188 000 BTU/hr. (55.3 kW)	183 000 BTU/hr. (53.6 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	184 000 BTU/hr. (53.6 kW)	165 000 BTU/hr. (48.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	187 000 BTU/hr. (54.6 kW)	187 000 BTU/hr. (54.6 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	178 000 BTU/hr. (52.0 kW)	160 000 BTU/hr. (46.9 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	181 000 BTU/hr. (48.3 kW)	181 000 BTU/hr. (48.3 kW)
Multicool Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	254 000 BTU/hr. (74.3 kW)	196 000 BTU/hr. (57.3 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	205 000 BTU/hr. (60.0 kW)	181 000 BTU/hr. (52.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	200 000 BTU/hr. (58.3 kW)	191 000 BTU/hr. (55.9 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	179 000 BTU/hr. (52.6 kW)	167 000 BTU/hr. (48.9 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	168 000 BTU/hr. (49.3 kW)	168 000 BTU/hr. (49.3 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	162 000 BTU/hr. (47.6 kW)	156 000 BTU/hr. (45.6 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	154 000 BTU/hr. (45.3 kW)	154 000 BTU/hr. (45.3 kW)

Performance

Coolant Requirements

THR	263 000 MBH (77.0 kW)
65F (18.3 C) Water In	13.2 GPM (2.5 L/s)
105F (40.6 C) Water In Pressure Drop	0.3 psig (2.1 kPa)
75F (23.9 C) Water In	20.3 GPM (1.3 L/s)
75F (23.9 C) Water In Pressure Drop	0.8 psig (4.9 kPa)
85F (29.4 C) Water In	47.9 GPM (3.0 L/s)
85F (24.9 C) Water In Pressure Drop	3.9 psig (26.9 kPa)

Multicool Requirements

Chilled Water, 45F (7.2C) EWT Water In	44.0 GPM (2.8 L/s)
Chilled Water, 45F (7.2C) Pressure Drop	15.2 psig (104.8 kPa)

Reheat Electric Equally Loaded 3-phase Finned Tubular, Low-Watt Density

Capacity	32 400 BTU/hr. (9.5 kW)
Stages	One

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps	43.6
Wire Size Amps	65.9
Max. Overcurrent Protection	70.0

Mechanical

Water Regulating Valves Size 1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)

Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Compressor

Mechanical

Tandem Scroll EER	13.2
Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)
Evaporator Coil	
Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)
Humidification	
Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW
Filters	
Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

Physical

Dimensions (H × W × D)	
FM35-50	76 × 70.9 × 35 in (1930 × 1800 × 889 mm)
Weight	
FM35-50	1340 lb (608 kg)
Connection Sizes	
Water In/Out	1½ in
Humidifier Supply Line	¼ in
Condensate Drain Line	7/8 in

Physical

Multicool Supply Line 1½ in

Multicool Return Line 1½ in

Compliance

Approvals ASHRAE 52.1, CSA, MEA, UL Listed

FM 50kW Water Cooled 575V with Multicool

Product Overview

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	209 000 BTU/hr. (61.3 kW)	172 000 BTU/hr. (50.5 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	193 000 BTU/hr. (56.3 kW)	169 000 BTU/hr. (49.6 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	188 000 BTU/hr. (55.3 kW)	183 000 BTU/hr. (53.6 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	184 000 BTU/hr. (53.6 kW)	165 000 BTU/hr. (48.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	187 000 BTU/hr. (54.6 kW)	187 000 BTU/hr. (54.6 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	178 000 BTU/hr. (52.0 kW)	160 000 BTU/hr. (46.9 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	181 000 BTU/hr. (48.3 kW)	181 000 BTU/hr. (48.3 kW)
Multicool Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	254 000 BTU/hr. (74.3 kW)	196 000 BTU/hr. (57.3 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	205 000 BTU/hr. (60.0 kW)	181 000 BTU/hr. (52.9 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	200 000 BTU/hr. (58.3 kW)	191 000 BTU/hr. (55.9 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	179 000 BTU/hr. (52.6 kW)	167 000 BTU/hr. (48.9 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	168 000 BTU/hr. (49.3 kW)	168 000 BTU/hr. (49.3 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	162 000 BTU/hr. (47.6 kW)	156 000 BTU/hr. (45.6 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	154 000 BTU/hr. (45.3 kW)	154 000 BTU/hr. (45.3 kW)

Performance

Coolant Requirements

THR	263 000 MBH (77.0 kW)
65F (18.3 C) Water In	13.2 GPM (2.5 L/s)
105F (40.6 C) Water In Pressure Drop	0.3 psig (2.1 kPa)
75F (23.9 C) Water In	20.3 GPM (1.3 L/s)
75F (23.9 C) Water In Pressure Drop	0.8 psig (4.9 kPa)
85F (29.4 C) Water In	47.9 GPM (3.0 L/s)
85F (24.9 C) Water In Pressure Drop	3.9 psig (26.9 kPa)

Multicool Requirements

Chilled Water, 45F (7.2C) EWT Water In	44.0 GPM (2.8 L/s)
Chilled Water, 45F (7.2C) Pressure Drop	15.2 psig (104.8 kPa)

Reheat Electric Equally Loaded 3-phase Finned Tubular, Low-Watt Density

Capacity	32 400 BTU/hr. (9.5 kW)
Stages	One

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps	35.5
Wire Size Amps	51.1
Max. Overcurrent Protection	60.0

Mechanical

Water Regulating Valves Size 1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)

Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Mechanical

Compressor

Tandem Scroll EER	13.2
Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)

Evaporator Coil

Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)

Humidification

Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW

Filters

Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

Physical

Dimensions (H × W × D)

FM35-50	76 × 70.9 × 35 in (1930 × 1800 × 889 mm)
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Weight

FM35-50	1340 lb (608 kg)
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Connection Sizes

Water In/Out	1½ in
Humidifier Supply Line	¼ in
Condensate Drain Line	7/8 in
Multicool Supply Line	1½ in
Multicool Return Line	1½ in

Compliance

Approvals

ASHRAE 52.1, CSA, MEA, UL Listed

FM 50kW Water Cooled 208V without Multicool

Product Overview

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	209 000 BTU/hr. (61.3 kW)	172 000 BTU/hr. (50.5 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	193 000 BTU/hr. (56.3 kW)	169 000 BTU/hr. (49.6 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	188 000 BTU/hr. (55.3 kW)	183 000 BTU/hr. (53.6 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	184 000 BTU/hr. (53.6 kW)	165 000 BTU/hr. (48.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	187 000 BTU/hr. (54.6 kW)	187 000 BTU/hr. (54.6 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	178 000 BTU/hr. (52.0 kW)	160 000 BTU/hr. (46.9 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	181 000 BTU/hr. (48.3 kW)	181 000 BTU/hr. (48.3 kW)
Coolant Requirements		
THR	263 000 MBH (77.0 kW)	
65F (18.3 C) Water In	13.2 GPM (2.5 L/s)	
105F (40.6 C) Water In Pressure Drop	0.3 psig (2.1 kPa)	
75F (23.9 C) Water In	20.3 GPM (1.3 L/s)	
75F (23.9 C) Water In Pressure Drop	0.8 psig (4.9 kPa)	
85F (29.4 C) Water In	47.9 GPM (3.0 L/s)	
85F (24.9 C) Water In Pressure Drop	3.9 psig (26.9 kPa)	
Reheat Electric Equally Loaded 3-phase Finned Tubular, Low-Watt		
Capacity	32 400 BTU/hr. (9.5 kW)	
Stages	One	

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps	93.2
Wire Size Amps	132.2
Max. Overcurrent Protection	150.0

Mechanical

Water Regulating Valves Size 1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)

Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Compressor

Tandem Scroll EER	13.2
Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)

Evaporator Coil

Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)

Humidification

Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW

Filters

Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

Physical

Dimensions (H × W × D)

FM35-50	76 × 70.9 × 35 in (1930 × 1800 × 889 mm)
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Weight

FM35-50	1340 lb (608 kg)
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Connection Sizes

Water In/Out	1½ in
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Humidifier Supply Line	¼ in
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Condensate Drain Line	7/8 in
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Compliance

Approvals	ASHRAE 52.1, CSA, MEA, UL Listed
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FM 50kW Water Cooled 460V without Multicool

Product Overview

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	209 000 BTU/hr. (61.3 kW)	172 000 BTU/hr. (50.5 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	193 000 BTU/hr. (56.3 kW)	169 000 BTU/hr. (49.6 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	188 000 BTU/hr. (55.3 kW)	183 000 BTU/hr. (53.6 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	184 000 BTU/hr. (53.6 kW)	165 000 BTU/hr. (48.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	187 000 BTU/hr. (54.6 kW)	187 000 BTU/hr. (54.6 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	178 000 BTU/hr. (52.0 kW)	160 000 BTU/hr. (46.9 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	181 000 BTU/hr. (48.3 kW)	181 000 BTU/hr. (48.3 kW)
Coolant Requirements		
THR	263 000 MBH (77.0 kW)	
65F (18.3 C) Water In	13.2 GPM (2.5 L/s)	
105F (40.6 C) Water In Pressure Drop	0.3 psig (2.1 kPa)	
75F (23.9 C) Water In	20.3 GPM (1.3 L/s)	
75F (23.9 C) Water In Pressure Drop	0.8 psig (4.9 kPa)	
85F (29.4 C) Water In	47.9 GPM (3.0 L/s)	
85F (24.9 C) Water In Pressure Drop	3.9 psig (26.9 kPa)	
Reheat Electric Equally Loaded 3-phase Finned Tubular, Low-Watt		
Capacity	32 400 BTU/hr. (9.5 kW)	
Stages	One	

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps	43.6
Wire Size Amps	65.9
Max. Overcurrent Protection	70.0

Mechanical

Water Regulating Valves Size 1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)

Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Compressor

Tandem Scroll EER	13.2
Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)

Evaporator Coil

Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)

Humidification

Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW

Filters

Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

Physical

Dimensions (H × W × D)

FM35-50	76 × 70.9 × 35 in (1930 × 1800 × 889 mm)
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Weight

FM35-50	1340 lb (608 kg)
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Connection Sizes

Water In/Out	1½ in
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Humidifier Supply Line	¼ in
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Condensate Drain Line	7/8 in
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Compliance

Approvals	ASHRAE 52.1, CSA, MEA, UL Listed
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FM 50kW Water Cooled 575V without Multicool

Product Overview

Description	The NetworkAIR FM utilizes leading edge precision air technologies. Modular construction, variable frequency drives, dedicated dehumidification, tandem scroll compressors, and front service access are all integrated into one high efficiency system. A scalable design enables customers to meet the changing needs of their environments.
Features	Downflow or upflow options, multiple configurations, multicool options, modularity, microprocessor controller, ease of use, humidifier, tandem scroll compressors, variable frequency drives, dedicated dehumidification
Includes	Operations and Maintenance Manual, User Manual

Performance

Net Cooling Capacity	<u>Total</u>	<u>Sensible</u>
80F DB, 67F WB (26.7C DB, 19.4C WB) 50% RH	209 000 BTU/hr. (61.3 kW)	172 000 BTU/hr. (50.5 kW)
75F DB, 62.5F WB (23.9C DB, 16.9C WB) 50% RH	193 000 BTU/hr. (56.3 kW)	169 000 BTU/hr. (49.6 kW)
75F DB, 61F WB (23.9C DB, 16.1C WB) 45% RH	188 000 BTU/hr. (55.3 kW)	183 000 BTU/hr. (53.6 kW)
72F DB, 60F WB (22.2C DB, 15.5C WB) 50% RH	184 000 BTU/hr. (53.6 kW)	165 000 BTU/hr. (48.3 kW)
72F DB, 58.6F WB (22.2D DB, 14.8C WB) 45% RH	187 000 BTU/hr. (54.6 kW)	187 000 BTU/hr. (54.6 kW)
70F DB, 58.5F WB (21.1C DB, 14.8C WB) 50% RH	178 000 BTU/hr. (52.0 kW)	160 000 BTU/hr. (46.9 kW)
70F DB, 57.2F WB (21.1C DB, 14.0C WB) 45% RH	181 000 BTU/hr. (48.3 kW)	181 000 BTU/hr. (48.3 kW)
Coolant Requirements		
THR	263 000 MBH (77.0 kW)	
65F (18.3 C) Water In	13.2 GPM (2.5 L/s)	
105F (40.6 C) Water In Pressure Drop	0.3 psig (2.1 kPa)	
75F (23.9 C) Water In	20.3 GPM (1.3 L/s)	
75F (23.9 C) Water In Pressure Drop	0.8 psig (4.9 kPa)	
85F (29.4 C) Water In	47.9 GPM (3.0 L/s)	
85F (24.9 C) Water In Pressure Drop	3.9 psig (26.9 kPa)	
Reheat Electric Equally Loaded 3-phase Finned Tubular, Low-Watt		
Capacity	32 400 BTU/hr. (9.5 kW)	
Stages	One	

Electrical (Electric Reheat/ Electrode Canister-Steam Humidifier)

Amps

Full Load Amps	35.5
Wire Size Amps	51.1
Max. Overcurrent Protection	60.0

Mechanical

Water Regulating Valves Size 1½ (35); 3 Way Ball Valve--Inches, NPT (Cv)

Air System

Direct Drive Centrifugal Air Volume	9000 CFM(4248 L/s)
Direct Drive Centrifugal Blower Motor	4 HP (3 kW)
External Static Pressure	0.5 inches of water (125 Pa)
Number of Blowers	2

Compressor

Tandem Scroll EER	13.2
Tandem Scroll Quantity	2 tandem
Tandem Scroll Nominal	15.6 HP (11.64 kW)

Evaporator Coil

Face Area	21ft ² (1.95 m ²)
Rows Deep	3
Face Velocity	428 FPM (2.17 m/s)

Humidification

Solid State Electricode Canister Flush Cycle	Automatic
Solid State Electricode Canister Capacity	10 lbs/hr. (4.53 kg/hr.)
Solid State Electricode Canister	3.2 kW

Filters

Quantity	5
Size	12.3 × 29.0 in (325 × 797 mm)
Depth	4 in (100.8 mm)

Communication and Management

Control Panel	Multi-function LCD status and control console
Smart Slot Interface Quantity	1

Physical

Dimensions (H × W × D)

FM35-50	76 × 70.9 × 35 in (1930 × 1800 × 889 mm)
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Weight

FM35-50	1340 lb (608 kg)
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Connection Sizes

Water In/Out	1½ in
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Humidifier Supply Line	¼ in
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Condensate Drain Line	7/8 in
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Compliance

Approvals	ASHRAE 52.1, CSA, MEA, UL Listed
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NetworkAIR IR

IR40-CAA-ESA, IR40-CCA-ESA, IR40-CDA-ESA, IR40-CEA-ESA, IR40-CMA-ESA

Product Overview

Description	The NetworkAIR IR is a computer room air conditioning system with a horizontal airflow pattern specifically designed for hot aisle/cold aisle configurations. Warm exhaust air is drawn from the hot aisle, cooled, and distributed into the cold aisle, ensuring that equipment inlet temperatures will be constant and adequate from proper operation.
Includes	Installation Guide, Operations and Maintenance Manual

Performance

Air System—Direct Drive Centrifugal

Air Volume	6,450CFM (3,044L/s)
Blower Motor	3.0HP (2.3kW)
Number of Blowers	2

Humidification—Solid State Electrode Canister

Flush Cycle	Automatic
Capacity	10lbs/hr (4.53kg/hr)
kW	3.2

Reheat Electric—Equally loaded three (3) phase, finned tubular, low-watt density

Capacity	41,000BTU/hr (12.0kW)
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Condensate Pump Capacity

Capacity	60 gal/hr
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Electrical	208V/	230V/	460V/	460V/	460V/	575V/	575V/	575V/
(Voltage Main/Voltage UPS)	208V	230V	208V	460V	230V	208V	230V	N/A

Input

Nominal Voltage	208V 3-phase
Frequency	60Hz ±3 Hz

40kW Combined

Operating Amps	34.4	35.5	n/a	n/a	16.8	n/a	n/a	n/a
Wire Size Amps	57.8	57.8	n/a	n/a	28.0	n/a	n/a	n/a

Electrical (Voltage Main/Voltage UPS)	208V/ 208V	230V/ 230V	460V/ 208V	460V/ 460V	460V/ 230V	575V/ 208V	575V/ 230V	575V/ N/A
Max. Overcurrent Protection	60.0	60.0	n/a	n/a	30.0	n/a	n/a	n/a
40kW Main								
Operating Amps	21.6	23.9	11.0	11.0	11.0	9.6	9.6	14.2
Wire Size Amps	40.2	40.2	19.3	19.3	19.3	16.4	16.4	22.1
Max. Overcurrent Protection	50.0	20.0	20.0	20.0	15.0	20.0	20.0	n/a
40kW UPS (Optional second electrical feed and components it supports at 208V)								
Operating Amps	12.8	11.6	12.8	11.6	5.8	12.8	11.6	n/a
Wire Size Amps	15.8	15.8	15.8	15.8	7.9	15.8	15.8	n/a
Max. Overcurrent Protection	20.0	20.0	20.0	20.0	15.0	20.0	20.0	n/a

Communication and Management

Control Panel	Multi-function LCD status and control console
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Physical

Dimensions (H × W × D)

FM IR 76.89 × 70.87 × 35 in (1953 × 1800 × 890mm)

Shipping 82 × 77 × 45 in (2080 × 1960 × 1140mm)

Weight

FM IR 1,180lb (536kg)

Shipping 1,195lb (543kg)

Connection Sizes

Chilled Water 1-5/8 in (supply and return line)

Humidifier 3/8 in (supply line)

Condensate Drain 5/8 in (drain line)

Filters

Quantity 5

Size 12.8 × 29.0 in (325 × 737mm)

Depth 4.0 in (101 mm)

Warranty 1 year parts

NetworkAIR PA Portable Air Conditioning

ACPA4000

Product Overview

Description	The NetworkAIR PA provides portable cooling for sensitive electronic equipment to meet the environmental demands of small rooms and data closets. The self-contained solution does not require an external condenser, refrigerant piping, or building water source for operation and can be installed quickly and inexpensively without the need for building modifications.
Features	Automatic restart, localized cooling, ease of use, portable, on/off scheduling, multiple configurations
Includes	Exhaust duct kit, installation guide, user manual

Electrical

Input	
Power	1610 Watts
Frequency	60Hz \pm 3 Hz
Nominal Voltage	120V
Amp Draw Nominal	14

Mechanical

Cooling Capacity Options	3.9kW
Cooling Options	Air
Compressor Type	Rotary
Refrigerant	R22
Air Flow	600CFM

Communication and Management

Control Panel	Multi-function LCD status and control console
Pre-installed SmartSlot Cards	AP9617

Physical

Dimensions (H × W × D)

Unit 45.75 × 23.00 × 28.25in (1162 × 584 × 718mm)

Shipping 54.5 × 31.00 × 48.00in (1384 × 787 × 1219mm)

Weight

Unit 210lb (95.45kg)

Shipping 342lb (155.45kg)

Warranty 2 years repair or replace

Compliance

Approvals UL Listed

Management—Network-Critical

InfraStruXure Manager

AP9420 (25 node)

Product Overview

Description	InfraStruXure Manager Appliance is a browser-accessible, user-friendly tool that makes management of the entire APC network critical physical infrastructure easy. It enables both quick assessment of the present situation as well as notifying the appropriate personnel should situations that threaten availability occur. Analysis features help to plan for changes in availability, power, runtime, or cooling requirements. Reduce the complexity of the network critical infrastructure by managing APC devices from a single console or by integrating InfraStruXure Manager into the preferred management system.
Features	Autodiscovery of APC devices, battery status reports, browser accessible, building management integration, centralized management console, concurrent deployment and updates, data logging, event logging, fault notification, global threshold alarms, inventory reports, load management, multi-device support, network management integration, notification groups, power flow diagrams, private IP network, read-only access, recommended actions, scalable architecture, set-up wizards
Includes	Country-specific detachable power cord, installation guide, rack mounting brackets.

Electrical

Input	100–240 VAC; 50/60 Hz; 0.5 A
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Physical

Dimensions (H×W×D)

Unit	1.75 × 17 × 6.75 in (45 × 432 × 172 mm)
Shipping	8.5 × 22.75 × 13.25 in (216 × 578 × 337 mm)

Weight

Unit	6.6 lb (3.0 kg)
Shipping	11.5 lb (5.2 kg)

Warranty	2 year (manufacturer's defect)
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Environmental

Temperature

Operating	23 to 113°F (-5 to 45°C)
Storage	-13 to 49°F (-25 to 65°C)

Humidity

Operating	5–95%, non-condensing
Storage	5–95%, non-condensing

Elevation

Operating	0–10 000 ft (0–3000m)
Storage	0–10 000 ft (0–3000m)

Compliance

Approvals	UL, cUL, FCC Class A
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AP9421 (100 node)**Product Overview**

Description	InfraStruXure Manager Appliance is a browser-accessible, user-friendly tool that makes management of the entire APC network critical physical infrastructure easy. It enables both quick assessment of the present situation as well as notifying the appropriate personnel should situations that threaten availability occur. Analysis features help to plan for changes in availability, power, runtime, or cooling requirements. Reduce the complexity of the network critical infrastructure by managing APC devices from a single console or by integrating InfraStruXure Manager into the preferred management system.
Features	Autodiscovery of APC devices, battery status reports, browser accessible, building management integration, centralized management console, concurrent deployment and updates, data logging, event logging, fault notification, global threshold alarms, inventory reports, load management, multi-device support, network management integration, notification groups, power flow diagrams, private IP network, read-only access, recommended actions, scalable architecture, set-up wizards
Includes	Country-specific detachable power cord, installation guide, rack mounting brackets.

Electrical

Input	100–240 VAC; 50/60 Hz; 0.5 A
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Physical

Dimensions (H×W×D)

Unit	1.75 × 17 × 6.75 in (45 × 432 × 172mm)
Shipping	8.5 × 22.75 × 13.25 in (216 × 578 × 337mm)

Weight

Unit	6.6lb (3.0kg)
Shipping	11.5lb (5.2kg)

Warranty	2 year (manufacturer's defect)
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Environmental

Temperature

Operating	23 to 113°F (–5 to 45°C)
Storage	–13 to 49°F (–25 to 65°C)

Humidity

Operating	5–95%, non-condensing
Storage	5–95%, non-condensing

Environmental

Elevation

Operating 0–10 000 ft (0–3000m)

Storage 0–10 000 ft (0–3000m)

Compliance

Approvals UL, cUL, FCC Class A

AP9422 (500 node)**Product Overview**

Description	InfraStruXure Manager Appliance is a browser-accessible, user-friendly tool that makes management of the entire APC network critical physical infrastructure easy. It enables both quick assessment of the present situation as well as notifying the appropriate personnel should situations that threaten availability occur. Analysis features help to plan for changes in availability, power, runtime, or cooling requirements. Reduce the complexity of the network critical infrastructure by managing APC devices from a single console or by integrating InfraStruXure Manager into the preferred management system.
Features	Autodiscovery of APC devices, battery status reports, browser accessible, building management integration, centralized management console, concurrent deployment and updates, data logging, event logging, fault notification, global threshold alarms, inventory reports, load management, multi-device support, network management integration, notification groups, power flow diagrams, private IP network, read-only access, recommended actions, scalable architecture, set-up wizards
Includes	Country-specific detachable power cord, installation guide, rack mounting brackets.

Electrical

Input	100–240 VAC; 50/60 Hz; 0.5 A
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Physical

Dimensions (H×W×D)

Unit	1.75 × 17 × 6.75 in (45 × 432 × 172 mm)
Shipping	8.5 × 22.75 × 13.25 in (216 × 578 × 337 mm)

Weight

Unit	6.6 lb (3.0 kg)
Shipping	11.5 lb (5.2 kg)
Warranty	2 year (manufacturer's defect)

Environmental

Temperature

Operating	23 to 113°F (–5 to 45°C)
Storage	–13 to 49°F (–25 to 65°C)

Humidity

Operating	5–95%, non-condensing
Storage	5–95%, non-condensing

Environmental

Elevation

Operating 0–10 000 ft (0–3000m)

Storage 0–10 000 ft (0–3000m)

Compliance

Approvals UL, cUL, FCC Class A

AP9423 (1000 node)**Product Overview**

Description	InfraStruXure Manager Appliance is a browser-accessible, user-friendly tool that makes management of the entire APC network critical physical infrastructure easy. It enables both quick assessment of the present situation as well as notifying the appropriate personnel should situations that threaten availability occur. Analysis features help to plan for changes in availability, power, runtime, or cooling requirements. Reduce the complexity of the network critical infrastructure by managing APC devices from a single console or by integrating InfraStruXure Manager into the preferred management system.
Features	Autodiscovery of APC devices, battery status reports, browser accessible, building management integration, centralized management console, concurrent deployment and updates, data logging, event logging, fault notification, global threshold alarms, inventory reports, load management, multi-device support, network management integration, notification groups, power flow diagrams, private IP network, read-only access, recommended actions, scalable architecture, set-up wizards
Includes	Country-specific detachable power cord, installation guide, rack mounting brackets.

Electrical

Input	100–240 VAC; 50/60 Hz; 0.5 A
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Physical

Dimensions (H×W×D)

Unit	1.75 × 17 × 6.75 in (45 × 432 × 172 mm)
Shipping	8.5 × 22.75 × 13.25 in (216 × 578 × 337 mm)

Weight

Unit	6.6 lb (3.0 kg)
Shipping	11.5 lb (5.2 kg)

Warranty	2 year (manufacturer's defect)
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Environmental

Temperature

Operating	23 to 113°F (–5 to 45°C)
Storage	–13 to 49°F (–25 to 65°C)

Humidity

Operating	5–95%, non-condensing
Storage	5–95%, non-condensing

Environmental

Elevation

Operating 0–10 000 ft (0–3000m)

Storage 0–10 000 ft (0–3000m)

Compliance

Approvals UL, cUL, FCC Class A

Management—UPS Management

UPS Network Management Card

AP9617

Product Overview

Description	Provides management of an individual UPS by connecting the UPS directly to the network with a dedicated IP address, avoiding the need for a proxy such as a server. Embedded technology provides exceptional reliability and enables the UPS to reboot hung equipment. The user can manage each APC UPS individually through a web browser, Telnet, or SSH. Notification features inform the user of problems as they occur. For protected servers, the included PowerChute Network Shutdown software provides graceful, unattended shutdown in the event of an extended power outage.
Features	Browser accessible, data logging, event logging, fault notification, flash upgradeable, graceful system shutdown, MD5 authentication security, network time protocol, password security, read-only access, reboot equipment remotely, recommended actions, standards-based management, telnet management
Includes	CD with software, user manual

Communication and Management

Control Panel	Link RX/TX indicator
Smart-Slot Interface Type Connects with UPS	SU3G, SU35G, SU36G, SUDP, SUOL, MXES, SY11, SYRM11H, SYRM11P, SYRM22P, SY31, SY33, SLDP3, SSSC, SSTC
Interface Connectors	RJ-45 10/100 Base-T

Physical

Dimensions (H × W × D)	
Management Card	1.50 × 4.75 × 4.25 in (38 × 121 × 108 mm)
Shipping	2.86 × 9.00 × 6.50 in (73 × 229 × 165 mm)
Weight	
Management Card	0.30 lbs (0.14 kg)
Shipping	2.0 lbs (0.91 kg)

Environmental

Temperature

Operating	32 to 113° F (0 to 45° C)
Storage	5 to 149° F (-15 to 65° C)

Humidity

Operating	0–95%, non-condensing
Storage	0–95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000 m)

Compliance

Approvals	FCC Part 15 Class A
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UPS Network Management Card with Environmental Monitoring and Out of Band Management

AP9618

Product Overview

Description	Provides management of an individual UPS by connecting the UPS directly to the network with a dedicated IP address, avoiding the need for a proxy such as a server. Embedded technology provides exceptional reliability and enables the UPS to reboot hung equipment. The user can manage each APC UPS individually through a web browser, Telnet, or SSH. Notification features inform the user of problems as they occur. For protected servers, the included PowerChute Network Shutdown software provides graceful, unattended shutdown in the event of an extended power outage.
Features	Browser accessible, customizable input contacts, customizable output relays, data logging, event logging, fault notification, flash upgradeable, graceful system shutdown, MD5 authentication security, network time protocol, out-of-band management, password security, read-only access, reboot equipment remotely, standards based management, telnet management, temperature monitoring.
Includes	CD with software, temperature sensor, user manual

Communication and Management

Control Panel	Link RX/TX indicator
Smart-Slot Interface type connects with UPS	SU36G, SUDP, SUOL, SY11, SYRM11H, SYRM11P, SYRM22P, SY31, SY33, SLDP3, SSSC, SSTC

Physical

Dimensions (H × W × D)	
Management Card	1.50 × 4.75 × 4.25 in (38 × 121 × 108 mm)
Shipping	2.86 × 9.00 × 6.50 in (73 × 229 × 165 mm)
Weight	
Management Card	0.30 lbs (0.14 kg)
Shipping	2.0 lbs (0.91 kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating	32 to 113° F (0 to 45° C)
Storage	5 to 149° F (-15 to 65° C)

Humidity

Operating	0–95%, non-condensing
Storage	0–95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000 m)

Compliance

Approvals	FCC Part 15 Class A
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UPS Network Management Card with Environmental Monitoring

AP9619

Product Overview

Description	Provides management of an individual UPS by connecting the UPS directly to the network with a dedicated IP address, avoiding the need for a proxy such as a server. Embedded technology provides exceptional reliability and enables the UPS to reboot hung equipment. The user can manage each APC UPS individually through a web browser, Telnet, or SSH. Notification features inform the user of problems as they occur. For protected servers, the included PowerChute Network Shutdown software provides graceful, unattended shutdown in the event of an extended power outage.
Features	Browser accessible, customizable input contacts, customizable output relays, data logging, event logging, fault notification, graceful system shutdown, MD5 authentication security, network time protocol, password security, read-only access, remote monitoring service, standards-based management, telnet management, temperature monitoring
Includes	CD with software, temperature sensor, user manual

Communication and Management

Control Panel	Link RX/TX indicator
Smart-Slot Interface Type (connects with UPS)	SU35G, SU36G, SUDP, SUOL, SY11, SYRM11H, SYRM11P, SYRM22P, SY31, SY33, SLDP3, SSXC, SSTC

Physical

Dimensions (H × W × D)	
Management Card	1.50 × 4.75 × 4.25 in (38 × 121 × 108 mm)
Shipping	2.86 × 9.00 × 6.50 in (73 × 229 × 165 mm)
Weight	
Management Card	0.30 lbs (0.14 kg)
Shipping	2.0 lbs (0.91 kg)
Warranty	2 years repair or replace

Environmental

Temperature

Operating	32 to 113° F (0 to 45° C)
Storage	5 to 149° F (-15 to 65° C)

Humidity

Operating	0–95%, non-condensing
Storage	0–95%, non-condensing

Elevation

Operating	0 to 10 000 ft (0 to 3000 m)
Storage	0 to 50 000 ft (0 to 15 000 m)

Compliance

Approvals	FCC Part 15 Class A
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Modbus/Jbus Interface Card

AP9622

Product Overview

Description	Integrates APC UPSs into leading Building Management Systems
Features	Communication, data transfer, MD5 authentication security, password security, UPS signal support, UPS support, vendor support
Includes	User Manual

Electrical

Operating Current Draw	5mAdc (typical)
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Communication and Management

Control Panel	Network link status LED, Power on/off indicator
Interface Connectors	DB-9 RS-232

Physical

Dimensions (H × W × D)

Management Card	1.5 × 4.75 × 4.25 in (38 × 121 × 108mm)
Shipping	2.86 × 6.5 × 9.00 in (73 × 165 × 229mm)

Weight

Management Card	0.30lb (0.14kg)
Shipping	1.0lb (0.45kg)

Warranty	2 years repair or replace
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Environmental

Temperature

Operating	32 to 113° F (0 to 45° C)
Storage	5 to 149° F (–5 to 65° C)

Environmental

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0–10 000 ft (0–3000m)

Storage 0–50 000 ft (0–15 000m)

Compliance

Approvals DOC/Industry Canada, FCC Part 15 Class B

Management—Environmental

Environmental Management System

AP9320

Product Overview

Description	The Environmental Management System is a browser-accessible 1 U rack-mountable appliance that allows monitoring of a broad range of environmental and related conditions. While monitoring of one temperature, one humidity, and one vibration sensor ship as standard, this flexible system allows the user to add sensors to suit their needs. When conditions change, notifications are sent by e-mail to the appropriate personnel. Eight input contacts provide for monitoring of other equipment. Two output relays and controllable power outlets allow the user to define actions remotely if conditions warrant it.
Features	Access monitoring, alarm beacon, browser accessible, customizable input contacts, customizable output relays, data logging, event logging, fault notification, humidity monitoring, network management integration, optional sensors, rack-mount, read-only access, temperature monitoring, vibration monitoring
Includes	Alarm beacon, door sensor, humidity sensor, installation guide, mounting pads, rack mounting brackets, temperature sensor, vibration sensor

Electrical

Input Power	40 W
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Communicaton and Management

Control Panel	Link RX/TX indicator
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Physical

Dimensions (H × W × D)

Unit	1.74 × 17.10 × 7.00 in (44 × 434 × 178 mm)
Shipping	8.30 × 22.90 × 13.4 in (211 × 582 × 340 mm)
Weight	
Net Weight	6.0 lb (2.73 kg)
Shipping	12.9 lb (5.84 kg)

Physical

Warranty 2 years repair or replace

Environmental

Temperature

Operating 32 to 113° F (0 to 45° C)

Storage 5 to 149° F (-15 to 65° C)

Humidity

Operating 0–95% RH non-condensing

Storage 0–95% RH non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000 m)

Compliance

Approvals CSA 22.2 No 950, UL Listed, FCC Part 15 Class A

Environmental Monitoring Unit

AP9319

Product Overview

Description	The Environmental Monitoring Unit is a browser-accessible 1U rack-mountable appliance that allows monitoring of the included temperature and humidity sensor. Additional temperature and humidity sensors are also available. Early warnings of conditions that lead to equipment failure allow the user to react to changes and minimize the impact on network availability. When conditions change, notifications are sent by e-mail to the appropriate personnel. Four output contacts provide for monitoring of other equipment. An output relay allows the user to define action remotely should conditions warrant it.
Features	Browser accessible, customizable input contacts, customizable output relays, data logging, event logging, fault notification, humidity monitoring, rack-mount, read-only access, telnet management, temperature monitoring
Includes	CD with software, humidity sensor, installation guide, rack-mounting brackets, temperature sensor, user manual

Performance

Accuracy

Temperature	$\pm 2^{\circ}$ C, from 0 to 40 $^{\circ}$ C
Humidity	10 to 90% RH, at 25 $^{\circ}$ C 30 to 80% RH, from 15 to 30 $^{\circ}$ C

Electrical

Input Voltage Nominal	24 VDC
Maximum Total Current Draw	380mA at 24 VDC with standard sensors attached

Physical

Dimensions (H \times W \times D)

Unit	1.75 \times 7.9 \times 4.7 in (45 \times 201 \times 119 mm)
Shipping	2.75 \times 18.25 \times 9.0 in (70 \times 464 \times 229 mm)
Weight	
Net Weight	1.80 lb (0.82 kg)
Shipping	5.60 lb (2.55 kg)

Physical

Warranty 2 years repair or replace

Environmental

Temperature

Operating 32 to 104° F (0 to 40°C)

Storage 32 to 113° F (0 to 45° C)

Humidity

Operating 0–95%, non-condensing

Storage 0–95%, non-condensing

Elevation

Operating 0 to 10 000 ft (0 to 3000 m)

Storage 0 to 50 000 ft (0 to 15 000 ft)

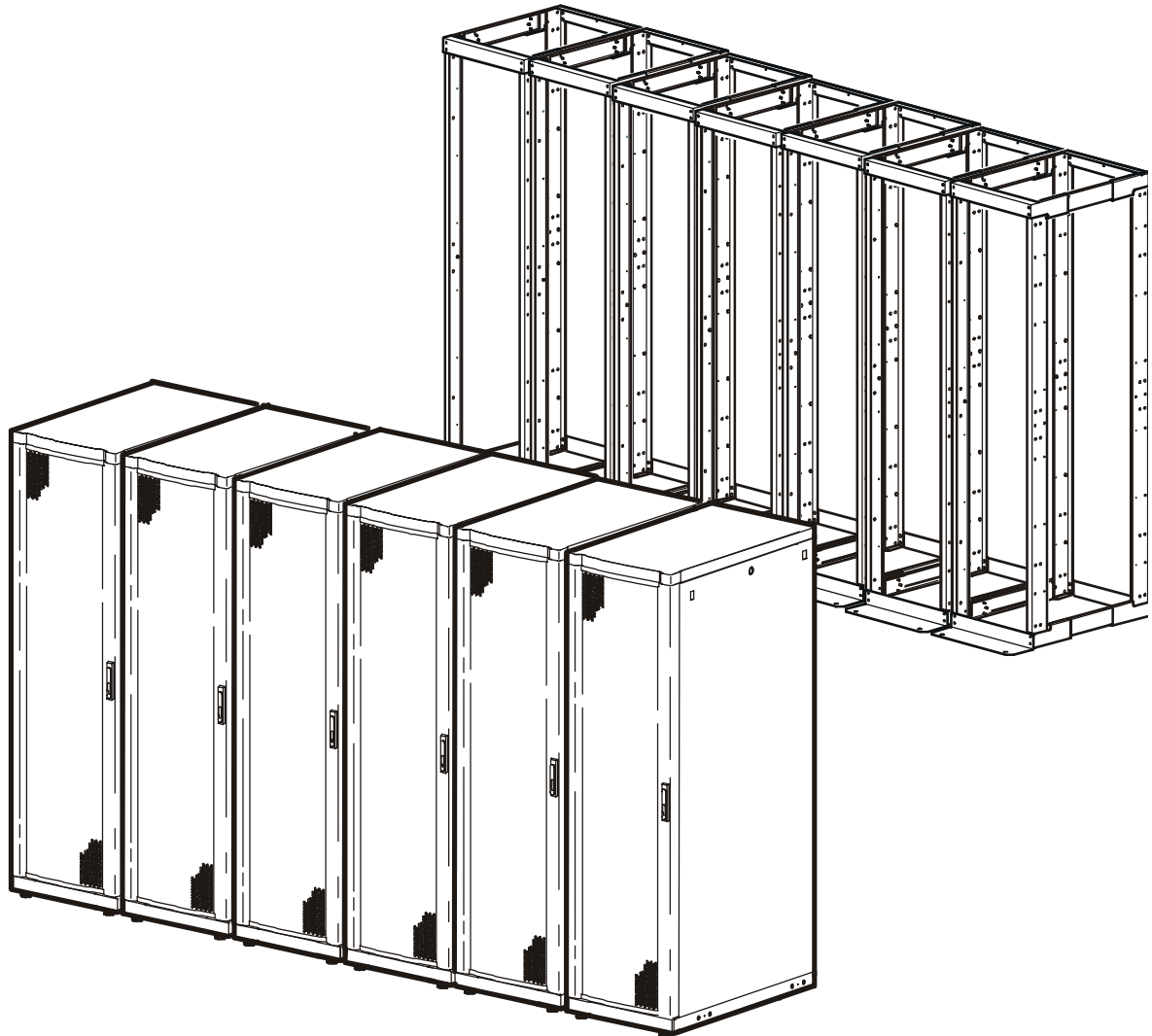
Compliance

Approvals FCC Part 15 Class A

Rack

NetShelter

American Power Conversion's NetShelter racks and enclosures support a rack-mount IT infrastructure. NetShelter includes a full line of industry-standard enclosures, racks, and accessories specifically designed to meet the needs of present and future data center requirements.



NetShelter VX Enclosures

General description

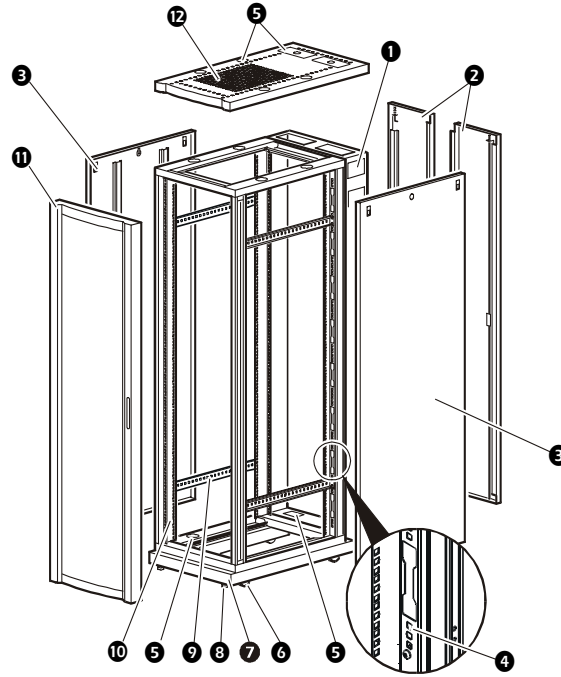
NetShelter VX is a high-quality enclosure for storage of industry standard (EIA-310), 19-inch, and 23-inch rack-mount equipment (selected models only). This equipment includes servers, networking, telecom, and APC power-protection equipment. APC's new enclosure design addresses many of the emerging challenges and issues data center managers face today including deeper servers, increasing heat densities, increasing quantity of power and data cables, server compatibility, and speed of deployment. Each enclosure offered consists of an enclosure frame, roof, doors, side panels (base models only), base, and a baying kit (expansion models only).

NetShelter VX enclosures are 42 inches (1070mm) deep and available in the following sizes:

Model	Mounting Height	Mounting Width	External Width	Description
AR2100BLK	42U [†]	19"	600mm	Base (with sides)
AR2101BLK	42U	19"	600mm	Expansion (without sides)
AR2102BLK	42U	19"	600mm	Without sides or doors
AR2103BLK	47U	19"	600mm	Base (with sides)
AR2104BLK	47U	19"	600mm	Expansion (without sides)
AR2105BLK	25U	19"	600mm	Base (with sides)
AR2310BLK	42U	19" or 23"	750mm	Base (with sides)
AR2311BLK	42U	19" or 23"	750mm	Expansion (without sides)
AR2312BLK	42U	19"	750mm	Base (with sides)
AR2313BLK	42U	19"	750mm	Expansion (without sides)
AR2314BLK	42U	19"	750mm	Base (with sides)
AR2315BLK	42U	19"	750mm	Expansion (without sides)

[†]One U = 1.75 in (44mm)

Description of specific sub-components



- | | |
|---------------------------------------|--------------------------------------|
| ➊ Rear cabling channel | ➋ Front and rear skirts |
| ➌ Split rear doors [‡] | ➍ Adjustable leveling feet |
| ➎ Side panels with locks [†] | ➏ Adjustable horizontal braces |
| ➐ Frame posts | ➑ Vertical rails |
| ➒ Cable access | ➓ Reversible front door [‡] |
| ➔ Casters | ➕ Ventilated roof |

[†]Enclosures with sides only

[‡]Enclosures with doors only

Hardware, grommets, and covers

	AR2100BLK AR2103BLK AR2105BLK AR2310BLK AR2312BLK AR2314BLK	AR2102BLK AR2101BLK AR2104BLK AR2311BLK AR2313BLK AR2315BLK
Baying Hardware		
Rear baying bracket	none	1
Front vertical baying trim	none	1
Front baying bracket	none	4
M6 counter-sunk screws	none	6
M6 × 12 low profile screws	none	4
M6 × 12 socket-head screws	none	4
M6 nuts	none	4
M3 allen wrench	none	1
Mounting Hardware		
M6 × 16mm phillips/slotted screws	60	60
Caged nut installation tool	1	1
M6 caged nuts	60	60
Plastic cup washers	60	60
Open-ended wrench (13mm/14mm)	1	1
M5 allen wrench	1	1
Door/side panel keys	2	2
Grommets/ Covers		
4 × 4in grommets	2 base; 2 sides	2 base; 4 sides
4 × 8in grommets	4 roof; 3 sides	4 roof; 6 sides
4 × 4in cover	4 roof	4 roof

Operation

If configured in an InfraStruXure solution, NetShelter VX Enclosures are designed to join together seamlessly, and placed next to the InfraStruXure PDU. The first enclosure should be positioned to the right or left of the InfraStruXure PDU, depending on the location of the Symmetra PX UPS, and each additional enclosure placed after the first to form a complete row. After placing the enclosures in the desired position, level, join, and stabilize (if necessary) the enclosures before installing any equipment.

Placement considerations. NetShelter VX Enclosures are optimized for placement on a raised floor. When bayed together, the enclosure width is such that it can be positioned to align exactly on a 24in or 600mm floor tile. The 42 in (1070mm) depth also provides the optimal depth in a hot aisle/cold aisle layout, allowing for 36in (914mm) hot aisles and 48in (1219mm) cold aisles. To accomplish this optimized layout, the front of each enclosure in a cold aisle should align exactly with the front of a floor tile.

Ensure that the floor and sub-floor can support the total weight of the system configuration when concentrated on the leveling feet. If the equipment must be placed on a raised floor, consult the flooring manufacturer for loading requirements prior to installing equipment.

Leveling the enclosures. Leveling feet are attached under the enclosure at each corner. The leveling feet can help provide a stable base if the selected floor space is uneven, but they are not intended to compensate for a badly sloped surface. The leveling feet and casters can also be completely removed to allow the enclosure base to rest directly on the floor.

Joining the enclosures. Expand the installation by joining an expansion enclosure to a base enclosure or by joining two expansion enclosures together. The procedure involves removing one side panel of the base enclosure and attaching it to the open side of the expansion enclosure. The expansion enclosure includes pre-installed expansion hardware and vertical baying trim. The trim covers the gap between the joined enclosures and creates a finished appearance.

Stabilizing the enclosures. American Power Conversion offers additional products (not included) for stabilizing the enclosure. These options are typically used if there is a need to meet UBC (Uniform Building Code) requirements for Zone 4 seismic anchoring.

Bolt-Down Bracket Kit (AR8112BLK)—This kit consists of four brackets and mounting hardware for attaching to the interior or the exterior of the base of the enclosure. These brackets must be bolted to the sub-floor to stabilize the enclosure.

Stabilizer Plate Kit (AR8115ABLK for 600mm enclosures and AR8120BLK for 750mm enclosures)—This kit consists of one plate and mounting hardware for attaching to the enclosure. Use up to three plate kits to provide stability to the front and sides. Stabilizer plates, bolted to the sub-floor, create additional stability.

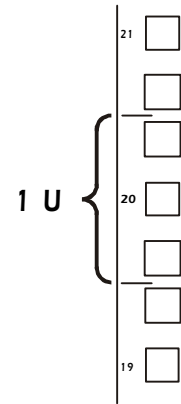
Installing equipment. Consider the following instructions before installing equipment in any NetShelter VX Enclosure:

- Do not install more than 2000lb (907.2 kg) of equipment.
- Do not extend more than one installed component from the enclosure at one time to prevent the enclosure from becoming dangerously unstable.
- Load the heaviest components first and place them toward the bottom of the enclosure to prevent the enclosure from becoming top-heavy.

NetShelter VX Enclosures accommodate industry standard 19-inch or 23-inch equipment (selected models only).

Depth -adjustable vertical mounting rails have square mounting holes that provide the best mounting flexibility. When installing equipment, locate the top and bottom of a U-space on the mounting rails. The numbers on the vertical mounting rails of NetShelter VX Enclosures indicate the middle of each U-space. A U-space consists of one of these numbered holes and one hole immediately above and below it, as shown.

Each NetShelter VX Enclosure includes sixty sets of mounting hardware (M6 cage nuts, screws, and plastic washers).



Features and benefits.

Feature	Benefit
Rear power distribution channels	Allow for easy Rack PDU access and a high density of power recepticals.
Rear cable management channels	Provide ample space for neatly routing and securing large bundles of data and power cables without intruding into rear service area of rack-mount equipment.
Fully ventilated front door	Exceeds airflow requirements of today's IT equipment.
Deep form-factor	Accommodates deeper equipment with space for cable management and power distribution.
EIA-310 compliant	Compatible with equipment from multiple vendors.
Depth adjustable vertical mounting rails	Compatible with equipment from multiple vendors.
2000lb static and dynamic load rating	Supports the heaviest of installations.
Variety of widths and heights	Provide flexibility.
Split rear doors	Provide improved access and serviceability to the rear of rack-mount equipment.
Numbered "U" positions	Allow for rapid installation of rack-mount equipment.
Lockable doors and side panels	Prevent unauthorized entry through an increased level of security.
Rolls through a 7ft doorway	Provides easy installation.
Quick release doors and side panels	Allow for ease of installation and speed of deployment.
Protective grounding provisions	Provide safety protection against electric shock and reduction of EMI emissions.
Casters and leveling feet	Allow for ease of installation.

NetShelter 4-Post Racks

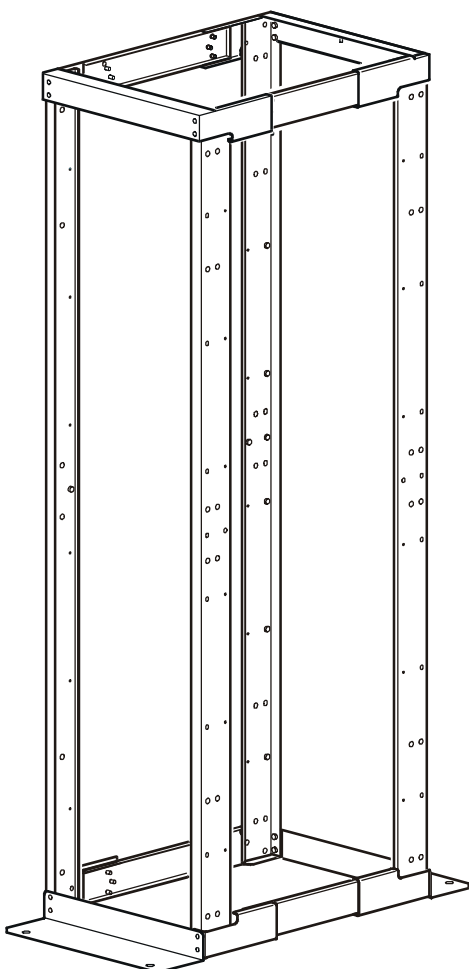
General description

NetShelter 4-Post Racks provide economical solutions for storage of industry standard (EIA-310) 19-inch rack-mount equipment, which includes servers, networking, telecom, and APC power-protection equipment. APC offers the following NetShelter 4-Post Racks:

Model	Mounting Height	Mounting Width	External Depth	Mounting Holes
AR203	43U [†]	19" EIA	29" (737mm)	Square 9.5mm
AR204	43U	19" EIA	29" (737mm)	Threaded Hole (#12-24THD)

[†]One U = 1.75 in. (44mm)

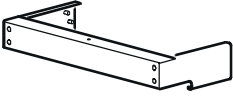
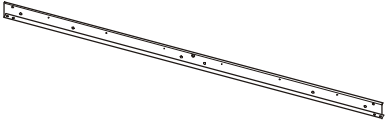
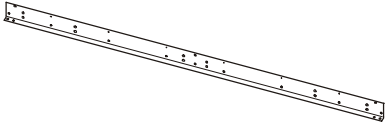


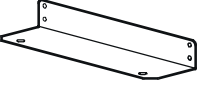




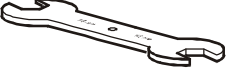
Description of specific sub-components



Equipment Mounting Hardware

	AR203	AR204
12-24 × 1/2 in phillips slotted screws	none	60
M6 × 16-mm phillips slotted screws	60	none
M6 caged nuts	60	none
Caged nut installation tool	1	none
Plastic cup washers	60	none

Inventory of Parts

Qty	Description	Item
2	Upper frame	
2	Left corner post	
2	Right corner post	
2	Left corner bracket	
2	Right corner bracket	
2	Stabilizer plate	
4	Side channel	
18	Hex-head bolts	
42	Hex nuts	
60	Star washers	
1	Open-ended wrench (13mm/14mm)	

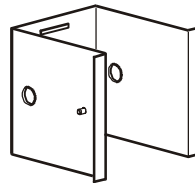
Operation

NetShelter 4-Post Racks are used primarily when the following conditions are met:

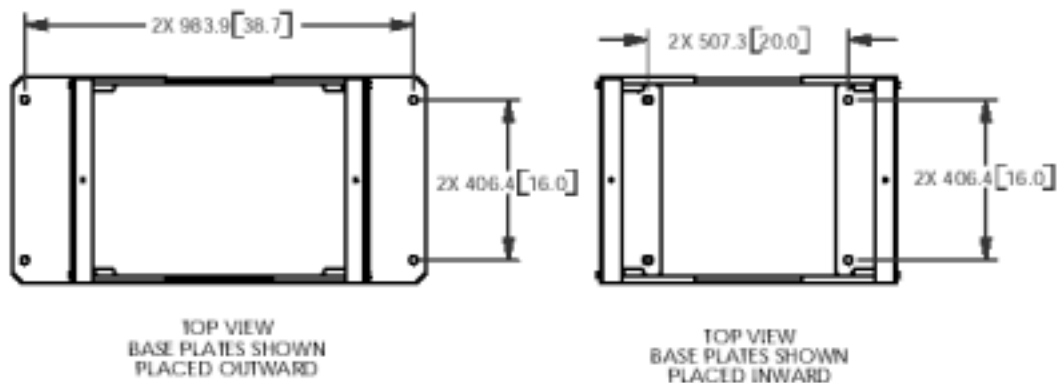
- No need for support of more than 1000lb (455kg).
- No need for physical security at the rack level.
- Provisions are made to bolt the racks to the floor.
- Static mounting depth of 29in (737mm) is sufficient.

NetShelter 4-Post Racks are designed to join together seamlessly and to be placed next to the InfraStruXure PDU. The first rack should be positioned to the right or left of the InfraStruXure PDU, depending on the location of the Symmetra PX UPS, with each additional rack placed after the first to form a complete row. After placing the racks in the desired position, join and stabilize the enclosures before installing any equipment.

Joining the racks. Racks can be joined together using optional baying kits AR8410 (24in spacing) or AR8411 (600mm spacing).



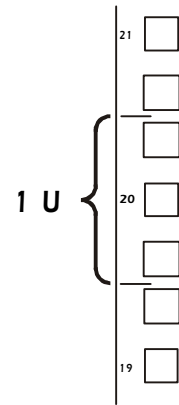
Stabilizing the racks. In order to properly support the installed equipment, NetShelter 4-Post Racks must be bolted to the floor. The reversible base plates provide floor-mounting on the outside or the inside of the rack. Holes on the base plates are available for accomplishing this benefit. See below for proper hole distances.



Installing equipment. The frame post of the AR203 has square holes for use with caged nuts. The frame post of the AR204 has threaded holes for use with #12-24 screws. Consider the following instructions before installing equipment in any NetShelter 4-Post Rack:

- Do not install more than 1000lb (455kg) of equipment.
- Do not extend more than one installed component from the enclosure at one time to prevent the rack from becoming dangerously unstable.
- Load the heaviest components first and place them toward the bottom of the rack to prevent it from becoming top-heavy.

The design of NetShelter 4-Post Racks accommodate industry-standard 19-inch equipment. Vertical mounting rails are fixed at a 29 in (737mm) depth. When installing equipment, locate the top and bottom of a U-space on the mounting rails. The numbers on the vertical mounting rails of NetShelter 4-Post Racks indicate the middle of each U-space. A U-space consists of one of these numbered holes and one hole immediately above and below it, as shown.



The AR203 comes with sixty sets of mounting hardware (M6 caged nuts, screws, and plastic washers). The AR204 also comes with sixty sets of mounting hardware (#12-24 screws). Servers today by various manufacturers often provide means for toolless installation into square mounting holes. In these cases, cage nuts are often not required.

Features and benefits.

Feature	Benefit
Numbered U positions	Eliminates the pain involved in determining where to install rack-mount devices within an enclosure or rack by labeling each vertical mounting rail with the actual U positions.
Reversible stabilization plates	Conserves floor space by providing the option of either being mounted internally or externally.

Shielding Troughs, Shielding Partitions, and Cable Ladders

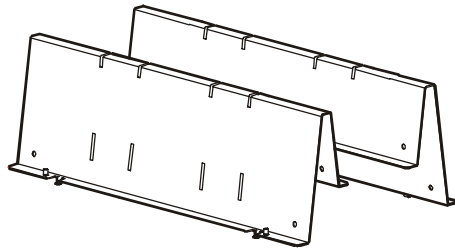
General description

Shielding Troughs, Shielding Partitions, and Cable Ladders are used to easily and cost-effectively route power and data cabling overhead. The overhead cabling system consists of three major components:

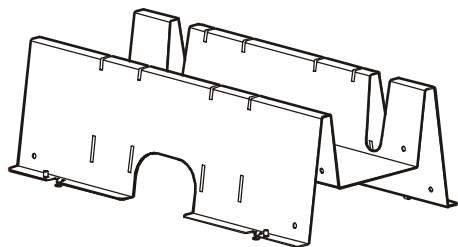
- Shielding Troughs
- Shielding Partitions
- Cable Ladders

Description of specific sub-components and operation

Shielding Troughs for power cables. The design of each Shielding Trough provides a means for overhead routing and support for the maximum amount of power cables used in an InfraStruXure System. There are two types of Shielding Troughs:

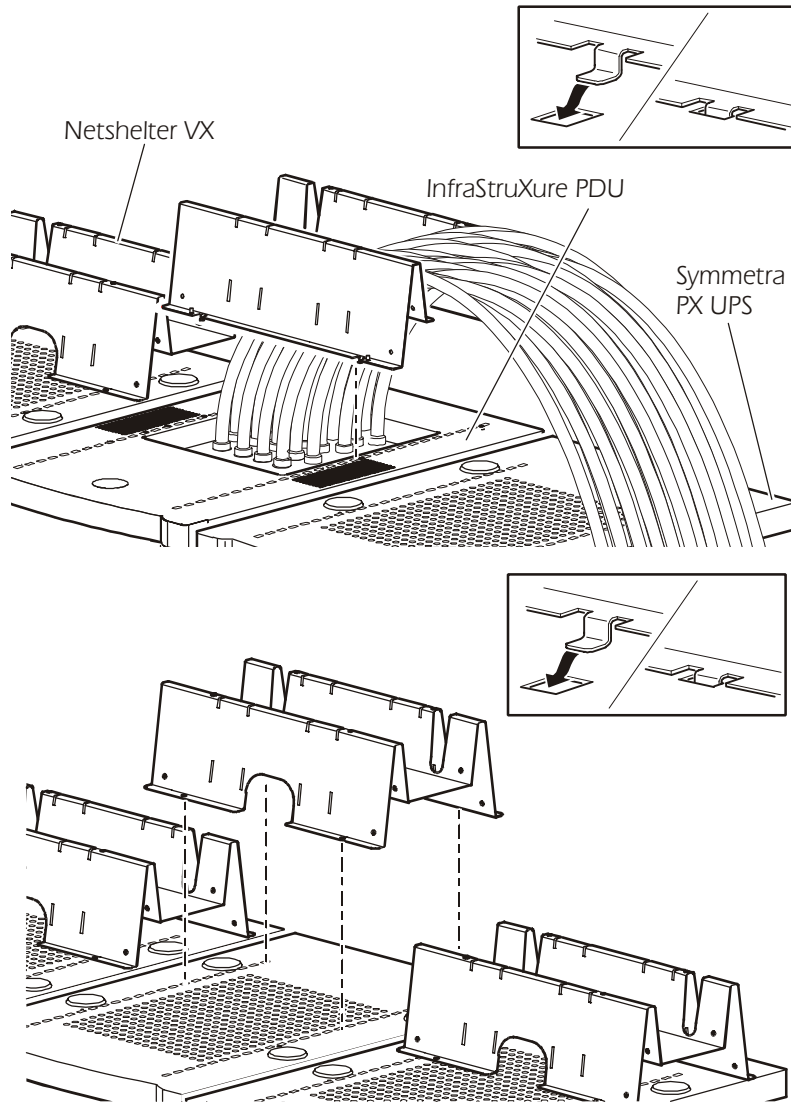


The PDU Shielding Trough sits on top of the PDU and has an opening in one end to fit around the power cables where they exit the PDU.

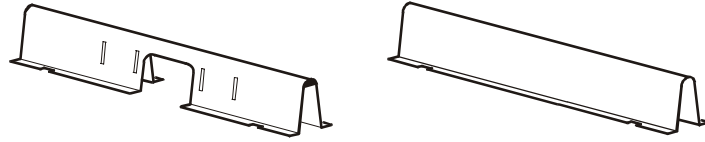


The NetShelter Shielding Troughs have an opening in each side through which data cables can be routed to the Shielding Partitions and two rear slots for routing of up to two power cables into each NetShelter VX enclosure or rack.

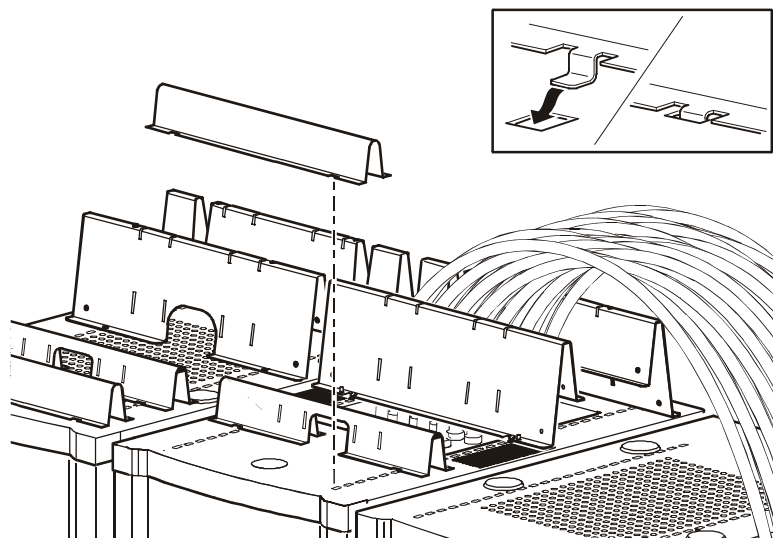
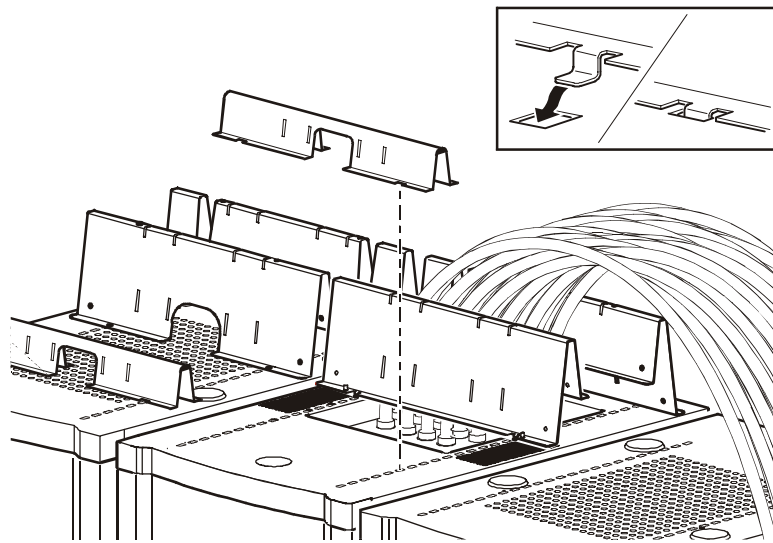
Shielding Troughs are designed to mount along the back edge on the roof of each row of enclosures or racks.



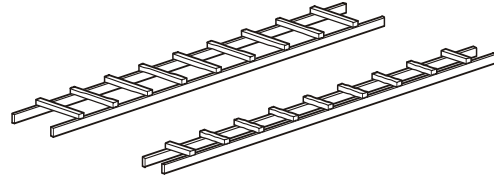
Shielding Partitions for data cables. There are two types of Shielding Partitions, each of which forms a side-wall of a trough ideal for routing data cables. The width of the trough can be customized for each row of the system—wider for rows carrying many data cables, narrower for rows carrying fewer.



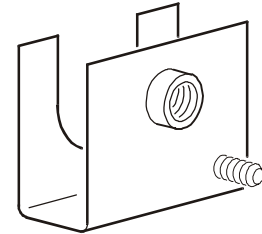
The trough for routing data cables must use, as its back wall, the Shielding Partition that contains a pass-through opening for routing data cables. Place the solid Shielding Partition in the front of the enclosure to hide data cable bundles.



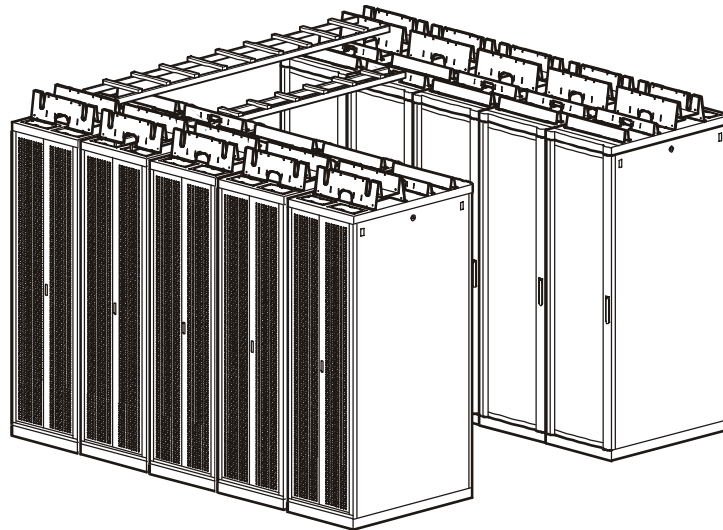
Cable Ladders. There are two types of Cable Ladders available, each of which is used for running power and data cables between rows of enclosures. Depending on the volume of data and power cables being supported, choose either the 12 in (305 mm) wide version or the 6 in (152 mm) wide Cable Ladder.



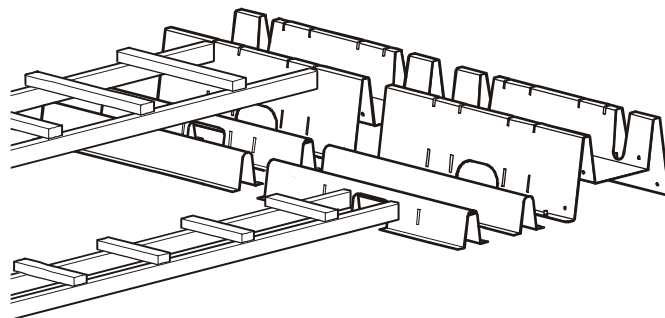
Both Cable Ladders are 10 ft (3.05 m) in length, but can be shorted by cutting to the desired length or lengthened by connecting them together using an APC Cable Ladder clamp kit (AR8169). Cable Ladders are designed to mount in one of two configurations: across rows front-to-front, or across rows back-to-back.



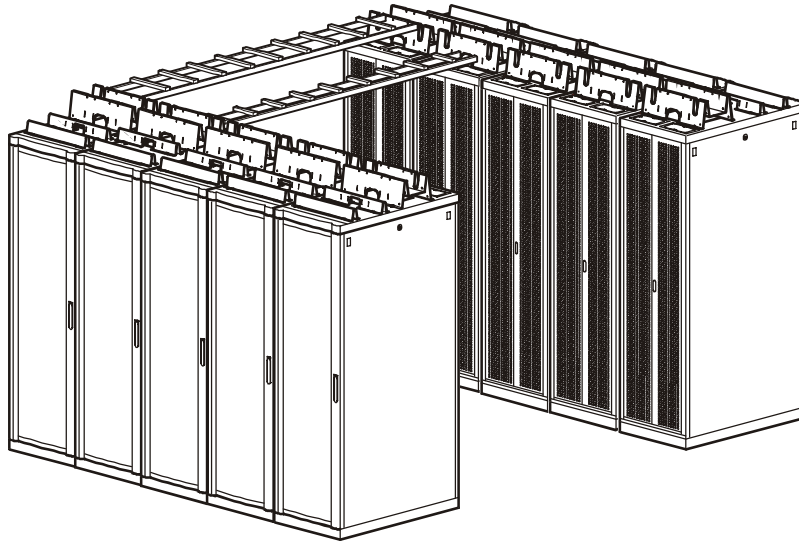
Rows Front to Front—Use the Cable Ladder brackets (included) to attach the 12 in (305 mm) Cable Ladder to the slotted top of the Shielding Troughs of adjacent rows.



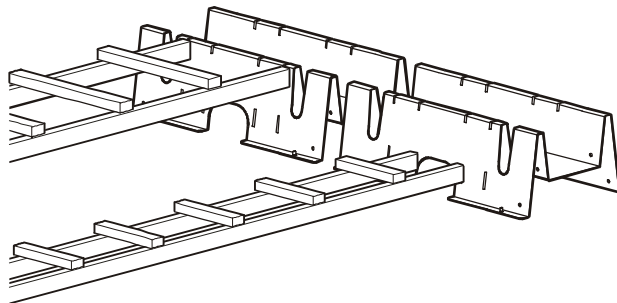
Attach a wide Cable Ladder to the slots in the top of the Shielding Trough. The Cable Ladder runs above the Shielding Partition and carries power cables between rows. Attach a narrow Cable Ladder between the Shielding Partitions that have openings for routing data cables into the data cable trough.



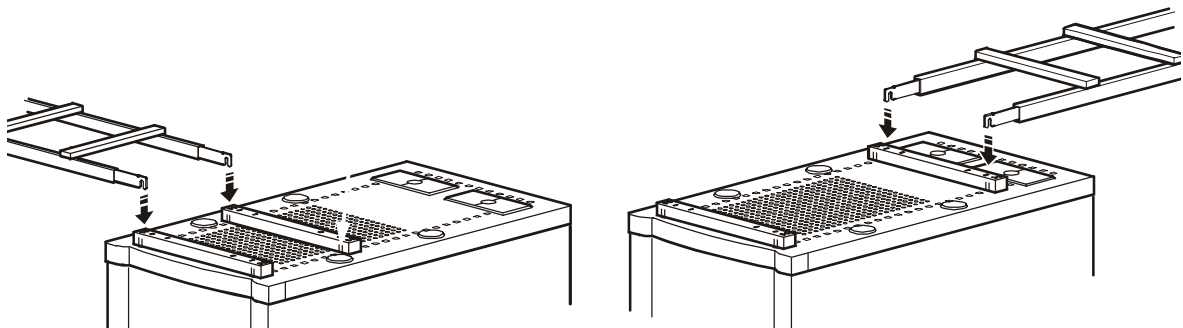
Rows back-to-back—Use the Cable Ladder brackets (included) to attach the 12 in (305 mm) Cable Ladder to the slotted top of the Shielding Troughs of adjacent rows.



Attach a wide Cable Ladder to the slots in the top of the Shielding Trough to route power cables into the Shielding Troughs. Attach a narrow Cable Ladder to the slots in the middle of a Shielding Trough to route data cables under the Shielding Trough and into the data cable trough.



Running ladders across aisles of enclosures. Bracket kits (AR8165ABLK and AR8165ABLK) run ladders across aisles of enclosures from the front or back of parallel enclosures or the sides of parallel enclosures. The hooks and brackets included in the kits allow for extending and attaching ladders directly to the enclosures.



Grounding. Shielding Troughs, Shielding Partitions, Cable Ladders all have ground studs on them. These components also include a kit containing grounding strips and hardware.

Specifications

Part Number	Description	Height	Width	Depth	Weight
AR8160ABLK	PDU Shielding Trough (600-mm wide)	7.2"	22.0"	12.7"	15lb
AR8161ABLK	Power Cable Shielding Trough for NetShelter (600-mm wide)	7.2"	22.0"	12.7"	10lb
AR8162ABLK	Shielding Partition Solid (600-mm wide)	4.8"	22.8"	2.8"	4lb
AR8163ABLK	Shielding Partition Pass-through (600-mm wide)	4.8"	22.8"	2.8"	4lb
AR8164ABLK	Data Cable Ladder with Bracket Kit	119.0"	6.0"	2.0"	18lb
AR8165ABLK	Power Cable Ladder with Bracket Kit	119.0"	12.0"	2.0"	20.5lb
AR8169	Cable Ladder Clamp Kit	1.0"	3.5"	5.0"	0.7lb
AR8171BLK	NetShelter Shielding Trough (750-mm wide)	7.2"	28.8"	12.7"	15lb
AR8172BLK	Shielding Partition Solid (750-mm wide)	4.8"	28.8"	2.8"	5lb
AR8173BLK	Shielding Partition Pass-through (750-mm wide)	4.8"	28.8"	2.8"	5lb
AR8167BLK	Shielding Trough End Cap	1.80"	8.60"	7.10"	1.5lb
AR8174BLK	Shielding Trough Cover (600-mm wide)	25.7"	10.5"	1.50"	5.0lb
AR8175BLK	Shielding Trough Cover (750-mm wide)	1.40"	31.5"	10.4"	4.9lb
AR8176BLK	Trough Brackets (750-mm wide)	1.75"	9.25"	6.5"	0.5lb
AR8177BLK	Partition Brackets (750-mm wide)	1.75"	9.25"	6.5"	0.5lb
AR8168BLK	Ladder to Enclosure Connection Brackets (600-mm wide)	18.25"	12.25"	4.75"	4.5lb
AR8170BLK	Shielding Trough for PDU and NSVX 47U	13.3"	23.5"	18.0"	21.5lb
AR8178BLK	PDU Shielding Trough	6.5"	29.5"	11.75"	14.8lb
AR8190BLK	Shielding Trough 3rd Party Roof Adapter	4.0"	16.5"	32.5"	9.0lb

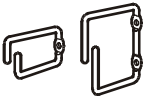





NetShelter Enclosure and Rack Accessories

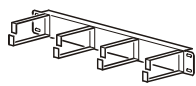

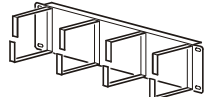
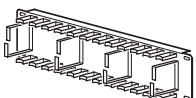
General description

NetShelter accessories are optional devices that enhance the functionality of NetShelter VX Enclosures and NetShelter 4-Post Racks.

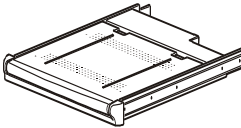
Description of specific sub-components

Cable management options. APC offers the following products for managing cables in a NetShelter enclosure:

Product	SKU	Description	Figure
Cable Management Rings	AR8113A	Fastens cables to posts, mounting rails, or braces	
Side Cable Management Tray	AR8114BLK	Provides vertical mounting in the sides of NetShelter VX Enclosures for routing and managing cables	
Cable Containment Brackets	AR8116BLK	Provides a means for securing cable bundles within the vertical rear cabling channels of NetShelter VX Enclosures	
Rear Cable Management Tray (42U enclosure)	AR8118BLK	Provides vertical mounting in the center-rear of NetShelter VX Enclosures for routing and managing cables when the rear cabling channels are fully occupied with Rack PDUs or data cables	
Rear Cable Management Tray (47U enclosure)	AR8119BLK		
Side Channel Cable Trough (750mm-wide enclosures and 4-Post racks only)	AR8008BLK	Routes cables from the front to the rear of the enclosure when the rails are set to 19"	
42-U Networking Enclosure Trough	AR8016BLK	Routes cables from the front to the rear of the enclosure.	

Product	SKU	Description	Figure
19-inch 1U Horizontal Cable Organizer	AR8425A	Routes cables horizontally on front or back of the 19" EIA rack	
Vertical Cable Organizer	AR8442	Routes cables vertically on the EIA rack	
2U Horizontal Cable Organizer	AR8426A	Routes cables horizontally on front or back of the 19" EIA rack	
2U Patch Cord Organizer	AR8427A	Routes cables horizontally on front or back of the 19" EIA rack	
1U Cable Management Arm	AR8129	Attaches to APC sliding shelves and keyboard drawers to secure cables	No image available

Keyboard and keyboard drawer options. APC offers the following products for keyboards and keyboard drawers in a NetShelter enclosure:

Product	SKU	Description	Figure
17" Keyboard Drawer	AR8126ABLK	1U keyboard drawer for 17" keyboards	
19" Rotating Keyboard Drawer	AR8127BLK	2U keyboard drawer for 19" keyboards	
17" Keyboard North American	AR8250BLK	17" 104- key, keyboard with integrated touchpad	

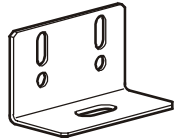
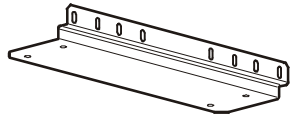
Shelving options. APC offers the following products for shelving in a NetShelter enclosure:

Product	SKU	Description
Fixed Shelf—50 lbs/23kg	AR8105BLK	2-post mount fixed shelf supports
Fixed Shelf—250 lbs/114kg	AR8122BLK	4-post mount fixed shelf supports
Sliding Shelf—100 lbs/45kg	AR8123BLK	4-post mount fixed shelf supports
Sliding Shelf—200 lbs/91kg	AR8128BLK	4-post mount fixed shelf supports


Blanking panel options. APC offers the following products for blanking panels in a NetShelter enclosure:

Product	SKU	Description
Blanking Panel Kit 19” (1U, 2U, 4U, 8U)	AR8101BLK	Covers unused or open U space to promote proper airflow
Blanking Panel Kit 23” (1U, 2U, 4U, 8U)	AR8107BLK	Covers unused or open U space to promote proper airflow
1U Blanking Panel Kit 19”	AR8108BLK	Covers unused or open U space to promote proper airflow
2U Blanking Panel Kit 19”	AR8109BLK	Covers unused or open U space to promote proper airflow
4 U Blanking Panel Kit 19”	AR8134BLK	Covers unused or open U space to promote proper airflow
8 U Blanking Panel Kit 19”	AR8135BLK	Covers unused or open U space to promote proper airflow

Stabilization options. APC offers the following stabilization products for a NetShelter enclosure:

Product	SKU	Description	Figure
Bolt-down Bracket Kit	AR8112BLK	Allows NetShelter VX Enclosures to bolt to the floor to meet UBC Zone 4 standards for seismic anchoring.	
Stabilizer Plate 600mm	AR8115ABLK	Stabilizes the enclosure	
Stabilizer Plate 750mm	AR8120BLK	Stabilizes the enclosure	

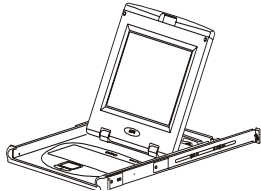
Fan options. APC offers the following products for fans in a NetShelter enclosure:

Product	SKU	Description	Figure
Roof Fan Tray 120 VAC	AR8210BLK	Provides 440 CFM of bottom to top airflow	
Roof Fan Tray 230 VAC	AR8211BLK	Provides 440 CFM of bottom to top airflow	

Mounting hardware options. APC offers the following products for mounting hardware in a NetShelter enclosure:

Product	SKU	Description
#10-32 Hardware Kit	AR8005	Provides 36 additional caged nuts for mounting equipment.
M6 Hardware Kit	AR8100	Provides 32 additional caged nuts, washers, and screws for mounting equipment.
M6 Hardware Kit for 750mm wide Enclosures	AR8015	Provides 32 additional caged nuts, washers, and screws for mounting equipment.
#12-24 Hardware Kit	AR8400	Provides 100 additional screws for mounting equipment in 4-post racks with threaded holes.
Equipment Support Rails	AR8006	Supports any non-rack-mount device that measures 16.75–17.7" wide and has a maximum weight of 200lbs (91 kg).
HP Adapter Kit—L Class/ RP54XX	AR8013	Two adapter rails that allow HP's L Class and RP54XX servers to be mounted in NetShelter enclosures
HP Adapter Kit—N Class/ RP7400	AR8014	Two adapter rails that allow HP's N Class servers to be mounted in NetShelter enclosures

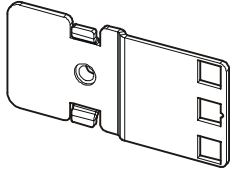


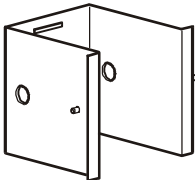
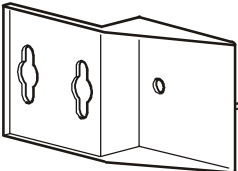
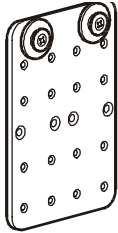
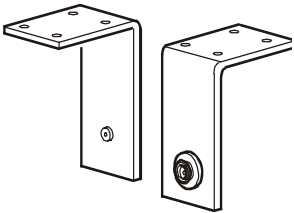
LCD monitor options. APC offers the following products for LCD monitors in a NetShelter enclosure:

Product	SKU	Description	Figure
Rack-mount 15" LCD Monitor/Keyboard Drawer	AR8215BLK	15" LCD monitor with keyboard and trackball pointing device integrated into 1U of rack space	

KVM switch options. APC offers the following products for KVM switches in aNetShelter enclosure:

Product	SKU	Description
4-Port KVM Switch (PC Only)	AP9254	Used for controlling multiple servers with one keyboard, monitor, and mouse.
8-Port KVM Switch (PC Only)	AP9258	Used for controlling multiple servers with one keyboard, monitor, and mouse.
8-Port KVM Switch (Sun, USB, PC compatible)	AP9278	Used for controlling multiple servers with one keyboard, monitor, and mouse.
KVM Cable for PC servers (PS/2, VGA)—10 ft/2.5 m	AP9850	Used for connecting a server to a KVM switch.
KVM Cable for PC servers (PS/2, VGA)—25 ft/6.3 m	AP9851	Used for connecting a server to a KVM switch.
KVM Pairing Cable Kit—3 ft/0.9 m	AP9852	Used for connecting a server to a KVM switch.
KVM Cable for Sun servers (Sun, VGA) —15 ft/4.6 m	AP9853	Used for connecting a server to a KVM switch.
KVM Cable for Sun servers (Sun, 13W3)—15 ft/4.6 m	AP9854	Used for connecting a server to a KVM switch.
KVM Cable for USB servers (USB, VGA)—12 ft/3.7 m	AP9855	Used for connecting a server to a KVM switch.

Miscellaneous options. APC offers the following products for miscellaneous options for a NetShelter Enclosure or NetShelter 4-Post Rack:

Product	SKU	Description	Figure
Adapter Kit 23" to 19" Mounting	AR8150BLK	Allows for 19" equipment to be installed in a 750 mm wide VX enclosure when vertical mounting rails are oriented for 23" equipment	
NetShelter Grounding Kit	AR8390	Connects major sheet metal components of enclosures, using ground straps, to reduce electromagnetic interference	
4-Post Open Frame Rack Roof	AR8450	Allows for installation of Shielding Troughs and Shielding Partitions on NetShelter 4-Post Rack	
Rack Baying Brackets 24"	AR8410	Allow for joining 4-post racks together	
Rack Baying Brackets 24"	AR8411	Allow for joining 4-post racks together	
Vertical PDU Mounting Brackets	AR8415	Allow for vertical mounting of APC PDUs in 4-post racks	
Vertical PDU Mounting Plates	AR8416	Provide vertical mounting options for the following APC PDUs: AP9559, AP9560, and AP9561	
NetShelter 4-Post Rack PDU Adapter Brackets	AR8417	Provides mounting options for APC PDUs	

Power Distribution in the Rack

Rack Automatic Transfer Switch

APC's Rack Automatic Transfer Switch (ATS) is a high availability switch that has two input power cords, one for each AC line, which provide redundant power to connected equipment. The Rack ATS supplies power to the connected load from a primary AC source. If that primary source becomes unavailable for whatever reason, the Rack ATS will automatically begin sourcing power from the secondary source. The transfer time from one source to the other is seamless to the connected equipment. The networked units have built-in network connectivity, which allows for remote management through the Web, SNMP, or Telnet interfaces.

Rack Power Distribution Units

The features of the Rack Power Distribution Units (PDUs) offered by APC range from simple power distribution to controllable outlets and current monitoring. This section provides specific information on the following three categories:

- Basic Rack PDUs
- Metered Rack PDUs
- Switched Rack PDUs.

Basic Rack Power Distribution Units. APC offers a wide variety of Basic Rack Power Distribution Units (PDUs), which allow users to distribute power to rack-mount equipment. These PDUs are offered in horizontally and vertically mounted styles, as well as in a variety of power inputs and outputs to fit most power environments. Additionally, APC offers Basic Rack PDUs that mount without tools, in the rear channel of a NetShelter VX.

Metered Rack Power Distribution Units. APC's Metered Rack Power Distribution Units (PDUs) provide power distribution and equip on-site installers with the ability to monitor the aggregate current draw as equipment is connected to the unit. These Metered Rack PDUs also have alarm thresholds that, when exceeded, provide alarms that alert users of potential problems. These features help eliminate the possibility of an overloaded circuit.

Switched Rack Power Distribution Units. APC's Switched Rack Power Distribution Units (PDUs) are premium solutions to many of the power management problems seen in today's IT environments. Some of these problems include:

- unauthorized use of power outlets
- locked-up equipment
- in-rush current
- overloaded circuits
- the need for remote access to power outlets in the rack.

The Switched Rack PDUs address these problems through individual outlet control, power on and off delays, current monitoring, alarm thresholds, and network management.

Individual outlet control allows users to turn outlets on, turn outlets off, or recycle power to equipment. These options allow users to reboot locked-up equipment and avoid unauthorized use of outlets. Power delays allow users to determine the order in which equipment is powered up or down. Using the power delay feature will avoid in-rush current, which can cause overloads.

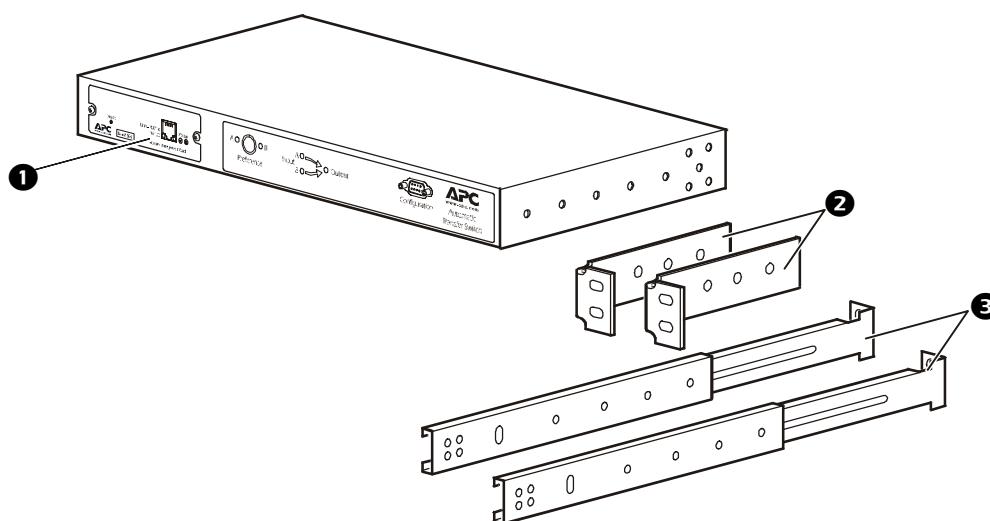
Monitoring the current draw at the rack level is key to avoiding downtime due to overloaded circuits. The Switched Rack PDUs provide an aggregate current draw, which can be viewed remotely or locally on digital display. In addition, it generates alarms based on user-defined thresholds to alert users of potential circuit overloads.

Users can access, configure, and control the Switched Rack PDUs through the Web, SNMP, or Telnet Interfaces.

Rack Automatic Transfer Switch

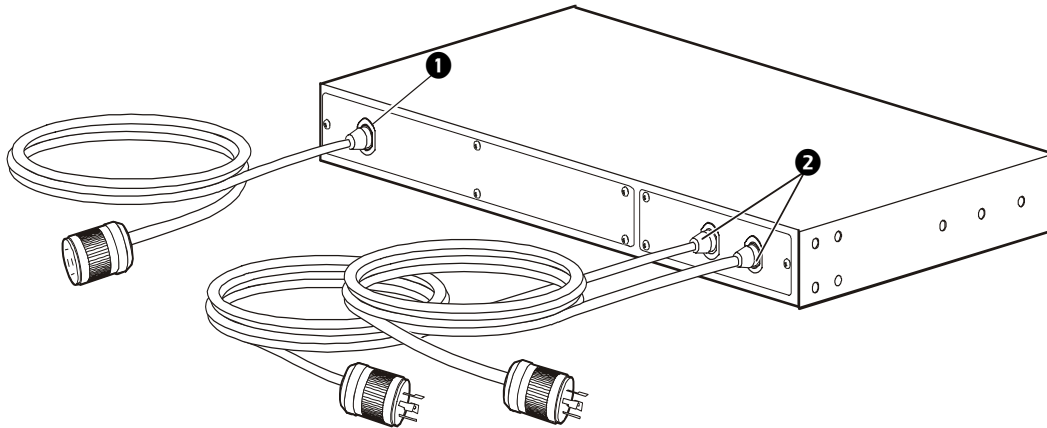
APC's Rack Automatic Transfer Switch (ATS) provides redundant power to rack-mount equipment ensuring high availability. The Rack ATS supplies power from a primary input line. If that line becomes unavailable for any reason, the Rack ATS automatically begins supplying power from a secondary source

Front view



- | | |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| ❶ Network Management Card | Communicates directly with the InfraStruXure Manager. Connects to the InfraStruXure Manager Hub, using at CAT-5 cable (provided with the system). |
| ❷ Rack Mount Brackets | Used to install in standard, 19-inch enclosure or rack. |
| ❸ Rack Mount Rails | Used to support the Automatic Transfer Switch in enclosures or 4-post racks. |

Rear view



- ❶** Output Power Cord The NEMA L21-20 outlet cord connects the switch to a Rack PDU, providing a redundant source of power to the PDU and the equipment connected to it.
- ❷** Input Power Cords The two NEMA L21-20 plug cords connect the switch to two separate power sources, (A, B). The switch is set to draw power from the preferred source and automatically switch over to the secondary source, when necessary.

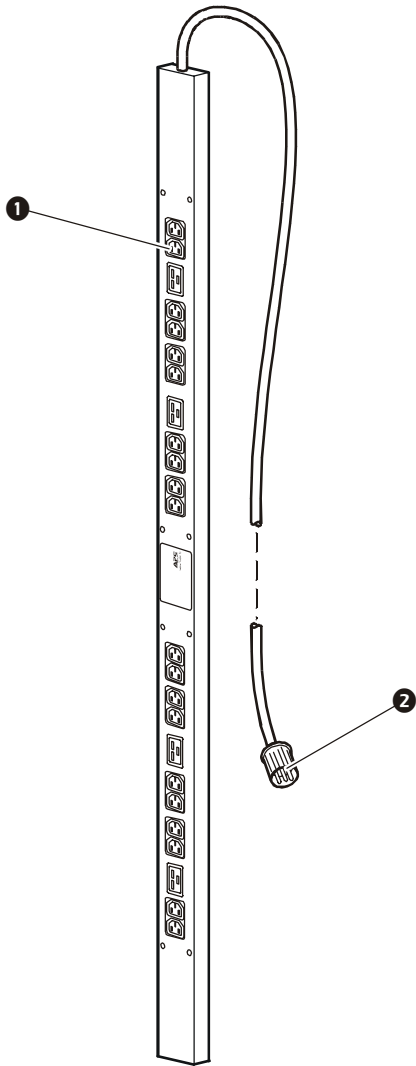
Basic Rack Power Distribution Units

Single-Branch Basic Rack PDUs: AP7530, AP7540, AP7580, AP7581, AP7582, AP7583, AP7584, AP9562, AP9563, AP9566, AP9567

APC offers various Basic Rack PDUs for single-phase power distribution. All of these PDUs distribute input power from a single source to the Basic Rack PDU outlets for use by connected equipment. These units mount either vertically or horizontally in NetShelter VX Enclosures. The table below lists the available Basic Rack PDUs with the plug and outlet types of each.

SKU	Input Plug Type	Output Voltage	Number of Outlets	Type of Outlets
AP7530	NEMA L5-20P	120V	24	NEMA 5-20R
AP7540	NEMA L6-20P	208V	24	(21) IEC 320 C13 (3) IEC 320 C19
AP7580	NEMA L14-30P	120V	4	NEMA L5-20R
AP7581	NEMA L14-30P	208V	4	NEMA L6-20R
AP7582	NEMA L14-30P	120V	12	NEMA 5-20R
AP7583	NEMA L14-30P	120V		NEMA L5-30R
AP7584	NEMA L14-30P	208V	4	NEMA L6-30R
AP9559	IEC 320 C20	208V	12	IEC 320 C13 IEC 320 C19
AP9562	NEMA 5-15P	120V	10	NEMA 5-15R
AP9563	NEMA 5-20P	120V	10	NEMA 5-20R
AP9566	NEMA L6-20P	208V	12	IEC 320 C13
AP9567	NEMA 5-15P	120V	14	NEMA 5-15R
AP9568	IEC-320 C14	208,230V	15	IEC-320 C13

AP7530 and AP7540



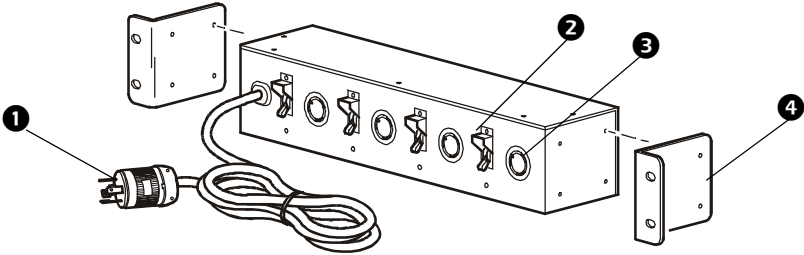
AP7530

- ❶ (24) NEMA 5-20 outlets
- ❷ NEMA L5-20 plug

AP7540

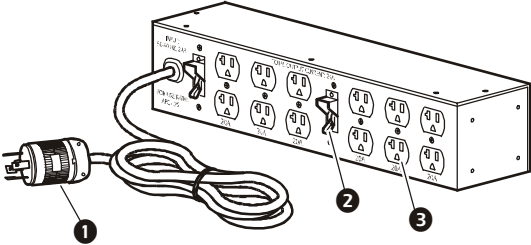
- (20) IEC-320-C13 outlets
(4) IEC-320-C19 outlets
- NEMA L6-20 plug

AP7580 and AP7581



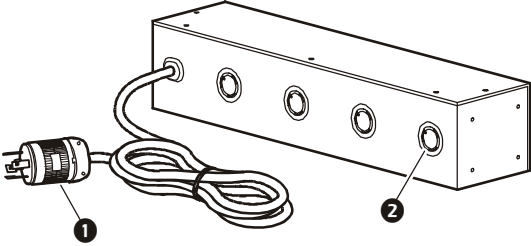
- ❶ 28-foot NEMA L14-30 power cord
- ❷ Four 20-amp circuit breakers
- ❸ AP7580: Four NEMA L5-20 outlets
AP7581: Four NEMA L6-20 outlets
- ❹ Mounting Brackets

AP7582



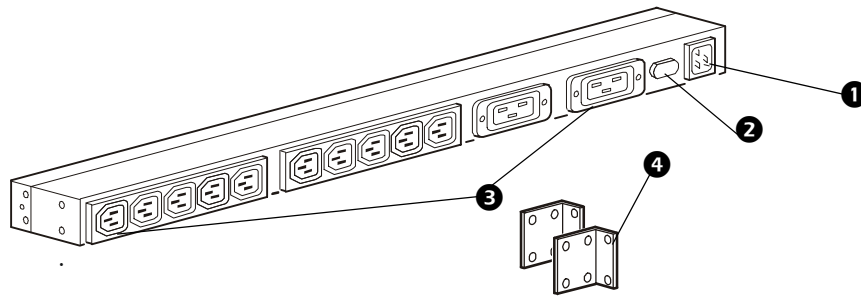
- ❶ 28-foot NEMA L14-30 power cord
- ❷ Two 20-amp circuit breakers
- ❸ Twelve NEMA 5-20 outlets

AP7583 and AP7584



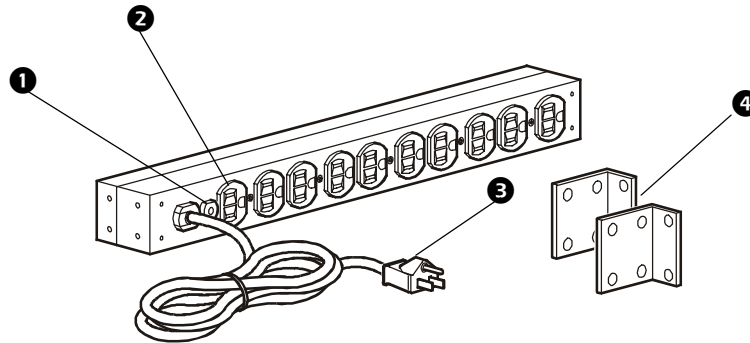
- ❶ 28-foot NEMA L14-30 power cord
- ❷ AP7583: Four NEMA L5-30 outlets
AP7584: Four NEMA L6-30 outlets

AP9559



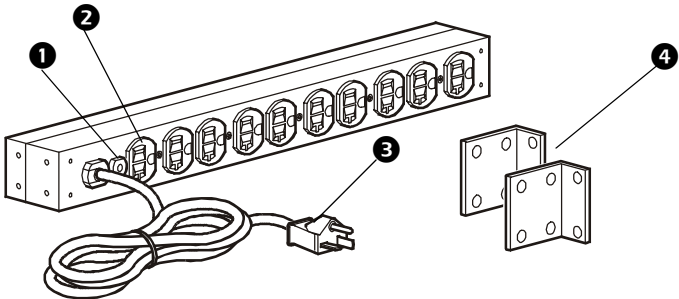
- ❶ Inlet IEC 320 C20 inlet used with detached power cord (supplied).
- ❷ Circuit Breaker When the button is extended the circuit breaker is tripped because the PDU is overloaded, and at least one piece of equipment needs to be unplugged.
- ❸ Outlets (10) IEC 320 C13 outlets
(2) IEC 320 C19 outlets
- ❹ Mounting Brackets Used for mounting the PDU to the rack

AP9562



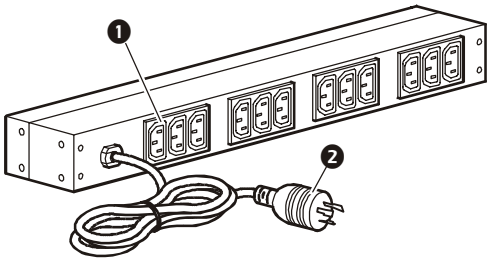
- ❶ Circuit Breaker (1) 15-amp circuit breaker
- ❷ Outlets (10) NEMA 5-15 outlets
- ❸ Power Cord 12 ft NEMA 5-15 power cord
- ❹ Mounting Brackets Used for mounting the PDU to the rack

AP9563



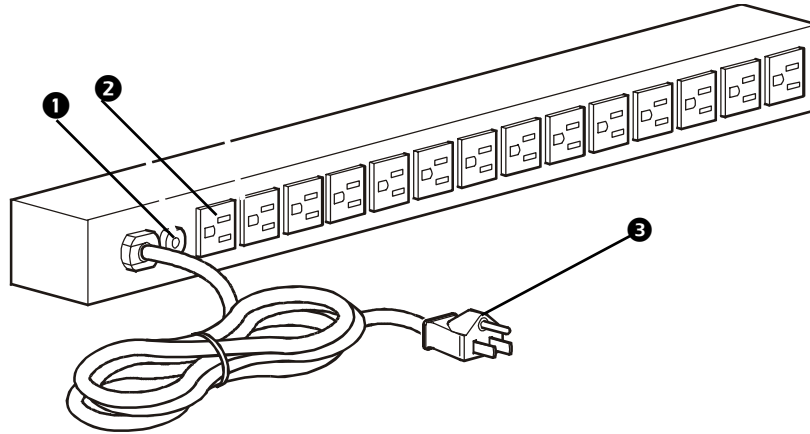
- 1 Circuit Breaker (1) 20-amp circuit breaker
- 2 Outlets (10) NEMA 5-20 outlets
- 3 Power Cord 12ft NEMA 5-20 power cord
- 4 Mounting Brackets Used for mounting the PDU to the rack

AP9566



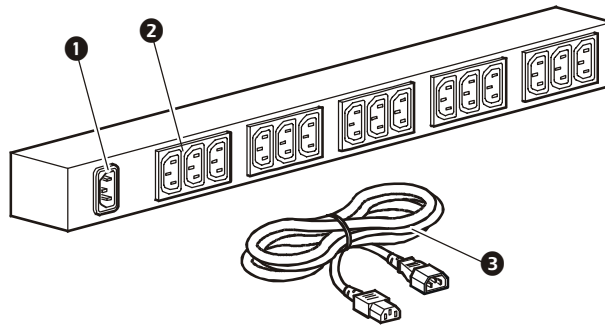
- 1 12 IEC 320-C13 Outlets
- 2 12-foot NEMA L6-20 power cord

AP9567



- | | |
|--------------------------|------------------------------|
| 1 Circuit Breaker | (1) 15-amp circuit breaker |
| 2 Outlets | (14) NEMA 5-15 outlets |
| 3 Power Cord | 12-foot NEMA 5-15 power cord |

AP9568

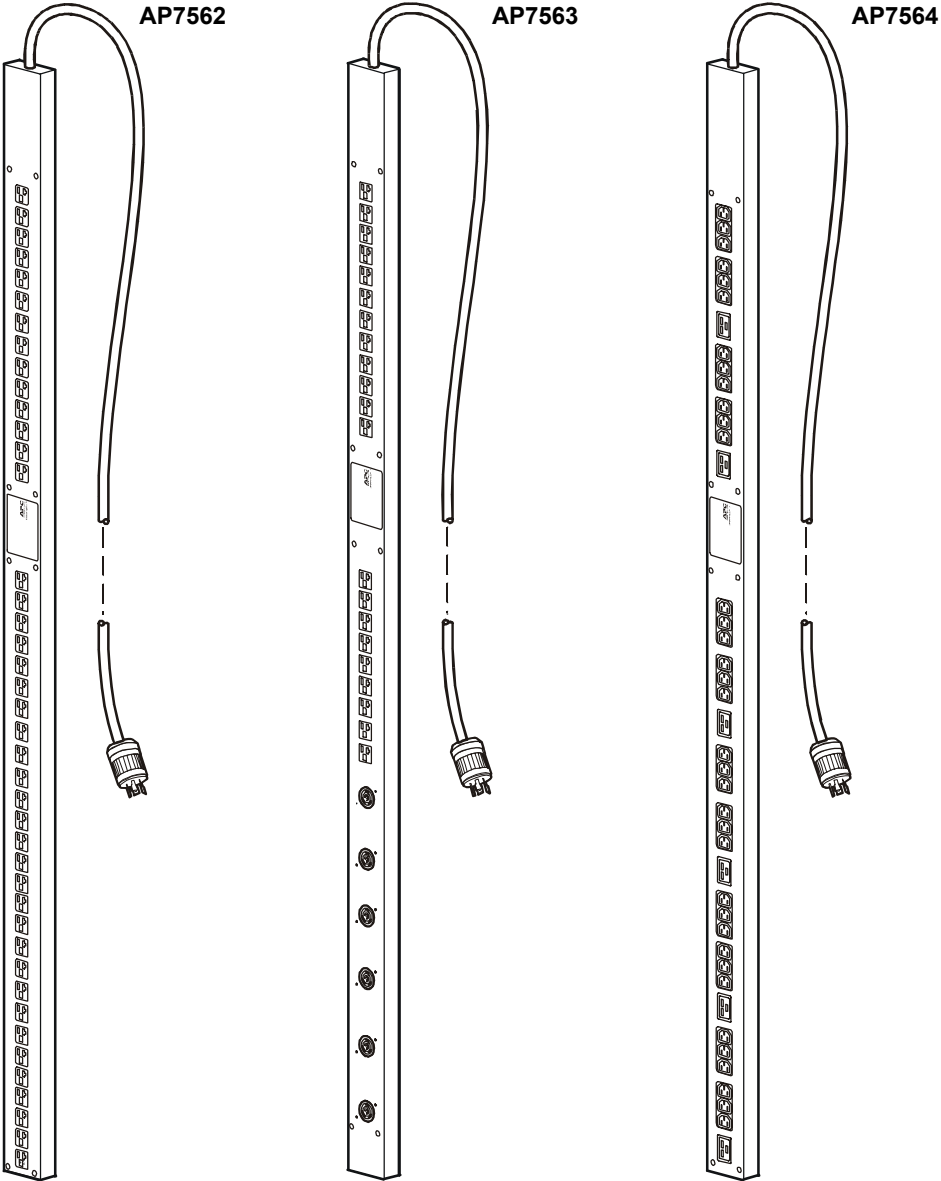


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|---------------------|-------------------------------------------------------------|
| 1 Inlet | IEC 320 C14 inlet used with detached power cord (supplied). |
| 2 Outlets | (15) IEC 320 C13 outlets |
| 3 Power Cord | 12 ft IEC 320 C14 power cord |

Multi-Branch Basic Rack PDUs: AP7562, AP7563 and AP7564

APC offers three Basic Rack PDUs for multi-branch power distribution. All of these PDUs distribute input power from a single, 3-phase source to the multiple, single-phase outlets for use by connected equipment. These units mount vertically in the rear channel of APC NetShelter VX Enclosures. The table below lists each of the available multi-branch Basic Rack PDUs with the plug and outlet types of each.

SKU	Input Plug Type	Output Voltage	Number of Outlets	Type of Outlets
AP7562	NEMA L21-20P	120V	42	NEMA 5-20R
AP7563	NEMA L21-20P	120V/208V	27	(21) NEMA 5-20R (6) NEMA L6-20R
AP7564	NEMA L21-20P	208V	42	(36) IEC 320 C13 (6) IEC 320 C19



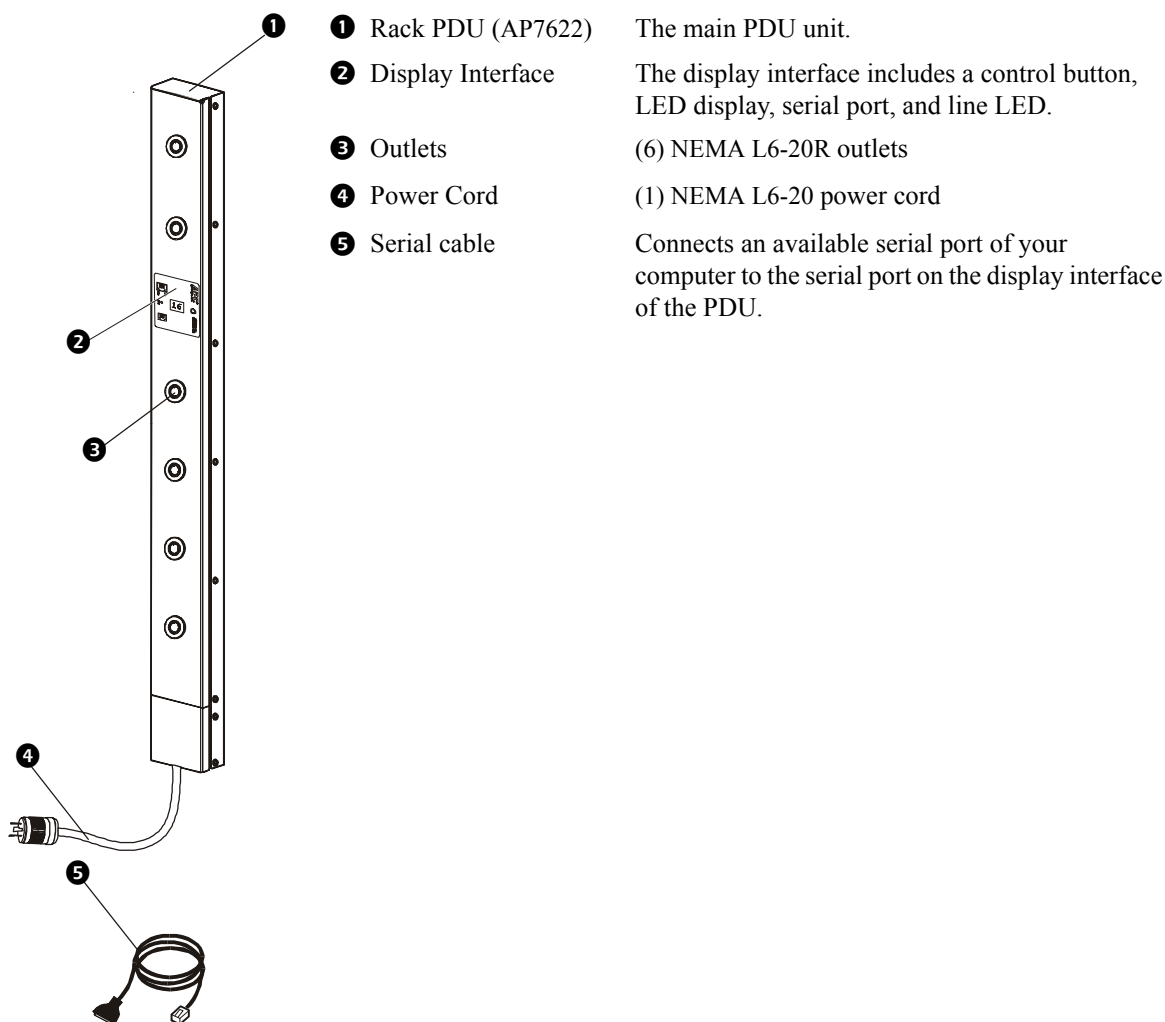
Metered Rack Power Distribution

Single-Branch Metered Rack PDUs: AP7622, AP7830, AP7840

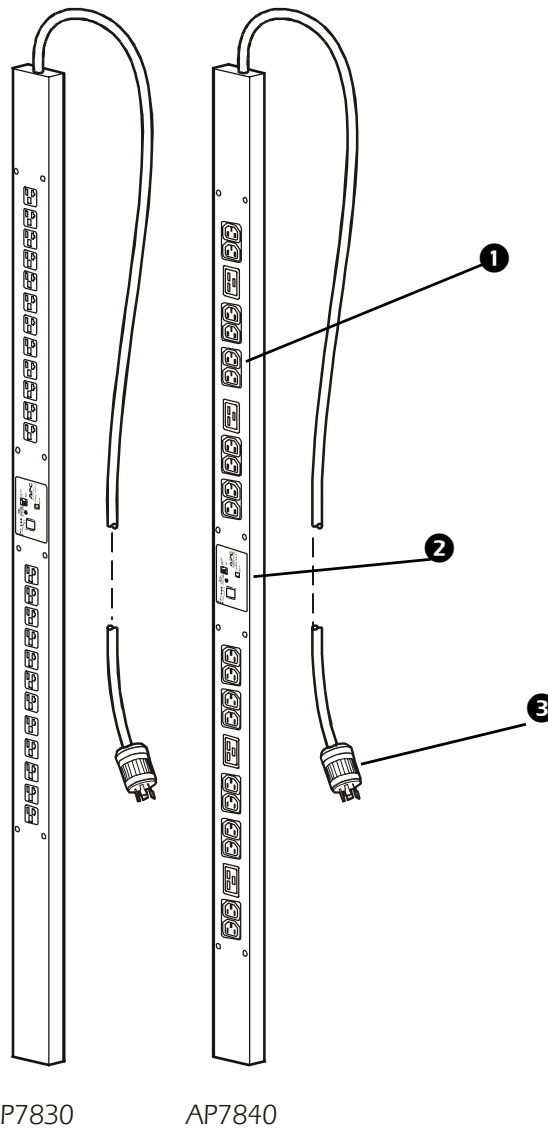
APC offers three single-branch Metered Rack PDUs for single-phase power distribution. All of the Metered Rack PDUs distribute input power from a single source to the Rack PDU outlets for use by connected equipment, and provide current monitoring to guard against overload conditions. The value shown on the digital display is the aggregate current of the unit. The table below shows the available single-branch Metered Rack PDUs with their plug and outlet types.

SKU	Input Plug Type	Output Voltage	Number of Outlets	Type of Outlets
AP7622	NEMA L6-20P	208V	6	NEMA L6-20R
AP7830	NEMA L5-20P	120V	24	NEMA 5-20R
AP7840	NEMA L6-20P	208V	24	(20) IEC 320 C13 (4) IEC 320 C19

AP7622



AP7830 and AP7840



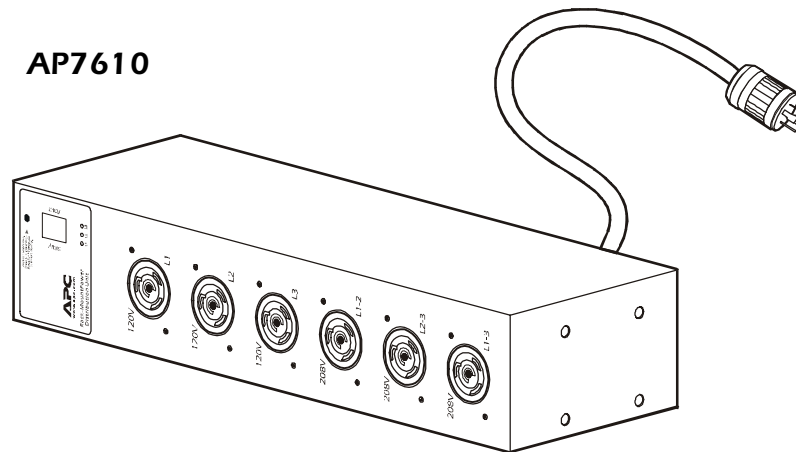
- ❶ Outlets
 - The outlets connect the PDU to equipment in the rack or enclosure.
 - AP7830 has (24) NEMA L5-20 outlets
 - AP7840 has (20) IEC 320 C13 outlets and (4) IEC 320 C19 outlets
- ❷ Display interface
 - The display interface on the Metered PDUs shows the aggregate current being used by the PDU and its attached devices. An alarm occurs if the aggregate current is above the high threshold value or below the low threshold value that is configured.
- ❸ Plug
 - Each PDU has a plug that connects to a variety of APC equipment.
 - AP7830 has a NEMA L5-20 plug
 - AP7840 has a NEMA L6-20 plug

Multi-Branch Metered Rack PDU: AP7610

APC offers four multi-branch Metered Rack PDUs, one which mounts horizontally and three that mount vertically in any standard, 19-inch rack or enclosure. This units distribute multi-branch power to multiple single-phase outlets. All Metered Rack PDUs provide the ability to monitor the current draw to avoid overloaded circuits. The value shown on the digital display is the aggregate current of an individual phase. The multi-branch units also communicate with the InfraStruXure Manager, which provides remote access to the Rack PDUs. The table below shows the available multi-branch Metered Rack PDUs with their plug and outlet types.

SKU	Input Plug Type	Output Voltage	Number of Outlets	Type of Outlets
AP7610	NEMA L21-20P	120/208V	6	(3) NEMA L5-20R (3) NEMA L6-20R
AP7862	NEMA L21-20P	120V	42	NEMA 5-20R
AP7863	NEMA L21-20P	120/208V	27	(21) NEMA 4-20R (6) NEMA L6-20R
AP7864	NEMA L21-20P	208V	42	(36) IEC 320 C13 (6) IEC 320 C19

AP7610



The AP7610 Metered Rack PDU requires connection to additional Rack PDUs. See the following tables for a list of APC Rack PDUs that are compatible with the AP7610.

Compatible APC 120V Rack PDUs

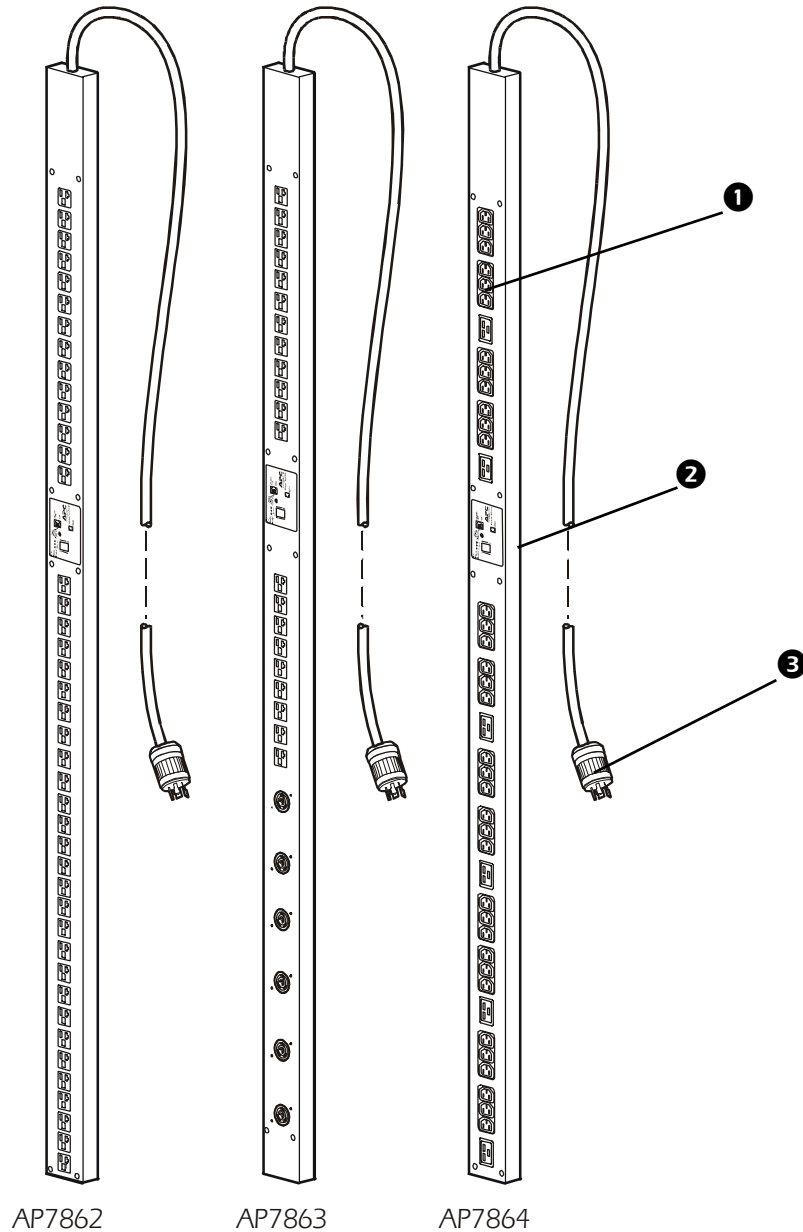
SKU	Input Plug Type	Outlet Type	Rack PDU Group
AP9563	NEMA L5-20P	(10) NEMA 5-20R	Basic
AP7901	NEMA L5-20P	NEMA 5-20R	Switched

Compatible APC 208V Rack PDUs

SKU	Input Plug Type	Outlet Type	Rack PDU Group
AP9566	NEMA L6-20	(12) IEC 320 C13	Basic
AP9559*	IEC 320 C20	(10) IEC 320 C13 (2) IEC 320 C19	Basic
AP7921*	IEC 320 C20	IEC 320 C13	Switched

*Using these Rack PDUs with AP7610 requires an additional power cord (AP9871).

AP7862, AP7863, AP7864



- 1** Outlets

The outlets connect the PDU to equipment in the rack or enclosure.

 - AP7862 has (42) NEMA 5-20 outlets
 - AP7863 has (21) NEMA 5-20 outlets and (6) NEMA L6-20 outlets
 - AP7864 has (36) IEC 320 C13 outlets and (6) IEC 320 C19 outlets
- 2** Display interface

The display interface on the Metered PDUs shows the aggregate current being used by the PDU and its attached devices. An alarm occurs if the aggregate current is above the high threshold value or below the low threshold value that is configured.
- 3** Plug

Each of the PDUs has a NEMA L21-20 plug which can connect to a variety of APC equipment.

Switched Rack Power Distribution Unit

Single-Branch Switched Rack PDUs: AP7900, AP7901, AP7920, AP7921

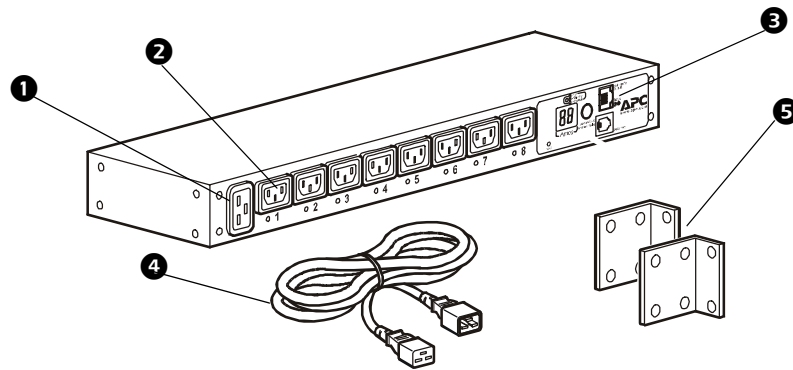
APC offers four horizontal and two vertical Switched Rack PDUs that distribute single-phase power to multiple outlets. All six units mount into any standard, 19-inch rack or enclosure and the horizontal units occupy one U space. These units provide individual outlet control and current monitoring to help avoid overloaded circuits and manage the power draw at the rack level. The user can access and manage the Switched Rack PDUs through the Web, SNMP, Telnet, or InfraStruXure network interfaces. The table below lists each of the available single-branch Switched Rack PDUs with the plug and outlet types of each.

SKU	Input Plug Type	Output Voltage	Number of Outlets	Type of Outlets
AP7900	NEMA 5-15P	120V	8	NEMA 5-15R
AP7901*	NEMA L5-20P	120V	8	NEMA 5-20R
AP7920	IEC 320 C14	208/230V	8	IEC 320 C13
AP7921**	IEC 320 C20	208/230V	8	IEC 320 C13
AP7930	NEMA L5-20P	120V	24	NEMA 5-20R
AP7940	NEMA L6-20P	208V	24	(21) IEC 320 C13 (3) IEC 320 C19

* No image available

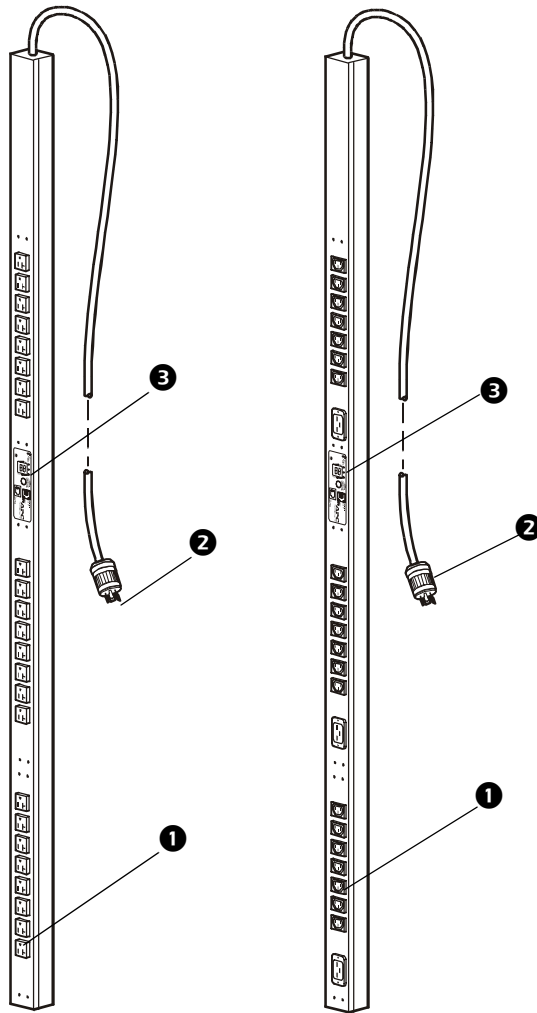
** When used at 208V, use APC power cord AP9871 which has a NEMA L6-20P input plug and an IEC 320 C19 outlet plug.

208/230V 16A Switched Rack PDU: AP7921



- | | |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>❶ Inlet</p> <p>❷ Outlets</p> <p>❸ Digital Display</p> <p>❹ Power Cord</p> <p>❺ Mounting Brackets</p> | <p>The IEC 320 C20 inlet connects to the power cord.</p> <p>Connect the PDU to equipment in the rack or enclosure. Each outlet allows independent control of the connected equipment and the PDU provides 24 outlet user accounts.</p> <p>Allows the user to monitor the aggregate current of the PDU and to establish a network connection using the network port.</p> <p>Connects the PDU to one power source. Connects to the front of the PDU for easier mounting and user access. The 8-foot cord terminates with a C20 plug.</p> <p>Used for mounting the PDU to the rack</p> |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

AP7930 and AP7940



1 Outlets

2 Power Cord

3 Digital Display

AP7930: (24) NEMA 5-20 outlets

AP7940: (21) IEC 320 C13, (3) IEC 320 C19

10-foot (3.05-meter) cord which terminates with a NEMA L5-20 connector (AP7930) and a NEMA L6-20 connector (AP7940).

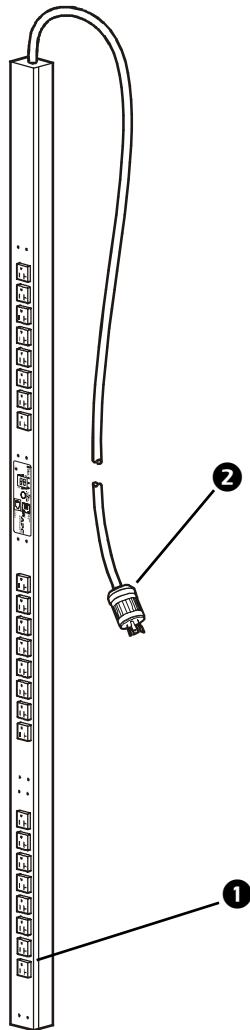
Allows the user to monitor the aggregate current of the rack PDU and to establish a network connection using the network port.

Multi-Branch Switched Rack PDUs: AP7960 and AP7961

APC offers two multi-branch Switched Rack PDUs that distributes 3-phase power to multiple single-branch outlets and mount vertically in the rear channel of a NetShelter VX Enclosure. These units provide individual outlet control and current monitoring to help avoid overloaded circuits and manage the power draw at the rack level. The value shown on the digital display is the aggregate current of an individual phase. The user can access and manage the Switched Rack PDU using the Web, SNMP, Telnet, or InfraStruXure Manager network interfaces. The table below provides the input plug type and outlet types of each unit.

SKU	Input Plug Type	Output Voltage	Number of Outlets	Type of Outlets
AP7960	NEMA L21-20P	120V	24	NEMA 5-20R
AP7961	NEMA L21-10P	208V	24	(21) IEC 320 C13 (3) IEC 320 C19

AP7960

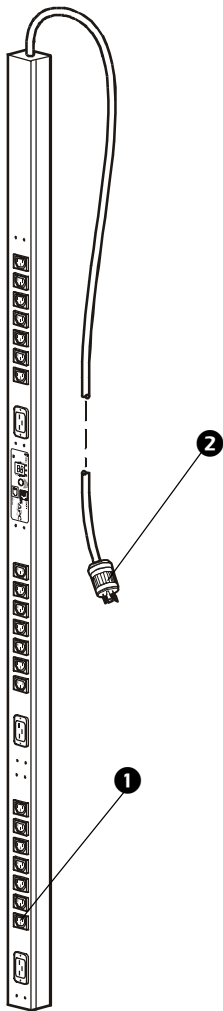


- 1** Outlets

Connect the PDU to equipment in the rack or enclosure. Each outlet allows independent power control of the connected equipment. The PDU provides 24 outlet user accounts.
- 2** Power Cord

Connects the PDU to one power source. The 8-foot cord terminates with a NEMA L21-20 connector.

AP7961



1 Outlets

Connect the PDU to equipment in the rack or enclosure. Each outlet allows independent power control of the connected equipment. The PDU provides 24 outlet user accounts.

2 Power Cord

Connects the PDU to one power source. The 8-foot cord terminates with a NEMA L21-10 connector.

Overview

UPS components

Symmetra RM UPS (SYRM). The Symmetra RM UPS provides scalable, N+1 redundant UPS technology in a convenient rack-mountable form factor. Today, servers, storage products, and other critical IT equipment are predominately rack-based, and Symmetra RM provides power-dense, highly-available protection ideal for today's needs. IT managers can choose between a scalable 2–6kVA Symmetra RM in 8U of rack space and an 8–12kVA Symmetra RM in 15U of rack space. Both of these solutions can be purchased with N+1 redundancy, scalable components, and integrated Web/SNMP management features, making Symmetra RM the perfect UPS solution for critical server rooms or network closets with multiple racks. The UPS can also be used in floor-standing, stand-alone applications.

Smart-UPS. The Smart-UPS protects data by supplying reliable, network-grade power in either traditional Tower or Rack-optimized form factors for space constrained business critical applications. Award winning Smart-UPS is the perfect UPS for protecting business critical file servers, minicomputers, network switches and hubs, Point of Sale, retail/bank back office, and ATMs.

InfraStruXure 20kW System. The InfraStruXure 20kW is a self-contained UPS and Power Distribution system. Providing all of the features of a Symmetra PX UPS system, the InfraStruXure 20kW also incorporates a power distribution panel as well as maintenance bypass, all within the same cabinet. With APC's Configure-To-Order process, the InfraStruXure 20kW is quick to install, consumes very little space, and provides reliable power availability in a "pay-as-you-grow" function. Ideal for data centers or network rooms containing 5-12 racks.

Symmetra PX UPS (SYPX). Advances in large corporation computing, storage technologies, and an increasing power demand requires a change in large corporation power-protection technology. The Symmetra PX UPS [three-phase input/three-phase output (3:3)] is a single unit composed of modular components. This modular architecture provides the foundation of building and scaling near-continuous availability power systems with a flexible range of power capacity. The Symmetra PX UPS packages the high-availability requirements of easy power and runtime scalability into a very small footprint. Combined with the complete line of APC data center protection software and accessories, it provides the four most critical elements of total data center protection.

Symmetra MW UPS (SYMW). The Symmetra MW UPS is the first-ever, fault-tolerant, modular UPS which redefines high-power UPS technology in the 400–1600 kW power range, including paralleling features to handle even larger load requirements.

Distribution components

40kW InfraStruXure PDU. APC's InfraStruXure PDU provides distribution and management of electrical power. The PDU has the capacity of 40kW, accepts 208, 480, or 600 V, 3-phase input, and distributes power to equipment racks or enclosures. All PDUs offer full front access for service maintenance. This feature dramatically increases the possibilities for equipment placement, while decreasing the requirements for footprint space. The APC PDU has pre-cut power cables that easily integrate with our Rack Power Distribution Units through twist-lock plugs.

80kW InfraStruXure PDU. The APC 80kW InfraStruXure PDU provides distribution and management of electrical power. The InfraStruXure PDU has the capacity of 80kW, accepts 208, 480, or 600 V, 3-phase input, and distributes 208 V, 3-phase power to equipment racks and Rack Distribution Panels (RDPs). The InfraStruXure PDU is housed in a specially-designed NetShelter VX Wide enclosure. Each 80kW InfraStruXure PDU has thirty pole positions available for feeding equipment racks and four, three-pole positions available for feeding RDPs.

Rack Distribution Panel (RDP). The Rack Distribution Panel (RDP) enables the user to add breaker positions without the need of integrating into the existing premise. Mounted within an APC NetShelter VX enclosure, the RDP is a 42 position power panel that is self contained with its own locking door for integrity/security purposes. The RDP consumes 10U (10.75") at the top of the rack and can be "Configured-To-Order" from APC's factory. Each RDP has thirty-nine pole positions available for feeding equipment racks and one, three-pole position that back-feeds the RDP. The RDP can be equipped with a pin-and-sleeve connector to provide tool-less integration with the InfraStruXure PDU. These features allow the RDP to be easily implemented and scaled to match demand while reducing installation costs.

60kW InfraStruXure PDU. APC's 60kW InfraStruXure PDU provides distribution and management of electrical power. The PDU has the capacity of 60kW, accepts 208, 480, or 600V, 3-phase input, and distributes power to equipment racks or enclosures. All PDUs offer full front access for service maintenance. This feature dramatically increases the possibilities for equipment placement, while decreasing the requirements for footprint space. The APC PDU has pre-cut power cables that easily integrate with our Rack Power Distribution Units through twist-lock plugs.

Battery components

Symmetra PX Premium XR Battery Enclosure. The Symmetra PX XR Premium Battery Enclosure is a manageable VRLA battery system that works with the Symmetra PX UPS systems to add additional run-time to a Symmetra PX UPS. Each Battery Enclosure holds up to eight battery modules. The user can attach up to three Battery Enclosures to a single Symmetra PX UPS. Connection and installation of the Battery Enclosure is performed by APC Field Service Engineers.

Symmetra PX Premium Battery Enclosure. The Symmetra PX Premium Battery Enclosure is a manageable VRLA battery system that is included with the Symmetra PX 80kW UPS. Each Battery Enclosure holds up to eight battery modules. Connection and installation of the Battery Enclosure is performed by APC Field Service Engineers.

Symmetra RM UPS

Overview

The Symmetra RM UPS is a high-performance, uninterruptible power system (UPS) in a “power array” configuration. It is designed to power high-availability servers and other sensitive electronic equipment. The UPS provides conditioned, reliable AC power to connected equipment, and provides protection from power blackouts, brownouts, swells, sags, surges, and interference. There are two Symmetra RM models: a 2–6kVA UPS, and a 4–12kVA UPS.

SYRM: 2–6kVA

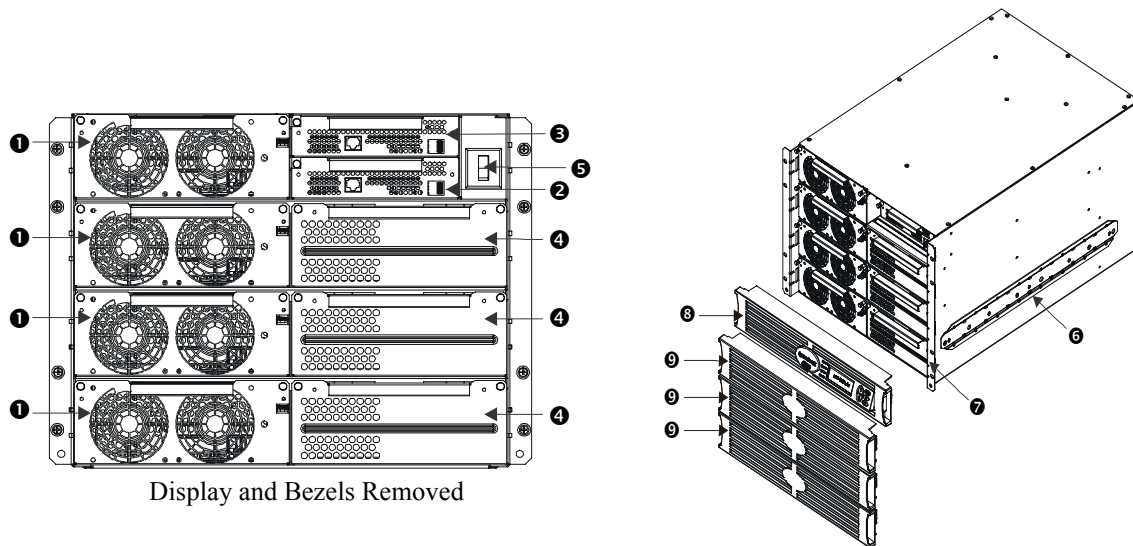
SKU	Available Power	Battery Modules	Power Modules	Nominal Input Voltage	Nominal Output Voltage
SYH2K6RMT	2kVA	1	1	208/240 V	208/240 V
SYH4K6RMT	4kVA	2	2		
SYH6K6RMT	6kVA	3	3		
SYH2K6RMT-P1	2kVA	1	1	208 V	120 and 208 V
SYH4K6RMT-P1	4kVA	2	2		
SYH6K6RMT-P1	6kVA	3	3		
SYH2K6RMT-TF3	2kVA	1	1	208 V	120 and 208 V
SYH4K6RMT-TF3	4kVA	2	2		
SYH6K6RMT-TF3	6kVA	3	3		

SYRM: 4–12kVA

SKU	Available Power	Battery Modules	Power Modules	Nominal Input Voltage	Nominal Output Voltage
SYP8K12RMT	8kVA	2	2	208/240 V	208/240 V
SYP12K12RMT	12kVA	3	3		
SYP8K12RMT-P1	8kVA	2	2	208 V	120 and 208 V
SYP12K12RMT-P1	12kVA	3	3		
SYP12K12RMT-P2	12kVA	3	3		
SYP8K12RMT-2TF3	8kVA	2	2	208 V	120 and 208 V
SYP12K12RMT-2TF3	12kVA	3	3		

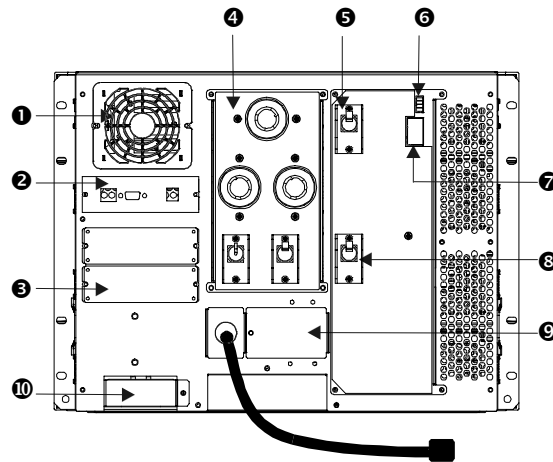
SYRM: 2–6kVA

Front View



- ❶ Each **power module** can provide up to 2kVA/1.4kW power. The UPS frame can support up to four modules.
- ❷ The **Main Intelligence Module (MIM)** performs all monitoring, control, and communication functions for the UPS.
- ❸ The **Redundant Intelligence Module (RIM)** provides backup in the event of a MIM failure.
- ❹ Each **battery module** provides backup energy storage. The UPS frame can support up to six battery modules.
- ❺ When the **system enable switch** is in the “On” position, the UPS powers up internally, but does not power the load. When in the “Off” position, the system powers down internally.
- ❻ Two **rail cleats** (one on each side) engage with the rack mounting rails to secure the UPS in the rack.
- ❼ Two **mounting flanges** are used to secure the UPS to the rack.
- ❽ The **display interface** can be programmed to provide full control, monitoring, and configuration for the UPS.
- ❾ **Front bezels** cover the power modules, battery modules, and unoccupied bays in the front of the UPS.

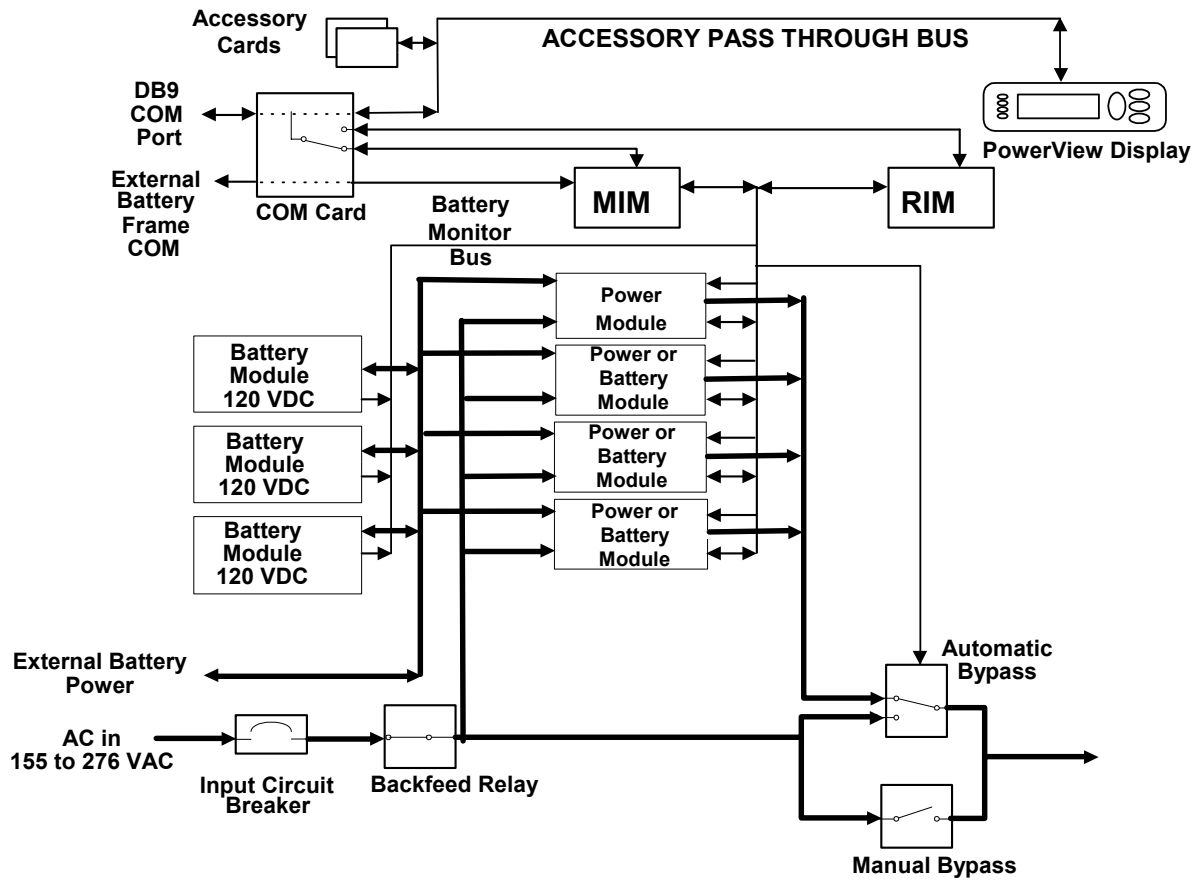
Rear View



(SYPD4 installed)

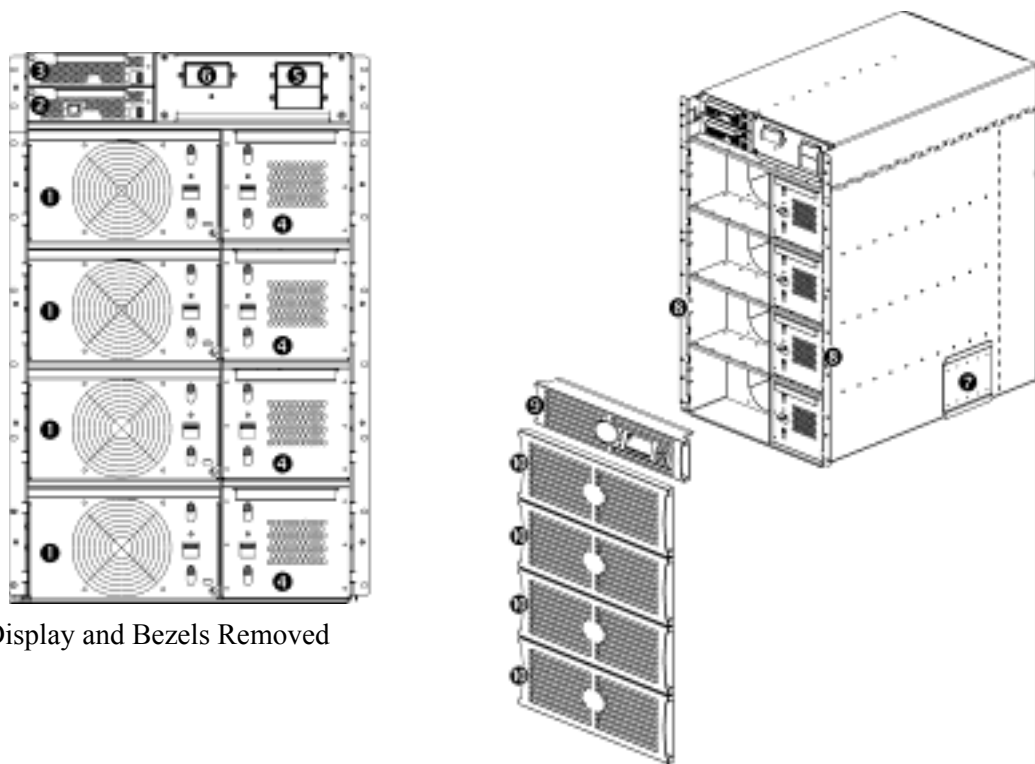
- ❶ The **system fan** provides cooling for frame components.
- ❷ The **communications card** provides serial interface port for remote management and communications to extended run battery cabinets.
- ❸ Two **accessory ports** are provided for optional SmartSlot accessories. A Web/SNMP management card for accessing data via a network is pre-installed.
- ❹ **Power distribution panels** provide receptacles for connecting load equipment. Panel type is based on configuration.
- ❺ The **input circuit breaker** protects the UPS and load equipment from extreme overloads.
- ❻ The **Remote Emergency Power Off (REPO) connection** provides connection to an emergency power off switch, that shuts OFF power to the UPS and prevents the unit from operating on-battery.
- ❼ Set the **input voltage selection switch** to correspond to your input power.
- ❽ Use the **maintenance bypass switch** to manually control the bypass function. When the maintenance bypass switch is in the “On” position, power is delivered directly from branch circuit (mains) to the load equipment.
- ❾ The **wiring access panel** provides access to wiring terminal blocks for hardwiring the input and (optional) output.
- ❿ Attach an external battery cabinet to the UPS using the **external Battery Cabinet Connector**.

System Block Diagram



SYRM: 4–12kVA

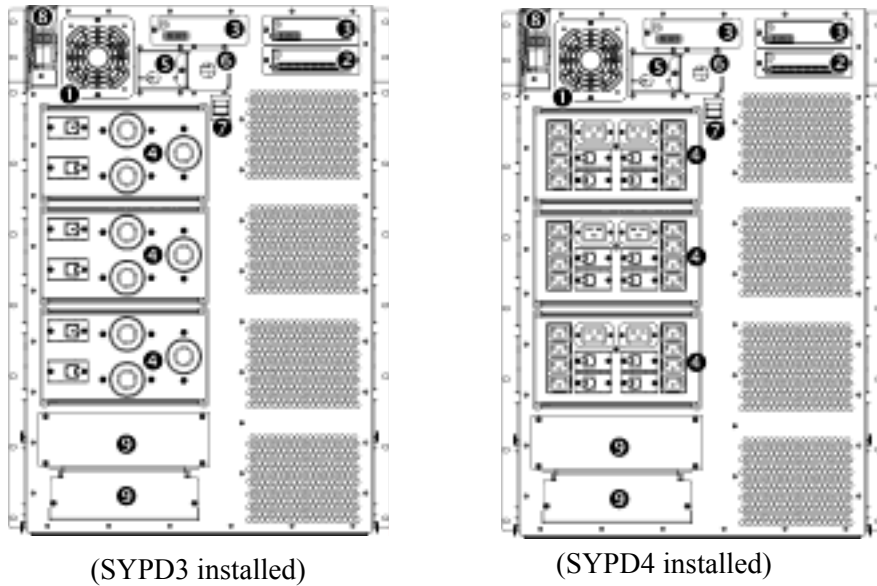
Front View



Display and Bezels Removed

- ❶ Each **power module** can provide up to 4kVA/2.8kW of power. The UPS frame can support up to four power modules.
- ❷ The **Main Intelligence Module (MIM)** performs all monitoring, control, and communication functions for the UPS.
- ❸ The **Redundant Intelligence Module (RIM)** provides backup in the event of a MIM failure
- ❹ Each **battery module** provides backup energy storage. The UPS frame can support up to four battery modules.
- ❺ The **input circuit breaker** protects the UPS and load equipment from extreme overloads.
- ❻ The **maintenance bypass switch** provides control of the bypass function. When the maintenance bypass switch is in the “On” position, power is delivered directly from the branch circuit (mains) to the load equipment.
- ❼ Two **rail cleats** (one on each side) engage with the rack mounting rails to secure the UPS in the rack.
- ❽ Two **mounting flanges** are used to secure the UPS to the rack.
- ❾ The **display interface** can be programmed to provide full control, monitoring, and configuration of the UPS.
- ❿ **Front bezels** cover the power modules, battery modules, and unoccupied bays in the front of the UPS.

Rear View



- ❶ The **system fan** provides cooling for frame components.
- ❷ The **communications card** provides a serial interface port for remote management and communications to extended run battery cabinets.
- ❸ Two **accessory ports** are provided for optional SmartSlot accessories. A Web/SNMP management card for accessing data through a network is preinstalled.
- ❹ **Power distribution panels** provide receptacles for connecting load equipment. Panel type is based on configuration.
- ❺ When the **system enable switch** is in the “On” position, the UPS powers up internally, but does not power the load. When in the “Off” position, the system powers down internally.
- ❻ The **Remote Emergency Power Off (REPO)** connection provides connection to an emergency power off switch, that shuts off power to the UPS and prevents the unit from operating on battery.
- ❼ Set the **input voltage selection switch** to correspond to your input power.
- ❽ Attach an external battery cabinet to the UPS using the **external battery cabinet connector**.
- ❾ The **wiring access panel** provides access to wiring terminal blocks for hardwiring the input and (optional) output.

Smart-UPS

Overview

APC Smart-UPS protects data by supplying reliable, network-grade power in either traditional Tower or Rack-optimized form factors for space constrained business critical applications. Award winning Smart-UPS is the perfect UPS for protecting business critical file servers (Intel or UNIX based), minicomputers, network switches and hubs, Point of Sale, retail/bank back office, and ATM's. Rack-mount versions are the choice for rack optimized servers, server appliances, blade servers, other blade devices, and rack-mount network switches and hubs.

With included PowerChute management software for servers and workstations, IT administrators can provide safe system shutdown and advanced UPS management. Connectivity is through serial or USB port. Additional manageability is available through the SmartSlot, an internal accessory slot that allows the user to install optional accessories to enhance the performance of the UPS. Network Connection with Web browser management and/or environmental monitoring, serial port expansion, and out-of-band management options are available. With pure sine wave output ensuring compatibility with all connected devices, Intelligent Battery Management ensuring a highly available UPS, and an advanced 16 segment bar graph display ensuring information and management, the Smart-UPS is one that its users can count on.

InfraStruXure Smart-UPS Models

SKUs	Description
SU5000R5T-TF3	Smart-UPS 5000VA RM 7U with transformer
SU5000R5TBX120	Smart-UPS 5000VA RM 5U
SUM1500RXML2U	Smart-UPS XL Modular 1500VA Tower
SUM3000RXML2U	Smart-UPS XL Modular 3000VA Tower
SU5000R5XLT-TF3	Smart-UPS 5000VA RM XL 7U with transformer
SU5000RXMLT5U	Smart-UPS XL 5000VA RM 5U

Features and benefits

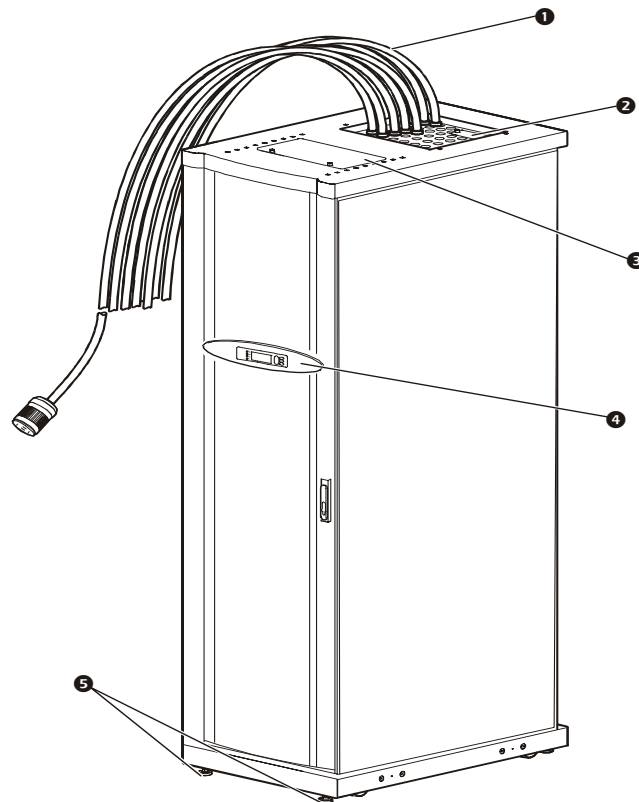
Line Interactive	Uses the DC to AC power inverter “in-reverse,” like a battery charger, during normal operation providing greater performance and efficiency.
Network Grade Line Conditioning	Full time EMI/RFI filters prevent line noise from causing data errors.
Sine-wave Output	Provides assurance of compatibility with all loads
Lightening and Surge Protection	The suppression performance of the Smart-UPS is superior to virtually all separate surge suppressors.
Automatic Self Test	Ensures the user is alerted to degraded batteries before they wear out.
Unattended Shutdown	In the event of an extended power outage, the Smart-UPS will interface with PowerChute Plus through the serial port to automatically perform automatic safe shutdown of the attached system.
Site Wiring Fault Indicator	Alerts the user to potential problems such as missing ground and reversed polarity.
Alarms	Alert the user to changes in the operating environment and battery conditions.
AVR Boost	Automatically corrects brownout conditions, allowing the user to work through brownouts without unnecessary battery drain.
Faster Recharge Time	Microprocessor controlled battery charging system charges batteries in less time than legacy UPS systems.
Quick Swap	Allows safe and easy replacement of the batteries while the system is up and running.
Built in SmartSlot	Allows the user to implement various UPS accessory cards to customize and enhance the management of the Smart-UPS
Status Indicator LEDs	Instantly assess the power of the Smart-UPS without even pushing a button. Bar meters and status indicators are simple to use and easy to understand.
Load Meter	Prevents the user from exceeding UPS capacity.
Software	PowerChute Business Edition provides safe system shutdown and UPS management for servers and workstations.

InfraStruXure 20kW System

Overview (ISX-20KF)

The InfraStruXure 20kW is a self-contained UPS and Power Distribution system. Providing all of the features of a Symmetra PX UPS system, the InfraStruXure 20kW also incorporates a power distribution panel as well as maintenance bypass, all within the same cabinet.

Front View

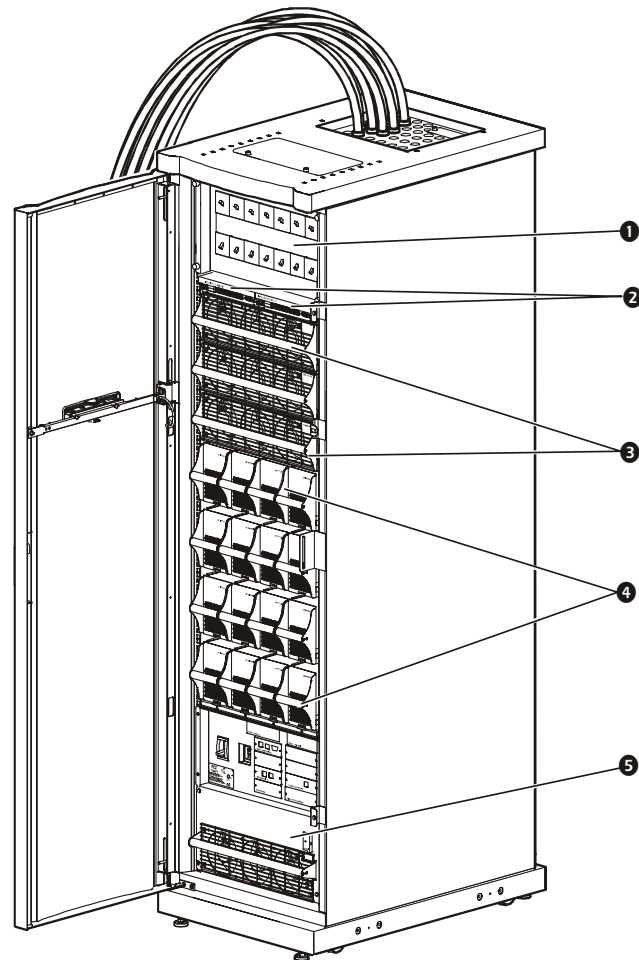


- 1 The **PDU power cables** supply power to equipment racks; they are fed through knockouts on the top of the PDU. There are the following two options for PDU power cables: multi-circuit power cable that terminates with an L21-20 outlet (shown) and single-circuit power cable that terminates with an L6-30 outlet. The number of PDU cables installed in the PDU depends on the system configuration. Each power cable accepts a variety of APC InfraStruXure rack-mount power distribution accessories.
- 2 The **main input gland plate** is used for wiring access to the main input terminals. When the electrician connects utility power to the system, this gland plate guides the conductors to the main input terminals.
- 3 The **wiring access cover** is used for wiring access to the distribution circuit breaker panel. Remove this plate when power cables or breakers are added to the system.
- 4 The **display interface** is attached to the name plate on the front door of the enclosure. It has an LCD, five-button interface, basic status lights, and a beeper.
- 5 The **leveling feet** adjust for leveling the enclosure. All enclosures must be level before installation of the system begins.

Front View (interior)

- 1 Each system has a **42-position circuit breaker panel** with 39 pole positions available for load equipment. Each pole provides power at 120V L-N; two poles provide 208V L-L. The amperage provided by each position depends on the size of the circuit breaker used.

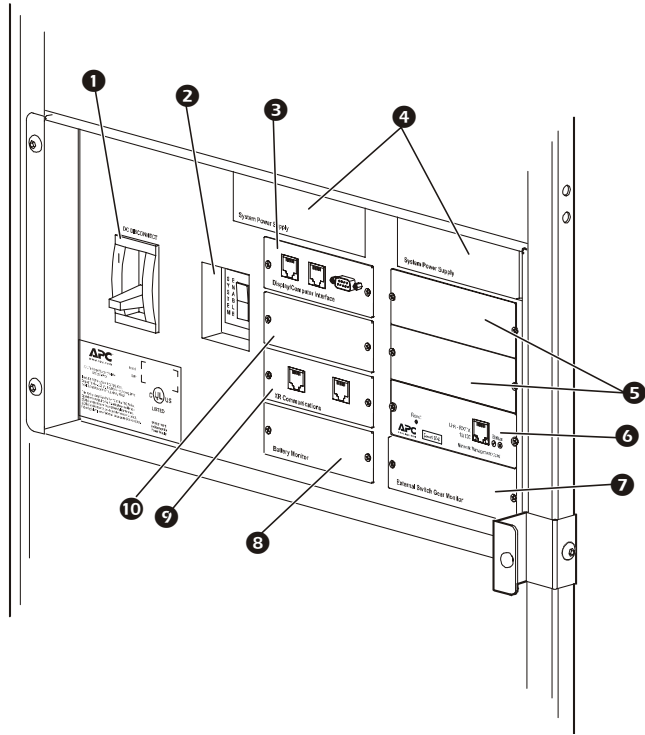
- 2 The **intelligence modules** control the system. The MIM (Main Intelligence Module) is the main controller of the system. It reports status, configures the UPS, performs UPS diagnostics, manages power and batteries, controls general UPS performance, regulates output voltage, and accommodates power module load-sharing. The RIM (Redundant Intelligence Module) is the redundant controller. The RIM is identical to the MIM (same part number), and is responsible for system operation if the MIM fails or is removed. When there is two intelligence modules, one can be removed without affecting the load. However, when there is only one intelligence module, always put the system in maintenance bypass before removing it.



- 3 Each **power module** can support up to 10kVA of power. Each time a power module is added, it increases the total capacity of your UPS. The total capacity cannot go above 20kVA (N +1). There can be up to three power modules in each system. The power modules can be removed without affecting the load.
- 4 A **battery module** consists of four battery units. Battery modules can be removed without affecting power supplied to the load. The number of battery modules determines the runtime of a particular load. A battery module provides six minutes of runtime to one power module at full load (assuming a 0.8 load power factor)
- 5 The **static switch module** is a parallel power path within the system. If the system suffers a catastrophic failure, the static switch is activated; input power bypasses the power modules; and power flows through the static switch to the connected load. The static switch has its own power supply and operates on a fail-safe signal from the intelligence modules. This module cannot be removed without affecting the load.

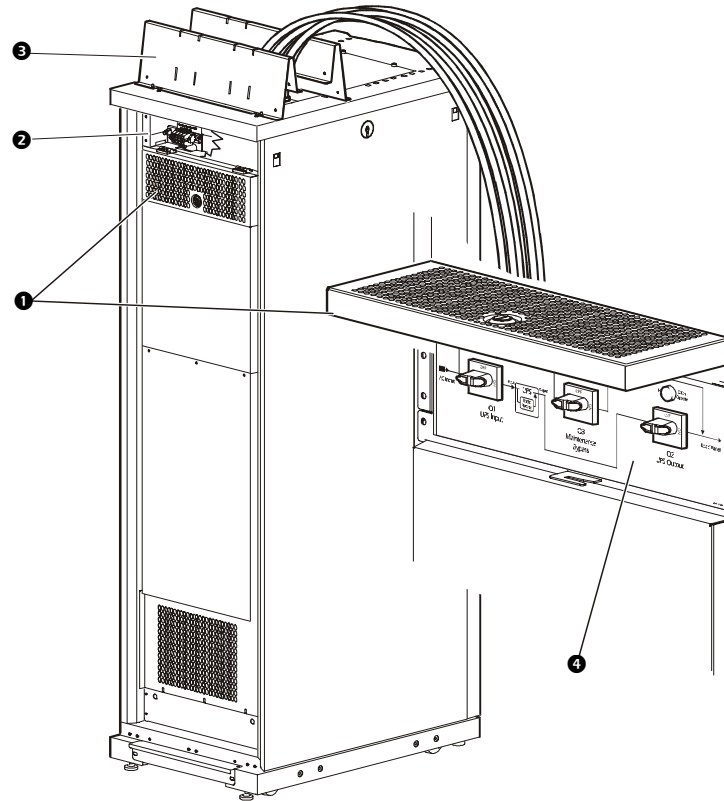
Front View (lower interior)

- ❶ The **DC disconnect breaker** controls the flow of DC power on the system's DC bus. The breaker is an over-current device that protects the system from a fault on the DC bus.
- ❷ The **system enable switch** acts as the on/off switch for the UPS.
- ❸ The **display/computer interface card** provides communication between the display interface, a computer, and each intelligence module (MIM and RIM).
- ❹ The **system power supply cards** supply power to the MIM and RIM. The cards are their own separate input and output buses and each can support the MIM and RIM if one of the cards fail.
- ❺ The **accessory card slots** are available for APC management card accessories.



- ❻ The **network management card** communicates directly with the InfraStruXure Manager. The card connects to the hug, using a network cable (provided).
- ❼ The **external switch gear monitoring card** monitors the maintenance bypass panel in the InfraStruXure.
- ❽ The **battery monitoring card** monitors the battery voltage and current in order to provide accurate runtime and battery status.
- ❾ The **XR communications card** provides communication between the InfraStruXure intelligence modules (MIM and RIM) and an XR Battery Enclosure (if applicable).
- ❿ **Reserved for future use**

Rear View



- ❶ The **maintenance bypass panel access door** is connected to the enclosure with friction hinges. To increase friction so that the door stays open when accessing the maintenance bypass panel, tighten the hinge screws on top of the access door.
- ❷ The **main input access panel** covers the main input terminals. Remove this panel for easy access when connecting the utility conductors to the main input terminals.
- ❸ The **PDU shielding trough** accommodates the power cables exiting the roof of the system's enclosure. The PDU shielding trough lines up with NetShelter shielding troughs to route power cables to equipment enclosures.
- ❹ The **maintenance bypass panel** has three switches that allow the UPS to be electrically isolated from the main power source, while maintaining power to the panel. The main input switch is labeled Q1, the output switch is labeled Q2, and the maintenance bypass switch is labeled Q3. The diagram label on the maintenance bypass panel illustrates the power flow, and the H2 and H3 LEDs indicate when it is safe to operate the Q2 and Q3 switches.

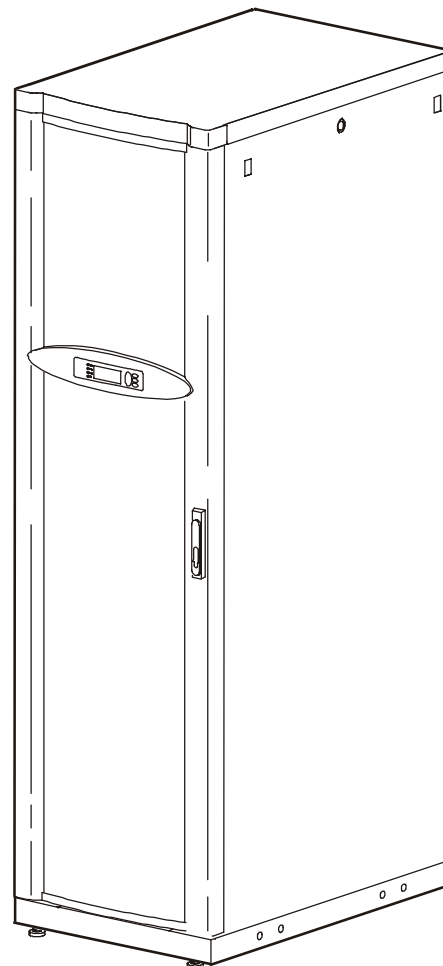
Symmetra PX 40kW UPS

Overview

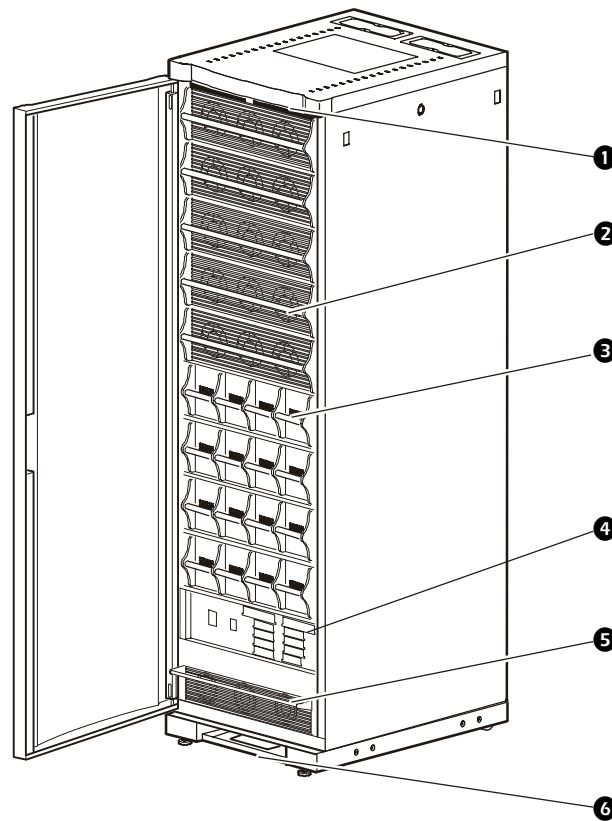
The Symmetra PX UPS is a 10–40kW scalable, modular, N+1 UPS housed in a Netshelter VX enclosure (a line-up-and-match with the 40kW InfraStruXure PDU). The enclosure supports up to five power modules and four battery modules; all modules are hot-swappable and easily slide into the enclosure.

The Symmetra PX UPS accepts 208-volt input from the InfraStruXure PDU and returns 208-volt power to the InfraStruXure PDU for distribution to equipment enclosures. Connection to and from the InfraStruXure PDU is performed by APC Field Service Engineers during installation of the InfraStruXure system.

SKUs	Description
SY10K40F	10kW UPS, scalable to 40kW N+1
SY20K40F	20kW UPS, scalable to 40kW N+1
SY30K40F	30kW UPS, scalable to 40kW N+1
SY40K40F	40kW UPS, scalable to 40kW N+1

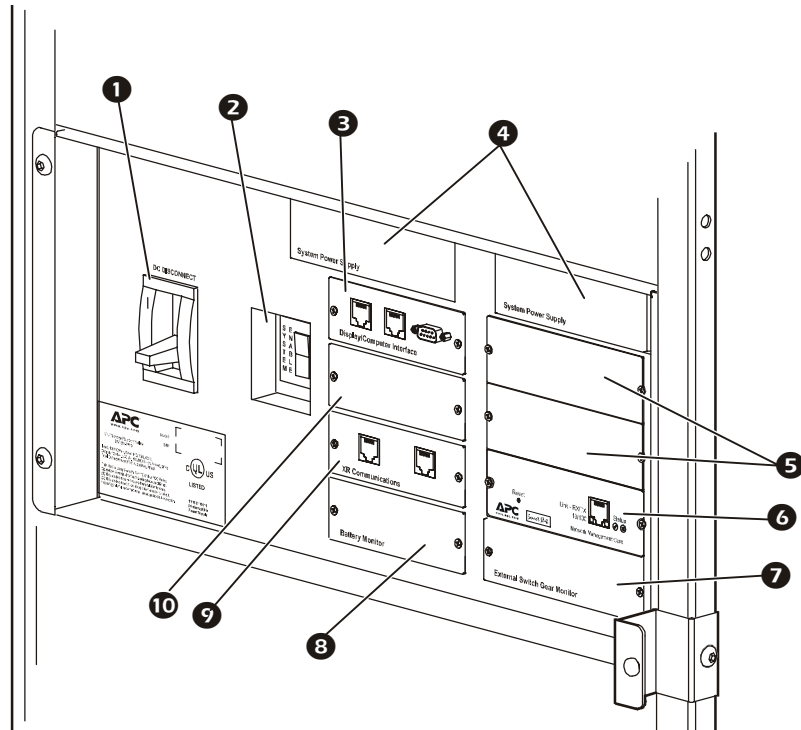


SY40K40F



- ❶ The **intelligence modules** control the UPS. The MIM (Main Intelligence Module) is the main controller of the Symmetra PX UPS. It reports status, configures the UPS, performs UPS diagnostics, manages power and batteries, controls general UPS performance, regulates output voltage, and accommodates power module load-sharing. The RIM (Redundant Intelligence Module) is the redundant controller. The RIM is identical to the MIM (same part number), and is responsible for system operation if the MIM fails or is removed. When there are two intelligence modules, one can be removed without affecting the load. However, when there is only one intelligence module, always put the system in maintenance bypass before removing it.
- ❷ Each **power module** can support up to 10kW of power. Each time a power module is added, it increases the total capacity of the UPS. The power modules can be removed without affecting the load.
- ❸ A **battery module** consists of four battery units. Battery modules can be removed without affecting power supplied to the load. The number of battery modules determines the runtime of a particular load. A battery module provides six minutes of runtime to one power module at full load (assuming a 0.8 load power factor)
- ❹ The **UPS control and communication panel** allows the user to control and manage the UPS (see the detailed description on the following page).
- ❺ The **static switch module** provides a safety net, should a failure occur within the Symmetra PX UPS system. When activated, the static switch reroutes the power input and provides surge-protected power directly to the output distribution.
- ❻ The **documentation tray** holds the Symmetra PX UPS documentation, providing easy access to and storage for important safety information and operation instructions.

UPS control and communication panel



- ❶ The **DC disconnect breaker** controls the flow of power on the Symmetra PX UPS's DC bus. The breaker is an over-current device that protects the Symmetra PX UPS from a fault on the DC bus.
- ❷ The **system enable switch** acts as the on/off switch for the UPS.
- ❸ The **display/computer interface card** provides communication between the display interface, a computer, and each intelligence module (MIM and RIM).
- ❹ The **system power supply cards** supply power to the MIM and RIM. The cards are their own separate input and output buses and each can support the MIM and RIM if one of the cards fails.
- ❺ The **accessory card slots** are available for APC management card accessories.
- ❻ The **Network Management Card** communicates directly with the InfraStruXure Manager. The card connects to the hub, using a network cable (provided).
- ❼ The **external switch gear monitoring card** monitors switchgear external to the Symmetra PX UPS and the InfraStruXure system. This card could be connected to a generator, an automatic transfer switch, or other external components for communication purposes.
- ❽ This **battery monitoring card** monitors the battery voltage and current in order to provide accurate runtime and battery status.
- ❾ This **XR communications card** provides communication between the InfraStruXure intelligence modules (MIM and RIM) and an XR Battery Enclosure (if applicable).
- ❿ **Reserved for future use.**

Symmetra PX 80kW UPS

Overview

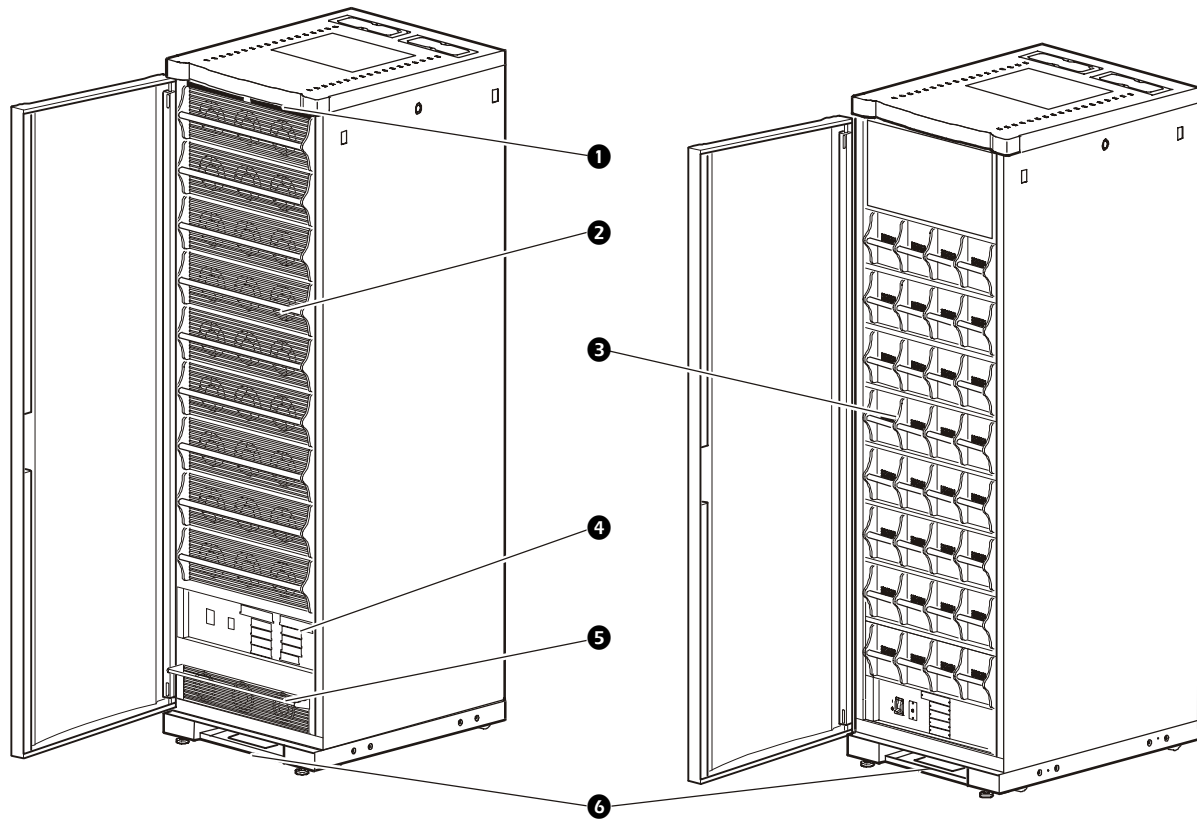
The Symmetra PX UPS is a 10–80kW scalable, modular, N+1 UPS housed in a NetShelter® VX enclosure (a line-up-and-match with the InfraStruXure PDU). The enclosure supports up to five power modules and four battery modules; all modules are hot-swappable and easily slide into the enclosure.

The Symmetra PX UPS accepts 208-volt input from the InfraStruXure PDU and returns 208-volt power to the InfraStruXure PDU for distribution to equipment enclosures. Connection to and from the InfraStruXure PDU is performed by APC Field Service Engineers during installation of the InfraStruXure system.

SKUs	Description
SY10K80F	10kW UPS, scalable to 80kW N+1
SY20K80F	20kW UPS, scalable to 80kW N+1
SY30K80F	30kW UPS, scalable to 80kW N+1
SY40K80F	40kW UPS, scalable to 80kW N+1
SY50K80F	50kW UPS, scalable to 80kW N+1
SY60K80F	60kW UPS, scalable to 80kW N+1
SY70K80F	70kW UPS, scalable to 80kW N+1
SY80K80F	80kW UPS, scalable to 80kW N+1

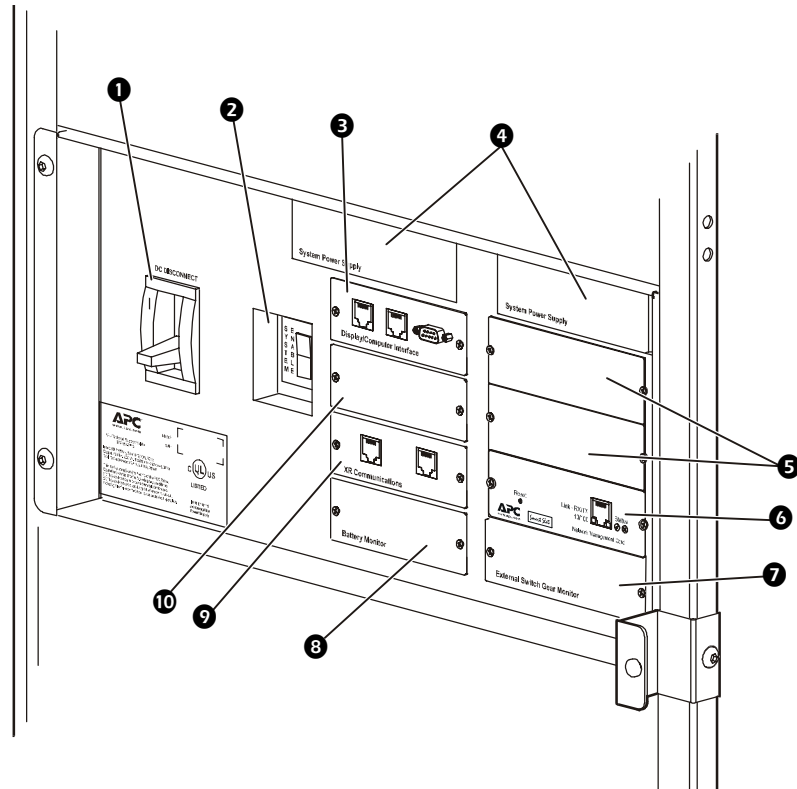


SY80K80F



- ❶ The **intelligence modules** control the UPS. The MIM (Main Intelligence Module) is the main controller of the Symmetra PX UPS. It reports status, configures the UPS, performs UPS diagnostics, manages power and batteries, controls general UPS performance, regulates output voltage, and accommodates power module load-sharing. The RIM (Redundant Intelligence Module) is the redundant controller. The RIM is identical to the MIM (same part number), and is responsible for system operation if the MIM fails or is removed. When there are two intelligence modules, one can be removed without affecting the load. However, when there is only one intelligence module, always put the system in maintenance bypass before removing it.
- ❷ Each **power module** can support up to 10kW of power. Each time a power module is added, it increases the total capacity of the UPS. The power modules can be removed without affecting the load.
- ❸ A **battery module** consists of four battery units. Battery modules can be removed without affecting power supplied to the load. The number of battery modules determines the runtime of a particular load. A battery module provides six minutes of runtime to one power module at full load (assuming a 0.8 load power factor)
- ❹ The **UPS control and communication panel** allows the user to control and manage the UPS (see the detailed description on the following page).
- ❺ The **static switch module** provides a safety net, should a failure occur within the Symmetra PX UPS system. When activated, the static switch reroutes the power input and provides surge-protected power directly to the output distribution.
- ❻ The **documentation tray** holds the Symmetra PX UPS documentation, providing easy access to and storage for important safety information and operation instructions.

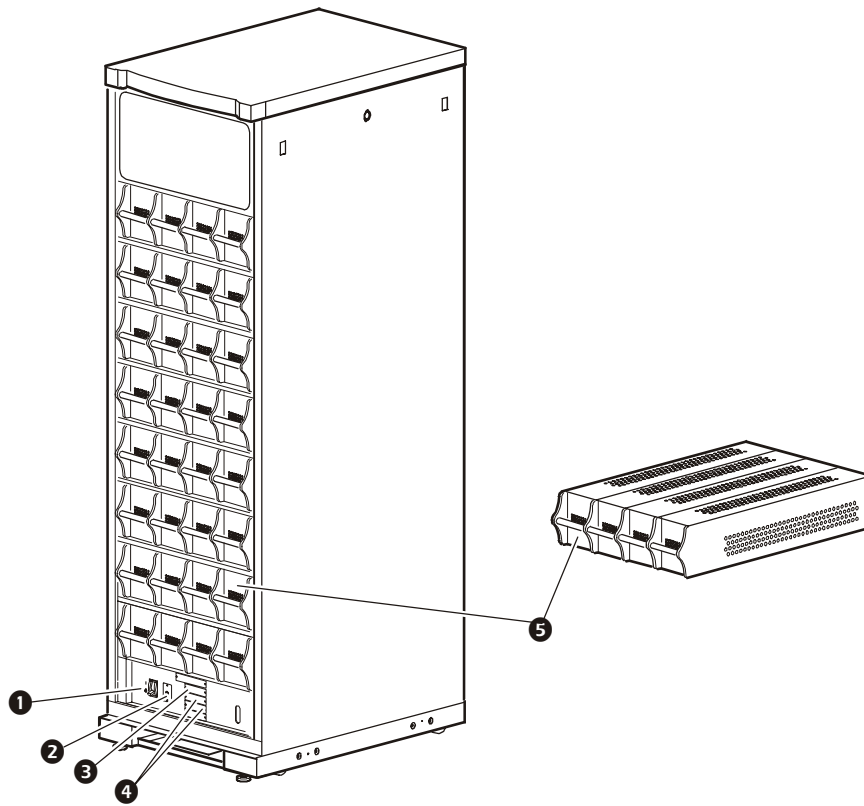
UPS control and communication panel



- ❶ The **DC disconnect breaker** controls the flow of power on the Symmetra PX UPS's DC bus. The breaker is an over-current device that protects the Symmetra PX UPS from a fault on the DC bus.
- ❷ The **system enable switch** acts as the on/off switch for the UPS.
- ❸ The **display/computer interface card** provides communication between the display interface, a computer, and each intelligence module (MIM and RIM).
- ❹ The **system power supply cards** supply power to the MIM and RIM. The cards are their own separate input and output buses and each can support the MIM and RIM if one of the cards fails.
- ❺ The **accessory card slots** are available for APC management card accessories.
- ❻ The **Network Management Card** communicates directly with the InfraStruXure Manager. The card connects to the hub, using a network cable (provided).
- ❼ The **external switch gear monitoring card** monitors switchgear external to the Symmetra PX UPS and the InfraStruXure system. This card could be connected to a generator, an automatic transfer switch, or other external components for communication purposes.
- ❽ This **battery monitoring card** monitors the battery voltage and current in order to provide accurate runtime and battery status.
- ❾ This **XR communications card** provides communication between the InfraStruXure intelligence modules (MIM and RIM) and an XR Battery Enclosure (if applicable).
- ❿ **Reserved for future use.**

Symmetra PX XR Premium Battery Enclosure

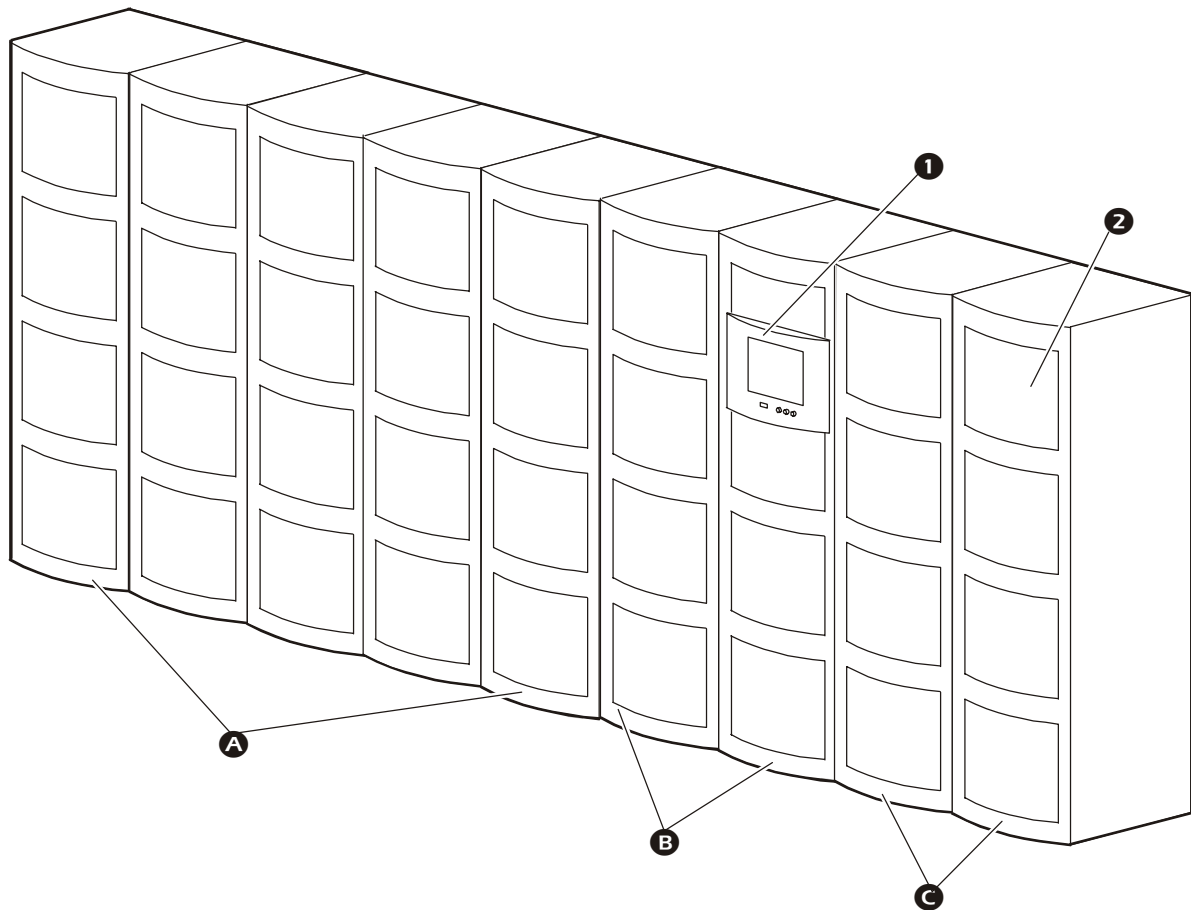
The Symmetra PX XR Premium Battery Enclosure adds additional run-time to a Symmetra PX UPS. Each Battery Enclosure holds up to eight battery modules. Up to three Battery Enclosures can be attached to a single Symmetra PX UPS. Connection and installation of the Battery Enclosure is performed by APC Field Service Engineers.



- ❶ The **DC disconnect breaker** controls the flow of DC power on the DC bus. The breaker is an over-current device that protects the system from a fault on the DC bus.
- ❷ The **battery monitoring card** monitors the battery voltage and current in order to provide accurate run-time and health status of the batteries.
- ❸ The **extended-run frame card** provides communication between the Symmetra PX UPS MIM/RIM and the XR Battery Enclosure.
- ❹ The **access for data cables** provide access for routing data cables to and from the management cards located in the cardslots.
- ❺ A **battery module** consists of four battery units. Battery modules can be removed without affecting power supplied to the load. The number of battery modules determines the runtime of a particular load. A battery module provides six minutes of runtime to one power module at full load (assuming a 0.8 load power factor).

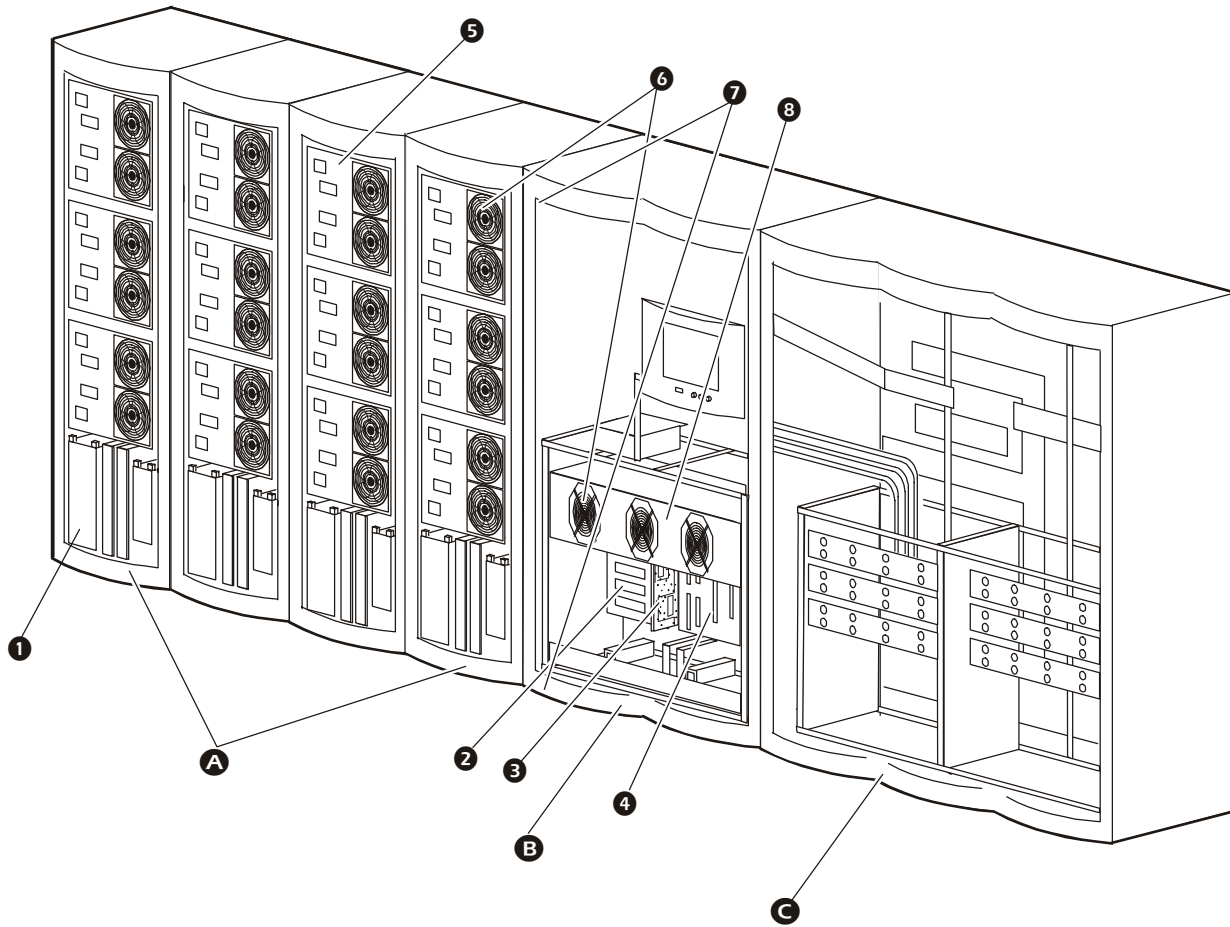
Symmetra MW UPS

The Symmetra MW is a fault-tolerant, modular, scalable N + 1 UPS solution in the 400–1600 kW power range, and includes paralleling features to handle even larger load requirements. The Symmetra MW is designed for 480 V, 60Hz 3-phase input and output. Optional equipment include Bypass Static Switch, Maintenance Bypass Panel, and Battery Cabinet (all in line-up-and-match design).



- ❶ A state-of-the-art **LCD** touch-screen provides full system visibility and easy access to critical data. Each of the 3 sections and the system as a whole is monitored by the latest digital technology offering automatic fault analysis and early-warning problem notification to ensure uninterrupted system availability.
- ❷ The **finishing panels** are easy to remove without the use of tools for quick change of the incorporated air filters. A safety barrier behind the finishing panels makes it safe to change the filters, even on running units.
- ❸ **Inverter Section**
- ❹ **Control Section**
- ❺ **Input/Output Section**

Front View (interior)

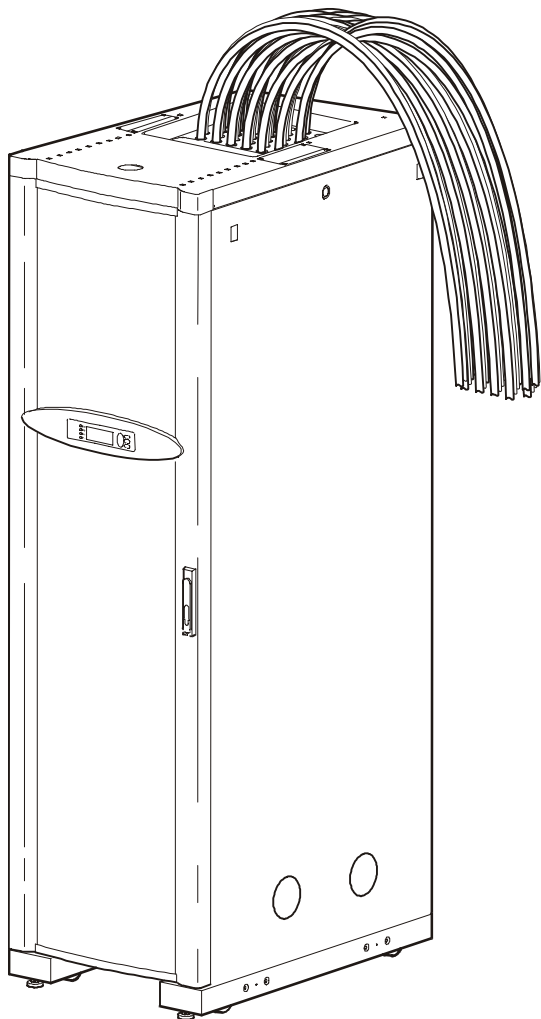


- A** The **inverter section** is configured with x times 200kW power sections. The above unit has 4 power sections for 800kW of power capacity, or 800kW N +1. Each power unit has 3 67kW inverter modules.
- 1** The **contactor/fuse section** contains input and output fuses, and contactors for the 200kW section ensuring fault containment. In the event of a problem in a section, the fuses will handle the fast interruption, and the contactors will handle the mechanical interruption and provide back-feed protection.
- 5** The **inverter modules** are designed to slide in/out for fast repairs and low MTTR (Mean Time to Repair), and house a complete single-phase delta inverter and a main inverter, including capacitor, magnetic filters, and control boards. Each module has independent input and output fuses and a built-in crowbar to ensure fault containment and thus prevent any faults in one module from affecting other parts of the UPS.
- 6** The unit is equipped with redundant, monitored **fans**. The automatic monitoring function ensures that early notification of any required maintenance to be carried out by the next Preventative Maintenance Visit.

- **B** The **control section** houses the display interface, the main control board, communication boards, network ports, and the main input switch.
 - **2** The **CAN board/bus system** monitors all ancillary equipment, enabling the main controller to make the right decisions in each individual case to prevent the loss of output to the critical load.
 - **3** The **main control board** controls the overall UPS functions. It gathers information and provides status reports, manages power, controls the overall UPS state, and regulates both power flow and output voltage. The main control board also handles a self-diagnostic function measuring predictive failure analysis on mission-critical and identified wear-out types of components and modules. Preventative maintenance is thus possible in a proactive manner, enhancing availability and reducing maintenance costs. The monitoring of all critical unit components ensures early-warning notification of any irregularities. '
 - **4** The **power supplies** feed control boards from two redundant power supplies. Each power supply has dual input for increased availability. All outputs are fused to ensure isolation of faulty components.
 - **7** Top and bottom **network ports** allow monitoring through network and web, locally and remotely and offers Building Management Support through Modbus.
 - **8** The **main input SSW** provides fast interruption in the event of utility failures to prevent system level back-feed.
- **C** The **input/output section's** spacious design and the standard top or bottom cable entry offer a high degree of flexibility and ease of installation. The modular design allows a cable first installation as the input/output section can be wired up first, keeping sensitive electronics out of the work area until their installation time.

40kW InfraStruXure PDU

Overview



APC's Power Distribution Unit (PDU) provides distribution and management of electrical power. APC offers a InfraStruXure PDU with the capacity of 40kW. The PDU accepts 208, 480, or 600-volt, 3-phase input, and distribute power to equipment racks or enclosures. The available 40kW InfraStruXure PDU models are:

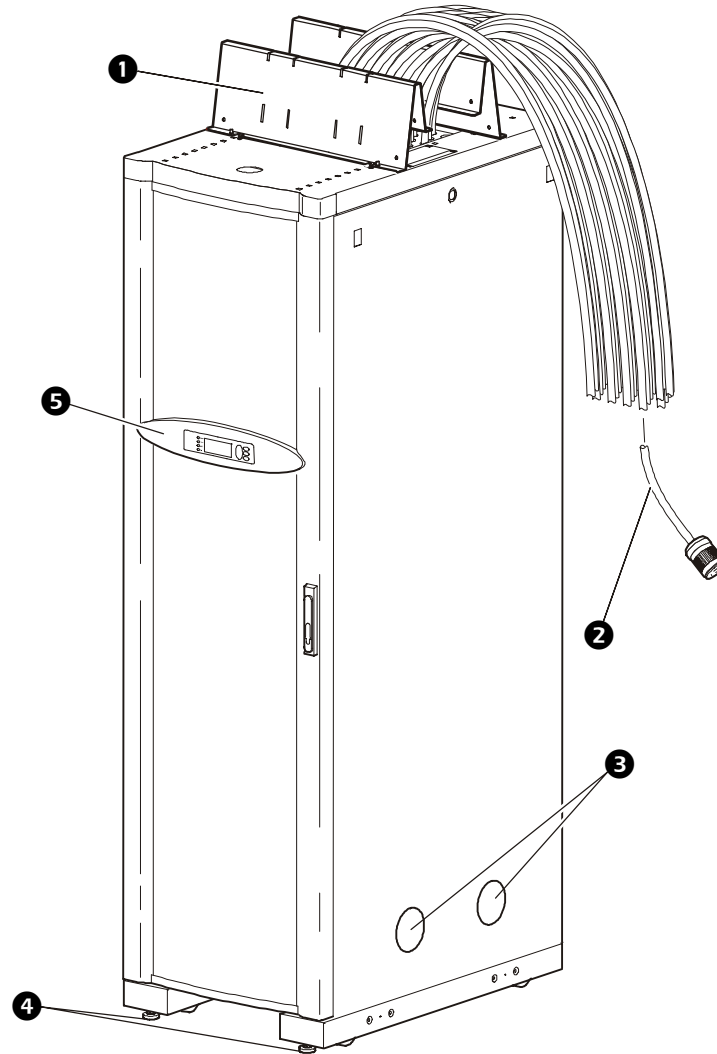
SKUs	Description
PD40KF6FK1	PDU 40kW 208V without MBP
PD40KF6FK1-M	PDU 40kW 208V with MBP
PD40KG6FK1	PDU 40kW 480V without MBP
PD40KG6FK1-M	PDU 40kW 480V with MBP
PD40L6FK1-M	PDU 40kW 600V with MBP

Options available on the InfraStruXure PDU include a load test port and branch-circuit monitoring.

Each InfraStruXure PDU is housed in a NetShelter VX Enclosure and is a line-up-and-match with the Symmetra PX UPS. The InfraStruXure PDU enclosure has knockouts on the bottom and top of the unit to accommodate output power distribution overhead or under the floor.

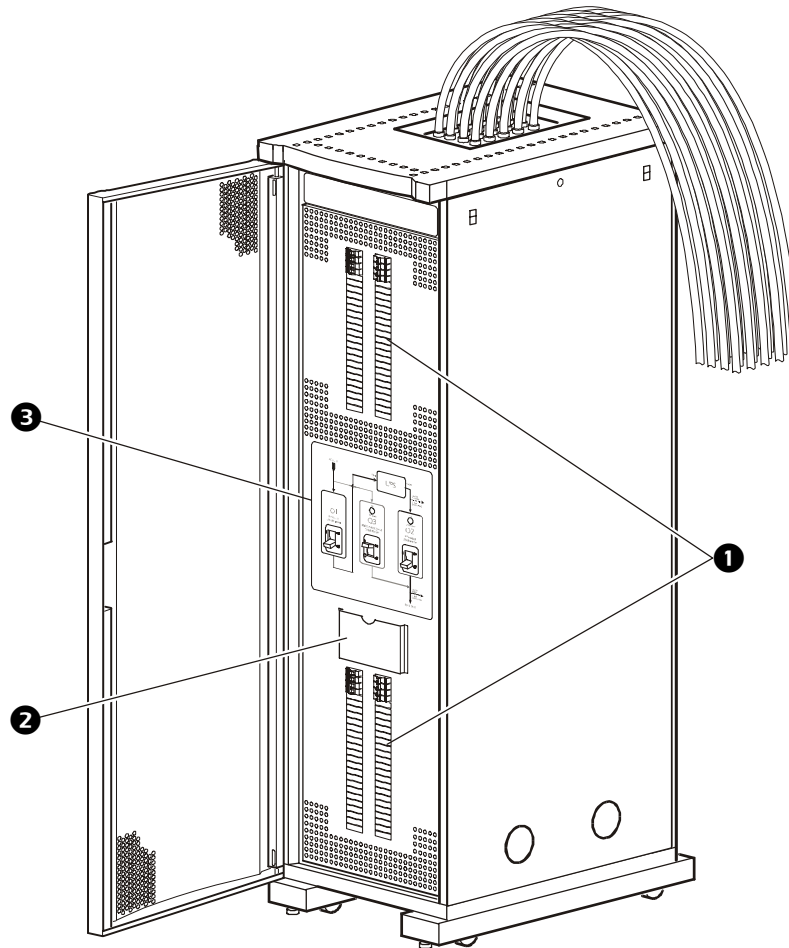
For security, the front door of the InfraStruXure PDU can be locked. A half-door, located on the upper half of the rear of the unit, can also be locked. The rear and front lock accepts the same key. An APC representative can provide information on the option of having two different locks, by contacting the lock manufacturer.

Front view: exterior



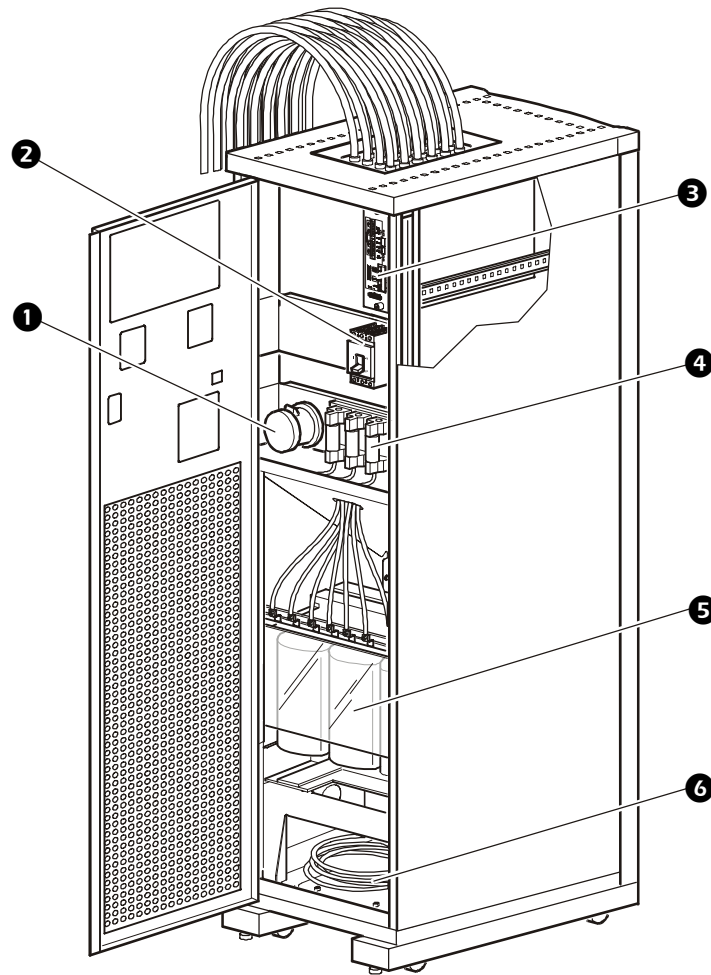
- ❶ The **PDU shielding trough** accommodates the power cables exiting the roof of the PDU, and separates power cables from data cables.
- ❷ The **PDU power cables** supply power to equipment racks. They are fed through knockouts on the top of the PDU. There are the following two options for PDU power cables:
 - Multi-circuit power cable that terminates with an L21-20 outlet (shown)
 - Single-circuit power cable that terminates with an L6-30 outletThe number of power cables installed in the PDU depends on the system configuration. Each power cable accepts a variety of APC InfraStruXure rack-mount power distribution accessories.
- ❸ **Cable access holes** allow access for Symmetra PX UPS input and output wiring. During installation, the APC Field Service Engineer exchanges side panels between the PDU and the UPS so that the adjacent sides of the two units have panels with cable access holes.
- ❹ **Leveling feet** adjust to level the enclosure. All enclosures must be level before installation of the system begins.
- ❺ The **display interface** provides a local interface for viewing status data. It has an LCD, five-button interface, basic status lights, and a beeper.

Front view: interior



- ❶ The **42-position circuit breaker panels** provide 84 total pole positions. Each single pole provides power at 120V L-N or two single poles provide 208V L-L. The amperage each position provides depends on the size of the circuit breaker used.
- ❷ The **document pocket** provides storage of documents relating to the circuit breaker panels, such as the PDU panel board schedules (provided).
- ❸ The **wraparound maintenance bypass panel** holds three circuit breakers that allow the UPS to be electrically isolated from the main power source, while maintaining the power panels. The input circuit breaker is labeled Q1, the output circuit breaker is labeled Q2, and the maintenance bypass circuit breaker is labeled Q3. The label on the maintenance bypass panel of the PDU illustrates the power flow, and the H2 and H3 LEDs indicate when it is safe to operate the Q2 and Q3 circuit breakers.

Rear view: interior



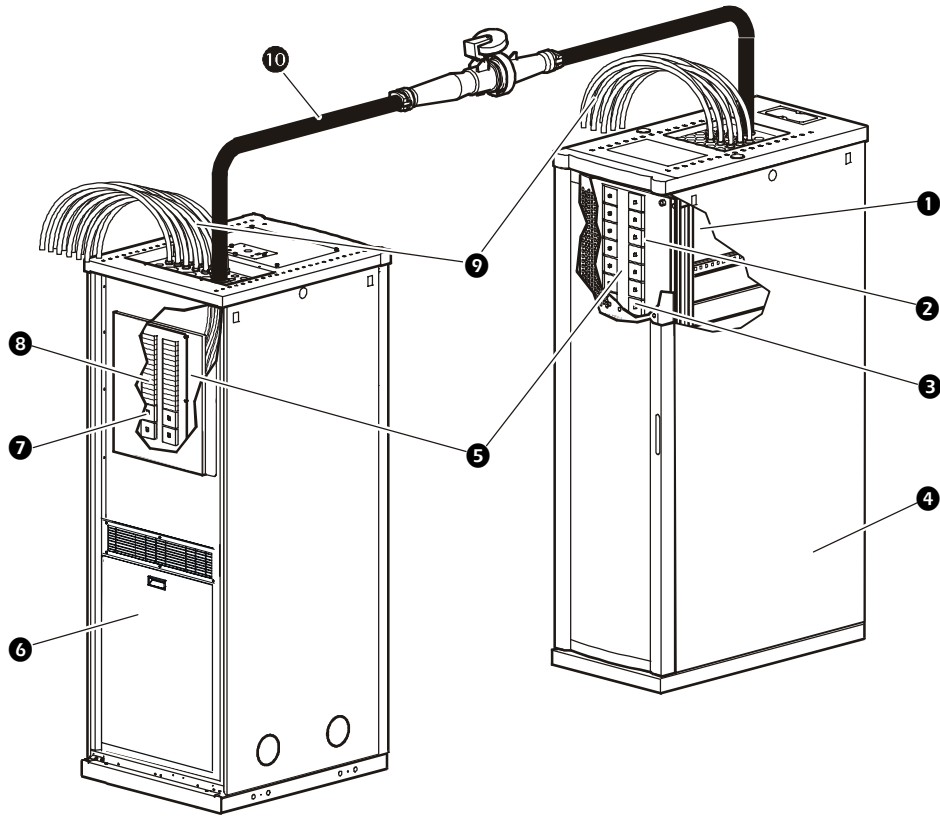
- ❶ The **load test port** allows a UPS system to be load-tested to ensure that the system will operate according to specifications if a power outage occur. (This is an optional component.)
- ❷ The **main input switch** connects to the main power source. The switch accepts 208 V, 480 V, or 600 V input and requires 3-wire input conductors for PDUs with a transformer and 4-wire input conductors for PDUs without a transformer.
- ❸ The **PDU monitoring unit** has several current and voltage monitoring boards that report to a central board assembly located in the PDU monitoring unit. The PDU monitoring unit has one 10BaseT (Cat-5) connection to the Information Controller Hub (or switch), four output relay connections, four input contact connections, and one EPO input connection.
- ❹ These **fuses** protect the silicon-controlled rectifiers in the UPS bypass static switch. The fuses are present only on PDUs without a transformer.
- ❺ The delta-wye **input transformer** is based on the input voltage (208 V, 480 V, or 600 V input). The output of the transformer feeds the input circuit breaker of the maintenance bypass panel.
- ❻ The **UPS input and output cables** connect the PDU to the UPS and are shipped coiled on the floor of the PDU. The input cables consist of 5 wires: 3 phases, 1 neutral, and 1 ground. The output cable consists of 4 wires: 3 phases and 1 neutral. Each wire is labeled and corresponds to a terminal on the Symmetra PX UPS. During installation, the Field Service Engineer will connect the PDU to the UPS.

80kW InfraStruXure PDU

Overview

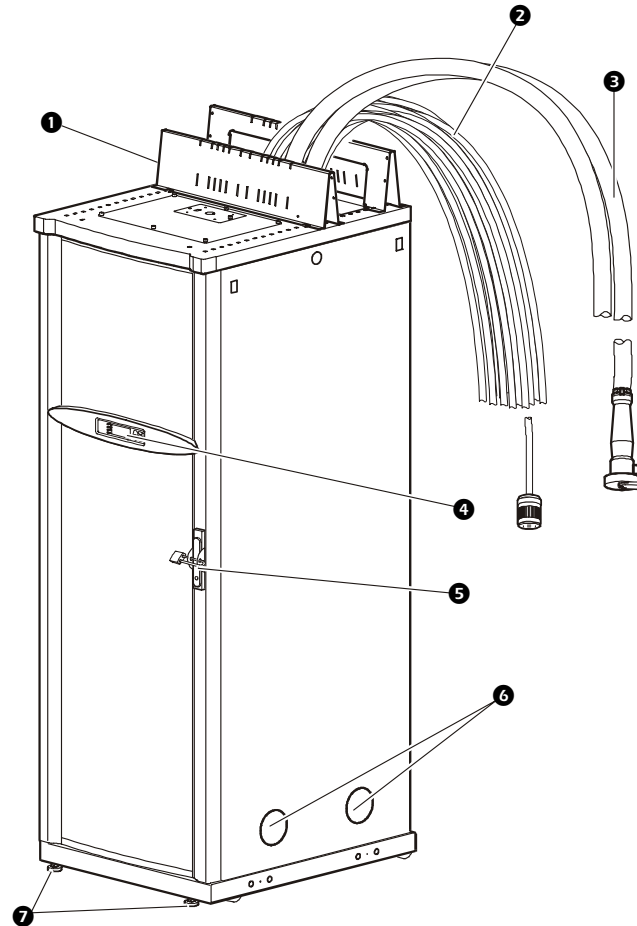
The APC 80kW InfraStruXure PDU provides distribution and management of electrical power. The InfraStruXure PDU has the capacity of 80kW, accepts 208, 480, or 600V, 3-phase input, and distributes 208V, 3-phase power to equipment racks and Rack Distribution Panels (RDPs). The RDPs sit in the top 10U of specially-designed NetShelter VX enclosures and distribute power to equipment racks. The InfraStruXure PDU is housed in a specially-designed NetShelter VX Wide enclosure. Each 80kW InfraStruXure PDU has thirty pole positions available for feeding equipment racks and four, three-pole positions available for feeding RDPs. Each RDP has thirty-nine pole positions available for feeding equipment racks and one, three-pole position that back-feeds the RDP. The available PDUs are listed below.

SKUs	Description
PD80F6FK1-M	PDU 80kW 208 V with MBP
PD80G6FK1-M	PDU 80kW 480 V with MBP
PD80L6FK1-M	PDU 80kW 600 V with MBP



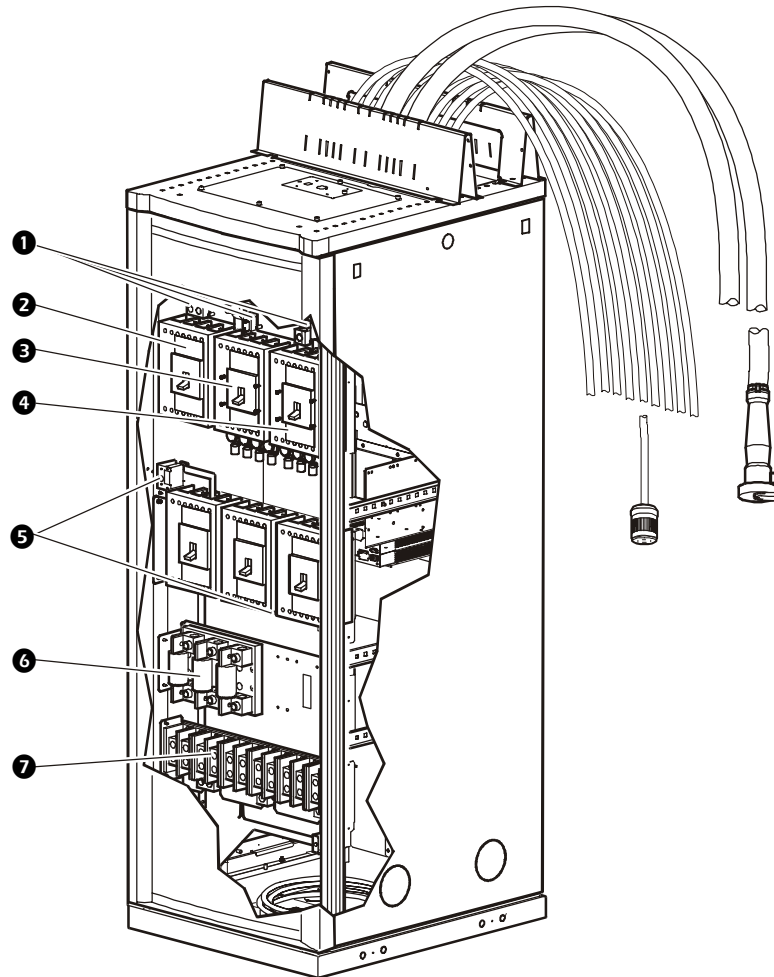
- ❶ Rack Distribution Panel
- ❷ 39 pole positions available
- ❸ One, 3-pole breaker back-feeding the RDP
- ❹ NetShelter VX Enclosure
- ❺ 42-position circuit breaker panel
- ❻ InfraStruXure PDU
- ❼ Four circuit breakers sub-feeding the RDPs
- ❽ 30 pole positions available
- ❾ Power cables feeding equipment racks
- ❿ Sub-feed power cable feeding the RDP

Front view: exterior



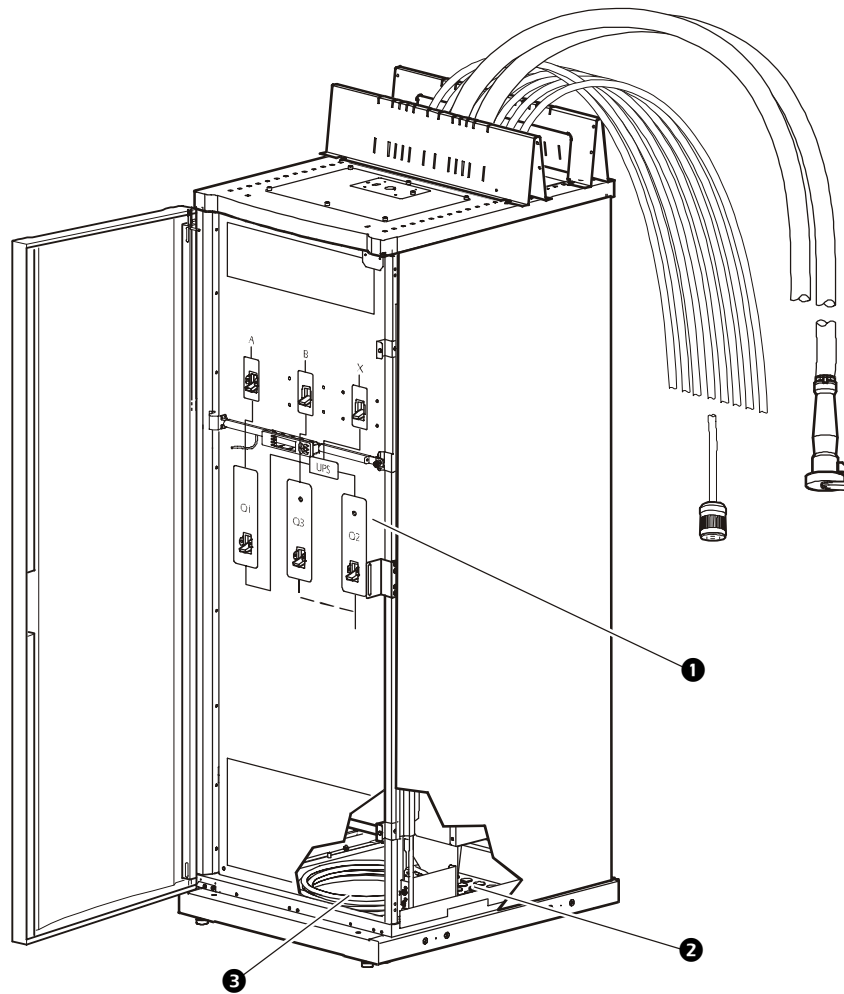
- ❶ The **PDU wide shielding troughs** accommodate the power cords exiting the roof of the PDU.
- ❷ **Power cables** feed equipment racks; they are fed through knockout panels on the top (or bottom) of the PDU. The power cables consist of five wires: 3 phase, 1 neutral, and 1 ground. The number of power cables installed in the PDU depends on the system configuration. Each power cable has a NEMA L21-20 outlet, which accepts a variety of APC InfraStruXure accessories, including Rack PDUs and the Automatic Transfer Switch.
- ❸ The **sub-feed power cables** are an option for feeding RDPs. They are fed through knockout panels on the top (or bottom) of the PDU. The power cables consist of five wires: 3 phases, 1 neutral, and 1 ground. The PDU can have up to four sub-feed power cables. Each power cable has an IEC 309 outlet, which connects to another sub-feed power cable fed from the RDP with an IEC 309 plug.
- ❹ The **display interface** is attached to the name plate on the front door of the enclosure. It has an LCD, five-button interface, basic status lights, and a beeper.
- ❺ The **lock-out bracket** allows for a padlock to be applied to the door to lock access to the PDU switches and breakers.
- ❻ Both side panels on the PDU have **cable access holes** for Symmetra PX UPS input and output wiring. During installation, the APC Field Service Engineer exchanges side panels between the PDU and the Symmetra PX UPS so that the adjacent sides of the two units have panels with cable access holes.
- ❼ The **leveling feet** adjust for leveling the enclosure. All enclosures must be level before installation of the system begins.

Front View (interior)



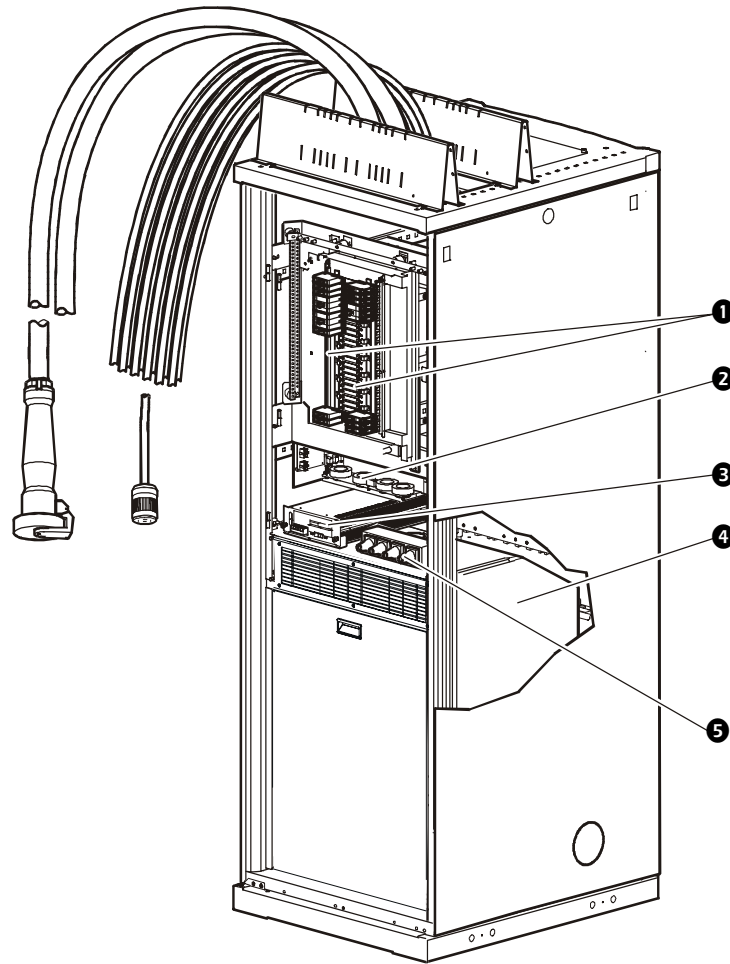
- ❶ **Ground lugs** are provided for the main input switch, bypass input switch, and cross tie output breaker. The main input lug has two holes: one for a main ground and one for the GEC.
- ❷ The main power source connects to the system at the **main input switch (A)**.
- ❸ If the ordered PDU accepts input power from two different sources, the secondary power source connects to the system at the **optional bypass input switch (B)**. The switch requires 208V input and 4-wire input conductors. The secondary source must have its phases in sync with the main input source (A).
- ❹ The **optional cross tie output breaker (X)** is a 4-pole breaker that outputs 208V to a bypass input switch on a different system. The cross tie breaker allows systems to be cascaded.
- ❺ Power supplied to the PDU monitoring unit is controlled through these two **PDU monitoring unit breakers**.
- ❻ The **fuses** protect the silicon-controlled rectifiers in the UPS bypass static switch. The fuses are present only on dual-fed PDUs and single-fed PDUs without a transformer.
- ❼ In the customer orders the main input wiring to be routed under the floor, these **optional bottom feed terminal blocks** are the connection to the main input switch, bypass input switch, and cross tie output breaker.

Front View (interior)



- ❶ The **wraparound maintenance bypass panel** has three breakers that allow the UPS to be electrically isolated from the main power source, while maintaining the power panels. The input breaker is labeled Q1, the output breaker is labeled Q2, and the maintenance bypass breaker is labeled Q3. The label on the maintenance bypass panel of the PDU illustrates the power flow, and the H2 and H3 LEDs indicate when it is safe to operate the Q2 and Q3 breakers.
- ❷ The **optional bottom-feed cable access** knock-outs are for bottom-feed power cables and RDP cables. If the ordered PDU accommodates under floor wiring, the power cables for equipment racks and RDPs will exit the PDU from these cable access holes.
- ❸ The **UPS input and output cables** connect the PDU to the UPS and are shipped coiled on the floor of the PDU. The input cables consist of 5 wires: 3 phases and 1 neutral. The output cable consists of 4 wires: 3 phases and 1 neutral. The bypass cables consist of 4 wires: 3 phases and 1 neutral. Each wire is labeled and corresponds to a lug on the Symmetra PX UPS bus bars. During installation, the Field Service Engineer will connect the PDU to the UPS.

Rear View (exterior)

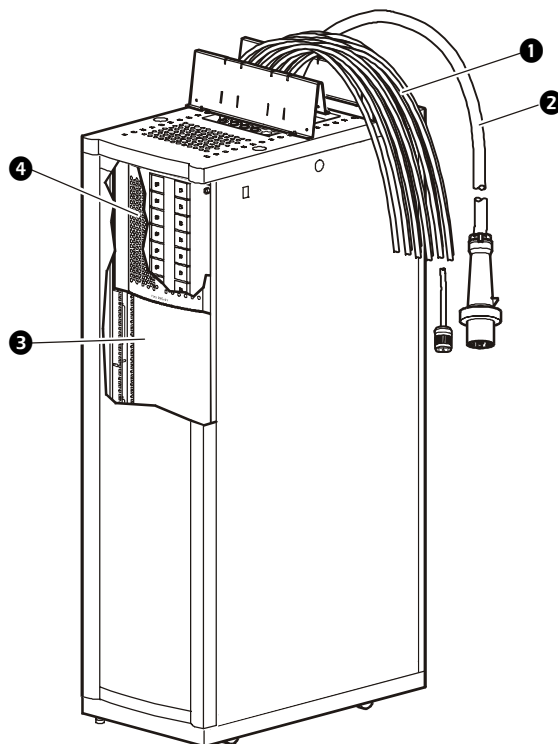


- ❶ Each PDU has a **42-position circuit breaker panel**. Each pole provides power at 120V L-N or 208V L-L. The amperage each position provides depends on the size of the circuit breaker used.
- ❷ Wires that feed the distribution panel pass through these **panel current sensors**, providing data to the PDU monitoring unit.
- ❸ The PDU has several current and voltage monitoring boards that report to a central board assembly located in the **PDU monitoring unit**. The PDU monitoring unit has one 10BaseT (CAT-5) connection to the InfraStruXure Manager hub (or switch), four contact closure connections for user-definable contacts, and a choice of three different connections (contact closure, 24VAC, 24VDC) for an EPO switch. Access the contact connections and 10BaseT port at the remote user connection board, which is located either in the roof or on the floor of the PDU, depending upon the configuration.
- ❹ The delta-wye **input transformer** installed in the PDU is based on the input voltage (208V, 480V, or 600V input). The output of the transformer feeds the input circuit breaker of the maintenance bypass panel.
- ❺ The **load test ports** are an available option on the PDU. The load test bank connector allows a UPS system to be load-tested to ensure that the system will operate according to specifications if a power outage occurs.

Rack Distribution Panel (RDP)

Overview

The Rack Distribution Panel (RDP) enables the user to add breaker positions without the need of integrating into the existing premise. Mounted within an APC NetShelter VX enclosure, the RDP is a 42-position power panel that is self contained with its own locking door for integrity/security purposes.



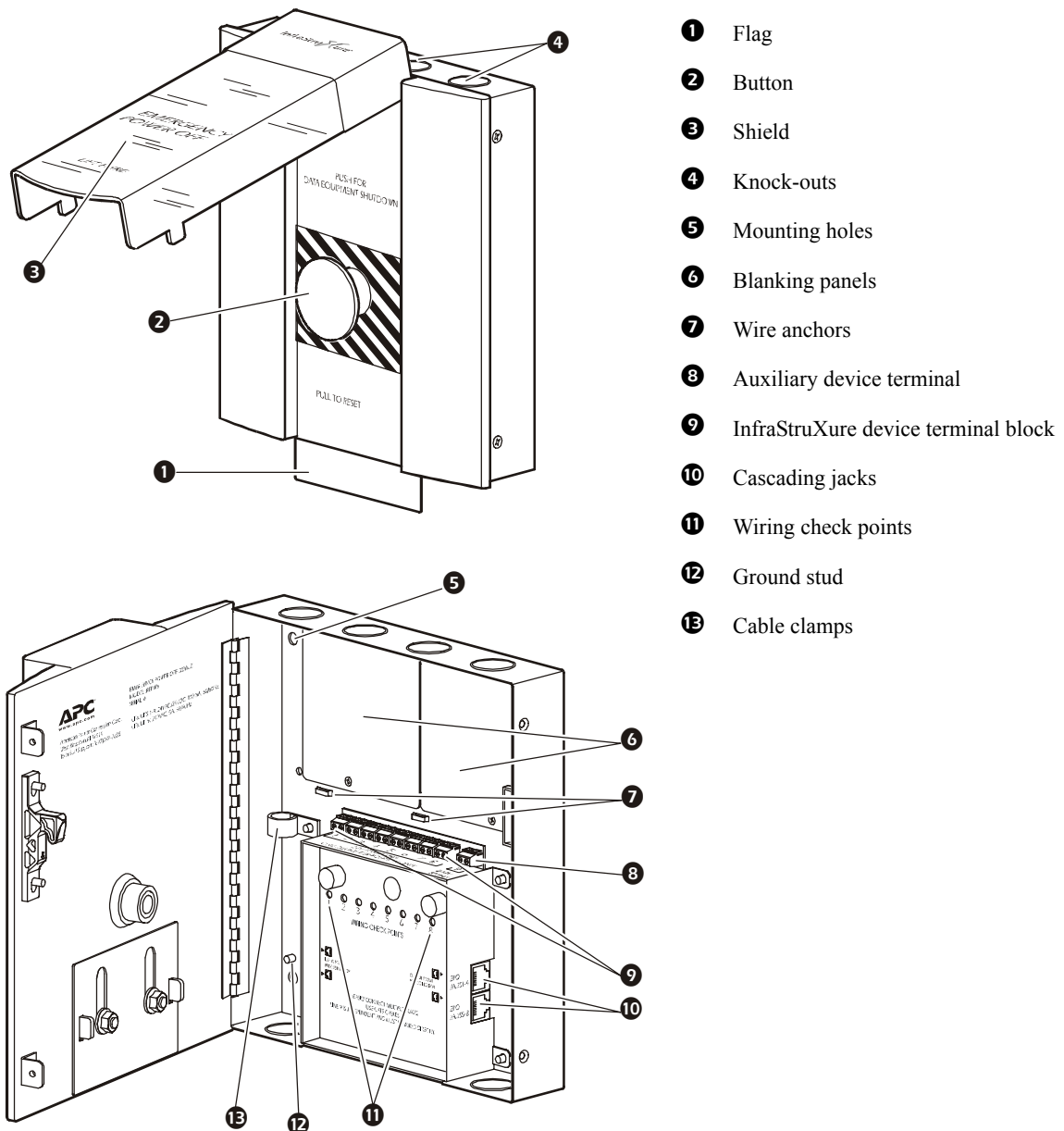
- 1 The **power cables** exit from knock-out panels on the roof of the RDP enclosure. The power cables consist of 5 wires (3 phases, 1 neutral, and 1 ground). The number of power cables installed in the RDP depends on the system configuration. Each power cable terminates with a NEMA L21-20 outlet, which accepts a variety of APC InfraStruXure power accessories, including Rack PDUs and the Automatic Transfer Switch.
- 2 The **sub-feed power cable** consists of 5 wires (3 phases, 1 neutral, and 1 ground), and terminates with an IEC 309 plug. If an 80kW PDU is part of the system, this power cable attaches to a sub-feed power cable from the PDU.
- 3 The RDP provides 32U of **available rack space** in the lower part of the enclosure for installing rack-mount equipment.
- 4 Each RDP has one **42-position circuit breaker panel**. Three pole positions back-feed the RDP and three pole positions provide power to an L21-20 outlet that can connect to a Rack PDU installed in the RDP enclosure. The remaining 36 pole positions are available to provide power to equipment racks and enclosures. Each pole provides power at 120V L-N or 208V L-L. The amperage each position provides depends on the rating of the circuit breaker used.

Emergency Power Off System (EPO)

Overview

The Emergency Power Off (EPO) System consists of one or more wall-mounted, push-button EPO boxes. Each EPO box provides a single point of equipment shutdown for up to eight APC InfraStruXure devices and one third-party device (such as an upstream breaker), using normally open (NO) contact closure connections. An EPO box may be cascaded with other EPO boxes to support multiple points of equipment shutdown.

Front View



60kW InfraStruXure PDU

Overview

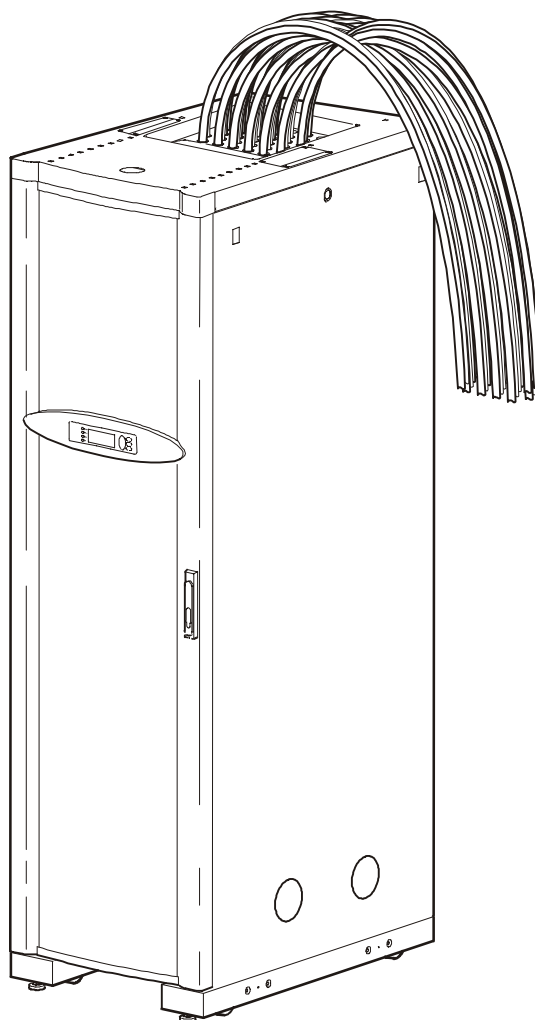
APC's Power Distribution Unit (PDU) provides distribution and management of electrical power. The PDU has the capacity of 60kW, accepts 208, 480, or 600V, 3-phase input, and distributes power to equipment racks or enclosures. The available 60kW InfraStruXure PDU models are:

SKUs	Description
PD60F6FK1	PDU 60kW 208V without MBP
PD60F6FK1-M	PDU 60kW 208V with MBP
PD60G6FK1	PDU 60kW 480V without MBP
PD60G6FK1-M	PDU 60kW 480V with MBP
PD60L6FK1	PDU 60kW 480V without MBP
PD60L6FK1-M	PDU 60kW 480V with MBP

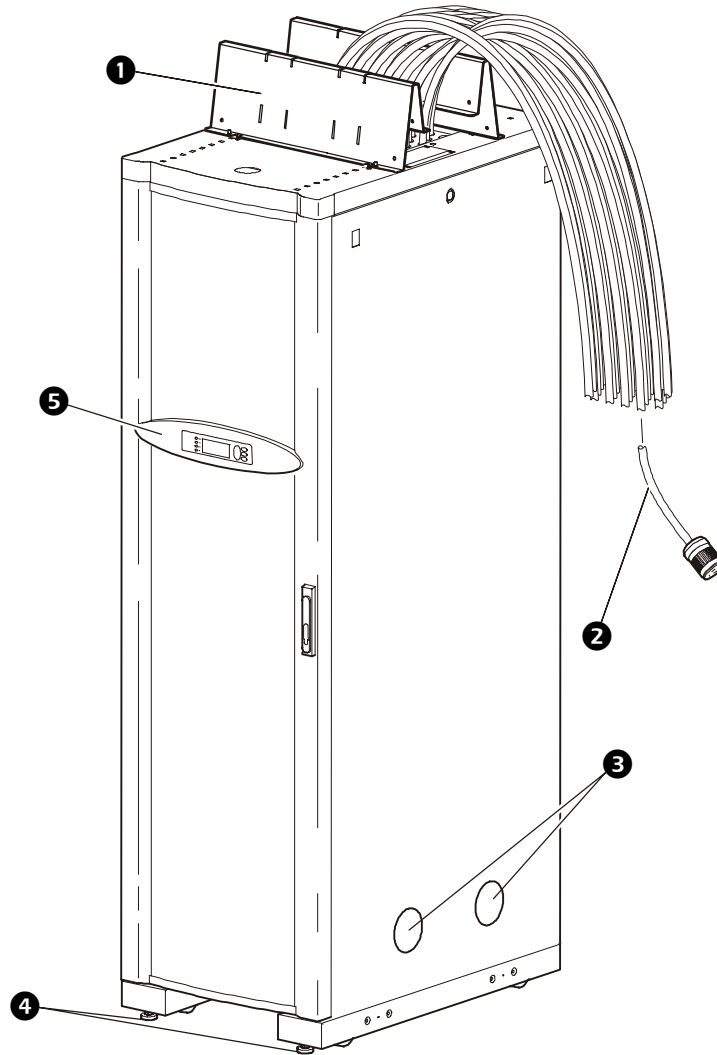
Options available on the PDU include branch-circuit monitoring.

Each PDU is housed in a NetShelter VX Enclosure. The enclosure has knockout panels on the bottom and top to accommodate output power distribution overhead or under the floor.

For security, the front door of the PDU can be locked. A half door, on the upper half of the rear of the unit, can also be locked. The rear and front locks accept the same key. An APC representative can provide information on the option of having two different locks by contacting the lock manufacturer.

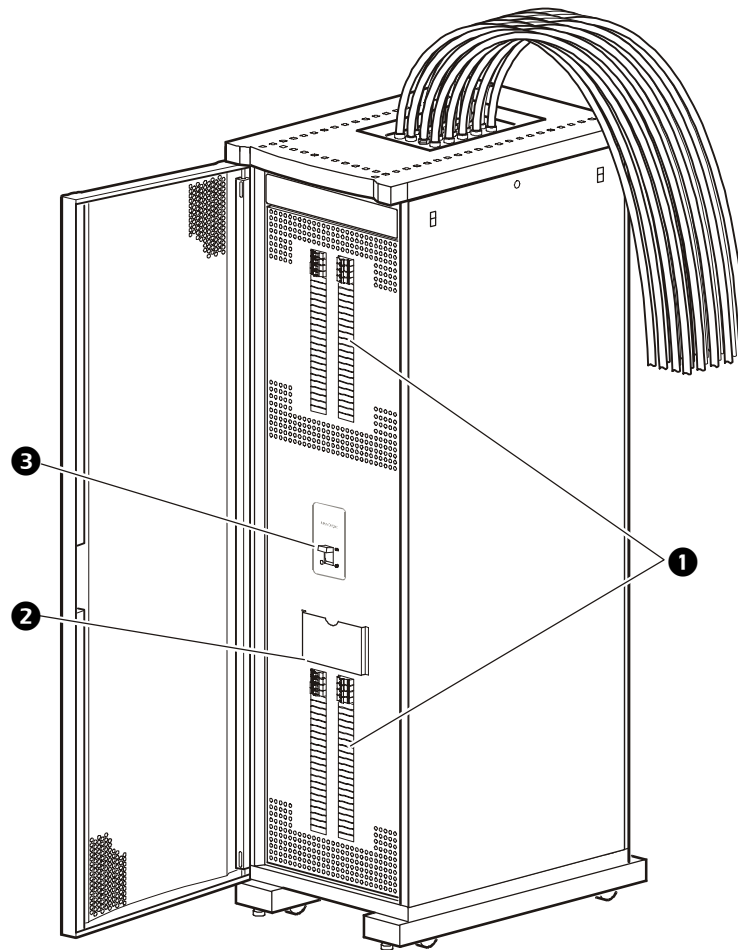


Front View (exterior)



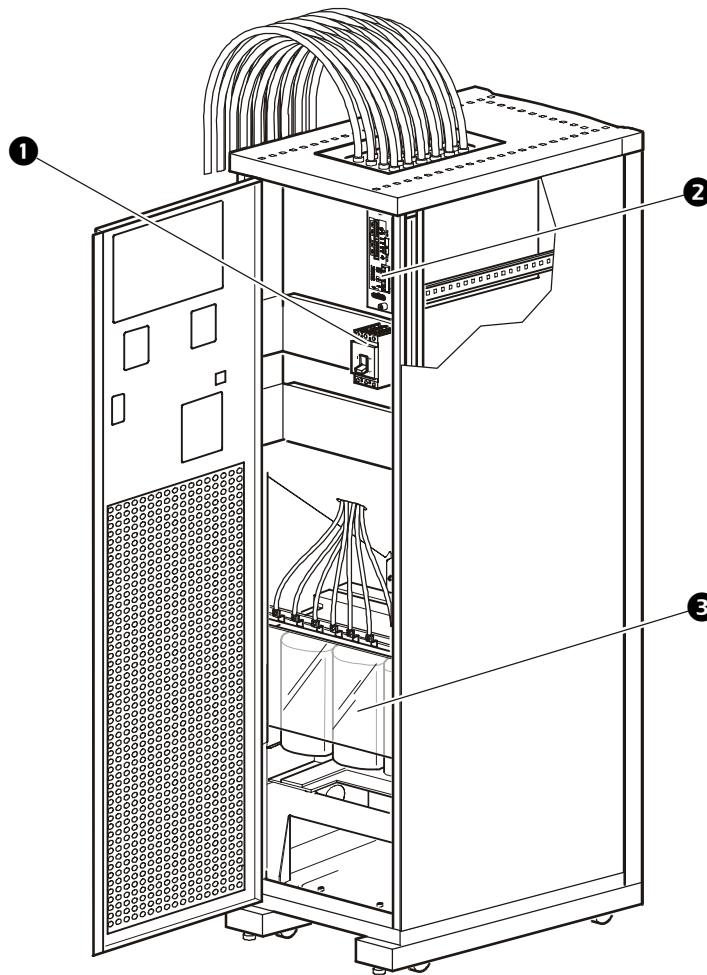
- ❶ The **PDU shielding trough** accommodates the power cables exiting the roof of the PDU, and it separates power cables from data cables.
- ❷ The **PDU power cables** supply power to equipment racks; they are fed through knockouts on the top of the PDU. There are the following two options for PDU power cables:
 - Multi-circuit power cable that terminates with an L21-20 outlet (shown)
 - Single-circuit power cable that terminates with an L6-30 outletThe number of power cables installed in the PDU depends on the system configuration. Each power cable accepts a variety of APC InfraStruXure rack-mount power distribution accessories.
- ❸ **Cable access holes** allow access for Symmetra PX UPS input and output wiring. During installation, the APC Field Service Engineer exchanges side panels between the PDU and the UPS so that the adjacent sides of the two units have panels with cable access holes.
- ❹ **Leveling feet** adjust to level the enclosure. All enclosures must be level before installation of the system begins.
- ❺ The **display interface** provides a local interface for viewing status data. It has an LCD, five-button interface, basic status lights, and a beeper.

Front View (interior)



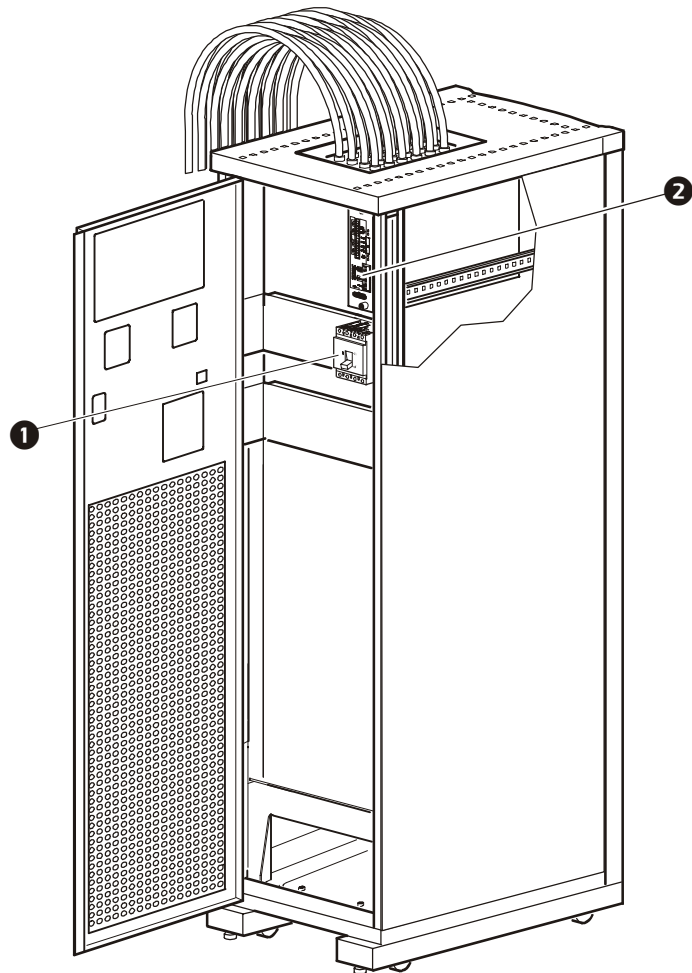
- ❶ Each PDU is equipped with two, **42-position circuit breaker panels**. Each panel has 42 positions to mount circuit breakers, for a total of 84 positions. Each position provides 120V of single-phase power. The amperage each position provides depends on the size of the circuit breaker used.
- ❷ The **document pocket** provides storage of documents relating to the circuit breaker panels, such as the PDU panel board schedules (provided).
- ❸ The **main output breaker** is the main breaker protecting the distribution circuit breaker panels. On PDUs without a transformer, this breaker is located in the rear interior of the PDU.

Rear View: interior (60kW PDU with transformer)



- ❶ Power from the main power source connects to the PDU at the **main input switch**. The switch requires 3-wire input conductors.
- ❷ The PDU has several current and voltage monitoring boards that report to a central board assembly located in the **PDU monitoring unit**. The PDU monitoring unit has one 10BaseT (Cat-5) connection to the Information Controller hub (or switch), four output relay connections, four input contact connections, and one EPO input connection.
- ❸ The delta-wye input transformers available for the PDU are:
 - an isolation transformer (208V input: 208V output)
 - a step-down isolation transformer (480V input: 208V output)

Rear View: interior (60kW PDU without transformer)



- ❶ Power from the main power source connects to the PDU at the **main output breaker** (main disconnect). The switch requires 4-wire input conductors.
- ❷ The PDU has several current and voltage monitoring boards that report to a central board assembly located in the **PDU monitoring unit**. The PDU monitoring unit has one 10BaseT (Cat-5) connection to the Information Controller hub (or switch), four output relay connections, four input contact connections, and one EPO input connection.

Overview

APC's air systems provide means for supporting IT infrastructure regardless of the largeness or density of the heat load. APC designed these systems to cool the room in addition to delivering cool air to the areas in most need of it. This section contains a thorough description of the following products:

Distribution and ventilation components

Rack Air Distribution Unit (ADU). APC's Rack Air Distribution Unit is a unique 2U rack-mount fan unit. It works with an existing precision air-conditioning system to deliver cool air to the equipment contained in a rack enclosure. The Rack Air Distribution Unit connects into the raised floor and pulls supply air directly into the enclosure. This setup prevents the conditioned air from mixing with warmer room air before it reaches the equipment. With or without a raised floor, the Rack Air Distribution Unit helps to eliminate temperature differences between the top and bottom of the enclosure. It also prevents hot exhaust air from recirculating to the inlet of the enclosure. The Rack Air Distribution Unit is recommended for rack enclosures with loads greater than 1.5kW and can provide airflow for loads up to 3.5 kW. Additionally, it is recommended for raised floor environments where under-floor air distribution is inadequate for adjacent IT loads.

Rack Air Removal Unit (ARU). APC's Rack Air Removal Unit provides an innovative, value-oriented, redundant solution for cooling high-density rack enclosures in data centers, network rooms, and wiring closets. Through automatic fan speed adjustment, based on temperature or power consumption, a desired temperature can be set and fans will self-adjust for optimal energy efficiency. A ducted exhaust system directs hot air out of the room, and provides proper air distribution which minimizes temperature gradients in the rack. This feature ensures that equipment mounted at the top of the rack remains as cool as equipment mounted at the bottom of the rack. The Rack Air Removal Unit can cool up to a 5.0 kW rack with fan redundancy and a 7.5 kW rack at full capacity, as well as provide power redundancy through dual corded input. This space-saving product mounts to the back of the enclosure and does not require any U space.

Cooling components

Portable Air Cooling (PA). The APC PA 4000 is a 4kW portable air conditioner for small closets and IT rooms. Two air ducts provide an isolated air circuit for the condenser to ensure all the cooling capacity is being utilized for the equipment heat load. The PA 4000 provides 4kW of cooling at 95°, 50% relative humidity, and 2.5 kW of cooling at 72°, 50% relative humidity.

Floor Mount Cooling (FM). The APC FM is a culmination of leading edge precision air technologies. This high-efficiency system consists of modular construction, variable frequency drives, dedicated de-humidification, tandem scroll compressors, and full frontal service access. A scalable design enables customers to meet the changing needs of their environments.

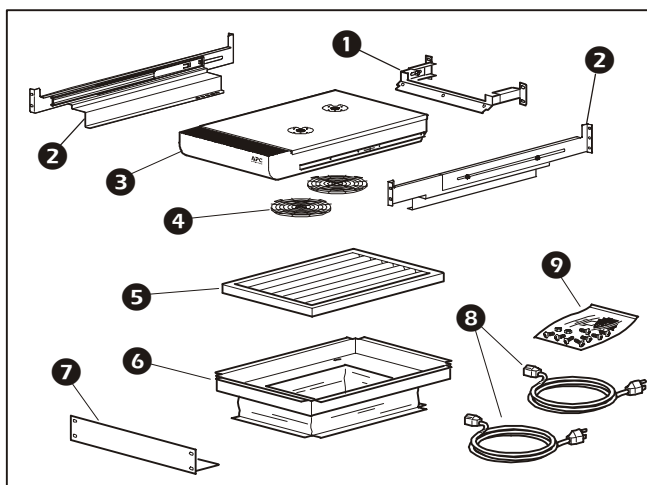
NetworkAIR IR. This modular, Floor Mount computer room air-conditioning system offers, efficient, effective, and economical cooling for a variety of spaces.

NetworkAIR ADU

General description

The Rack Air Distribution Unit is a unique 2U rack-mounted fan unit. It works with an existing precision air-conditioning system to deliver cool air to the equipment contained in a rack enclosure. It connects into the raised floor and pulls supply air directly into the enclosure. This setup prevents the conditioned air from mixing with warmer room air before it reaches the equipment.

The dual fans of the unit work to eliminate dangerous hot spots by boosting the airflow to the IT equipment within the enclosure. The unit can also improve air delivery in poor static pressure areas. This feature allows the unit to solve many of the heat issues facing today's data center manager.



- ❶ Stop bracket
- ❷ Left-and right-side guide and rail assembly
- ❸ Fan assembly
- ❹ Air intake fan guards
- ❺ Replaceable air filter (ACF001RF)
- ❻ Duct and bellows assembly
- ❼ Blanking plate
- ❽ Power cords (NEMA 5-15)
- ❾ Accessories and fasteners:
 - Caged nut
 - Caged nut installation tool
 - Screw—M6 × 12mm Phillips pan-head
 - Alcohol wipes
 - Plastic washers

Cabinet. Most EIA 19-inch standard IT enclosures will hold the Rack Air Distribution Unit. The inside floor of the enclosure, often referred to as the gland plate, must be removed prior to placing the ADU inside.

Air filter. The filtration of conditioned air proves extremely vital in maintaining the clean, particle-free environment that electrical equipment requires. The system uses 30% (100 microns) (ASHRAE 52.1-92), 2-inch deep filters with full depth filter pleats. Use of these filters give an added level of protection beyond that of the CRAC or Comfort Cool System.

Features and benefits.

Dual fans	Provide even airflow across the inlet of rack-mount IT equipment.
Compact 2U design	Minimizes the amount of space taken from IT equipment.
A–B redundant power feeds	Allow for the use of redundancy power inputs.
Additional filtration	Allows for the cold air being delivered to the IT equipment to be filtered nearer to that product’s inlet.

NetworkAIR ARU

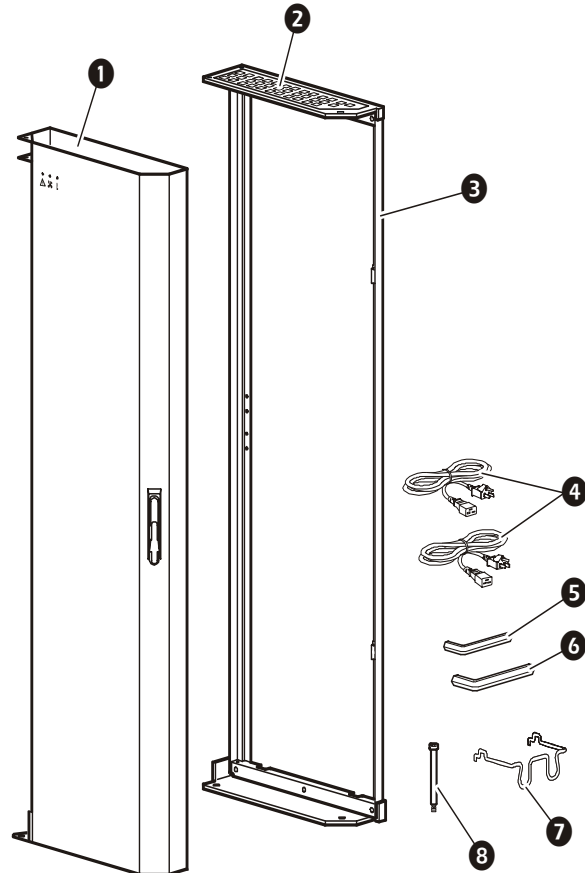
General description

The Rack Air Removal Unit is a back door replacement for the NetShelter VX enclosure. This unit works by moving the heated air that the IT equipment rejects into the rear of the enclosure. Three fans then remove the air from the rear of the enclosure by three fans and distribute it into the dropped ceiling plenum through two pieces of ducting.

- ❶ Fan frame
- ❷ Exhaust vent
- ❸ Cord retainer
- ❹ M5 Allen wrench
- ❺ 5/32" Allen wrench
- ❻ Hinge screw
- ❼ Power cords (NEMA 5-15)
- ❽ Fan assembly

The three fans are independently controlled by a customer settable kW load or exhaust temperature. These options both assume that 160 cfm is required in order cool 1kW of heat with a 20 degree F Delta T. (This is defined by $Q=1.085 \times \text{CFM} \times \text{Delta T.}$)

The removal of the heat from the IT space ensures that thermal stratification of the air heated by the IT load will not occur. As a secondary benefit, the increased return temperature to the cooling system increases the unit's efficiency.



Cabinet. The Rack Air Removal Unit fits on NetShelter VX models that are 600mm wide.

Features and benefits.

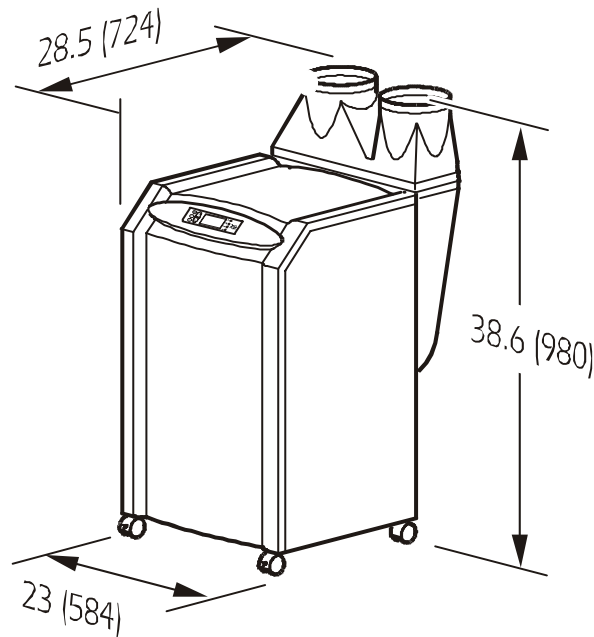
Three independent fans	Allow for use of the unit for higher loads or in a redundant capacity.
Local LED's	Provide local notification of fan, control board, and temperature alarms.
A-B redundant power feeds	Allow redundancy power inputs to be used.
Ducting kit	Removes heat from IT space virtually eliminating thermal gradient and increases the return temperature to the cooling system, increasing that unit's efficiency.
kW/ Temperature controlled fans	Move air required in order to cool load in the enclosure. In turn, the fans intelligently control the amount of airflow at the IT enclosure level.

NetworkAIR Precision Air Conditioning

General description

Inconsistent and high temperatures can lower the expected life of, and permanently damage electronic equipment. IT refreshes and equipment relocation result in unpredictable and ever-changing environments. The NetworkAIR PA provides portable cooling for sensitive electronic equipment, to meet the environmental demands of small rooms and data closets.

This self-contained solution does not require an external condenser, refrigerant piping, or building water source for operation. Heat is rejected to a drop ceiling or adjacent area through a flexible duct kit. The NetworkAIR PA can be installed quickly and inexpensively, without the need for building modifications.



* All dimensions are in inches (millimeters)

Features and benefits.

Automatic restart	Returns the unit to its last operating status in the event of a power failure, in order to protect the compressor and the environment.
Localized Cooling	Reduces network downtime by bringing cool air directly to servers, routers, hubs, and other heat sensitive electronic equipment.
Ease of use	Provides powerful localized cooling without costly modifications to the user's fixed air conditioning system.
Portable	Provides flexibility to move the unit wherever cooling is required.
On/Off Scheduling	Allows the user to determine when the unit operates, saving energy costs.
Multiple configurations	Ensures a comfortable environment with three operation mode selections: cool, dehumidify, and fan.

NetworkAIR FM

General description

The modular Floor Mount precision air-conditioning system offers efficient, effective, and economical cooling for a variety of spaces. Precision environmental requirements now reach far beyond the confines of the traditional data centers or computer rooms and encompass a larger suite of applications, referred to as technology rooms. Critical environment applications include:

- Computer rooms
- Telecommunication facilities
- Clean rooms
- Power equipment
- Medical equipment rooms
- Archives
- LAN/WAN environments



A worldwide network of APC representatives is fully qualified to provide engineering, sales, installation and service for FM products. APC warrants all parts for 12 months from shipment. Extended warranties are available.

Capacity. FM is available from 35kW (10 ton) to 150 kW (45 ton). The system configurations consist of one, two, or three modules. Multiple module configurations consist of one main module and up to two expansion modules.

Room air distribution. Downflow systems discharge air into the raised floor plenum. These systems suit areas with raised floors greater than 12" (305 mm) high. The top of the system draws in return air. Downflow systems also include a static regain plenum for each blower, which evens out velocity profile and increases static performance while reducing noise level. It also allows access to some components while the system is operating without interrupting airflow.

Upflow systems discharge air into either a plenum or ductwork. These systems suit areas without raised floors, as well as areas with raised floors. The standard design draws air in through the front or optionally from the rear of the system. The FM delivers high volumes of airflow (620 CMF/ton or 160 CMF/kW) to eliminate hot spots in densely populated environments.

Configurations.

- Glycol Cooled
- Glycol Cooled with Economizer
- Glycol Cooled with MultiCool
- Water Cooled
- Water Cooled with Multicool
- Air Cooled
- Air Cooled with MultiCool

Standard features.

- Tandem scroll compressors
- Direct drive motor/blower assembly
- Frequency controlled motor
- Mechanical latch baying system
- Remote input/output interface module
- Main power circuit breaker
- Cleanable steam canister humidifier
- Double skin panels
- SCR controlled electric reheat
- Microprocessor controller
- 30% ASHRAE 52.1 filters
- 2 way fluid regulating valves (Glycol or Water models)
- 3 way fluid regulation valves (Economizer & MultiCool)
- 94 VO thermal (anti-fungal) condensate pan
- Static regain plenum (downflow only)
- Bearing life, L₁₀ - 500,000 hrs
- Front service access only
- High lift, dual float condensate pump

Optional features.

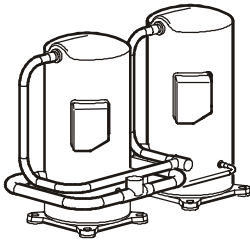
- Plenums (with or without grilles)
- Floorstand (with optional turning vane)
- Firestat
- Smoke detector
- Spot cable or water detectors
- Water flow switch
- Additional remote input/output interface modules
- Casters
- Environmental Monitoring Unit

Scalable solution for critical environments

Temperature and humidity design conditions. The smooth operation of a technology room depends greatly on maintenance of temperature and humidity design conditions. Design conditions should be 72 to 75°F (22.2 to 24.8°C) and 45–50% relative humidity (RH). Just as the wrong maintained conditions can prove damaging, rapid temperature swings can also have a negative effect on hardware operation. This effect is one of the reasons that hardware remains powered up, even when not processing data. Precision air conditioning maintains temperature at $\pm 1^\circ\text{F}$ and humidity at $\pm 3\text{--}5\%$ relative humidity, 24 hours a day, 8760 hours a year. The maintenance of these tolerances requires vapor barriers and sealed rooms.

In contrast, comfort systems are designed to maintain $\pm 5^\circ\text{F}$ from the temperature setpoint. There is usually no dedicated humidity control and the simple controllers cannot maintain the set point tolerance required for temperature. This lack of control allows potentially harmful temperature and humidity swings to occur, which proves unacceptable for sensitive electronic equipment.

Air quality. Precision air conditioners provide a high CFM, around 600 CFM/ton (160 CFM/kW). This high CFM moves more air through the space and improves air distribution which reduces the chance of localized hot spots. It also allows more air to move through the filters, ensuring a cleaner environment. This feature requires a moderate- to high-efficiency filter bank to minimize airborne particles.



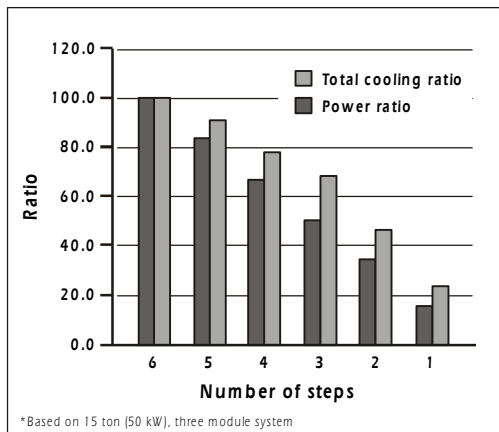
Capacity control. The FM modules utilize tandem scroll compressors for two-step modulation. One or both of the compressors can run depending on the load of the system. This feature allows for up to six steps of “true” unloading in a three-module system without the power factor and friction penalty of an unloaded semi-hermetic compressor.

Efficiency and reliability. The high EER (up to 20.0) and few moving parts of the scroll compressors provide efficient and reliable operation.

Scroll technology has unparalleled ability to withstand liquid refrigerant ‘slugging’ which is a major cause of compressor failure. It is designed as a single assembly with one suction line and one discharge line per set.

Energy efficiency. The FM’s modular design and ability to connect up to three modules, working as a single system, provides up to six steps of capacity control. This allows for a precise response to changing room loads using multiple stages of capacity. The 35–50 kW (10–15 ton) modules control capacity using a tandem scroll compressor that can be unloaded in two stages. As seen in the graph, energy saving are directly impacted by the steps of unloading. At step 3, a 68% cooling capacity is achieved while consuming only 50% of the compressor power.

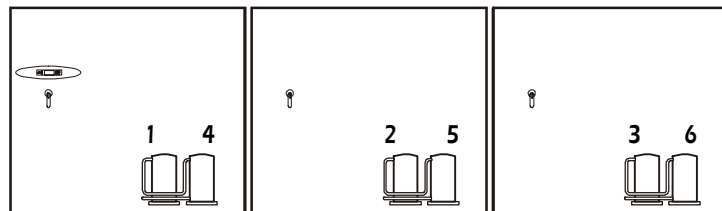
Initial capacity control steps maximize evaporator surface to compressor displacement providing high efficiencies. This is accomplished by operating one step in each module as capacity increases, before operation of a second step per module is utilized.



$$\text{Total Cooling Ratio} = \frac{\text{Unloaded cooling capacity}}{\text{Maximum system capacity}}$$

$$\text{Power Ratio} = \frac{\text{Unloaded electrical consumption}}{\text{Full cooling mode electrical consumption}}$$

Multiple module capacity staging uses one compressor per module before any module starts a second compressor in response to load demand. Load sequence can be rotated by hour intervals, time of day, or day of week. Proper rotation of the load sequence ensures equal runtime on each compressor and tandem set. The first step in each module will rotate, avoiding over utilization of one compressor in the pair.



Problems caused by the wrong environment

A poorly maintained technology room environment will have a negative impact on computer room operations. The results can range from data corruption to complete system shutdowns and failures.

High and low temperature. A high or low temperature or rapid temperature swings can corrupt data processing and shut down an entire system. Temperature variations can also alter the electrical and physical characteristics of electronic chips and other board components causing faulty operation or failure. These problems may be transient or may last for days. Transient problems can be very difficult to diagnose and repair.

High humidity. High humidity can result in tape and surface deterioration, head crashes, condensation, corrosion, paper handling problems, and (gold and silver) migration leading to component and board failure.

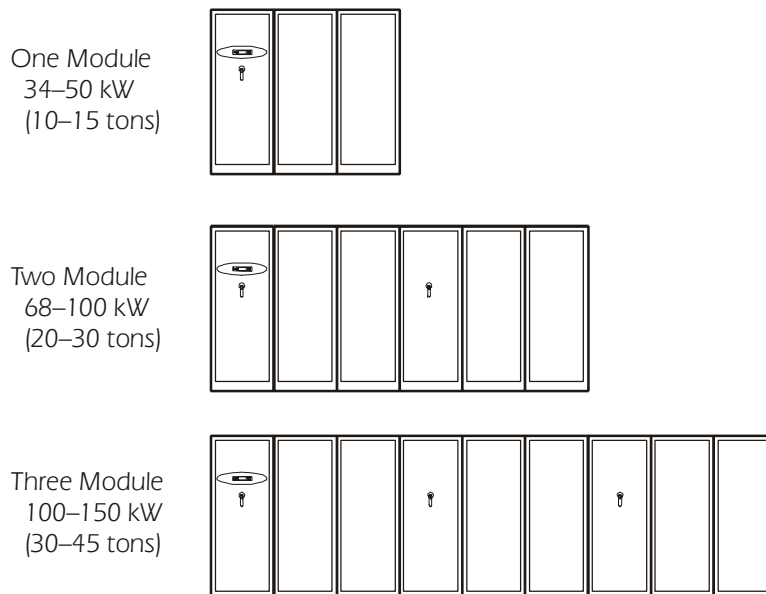
Low humidity. Low humidity greatly increases the possibility of static electric discharges. Such static discharges can corrupt data and damage hardware.

APC NetworkAIR FM—the right solution

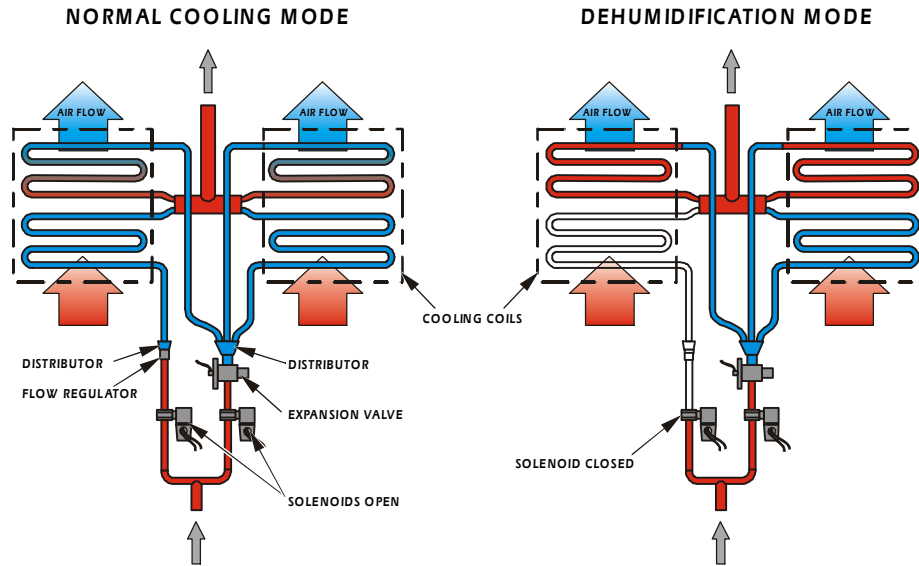
The APC NetworkAIR FM provides the maximum amount of precision cooling in a compact footprint. Highly scalable, the system is capable of growing with cooling needs as they increase. Each system comes standard with concise capacity controls for high efficiency operation.

Compact footprint. The FM delivers a high capacity of cooling in a small “overall” footprint. Since the system requires only front service access, modules can be placed or latched side by side and valuable floor space is not wasted.

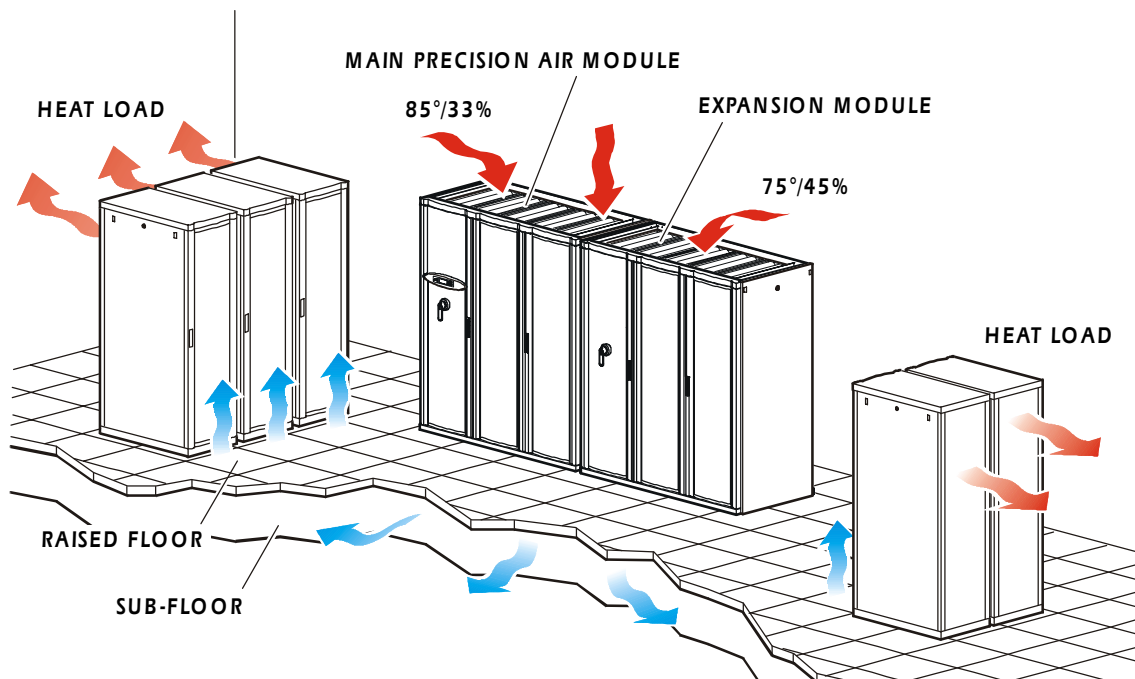
Scalable and modular. Cooling requirements often change with business requirements. The FM provides the ability to scale cooling needs with changing heat loads. Available in three capacity choices, each module can be mated with one or two more modules to make a system of up to three modules. When controls are linked, up to four systems can communicate to avoid demand fighting. Without proper communications, cooling and reheating, humidification, and dehumidification can occur on different systems at the same time, lowering efficiencies. The scalability of the FM allows system configurations from 35kW–150kW (10–45 tons).



Dedicated dehumidification cycle. A dedicated dehumidification cycle allows the system to increase latent capacity without overcooling. This feature lowers the requirement for reheating and humidification. Isolating a portion of the coil from the refrigerant flow and lowering the evaporator temperature when dehumidification is required achieves this benefit.



Temperature and humidity averaging. In multiple module systems, the main module receives communication about the return air temperature and humidity sensed by each other module. The main module then averages the reported values and communicates the averages to each module in the system. This communication allows connected modules to operate as one complete system. Each module within the system reports runtime to the controller, which assigns load to the module and cools according to the one with the fewest hours of operation to ensure even cycling.

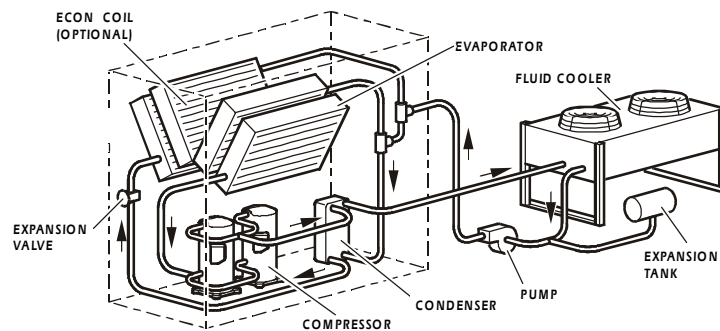
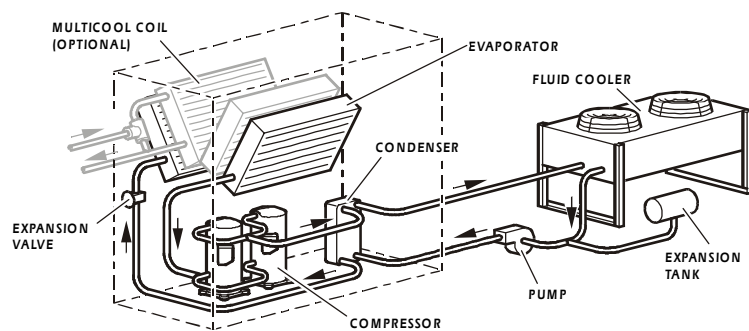


Glycol-cooled systems

Glycol-cooled systems are completely charged and factory tested in a sealed system for reliability. In mid-to-low ambient climates, use of an economizer coil may increase efficiency and extend compressor life. Economizer operation greatly reduces the energy consumption of the system. Water regulating valves control head pressure.

Features and benefits.

- System is used with a fluid cooler.
- Factory tested as a sealed system.
- Eliminates the need for field refrigerant piping.
- No requirement for water treatment.
- Economizer option for high efficiency.
- Low maintenance.

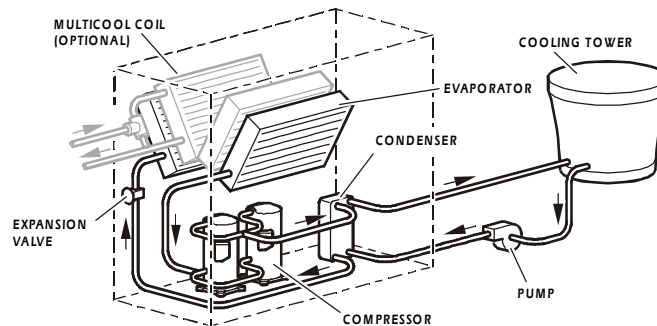


Water-cooled systems

Water-cooled systems are completely charged and factory tested as a sealed system for reliability. Cooling towers are used as a source of heat rejection and can be used to serve multiple indoor units. Towers utilizing outdoor air require water treatment.

Features and benefits.

- System used with a cooling tower or other source of water.
- Factory sealed and tested system.
- Eliminates the need for field refrigerant piping.

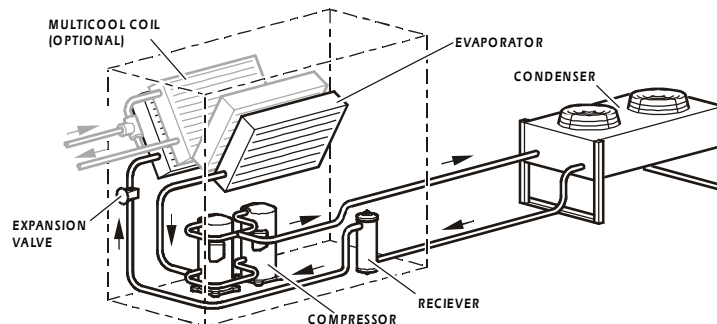


Air-cooled systems

Air-cooled systems are not pre-charged from the factory, and require field refrigerant piping. Each installation requires an engineered piping solution. APC strongly recommends installation by a highly qualified refrigeration contractor, to avoid improper elevation and long piping runs.

Features and benefits.

- System used with a remote air cooled condenser.
- Requires field refrigerant piping.
- Low maintenance.

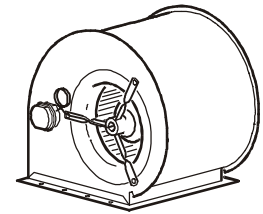


Standard features of NetworkAIR FM systems

Cabinet. The frame consists of bolt together 12 gauge formed steel for maximum strength. The cabinet is serviceable from the front. All exterior panels and corner posts on the frame are powder coated for durability and an attractive finish. The front exterior panel crown is 16 gauge. All other panels are double skin, 22 gauge exterior, 22 gauge interior with 1 ½ lb. (0.68 kg) per cubic foot insulation for quiet operation. Insulation is both CFC-free and recyclable. Double skin panels isolate insulation from the air stream and further reduce sound levels. Left and right front panels are hinged and removable for easy access. The middle panel is also removable.

Electric reheat. Electric reheat elements are low watt density, wired for 3-phase, loaded equally on all three phases, SCR controlled, and electrically and thermally protected by both automatic and manual reset thermal cut outs. Reheat coils consist of stainless steel and fin tubular construction.

Fan section. Each cabinet includes a precision balanced centrifugal blower assembly that is less than 1 mil displacement on all axis. This setup provides quiet, reliable operation. Mass and frequency determine the placement of the blowers to eliminate vibration and noise. Each blower in the system uses a direct drive (L₁₀-500,000 hour bearing life) motor and frequency



controller to enhance user functionality. The frequency controller communicates with the microprocessor controller allowing user adjustable rpm settings through the main module display. This feature makes field air balancing quick and easy. Modules come equipped with two blower assemblies.

Humidifier. The humidifier utilizes a pure steam generator specifically designed for precision environmental. The pure steam eliminates contaminating mineral deposits, potentially harmful bacteria, white dust, and excessive humidity. The humidifier requires little scheduled maintenance. Automatic flushing combined with a communication link to the microprocessor controller, signals when the canister requires changing. The humidifier is proportionally controlled to meet the humidification demands of the particular conditioned space. The communication link to the main controller provides diagnostic capability for the humidifier. Humidifier canisters can either be cleaned or replaced. The cleanable canister has a maximum life up to three times longer than disposable canisters.

Condenser. Water- and Glycol-cooled systems use a brazed plate heat condenser, equipped with clean out plugs. Rotalock valves make removal of the brazed plate condenser easy for maintenance or replacement.

Refrigeration system and compressor. The refrigeration system operates under a master controller for greater efficiency and accuracy. It monitors and electronically controls suction and discharge pressures. The scroll compressors operate year-round with a 15-year life expectancy. The microprocessor controller provides real-time suction and discharge pressure readings reported by transducers installed on the refrigeration system.

Electrical panel. The electrical panel contains the contactors, starters, overload protection devices, and input power disconnects. Its removable nature allows easy access to blower motor assemblies.

Discrete input/output. The main module provides field connections through a system programmable input/output module. Up to three additional input/output interfaces may be added to the main module. Each interface module is programmable with inputs that can be mapped to any system alarm or annunciated to outputs as a system alarm or custom (12 character) alarm.

Evaporator coil/condensate pan. The evaporator coil is ½” rifled, copper tube, with sine wave aluminum fins and is configured as a V coil. The condensate pan is 94V0 thermal formed, anti-fungal, non-ferrous material for higher indoor air quality.

Condensate pump. The factory-installed and wired condensate pump has the ability to pump 60 gal/hr (0.06 L/s) at 60 ft. (4.6m) head.

Air filter. The filtration of conditioned air proves extremely vital in maintaining the clean, particle-free environment required by electrical equipment. The system uses 30% efficient (100 microns) (ASHRAE 52.1-92), 4-inch (102 mm) deep filters, with full depth filter pleats. Deeper filters produce a lower pressure drop, requiring less energy during normal operation. The filters are replaceable through the front of the upflow unit, and through the top of the downflow unit.

Optional features of NetworkAIR FM systems

Hot water reheat. A modulating control valve controls hot water reheat. A factory-installed copper tube and an aluminum fin hot water coil supply the system. Multicool models do not have this option available.

Steam reheat. An on/off solenoid valve maintains the dry bulb temperature during the dehumidification and reheat mode of the system. Completely factory pre-piped, the system includes a copper tube, aluminum fin reheat coil, float, and thermostatic steam trap. MultiCool models do not have this option.

Hot gas reheat. Hot gas reheat is optional on water- and glycol-cooled systems. The copper tube, aluminum fin hot gas reheat coil maintains the leaving dry bulb temperature when the system is in dehumidification mode. The processor controls the coil through a factory piped and wired three-way heat reclaim regulator and check valve.

Firestat. The air stream of the unit can have a firestat installed at the factory. If the return air temperature reaches 125°F (52°C) it activates an audible and visual alarm on the microprocessor and the unit immediately shuts down.

Smoke detector. The factory-installed smoke detector senses smoke in the return air stream. Upon detection of smoke, it activates an audible and visual alarm on the microprocessor and the unit immediately shuts down.

Spot water detector. The solid-state spot water detector activates an audible alarm on the controller upon the detection of moisture. The unit allows for the installation of a maximum of four spot or cable detectors.

Cable leak detector. A leak detection sensing cable is placed on the floor or subfloor around all possible leak sources. If water or other conductive liquids contact the cable anywhere along its length, the master controller visually and audibly announces a leak. The 35 ft. cable can cascade to make custom lengths up to 1000 ft.

Floorstand. The floorstand raises the unit above the subfloor to match the height of the raised floor. Heights are available (from 12" (305mm) to 24" (610mm) in 3" (76mm) increments and are adjustable \pm 1.5" (38 mm). Threaded pedestals provide the adjustment. Vibration absorbing pads are included. The floorstand, pedestal, and pads ship loose.

Air deflector. A field-installed air deflector runs the length of the unit and attaches to the floorstand for changing air direction from vertical to horizontal.

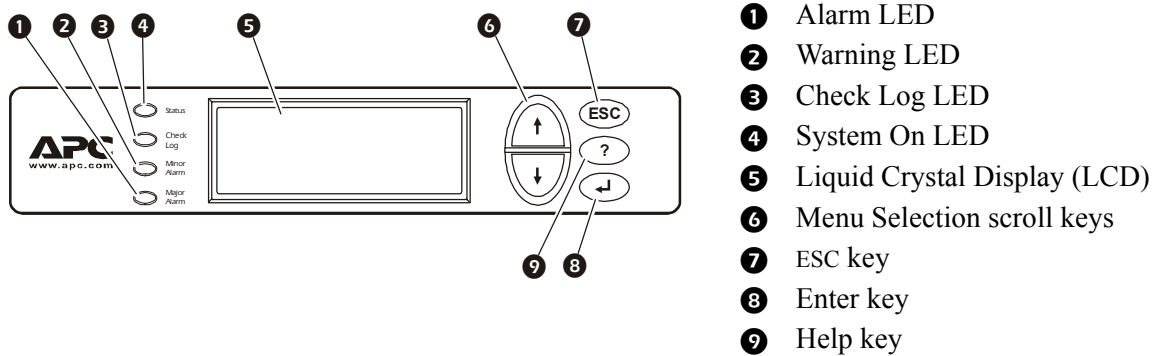
Duct flange. A 1" (25 mm) duct flange is shipped loose from the factory for field installation to provide a convenient connection to external ductwork for either supply or return as needed.

High efficiency filter. A pleated final filter with an efficiency of 85%, 4" (102mm) deep, allows the removal of a greater percentage of airborne particulate contaminants. Prefilters come standard with high efficiency filters. The prefilters capture large airborne particulate contaminants, thereby extending the life of the high-efficiency filter. Prefilters are 2" (50mm) deep and easily disposed.

MultiCool. The MultiCool systems contain both a chilled water coil and direct expansion coil within the same cabinet. Either cooling coil can act as a backup to the other. These systems provide cooling using either building chilled water or the direct expansion system.

Plenum. Air discharge plenums are available with upflow configurations. Heights are offered in 20" (508mm) and 24" (610mm) with front, 2-sided, or 3-sided grilles.

Microprocessor controller



Microprocessor controller. The main module of each system contains a microprocessor controller. The controller provides precision control for the demanding requirements of:

- Data centers
- Control rooms
- Clean rooms
- Switch rooms
- UPS rooms

The easy-to-use display allows the operator to select options from the device's menu-driven interface to control and monitor the connected air conditioning system.

Open architecture. The FM protocol allows for integration with all building management systems. Communication interface on the system can be either Serial RS232 or MODBUS RS485.

Control type. The controller utilizes proportional and integral control, a time proven industry standard for controlling temperature and humidity. This allows for control tuning of the system variables.

Logging. The microprocessor displays the 30 most recent alarms. Each alarm log contains a time and date stamp as well as detailing the operating conditions at the time of occurrence. The controller also displays run time, in hours, for major components such as compressors, heaters, humidifiers, and blower motors.

Functions.

- Status Report
- System Control
- Event Logging
- Redundant Unit Group
- Static Pressure Adjustment

Control. The backlit, four-line × twenty-character display is password configurable.

- Temperature Setpoint 65–85° F (18–29° C)
- Humidity Setpoint 30–60% R.H.
- Blower Motor Setpoint 40–60Hz. (Factory preset for model size and options.)
- High Temperature Alarm 35–90° F (2–32° C)
- Low Temperature Alarm 35–90° F (2–32° C)
- High Humidity Alarm 15–85% RH
- Low Humidity Alarm 15–85% RH

Redundant unit group. Multiple systems can be linked together to prevent demand fighting and provide redundant operation. When any system within the group is cooling, all other systems will be inhibited from heating mode. This relationship applies to humidification and dehumidification as well. When configured for run or standby applications, RUG provides for automatic changeover in the event of an alarm condition.

Alarms.

- | | |
|---------------------------|-----------------------------------------|
| • High return temperature | • Water regulator actuator failure |
| • Low return temperature | • Economizer/Multicool Actuator failure |
| • High return humidity | • High head pressure |
| • Low return Humidity | • Low suction pressure |
| • Clogged filter | • Humidifier failure |
| • Return sensor failure | • Replace humidifier canister |
| • High supply temperature | • Frequency controller failure |
| • Low supply temperature | • Air block interlock open |
| • High supply humidity | • Water detected |
| • Low supply humidity | • Fire (thermal sensor trip) |
| • Loss or low airflow | • Smoke detected |
| • Loss of water flow | • Condensate pump failure |
| • Supply sensor failure | • Module failure |

Features and benefits.

Dedicated dehumidification cycle	Increases latent capacity when required and lowers requirement for electric reheat.
Frequency controlled motors	Provide easy air balancing and have a soft start on fan assembly.
Motorized water regulating valve	Provides tighter control of head pressure and meets the 400 PSI standard.
Intelligent steam humidifier	Provides capacity control from 20–100%, has cleanable canister option and uses pure steam for higher air quality.
Tandem scroll compressors	Provide efficient and reliable operation and staged capacity control.
Front service access	Allows for side by side installation of modules and provides easy access for preventative maintenance.
Direct drive blower motors	Consist of an integrated blower and motor for easy replacement and eliminates common single points of failure such as belts, pulleys, and a single drive shaft.

NetworkAIR IR

General description

This modular floor mount computer room air-conditioning system offers efficient, effective, and economical cooling for a variety of spaces.

Precision environmental requirements now reach far beyond the confines of the traditional data center or computer room to encompass a larger suite of applications, referred to as technology rooms.

Critical environment applications include:

- Computer rooms
- Telecommunication facilities
- Clean rooms
- Power equipment
- Medical equipment rooms
- Archives
- LAN/WAN environments

In-row systems are placed in line with rack enclosures. At least one system is used per hot aisle. Air is drawn in through the rear of the system, cooled, and discharged into the cold aisle using a top plenum. Optional diffusers can be installed on the left and right side of the plenum, over adjacent racks, to reduce noise levels and promote even air distribution.

The NetworkAIR IR delivers high volumes of airflow (550cfm per ton/160cfm/kW) to eliminate hot spots in densely populated environments.

Capacity

The NetworkAIR IR chilled water configuration is available in a 40kW (12 ton) capacity.

Configuration

The NetworkAIR IR is offered in a chilled water configuration.

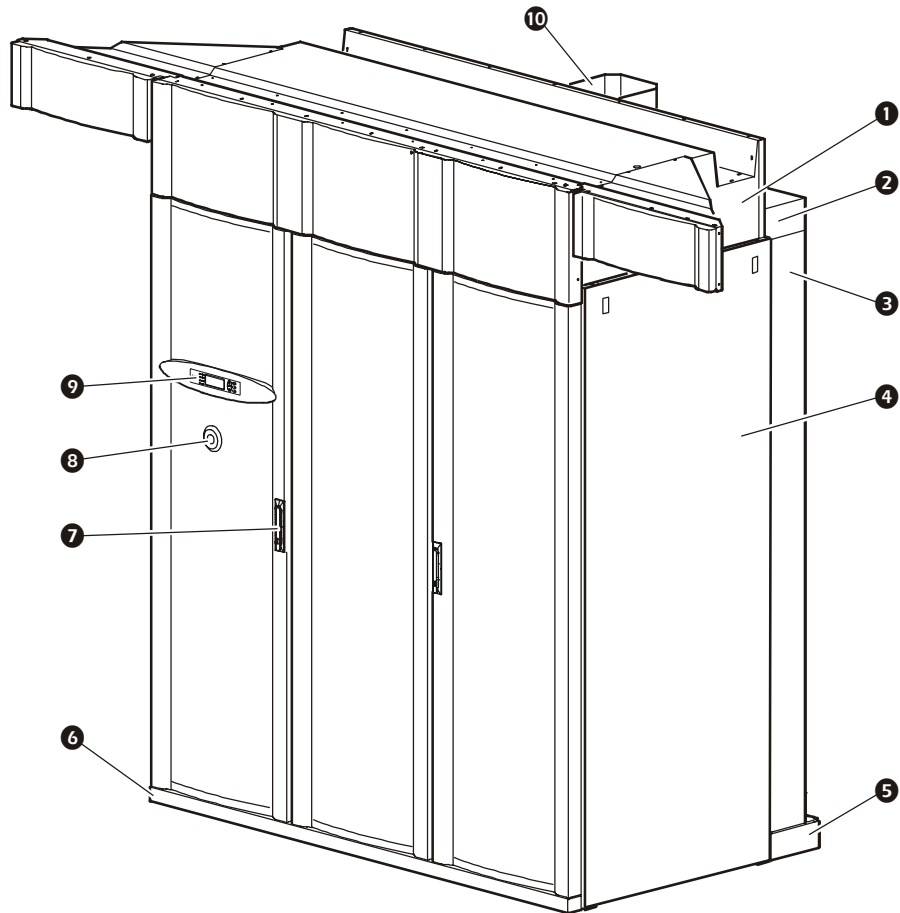
Standard features

- Direct drive motor/blower assembly
- Frequency controlled motor
- Programmable input/output interface
- Steam generating humidifier
- Main power circuit breakers
- Double skin panels
- Microprocessor controller
- 30% ASHRAE 52.1 filters
- Cross circuited cooling coil
- 90 VO thermal (anti-fungal) condensate pan
- Predictive failure warnings
- SCR controlled electric reheat
- Smoke detector
- High lift, dual float condensate pump
- Twist-lock critical power feed whip
- Selectable up or down piping kit
- Electrical panel
- Rear door kit
- Discharge plenum
- 2-way/3-way modulating valve

Optional features

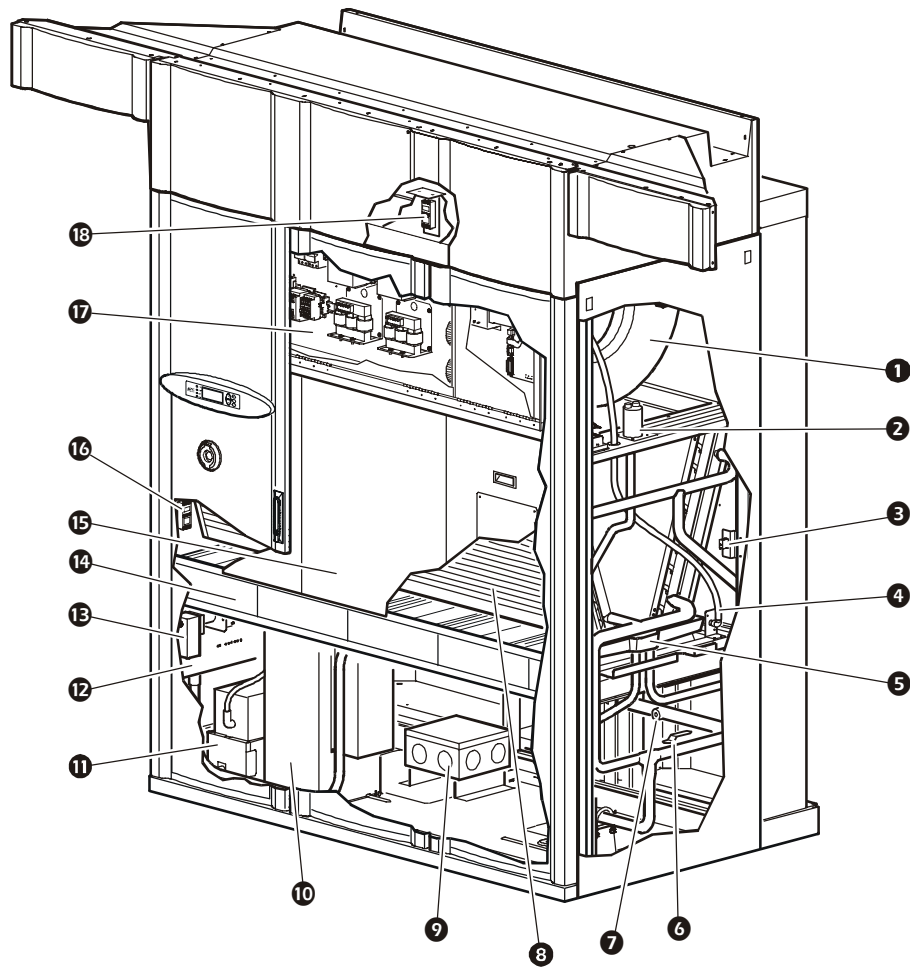
- Flowswitch
- Spot water detectors
- Cable leak detector
- Air discharge diffusers
- Circuit setter read-out
- Bay kit IR/ NetShelter VX
- Side panel kit
- Dual critical/non-critical power inputs

External components



- | | | | |
|---|-----------------------|---|-----------------------|
| ❶ | Plenum (optional) | ❸ | Rear panels |
| ❷ | Rear panel bracket | ❹ | Side panel (optional) |
| ❸ | Rear panels | ❺ | Rear toe kick |
| ❹ | Side panel (optional) | ❻ | Front toe kick |
| ❺ | Rear toe kick | ❼ | Front door handle |
| | | ❽ | Disconnect handle |
| | | ❾ | Display interface |
| | | ❿ | Plumbing chase |

Internal components



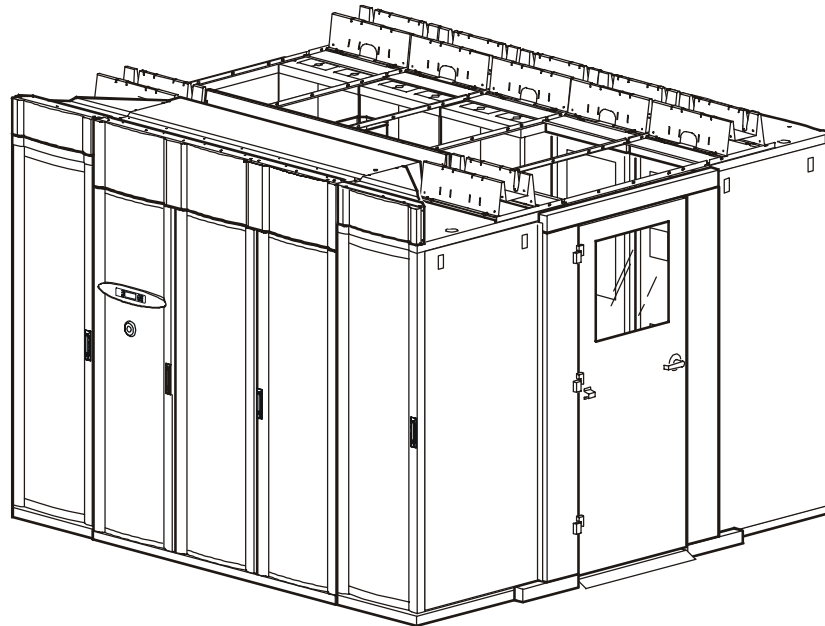
- | | | | |
|---|---------------------------------|---|------------------------------------------|
| ① | Motor and blower assembly | ⑩ | Humidifier |
| ② | Humidifier distributor nozzle | ⑪ | Condensate pump |
| ③ | Fan interlock (4) | ⑫ | User interface box |
| ④ | Smoke detector sample tube | ⑬ | Firestat |
| ⑤ | Condensate pan | ⑭ | Air filters |
| ⑥ | 3-way to 2-way conversion value | ⑮ | Air block and access panels |
| ⑦ | Circuit setter | ⑯ | Temperature/humidity sensor (return air) |
| ⑧ | Cooling Coil | ⑰ | Electrical panel |
| ⑨ | Power distribution box | ⑱ | Temperature/humidity sensor (supply air) |

NetworkAIR Hot Aisle Containment System

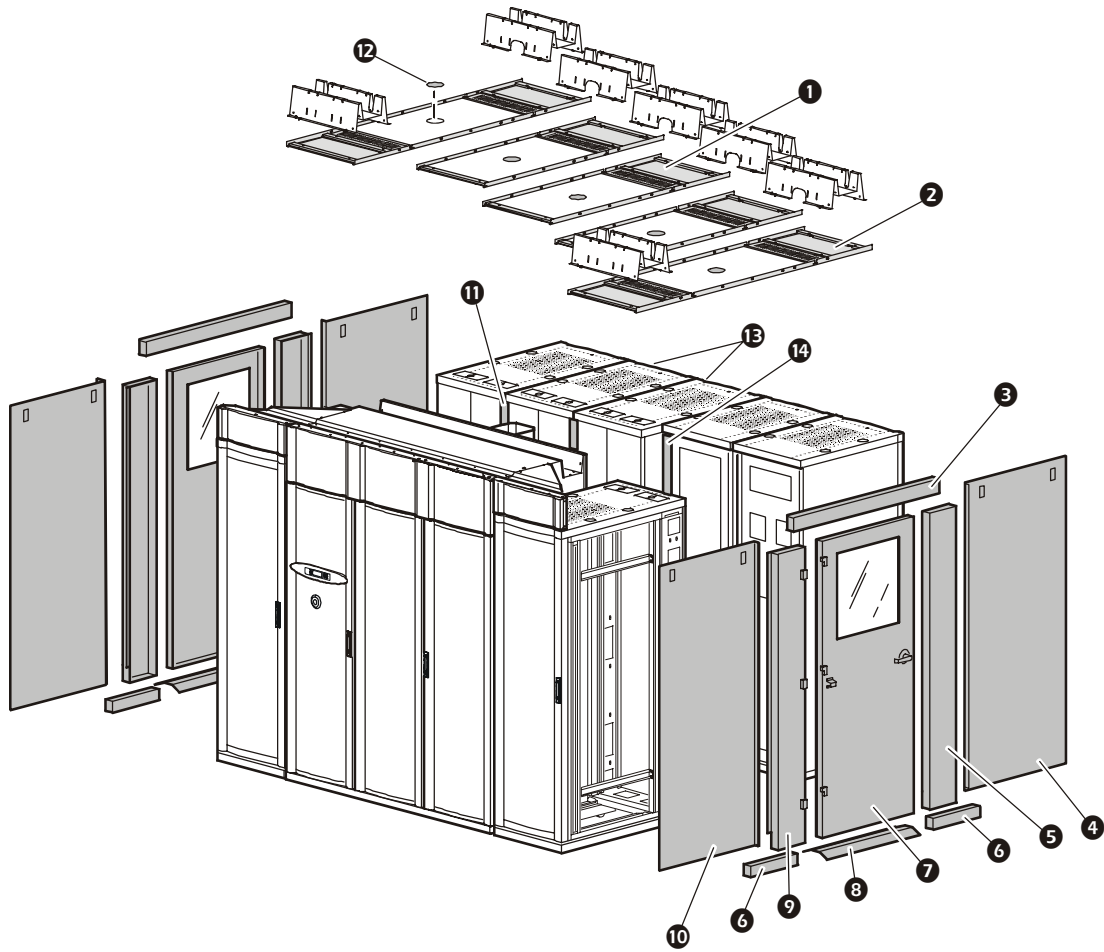
General description

The Hot Aisle Containment System uses a series of panels, doors, and air blocks to enclose a hot aisle which contains equipment exhaust air. The enclosed hot air is cooled and sent to the outside of the Hot Aisle Containment System where it is made available to IT equipment cool air intakes.

By preventing mixing of supply and exhaust air, this self-contained configuration is capable of supporting extremely high power density loads, and can be deployed in multiple environments without affecting the surrounding area.



Main Components



- | | | | |
|---|--------------------------|----|------------------------------------|
| 1 | Top panel assembly—short | 8 | Door Threshold |
| 2 | Top panel assembly—long | 9 | Door frame upright —left |
| 3 | Door header | 10 | Side panel —left |
| 4 | Side panel—right | 11 | 1070 mm to 1070 mm joining bracket |
| 5 | Door frame upright—right | 12 | Cap plug |
| 6 | Plinth block | 13 | 21 U side panels (not shown) |
| 7 | Door | 14 | 900 mm to 1070 mm joining trim |

Service

Overview

Product-based services

- Extended Warranties
- Start-Up
- Preventive Maintenance
- On-Site Service
- Battery Refresh

Professional services

- Project Management
- Installation Planning
- Needs Assessment
- Network Integration
- Load Bank Testing
- Thermography Services
- One-Day On-Site Basic Operational Training
- Remote Monitoring

Product-Based Services

Extended warranties

Extended warranties for InfraStruXure solutions are available for point products only. For additional information, see an APC sales representative

Assembly services

APC's Assembly services provide customers with APC authorized service personnel to properly unpack, inspect, position, and assemble all components of the InfraStruXure solution in preparation for final input wiring and system start-up. APC authorized personnel will perform a visual inspection of all components to ensure that all equipment required on the CTO report has been received and is undamaged. In addition, APC's personnel will remove all packing materials to the customer's disposal area or container.

Start-Up Service—InfraStruXure

Description. The APC Field Service Engineer positions and configures the InfraStruXure system according to the customer specifications from the Configure-To-Order (CTO) report. Working closely with the electrician on-site, the APC authorized service personnel will ensure that the input wiring to the system is installed correctly. APC will then complete all internal wiring as well as energize and check functionality of the solution in all modes of operation to ensure compliance with factory specifications.

Base building block components. The InfraStruXure system may include any of the following:

- DC Power Shelf
- Rack-Mount Air Distribution Unit
- Extended Runtime Battery Enclosure
- Symmetra PX UPS
- Automatic Transfer Switch
- Rack-Mount Air Removal Unit
- InfraStruXure PDU
- Symmetra RM UPS
- Rack-Mount PDU
- Step- Down Transformer
- NetShelter VX Enclosure
- Environmental Monitoring Unit
- Rack Distribution Panel

APC Field Service Engineer task list.

- Confirm the receipt of all InfraStruXure components on the CTO report and ensure that they are free of damage.
- Install all InfraStruXure components.
- Ensure that all InfraStruXure connections are properly fixed and tight.
- Verify the following:
 - Wiring is correct, noting any discrepancies.
 - Power wires terminate in the correct location.
 - Electrical wiring on the InfraStruXure system complies with all local and national electrical codes and regulations.
- Start up the InfraStruXure system and perform a comprehensive diagnostic and self-test including:
 - Static and manual bypass functions are operating properly.
 - Components are operating according to defined specifications.
 - Record all front panel readings and parameter stacks.
 - Ensure the system is clean and free of dust or debris.
 - Train customer-support staff on the basic operation of the InfraStruXure system.

Configuration options. The start-up can be performed outside normal business hours, including weekends and holidays (7 × 24).

Benefits to customer.

- Assures proper installation and internal wiring.
- Ensures that the InfraStruXure system performs to specifications.
- Trains support staff on the proper use and functionality of the system.

Important points.

- Allow for a two-week lead-time in service scheduling.
- The APC Field Service Engineer will not cut any holes in the floor tiles associated with the installation of the InfraStruXure system.
- Assembly services include APC accessories only.
- A safety barrier is required any time energized electrical conductors, bus bars, or terminals are exposed.
- Refer to the APC Build-Out-Tool or contact an APC representative for pricing and configuration information.

Preventive Maintenance Visit

The Preventive Maintenance Visit includes a comprehensive visual, environmental, and electronic inspection of the InfraStruXure solution aimed at maximizing data center uptime by ensuring that the InfraStruXure components are performing to defined technical and environmental specifications.

Preventive Maintenance Visit—InfraStruXure

APC Field Service Engineer task list.

- Verify that system environment is within specified conditions.
- Verify proper airflow of fans.
- Check system event log for any alarm entries and record logs.
- Check all power terminals of system under load.
- Check all remaining termination points.
- Verify accuracy of System Bypass display voltage and current to the UPS.
- Verify accuracy of System Bypass display voltage and current to the PDU, if applicable.
- Check random battery bus connection temperatures.
- Visual inspection of the InfraStruXure solution, assuring that all power wires are properly seated and undamaged.
- Check proper torque of power connections.
- Test internal static bypass and service bypass operation, if applicable.
- Battery verification test.
- Clean all dust and debris from system.
- Perform any outstanding service bulletins.

Configuration options.

- The visit will be performed within normal business hours (5 × 8).
- The visit can be performed outside normal business hours, including weekends and holidays (7 × 24).

Benefits to customer.

- Maximizes data center up-time through preventative maintenance.
- Assures that the system is performing according to specifications.
- Increases reliability and security against unplanned outages of critical systems.
- Optimizes capital expenditures by increasing the lifetime of the data center infrastructure.

On-Site Repair Services

This service provides APC authorized service personnel at the customer's location within a specified period of time. This service offering includes parts, internal batteries (if applicable), labor, and travel. The on-site service from APC is available in four different configurations that allow the customer to determine how quickly APC should arrive on-site for an unscheduled visit or emergency situation.

Battery Refresh—InfraStruXure for small and medium data centers

In spite of proper installation and recommended maintenance of valve-regulated lead acid (VRLA) batteries, the environments in which the batteries operate highly affect their lifetime. For example, small increases in data room temperatures above the recommended 77° F (15° C) impose a considerable threat to battery performance and life. Additionally, inadequate humidity levels, battery discharges, and uncontrollable events such as power outages also decrease battery life. Consequently, a data center's continuously changing environment may drastically reduce both the expected runtime and the performance levels of the system's batteries.

APC's Battery Refresh Service reduces the risk of unplanned and costly downtime due to decreased battery performance or battery runtime, while providing assurance and peace of mind regarding available battery backup time.

The Battery Refresh Service includes.

- New battery modules
- Installation of battery modules into Symmetra RM, Symmetra PX UPS, or the XR Battery Enclosure, including the cost of on-site labor and travel expenses associated with the visit.
- Testing of the new batteries.
- Proper disposal and recycling of old batteries in accordance with EPA standards.

Benefits to customer.

- Maximizes data center up-time.
- Assures battery life, performance, and expected runtime.
- Prevents system downtime when coupled with the System Predictive Failure analysis.
- Optimizes lifetime of the InfraStruXure system.

Important points.

- To avoid interference with the customer's business, APC recommends that the Battery Replacement Service be performed in conjunction with a scheduled maintenance call.
- Unless performed in conjunction with a 7 × 24 scheduled maintenance call, this service is performed during normal business hours.
- Contact a local APC office for normal business hour information.
- Battery shipping costs are not included.
- APC recommends the Battery Refresh Service for batteries reaching 3–5 years of battery lifetime, depending also on battery status and the data center environment.
- The Battery Refresh Service does not cover any replacement batteries associated with unscheduled maintenance calls.

Professional Services

Project Management Service

APC's Project Management Service provides customers with APC authorized personnel to ensure proper installation of power availability and air conditioning systems. Depending on the customer's requirements, project management may include any or all of the following.

- Provide turn-key/install solutions: qualify, contact, and manage required suppliers/resources (i.e. electrical contractors).
- Act as direct contact and liaison with customer (or customer's appointed project manager), contractors, vendors, consultants, and industry related engineering firms.
- Guarantee delivery and installation in turn-key projects performed by APC.
- Obtain and submit all project documentation (i.e. drawings, progress reports, equipment manuals).
- Survey sites and recommend steps for site preparation and product installation (WICS).
- Plan, organize, and schedule efficient use of labor, sub contractors, and materials in adherence within customer budgetary specifications.
- Assess project risk prior to initiation (i.e. cost, resources, schedule, existing infrastructure).
- Provide continual risk management throughout project implementation.
- Available for short term or long term durations.

InfraStruXure Installation Planning Service

This service helps with the electrical installation and positioning of the InfraStruXure system at the customer's site. The pre-installation service provides an APC Field Service Engineer on-site to provide guidance on how to physically connect the InfraStruXure system to utility service and oversee the installation. A customer designated electrician or an APC referred electrical contractor will perform the actual installation.

An APC Authorized Engineer remains on-site for one business day to review one or more of the following:

- Ideal location for the InfraStruXure system.
- Weight of the InfraStruXure system and floor-loading requirements.
- Electrical details such as breakers, wire sizes, and EPO connections Environment-temperature and humidity considerations.
- Load cut-over concerns.
- Generator and transfer switch wiring.
- XR Battery Enclosure installation consulting.

Benefits to customer.

- Assures proper positioning of the InfraStruXure system.
- Ensures a seamless installation.
- Avoids costly delays by indentifying and removing unforeseen installation barriers.
- Provides peace of mind that the electrical installation adheres to manufacturer specifications.

Important points.

- A customer designated electrician or an APC-referred electrical contractor must perform the actual electrical connections.
- The customer supplies electrical equipment up to the connection point of the InfraStruXure system.
- This service does not include electrical installation.
- APC is not responsible for electrical wiring.
- Allow for a two-week lead time when scheduling the service.
- An additional pre-installation service contract must be purchased for each additional day on site.
- APC recommends that the customer has their installation/electrical contractor present at the site visit.

Needs Assessment Service

The APC Needs Assessment Service offers a detailed review of the customer’s data center of server room. An APC authorized Field Service Engineer will visit the site for one business day and collect data pertaining to electrical loads, wiring practices, power quality, existing power protection equipment and environmental conditions. With this data, a customized or standard report will be developed which includes the optimal Power Protection Strategy given the actual load requirement and the electrical infrastructure of the particular site.

Items included in the standard report:

- APC and customer contact information.
- Executive summary.
- Site description.
- Existing power back-up equipment.
- Proposed/new power back-up equipment.
- Electrical requirements necessary for power protection solution.
- Constraints, such as floor loading and building access.
- Floor plan sketch.
- Digital photographs.

Additional items, which may be included in a customized report:

- Professional CAD drawing of room.
- One-line electrical diagram.

Data collection task list. The following lists are general guidelines for the common points/ areas of measurement and data collection.

Power/Power Quality

- Service entrance
- Electrical sub-panel measurements/review
- Detailed power quality analysis
- Power quality—quick review
- Electrical one-line diagram
- NEC/IEEE compliance

Critical Loads

- Actual load measurements taken
- Nameplate load data recorded
- Loads listed—location, voltage, kVA

Existing UPS/Cooling

- Type, location, size/VA, voltage, existing load, runtime
- Details on existing air/environment
- Condition of existing equipment detailed
- Recommendation for optimal UPS solution

HVAC/Cooling

- Temperature/humidity reading taken
- Analysis of environment within racks/ rack design analysis
- Thermal imaging to the rack level
- Recommendations for optimal air solution

Building Access/Delivery

- Loading dock survey
- Elevator survey
- Examine route for positioning of equipment

Site Plans

- Detailed CAD/Visio drawing of data/server rooms
- Floor plan sketch of existing and proposed solutions

Fire Suppression

- Detailed review of fire suppression system
- Recommendations for optimal fire suppression system

Floor Space/Type

- Detailed review of server room layout, hot aisle/ cold aisle, optimal use of space
- Existing floor type analysis
- Recommendations for optimal layouts in data rooms

Generators

- Detailed review of existing generator: size, fuel type, age, ATS, etc.
- Review of existing generator condition
- Recommendations for optimal layouts in data rooms

Optimal Solution Detailed

- Detailed electrical scope of work for proposed solution
- Complete list of part numbers for proposed solution
- Proposal included for turn-key installation of proposed solution

Digital Photographs

- Digital photographs used for identification of items in site survey

Availability Analysis

- Estimate of the expected #9's availability with existing conditions
- Estimate of the expected #9's availability with the proposed solutions

Benefits to customer.

- Measure actual power consumption of electrical loads to ensure proper UPS sizing.
- Discover power quality or grounding issues prior to a UPS solution.
- Determine exact electrical requirements necessary for UPS installation.
- Free customer resources to focus on core business function.
- Report template customizable to the customer's needs.

Important points.

- An additional Needs Assessment Service must be purchased for each additional day on-site (discount applies).
- APC engineers must have access to all electrical panels and data/server rooms.
- Allow five business days for completed report to be shipped to customer.
- Scheduling must be arranged two weeks in advance.
- If branch circuit tracing is required, additional SKUs must be purchased for additional days on site.

Network Integration Service

The APC Network Integration Service is designed to ensure optimal integration between APC products and customer systems. Under this service, APC authorized personnel will perform on-site installation and integration of APC software and software accessories.

Product Preparation

- Unpack, inventory, and attach all APC required cables
- Label UPS and APC accessories per customer request
- Mount all rack-mountable APC products

Installation—Install APC software and software accessories on defined systems

Configuration—Configure APC software and software accessories per customer request

Integration—Insert customer IP address and network settings, change accessory and software passwords per customer request and dress all APC and network cabling (attached to APC products).

Verification of equipment

- Perform power-on self test
- Validate UPS and accessory operation
- Ping APC networked products
- Perform functional test per customer request (scheduled downtime might be required)

Benefits to customer.

- Frees customer resources to concentrate on core business focuses.
- Ease of installation of APC software and software accessories.
- Optimal integration and management of UPS systems.
- Maximizes ease of software installation while minimizing network soft errors.

Important points.

- Must ensure that UPS is installed and operational prior to Network Integration Visit.
- Customer must include access to systems for software installation, access to network connections, and access to UPS devices.
- Customer must provide APC with information on non-standard applications installed on workstation/ servers prior to visit.
- Customer must provide raceway or routing path for APC network cabling.
- Customer must complete the APC Network Integration On-Site authorization form.
- This service is limited to currently manufactured APC products.

Thermography Service

The Thermography Service is a predictive maintenance service that reveals any hot spots within the InfraStruXure solution. By converting invisible heat energy into a visible heat picture of the equipment under typical working conditions, the infrared thermography scan exposes components that are over-loaded or at increased risk of failure. The result is the knowledge to act proactively and thus gives the customer the power to avert problems before they actually arise. Because the infrared thermography scan applies a non-intrusive methodology, the InfraStruXure solution receives less stress than during conventional maintenance services.

For one day, a thermographic engineer conducts temperature readings on equipment found throughout the customer's building (breakers, transformers, UPS, racks, etc.). The engineer then delivers a report, that recommends any corrective action, to the customer

APC Field Service Engineer task list. The Thermography Service for the InfraStruXure solution encompasses the following test points:

- InfraStruXure PDU upper and lower panel terminals
- InfraStruXure PDU Q2, Q2, and Q3 breakers
- Symmetra PX UPS DC back plane
- Symmetra PX UPS power module back plane
- Symmetra PX UPS DC terminals
- Symmetra PX UPS input and output terminals
- InfraStruXure PDU transformer primary/secondary terminals
- InfraStruXure PDU system input breaker, input fuses and transformer coils
- InfraStruXure PDU distribution panels branch circuit breakers

A bypass and battery test concludes the visit, ensuring that the system functionality complies with stated specifications.

Base building block components. The InfraStruXure system may include any of the following (includes only components that are subject to infrared thermography scanning):

- Symmetra PX UPS
- Rack PDU
- InfraStruXure PDU
- DC Rectifiers
- NetworkAIR Air Distribution Unit
- XR Battery Enclosure

Benefits to customer.

- Maximizes system uptime through non-intrusive predictive maintenance.
- Optimizes lifetime of system.
- Requires no downtime.
- Includes full status and report of findings including all thermal, visual, and written documentation.

Important points.

The Thermography Service is performed while the equipment is in operation. Customer must provide adequate safety barriers, as hazardous energy levels may be present on the equipment. Unqualified personnel should keep away from the equipment.

- A certified thermography engineer will perform the service.
- This service does not include replacement of parts.
- This service includes labor and travel expenses.
- Allow for a two-week lead time when scheduling service.
- The Thermography Service does not replace a recommended yearly Preventative Maintenance Visit, but adds another important level to a proactive approach in increasing system availability.
- The service scheduling window is inside normal business hours. Contact a local APC office for normal business hour information.

InfraStruXure One-Day On-Site Basic Operational Training

Attendees should include managers, supervisors, and facility personnel who interact with the InfraStruXure system. Only **qualified** personnel should attempt to interact with this equipment. Attendees receive a detailed training of the InfraStruXure system. The training educates the end-user (qualified and non-qualified) on how to interact with the system. Upon completion of the training, attendees shall be able to:

- Follow general safety practices when working with and/or around the InfraStruXure system.
- Identify the InfraStruXure components.
- Provide a detailed description of the system components.
- Explain the general theory of operation.
- Explain the power management software available.
- Troubleshoot the system by interpreting system status, notifications, and alarms on the display interface.
- Remove and replace hot-swappable modules.
- Download Main Intelligence Module (MIM) and Web card logs.
- Operate the InfraStruXure system safely and confidently including Power-Up and
- Total Shut-Down.



A qualified person is one familiar with the construction and operation of the InfraStruXure system and the hazards involved.

Remote Monitoring Service

APC's Remote Monitoring Service is a complete customized solution that monitors power-protection equipment 24 hours a day, 7 days a week. The remote monitoring system monitors all internal parameters, as well as ambient room temperature and humidity levels where the UPS is located. When a power event occurs, the monitoring equipment sends a notification to the APC Monitoring Operations Center. The center immediately analyzes the event and carries out the appropriate response according to the pre-defined customer profile.

APC Field Service Engineer task list.

- Issue regular UPS parameter and event reports with event frequency, duration and resolution.
- Send monthly alarm reports to the customer.
- Perform the customer-defined response procedure for all events through web-based applications.

Configuration options.

- **In-Band Remote Monitoring:** 1-Year monitoring contract. Performs completely over the network through the APC Network Management Card. This configuration requires no extra equipment or installation.
- **Out-of-Band Remote Monitoring:** Requires monitoring equipment (Triple Chassis, Call UPS, Measure UPS, and Power Stack), installation and initial year service contract.

Benefits to customer.

- Peace of mind about health of power protection equipment.
- Immediate notification of events by phone, paging, and/or e-mail.
- Immediate response to events assures faster resolution of power problems.
- Reduced staffing due to APC power professionals keeping systems personnel informed of power events and taking the necessary steps to resolve problems.
- Maximum uptime of network equipment, as the remote monitoring system detects potential failures even before they occur.
- Increased lifetime of UPS, batteries, and other supporting equipment due to monitoring of both internal and external critical parameters.

Important points.

- **Out-of-Band configuration:** Connection to the remote monitoring device requires two AC power outlets.
- Requires one dedicated analog direct dial-in/dial-out phone line.
- Customer must define response criteria to create a tailored customer profile.
- Allow for a two-week lead time when scheduling service.
- This service offers even greater payback and enhanced availability when combined with other APC services.

Management

Overview

APC's revolutionary new approach to data center infrastructure design deserves and requires an equally revolutionary approach to management tools to remotely monitor and control, easily and economically. The sheer volume of critical data available from APC's InfraStruXure products would cripple a traditional data center management application. Achieving greater levels of availability only comes about by capturing, analyzing, and assessing this important data. For this reason, APC developed and adapted a comprehensive suite of management products to respond to these issues. These products empower IT and facilities managers to centrally manage the power of data center infrastructure from the highest level down to the equipment outlet level. APC's suite of management products, the only integrated power management family in the industry, enable the user to monitor the elements of infrastructure, understand how infrastructure performs, and take action remotely, when necessary, to ensure service levels are met. A Web browser on a desktop computer provides convenient and easy access to all of these features.

APC's management solutions are divided into the following three categories:

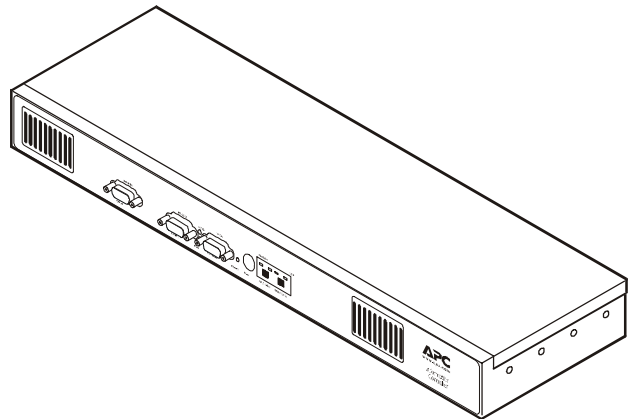
- Network-Critical physical InfraStruXure management
- UPS management
- Environmental management

Network-Critical Physical InfraStruXure Management

InfraStruXure Manager

Visible and manageable.

The InfraStruXure Manager, a server appliance, provides web-based remote management of APC devices through a single IP address. It addresses overload situations by monitoring the current draw of each branch circuit for threshold violations, and issues alerts in response to hazardous environmental conditions which may threaten the availability of sensitive IT equipment. This appliance also incorporates APC into existing critical network infrastructure by integrating with the leading management systems.



Multiple devices, single IP address . The InfraStruXure Manager creates a private network allowing the management of multiple APC devices from anywhere on the network through a single IP address allowing the user to remotely configure, control, and monitor Symmetra PX, PDUs, RM PDUs, Automatic Transfer Switches, and Environmental Monitoring Units. Additional benefits of this private network include enhanced security and decreased set-up time.

Eliminate overloads. The typical observed server power consumption may be much lower than the potential power consumption when under a high computational load. This situation may cause data center staff to inadvertently put too many servers onto a given branch circuit, creating the potential for a branch circuit overload. The InfraStruXure Manager monitors the current draw of each branch circuit and alerts the user to potential overload situations before they occur, ensuring the availability of connected equipment.

Identify hot spots. All electrical power consumed by computing equipment is dissipated as heat. When the power consumption of computing equipment varies due to computational load, the heat output also varies. If equipment in one part of the data center suddenly increases its power consumption it can create a localized hot spot that requires addressing by a cooling system. To avoid this potential problem, InfraStruXure Manager monitors temperature, humidity, and dry contact inputs through APC's Environmental Monitoring Unit and alerts the user to hazardous conditions that threaten the availability of critical network infrastructure.

Integration with traditional management systems. Integration with leading management systems allows the user to manage InfraStruXure in conjunction with critical infrastructure. The InfraStruXure Manager sends SNMP traps to a preferred network management system, allowing the user to manage APC devices and critical network infrastructure from a single display. Its Modbus support also provides ease of integration with Building Management Systems.

Immediate notification. Receive immediate notification of critical power and environmental events before they impact the availability of critical loads. The InfraStruXure Manager automatically takes predetermined action based on severity levels (critical, warning, and informational) for each APC device. In addition, it allows for the notification of multiple people in the occurrence of one of these events.

Records events . The dynamic event log of the InfraStruXure Manager stores thousands of events allowing the user to determine the timing and sequence of those events leading up to a particular incident.

Historical data. Provides historical data for each APC device allowing the user to identify trends that threaten the availability of critical equipment. The data logs record information such as voltages, load, and temperature, with a description and a time and date stamp to help diagnose UPS, power, and environmental problems and prevent the occurrence of future problems of these natures.

Auto-discovery of APC devices. Automatically discovers and manages Symmetra PX, PDUs, RM PDUs, Automatic Transfer Switches, and Environmental Monitoring Units without manual intervention. The auto-discovery of multiple APC devices greatly minimizes the amount of time required to initially configure the InfraStruXure Manager.

APC remote monitoring service-ready. The InfraStruXure Manager ships Remote Monitoring Service-Ready, which allows the user to rely on the expertise of APC. APC's Remote Monitoring Service provides out sourced monitoring and performance trending of enterprise power and environmental infrastructure. These features enable data center managers to meet service level objectives and minimize costs by tapping into APC's experienced staff of power professionals.

Network Management Card EX

The industry-leading management card . At the very core of APC's Management strategy is the APC Network Management Card EX. This industry-leading card allows the user to network-enable all APC InfraStruXure products. It also enables remote management of APC devices based on a number of industry standards including SNMP, HTTP (web), WAP, and Telnet. This small, highly reliable, fault-tolerant management card provides features and functions found in today's most robust power management applications and ships standard with APC's enterprise-level products.

Secure device level management. The Network Management Card EX, a comprehensive device-level management platform, provides real-time monitoring, control, diagnostics, logging, and notification without the need of a server. Key features of the card include, e-mail notification, full SNMP support, historical data logging, and event logging.

Unattended shutdown. User-definable parameters allow the user to remotely shutdown or reboot systems as required. The Network Management Card EX works in conjunction with APC's PowerChute Network Shutdown software to gracefully shutdown servers in the event of an extended power outage.

Investment protection. The Network Management Card EX functions in both 10 and 100BaseT network environments, and automatically senses the network connection speed allowing it to adapt to new and faster networks as they come into existence. In addition, the card is remotely configurable allowing for flash upgrades over the network to take advantage of new functionality throughout the future.

UPS Management

Remote Monitoring Service

Rest easy under the watchful eye of APC. With the increasing demand for uptime of mission-critical equipment, Network Administrators need an around-the-clock, high-availability solution. With APC's Remote Monitoring Service, Network Administrators can boost uptime of their mission-critical applications. The Remote Monitoring Service combines the Legendary Reliability of APC availability solutions with the expertise of APC power professionals, allowing systems managers to rest easy under the watchful eye of APC.

Cut costs of downtime . APC's 7 × 24 × 365 operations center monitors equipment ensuring that power problems never pass unnoticed. APC keeps the user informed of power events and takes the necessary steps to resolve them before a catastrophe strikes. The Remote Monitoring Service saves businesses the cost of unintended power problems and keeps systems up and running.

Reduce staffing with added benefits . Implementing APC's Remote Monitoring Service virtually adds a complete staff of power professionals to the user's resource pool, without the cost of additional staffing. APC's Network Operations Center continuously monitors the systems, allowing Network Administrators to focus their scarce resources on other critical aspects of the user's business.

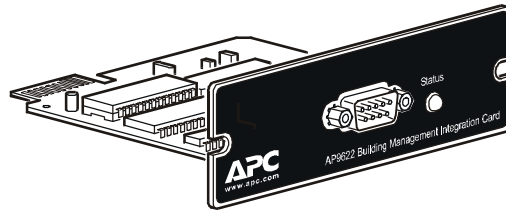
Customized escalation . APC realizes the uniqueness of each customer's application, that's why APC based the Remote Monitoring Service on a customized escalation process. APC's ability to uniquely profile each customer, through a customized web application, allows APC to react to UPS events in the same manner that systems personnel would. APC will jointly establish communication parameters and response methodologies with the user's staff to maximize responsiveness when power events occur.

Reports . APC stands by their promise to keep the user well informed of status changes in systems as they occur. The customer receives reports detailing a history of events as well as the actions taken to combat each event. These customizable reports are tailored to meet the customer's specific needs and can graph or numerically display detailed information, such as load or input voltage, offering a means of trending over time. In this way, APC has the ability to watch certain UPS parameters and provide beneficial preventative maintenance advice.

Modbus/Jbus Integration Card

Integration with traditional management systems. American Power Conversion's Modbus/Jbus Card is a SmartSlot card that enables APC's UPSs to integrate with leading building management systems. As a SmartSlot card, the BMI card requires an available card slot, either in the UPS, an APC Expansion Chassis, or an APC Triple Chassis. Each UPS family has its own data points. For instance, the Modbus/Jbus Card used with a Silcon UPS would support more data points than a Smart-UPS. The communication occurs through the card's standard DB9 RS-232 port. However, this port also works with adapters to support RS-485.

The card sends data about the UPS through the Modbus/Jbus protocol which remains the protocol of choice by leading building management systems because it is the most common protocol used for integration of UPSs with these systems.



PowerChute Network Shutdown

Reliable network-based shutdown of multiple computer systems. APC's PowerChute Network Shutdown software works in conjunction with the APC Network Management Card EX to provide graceful, unattended shutdown of multiple computer systems over a network. Its scalable architecture can support a virtually unlimited number of client systems. Administrators can quickly configure it through a browser-based interface, and can customize command files to run on each server in the event of an unattended shutdown.

Features include:

- Prevents possible data corruption by performing graceful, unattended operating system shutdown in the event of an extended power outage.
- Initiates actions including running a command file, enabling customized responses (i.e. application shutdown) to an event.
- Supports a virtually unlimited number of clients.
- Initiates up to four types of actions for over 20 UPS or power events.
- Reduces cable clutter by eliminating the need to connect the UPS and protected servers via serial cables

Environmental Management

Environmental Monitoring Unit

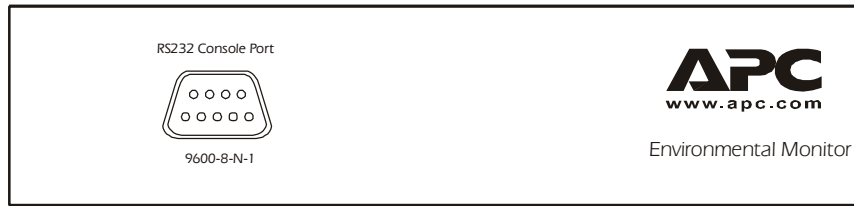
Reliable monitoring of important environmental conditions. APC's Environmental Monitoring Unit (EMU) is a browser-accessible 1U rack-mountable appliance that allows monitoring of the included temperature and humidity sensor. Additional temperature and humidity sensors are also available. Early warnings of conditions that lead to failure allow the user to react to changes and minimize the impact on network availability. When conditions change, notifications are sent through e-mail to the appropriate personnel. Four input contacts provide for monitoring of other equipment. An output relay allows the user to define action remotely should conditions warrant it.

Easily manageable. The Environmental Monitoring Unit is an easily manageable system. It includes both temperature monitoring and humidity monitoring, with the option of adding additional sensors if necessary. Customizable input contacts and output relays allow the user to utilize the device in a way that meets their needs most.

Convenient and accessible. In addition to the easy manageability of the EMU, it is also a quite convenient device. Its browser-accessibility gives the user quick access to the interface from anywhere on the network without the need to install software. Remote management access is provided through a simple telnet session. In addition, the user can also manage the APC devices from a single system by forwarding SNMP traps (events) to the preferred enterprise management system. Data logging identifies problematic trends before they escalate. In the event that a problem does occur, fault notification ensures that critical situations are dealt with in a timely manner by providing notification of critical issues through e-mail, pager, or SNMP traps and event logging pinpoints the timing and sequencing of events leading up to an incident with the event log.

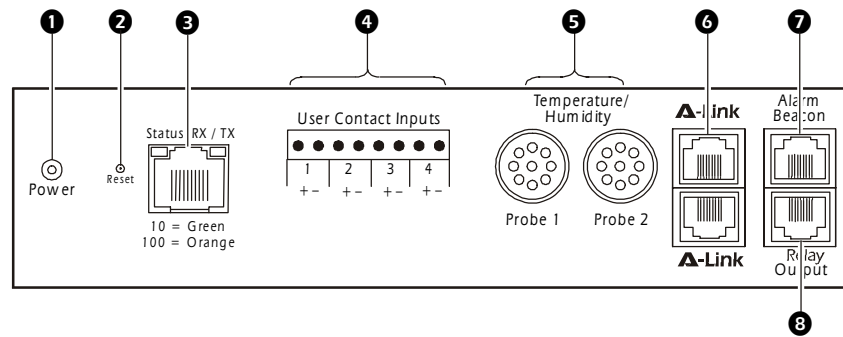
Security and protection for peace of mind. The security features of the EMU provide peace of mind about the protection of the system. A user-selectable password and read-only access ensure that only designated users can have access to the configuration settings of the systems. In addition, authentication and encryption features help ensure effective access control and integrity for SSL browser and SSH sessions.

Front View



The front panel has a RS232 console port that connects the unit to a local computer using the configuration cable (940-0103). Through the serial connection the user can access all setup, status, maintenance, and diagnostic information.

Rear View



Item	Function
1	Power LED Indicates whether the EMU is receiving power green: powered dark: not powered
2	Reset Button Reset the EMU. This will not affect the operation of any connected devices.
3	10/100 LEDs 10/100 LEDs: indicate traffic on the network green: operating at 10 mbps orange: operating at 100 mbps
4	User Input Contacts Four user input connections for connecting normally open or normally closed sensor devices.
5	Probe Connections Connect two local temperature/humidity sensors.
6	A-Link Ports Connects to APC temperature/humidity probes and air distribution products. A-Link is APC's device communication protocol.
7	Alarm Beacon Port Connect to the rack beacon.
8	Output Relay Connect to other equipment for mapping EMU events to outside devices.

Environmental Management System

Complete management of surrounding environment and critical data

applications. APC's Environmental Management System (EMS) provides monitoring and management of surrounding environment and critical data application areas. Today's large corporate-wide networks find that the physical environment greatly affects the availability, reliability, and security of the equipment. The Environmental Management System monitors and manages three major conditions including: temperature and humidity, intrusion detection, and "acts of nature" such as fires, floods, or earthquakes. Monitoring these conditions allows for the reduction or elimination of the amount of damage that any of the above would normally cause to the network.

A complete understanding of inlet temperature. The Environmental Management System allows for the monitoring of up to ten temperature and humidity probes with one temperature-only probe included. Two probes per rack can be used to give a complete understanding of inlet temperature at both the bottom and top of the rack. The probes also include the ability to provide a thorough understanding of the temperature and humidity throughout an entire room.

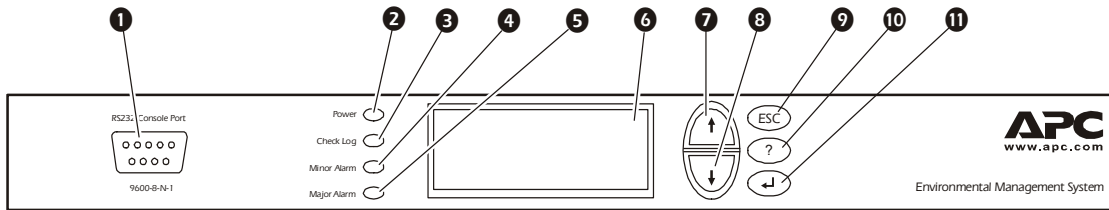
Security and peace of mind. Security of critical equipment often stands out as an important concern. The two door switch sensors included with the EMS, help eliminate these concerns by monitoring access to rack or room doors. Additionally, optional motion sensors detect any movement in the room caused by personnel or intruders. The user can rest easy with peace of mind knowing that the security of important systems is always being monitored.

"Acts of nature" notification. With optional smoke, vibration, and leak detection sensors, the EMS provides the user with notification of any fires, earthquakes, or liquid leaks and spills that may threaten the availability of critical data application areas.

Customizable input contacts. The Environmental Management System has up to 8 input contact closures for the monitoring of additional APC sensors or devices such as generators, air conditioners, or TVSS systems. The customizable nature of these closures assures monitoring of the equipment most important to the user.

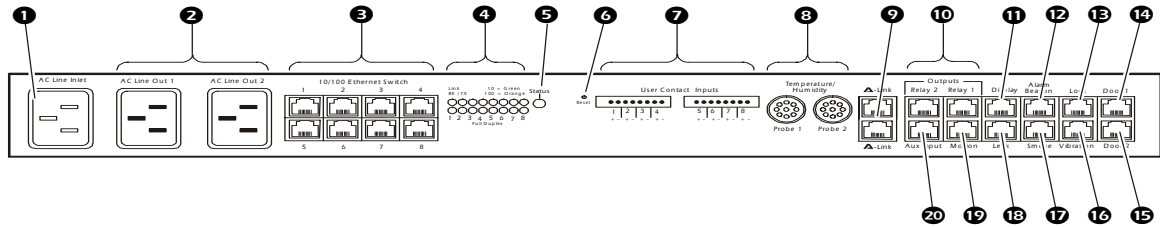
Ease of manageability. The EMS's integrated management card provides a web based or a telnet interface and accomplishes event notification through e-mail or SNMP traps. Additionally, the DHCP compatibility of the unit allows for address configuration. The EMS also supports the logging of events and data for easy record keeping and an optional LCD display provides ever greater enhanced local management.

Front View



Item	Function
① Serial Port	Connects to a terminal emulator program for local access to the control console.
② Power LED	Indicates that the Environmental Management System has power.
③ Check Log LED	Indicates that an event has occurred. Can be configured to activate for different severities of events.
④ Minor Alarm LED	Indicates that a minor alarm condition exists.
⑤ Major Alarm LED	Indicates that a major alarm condition exists.
⑥ LCD Screen	Displays menus and settings for the EMS.
⑦ Up Arrow Button	Selects menu items and changes settings.
⑧ Down Arrow Button	Selects menu items and changes settings.
⑨ ESC Button	Returns the LCD to the previous screen displayed and exits a setting without saving it.
⑩ Help Button	Displays help for the selected option or setting
⑪ Enter Button	Selects menu options and saves settings.

Rear View



Item	Function
1 AC Line Inlet	Provides power to the EMS.
2 AC Line Out 1 & 2	Provides power to devices within the rack.
3 10/100 Ethernet Switch	Connect network devices to the EMS and connects the EMS to the network.
4 10/100 & Duplex LEDs	10/100 LEDs: indicate traffic on the network Duplex LEDs: indicate how data are being transmitted over the network
5 Status LED	Shows the current status of the EMS
6 Reset Button	Resets the EMS. Does not affect the operation of any connected devices.
7 User Input Contacts	Eight user input connections for connecting normally open or normally closed sensor devices.
8 Probe Connections	Connect two local temperature/humidity sensors.
9 A-Link Ports	Connect to remote temperature/humidity sensors and other devices.
10 Output Relays	Connect to other equipment for mapping EMS events to outside devices.
11 Display Port	Connect to an external display interface.
12 Alarm Beacon Port	Connect to the beacon.
13 Electronic Lock Port	Not currently supported.
14 Door 1 Sensor Port	Connect to a sensor on the front or rear door of a rack.
15 Door 2 Sensor Port	Connect to a sensor on the front or rear door of a rack.
16 Vibration Sensor Port	Connect to a vibration sensor in the room
17 Smoke Sensor Port	Connect to a smoke sensor in the room or in a rack.
18 Leak Sensor Port	Connect to a leak sensor, which is normally used to detect water on the floor in the room.
19 Motion Sensor Port	Connect to a motion sensor in the room
20 Auxiliary Sensor Input Port	Connect to another sensor device

Certifications, Codes, and Standards

Overview

Introduction

The InfraStruXure architecture is designed and certified for maximum safety of installing personnel and operating personnel. Wherever possible, plug-in “modules” replace hard-wired connections. Recognizing that “hot work” is inevitable (even though it is not recommended), the ISX architecture minimizes the risk to personnel and operational integrity. Safety agency certification assures owners, insurance companies, installers, and inspectors that the product meets the requirements of nationally and internationally recognized standards so that new testing and/or certification is not necessary at every site. Typical inspection categories include quality, safety, form, fit and function, marketing and labeling, and packaging and UPS verification. The acronyms used in this section are defined at the end.

InfraStruXure safety agency certifications

ISX modular power architecture is listed two different ways:

- Module level: power module, battery module, enclosure, transfer switch, etc.
- System level: entire line-up of bays integrated into a single system.

The basic power subsystem as a stand-alone item is listed as Uninterruptible Power Supply (UPS) equipment. The Power Distribution Unit (PDU) and overall ISX system are treated as Information Technology Equipment (ITE). The ISX “system” includes the UPS, power distribution unit, interconnecting cords, controllers, distribution strips, and other options that are factory installed.

What are listings for?

Municipal electrical, building, and fire safety codes in localities such as New York, Chicago, Los Angeles, and Seattle require testing of products by an independent testing laboratory before they can be put in service. In North America the most common testing labs are UL, CSA, and ETL. Many dealers will not sell unlisted products for insurance purposes. CSA is a Canadian Federal requirement, so one cannot sell a product in Canada unless it passed certification to the applicable Canadian standard by an independent lab. APC gives customers peace of mind that the product is safe to use in the application for which it was designed.

What are the APC certifications?

APC’s decision about which standard to use depends on the product’s use. The ISX products in North America are listed to UL 1950/UL 60950 and CSA 60950. The UPS modules are listed to UL 1778.

Who writes the standards?

Standards are usually consensus documents written in collaboration with standards organizations such as NEMA, independent compliance labs like UL and CSA, and industry such as APC.

What is UL?

Underwriters Laboratory (UL) evolved from the insurance industry to test products for safety. UL allows a product label to bear its “mark” once it has passed complete testing and a report has been filed.

What is NEC?

The National Electric Code sets forth the minimum requirements in the USA for building wiring. NEC writes its codes around safety requirements as well, most importantly addressing fire concerns. One of the primary NEC requirements states that installed products must be used according to their listed purpose per UL. In those cases UL supersedes the NEC for the internal wiring of a product. The NEC sets forth requirements for input wiring up to the ISX system, but it has no directive on the wiring within the system.

Why use one standard vs. another?

On some products the choice of which standard to use is clear-cut. Computers must be certified to the IT standards of UL, and CSA. UPS's are certified to the UPS standards of Safety of ITE Equipment (UL 1778 and CSA 107.1).

The category of the InfraStruXure Power Distribution Unit (PDU) seems less obvious, so APC uses the standard that makes the most sense and lists the InfraStruXure system and the ISX PDU both as ITE equipment because:

- The basic elements of the system, the UPS portion and the PDU portion, provide power almost exclusively to IT equipment such as servers, routers, hubs, and PCs.
- The National Electric Code has a section specifically for ITE equipment.
- The IT standards are harmonized internationally for USA and Canada.
- ISX is a comparatively small and integrated system, unlike larger power systems that require an electrician to interconnect elements in different parts of the building.
- APC's customers expect it.

In contrast, if the loads were large industrial motors, APC might have chosen UL 891 (Dead Front Switchboards) or UL 1008 (Transfer Switch Equipment) or UL 1012 (Power Supplies).

What is “listed” vs. “recognized” vs. “tested” vs. “approved”?

The UL term “listed” means that the product meets the requirements of a particular standard for use as a stand-alone device. More specifically, it includes a complete fire and electrical enclosure along with a means of connection to a branch circuit.

The UL term “recognized” applies to components that a factory installs within listed products. Safety-critical components such as capacitors, switches, circuit breakers, fuses, and motors have requirements particular to the component, yet APC cannot control what all manufacturers do to their components. Therefore, UL verifies that recognized components meet the particular safety requirements and APC does not have to verify them again.

The unofficial term “tested” frequently applies to EMI and Immunity testing. These standards do not require certification, but the law requires the products to be tested to the standards and pass the requirements in them. APC tests its products at independent laboratories in Massachusetts such as Curtis-Straus, ITS (Intertech Testing Services) and Integrity Test Lab.

Approved is not an official term. It is a slang term often misused when the speaker really means “listed,” “certified,” or “recognized.” Testing laboratories do not “approve” anything.

Who does the testing?

UL and CSA perform the product safety testing for those companies with few resources. APC performs the testing under such programs as:

- UL Manufacturer’s Test Data Acceptance and COMPASS Programs
- CSA Category Certification Program

What do we test?

The safety standards are written to ensure that personnel are protected against injury and that the location where a product is installed will be protected against damage (usually fire). Tests include both normal and abnormal conditions. Factors in a Safety listing typically include:

- Electric Shock (electric current passing through the human body)
- Energy hazard (e.g. short circuit between adjacent poles of a battery or capacitor, causing burns, arcing, and ejection of molten metal)
- Fire hazards (hazards resulting from excessive temperatures, either under normal conditions or due to overloading, component failure, insulation breakdown, high resistance, or loose connections)
- Mechanical hazards (injury due to hot surfaces, sharp edges, instability, and moving parts)

The standards also define the equipment usage:

- Environment (e.g. pollution degree [2=office; 3=industrial])
- Movable, stationary, or handheld
- Type of power source (e.g. AC mains, battery, etc.)

What is the significance of a listing for the InfraStruXure system?

Without UL/CSA Certification, InfraStruXure will not be installed in a building. This requirement is because it is a large product that must be connected to the utility branch circuit by a licensed electrician, so it's subject to inspection by electrical inspectors or other Authorities of Jurisdiction. If an authority does not see a certification, it is assumed that the product is untested and unsafe. The options then would be to reject the installation or require testing on site.

Special requirements by locality

New York—Calendar Number. A “Calendar Number” basically gives one authorization to use a product in the New York City area. Without a calendar number a product cannot be installed. As of about three years ago the Board of Advisors decided that a UL-listed UPS system 150 kVA or smaller could be installed without a Calendar number. However, because of the novelty and unfamiliarity of people with the InfraStruXure concept, APC opted to apply for a calendar number anyway. The Board of Advisors reviewed APC’s submittal and determined that ISX is suitable for use in the NYC metro area. With a UL listing and a calendar number marked on the product, there should be no barriers to having the product accepted by an inspector (assuming it has been installed in accordance with APC instructions).

- InfraStruXure UPS—Calendar # 44177 (includes UPS, PDU, cabinets, distribution and cables)
- InfraStruXure NetworkAIR FM—Calendar # 108-03-E

Acronyms and abbreviations used in this section

ANSI	American National Standards Institute
CSA	Canadian Standards Association
cUL	Underwriter’s Laboratories—Canada
EMC	Electro-Magnetic Compatibility
EMI	Electro-Magnetic Interference
ETL	Engineering Testing Laboratories (Registered Trademark)
NEMA	National Electrical Manufacturer’s Association (Registered Trademark)
UL	Underwriter’s Laboratories (Registered Trademark)

Uniform Fire Code Article 64—Stationary Lead-Acid Battery Systems



Note

This code is only applicable to InfraStruXure for Large Data Centers.

2000 UFC

Section 640—Scope. Stationary lead-acid battery systems having an electrolyte capacity of more than 100 gallons (378.5L) in sprinklered buildings or 50 gallons (189.3L) in unsprinklered buildings used for facility standby power, emergency power, or uninterrupted power supplies shall be in accordance with Article 64.

Section 6402—Definitions. For definitions of Battery, Lead-Acid, Battery System, and Stationary Lead-Acid, see Article 2.

Section 6403—Permits.

6403.1 For a permit to install or operate battery systems with stationary lead-acid batteries, see Section 105.8, Permit b.1.

6403.2 Prior to installation, plans shall be submitted and approved.

Section 6404—Installation and maintenance

6404.1 Installation and maintenance of battery systems shall be in accordance with nationally recognized standards. See Section 9003, Standards a.2.10 and a.2.11, and Section 6404.

6404.2 Batteries shall be provided with safety venting caps.

6404.3 In other than Groups A, E, I, and R Occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum one-hour fire-resistive occupancy separation. In Groups A, E, I, and R Occupancies, battery systems shall be located in a room separated from other portions of the building by a two-hour fire-resistive occupancy separation.

6404.4 Each rack of batteries, or group of racks shall be provided with a liquid-tight 4-inch (101.6-mm) spill-control barrier which extends at least 1 inch (25.4 mm) beyond the battery rack in all directions.

6404.5 An approved method to neutralize spilled electrolyte shall be provided. The method shall be capable of neutralizing a spill from the largest lead acid battery to a pH between 7.0 and 9.0.

6404.5 Ventilation shall be provided in accordance with the Mechanical Code and the following:

1. The ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room in accordance with nationally recognized standards.
2. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (5.1 m³/s per m²) of floor area of the room.

6404.6 Doors into rooms or buildings containing stationary lead-acid battery systems shall be provided with approved signs. The signs shall state that the room contains lead-acid battery systems, that the battery room contains energized electrical circuits; and that the battery electrolyte solutions are corrosive liquids.

6404.7 Battery systems shall be seismically braced in accordance with the Building Code.

6404.8 An approved automatic smoke detection system shall be installed in such areas and supervised by an approved central, proprietary or remote station service or a local alarm which will give an audible signal at a constantly attended location.

Uniform Fire Code (NFPA-1)—2003



This code is only applicable to InfraStruXure for Large Data Centers.

Chapter 52 Stationary Lead-Acid Battery Systems

Section 52.1—General. Stationary lead-acid battery systems having an electrolyte capacity of more than 100 gal (378.5 L) in sprinklered buildings or 50 gal (189.3 L) in unsprinklered buildings used for facility standby power, emergency power, or uninterrupted power supplies shall be in accordance with Chapter 52.

Section 52.2—Permits.

52.2.1 Permits, where required, shall comply with 1.12.19

52.2.2 Prior to installation, plans shall be submitted and approved by the AHJ

Section 52.3—Safety features.

52.3.1 Batteries shall be provided with safety venting caps.

52.3.2 Valve-regulated lead-acid (VRLA) battery systems shall be provided with a listed device or other approved method to preclude, detect, and control thermal runaway.

Section 52.3.3—Location and occupancy separation.

52.3.3.1 Battery systems shall be permitted in the same room as the equipment that they support.

52.3.3.2.1 Battery systems shall be housed in a noncombustible, locked cabinet or other enclosure to prevent access by unauthorized personnel unless located in a separate equipment room accessible only to authorized personnel.

52.3.3.2.2 In other than assembly, educational, detention and correction facilities, health care, ambulatory health care, day care centers, residential board and care, and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 1-hour fire barrier.

52.3.3.2.3 In assembly, educational, detention and correction facilities, health care, ambulatory health care, day care centers, residential board and care, and residential occupancies, battery systems shall be located in a room separated from other portions of the building by a minimum of a 2-hour fire barrier.

Section 52.3.4—Spill control.

52.3.4.1 Rooms, buildings, or areas containing free-flowing liquid electrolyte in individual vessels having a capacity of more than 55 gal (208L) or multiple vessels having an aggregate

capacity exceeding 1000 gal (3785L) shall be provided with spill control to prevent the flow of liquids to adjoining areas.

52.3.4.2 An approved method and materials for the control of a spill of electrolyte shall be provided. The method shall be capable of controlling a spill from the single largest vessel.

Section 52.3.5—Neutralization.

52.3.5.1 An approved method to neutralize spilled electrolyte shall be provided.

52.3.5.2 The method shall be capable of neutralizing a spill from the largest lead-acid battery to a pH between 7.0 and 9.0.

Section 52.3.6—Ventilation. Ventilation shall be provided for rooms and cabinets in accordance with the mechanical code adopted by the jurisdiction and one of the following:

- The ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room during the worst-case event of simultaneous “boost” charging of all the batteries, in accordance with nationally recognized standards.
- Continuous ventilation shall be provided at a rate of not less than $1 \text{ ft}^3/\text{min}/\text{ft}^2$ ($5.1 \text{ L}/\text{sec}/\text{m}^2$) of floor area of the room or cabinet.

Section 52.3.7—Environment. The battery environment shall be controlled or analyzed to maintain temperature in a safe operating range for the specific battery technology used.

Section 52.3.8—Signs.

52.3.8.1 Doors or access into rooms, buildings, or areas containing stationary lead-acid battery systems shall be provided with approved signs.

52.3.8.2 The signs shall state that the room contains lead-acid battery systems, that the battery room contains energized electrical circuits, and that the battery electrolyte solutions are corrosive liquids.

52.3.8.3 Battery cabinets shall be provided with exterior labels that identify the manufacturer and model number of the system and electrical rating (voltage and current) of the contained battery system. Within the cabinet, signs shall be provided to indicate the relevant electrical, chemical, and fire hazard.

Section 52.3.9—Seismic protection. In seismically active areas, battery systems shall be seismically braced in accordance with the building code.

Section 52.3.10—Smoke detection. An approved automatic smoke detection system shall be installed in such areas and supervised by an approved central, proprietary, or remote station service of a local alarm that will give an audible signal at a constantly attended location.

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International Fire Code—2002



Note

This code is only applicable to InfraStruXure for Large Data Centers.

Section 609 Valve-Regulated Lead-Acid (VRLA) Battery Systems

609.1—Scope. Valve-regulated lead-acid (VRLA) battery systems having an electrolyte capacity of more than 50 gallons (189 L) used for facility standby power, emergency power, or uninterrupted power supplies (UPS) shall comply with this section.

609.2—Safety vents. VRLA batteries shall be equipped with self-sealing flame-arresting safety vents.

609.3—Thermal runaway. VRLA battery systems shall be provided with a listed device or other approved method to preclude, detect, and control thermal runaway.

609.4—Room design and construction. Enclosure of VRLA battery system rooms shall comply with the International Building Code. The battery systems are permitted to be in the same room with the equipment they support. When VRLA battery systems are installed in a separate equipment room accessible only to authorized personnel, they may be installed on an open rack for ease of maintenance. When a VRLA battery system is situated in an occupied work center, it shall be housed in a noncombustible cabinet or other enclosure to prevent access by unauthorized personnel.

609.5—Neutralization. An approved manual method and materials for the neutralization of a release of electrolyte shall be provided. The method and materials shall be capable of controlling and neutralizing a release of 3 percent of the capacity of the largest VRLA cell or block in the room to a pH between 7.0 and 9.0.

609.6—Room ventilation. Ventilation shall be provided to limit the maximum concentration of hydrogen to 1 percent of the total volume of the room during the worst-case event of simultaneous “boost” charging of all the batteries in the room. Where calculations are not provided to substantiate the ventilation rate, continuous ventilation at a rate of not less than 1 cubic foot per minute per square foot ($1 \text{ ft}^3/\text{min}/\text{ft}^2$) [$(0.0051 \text{ m}^3/(\text{s}\cdot\text{m}^2))$] of floor area of the room shall be provided. The ventilation shall be either mechanically or naturally induced.

609.7—Cabinet ventilation. Where VRLA batteries are installed inside a cabinet, the cabinet shall be vented. The cabinet ventilation shall limit the maximum concentration of hydrogen to 1% of the total volume of the cabinet during the worst-case event of simultaneous “boost” charging of all the batteries in the cabinet. Where calculations are not provided to substantiate the ventilation rate, continuous ventilation at a rate of not less than 1 cubic foot per minute per square foot ($1 \text{ ft}^3/\text{min}/\text{ft}^2$) [$(0.0051 \text{ m}^3/(\text{s}\cdot\text{m}^2))$] of floor area covered by the cabinet shall be provided. The ventilation shall be either mechanically or naturally induced. The room in which the cabinet is installed shall also be ventilated as required in 609.6.

609.8—Signs. Doors into electrical equipment rooms containing VRLA battery systems shall be provided with approved signs. The signs shall state that the room contains lead-acid battery systems and contains energized electrical circuits. Where VRLA batteries are contained in cabinets in occupied work centers, the cabinet enclosures shall be located within 10 ft (3048mm) of the equipment that they support. The cabinets shall have exterior labels that identify the manufacturer and model number of the system and electrical rating (voltage and current) of the contained battery system. Within the cabinet there shall be signs that indicate the relevant electrical, chemical, and fire hazards.

609.9—Seismic protection. The battery systems shall be seismically braced in accordance with the International Building Code.

609.10—Smoke detection. An approved automatic smoke detection system shall be installed in rooms containing VRLA battery systems in accordance with Section 907.2.23.

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Certifications and Standards for Individual InfraStruXure Products

For information on which specific certifications and standards apply to the individual APC products covered in this handbook, refer to the product's individual entry in the Quick Reference section (Chapter 6). The "Compliance" category of the specification table, lists the individual certifications and standards for that specific product. Copies of some of the certification certificates can also be found on the APC Web site (www.apc.com).

Available Supporting Documentation

Overview

The following section provides a list and description of the documentation available for the products covered in the InfraStruXure Technical Handbook. Use this section to quickly look up the available user manuals for individual products and InfraStruXure systems. All documentation in this section can be found on the APC Web site (www.apc.com).



Note

You can check for updates to any of the documentation in this section by clicking on the User Manuals link on the Support page of the APC Web site (www.apc.com). In the list of manuals, look for the latest letter revision (A, B, etc.) of the part number for the manual.

Rack

NetShelter VX Enclosures

SKU Number	Name of Document (Part Number) and Description
AR2100BLK	NetShelter VX Enclosure User Manual (990-0393C) Provides product description, inventory of parts, installation instructions, specifications and warranty and service information.
AR2101BLK	NetShelter VX Enclosure User Manual (990-0393C) Provides product description, inventory of parts, installation instructions, specifications and warranty and service information.
AR2102BLK	NetShelter VX Open Frame User Manual (990-0398) Provides product description, inventory of parts, installation instructions, specifications, and warranty and service information.
AR2103BLK	NetShelter VX Enclosure User Manual (990-0393C) Provides product description, inventory of parts, installation instructions, specifications and warranty and service information.
AR2104BLK	NetShelter VX Enclosure User Manual (990-0393C) Provides product description, inventory of parts, installation instructions, specifications and warranty and service information.
AR2310BLK	NetShelter VX Enclosure User Manual (990-0393C) Provides product description, inventory of parts, installation instructions, specifications and warranty and service information.
AR2311BLK	NetShelter VX Enclosure User Manual (990-0393C) Provides product description, inventory of parts, installation instructions, specifications and warranty and service information.
AR2311BLK	NetShelter VX Enclosure User Manual (990-0393C) Provides product description, inventory of parts, installation instructions, specifications and warranty and service information.
AR2312BLK	NetShelter VX Networking Enclosure (990-1501) Provides product description, inventory of parts, installation instructions, specifications and warranty and service information.

NetShelter 4-Post Racks

Sku Number	Name of Document (Part Number) and Description
AR203	NetShelter 4-Post Open Frame Rack Installation Guide (990-1191) Provides product description, installation instructions, specifications, and warranty and service information.
AR204	NetShelter 4-Post Open Frame Rack Installation Guide (990-1191) Provides product description, installation instructions, specifications, and warranty and service information.

NetShelter Enclosure and 4-Post Rack accessories

Sku Number	Name of Document (Part Number) and Description
AR8160ABLK	Shielding Troughs and Shielding Partitions Installation Sheet (990-1393B) Provides installation instructions and grounding information for Shielding Troughs and Shielding Partitions.
AR8161ABLK	Shielding Troughs and Shielding Partitions Installation Sheet (990-1393B) Provides installation instructions and grounding information for Shielding Troughs and Shielding Partitions.
AR8162ABLK	Shielding Troughs and Shielding Partitions Installation Sheet (990-1393B) Provides installation instructions and grounding information for Shielding Troughs and Shielding Partitions.
AR8163ABLK	Shielding Troughs and Shielding Partitions Installation Sheet (990-1393B) Provides installation instructions and grounding information for Shielding Troughs and Shielding Partitions.
AR8164ABLK	Cable Ladders with Troughs and Partitions Installation Sheet (990-1576) Provides installation instructions and grounding information for Cable Ladders. Cable Ladder Installation (990-7212A) Provides installation instructions for Cable Ladders.
AR8165ABLK	Cable Ladders with Troughs and Partitions Installation Sheet (990-1576) Provides installation instructions and grounding information for Cable Ladders. Cable Ladder Installation (990-7212A) Provides installation instructions for Cable Ladders.
AR8169	Ladder Clamp Kit Installation Sheet (990-1252) Provides graphic installation instructions for the Ladder Clamp Kit.
AR8171BLK	Shielding Troughs and Shielding Partitions Installation Sheet (990-1393B) Provides installation instructions and grounding information for Shielding Troughs and Shielding Partitions.

Sku Number	Name of Document (Part Number) and Description
AR8172BLK	Shielding Troughs and Shielding Partitions Installation Sheet (990-1393B) Provides installation instructions and grounding information for Shielding Troughs and Shielding Partitions.
AR8173BLK	Shielding Troughs and Shielding Partitions Installation Sheet (990-1393B) Provides installation instructions and grounding information for Shielding Troughs and Shielding Partitions.
AR8174BLK	Trough Cover Installation Sheet (990-1274) Provides graphic instructions for the installation of the Trough Cover.
AR8175BLK	Trough Cover Installation Sheet (990-1274) Provides graphic instructions for the installation of the Trough Cover.
AR8176BLK	Trough Brackets Installation Sheet (990-1440) Provides graphic instructions for the installation of Trough Brackets.
AR8177BLK	Partition Brackets Installation Sheet (990-1439) Provides graphic instructions for the installation of Partition Brackets.
AR8168BLK	Cable Ladder Installation (990-7212A) Provides installation instructions for Cable Ladders.
AR8170BLK	Shielding Troughs and Shielding Partitions Installation Sheet (990-1393B) Provides installation instructions and grounding information for Shielding Troughs and Shielding Partitions. Shielding Trough Installation Sheet for 47U NetShelter VX (990-1453) Provides graphic installation instructions for the Shielding Trough with a 47U NetShelter VX.
AR8113	Cable Management Rings Installation Sheet (990-0184A) Provides graphic instructions for placing and installing the Cable Management Rings
AR8116BLK	Cable Containment Kit Installation Sheet (990-0716) Provides graphic instructions for the installation of the Cable Containment Kit.
AR8114BLK	Cable Tray Installation Sheet (990-6044) Provides graphic instructions for the installation of the Cable Tray.
AR8118BLK	Rear Cable Management Tray Installation Sheet (990-1116) Provides graphic instructions for the installation of the Rear Cable Management Tray.
AR8119BLK	Rear Cable Management Tray Installation Sheet (990-1116) Provides graphic instructions for the installation of the Rear Cable Management Tray.
AR8008BLK	Side Channel Cable Trough Installation Sheet (990-1204) Provides graphic instructions for the installation of the Side Channel Cable Trough.
AR8129	Cable Management Arm Installation Sheet (990-0310A) Provides graphic instructions for the installation of the Cable Management Arm.
AR8126ABLK	17" Keyboard Drawer Installation Sheet (990-0241C) Provides graphic instructions for the installation of the 17" keyboard drawer.

Sku Number	Name of Document (Part Number) and Description
AR8127BLK	19" Rotating Keyboard Drawer (990-0311A) Provides graphic instructions for the installation of the 19" rotating keyboard drawer.
AR8105BLK	Monitor Shelf Installation Sheet (990-7046B) Provides graphic instructions for the installation of the Monitor Shelf.
AR8122BLK	250lb Fixed Shelf Installation Sheet (990-0236B) Provides graphic instructions for the installation of the 250lb fixed shelf.
AR8123BLK	100lb Sliding Shelf Installation Sheet (990-0816) Provides description of inventory and mounting instructions for the 100lb Sliding Shelf.
AR8128BLK	200lb Sliding Shelf Installation Sheet (990-0309B) Provides graphic instructions for the installation of the 200lb Sliding Shelf.
AR8112BLK	Bolt Down Kit Installation Sheet (990-0187A) Provides graphic instructions for the installation of the Bolt Down Bracket Kit.
AR8115ABLK	Stabilizer Plate Kit Installation Sheet (990-7215) Provides graphic instructions for the installation of the Stabilizer Plate Kit.
AR8120BLK	Stabilizer Plate Kit for 75 mm Enclosure Instruction Sheet (990-1197) Provides graphic instructions for the installation of the Stabilizer Plate Kit for 750mm Enclosures.
AR8210BLK	Rack Fan Tray for NetShelter Enclosures Installation Sheet (990-0237B) Provides graphic instructions for the installation of the Rack Fan Tray for NetShelter Enclosures.
AR8211BLK	Declaration of Conformity (992-0015A) Specifies the directives that the Fan Tray for NetShelter VX Enclosures conforms with. Rack Fan Tray for NetShelter Enclosures Installation Sheet (990-0237B) Provides graphic instructions for the installation of the Rack Fan Tray for NetShelter Enclosures.
AR8006	Equipment Support Rails Installation Sheet (990-1247) Provides graphic instructions for the installation of Equipment Support Rails.
AR8013	Mounting Kit Installation Instructions (990-1322A) Provides inventory of parts, and installation instructions for the Mounting Kit for HP L-Class Server.
AR8014	Mounting Kit Installation Instructions (990-1323) Provides inventory of parts, and installation instructions for the Mounting Kit for HP N-Class Servers.
AR8150BLK	EIA Adapter Kit Installation Sheet (990-1200) Provides graphic instructions for the installation of the EIA adapter kit.
AR8390	Ground Kit Installation Sheet (990-0401) Provides inventory of parts and installation instructions for the Grounding Kit.

Sku Number	Name of Document (Part Number) and Description
AR8450	Roof for the 4-Post Rack Installation Sheet (990-1253) Provides instructions for the installation of the roof for the NetShelter 4-Post Rack.
AR8410	Baying Bracket for the 4-Post Rack Installation Sheet (990-1256) Provides inventory of parts and installation instructions for the Baying Bracket for the 4-Post Rack.
AR8411	Baying Bracket for the 4-Post Rack Installation Sheet (990-1256) Provides inventory of parts and installation instructions for the Baying Bracket for the 4-Post Rack.
AR8415	PDU Mounting Brackets Installation Sheet (990-1257) Provides graphic instructions for the installation of the PDU Mounting Brackets
AR8416	Toolless Mounting Brackets Installation Sheet (990-1261) Provides inventory of parts and installation instructions for the Toolless Mounting Brackets.
AR8417	PDU Adapter Brackets for the 4-Post Rack Installation Sheet (990-1324) Provides graphic instructions for installing the PDU Adapter Brackets.

Rack Automatic Transfer Switch

Sku Number	Name of Document (Part Number) and Description
AP7701	NetShelter 4-Post Open Frame Rack Installation Guide (990-1191) Provides product description, installation instructions, specifications, and warranty and service information. Provides a product overview, installation and configuration instructions and warranty and service information.
	Automatic Transfer Switch Interface User's Guide (990-1240A) Explains how the Automatic Transfer Switch can be managed through two internal interfaces.

KVM switches

Sku Number	Name of Document (Part Number) and Description
AP9254	KVM Switch Installation Guide (990-0318A) Provides installation, operation, and troubleshooting information for the KVM switches, along with product specifications and warranty information.
AP9258	KVM Switch Installation Guide (990-0318A) Provides installation, operation, and troubleshooting information for the KVM switches, along with product specifications and warranty information.
AP9278	KVM Switch Installation Guide (990-0827) Provides installation, operation, and troubleshooting information for the KVM switches, along with product specifications and warranty information.

Basic Rack PDUs

Sku Number	Name of Document (Part Number) and Description
AP7562	Rack Power Distribution Unit Installation Manual (990-1416A) Provides installation instructions, specifications, and warranty and service information.
AP7563	Rack Power Distribution Unit Installation Manual (990-1416A) Provides installation instructions, specifications, and warranty and service information.
AP7564	Rack Power Distribution Unit Installation Manual (990-1416A) Provides installation instructions, specifications, and warranty and service information.
AP9567	Rack Power Distribution Unit Installation Guide (990-1481) Provides installation instructions, specifications, and warranty and service information.
AP7530	Rack Power Distribution Unit Installation and Start-Up Guide (990-1417A) Provides installation instructions, specifications, and warranty and service information.
AP7540	Rack Power Distribution Unit Installation and Start-Up Guide (990-1417A) Provides installation instructions, specifications, and warranty and service information.
AP7580	Rack Power Distribution Unit Installation Manual (990-1583A) Provides installation instructions, specifications, and warranty and service information.
AP7581	Rack Power Distribution Unit Installation Manual (990-1583A) Provides installation instructions, specifications, and warranty and service information.
AP7582	Rack Power Distribution Unit Installation Manual (990-1583A) Provides installation instructions, specifications, and warranty and service information.
AP7584	Rack Power Distribution Unit Installation Manual (990-1583A) Provides installation instructions, specifications, and warranty and service information.
AP7583	Rack Power Distribution Unit Installation Manual (990-1583A) Provides installation instructions, specifications, and warranty and service information.
AP9559	Power Distribution Unit Installation Guide (990-7213) Provides installation instructions, specifications, and warranty and service information.
AP9558	APC PDU Installation Manual (990-6049B) Provides installation instructions, specifications, and warranty and service information.
AP9562	Power Distribution Units Installation Guide (990-1215B) Provides installation instructions, specifications, and warranty and service information.
AP9563	Power Distribution Units Installation Guide (990-1215B) Provides installation instructions, specifications, and warranty and service information.
AP9566	Power Distribution Units Installation Guide (990-1535) Provides installation instructions, specifications, and warranty and service information.
AP9568	Rack Power Distribution Unit Installation Manual (990-1487) Provides installation instructions, specifications, and warranty and service information.

Metered Rack PDUs

Skus Number	Name of Document (Part Number) and Description
AP7622	<p>Metered Rack PDU User's Manula (990-0565A) Provides installation, operation, and configuration instructions as well as specifications and warranty and service information.</p>
AP7610	<p>Metered Rack PDU User's Manual (990-1474) Provides installation, operation, and configuration instructions as well as specifications and warranty and service information.</p>

Switched Rack PDUs

Skus Number	Name of Document (Part Number) and Description
AP7900	<p>Switched Rack PDU Sheet (990-1411) Provides an overview of the product and product specifications.</p> <p>PowerNet Management Information Base Manual (990-6052F) Describes how to use the PowerNet Management Information Base to manage APC products that allow or enable using SNMP protocol for management.</p> <p>Switched Rack PDU Installation and Quick Start Manual (990-1367A) Provides installation and configuration information in addition to warranty and service information.</p> <p>Power Distribution Units Online Guide Addendum (990-1748) Describes how to use the Management Card Wizard with the Switched Rack PDU.</p>
AP7901	<p>Switched Rack PDU Sheet (990-1411) Provides an overview of the product and product specifications.</p> <p>PowerNet Management Information Base Manual (990-6052F) Describes how to use the PowerNet Management Information Base to manage APC products that allow or enable using SNMP protocol for management.</p> <p>Switched Rack PDU Installation and Quick Start Manual (990-1367A) Provides installation and configuration information in addition to warranty and service information.</p> <p>Power Distribution Units Online Guide Addendum (990-1748) Describes how to use the Management Card Wizard with the Switched Rack PDU.</p>
AP7920	<p>Switched Rack PDU Installation and Quick Start Manual (990-1367A) Provides installation and configuration information in addition to warranty and service information.</p> <p>Power Distribution Units Online Guide Addendum (990-1748) Describes how to use the Management Card Wizard with the Switched Rack PDU.</p>
AP7921	<p>Switched Rack PDU Sheet (990-1527) Provides an overview of the product and product specifications.</p> <p>Switched Rack PDU Installation and Quick Start Manual (990-1367A) Provides installation and configuration information in addition to warranty and service information.</p>

Sku Number	Name of Document (Part Number) and Description
	Power Distribution Units Online Guide Addendum (990-1748) Describes how to use the Management Card Wizard with the Switched Rack PDU.
AP7960	Switched Rack PDU Installation and Quick Start Manual (990-1486) Provides installation and configuration information in addition to warranty and service information. Switched Rack PDU Sheet (990-1488) Provides an overview of the product and product specifications. Bracket Kit for Vertical Rack PDUs (990-1644) Provides instructions for installing the Bracket Kit for Vertical Rack PDUs. Power Distribution Units Online Guide Addendum (990-1748) Describes how to use the Management Card Wizard with the Switched Rack PDU.
AP7961	Switched Rack PDU Installation and Quick Start Manual (990-1486) Provides installation and configuration information in addition to warranty and service information. Bracket Kit for Vertical Rack PDUs (990-1644) Provides instructions for installing the Bracket Kit for Vertical Rack PDUs. Power Distribution Units Online Guide Addendum (990-1748) Describes how to use the Management Card Wizard with the Switched Rack PDU.

Power

Symmetra RM UPS

Sku Number	Name of Document (Part Number) and Description
SYH2K6RMT	Row Expander PDU Installation Guide (990-3005)
SYH4K6RMT	Provides safety requirements, an overview of the Row Expander PDU and installation instructions for a 1070mm NetShelter or rack.
SYH6K6RMT	
	Symmetra RM 2–6kVA N +1 Installation Guide (990-7802A) Provides safety information, installation instructions, operating instructions, warranty information, and specifications.
	Symmetra RM 2–6kVA Installation Guide Addendum (990-1222) Provides instructions for installing the Symmetra RM into a 4-Post Rack.
	Symmetra RM 2-Post Rack Installation Sheet (990-7807) Provides a graphical depiction of how to install the Symmetra RM into a 2-Post rack.
	InfraStruXure For Small Data Centers Sheet (990-7207A) Provides an overview of an installation for InfraStruXure for Small Data Centers.
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SYP6K12RMT	Symmetra RM 4–12kVA Manual (990-7810B)
SYP8K12RMT	Provides safety information, installation instructions, operating instructions, warranty information, and specifications.
	Web/SNMP Management Card Installation and Quick Start Guide (990-6008C) Provides installation and configuration instructions for the Web/SNMP Management SmartSlot Card.

Symmetra PX 40kW UPS

Sku Number	Name of Document (Part Number) and Description
SY10K40F	Symmetra PX 10–40kW 208V Quick Start Guide (990-4061A)
SY20K40F	Provides safety instructions, installation instructions, system start-up procedure, and basic trouble shooting instructions.
SY30K40F	
SY40K40F	
	Symmetra PX 10–40kW 208V Site Preparation Guide (990-4060B) Provides instructions on how to prepare a site for the installation of the Symmetra PX UPS.
	Symmetra PX 10–40kW 208V Basic Operation Guide (990-4104B) Provides instructions for the basic operation of the Symmetra PX 10–40kW UPS
	Symmetra PX 10–40kW 208V Receiving and Unpacking Guide (990-4150B) Provides instructions for receiving, unpacking and moving to installation site.
	Symmetra PX 10–40kW 208V Electrical Installation Guide (990-4063D) Provides safety and electrical installation instructions.

Symmetra PX 80kW UPS

Sku Number	Name of Document (Part Number) Description
SY10K80F	Symmetra PX 10–80kW 208V Installation Guide (990-1428A)
SY20K80F	Provides safety instructions, electrical information, and installation instructions.
SY30K80F	Symmetra PX 10–80kW 208V Site Preparation Guide (990-1425A)
SY40K80F	Provides instructions for preparing the site for installation of the UPS.
SY50K80F	Symmetra PX 10–80kW 208V Operation and Maintenance Manual (990-1430)
SY60K80F	Provides operation, system start-up, and troubleshooting information for the UPS.
SY70K80F	Symmetra PX 10–80kW 208V Receiving and Unpacking Guide (990-1427A)
	Provides instructions on how to receive the UPS, move it to the installation site, and unpack it safely.

XR Battery Enclosure

Sku Number	Name of Document (Part Number) Description
SYCFXR8	Symmetra PX XR Battery Enclosure Installation Manual (990-4125C)
	Provides electrical requirements, installation instructions, and warranty information.
	XR Battery Enclosure Receiving, Unpacking, and Moving Guide (990-4144A)
	Provides instructions on how to safely receive, unpack, and move the unit to the installation site.
	XR Battery Enclosure Quick Start and Basic Installation Guide (990-4145A)
	Provides safety instructions, basic troubleshooting instructions, and installation instructions for the unit.

Symmetra PX 80kW Battery Enclosure

Sku Number	Name of Document (Part Number) Description
SYCF8BF	Symmetra PX Battery Enclosure Receiving, Unpacking, and Moving to Site (990-1423)
	Provides instructions on how to safely receive, unpack, and move the unit to the site. Also provides explanation of operating conditions and weights and dimensions of the module.
	Symmetra PX Battery Enclosure Installation Manual (990-1424A)
	Provides safety instructions and installation procedures for the Enclosure.
	Symmetra PX Battery Enclosure Operation and Maintenance Manual (990-1426A)
	Provides an overview of system components, operation instructions, maintenance instructions, and warranty information.

Symmetra MW UPS

Sku Number	Name of Document (Part Number) Description
SY600K600G	Symmetra MW 600kW 480V Site Preparation Guide (990-1632) Provides a system overview, site preparation information, specifications, and wiring and grounding information.
	Symmetra MW 600kW 480V User Guide (990-1628) Provides a system overview, overview of operational modes, alarms/troubleshooting information, and warranty information.
	Symmetra MW 600kW 480V Installation Guide (990-1629) Provides safety instructions, system overview, mechanical and electrical installation instructions, specifications, and warranty information.
	Symmetra MW Parallel System with External Static Switch User Guide (990-1889) Provides a system overview, operating instructions, display information, alarms, and troubleshooting information.
SY800K800G	Symmetra MW 800kW 480V User Guide (990-1377A) Provides safety instructions, system overview, overview of operational modes, and warranty information.
	Symmetra MW 800kW 480V Site Preparation Guide (990-1380A) Provides safety instructions, space considerations, site preparation instructions, specifications, and wiring and grounding information.
	Symmetra MW 800kW 480V Installation Guide (990-1382B) Provides safety instructions, installation instructions, and warranty information.
	Symmetra MW Receiving and Unpacking Guide (990-4114A) Provides instructions on safely receiving, unpacking, and moving the UPS to the installation site.
	Symmetra MW Parallel System with External Static Switch User Guide (990-1889) Provides a system overview, operating instructions, display information, alarms, and troubleshooting information.
SY1000K1000G	Symmetra MW 1MW 480V Site Preparation Guide (990-4111) Provides safety instructions, space considerations, site preparation instructions, specifications, and wiring and grounding information.
	Symmetra MW 1MW 480V User Guide (990-4119) Provides a system overview, overview of operational modes, alarms/troubleshooting information, and warranty information.
	Symmetra MW 1MW 480V Installation Guide (990-4112A) Provides safety instructions, installation instructions, and warranty information.
	Symmetra MW Receiving and Unpacking Guide (990-4114A) Provides instructions on safely receiving, unpacking, and moving the UPS to the installation site.
	Symmetra MW Parallel System with External Static Switch User Guide (990-1889) Provides a system overview, operating instructions, display information, alarms, and troubleshooting information.

Smart-UPS

Skus Number	Name of Document (Part Number)	Description
SUM1500RMXL2U	Smart-UPS User Guide (990-1704)	Provides installation, start-up and operation instructions along with maintenance, troubleshooting, and warranty information.
SU5000RMXL5U	Smart-UPS User Guide (990-1056A)	Provides information on how to install the battery pack.
	Smart-UPS User Guide (990-1139)	Provides installation, start-up and operation instructions along with maintenance, troubleshooting, and warranty information.
	Smart-UPS Rail Kit Instructions (990-7034G)	Provides graphic instructions for installing the Smart-UPS rail kit.

40 kW InfraStruXure PDU

Skus Number	Name of Document (Part Number)	Description
PD40F6FK1-M PD40G6FK1-M	40kW InfraStruXure PDU Operation and Maintenance Manual (990-1484B)	Describes PDU components and display interface menus and provides information on the basic system operation and maintenance.
	InfraStruXure 40kW System Installation and Start-Up (990-1483B)	Provides safety instructions, site planning information, installation procedures, start-up procedures, and system operation instructions.
	How to Connect Utility Conductors to the 40kW InfraStruXure PDU (990-1177A)	Provides electrician's instructions for connecting the utility conductors to the InfraStruXure PDU.
	InfraStruXure Label Kit Guide (990-1225B)	Describes the labels provided in the InfraStruXure label kit and provides instructions for how to use them correctly.

60kW InfraStruXure PDU

Skus Number	Name of Document (Part Number)	Description
PD60F6FK1-M PD60G6FK1-M	60kW InfraStruXure PDU Operation and Maintenance (990-1600B)	Describes PDU components and display interface menus and provides information on the basic system operation and maintenance.
	InfraStruXure 60kW System Installation and Start-Up (990-1638B)	Provides safety instructions, site planning information, installation procedures, start-up procedures, and system operation instructions..

80 kW InfraStruXure PDU

Sku Number	Name of Document (Part Number) Description
PD80F6FK1-M PD80G6FK1-M PD80L6FK1-M	<p>InfraStruXure 80kW System Installation and Start-Up (990-1467B) Provides safety instructions, site planning information, instllation procedures, start-up procedures, and system operation instuctions. .</p> <p>80kW InfraStruXure PDU Operation and Maintenance (990-1468B) Describes PDU components and display interface menus and provides information on the basic system operation and maintenance.</p> <p>Certified Electrician’s Instructions (990-1469B) Provides electrician’s instructions for connecting the utility conductors to the InfraStruXure PDU.</p> <p>InfraStruXure Label Kit Guide (990-1225B) Describes the labels provided in the InfraStruXure label kit and provides instructions for how to use them correctly.</p>

Rack Distribution Panel

Sku Number	Name of Document (Part Number) Description
PDRDPF10U	<p>Rack Distribution Panel Installation and Operation (990-1492B) Provides safety instructions, overview of components, installation instructions, maintenance instructions, specifications, and warranty information.</p>

Emergency Power Off (EPO) System

Sku Number	Name of Document (Part Number) Description
EPW9	<p>Emergency Power Off System Installation and Operation (990-1611A) Provides safety, installation, and operation instructions, along with specifications and warranty information for the EPO system.</p>

Air

NetworkAIR Rack Air Distribution Unit

Sku Number	Name of Document (Part Number) Description
ACF001	Air Distribution Unit Installation, Operation, and Maintenance (990-7206A) Provides safety information, installation instructions, operation instructions, warranty and service information, specifications, and life-support policy for the NetworkAIR Rack Air Distribution Unit

NetworkAIR Rack Air Removal Unit

Sku Number	Name of Document (Part Number) Description
ACF101BLK	Rack Air Removal Unit Installation Manual (990-1232A) Provides safety information, installation instructions, operation instructions, warranty and service information, specifications, and life-support policy for the NetworkAIR Rack Air Removal Unit.

NetworkAIR FM Precision Air Conditioning

Sku Number	Name of Document (Part Number) Description
FM35-50	Temperature and Humidity Probe Installation Sheet (990-9228C) Provides instructions for installing the temperature and humidity probe for the NetworkAIR FM unit. Water Spot Detector Installation Sheet (990-1516) Provides instructions for installing the NetworkAIR Water Spot Detector. NetworkAIR FM Operation, Maintenance, and Troubleshooting (990-1260) Provides operation instructions, maintenance instructions, troubleshooting instructions, and warranty information for the NetworkAIR FM unit. NetworkAIR FM Installation Manual (990-1138A) Provides information on receiving the unit, installing the unit, starting and commissioning the unit, and warranty information. Side Panel Kit Installation Sheet (990-1503A) Provides instructions on how to install the NetworkAIR FM side panel. NetworkAIR FM Management Card Addendum (990-1787) Provides information on configuring and using management cards for the NetworkAIR FM air conditioner. NetworkAIR FM Technical Data Manual (990-1100B) Provides an overview of the product in addition to diagrams and product specifications. NetworkAIR FM Addendum (990-1830) Provides a correction to the lengths of common valves and fittings that appears in the installation manual (990-1138A).

Sku Number	Name of Document (Part Number) Description
	<p>Leak Detection System Installation Sheet (990-1521A) Provides instructions for installing the Leak Detection System for the Network AIR FM.</p> <p>NetworkAIR FM User’s Guide (990-1608) Provides product description and instructions for initial setup and operation of the FM’s Network Management Catd.</p> <p>NetworkAIR FM Main Module and Extension Floorstand Installation (990-1282) Provides instructions for identifying the parts of, and installing the floorstands for the NetworkAIR FM units.</p>

NetworkAIR PA 4000

Sku Number	Name of Document (Part Number) Description
ACPA4000	<p>NetworkAIR PA Installation, Operation, and Maintenance (990-0412A) Provides product information, operation instructions, maintenance and troubleshooting information for the NetworkAIR PA.</p>

Hot Aisle Containment System

Sku Number	Name of Document (Part Number) Description
ACDC1004	<p>Hot Aisel Containment Manual (990-1607) Provides installation instructions for the NetworkAIR Hot Aisle Containment System</p>
ACDC1000	
ACDC1001	
ACDC1002	
ACDC1003	
ACDC1005	
ACDC1006	
ACDC1007	
ACDC1008	
ACDC1009	
ACDC1010	
ACDC1011	
ACDC1012	

NetworkAIR IR

Sku Number	Name of Document (Part Number) Description
IR40-CCA-ESA	<p>NetworkAIR Installation Manual (990-1495A) Provides installation instructions for the NetworkAIR IR</p> <p>NetworkAIR IR Operation and Maintenance Manual (990-1496A) Provides operation and maintenance instructions for the NetworkAIR IR</p> <p>NetworkAIR IR Technical Data Manual (990-1919A) Provides the technical specifications and diagrams for the NetworkAIR IR.</p>
IR40-CDA-ESA	
IR40-CEA-ESA	
IR40-CMA-ESA	

Management

InfraStruXure Manager

Sku Number	Name of Document (Part Number) Description
AP9420A	InfraStruXure Manager User's Guide --Online Help (990-1394A) Provides a product overview, installation instructions, configuration instructions, specifications, and warranty information. Addendum—InfraStruXure Manager v 4.1 (990-1783) Provides instructions on how to import v 4.1 settings to the InfraStruXure Manager. Addendum—Updating InfraStruXure Manager (990-1920) Provides instructions for updating an InfraStruXure Manager server when an update is available for that server.

Modbus/Jbus Integration Card

Sku Number	Name of Document (Part Number) Description
AP9622	Building Management Integration Installation and Operation (990-7410A) Provides a product description, installation, configuration, connection, and operation instructions, specifications, warranty and service information. Building Management Card Addendum—Register Descriptions (990-1223) Lists the UPS register reads for a building management system through the Building Management Integration Card. Installing Multiple Management Cards (990-0231D) Provides detailed instructions for how to install more than one APC management card.

Environmental Management System

Sku Number	Name of Document (Part Number) Description
AP9320	Environmental Management System Installation Manual (990-1285) Provides product information, installation and configuration instructions, and warranty and service information. Environmental Management System User's Guide (990-1364) Provides product information and instructions for the web and control console management interfaces. Safety—Manual Addendum (990-1727) Provides an additional safety warning for the Environmental Management System's Installation Manual.

Environmental Monitoring Unit

Sku Number	Name of Document (Part Number) Description
AP9319	Environmental Monitoring Unit Installation and Quick Start (990-1442) Provides a product overview, installation instructions, configuration instructions, specifications, and warranty information.
	Environmental Monitoring Unit User's Guide (990-1626) Provides a product description and operation instructions for the Environmental Monitoring Unit.

Network Management Card EX

Sku Number	Name of Document (Part Number) Description
AP9617	Installing Multiple Management Cards (990-0231D) Provides detailed instructions for installing multiple management cards in a UPS.
	How to Upgrade a Network Management Card (990-1349) Describes the types of upgrades available and provides instructions for upgrading the cards firmware.
	Management Information Base Reference Guide (990-6052G) Describes how to manage APC products that can be monitored and configured with the Simple Network Management Protocol (SNMP).
	Network Management Card User's Guide (990-0385C) Provides instructions for operation, customization, and integration with other products.
	Network Management Card Addendum (990-6015G) Provides an overview of configuring and using the APC Management Card Wizard application for single or multiple Network Management Cards.
	Network Management Card Installation and Quick-Start (990-7142B) Provides installation and configuration instructions for the Network Management Card in a UPS.
	Configurable Events: Network Management Cards and Related UPSs (990-1872) Serves as a reference guide listing configurable events.

Network Management Card with Environmental Monitoring and Modem

Sku Number	Name of Document (Part Number) Description
AP9618	Regulatory Agency Compliance (990-1350) Provides a description of regulatory and certification information for the Network Management Card.
	Installing Multiple Management Cards (990-0231D) Provides detailed instructions for installing multiple management cards in a UPS.
	Management Information Base Reference Guide (990-6052G) Describes how to manage APC products that can be monitored and configured with the Simple Network Management Protocol (SNMP).

Sku Number	Name of Document (Part Number) Description
	<p>Network Management Card User's Guide (990-0385C) Provides instructions for operation, customization, and integration with other products.</p> <p>Network Management Card Addendum (990-6015G) Provides an overview of configuring and using the APC Management Card Wizard application for single or multiple Network Management Cards.</p> <p>Network Management Card Installation and Quick-Start (990-7142B) Provides installation and configuration instructions for the Network Management Card in a UPS.</p> <p>Configurable Events: Network Management Cards and Related UPSs (990-1872) Serves as a reference guide listing configurable events.</p>

Network Management Card with Environmental Monitor

Sku Number	Name of Document (Part Number) Description
AP9619	<p>Installing Multiple Management Cards (990-0231D) Provides detailed instructions for installing multiple management cards in a UPS.</p> <p>Management Information Base Reference Guide (990-6052G) Describes how to manage APC products that can be monitored and configured with the Simple Network Management Protocol (SNMP).</p> <p>Network Management Card User's Guide (990-0385C) Provides instructions for operation, customization, and integration with other products.</p> <p>Network Management Card Addendum (990-6015G) Provides an overview of configuring and using the APC Management Card Wizard application for single or multiple Network Management Cards.</p> <p>Network Management Card Installation and Quick-Start (990-7142A) Provides installation and configuration instructions for the Network Management Card in a UPS.</p> <p>Configurable Events: Network Management Cards and Related UPSs (990-1872) Serves as a reference guide listing configurable events.</p>

InfraStruXure Systems

InfraStruXure for wiring closets and computer rooms

Name of Document (Part Number)	Description
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Installation Overview Closed Rack Systems (990-1212)

Sheet that provides an overview of system installation and setup for closed rack systems.

InfraStruXure Site Preparation, Planning, and Installation (990-1658A)

Provides an overview of the system components, site preparation and planning instructions, basic installation procedures, and basic connection procedures.

InfraStruXure Installation Overview 1.4, 1.5, and 3kVA Rack Systems (990-1438)

Provides a graphic overview of installation instructions for 1.4, 1.5, and 3kVA Rack Systems.

Site Preparation Guide, Seismic Closed Rack Systems (990-1391)

Provides information on preparing a site for installation, including environmental requirements, required clearances, weights, electrical requirements, and a sample configuration.

Site Preparation Guide, 2–6kVA Systems (990-7211A)

Provides information on preparing a site for installation, including environmental requirements, required clearances, weights, electrical requirements, and a sample configuration.

InfraStruXure Installation Overview 4–12kVA Systems (990-7202A)

Provides a graphic overview of installation instructions for 4–12kVA systems.

Site Preparation Guide, 4–12kVA Systems (990-7209A)

Provides information on preparing a site for installation, including environmental requirements, required clearances, weights, electrical requirements, and a sample configuration.

Site Preparation Guide, 5kVA Systems (990-1229)

Provides information on preparing a site for installation, including environmental requirements, required clearances, weights, electrical requirements, and a sample configuration.

Site Preparation Guide, 1.4 and 3kVA Closed Rack Systems (990-1454)

Provides information on preparing a site for installation, including environmental requirements, required clearances, weights, and electrical requirements.

InfraStruXure for small and medium data centers

Name of Document (Part Number)	Description
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InfraStruXure 20kW System Installation, Operation, and Maintenance (990-1493)

Provides safety, site planning information, installation instructions, start-up instructions, quick configuration instructions, operation instructions, troubleshooting advice, maintenance instructions, and specifications for the 20kW system.

InfraStruXure 40kW System Installation and Start-Up (990-1483A)

Provides safety instructions, site planning information, installation procedures, start-up procedures, and system operation instructions.

Emergency Power Off System Installation and Operation (990-1611A)

Provides safety, installation, and operation instructions, along with specifications and warranty information for the EPO system.

InfraStruXure Label Kit (990-1225A)

Provides a guide for labeling the components of the InfraStruXure system.

InfraStruXure 80kW System Installation and Start-Up Manual (990-1467A)

Provides safety instructions, site planning information, installation procedures, start-up procedures, and system operation instructions.

InfraStruXure for large data centers

Name of Document (Part Number)	Description
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InfraStruXure 60kW System Installation and Start-Up (990-1638A)

Provides safety instructions, site planning information, installation procedures, start-up procedures, and system operation instructions.

Bid Specifications

Overview

This section contains specifications for use during the bid process. They are:

- InfraStruXure for small data centers
- InfraStruXure for medium data centers

Due to the InfraStruXure architecture, these guide specifications contain not only UPS systems, but also rack systems, transfer switches, distribution, transformers, air conditioning, and more.

InfraStruXure for Small Data Centers

Guide specifications for 10kW–20kW UPS/distribution

PART 1 — GENERAL

1.01 SUMMARY

- A. This specification describes the operation and functionality of a continuous duty, three-phase, solid-state, static Uninterruptible Power System (UPS) hereafter referred to as the UPS. The UPS shall utilize a N +1 redundant, scalable array architecture. The system power train shall be comprised of hot swappable/ user replaceable 10kW/10kVA power modules, which shall operate in parallel, and be configured for N + 1 redundant operation at rated load. Each 10kVA/10kW power module contains a full rated input rectifier / boost converter (hereafter referred to as Input Converter), full rated output inverter, and 10% battery charging circuit. The system shall also comprise of a user-replaceable continuous duty bypass static switch module, hot swappable / user replaceable battery modules, redundant control modules, redundant logic power supplies, and LCD interface display. System static switch shall be capable of being fed from the same input as the rectifier or a separate input. All of the above system components are housed in two standard, 24 inch wide, 36 inch deep, 42U high equipment racks.
- B. In addition, this specification describes the performance, functionality, and design of the UPS Maintenance Bypass Cabinet and power distribution section of the UPS. In addition this specification also includes multi-conductor overhead distribution, rack level power management products, the battery system, and connectivity solutions including complete InfraStruXure™ system management solutions.
- C. The UPS and associated equipment shall operate in conjunction with a primary power supply and an output distribution section to provide quality uninterrupted power and distribution for mission critical, electronic equipment load. The entire system shall bear the UL60950 listing as a complete product solution.
- D. All programming and miscellaneous components for a fully operational system as described in this specification shall be available as part of the system.

1.02 STANDARDS

- A. UL 1778—Uninterruptible Power Supply Equipment
- B. UL60950—Information Technology Equipment

- C. Where applicable, the UPS shall also be designed in accordance with publications from the following organizations and committees:
 - 1. NFPA—National Fire Protection Associations
 - 2. NEMA—National Electrical Manufacturers Associations
 - 3. OSHA—Occupational Safety and Health Administration
- D. IEEE 519-1992 Standard Practices and Requirements for Harmonic Control in Electrical Power System.
- E. ISO 9001
- F. ISO14001

1.03 UPS MODES OF OPERATION

- A. **Normal:** The input converter and output inverter shall operate in an on-line manner to continuously regulate power to the critical load. The input and output converters shall be capable of full battery recharge while simultaneously providing regulated power to the load for all line and load conditions within the range of the UPS specifications.
- B. **Battery:** Upon failure of the AC input source, the critical load shall continue being supplied by the output inverter, which shall derive its power from the battery system. There shall be no interruption in power to the critical load during both transfers to battery operation and retransfers from battery to normal operation.
- C. **Recharge:** Upon restoration of the AC input source, the input converter and output inverter shall simultaneously recharge the battery and provide regulated power to the critical load.
- D. **Static Bypass:** The static bypass shall be used to provide transfer of critical load from the Inverter output to the bypass source. This transfer, along with its retransfer, shall take place with no power interruption to the critical load. In the event of an emergency, this transfer shall be an automatic function.
- E. **Maintenance Bypass:** The system shall be equipped with an external make-before-break Maintenance Bypass Cabinet (MBC) to electrically isolate the UPS during routine maintenance and service of the UPS. The MBC shall completely isolate both the UPS input and output connections.

1.04 SUBMITTALS

- A. Proposal Submittals
 - 1. As bid system bill of materials.
 - 2. Product catalog sheets or equipment brochures.
 - 3. Product guide specifications.

4. System single-line operation diagram.
5. Installation information, including weights and dimensions.
6. Information about terminal locations for power and control connections.
7. Drawings and details for requested optional accessories.

B. Delivery Submittals

1. Installation manual, which includes instructions for storage, handling, examination, preparation, installation, and start-up of the UPS.
2. User manual, which includes operating instructions.
3. As built equipment drawings.
4. InfraStruXure™ welcome package.

PART 2 — PRODUCT

2.01 DESIGN REQUIREMENTS

- A. The UPS shall be sized for _____ kVA and _____ kW load.
- B. The UPS battery shall be sized for _____ at a Power Factor of _____ for _____ minutes.

2.02 SYSTEM CHARACTERISTICS

- A. System Capacity: The system shall be rated for full kW output in the following frame sizes:
 1. 20 kVA/kW —Can be configured with up to (3), 10kW power modules for N+1.
- B. Input
 1. AC Input Nominal Voltage: 208 V, 3 Phase, 4 wire, 50/60 Hz.
 2. AC Input Voltage Window: +/- 15% of nominal (while providing nominal charging to the battery system).
 3. Short Circuit Withstand Rating: 30,000 Symmetrical Amperes
 4. Maximum Frequency Range: 40–70Hz
 5. Input Power Factor:
 - a. Minimum 0.99 lagging at 50% load.
 - b. Minimum 0.99 lagging at 100% load.
 6. Input Current Distortion *with no additional filters*:
 - a. < 6% at 100% load
 - b. < 6% at 50% load
 7. Soft-Start: Shall be linear from 0–100% input current and shall not exhibit inrush. This shall take place over a 15 second time period.

C. UPS Output

1. AC Output Nominal Voltage: 208V, 3 Phase, 4 wire, 60 Hz.

2. AC Output Voltage Distortion: Max. 3% at 100% Linear Load.
3. AC Output Voltage Regulation: +/- 1% For 100 % Linear or Nonlinear Load.
4. Voltage Transient Response: +/- 5% maximum for 100% load step.
5. Voltage Transient Recovery within <60 milliseconds
6. Output Voltage Harmonic Distortion:
 - a. <2% THD maximum and 1% single harmonic for a 100% linear load
 - b. <5% THD maximum for a 100% non-linear load
7. Phase Angle Displacement:
 - a. 120 degrees +/- 1 degree for balanced load
 - b. 20 degrees +/- 1 degrees for 50% imbalanced load
 - c. 120 degrees +/- 3 degrees for 100% imbalanced load
8. Overload Rating:
 - a. Normal Operation:
 1. 150% for 30 seconds
 2. <105% continuous
 - b. Bypass Operation:
 1. 125% continuous
 2. 1000% for 500 milliseconds
9. System AC-AC Efficiency: >91.5% at 100% load
10. Output Power Factor Rating: The UPS output shall not require derating for purely resistive loads (PF of 1). The output kW and kVA ratings of the UPS shall be equal. For loads exhibiting a power factor of .9 leading to .8 lagging no derating of the UPS shall be required.

2.03 ENVIRONMENTAL

- A. Storage and Ambient temperature: -40°F to 158°F (-40°C to 70°C).
- B. Operating Ambient Temperature: +32°F to 104°F (0°C to 40°C). (77°F is ideal for most battery types).
- C. Relative Humidity: 0 to 95% , non-condensing
- D. Altitude: Maximum installation with no derating of the UPS output shall be 10,000 feet (3000m) above sea level.

2.04 INPUT POWER CONVERTER

- A. The input power converters of the system are housed within the parallel connected, removable power modules, and shall constantly control the power imported from the mains input of the system, to provide the necessary UPS power for precise regulation of the DC bus voltage, battery charging, and Main Inverter regulated output power.
- B. Input Current Total Harmonic Distortion: The input current THDI shall be held to 6% or less at full system, while providing conditioned power to the critical load bus, and charging the batteries under steady-state operating conditions. This shall be true while supporting loads of both a linear or non-linear type. This shall be accomplished with no additional filters, magnetic devices, or other components.

- C. **Soft-Start Operation:** As a standard feature, the UPS shall contain soft-start functionality, capable of limiting the input current from 0-100% of the nominal input over a default 15 second period, when returning to the AC utility source from battery operation. The change in current over the change in time shall take place in a linear manner throughout the entire operation. ($di/dt = \text{constant}$).
- D. **Magnetization Inrush Current:** The UPS shall exhibit 0% inrush current.
- E. **Input Current Limit:**
 - 1. The input converter shall control and limit the input current draw from utility to 150% of the UPS output. During conditions where input current limit is active, the UPS shall be able to support 100% load, charge batteries at 10% of the UPS output rating, and provide voltage regulation with mains deviation of up to +/-15% of the nominal input voltage.
 - 2. In cases where the source voltage to the UPS is nominal and the applied UPS load is equal to or less than 100% of UPS capacity, input current shall not exceed 126% of UPS output current, while providing full battery recharge power and importing necessary power for system losses.
- F. **Redundancy:** The UPS shall be configured with redundant input converters, each with semiconductor fusing, and logic controlled contactors to remove a failed module from the input bus.
- G. **Charging:**
 - 1. The battery charging shall keep the DC bus float voltage of +/- 220v, +/-1%.
 - 2. The battery charging circuit shall contain a temperature compensation circuit, which will regulate the battery charging to optimize battery life.
 - 3. The battery charging circuit shall remain active when in Static Bypass and in Normal Operation.
- H. **Back-feed Protection:** The above-mentioned logic controlled contactor also provides the back-feed protection required by UL1778.

2.05 OUTPUT INVERTER

- A. The UPS output inverter shall constantly recreate the UPS output voltage waveform by converting the DC bus voltage to AC voltage through a set of IGBT driven power converters. In both normal operation and battery operation, the output inverters shall create an output voltage independent of the mains input voltage. Input voltage anomalies such as brown-outs, spikes, surges, sags, and outages shall not affect the amplitude or sinusoidal nature of the recreated output voltage sine wave delivered by the output inverters.
- B. **Overload Capability:** The output power converters shall be capable of 300% for short-circuit clearing. Steady-state overload conditions, of up to 150% of system capacity, shall be sustained by the inverter for 30 seconds in normal and battery operation. Should

overloads persist past the outlined time limitation, the critical load will be switched to the automatic static bypass output of the UPS.

- C. Output Contactor: The output inverter shall be provided with an output mechanical contactor to provide physical isolation of the inverter from the critical bus. With this feature a failed inverter shall be removed from the critical bus.
- D. Battery Protection: The inverter shall be provided with monitoring and control circuits to limit the level of discharge on the battery system.
- E. Redundancy: The UPS shall be configured with redundant output inverters, each with semiconductor fusing, and logic controlled contactors to remove a failed component from the critical bus.

2.06 STATIC BYPASS

- A. As part of the UPS, a system static bypass switch shall be provided. The system static bypass shall provide no break transfer of the critical load from the Inverter output to the static bypass input source during times where maintenance is required, or the inverter can not support the critical bus. Such times may be due to prolonged or severe overloads, or UPS failure. The UPS and static bypass switch shall constantly monitor the auxiliary contacts of their respective circuit breakers, as well as the bypass source voltage, and inhibit potentially unsuccessful transfers to static bypass from taking place.
- B. The design of the static switch power path shall consist of Silicon Controlled Rectifiers (SCR) with a continuous duty rating of 125% of the UPS output rating.
- C. Automatic Transfers: An automatic transfer of load to static bypass shall take place whenever the load on the critical bus exceeds the overload rating of the UPS. Automatic transfers of the critical load from static bypass back to normal operation shall take place when the overload condition is removed from the critical bus output of the system. Automatic transfers of load to static bypass shall also take place if for any reason the UPS cannot support the critical bus.
- D. Manual Transfers: Manually initiated transfers to and from static bypass shall be initiated through the UPS display interface.
- E. Overloads: The static bypass shall be rated and capable of handling overloads equal to or less than 125% of the rated system output continuously. For instantaneous overloads caused by inrush current from magnetic devices, or short circuit conditions, the static bypass shall be capable of sustaining overloads of 1000% of system capacity for periods of up to 500 milliseconds.
- F. Modularity: The static bypass switch shall be of a modular design.

G. System Protection:

1. As a requirement of UL1778, back-feed protection in the static bypass circuit shall also be incorporated in the system design. To achieve back-feed protection, a mechanical contactor in series with the bypass SCR(s) shall be controlled by the UPS/static switch by any source connected to the critical output bus of the system is occurring. One such condition could be a result of a shorted SCR.

2.07 DISPLAY AND CONTROLS

- A. Control Logic: The UPS shall be controlled by two fully redundant, user-replaceable / hot-swappable control modules. These modules shall have separate, optically isolated, communication paths to the power and static switch modules. Logic power for the control modules shall be derived from redundant power supplies, each having a separate AC and DC input and output. The communication of the control modules shall be of Controller Area Network (CAN Bus).
- B. Display Unit: A microprocessor controlled display unit shall be located on a hinged door in the front of the system. The display shall consist of an alphanumeric display with backlight, an alarm LED, and a keypad consisting of pushbutton switches.
- C. Metered Data: The following metered data, shall be available on the alphanumeric display:
 1. Year, Month, Day, Hour, Minute, Second of occurring events
 2. Source Input voltage
 3. Output AC voltage
 4. Output AC current
 5. Input frequency
 6. Battery voltage
 7. Internal battery temperature
- D. Event log: The display unit shall allow the user to display a time and date stamped log of the 64 most recent status and alarm events.
- E. Alarms: The display unit shall allow the user to display a log of all active alarms. The following minimum set of alarm conditions shall be available:
 1. Input frequency outside configured range
 2. AC adequate for UPS but not for Bypass
 3. Low/No AC input, startup on battery
 4. Intelligence Module inserted
 5. Intelligence Module removed
 6. Redundant Intelligence Module inserted
 7. Redundant Intelligence Module removed
 8. Number of Batteries changed since last ON
 9. Number of Power Modules changed since last ON

10. Number of Batteries increased
11. Number of Batteries decreased
12. Number of Power Modules increased
13. Number of Power Modules decreased
14. Number of External Battery Cabinets increased
15. Number of External Battery Cabinets decreased
16. Redundancy restored
17. Need Battery Replacement
18. The Redundant Intelligence Module is in control
19. UPS Fault
20. On Battery
21. Shutdown or unable to transfer to battery due to overload
22. Load Shutdown from Bypass
23. Input frequency volts outside limits
24. Fault, internal temp exceeded system normal limits
25. Input circuit breaker open
26. System level fan failed
27. Bad battery module
28. Bad power module
29. Intelligence Module is installed and failed
30. Redundant Intelligence Module is installed and failed
31. Redundancy has been lost
32. Redundancy is below alarm threshold
33. Runtime is below alarm threshold
34. Load is above alarm threshold
35. Load is no longer above alarm threshold
36. Minimum runtime restored
37. Bypass is not in range (either frequency or voltage)
38. Backfeed contactor stuck in OFF position
39. Backfeed contactor stuck in ON position
40. UPS in Bypass due to internal fault
41. UPS in Bypass due to overload
42. System in Forced Bypass
43. Fault, Bypass relay malfunction
44. Q001 open/closed
45. Q002 open/closed
46. Q003 open/closed
47. High DC warning
48. High DC shutdown
49. Low battery shutdown
50. Low battery warning

F. Controls: The following controls or programming functions shall be accomplished by use of the display unit. Pushbutton membrane switches shall facilitate these operations.

1. Silence audible alarm
2. Set the alphanumeric display language
3. Display or set the date and time

4. Enable or disable the automatic restart feature
5. Transfer critical load to and from static bypass
6. Test battery condition on demand
7. Set intervals for automatic battery tests
8. Adjust set points for different alarms
9. Program the parameters for remote shutdown.

G. Potential Free (Dry) Contacts

1. The following potential free contacts shall be available on an optional relay interface board:
 - a. Normal operation
 - b. Battery operation
 - c. Bypass operation
 - d. Common fault
 - e. Low battery
 - f. UPS off

H. Communication Interface Board: A communication interface board shall provide the following communication ports which can be used simultaneously:

1. RS232 Serial Port # 1
2. RJ-45 Interface Port for a remote display.

2.08 BATTERY

- A. The UPS battery shall be of modular construction made up of user replaceable, hot swappable, fused, battery modules. Each battery module shall be monitored for voltage and temperature for use by UPS battery diagnostic, and temperature compensated charger circuitry.
- B. The battery jars housed within each removable battery module shall be of the Valve Regulated Lead Acid (VRLA) type.
- C. The UPS shall incorporate a battery management system to continuously monitor the health of each removable battery module. This system shall notify the user in the event that a failed or weak battery module is found.

PART 3 — ACCESSORIES

3.01 BATTERY DISCONNECT BREAKER

- A. Each UPS system shall have a 250 VDC rated, thermal magnetic trip molded case circuit breaker. Each circuit breaker shall be equipped shunt trip mechanisms and 1A/1B auxiliary contacts. The circuit breakers are to be located within the UPS enclosure or as part of a line-up-and-match type battery cabinet.

3.02 MAINTENANCE BYPASS PANEL

- A. The UPS cabinet shall include an integrated three-switch maintenance bypass panel (MBP). The MBP shall provide power to the critical load from the bypass source, during times where maintenance or service of the UPS is required. The PDU/System bypass shall provide a mechanical means of complete isolation of the UPS from the critical output distribution.

3.03 OUTPUT DISTRIBUTION PANEL

- A. Each UPS cabinet shall include one 39 pole, 3-phase distribution panel. The distribution panel shall provide a means to install breakers and branch circuit conductors to power the connected critical load. Overhead distribution conductors like discussed in Section 3.7 may be connected to the distribution panel at the factory to provide a complete tested distribution system. Various breaker options may be factory installed and fully tested before shipment to site.

3.04 EXTENDED RUN (XR) BATTERY SOLUTIONS

- A. Extended runtime battery enclosures shall be available for increased reserve battery runtime. For ease of maintenance the extended runtime battery enclosures, shall house draw-out battery cartridges. These cartridges shall conform to OSHA lifting requirements for one person to replace battery cartridges without lifting tools or additional mechanisms. Battery cartridges shall interlock in place within the battery enclosure to ensure proper contact. When withdrawing a battery cartridge, a catch shall stop the battery cartridge from inadvertently being withdrawn in an unsafe manner. The Extended Run Battery solution shall be housed in a standard, 24 inch wide, 36 inch deep, 42U high equipment racks. Up to (3) Extended Run Battery enclosures may be added for increased battery runtime.

3.05 RACK MOUNT POWER DISTRIBUTION UNITS

- A. For purposes of distributing power within an IT enclosure, rack mount power distribution units shall be available for installation within the IT enclosure. The rack mount power distribution units shall be capable of being installed in the back of the accompanying enclosure to consume zero U space in the front of the rack, and shall not require tools for installation within the rack.
- B. Input Connection —For ease of installation, the Rack Mount PDU shall be connected via a twist lock connector, and shall be capable of being fed from agency approved flexible corded distribution wiring as described in section 3.6 of this specification. The input shall be capable of being served by 208Y120 Volts from an L21-20 type NEMA connector. A hard wired version of the product shall also be available as an option and shall be capable of being fed from a three-pole 20 Amp circuit breaker.

- C. Output Connections —The output of the Rack Mount PDU shall be fed from 208Y120Volts, and shall be distributed to receptacles capable of supplying power to cord connected equipment. Assuming Rack Mount PDU is fed from a circuit breaker with an 80% continuous rating, a single Rack Mount PDU shall be capable of distributing up to 5.7kW in a single rack.
- D. Options
 - 1. Phase metering —The current of each input phase of the Rack Mount PDU shall be monitored, displayed locally on an illuminated seven segment display, and reported through a built in Web/SNMP interface.
 - 2. Outlet Management—The outlets of the Rack Mount PDU shall have managed switched capability as an option. The current of each input phase of the Rack Mount PDU shall be monitored, displayed locally on an illuminated seven segment display, and reported through a built in Web/SNMP interface. The Web/SNMP interface will also be used to manage and control the outlet receptacles.

3.06 RACK MOUNT TRANSFER SWITCHES

- A. For purposes of providing redundancy (to single corded loads) as far as the equipment rack, and the load itself, 1U rack mount transfer switches shall be available. Rack mount transfer switches shall be capable of switching a combination of single-phase and three-phase loads up to 5.7kW. The Rack Mount Transfer Switch shall be designed to be fed from a 3 pole 20A circuit breaker via a NEMA L21-20 receptacle or cord cap.

3.7 OVERHEAD DISTRIBUTION

- A. Flexible Distribution Conductors —For purposes of overhead distribution wiring of datacenter branch circuits from the output distribution panel, flexible conductors of either an SJO type, or TC type shall be available as a distribution means. Flexible conductors shall be equipped with NEMA or IEC style cord caps and shall be agency approved under UL60950 as part of the InfraStruxure™ system.
- B. Cable Ladder —For purposes of routing data and power cables between rows in a datacenter aisle layout, cable ladders shall be available to span the gap between rows. Cable ladders shall be agency approved under UL60950 as part of the InfraStruXure™ system. The use of over head cable management shall minimize the need to run data and power cable beneath a raised floor, thus minimizing potential air flow obstructions for down-flow type precision cooling solutions. This means of cable management shall also facilitate ease of installation of power and data cabling in datacenters not utilizing raised floor. Optional covers shall be available for ladders as a means of adhering to local codes requiring such.
- C. Cable Trough—For purposes of routing data and power cable along the length of a row of IT enclosures in a data center environment, cable troughs shall be available as a means

of separating and housing data and power cable. Optional covers shall be available for troughs as a means of adhering to local codes requiring such. The use of over head cable management shall minimize the need to run data and power cable beneath a raised floor, thus minimizing potential air flow obstructions for down-flow type precision cooling solutions. This means of cable management shall also facilitate ease of installation of power and data cabling in datacenters not utilizing raised floor.

3.08 INFORMATION TECHNOLOGY (IT) ENCLOSURE

IT enclosures shall be available for housing of customer supplied IT equipment. Enclosures shall be listed under the same UL60950 agency approval as other products outlined within this specification.

A. General Requirements

1. The Enclosure shall be designed to provide a secure, managed environment for computer and networking equipment.
2. The Enclosure shall conform to EIA-310 Standard for Cabinets, Racks, Panel and Associated Equipment and accommodate industry standard 19" rack mount equipment.
3. The Enclosure shall be designed with four (4) vertical posts to allow rack mount equipment installation utilizing four (4) vertical mounting rails.
4. The Enclosure shall be available with a vertical equipment mounting space of 25U, 42U or 47U. (1U=1.75" or 44.45mm).
5. A four-post open frame configuration shall be available with 42U vertical equipment mounting space.

B. Physical Requirements

1. External Width Dimensions shall be 597mm (23.5") for 19" rack enclosures, and 747mm (29.4") for 23" rack enclosure.
2. External Depth Dimensions shall be 900mm (35.4") or 1070mm (42.2").
3. Rack enclosures of a 42U design shall have a maximum external height of 2070mm (81.5") to allow passage through a standard 7ft. (84") doorway without tipping.
4. Rack enclosure shall support a dynamic load (rolling on castors) of 909kG (2000 lbs.) total weight.
5. Rack enclosure shall also be designed and manufactured to be matching in both color and construction to the UPS, PDU/System bypass and extended runtime battery enclosures to provide a uniform and consistent appearance in a datacenter environment.

C. Equipment Access and Mounting

1. The enclosure shall provide [25U] [42U] [47U] of equipment vertical mounting space.
2. The vertical mounting rails shall be adjustable to allow different mounting depths.
3. Front and rear doors of the enclosure shall be designed with quick release hinges allowing for easy detachment without the use of tools.

3.09 FLOOR ANCHOR BRACKETS

Floor Anchor brackets shall be available to solidly connect UPS, PDU/System Bypass, and Battery Enclosures to minimize unintended moving of the equipment.

3.010 SEISMIC FLOOR STANDS

Seismic rated floor stands shall be available to take the place of supporting the PDU/system bypass, UPS, and Battery Enclosures on a raised floor environment. Floor Stands shall be available in custom heights to maintain a flush mount installation adjacent to the raised floor, and shall be designed in accordance to the equipment weight and contact points.

3.011 SOFTWARE AND CONNECTIVITY

A. Network Adaptor: The Ethernet Web/SNMP Adaptor shall allow one or more network management systems (NMS) to monitor and manage the UPS in TCP/IP network environments. The management information base (MIB) shall be provided in DOS and UNIX "tar" formats. The SNMP interface adaptor shall be connected to the UPS via the RS232 serial port on the standard communication interface board.

B. Unattended Shutdown

1. The System, in conjunction with a network interface card, shall be capable of gracefully shutting down one or more operating systems during when the UPS is on reserve mode.
2. The System shall also be capable of using an RS232 port to communicate by means of serial communications to gracefully shut down one or more operating systems during an on battery situation.

3.012 REMOTE SYSTEM MONITORING

A. The following three methods of remote UPS monitoring shall be made available

1. Web Monitoring: Remote monitoring shall be available via a web browser such as Internet Explorer.
2. RS232 Monitoring: Remote UPS monitoring shall be possible via either RS232 or contact closure signals from the UPS.
3. Simple Network Management Protocol (SNMP): Remote UPS Monitoring shall be possible through a standard MIB II compliant platform.

3.013 SOFTWARE COMPATIBILITY

- A. The UPS manufacturer shall have available software to support graceful shutdown and remote monitoring for the following systems:
1. Microsoft Windows 95/98/XP
 2. Microsoft Windows NT 4.0 SP6/2000
 3. OS/2
 4. Netware 3.2 - 5.1
 5. MAC OS 9.04, 9.22, 10
 6. Digital Unix/True 64
 7. SGI 6.0-6.5
 8. SCO UNIX
 9. SVR4 2.3, 2.41
 10. SCO Unix Ware 7.0 - 7.11
 11. SUN Solaris 2.6-2.8
 12. SUN OS 4.13, 4.14
 13. IBM AIX 4.3x-4.33g, 5.1
 14. HP-UX 9.x-11.i
 15. Linux

3.014 INFRASTRUXURE MANAGER

For purposes of complete system monitoring and management of all components outlined in this specification, there shall be a centralized manager, hereafter referred to as ISX Manager.

- A. **Monitoring**—ISX Manager shall be capable of monitoring all products in this specification including, UPS, PDU/System Bypass, Extended Run Battery Enclosures, and rack level distribution options through a network of category 5 cable and a 24 port hub, supplied by the UPS manufacturer. This 24 port hub shall relay information to the ISX Manager, which in turn shall allow access to this information via the user's public network via a single IP address.
- B. **Monitored Values**—ISX Manager shall be capable of monitoring alarms, general status parameters, voltage and current of products outlined in section 3.15.A. of this specification.
- C. **Thresholds** —For individualized customer needs, ISX Manager shall allow for user configurable thresholds for alarm notification. With this feature ISX Manager can notify clients of reaching thresholds for UPS capacity, PDU capacity, or branch circuit breaker capacity. Other custom programmable alarm points for non- APC products shall also be available via dry contact input signal.
- D. **Public Network Monitoring**—The ISX Manager shall also be capable of monitoring other APC devices that are connected to the client's public network.

PART 4 — EXECUTION

4.01 FACTORY ASSISTED START-UP

If a factory assisted UPS start-up is requested, factory trained service personnel shall perform the following inspections, test procedures, and on-site training:

A. Visual Inspection:

1. Inspect equipment for signs of damage.
2. Verify installation per manufacturer s instructions.
3. Inspect cabinets for foreign objects.
4. Inspect Battery Units.
5. Inspect Power Modules.

B. Mechanical Inspection:

1. Check all UPS and external maintenance bypass cabinet internal control wiring connections.
2. Check all UPS and external maintenance bypass cabinet internal power wiring connections.
3. Check all UPS and external maintenance bypass cabinet terminal screws, nuts, and/or spade lugs for tightness.

C. Electrical Inspection

1. Verify correct input and bypass voltage.
2. Verify correct phase rotation of all mains connections.
3. Verify correct UPS control wiring and terminations.
4. Verify voltage of all battery modules.
5. Verify neutral and ground conductors are properly landed.
6. Inspect external maintenance bypass switch for proper terminations and phasing.

D. Site Testing

1. Ensure proper system start-up.
2. Verify proper firmware control functions.
3. Verify proper firmware bypass operation.
4. Verify proper maintenance bypass switch operation.
5. Verify system set points.
6. Verify proper inverter operation and regulation circuits.
7. Simulate utility power failure.
8. Verify proper charger operation.
9. Document, sign, and date all test results.

E. On-Site Operational Training: During the factory assisted start-up, operational training for site personnel shall include key pad operation, LED indicators, start-up and shutdown procedures, maintenance bypass and AC disconnect operation, and alarm information.

4.02 MANUFACTURER FIELD SERVICE

- A. Worldwide service: The UPS manufacturer shall have a worldwide service organization Available, consisting of factory trained field service personnel to perform start-up, preventative maintenance, and service of the UPS system and power equipment. The service organization shall offer 24 hours a day, 7 days a week, 365 days a year service support.
- B. Replacement parts: Parts shall be available through the worldwide service organization 24 hours a day, 7 days a week, and 365 days a year. The worldwide service organization shall be capable of shipping parts within 4 working hours or on the next available flight, so that the parts may be delivered to the customer site within 24 hours.

4.03 MAINTENANCE CONTRACTS

- A. A complete offering of preventative and full service maintenance contracts for the UPS system and the battery system shall be available. All contract work shall be performed by APC factory trained service personnel.

4.04 TRAINING

- A. UPS service training workshop: A UPS service training workshop shall be available from the UPS manufacturer. The service training workshop shall include a combination of lecture and practical instruction with hands-on laboratory sessions. The service training workshop shall include instruction about safety procedures, UPS operational theory, sub-assembly identification and operation, system controls and adjustment, preventative maintenance, and troubleshooting.

End of Section 16611

InfraStruXure for Medium Data Centers

Guide specifications for 10kW–40kW UPS/PDU distribution

PART 1 — GENERAL

1.01 SUMMARY

- A. This specification describes the operation and functionality of a continuous duty, three-phase, solid-state, static Uninterruptible Power System (UPS) hereafter referred to as the UPS. The UPS shall utilize an N+1 redundant, scalable array architecture. The system power train shall be comprised of hot swappable / user replaceable 10kW/10kVA power modules, which shall operate in parallel, and be configured for N+1 redundant operation at rated load. Each 10kVA/10kW power module contains a full rated input rectifier / boost converter (hereafter referred to as Input Converter), full rated output inverter, and 10% battery charging circuit. The system shall also comprise of a user-replaceable continuous duty bypass static switch module, hot swappable / user replaceable battery modules, redundant control modules, redundant logic power supplies, and LCD interface display All of the above system components are housed in two standard, 24 inch wide, 36 inch deep, 42U high equipment racks.
- B. In addition, this specification describes the performance, functionality, and design of the UPS Maintenance Bypass Cabinet and power distribution unit, hereafter referred to as the PDU/System Bypass. In addition this specification also includes multi-conductor overhead distribution, rack level power management products, the Battery System, and connectivity solutions including complete InfraStruXure™ system management solutions.
- C. The UPS and associated equipment shall operate in conjunction with a primary power supply and an output distribution system to provide quality uninterrupted power and distribution for mission critical, electronic equipment load. The entire system shall bear the UL60950 listing as a complete product solution.
- D. All programming and miscellaneous components for a fully operational system as described in this specification shall be available as part of the System.

1.02 STANDARDS

- A. UL1778—Uninterruptible Power Supply Equipment
- B. UL891—Dead-Front Switchboards
- C. UL60950—Information Technology Equipment
- D. Where applicable, the UPS shall also be designed in accordance with publications from the following organizations and committees:
 - 1. NFPA—National Fire Protection Associations
 - 2. NEMA—National Electrical Manufacturers Association
 - 3. OSHA—Occupational Safety and Health Administration
- E. IEEE 519-1992 Standard Practices and Requirements for Harmonic Control in Electrical Power Systems.
- F. ISO 9001
- G. ISO 14001

1.3 UPS MODES OF OPERATION

- A. **Normal:** The input converter and output inverter shall operate in an on-line manner to continuously regulate power to the critical load. The input and output converters shall be capable of full battery recharge while simultaneously providing regulated power to the load for all line and load conditions within the range of the UPS specifications.
- B. **Battery:** Upon failure of the AC input source, the critical load shall continue being supplied by the output inverter, which shall derive its power from the battery system. There shall be no interruption in power to the critical load during both transfers to battery operation and retransfers from battery to normal operation.
- C. **Recharge:** Upon restoration of the AC input source, the input converter and output inverter shall simultaneously recharge the battery and provide regulated power to the critical load.
- D. **Static Bypass:** The static bypass shall be used to provide transfer of critical load from the Inverter output to the bypass source. This transfer, along with its retransfer, shall take place with no power interruption to the critical load. In the event of an emergency, this transfer shall be an automatic function.
- E. **Maintenance Bypass:** The system shall be equipped with an external make-before-break Maintenance Bypass Cabinet (MBC) to electrically isolate the UPS during routine maintenance and service of the UPS. The MBC shall completely isolate both the UPS input and output connections.

1.04 SUBMITTALS

A. Proposal Submittals:

1. As bid system bill of materials.
2. Product catalog sheets or equipment brochures.
3. Product guide specifications.
4. System single-line operation diagram.
5. Installation information, including weights and dimensions.
6. Information about terminal locations for power and control connections.
7. Drawings and details for requested optional accessories.

B. Delivery Submittals:

1. Installation manual, which includes instructions for storage, handling, examination, preparation, installation, and start-up of UPS.
2. User manual, which includes operating instructions.
3. As built equipment drawings.
4. InfraStruXure™ Welcome Package.

PART 2 — PRODUCT

2.01 DESIGN REQUIREMENTS

- A. The UPS shall be sized for _____ kVA and _____ kW load.
- B. The UPS battery shall be sized for _____ at a Power Factor of _____ for _____ minutes.

2.02 SYSTEM CHARACTERISTICS

- A. System Capacity: The system shall be rated for full kW output in the following frame sizes:
 1. 40 kVA/kW —Can be configured with up to (5), 10kW power modules for N+1
- B. Input:
 1. AC Input Nominal Voltage: 208 V, 3 Phase, 4 wire, 60 Hz.
 2. AC Input Voltage Window: +/- 15% of nominal (while providing nominal charging to the battery system).
 3. Short Circuit Withstand Rating: 30,000 Symmetrical Amperes
 4. Maximum Frequency Range: 40–70Hz
 5. Input Power Factor:
 - a. Minimum 0.99 lagging at 50% load
 - b. Minimum 0.99 lagging at 100% load
 6. Input Current Distortion *with no additional filters*:
 - a. < 6% at 100% load
 - b. < 6% at 50% load

7. Soft-Start: Shall be linear from 0–100% input current and shall not exhibit inrush. This shall take place over a 15 second time period.

C. UPS Output:

1. AC Output Nominal Output: 208V, 3 Phase, 4 wire, 60 Hz.
2. AC Output Voltage Distortion: Max. 3% at 100% Linear Load.
3. AC Output Voltage Regulation: +/- 1% For 100 % Linear or Nonlinear Load.
4. Voltage Transient Response: +/- 5% maximum for 100% load step.
5. Voltage Transient Recovery within <60 milliseconds.
6. Output Voltage Harmonic Distortion:
 - a. <2% THD maximum and 1% single harmonic for a 100% linear load
 - b. <5% THD maximum for a 100% non-linear load
7. Phase Angle Displacement:
 - a. 120 degrees +/- 1 degree for balanced load
 - b. 120 degrees +/- 1 degrees for 50% imbalanced load
 - c. 120 degrees +/- 3 degrees for 100% imbalanced load
8. Overload Rating:
 - a. Normal Operation:
 1. 150% for 30 seconds
 2. < 105% continuous
 - b. Bypass Operation:
 1. 125% continuous
 2. 1000% for 500 milliseconds
9. System AC-AC Efficiency: >91.5% at 100% load
10. Output Power Factor Rating: The UPS output shall not require derating for purely resistive loads (PF of 1). The output kW and kVA ratings of the UPS output shall be equal. For loads exhibiting a power factor of .9 leading to .8 lagging no derating of the UPS shall be required.

2.03 ENVIRONMENTAL

- A. Storage Ambient Temperature: -40°F to 158°F (-40°C to 70°C).
- B. Operating Ambient Temperature: +32°F to 104°F (0°C to 40°C). (77°F is ideal for most battery types).
- C. Relative Humidity: 0 to 95% Non-condensing
- D. Altitude: Maximum installation with no derating of the UPS output shall be 10,000 feet (3000m) above sea level.

2.04 INPUT POWER CONVERTER

- A. The input power converters of the system are housed within the parallel connected, removable power modules, and shall constantly control the power imported from the mains input of the system, to provide the necessary UPS power for precise regulation of the DC bus voltage, battery charging, and Main Inverter regulated output power.
- B. Input Current Total Harmonic Distortion: The input current THDI shall be held to 6% or less at full system, while providing conditioned power to the critical load bus, and charging the batteries under steady-state operating conditions. This shall be true while supporting loads of both a linear or non-linear type. This shall be accomplished with no additional filters, magnetic devices, or other components.
- C. Soft-Start Operation: As a standard feature, the UPS shall contain soft-start functionality, capable of limiting the input current from 0-100% of the nominal input over a default 15 second period, when returning to the AC utility source from battery operation. The change in current over the change in time shall take place in a linear manner throughout the entire operation. ($di/dt = \text{constant}$).
- D. Magnetization Inrush Current: The UPS shall exhibit 0 inrush current as a standard product. If provided with an optional isolation transformer or PDU/System Bypass, system inrush shall be limited to 6 times the nominal input current of the transformer.
- E. Input Current Limit:
 - 1. The input converter shall control and limit the input current draw from utility to 150% of the UPS output. During conditions where input current limit is active, the UPS shall be able to support 100% load, charge batteries at 10% of the UPS output rating, and provide voltage regulation with mains deviation of up to +/-15% of the nominal input voltage.
 - 2. In cases where the source voltage to the UPS is nominal and the applied UPS load is equal to or less than 100% of UPS capacity, input current shall not exceed 126% of UPS output current, while providing full battery recharge power and importing necessary power for system losses.
- F. Redundancy: The UPS shall be configured with redundant input converters, each with semiconductor fusing, and logic controlled contactors to remove a failed module from the input bus.
- G. Charging:
 - 1. The battery charging shall keep the DC bus float voltage of +/- 220v, +/-1%
 - 2. The battery charging circuit shall contain a temperature compensation circuit, which will regulate the battery charging to optimize battery life.
 - 3. The battery charging circuit shall remain active when in Static Bypass and in Normal Operation.
- H. Back-feed Protection: The above-mentioned logic controlled contactor also provides the back-feed protection required by UL1778.

2.05 OUTPUT INVERTER

- A. The UPS output inverter shall constantly recreate the UPS output voltage waveform by converting the DC bus voltage to AC voltage through a set of IGBT driven power converters. In both normal operation and battery operation, the output inverters shall create an output voltage independent of the mains input voltage. Input voltage anomalies such as brown-outs, spikes, surges, sags, and outages shall not affect the amplitude or sinusoidal nature of the recreated output voltage sine wave delivered by the output inverters.
- B. Overload Capability: The output power converters shall be capable of 300% for short-circuit clearing. Steady-state overload conditions, of up to 150% of system capacity, shall be sustained by the inverter for 30 seconds in normal and battery operation. Should overloads persist past the outlined time limitation, the critical load will be switched to the automatic static bypass output of the UPS.
- C. Output Contactor: The output inverter shall be provided with an output mechanical contactor to provide physical isolation of the inverter from the critical bus. With this feature a failed inverter shall be removed from the critical bus.
- D. Battery Protection: The inverter shall be provided with monitoring and control circuits to limit the level of discharge on the battery system.
- E. Redundancy: The UPS shall be configured with redundant output inverters, each with semiconductor fusing, and logic controlled contactors to remove a failed component from the critical bus.

2.06 STATIC BYPASS

- A. As part of the UPS, a system static bypass switch shall be provided. The system static bypass shall provide no break transfer of the critical load from the Inverter output to the static bypass input source during times where maintenance is required, or the inverter can not support the critical bus. Such times may be due to prolonged or severe overloads, or UPS failure. The UPS and static bypass switch shall constantly monitor the auxiliary contacts of their respective circuit breakers, as well as the bypass source voltage, and inhibit potentially unsuccessful transfers to static bypass from taking place.
- B. The design of the static switch power path shall consist of Silicon Controlled Rectifiers (SCR) with a continuous duty rating of 125% of the UPS output rating.
- C. Automatic Transfers: An automatic transfer of load to static bypass shall take place whenever the load on the critical bus exceeds the overload rating of the UPS. Automatic transfers of the critical load from static bypass back to normal operation shall take place when the overload condition is removed from the critical bus output of the system. Automatic transfers of load to static bypass shall also take place if for any reason the UPS cannot support the critical bus.

- D. Manual Transfers: Manually initiated transfers to and from static bypass shall be initiated through the UPS display interface.
- E. Overloads: The static bypass shall be rated and capable of handling overloads equal to or less than 125% of the rated system output continuously. For instantaneous overloads caused by inrush current from magnetic devices, or short circuit conditions, the static bypass shall be capable of sustaining overloads of 1000% of system capacity for periods of up to 500 milliseconds.
- F. Modularity: The static bypass switch shall be of a modular design.
- G. System Protection: As a requirement of UL1778, back-feed protection in the static bypass circuit shall also be incorporated in the system design. To achieve back-feed protection, a mechanical contactor in series with the bypass SCR(s) shall be controlled by the UPS/static switch, to open immediately upon sensing a condition where back-feeding of the static switch by any source connected to the critical output bus of the system is occurring. One such condition could be a result of a shorted SCR.

2.07 DISPLAY AND CONTROLS

- A. Control Logic: The UPS shall be controlled by two fully redundant, user-replaceable / hot-swappable control modules. These modules shall have separate, optically isolated, communication paths to the power and static switch modules. Logic power for the control modules shall be derived from redundant power supplies, each having a separate AC and DC input and output. The communication of the control modules shall be of Controller Area Network (CAN Bus).
- B. Display Unit: A microprocessor controlled display unit shall be located on a hinged door in the front of the system. The display shall consist of an alphanumeric display with backlight, an alarm LED, and a keypad consisting of pushbutton switches.
- C. Metered Data: The following metered data, shall be available on the alphanumeric display:
 - 1. Year, Month, Day, Hour, Minute, Second of occurring events
 - 2. Source Input Voltage
 - 3. Output AC voltage
 - 4. Output AC current
 - 5. Input Frequency
 - 6. Battery voltage
 - 7. Internal Battery temperature
- D. Event log: The display unit shall allow the user to display a time and date stamped log of the 64 most recent status and alarm events.

E. Alarms: The display unit shall allow the user to display a log of all active alarms. The following minimum set of alarm conditions shall be available:

1. Input Frequency outside configured range
2. AC adequate for UPS but not for Bypass
3. Low/No AC input, startup on battery
4. Intelligence Module inserted
5. Intelligence Module removed
6. Redundant Intelligence Module inserted
7. Redundant Intelligence Module removed
8. Number of Batteries changed since last ON
9. Number of Power Modules changed since last ON
10. Number of Batteries increased
11. Number of Batteries decreased
12. Number of Power Modules increased
13. Number of Power Modules decreased
14. Number of External Battery Cabinets increased
15. Number of External Battery Cabinets decreased
16. Redundancy Restored
17. Need Battery Replacement
18. The Redundant Intelligence Module is in control
19. UPS Fault
20. On Battery
21. Shutdown or unable to transfer to battery due to overload
22. Load Shutdown from Bypass. Input Frequency Volts outside limits
23. Fault, Internal Temp exceeded system normal limits
24. Input Circuit Breaker Open
25. System level fan failed
26. Bad Battery Module
27. Bad Power Module
28. Intelligence Module is installed and failed
29. Redundant Intelligence Module is installed and failed
30. Redundancy has been lost
31. Redundancy is below alarm threshold
32. Runtime is below alarm threshold
33. Load is above alarm threshold
34. Load is no longer above alarm Threshold
35. Minimum Runtime restored
36. Bypass is not in range (either frequency or voltage)
37. Backfeed contactor stuck in OFF position
38. Backfeed contactor stuck in ON position
39. UPS in Bypass due to Internal Fault
40. UPS in Bypass due to overload
41. System in Forced Bypass
42. Fault, Bypass Relay Malfunction
43. Q001 open/closed
44. Q002 open/closed
45. Q003 open/closed

46. High DC Warning
47. High DC Shutdown
48. Low Battery Shutdown
49. Low Battery Warning

F. Controls: The following controls or programming functions shall be accomplished by use of the display unit. Pushbutton membrane switches shall facilitate these operations.

1. Silence audible Alarm
2. Set the alphanumeric display language
3. Display or set the date and time
4. Enable or disable the automatic restart feature
5. Transfer critical load to and from static bypass
6. Test battery condition on demand
7. Set intervals for automatic battery tests
8. Adjust set points for different alarms
9. Program the parameters for remote shutdown.

G. Potential Free (Dry) Contacts

1. The following potential free contacts shall be available on an optional relay interface board:
 - a. Normal Operation
 - b. Battery Operation
 - c. Bypass Operation
 - d. Common Fault
 - e. Low Battery
 - f. UPS Off

H. Communication Interface Board: A communication interface board shall provide the following communication ports which can be used simultaneously:

1. RS232 Serial Port #1
2. RJ-45 Interface port for a Remote Display

2.08 BATTERY

- A. The UPS battery shall be of modular construction made up of user replaceable, hot swappable, fused, battery modules. Each battery module shall be monitored for voltage and temperature for use by the UPS battery diagnostic, and temperature compensated charger circuitry.
- B. The battery jars housed within each removable battery module shall be of the Valve Regulated Lead Acid (VRLA) type.
- C. The UPS shall incorporate a battery management system to continuously monitor the health of each removable battery module. This system shall notify the user in the event that a failed or weak battery module is found.

- D. As a standard product offering, the UPS shall be capable of delivering 4.5 minutes of back-up (at 40kW) with battery cartridges located internal to the UPS. This option shall not cause any increase to the UPS footprint.

PART 3 — ACCESSORIES

3.01 BATTERY DISCONNECT BREAKER

- A. Each UPS system shall have a 250 VDC rated, thermal magnetic trip molded case circuit breaker. Each circuit breaker shall be equipped shunt trip mechanisms and 1A/1B auxiliary contacts. The circuit breakers are to be located within the UPS enclosure or as part of a line-up-and-match type battery cabinet.

3.02 PDU/SYSTEM BYPASS

- A. The PDU/system bypass cabinet shall provide power to the critical load from the bypass source, during times where maintenance or service of the UPS is required. The PDU/System bypass shall provide a mechanical means of complete isolation of the UPS from the critical output distribution. The PDU/System bypass shall be constructed in a Standard 24 inch wide 36 inch deep 42U High, IT Rack Style enclosure.
- B. As a minimum, the PDU/system bypass shall contain the following features and accessories:
 - 1. Appropriately rated circuit breakers to fully isolate the UPS during times where maintenance is required. As a part of this design there shall be a UPS input circuit breaker designated as Q1, a UPS output circuit breaker designated as Q2, and a wrap-around maintenance bypass circuit breaker designated as Q3. For PDU/system bypass panels equipped with an input transformer, there shall also be a molded case switch to isolate the transformer primary windings from the mains input to the system. Minimum 1A/1B auxiliary contacts for the purpose of relaying status information of each circuit breaker / switch actuator to the UPS and PDU/system bypass shall be provided, along with a means of locking out the circuit breakers to inhibit operation of the bypass transfer pair. The PDU/System Bypass shall be available for a 208V, 480V, or 600V input.
 - 2. Also included in the PDU/system bypass shall be (2) 42 pole distribution panelboards connected to the output bus of the PDU/system bypass to serve as critical load distribution.
 - 3. For purposes of providing local annunciation of status and alarm messages, the PDU/system bypass shall have an alphanumeric display with pushbutton switches, allowing retrieval of active alarms, system level programming, and event history of the PDU/system bypass. For purposes of simplicity and ease of use, the PDU/system bypass display shall be identical in nature to that of the InfraStruXure™ 40kW UPS.
 - 4. The PDU/system bypass shall also have a full-length hinged front door, with locking mechanism; to allow access to the (2) 42 pole panelboard circuit breakers and "three breaker" type maintenance bypass circuit breakers. There shall also be a hinged rear door to allow access to the main input circuit breaker.

5. Mimic Bus—The PDU/system bypass shall bear a full mimic diagram inside the hinged front door. Also associated with the mimic panel shall be indicating lights, capable of depicting proper operation of maintenance bypass circuit breaker and UPS output circuit breaker.

C. The following minimum options shall also be available for the PDU/system bypass:

1. Load Test Port—For ease of load bank testing the system, a "pin and sleeve cam lock" type load bank test port shall be available to allow use of a portable load bank to be connected to the system, without having to remove dead-fronts or gain access to live bus work or circuit breakers. A load bank shall be available with a properly configured connector on flexible cord to facilitate ease of use.
2. Branch Circuit Monitoring —Each pole of each circuit breaker shall be monitored, and report the load current drawn on each circuit breaker pole to a common infrastructure management system. Values metered by branch circuit monitoring shall be available through a web based browsing system and shall be incorporated into the same monitoring system as the other components within this specification.

3.03 EXTENDED RUN (XR) BATTERY SOLUTIONS

For purposes of providing extended UPS back-up power, extended runtime battery enclosures shall be available. For ease of maintenance the extended runtime battery enclosures, shall house draw-out battery cartridges. These cartridges shall conform to OSHA lifting requirements for one person to replace battery cartridges without lifting tools or additional mechanisms. Battery cartridges shall interlock in place within the battery enclosure to ensure proper contact. When withdrawing a battery cartridge, a catch shall stop the battery cartridge from inadvertently being withdrawn in an unsafe manner. The Extended Run Battery solution shall be housed in a standard, 24 inch wide, 36 inch deep, 42U high equipment racks. Up to (4) Extended Run Battery enclosures may be added for increased battery runtime.

3.04 RACK MOUNT POWER DISTRIBUTION UNITS

For purposes of distributing power within an IT enclosure, rack mount power distribution units shall be available for installation within the IT enclosure. The rack mount power distribution units shall be capable of being installed in the back of the accompanying

enclosure to consume zero U space in the front of the rack, and shall not require tools for installation within the rack.

- A. Input Connection—For ease of installation, the Rack Mount PDU shall be connected via a twist lock connector, and shall be capable of being fed from agency approved flexible corded distribution wiring as described in section 3.6 of this specification. The input shall be capable of being served by 208Y120 Volts from an L21-20 type NEMA connector. A hard wired version of the product shall also be available as an option and shall be capable of being fed from a three-pole 20 Amp circuit breaker.
- B. Output Connections —The output of the Rack Mount PDU shall be fed from 208Y120Volts, and shall be distributed to receptacles capable of supplying power to cord connected equipment. Assuming Rack Mount PDU is fed from a circuit breaker with an 80% continuous rating, a single Rack Mount PDU shall be capable of distributing up to 5.7kW in a single rack.
- C. Options
 - 1. Phase metering—The current of each input phase of the Rack Mount PDU shall be monitored, displayed locally on an illuminated seven segment display, and reported through a built in Web/SNMP interface.
 - 2. Outlet Management—The outlets of the Rack Mount PDU shall have managed switched capability as an option. The current of each input phase of the Rack Mount PDU shall be monitored, displayed locally on an illuminated seven segment display, and reported through a built in Web/SNMP interface. The Web/SNMP interface will also be used to manage and control the outlet receptacles.

3.05 RACK MOUNT TRANSFER SWITCHES

For purposes of providing redundancy (to single corded loads) as far as the equipment rack, and the load itself, 1U rack mount transfer switches shall be available. Rack mount transfer switches shall be capable of switching a combination of single-phase and three-phase loads up to 5.7kW. The Rack Mount Transfer Switch shall be designed to be fed from a 3 pole 20A circuit breaker via a NEMA L21-20 receptacle or cord cap.

3.06 OVERHEAD DISTRIBUTION

- A. Flexible Distribution Conductors—For purposes of overhead distribution wiring of datacenter branch circuits, flexible conductors of either an SJO type, or TC type shall be available as a distribution means. Flexible conductors shall be equipped with NEMA or IEC style cord caps and shall be agency approved under UL60950 as part of the InfraStruxure™ system.
- B. Cable Ladder—For purposes of routing data and power cables between rows in a datacenter aisle layout, cable ladders shall be available to span the gap between rows. Cable ladders shall be agency approved under UL60950 as part of the InfraStruXure™ system. The use of over head cable management shall minimize the need to run data and power cable beneath a raised floor, thus minimizing potential air flow obstructions for down-flow type precision cooling solutions. This means of cable management shall also facilitate ease of installation of power and data cabling in datacenters not utilizing raised floor. Optional covers shall be available for ladders as a means of adhering to local codes requiring such.
- C. Cable Trough—For purposes of routing data and power cable along the length of a row of IT enclosures in a data center environment, cable troughs shall be available as a means of separating and housing data and power cable. Optional covers shall be available for troughs as a means of adhering to local codes requiring such. The use of over head cable management shall minimize the need to run data and power cable beneath a raised floor, thus minimizing potential air flow obstructions for down-flow type precision cooling solutions. This means of cable management shall also facilitate ease of installation of power and data cabling in datacenters not utilizing raised floor.

3.07 REMOTE POWER PANEL (RPP)

For purposes of wiring convenience, Remote Power Panels (RPP) shall be available to take a single feed from the PDU/System Bypass output, and distribute power to the critical load. A total of two 42 pole panelboards shall be housed in the RPP to distribute a combination of single-phase and three-phase load equipment.

- A. Branch Circuit Monitoring—Branch Circuit Monitoring shall be available as outlined in section 3.2 of this specification.
- B. InfraStruXure™ Manager - RPP shall be fully compatible with InfraStruXure™ Manager, management system as outlined in section 3.15 of this specification.

3.08 INFORMATION TECHNOLOGY (IT) ENCLOSURE

IT enclosures shall be available for housing of customer supplied IT equipment. Enclosures shall be listed under the same UL60950 agency approval as other products outlined within this specification.

A. General Requirements

- 1. The Enclosure shall be designed to provide a secure, managed environment for computer and networking equipment.
- 2. The Enclosure shall conform to EIA-310 Standard for Cabinets, Racks, Panel and Associated Equipment and accommodate industry standard 19" rack mount equipment.
- 3. The Enclosure shall be designed with four (4) vertical posts to allow rack mount equipment installation utilizing four (4) vertical mounting rails.
- 4. The Enclosure shall be available with a vertical equipment mounting space of 25U, 42U or 47U. (1U=1.75" or 44.45mm).
- 5. A four-post open frame configuration shall be available with 42U vertical equipment mounting space.

B. Physical Requirements

- 1. External Width Dimensions shall be 597mm (23.5") for 19" rack enclosures, and 747mm (29.4") for 23" rack enclosure.
- 2. External Depth Dimensions shall be 900mm (35.4") or 1070mm (42.2").
- 3. Rack enclosures of a 42U design shall have a maximum external height of 2070mm (81.5") to allow passage through a standard 7ft. (84") doorway without tipping.
- 4. Rack enclosure shall support a dynamic load (rolling on castors) of 909kG (2000 lbs.) total weight.
- 5. Rack enclosure shall also be designed and manufactured to be matching in both color and construction to the UPS, PDU/System bypass and extended runtime battery enclosures to provide a uniform and consistent appearance in a datacenter environment.

C. Equipment Access and Mounting

1. The enclosure shall provide [25U] [42U] [47U] of equipment vertical mounting space.
2. The vertical mounting rails shall be adjustable to allow different mounting depths.
3. Front and rear doors of the enclosure shall be designed with quick release hinges allowing for easy detachment without the use of tools.

3.09 FLOOR ANCHOR BRACKETS

Floor Anchor brackets shall be available to solidly connect UPS, PDU/System Bypass, and Battery Enclosure to minimize unintended moving of the equipment.

3.010 SEISMIC FLOOR STANDS

Seismic rated floor stands shall be available to take the place of supporting the PDU/system bypass, UPS, and Battery Enclosures on a raised floor environment. Floor Stands shall be available in custom heights to maintain a flush mount installation adjacent to the raised floor, and shall be designed in accordance to the equipment weight and contact points.

3.011 SOFTWARE AND CONNECTIVITY

A. Network Adaptor: The Ethernet Web/SNMP Adaptor shall allow one or more network management systems (NMS) to monitor and manage the UPS in TCP/IP network environments. The management information base (MIB) shall be provided in DOS and UNIX "tar" formats. The SNMP interface adaptor shall be connected to the UPS via the RS232 serial port on the standard communication interface board.

B. Unattended Shutdown

1. The System, in conjunction with a network interface card, shall be capable of gracefully shutting down one or more operating systems during when the UPS is on reserve mode.
2. The System shall also be capable of using an RS232 port to communicate by means of serial communications to gracefully shut down one or more operating systems during an on battery situation.

3.012 REMOTE SYSETEM MONITORING

A. The following three methods of remote UPS monitoring shall be available:

1. Web Monitoring: Remotemonitoringshallbeavailableviaawebrowsersuchas Internet Explorer.
2. RS232 Monitoring: Remote UPS monitoring shall be possible via either RS232 or contact closure signals from the UPS.
3. Simple Network Management Protocol (SNMP): Remote UPS Monitoring shall be possible through a standard MIB II compliant platform.

3.013 SOFTWARE COMPATIBILITY

A. The UPS manufacturer shall have available software to support graceful shutdown and remote monitoring for the following systems:

1. Microsoft Windows 95/98/XP
2. Microsoft Windows NT 4.0 SP6/2000
3. OS/2
4. Netware 3.2 - 5.1
5. MAC OS 9.04, 9.22, 10
6. Digital Unix/True 64
7. SGI 6.0-6.5
8. SCO UNIX
9. SVR4 2.3, 2.41
10. SCO Unix Ware 7.0 - 7.11
11. SUN Solaris 2.6-2.8
12. SUN OS 4.13, 4.14
13. IBM AIX 4.3x-4.33g, 5.1
14. HP-UX 9.x-11.i
15. Linux

3.014 INFRASTRUXURE MANAGER

For purposes of complete system monitoring and management of all components outlined in this specification, there shall be a centralized manager, hereafter referred to as ISX Manager.

- A. **Monitoring**—ISX Manager shall be capable of monitoring all products in this specification including, UPS, PDU/System Bypass, Extended Run Battery Enclosures, and rack level distribution options through a network of category 5 cable and a 24 port hub, supplied by the UPS manufacturer. This 24 port hub shall relay information to the ISX Manager, which in turn shall allow access to this information via the user's public network via a single IP address.
- B. **Monitored Values**—ISX Manager shall be capable of monitoring alarms, general status parameters, voltage, and current of products outlined in section 3.15.A. of this specification.
- C. **Thresholds**—For individualized customer needs, ISX Manager shall allow for user configurable thresholds for alarm notification. With this feature ISX Manager can notify clients of reaching thresholds for UPS capacity, PDU capacity, or branch circuit breaker capacity. Other custom programmable alarm points for non- APC products shall also be available via dry contact input signal.
- D. **Public Network Monitoring**—The ISX Manager shall also be capable of monitoring other APC devices that are connected to the client's public network.

PART 4 — EXECUTION

4.01 FACTORY ASSISTED START-UP

If a factory assisted UPS start-up is requested, factory trained service personnel shall perform the following inspections, test procedures, and on-site training:

A. Visual Inspection:

1. Inspect equipment for signs of damage.
2. Verify installation per manufacturer s instructions.
3. Inspect cabinets for foreign objects.
4. Inspect Battery Units.
5. Inspect Power Modules.

B. Mechanical Inspection:

1. Check all UPS and external maintenance bypass cabinet internal control wiring connections.
2. Check all UPS and external maintenance bypass cabinet internal power wiring connections.
3. Check all UPS and external maintenance bypass cabinet terminal screws, nuts, and/or spade lugs for tightness.

C. Electrical Inspection:

1. Verify correct input and bypass voltage.
2. Verify correct phase rotation of all mains connections.
3. Verify correct UPS control wiring and terminations.
4. Verify voltage of all battery modules.
5. Verify neutral and ground conductors are properly landed.
6. Inspect external maintenance bypass switch for proper terminations and phasing.

D. Site Testing:

1. Ensure proper system start-up.
2. Verify proper firmware control functions.
3. Verify proper firmware bypass operation.
4. Verify proper maintenance bypass switch operation.
5. Verify system set points.
6. Verify proper inverter operation and regulation circuits.
7. Simulate utility power failure.
8. Verify proper charger operation.
9. Document, sign, and date all test results.

E. On-Site Operational Training: During the factory assisted start-up, operational training for site personnel shall include key pad operation, LED indicators, start-up and shutdown procedures, maintenance bypass and AC disconnect operation, and alarm information.

4.02 MANUFACTURER FIELD SERVICE

- A. Worldwide service: The UPS manufacturer shall have a worldwide service organization Available, consisting of factory trained field service personnel to perform start-up, preventative maintenance, and service of the UPS system and power equipment. The service organization shall offer 24 hours a day, 7 days a week, 365 days a year service support.
- B. Replacement parts: Parts shall be available through the worldwide service organization 24 hours a day, 7 days a week, and 365 days a year. The worldwide service organization shall be capable of shipping parts within 4 working hours or on the next available flight, so that the parts may be delivered to the customer site within 24 hours.

4.03 MAINTENANCE CONTRACTS

A complete offering of preventative and full service maintenance contracts for the UPS system and the battery system shall be available. All contract work shall be performed by APC factory trained service personnel.

4.04 TRAINING

UPS service training workshop: A UPS service training workshop shall be available from the UPS manufacturer. The service training workshop shall include a combination of lecture and practical instruction with hands-on laboratory sessions. The service training workshop shall include instruction about safety procedures, UPS operational theory, sub-assembly identification and operation, system controls and adjustment, preventative maintenance, and troubleshooting.

End of Section

InfraStruXure for Medium Data Centers

Guide specifications for 10kW –80kW UPS/PDU distribution

PART 1 — GENERAL

1.01 SUMMARY

- A. This specification describes the operation and functionality of a continuous duty, three-phase, solid-state, static Uninterruptible Power System (UPS) hereafter referred to as the UPS. The UPS shall utilize an N+1 redundant, scalable array architecture. The system power train shall be comprised of hot swappable / user replaceable 10kW/10kVA power modules, which shall operate in parallel, and be configured for N+1 redundant operation at rated load. Each 10kVA/10kW power module contains a full rated input rectifier / boost converter (hereafter referred to as Input Converter), full rated output inverter, and 10% battery charging circuit. The system shall also comprise of a user-replaceable continuous duty bypass static switch module, hot swappable / user replaceable battery modules, redundant control modules, redundant logic power supplies, and LCD interface display. System static switch shall be capable of being fed from the same input as the rectifier or a separate input. All of the above system components are housed in two standard, 24 inch wide, 36 inch deep, 42U high equipment racks.
- B. In addition, this specification describes the performance, functionality, and design of the UPS Maintenance Bypass Cabinet and power distribution unit, hereafter referred to as the PDU/System Bypass. In addition this specification also includes multi-conductor overhead distribution, rack level power management products, the Battery System, and connectivity solutions including complete InfraStruXure™ system management solutions.
- C. The UPS and associated equipment shall operate in conjunction with a primary power supply and an output distribution system to provide quality uninterrupted power and distribution for mission critical, electronic equipment load. The entire system shall bear the UL60950 listing as a complete product solution.
- D. All programming and miscellaneous components for a fully operational system as described in this specification shall be available as part of the System.

1.02 STANDARDS

- A. UL1778—Uninterruptible Power Supply Equipment
- B. UL891—Dead-Front Switchboards
- C. UL60950—Information Technology Equipment
- D. Where applicable, the UPS shall also be designed in accordance with publications from the following organizations and committees:
 - 1. NFPA—National Fire Protection Associations
 - 2. NEMA—National Electrical Manufacturers Association
 - 3. OSHA—Occupational Safety and Health Administration
- E. IEEE 519-1992 Standard Practices and Requirements for Harmonic Control in Electrical Power Systems.
- F. ISO 9001
- G. .ISO 14001

1.03 UPS MODES OF OPERATION

- A. Normal: The input converter and output inverter shall operate in an on-line manner to continuously regulate power to the critical load. The input and output converters shall be capable of full battery recharge while simultaneously providing regulated power to the load for all line and load conditions within the range of the UPS specifications.
- B. Battery: Upon failure of the AC input source, the critical load shall continue being supplied by the output inverter, which shall derive its power from the battery system. There shall be no interruption in power to the critical load during both transfers to battery operation and retransfers from battery to normal operation.
- C. Recharge: Upon restoration of the AC input source, the input converter and output inverter shall simultaneously recharge the battery and provide regulated power to the critical load.
- D. Static Bypass: The static bypass shall be used to provide transfer of critical load from the Inverter output to the bypass source. This transfer, along with its retransfer, shall take place with no power interruption to the critical load. In the event of an emergency, this transfer shall be an automatic function.
- E. Maintenance Bypass: The system shall be equipped with an external make-before-break Maintenance Bypass Cabinet (MBC) to electrically isolate the UPS during routine maintenance and service of the UPS. The MBC shall completely isolate both the UPS input and output connections.

1.4 SUBMITTALS

A. Proposal Submittals:

1. As bid system bill of materials.
2. Product catalog sheets or equipment brochures.
3. Product guide specifications.
4. System single-line operation diagram.
5. Installation information, including weights and dimensions.
6. Information about terminal locations for power and control connections.
7. Drawings and details for requested optional accessories.

B. Delivery Submittals:

1. Installation manual, which includes instructions for storage, handling, examination, preparation, installation, and start-up of UPS.
2. User manual, which includes operating instructions.
3. As built equipment drawings.
4. InfraStruXure™ Welcome Package.

PART 2 — PRODUCT

2.01 DESIGN REQUIREMENTS

- A. The UPS shall be sized for _____ kVA and _____ kW load.
- B. The UPS battery shall be sized for _____ at a Power Factor of _____ for _____ minutes.

2.02 SYSTEM CHARACTERISTICS

- A. System Capacity: The system shall be rated for full kW output in the following frame sizes:
 1. 80 kVA/kW—Can be configured with up to (9), 10kW power modules for N+1
- B. Input:
 1. AC Input Nominal Voltage: 208 V, 3 Phase, 4 wire, 60 Hz.
 2. AC Input Voltage Window: +/- 15% of nominal (while providing nominal charging to the battery system).
 3. Short Circuit Withstand Rating: 30,000 Symmetrical Amperes.
 4. Maximum Frequency Range: 40–70Hz.
 5. Input Power Factor:
 - a. Minimum 0.99 lagging at 50% load
 - b. Minimum 0.99 lagging at 100% load
 6. Input Current Distortion *with no additional filters*:
 - a. < 6% at 100% load
 - b. < 6% at 50% load

7. Soft-Start: Shall be linear from 0-100% input current and shall not exhibit inrush. This shall take place over a 15 second time period.

C. UPS Output:

1. AC Output Nominal Output: 208V, 3 Phase, 4 wire, 60 Hz.
2. AC Output Voltage Distortion: Max. 3% at 100% Linear Load.
3. AC Output Voltage Regulation: +/- 1% For 100 % Linear or Nonlinear Load
4. Voltage Transient Response: +/- 5% maximum for 100% load step
5. Voltage Transient Recovery within <60 milliseconds
6. Output Voltage Harmonic Distortion:
 - a. <2% THD maximum and 1% single harmonic for a 100% linear load
 - b. <5% THD maximum for a 100% non-linear load
7. Phase Angle Displacement:
 - a. 120 degrees +/- 1 degree for balanced load
 - b. 120 degrees +/- 1 degrees for 50% imbalanced load
 - c. 120 degrees +/- 3 degrees for 100% imbalanced load
8. Overload Rating:
 - a. Normal Operation:
 1. 150% for 30 seconds
 2. 105% continuous
 - b. Bypass Operation:
 1. 125% continuous
 2. 1000% for 500 milliseconds
9. System AC-AC Efficiency: >91.5% at 100% load
10. Output Power Factor Rating: The UPS output shall not require derating for purely resistive loads (PF of 1). The output kW and kVA ratings of the UPS output shall be equal. For loads exhibiting a power factor of .9 leading to .8 lagging no derating of the UPS shall be required.

2.03 ENVIRONMENTAL

- A. Storage Ambient Temperature: -40°F to 158°F (-40°C to 70°C).
- B. Operating Ambient Temperature: +32°F to 104°F (0°C to 40°C). (77°F is ideal for most battery types).
- C. Relative Humidity: 0 to 95% Non-condensing
- D. Altitude: Maximum installation with no derating of the UPS output shall be 10,000 feet (3000m) above sea level.

2.04 INPUT POWER CONVERTER

- A. The input power converters of the system are housed within the parallel connected, removable power modules, and shall constantly control the power imported from the mains input of the system, to provide the necessary UPS power for precise regulation of the DC bus voltage, battery charging, and Main Inverter regulated output power.

- B. Input Current Total Harmonic Distortion: The input current THDI shall be held to 6% or less at full system, while providing conditioned power to the critical load bus, and charging the batteries under steady-state operating conditions. This shall be true while supporting loads of both a linear or non-linear type. This shall be accomplished with no additional filters, magnetic devices, or other components.
- C. Soft-Start Operation: As a standard feature, the UPS shall contain soft-start functionality, capable of limiting the input current from 0-100% of the nominal input over a default 15 second period, when returning to the AC utility source from battery operation. The change in current over the change in time shall take place in a linear manner throughout the entire operation. ($di/dt = \text{constant}$).
- D. Magnetization Inrush Current: The UPS shall exhibit 0 inrush current as a standard product. If provided with an optional isolation transformer or PDU/System Bypass, system inrush shall be limited to 6 times the nominal input current of the transformer.
- E. Input Current Limit:
 - 1. The input converter shall control and limit the input current draw from utility to 150% of the UPS output. During conditions where input current limit is active, the UPS shall be able to support 100% load, charge batteries at 10% of the UPS output rating, and provide voltage regulation with mains deviation of up to +/15% of the nominal input voltage.
 - 2. In cases where the source voltage to the UPS is nominal and the applied UPS load is equal to or less than 100% of UPS capacity, input current shall not exceed 126% of UPS output current, while providing full battery recharge power and importing necessary power for system losses.
- F. Redundancy: The UPS shall be configured with redundant input converters, each with semiconductor fusing, and logic controlled contactors to remove a failed module from the input bus.
- G. Charging:
 - 1. The battery charging shall keep the DC bus float voltage of +/- 220v, +/-1%.
 - 2. The battery charging circuit shall contain a temperature compensation circuit, which will regulate the battery charging to optimize battery life.
 - 3. The battery charging circuit shall remain active when in Static Bypass and in Normal Operation.
- H. Back-feed Protection: The above-mentioned logic controlled contactor also provides the back-feed protection required by UL1778.

2.05 OUTPUT INVERTER

- A. The UPS output inverter shall constantly recreate the UPS output voltage waveform by converting the DC bus voltage to AC voltage through a set of IGBT driven power converters. In both normal operation and battery operation, the output inverters shall create an output voltage independent of the mains input voltage. Input voltage anomalies such as brown-outs, spikes, surges, sags, and outages shall not affect the amplitude or sinusoidal nature of the recreated output voltage sine wave delivered by the output inverters.
- B. Overload Capability: The output power converters shall be capable of 300% for short-circuit clearing. Steady-state overload conditions, of up to 150% of system capacity, shall be sustained by the inverter for 30 seconds in normal and battery operation. Should overloads persist past the outlined time limitation, the critical load will be switched to the automatic static bypass output of the UPS.
- C. Output Contactor: The output inverter shall be provided with an output mechanical contactor to provide physical isolation of the inverter from the critical bus. With this feature a failed inverter shall be removed from the critical bus.
- D. H.Battery Protection: The inverter shall be provided with monitoring and control circuits to limit the level of discharge on the battery system.
- E. Redundancy: The UPS shall be configured with redundant output inverters, each with semiconductor fusing, and logic controlled contactors to remove a failed component from the critical bus.

2.06 STATIC BYPASS

- A. As part of the UPS, a system static bypass switch shall be provided. The system static bypass shall provide no break transfer of the critical load from the Inverter output to the static bypass input source during times where maintenance is required, or the inverter can not support the critical bus. Such times may be due to prolonged or severe overloads, or UPS failure. The UPS and static bypass switch shall constantly monitor the auxiliary contacts of their respective circuit breakers, as well as the bypass source voltage, and inhibit potentially unsuccessful transfers to static bypass from taking place.
- B. The design of the static switch power path shall consist of Silicon Controlled Rectifiers (SCR) with a continuous duty rating of 125% of the UPS output rating.
- C. Automatic Transfers: An automatic transfer of load to static bypass shall take place whenever the load on the critical bus exceeds the overload rating of the UPS. Automatic transfers of the critical load from static bypass back to normal operation shall take place when the overload condition is removed from the critical bus output of the system. Automatic transfers of load to static bypass shall also take place if for any reason the UPS cannot support the critical bus.

- D. Manual Transfers: Manually initiated transfers to and from static bypass shall be initiated through the UPS display interface.
- E. Overloads: The static bypass shall be rated and capable of handling overloads equal to or less than 125% of the rated system output continuously. For instantaneous overloads caused by inrush current from magnetic devices, or short circuit conditions, the static bypass shall be capable of sustaining overloads of 1000% of system capacity for periods of up to 500 milliseconds.
- F. Modularity: The static bypass switch shall be of a modular design.
- G. System Protection: As a requirement of UL1778, back-feed protection in the static bypass circuit shall also be incorporated in the system design. To achieve back-feed protection, a mechanical contactor in series with the bypass SCR(s) shall be controlled by the UPS/static switch, to open immediately upon sensing a condition where back-feeding of the static switch by any source connected to the critical output bus of the system is occurring. One such condition could be a result of a shorted SCR.

2.07 DISPLAY AND CONTROLS

- A. Control Logic: The UPS shall be controlled by two fully redundant, user-replaceable / hot-swappable control modules. These modules shall have separate, optically isolated, communication paths to the power and static switch modules. Logic power for the control modules shall be derived from redundant power supplies, each having a separate AC and DC input and output. The communication of the control modules shall be of Controller Area Network (CAN Bus).
- B. Display Unit: A microprocessor controlled display unit shall be located on a hinged door in the front of the system. The display shall consist of an alphanumeric display with backlight, an alarm LED, and a keypad consisting of pushbutton switches.
- C. Metered Data: The following metered data, shall be available on the alphanumeric display:
 - 1. Year, Month, Day, Hour, Minute, Second of occurring events
 - 2. Source Input Voltage
 - 3. Output AC voltage
 - 4. Output AC current
 - 5. Input Frequency
 - 6. Battery voltage
 - 7. Internal Battery temperature
- D. Event log: The display unit shall allow the user to display a time and date stamped log of the 64 most recent status and alarm events.

E. Alarms: The display unit shall allow the user to display a log of all active alarms. The following minimum set of alarm conditions shall be available:

1. Input Frequency outside configured range
2. AC adequate for UPS but not for Bypass
3. Low/No AC input, startup on battery
4. Intelligence Module inserted
5. Intelligence Module removed
6. Redundant Intelligence Module inserted
7. Redundant Intelligence Module removed
8. Number of Batteries changed since last ON
9. Number of Power Modules changed since last ON
10. Number of Batteries increased
11. Number of Batteries decreased
12. Number of Power Modules increased
13. Number of Power Modules decreased
14. Number of External Battery Cabinets increased
15. Number of External Battery Cabinets decreased
16. Redundancy Restored
17. Need Battery Replacement
18. The Redundant Intelligence Module is in control
19. UPS Fault
20. On Battery
21. Shutdown or unable to transfer to battery due to overload
22. Load Shutdown from Bypass.
23. Input Frequency Volts outside limits
24. Fault, Internal Temp exceeded system normal limits
25. Input Circuit Breaker Open
26. System level fan failed
27. Bad Battery Module
28. Bad Power Module
29. Intelligence Module is installed and failed
30. Redundant Intelligence Module is installed and failed
31. Redundancy has been lost
32. Redundancy is below alarm threshold
33. Runtime is below alarm threshold
34. Load is above alarm threshold
35. Load is no longer above alarm Threshold
36. Minimum Runtime restored
37. Bypass is not in range (either frequency or voltage)
38. Backfeed contactor stuck in OFF position
39. Backfeed contactor stuck in ON position
40. UPS in Bypass due to Internal Fault
41. UPS in Bypass due to overload
42. System in Forced Bypass
43. Fault, Bypass Relay Malfunction
44. Q001 open/closed
45. Q002 open/closed

46. Q003 open/closed
47. High DC Warning
48. High DC Shutdown
49. Low Battery Shutdown
50. Low Battery Warning

F. Controls: The following controls or programming functions shall be accomplished by use of the display unit. Pushbutton membrane switches shall facilitate these operations.

1. Silence audible Alarm
2. Set the alphanumeric display language
3. Display or set the date and time
4. Enable or disable the automatic restart feature
5. Transfer critical load to and from static bypass
6. Test battery condition on demand
7. Set intervals for automatic battery tests
8. Adjust set points for different alarms
9. Program the parameters for remote shutdown.

G. Potential Free (Dry) Contacts

1. The following potential free contacts shall be available on an optional relay interface board:
 - a. Normal Operation
 - b. Battery Operation
 - c. Bypass Operation
 - d. Common Fault
 - e. Low Battery
 - f. UPS Off

H. Communication Interface Board: A communication interface board shall provide the following communication ports which can be used simultaneously:

1. RS232 Serial Port #1
2. RJ-45 Interface port for a Remote Display

2.08 BATTERY

- A. The UPS battery shall be of modular construction made up of user replaceable, hot swappable, fused, battery modules. Each battery module shall be monitored for voltage and temperature for use by the UPS battery diagnostic, and temperature compensated charger circuitry.
- B. The battery jars housed within each removable battery module shall be of the Valve Regulated Lead Acid (VRLA) type.
- C. The UPS shall incorporate a battery management system to continuously monitor the health of each removable battery module. This system shall notify the user in the event that a failed or weak battery module is found.

PART 3 — ACCESSORIES

3.01 BATTERY DISCONNECT BREAKER

- A. Each UPS system shall have a 250 VDC rated, thermal magnetic trip molded case circuit breaker. Each circuit breaker shall be equipped shunt trip mechanisms and 1A/1B auxiliary contacts. The circuit breakers are to be located within the UPS enclosure or as part of a line-up-and-match type battery cabinet.

3.02 PDU/SYSTEM BYPASS

- A. The PDU/system bypass cabinet shall provide power to the critical load from the bypass source, during times where maintenance or service of the UPS is required. The PDU/System bypass shall provide a mechanical means of complete isolation of the UPS from the critical output distribution. The PDU/System bypass shall be constructed in a Standard 30 inch wide 36 inch deep 42U High, IT Rack Style enclosure.
- B. As a minimum, the PDU/system bypass shall contain the following features and accessories:
 1. Appropriately rated circuit breakers to fully isolate the UPS during times where maintenance is required. As a part of this design there shall be a UPS input circuit breaker designated as Q1, a UPS output circuit breaker designated as Q2, and a wrap-around maintenance bypass circuit breaker designated as Q3 and an input circuit breaker to the UPS static bypass labeled as Q10. For PDU/system bypass panels equipped with an input transformer, there shall also be a molded case switch to isolate the transformer primary windings from the mains input to the system. Minimum 1A/1B auxiliary contacts for the purpose of relaying status information of each circuit breaker / switch actuator to the UPS and PDU/system bypass shall be provided, along with a means of locking out the circuit breakers to inhibit operation of the bypass transfer pair. The PDU/System Bypass shall be available for a 208V, 480V, or 600V input.
 2. Also included in the PDU/system bypass shall be a 42 pole distribution panelboard connected to the output bus of the PDU/system bypass to serve as critical load distribution.
 3. For purposes of providing local annunciation of status and alarm messages, the PDU/system bypass shall have an alphanumeric display with pushbutton switches, allowing retrieval of active alarms, system level programming, and event history of the PDU/system bypass. For purposes of simplicity and ease of use, the PDU/system bypass display shall be identical in nature to that of the InfraStruXur^e™ 80kW UPS.

4. The PDU/system bypass shall also have a full-length hinged front door, with locking mechanism, to allow access to the panelboard circuit breakers and "three breaker" type maintenance bypass circuit breakers. There shall also be a hinged rear door to allow access to the main input 42 pole panelboard.
5. Mimic Bus—The PDU/system bypass shall bear a full mimic diagram inside the hinged front door. Also associated with the mimic panel shall be indicating lights, capable of depicting proper operation of maintenance bypass circuit breaker and UPS output circuit breaker.

C. The following minimum options shall also be available for the PDU/system bypass:

1. Load Test Port—For ease of load bank testing the system, a "cam lock" type load bank test port shall be available to allow use of a portable load bank to be connected to the system, without having to remove dead-fronts or gain access to live bus work or circuit breakers. A load bank shall be available with a properly configured connector on flexible cord to facilitate ease of use.
2. Branch Circuit Monitoring—Each pole of each circuit breaker shall be monitored, and report the load current drawn on each circuit breaker pole to a common infrastructure management system. Values metered by branch circuit monitoring shall be available through a web based browsing system and shall be incorporated into the same monitoring system as the other components within this specification.
3. Cross-Tie Circuit Breaker —In systems configured as 2N, an optional cross-tie circuit breaker shall be available. This circuit breaker shall allow a PDU/System Bypass transformer on an "A Bus" to feed the static bypass input of a UPS on the "B Bus" for purposes of fault tolerance.

3.03 EXTENDED RUN (XR) BATTERY SOLUTIONS

For purposes of providing extended UPS back-up power, extended runtime battery enclosures shall be available. For ease of maintenance the extended runtime battery enclosures, shall house draw-out battery cartridges. These cartridges shall conform to OSHA lifting requirements for one person to replace battery cartridges without lifting tools or additional mechanisms. Battery cartridges shall interlock in place within the battery enclosure to ensure proper contact. When withdrawing a battery cartridge, a catch shall stop the battery cartridge from inadvertently being withdrawn in an unsafe manner. The Extended Run Battery solution shall be housed in a standard, 24 inch wide, 36 inch deep, 42U high equipment racks. Up to (3) Extended Run Battery enclosures may be added for increased battery runtime.

3.04 RACK MOUNT POWER DISTRIBUTION UNITS

For purposes of distributing power within an IT enclosure, rack mount power distribution units shall be available for installation within the IT enclosure. The rack mount power distribution units shall be capable of being installed in the back of the accompanying enclosure to consume zero U space in the front of the rack, and shall not require tools for installation within the rack.

- A. Input Connection—For ease of installation, the Rack Mount PDU shall be connected via a twist lock connector, and shall be capable of being fed from agency approved flexible corded distribution wiring as described in section 3.6 of this specification. The input shall be capable of being served by 208Y120 Volts from an L21-20 type NEMA connector. A hard wired version of the product shall also be available as an option and shall be capable of being fed from a three-pole 20 Amp circuit breaker.
- B. Output Connections—The output of the Rack Mount PDU shall be fed from 208Y120Volts, and shall be distributed to receptacles capable of supplying power to cord connected equipment. Assuming Rack Mount PDU is fed from a circuit breaker with an 80% continuous rating, a single Rack Mount PDU shall be capable of distributing up to 5.7kW in a single rack.
- C. Options
 - 1. Phase metering—The current of each input phase of the Rack Mount PDU shall be monitored, displayed locally on an illuminated seven segment display, and reported through a built in Web/SNMP interface.
 - 2. Outlet Management - The outlets of the Rack Mount PDU shall have managed switched capability as an option. The current of each input phase of the Rack Mount PDU shall be monitored, displayed locally on an illuminated seven segment display, and reported through a built in Web/SNMP interface. The Web/SNMP interface will also be used to manage and control the outlet receptacles.

3.05 RACK MOUNT TRANSFER SWITCHES

For purposes of providing redundancy (to single corded loads) as far as the equipment rack, and the load itself, 1U rack mount transfer switches shall be available. Rack mount transfer switches shall be capable of switching a combination of single-phase and three-phase loads

up to 5.7kW. The Rack Mount Transfer Switch shall be designed to be fed from a 3 pole 20A circuit breaker via a NEMA L21-20 receptacle or cord cap.

3.06 OVERHEAD DISTRIBUTION

- A. Flexible Distribution Conductors—For purposes of overhead distribution wiring of datacenter branch circuits, flexible conductors of either an SJO type, or TC type shall be available as a distribution means. Flexible conductors shall be equipped with NEMA or IEC style cord caps and shall be agency approved under UL60950 as part of the InfraStruxure™ system.
- B. Cable Ladder—For purposes of routing data and power cables between rows in a datacenter aisle layout, cable ladders shall be available to span the gap between rows. Cable ladders shall be agency approved under UL60950 as part of the InfraStruXure™ system. The use of over head cable management shall minimize the need to run data and power cable beneath a raised floor, thus minimizing potential air flow obstructions for down-flow type precision cooling solutions. This means of cable management shall also facilitate ease of installation of power and data cabling in datacenters not utilizing raised floor. Optional covers shall be available for ladders as a means of adhering to local codes requiring such.
- C. Cable Trough—For purposes of routing data and power cable along the length of a row of IT enclosures in a data center environment, cable troughs shall be available as a means of separating and housing data and power cable. Optional covers shall be available for troughs as a means of adhering to local codes requiring such. The use of over head cable management shall minimize the need to run data and power cable beneath a raised floor, thus minimizing potential air flow obstructions for down-flow type precision cooling solutions. This means of cable management shall also facilitate ease of installation of power and data cabling in datacenters not utilizing raised floor.

3.07 RACKMOUNT DISTRIBUTION PANEL

For ease of distribution, a panel board with 39 available poles shall be housed in an enclosure of like color and construction to the InfraStruXure™ product line. This panel shall be mounted in a Netshelter VX enclosure for ease of integration into the datacenter environment. The RDP shall be fed from panel board circuit breaker(s) located on a 42 pole panel that is housed within the PDU/System Bypass, RPP, or other listed distribution means outlined in this specification.

3.08 REMOTE POWER PANEL (RPP)

For purposes of wiring convenience, Remote Power Panels (RPP) shall be available to take a single feed from the PDU/System Bypass output, and distribute power to the critical load. A total of two 42 pole panelboards shall be housed in the RPP to distribute a combination of single-phase and three-phase load equipment.

- A. Branch Circuit Monitoring—Branch Circuit Monitoring shall be available as outlined in section 3.2 of this specification.
- B. InfraStruXure™ Manager—RPP shall be fully compatible with InfraStruXure™ Manager, management system as outlined in section 3.15 of this specification.

3.09 INFORMATION TECHNOLOGY (IT) ENCLOSURE

IT enclosures shall be available for housing of customer supplied IT equipment. Enclosures shall be listed under the same UL60950 agency approval as other products outlined within this specification.

A. General Requirements

- 1. The Enclosure shall be designed to provide a secure, managed environment for computer and networking equipment.
- 2. The Enclosure shall conform to EIA-310 Standard for Cabinets, Racks, Panel and Associated Equipment and accommodate industry standard 19" rack mount equipment.
- 3. The Enclosure shall be designed with four (4) vertical posts to allow rack mount equipment installation utilizing four (4) vertical mounting rails.
- 4. The Enclosure shall be available with a vertical equipment mounting space of 25U, 42U or 47U. (1U=1.75" or 44.45mm).
- 5. A four-post open frame configuration shall be available with 42U vertical equipment mounting space.

B. Physical Requirements

- 1. External Width Dimensions shall be 597mm (23.5") for 19" rack enclosures, and 747mm (29.4") for 23" rack enclosure.
- 2. External Depth Dimensions shall be 900mm (35.4") or 1070mm (42.2").
- 3. Rack enclosures of a 42U design shall have a maximum external height of 2070mm (81.5") to allow passage through a standard 7ft. (84") doorway without tipping.
- 4. Rack enclosure shall support a dynamic load (rolling on castors) of 909kG (2000 lbs.) total weight.
- 5. Rack enclosure shall also be designed and manufactured to be matching in both color and construction to the UPS, PDU/System bypass and extended runtime battery enclosures to provide a uniform and consistent appearance in a datacenter environment.

C. Equipment Access and Mounting

1. The enclosure shall provide [25U] [42U] [47U] of equipment vertical mounting space.
2. The vertical mounting rails shall be adjustable to allow different mounting depths.
3. Front and rear doors of the enclosure shall be designed with quick release hinges allowing for easy detachment without the use of tools.

3.010 FLOOR ANCHOR BRACKETS

Floor Anchor brackets shall be available to solidly connect UPS, PDU/System Bypass, and Battery Enclosure to minimize unintended moving of the equipment.

3.011 SEISMIC FLOOR STANDS

Seismic rated floor stands shall be available to take the place of supporting the PDU/system bypass, UPS, and Battery Enclosures on a raised floor environment. Floor Stands shall be available in custom heights to maintain a flush mount installation adjacent to the raised floor, and shall be designed in accordance to the equipment weight and contact points.

3.012 SOFTWARE AND CONNECTIVITY

A. Network Adaptor: The Ethernet Web/SNMP Adaptor shall allow one or more network management systems (NMS) to monitor and manage the UPS in TCP/IP network environments. The management information base (MIB) shall be provided in DOS and UNIX "tar" formats. The SNMP interface adaptor shall be connected to the UPS via the RS232 serial port on the standard communication interface board.

B. Unattended Shutdown

1. The System, in conjunction with a network interface card, shall be capable of gracefully shutting down one or more operating systems during when the UPS is on reserve mode.
2. The System shall also be capable of using an RS232 port to communicate by means of serial communications to gracefully shut down one or more operating systems during an on battery situation.

3.013 REMOTE SYSETEM MONITORING

A. The following three methods of remote UPS monitoring shall be available:

1. Web Monitoring: Remotemonitoringshallbeavailableviaawebrowsersuchas Internet Explorer.
2. RS232 Monitoring: Remote UPS monitoring shall be possible via either RS232 or contact closure signals from the UPS.
3. Simple Network Management Protocol (SNMP): Remote UPS Monitoring shall be possible through a standard MIB II compliant platform.

3.014 SOFTWARE COMPATIBILITY

- A. The UPS manufacturer shall have available software to support graceful shutdown and remote monitoring for the following systems:
1. Microsoft Windows 95/98/XP
 2. Microsoft Windows NT 4.0 SP6/2000
 3. OS/2
 4. Netware 3.2 - 5.1
 5. MAC OS 9.04, 9.22, 10
 6. Digital Unix/True 64
 7. SGI 6.0-6.5
 8. SCO UNIX
 9. SVR4 2.3, 2.41
 10. SCO Unix Ware 7.0 - 7.11
 11. SUN Solaris 2.6-2.8
 12. SUN OS 4.13, 4.14
 13. IBM AIX 4.3x-4.33g, 5.1
 14. HP-UX 9.x-11.i
 15. Linux

3.015 INFRASTRUXURE MANAGER

For purposes of complete system monitoring and management of all components outlined in this specification, there shall be a centralized manager, hereafter referred to as ISX Manager.

- A. Monitoring—ISX Manager shall be capable of monitoring all products in this specification including, UPS, PDU/System Bypass, Extended Run Battery Enclosures, and rack level distribution options through a network of category 5 cable and a 24 port hub, supplied by the UPS manufacturer. This 24 port hub shall relay information to the ISX Manager, which in turn shall allow access to this information via the user's public network via a single IP address.
- B. Monitored Values—ISX Manager shall be capable of monitoring alarms, general status parameters, voltage and current of products outlined in section 3.15.A. of this specification.
- C. Thresholds—For individualized customer needs, ISX Manager shall allow for user configurable thresholds for alarm notification. With this feature ISX Manager can notify clients of reaching thresholds for UPS capacity, PDU capacity, or branch circuit breaker capacity. Other custom programmable alarm points for non- APC products shall also be available via dry contact input signal.
- D. Public Network Monitoring —The ISX Manager shall also be capable of monitoring other APC devices that are connected to the client's public network.

PART 4 — EXECUTION

4.01 FACTORY ASSISTED START-UP

If a factory assisted UPS start-up is requested, factory trained service personnel shall perform the following inspections, test procedures, and on-site training:

A. Visual Inspection:

1. Inspect equipment for signs of damage.
2. Verify installation per manufacturer s instructions.
3. Inspect cabinets for foreign objects.
4. Inspect Battery Units.
5. Inspect Power Modules.

B. Mechanical Inspection:

1. Check all UPS and external maintenance bypass cabinet internal control wiring connections.
2. Check all UPS and external maintenance bypass cabinet internal power wiring connections.
3. Check all UPS and external maintenance bypass cabinet terminal screws, nuts, and/or spade lugs for tightness.

C. Electrical Inspection:

1. Verify correct input and bypass voltage.
2. Verify correct phase rotation of all mains connections.
3. Verify correct UPS control wiring and terminations.
4. Verify voltage of all battery modules.
5. Inspect external maintenance bypass switch for proper terminations and phasing.

D. Site Testing:

1. Ensure proper system start-up.
2. Verify proper firmware control functions.
3. Verify proper firmware bypass operation.
4. Verify proper maintenance bypass switch operation.
5. Verify system set points.
6. Verify proper inverter operation and regulation circuits.
7. Simulate utility power failure.
8. Verify proper charger operation.
9. Document, sign, and date all test results.

E. On-Site Operational Training: During the factory assisted start-up, operational training for site personnel shall include key pad operation, LED indicators, start-up and shutdown procedures, maintenance bypass and AC disconnect operation, and alarm information.

4.02 MANUFACTURER FIELD SERVICE

- A. Worldwide service: The UPS manufacturer shall have a worldwide service organization Available, consisting of factory trained field service personnel to perform start-up, preventative maintenance, and service of the UPS system and power equipment. The service organization shall offer 24 hours a day, 7 days a week, 365 days a year service support.
- B. Replacement parts: Parts shall be available through the worldwide service organization 24 hours a day, 7 days a week, and 365 days a year. The worldwide service organization shall be capable of shipping parts within 4 working hours or on the next available flight, so that the parts may be delivered to the customer site within 24 hours.

4.03 MAINTENANCE CONTRACTS

A complete offering of preventative and full service maintenance contracts for the UPS system and the battery system shall be available. All contract work shall be performed by APC factory trained service personnel.

4.04 TRAINING

UPS service training workshop: A UPS service training workshop shall be available from the UPS manufacturer. The service training workshop shall include a combination of lecture and practical instruction with hands-on laboratory sessions. The service training workshop shall include instruction about safety procedures, UPS operational theory, sub-assembly identification and operation, system controls and adjustment, preventative maintenance, and troubleshooting.

End of Section

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