

A large red chevron graphic on the left side of the page, pointing to the right. It consists of three stacked, downward-pointing triangles.

MasterSwitch VM
Power Distribution Unit

AP9222
AP9222EXP

User's Guide

APC[®]

Thank You!

Thank you for selecting the APC MasterSwitch VM (vertical-mount) power distribution unit (PDU). It has been designed for many years of reliable, maintenance-free service. APC is dedicated to the development of high-performance electrical power conversion and control products. We hope that you will find this product a valuable, convenient addition to your system.

Please read this manual! It provides important configuration and operating instructions that will help you get the most from your MasterSwitch VM power distribution unit. See the *Installation and Quick Start Manual* included with MasterSwitch VM and on this CD for more detailed information on installing and setting up the unit.

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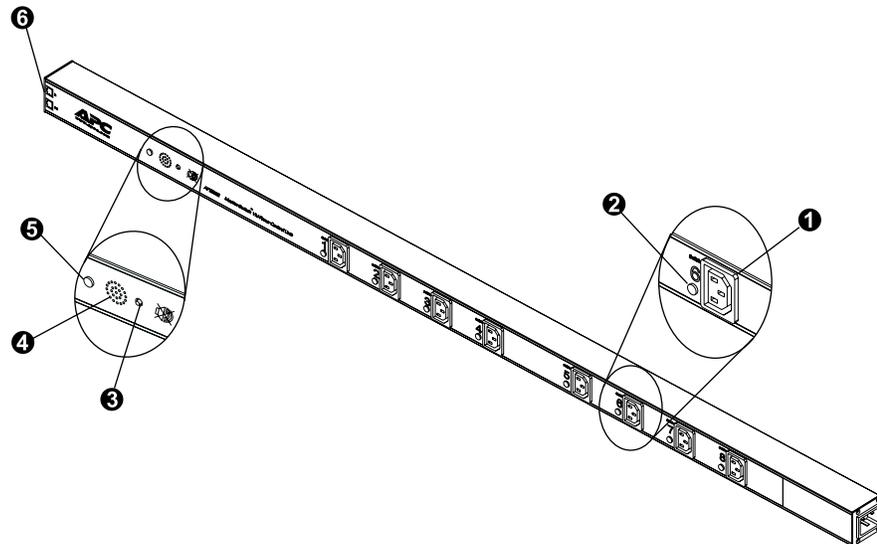
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APC® MasterSwitch VM

Introduction

Product Description

MasterSwitch VM



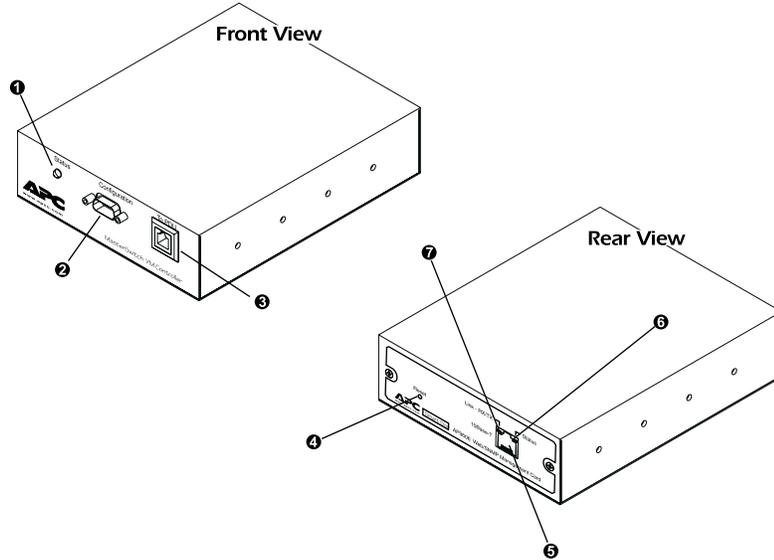
No.	Feature	Description
❶	Switched outlet	Provides individually managed power control to outlets.
❷	Outlet status LED	Indicates the state of the switched outlet.
❸	Overcurrent alarm silence button	Silences the audible alarm.
❹	Overcurrent audible alarm	Alerts you to an overload on the MasterSwitch VM unit.
❺	Overcurrent alarm LED	Indicates an overload on the MasterSwitch VM unit.
❻	Modular ports (RJ11)	Connects a unit to the controller or to another unit.

Continued on next page

Introduction

Product Description *continued*

MasterSwitch VM Controller



No.	Feature	Description
❶	Status LED	Indicates the status of the connection with the unit.
❷	Configuration Port	Connects the unit to a serial port on a device running the appropriate terminal emulation software in order to access the Control Console.
❸	Modular port (RJ11)	Connects the unit to an Ethernet LAN for configuration or remote access control.
❹	Reset Button	Re-initializes the MasterSwitch VM network interface without affecting outlet state.
❺	10Base-T network port	Connects the unit to an Ethernet LAN for configuration or remote access control.
❻	Status LED	Indicates the status of the management card.
❼	Link-RX/TX LED	Indicates the status of the Ethernet LAN connection.

Continued on next page

Introduction

Product Description *continued*

LEDs

LED	Status	Description
MasterSwitch VM Outlets page 1 , Item 2	On	The Outlet is on.
	Off	The Outlet is off.
MasterSwitch VM Overcurrent Alarm page 1 , Item 5	Off	The unit has no power.
	Green	The unit is operating under normal load conditions.
	Flashing green	The unit is approaching its maximum load. (Warning threshold exceeded)
MasterSwitch VM Controller Front Status page 2 , Item 1	On	The Controller has power.
	Off	The Controller has no power.
MasterSwitch VM Controller Rear Status page 2 , Item 6	Off	The unit has no power.
	Solid green	The unit has valid network settings.
	Flashing green	The unit does not have valid network settings.
	Solid red	A hardware failure has been detected in the unit.
MasterSwitch VM Controller Rear Link-RX/TX page 2 , Item 7	Off	The device which connects the unit to the network (whether a router, hub, or concentrator) is off or not operating correctly.
	Flashing Green	The unit is receiving data packets from the network.

Introduction

Operating MasterSwitch VM

Initial setup

You must configure the network settings of MasterSwitch VM before it can operate on a network. The required settings are:

- IP address of MasterSwitch VM
- Subnet Mask
- IP address of the default gateway

Note: If a default gateway is not present, enter an IP address of a computer on the same subnet that is always active.

For instructions on configuring the MasterSwitch VM network settings, see the installation manual included with the unit and on the CD. After you have configured MasterSwitch VM, no further configuration is required. The remaining MasterSwitch VM properties are pre-configured at the factory. However, you may want to customize these properties for your application. See **Menu Items on page 14** for more details on changing MasterSwitch VM properties.

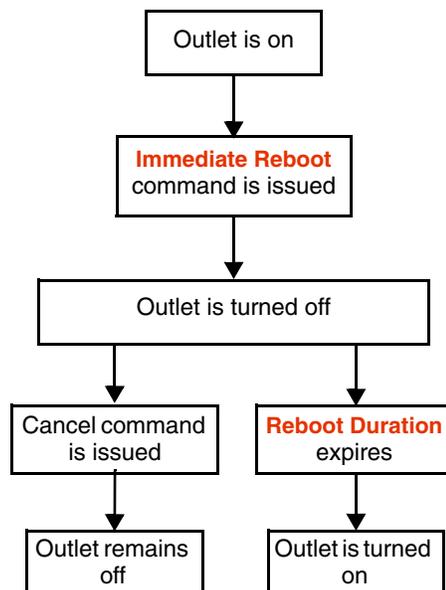
Configuring outlets for operation

MasterSwitch VM allows you to configure an outlet for on-demand operation. On-demand operation consists of On, Off, and Reboot Outlet Control Actions. The sections that follow describe each operation that you can configure for your MasterSwitch VM unit.

Immediate On. This action immediately turns an outlet on.

Immediate Off. This action immediately turns an outlet off.

Immediate Reboot. This action immediately turns an outlet off, and then turns it back on after the outlet's Reboot Duration expires.

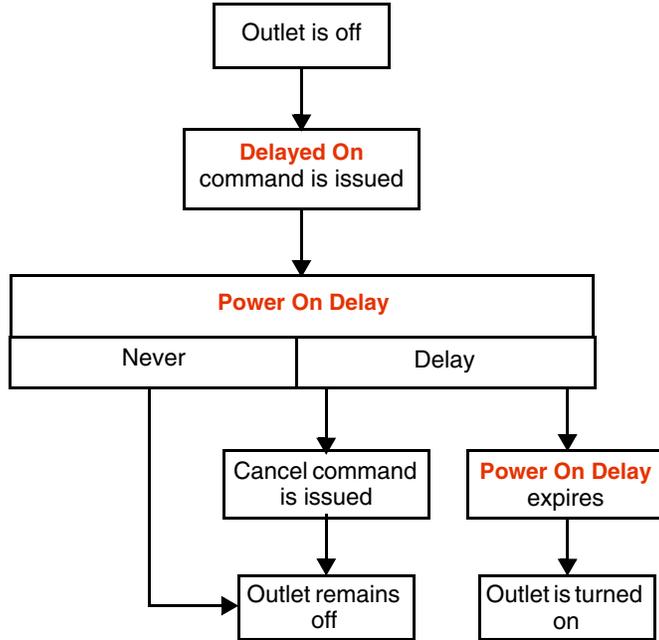


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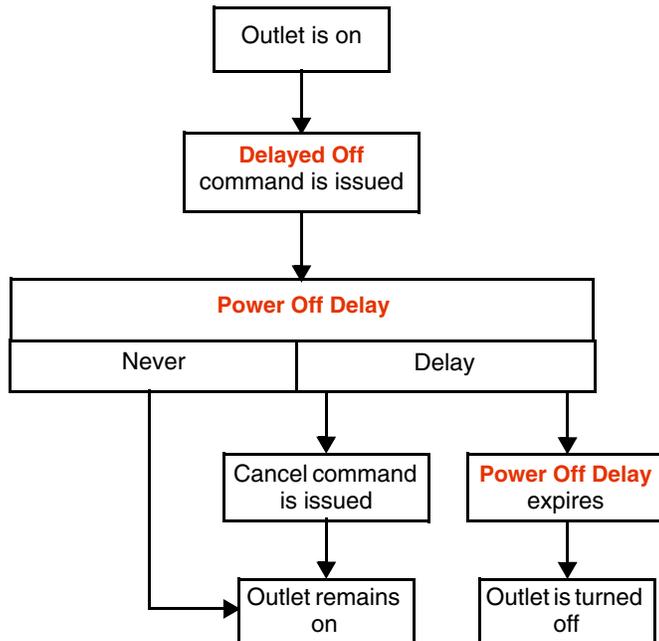
Operating MasterSwitch VM *continued*

Configuring outlets for operation, continued

Delayed On. This action turns on an outlet according to its Power On Delay.



Delayed Off. This action turns off an outlet according to its Power Off Delay.



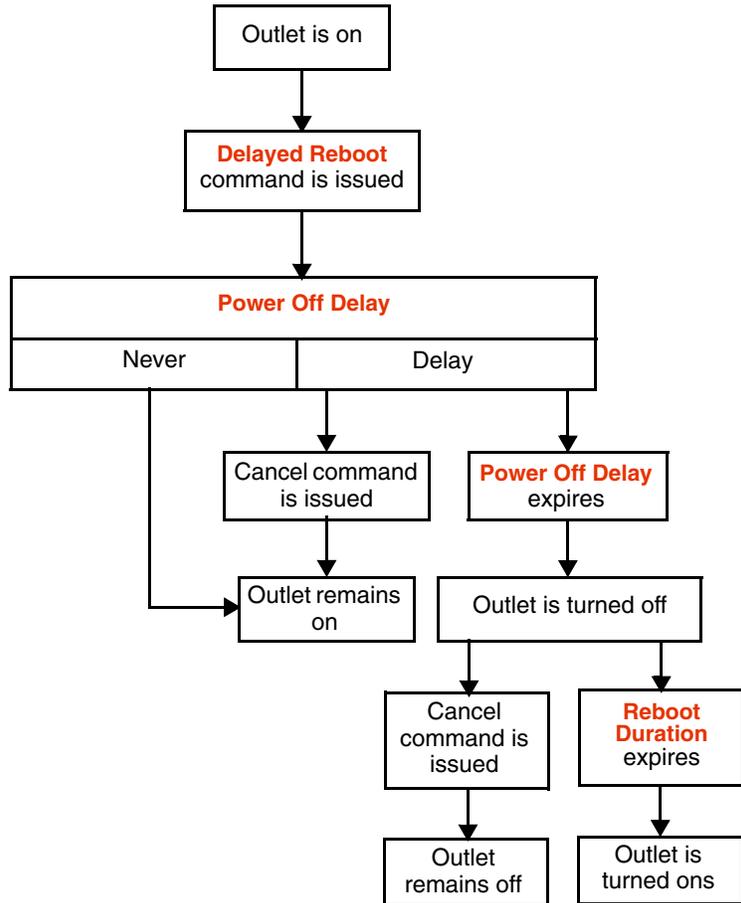
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Introduction

Operating MasterSwitch VM *continued*

Configuring outlets for operation, continued

Delayed Reboot. This action turns an outlet off after the outlet's Power Off Delay expires. Once the outlet's Reboot Duration expires, the outlet is turned on.



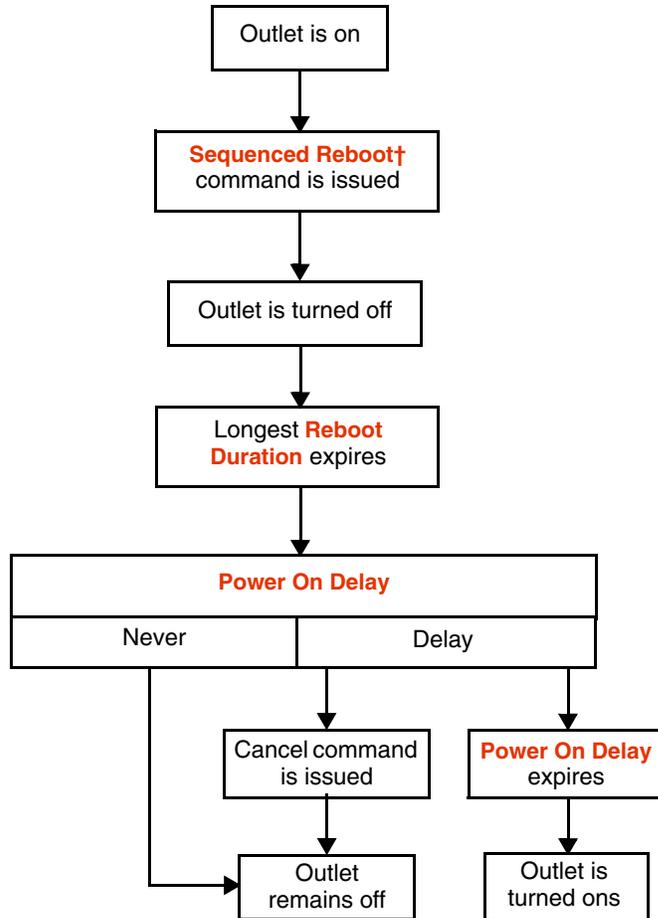
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Introduction

Operating MasterSwitch VM *continued*

Configuring outlets for operation, *continued*

Sequenced Reboot. This action is available only through Master Outlet Control. Initiating this action immediately powers off all outlets. Each outlet will wait the longest Reboot Duration time (in seconds) in the set of outlets on a MasterSwitch VM unit plus its own Power On Delay. When these two delays expire, the outlet will be turned on.



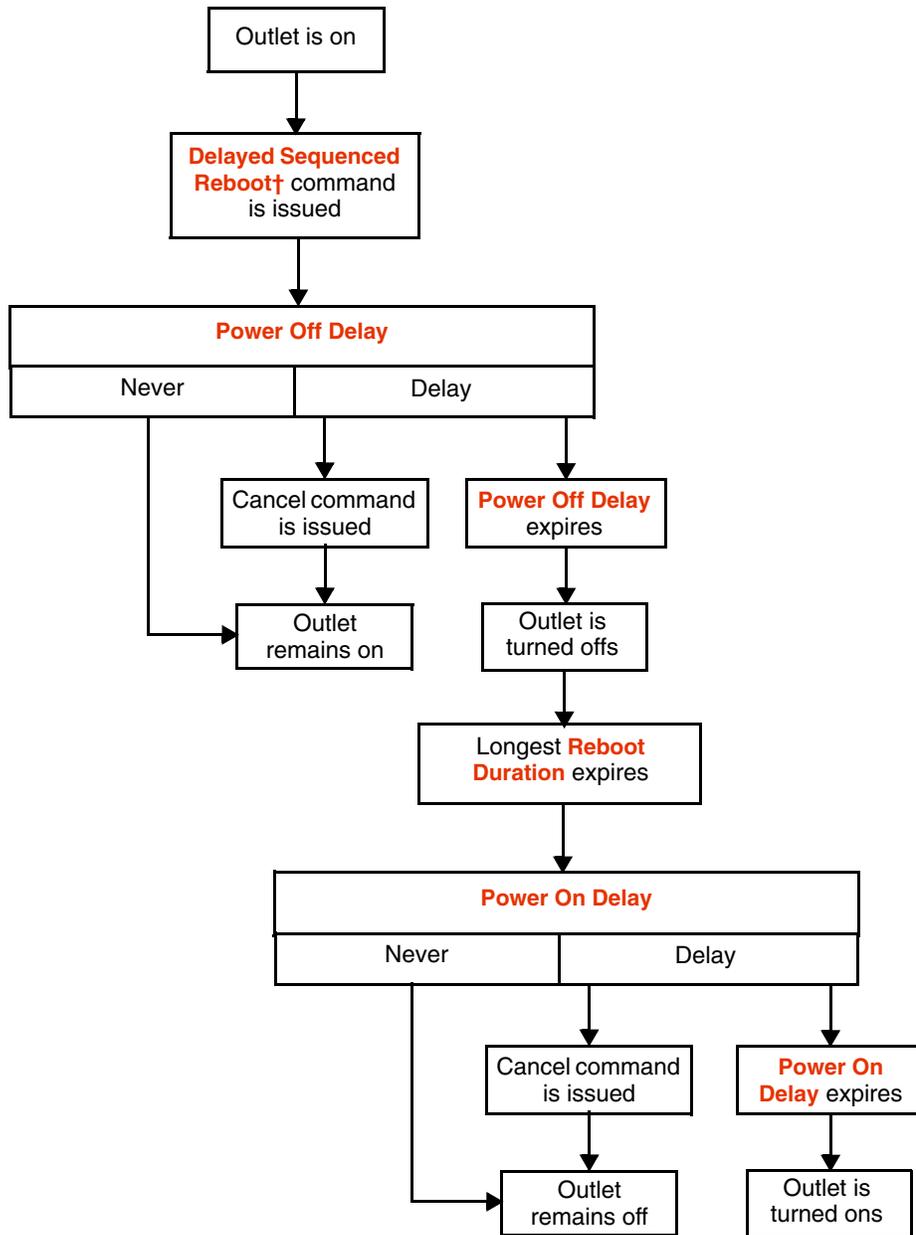
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Introduction

Operating MasterSwitch VM *continued*

Configuring outlets for operation, *continued*

Delayed Sequenced Reboot. This action is available only through Master Outlet Control. Initiating this action turns off outlets after their Power Off Delay expires. Once all the outlets on the unit are turned off, each outlet will wait the longest Reboot Duration time in the set of outlets plus its own Power On Delay. When these two delays expire, the outlet will be turned on.



Introduction

Operating MasterSwitch VM *continued*

Current sensing

Each MasterSwitch VM unit is equipped with a sensor that measures the total current being used by the unit and devices connected to the unit. The current measurement is displayed on the first screen that appears when you log on and is used to generate alarms that you define. The values displayed are:

- The aggregate current
- A percentage of the branch circuit rating, which is derived using the following formula:

$$\left(\frac{\text{Number of Amps Consumed}}{\text{Branch Circuit Rating (20 A)}} \right) \times 100$$

In the Unit Configuration section of the MasterSwitch VM menu, you can define Overload Outlet Restrictions, conditions that generate an Overload Audible Alarm, and the Low Current Threshold. (See **Unit Configuration on page 16** for a detailed description of the items listed in the menu.)



Do not exceed the maximum voltage and current ratings listed on the label on the back of the unit.

Overload Outlet Restrictions

Outlet Restrictions prevents users from turning on outlets when the current sensor detects an overload condition. The following restrictions can be set for each unit:

- None** Outlets always turn on.
- On Warning** Outlets do not turn on when the Overload Warning Threshold has been exceeded.
- On Overload** Outlets do not turn on when the full load percentage exceeds 100%.

Overload Audible Alarm

You can customize the Overload Audible Alarm so that it never sounds, it sounds when the load exceeds 100%, or it sounds when the load exceeds its Overload Warning Threshold. The value for the Overload Warning Threshold can be set at a value that you determine based on the needs of your system. If the Overload Audible Alarm is set to On Overload Warning and the load exceeds the Overload Warning Threshold, the Overload Warning LED flashes green and the alarm sounds.

Low Current Threshold

In addition to monitoring for overload conditions, the current sensor monitors for low-current conditions. If current drops below the Low Current Threshold that you have defined, the unit generates an SNMP trap to alert the host computer.

Note: This item is available only in the SNMP interface.

Managing MasterSwitch VM

Management Interfaces

Overview

After you have configured MasterSwitch VM with the proper network settings (see **Initial setup on page 4**), you can manage MasterSwitch VM remotely through its Web, Control Console, and SNMP interfaces. You can also manage locally on the Control Console through a serial connection. Only one user at a time can access MasterSwitch VM. Serial connections (using a terminal emulator) have precedence over Telnet users, and Telnet users have precedence over Web users.

Web interface

To access and log on to the MasterSwitch VM unit's Web interface perform these steps:

In the URL Location field, do one of the following:

- If the MasterSwitch VM unit's Web port is set to the default value of 80, type `http://` followed by the MasterSwitch VM unit's IP address. The following example shows a typical IP address:
- If the MasterSwitch VM Web port is set to a value other than the default of 80, enter the System IP address (the IP address of the MasterSwitch VM unit) followed by a colon and the configured Web Port value (8000 in the following example):

```
http://170.241.17.51
```

```
http://170.241.17.51:8000
```

- You can also enter the DNS name—this requires a DNS server entry for the MasterSwitch VM unit. See the example below:

```
http://MasterSwitchVM25
```

Respond to the username and password prompts. The default Administrator user name and password are both *apc*, all lowercase.

Note: You can change the user name, password, and time-out values in the System menu. See **User Manager on page 23** and **Outlet User Manager on page 24** for more information.

Note: Some Web interface features (data verification, APC Interactive Assistant, and MD5 authentication) require that you enable JavaScript and/or Java. In order for MD5 to function properly you must also have cookies enabled on your Web browser.

Continued on next page

Managing MasterSwitch VM

Management Interfaces *continued*

Control Console interface

In addition to using the Web, you can also manage MasterSwitch VM through the Control Console by one of the following modes of access:

- Telnet, for remote management
- A serial connection, for local management.

Telnet. To access the MasterSwitch VM unit's Control Console using Telnet:

1. Start a Telnet session and choose Remote System from the Connect pull-down menu.
2. Type in the IP address of the MasterSwitch VM unit.
3. Click on the Connect button.

Serial connection. To access the Control Console using a serial connection:

1. Use the supplied configuration cable (APC part number 940-0024C) to connect your serial port to the configuration port on the MasterSwitch VM Controller.
2. Set the terminal port for the following communication settings:

Item	Setting
Baud Rate	2400
Data Bits	8
Stop Bits	1
Parity	None
Handshaking	None
Local Echo	Off
Terminal Type	ANSI (VT100)

Logging on. The procedure for logging on to the Control Console is the same for both Telnet and a serial connection; respond to the user name and password prompts. The default values of Administrator name and password are both *apc*, all lowercase. You can change the username, password and time-out values through the System menu. See **User Manager on page 23**.

Structure. All menus in the Control Console list items by number and name. To select an item, type in the number and press ENTER. For menus that configure values, always use the **Accept Changes** option to save any changes you have made.

Continued on next page

Managing MasterSwitch VM

Management Interfaces *continued*

SNMP interface

MasterSwitch VM fully supports SNMP—all unit and outlet properties are configurable through SNMP. For instructions on how to use SNMP to manage MasterSwitch VM, see the *Mibguide.pdf* file in the **Snm** folder on the CD.

Auto-configuring MasterSwitch VM

Unit properties, outlet properties, and user accounts can be downloaded to MasterSwitch VM from a configuration file. For details on auto-configuring your MasterSwitch VM unit(s), open the *README.txt* file in the **apcConfigUtility** directory on the CD. You can also find additional information on the I2C utility on page 15 of the *Management Card Addendum.pdf* located on the CD.

Managing MasterSwitch VM

Password-Protected Accounts

Overview

MasterSwitch VM provides three types of password-protected accounts that allow you to control access to the MasterSwitch VM unit. Each type of account provides a different level of access to the management menus. There is one Administrator account, one Device Manager account, and up to 16 Outlet User accounts.

Account access to outlets and menu items

Administrator and Device Manager accounts have access to all outlets. Each Outlet User only has access to the outlets assigned to his or her account. The Administrator account can configure and manage all other accounts. For instructions on configuring Device Manager and Outlet User accounts, see [User Manager on page 23](#) and [Outlet User Manager on page 24](#).

MasterSwitch VM Main Menu Items	Account Type		
	Administrator	Device Manager	Outlet User
Outlets	Yes	Yes	Yes
MasterSwitch VM	Yes	Yes	No
Event Log	Yes	Yes	No
Network	Yes	No	No
System	Yes	No	No
Logout	Yes	Yes	Yes
Help	Yes	Yes	Yes
Links	Yes	Yes	Yes

Menu Items

Outlets

Control actions

Outlet Control Actions may be performed on individual outlets (by Individual Outlet Control) or on all accessible outlets as a group (by Master Outlet Control). A Control Action can only be applied to an outlet that is not executing a command. If there is a command pending, the State will be displayed orange.

Item	Definition
Immediate On	Turns outlet on.
Immediate Off	Turns outlet off.
Immediate Reboot	Turns off the outlet immediately, waits the outlet's Reboot Duration time, and turns the outlet back on. For further explanation, see the Immediate Reboot sequence diagram on page 4 .
Delayed On	Turns on the outlet according to its Power On Delay. For further explanation, see the Delayed On sequence diagram on page 5 .
Delayed Off	Turns off the outlet according to its Power Off Delay. For further explanation, see the Delayed Off sequence diagram on page 5 .
Sequenced Reboot†	Immediately powers off all outlets. Each outlet waits the longest Reboot Duration time plus its own Power On Delay and then turns on. Note: The longest Reboot Duration is the longest Reboot Duration (in seconds) in the set of outlets.
Delayed Reboot	Turns an outlet off after the outlet's Power Off Delay expires. Once the outlet's Reboot Duration expires, the outlet is turned on. For further explanation, see the Delayed Reboot sequence diagram on page 7 .
Delayed Sequenced Reboot†	Turns off each outlet after its Power Off Delay. Once the outlets are turned off, each outlet waits the longest Reboot Duration time plus its own Power On Delay. When this delay expires, the outlet turns on. Note: The longest Reboot Duration is the longest Reboot Duration (in seconds) in the set of outlets.
Cancel	Cancel all pending commands for the outlet(s). Note: Outlet State is displayed in orange with an asterisk (*) when a command is pending for the outlet(s).

† Applies only when using Master Outlet Control

Continued on next page

Menu Items

Outlets *continued*

Synchronized set configuration

Outlets that are members of a synchronization set will all execute the same control action simultaneously (within 16 milliseconds). In a configuration where multiple redundant power cords are being used in a daisy-chain configuration, this feature permits synchronized switching across units.

When you configure a synchronization set, you can assign an outlet to only one set, and all the outlets in a specified set assume the characteristics of the lowest numbered outlet. If you make changes to any of the outlets in a given set, all of the outlets will take on the new characteristics.

Item	Definition
Set Number	Identifies a specific set of outlets.
Member Outlets	Identifies the outlets assigned to a given set.

Note: In the Outlets menu, you can identify the synchronization set to which an outlet belongs by the number in brackets. For example:

```
(unit #: outlet # [synchronization set #])
```

Menu Items

MasterSwitch VM

Unit Configuration

Item	Definition
Name	Name of the MasterSwitch VM unit (23 characters maximum).
Cold Start Delay	The time that MasterSwitch VM will delay in applying power to outlets, once the AC power is applied to the MasterSwitch VM unit.
Overload Warning Threshold	The percentage of a full load that will trigger an overload warning. An overload warning will cause the overcurrent alarm LED to flash green and sound the audible alarm (if the overload audible alarm property is configured to do so).
Overload Outlet Restrictions	The overload conditions, if any, that will prevent outlets from turning on. The following actions are available under this item: None —Always allow outlets to be turned on. On Warning —Do not allow outlets to be turned on when the Overload Warning Threshold has been exceeded. On Overload —Do not allow outlets to be turned on when the load exceeds 100%.
Overload Audible Alarm	The overload conditions, if any, that will cause the audible alarm to sound. Once the alarm starts sounding, you can use the mute button to turn off the alarm or you can clear the alarm; selecting Disabled will not clear the alarm. The following actions are available under this item: Disabled —Disables the audible alarm. On Overload —Sounds the audible alarm when the load exceeds 100%. On Overload Warning —Sounds the audible alarm when the load exceeds the Overload Warning Threshold. Note: When you change settings, the new setting is not used until the next time the event occurs. For example, if the overload warning Threshold has been exceeded and the setting is then changed from On Overload to On Warning, the audible alarm will not be activated.
Low Current Threshold	The threshold for load current below which an SNMP trap is generated..
Reboot Duration	Longest reboot duration in the set of accessible outlets. You can change this value only by modifying the reboot duration of accessible outlets. Used by Sequenced Reboot and Delayed Sequenced Reboot.

Continued on next page

Menu Items

MasterSwitch VM *continued*

Outlet Configuration

Item	Definition
Outlet	Identifies each outlet, the unit to which the outlet is connected, and the synchronization set to which it belongs. This information appears in the following form: unit #:outlet # [synchronization set #]
Name	Identifies each outlet (23 characters maximum).
Power On Delay	The time that the outlet waits before turning on after the command is issued. Used by Delayed On, Sequenced Reboot, and Delayed Sequenced Reboot.
Power Off Delay	The time that the outlet waits before turning off after the command is issued. Used by Delayed Off, Delayed Reboot, and Delayed Sequenced Reboot.
Reboot Duration	The time that the outlet will remain off during a reboot. Used by Immediate Reboot and Delayed Reboot.

Outlet Configuration: Links

Item	Definition
Outlet	Identifies each outlet, the unit to which the outlet is connected, and the synchronization set to which it belongs. This information appears in the following form: unit #:outlet # [synchronization set #]
Name	Identifies the outlet (23 characters maximum).
Link	Defines HTTP links to relevant Web sites.

Menu Items

Event Log

Event Log

The Event Log displays the MasterSwitch VM unit's last 300 events. You can view the Event Log by selecting the Event Log menu in the Web interface or by pressing CTRL + L in the Control Console.

Item	Description
Date	Date the event occurred (DD/MM/YYYY)
Time	Time the event occurred (HH:MM:SS)
Event	Description of the event.

Accessing the Event Log using the FTP interface

You can retrieve the Event Log using client side FTP. (For example, from an MS-DOS prompt, type `ftp card-ip` where *card-ip* is the IP address of your MasterSwitch VM unit.) After logging into the unit's FTP server, type `dir`. You will see a listing similar to the following:

```
ftp>dir
200 Command okay.
150 Opening data connection for /.
--wx-wx-wx 1 apc apc 262144 Jul 23 2000
aos253.bin
--wx-wx-wx 1 apc apc 458752 Jul 23 2000
msp202.bin
-r--r--r-- 1 apc apc 4096 Jul 29 2000 event.txt
226 Closing data connection.
ftp: 194 bytes received in 0.00Seconds
194000.00Kbytes/sec.
ftp>
```

Continued on next page

Menu Items

Event Log *continued*

Retrieving the Event Log using the FTP interface

To retrieve the Event Log, type `get event.txt`. The MasterSwitch VM unit will transmit the Event Log to your specified drive. The unit ensures that at least the last 300 events will be transmitted. You will see a list similar to the following:

```
ftp>get event.txt
200 Command okay.
150 Opening data connection for event.txt
226 Closing data connection.
ftp: 3694 bytes received in 0.11Seconds
33.58Kbytes/sec.
ftp>
```

Viewing the Event Log

After retrieving the **event.txt** file, you can view it using a spreadsheet. The file is TAB delimited so it will format automatically into columns.

Note: The MasterSwitch VM unit always uses four-digit year representation when logging and displaying event data. However, you may need to select a four-digit date format in the spreadsheet to display all four digits.

The **event.txt** file includes the following information not directly shown in the Web and Control Console Event Log screens:

- The version of the **event.txt** file format (first field).
- The Date and Time the **event.txt** file was retrieved.
- The Name, Contact, Location, and IP address of the unit's management card.
- An unique Event Code for every type of event.

Deleting an Event Log in the FTP interface

To delete the Event Log, type `del event.txt`. No confirmation is required. A new **event.txt** file is created immediately in response to the Deleted Log event. You will see a list similar to the following:

```
ftp>del event.txt
250 Requested file action okay, completed.
ftp>
```

Menu Items

Network

TCP/IP

Item	Description
System IP	The IP address of the unit
Subnet Mask	The network subnet mask
Default Gateway	The local default gateway (router address)
BOOTP	Enables or disables BOOTP requests for TCP/IP settings at startup.

TFTP/FTP

Item	Definition
TFTP Client	
Remote Server IP	The network address of the TFTP server used for downloads.
FTP Client	
Remote Server IP	The network address of the FTP server used for downloads.
User Name	The user name for access to the FTP server.
Password	The password for access to the FTP server.
FTP Server	
Access	Enable or Disable FTP server access.
Port	The TCP/IP port on which the FTP server for the Management Card is located. Default: port 21

Continued on next page

Menu Items

Network *continued*

Telnet/Web

Item	Definition
Telnet	
Access	Enables or Disables Telnet Access.
Port	The TCP/IP port where the Telnet server for the MasterSwitch VM unit is located. Default: port 23
Web	
Access	Enables or Disables Web Access.
Port	The TCP/IP port where the Web server for the MasterSwitch VM unit is located. Default: port 80

SNMP

Item	Definition
SNMP Access	Enables or disables SNMP access.
Access Control	Controls access to each of the four SNMP channels.
Trap Receiver	Defines the NMSs (up to 4) to which traps are sent.

SNMP: Access Control

Item	Definition
Community Name	The password that the NMS (identified by the NMS IP option) must use for SNMP access to MasterSwitch VM. The allowed access type is defined by the Access Type option (15 characters maximum).
NMS IP	Limits access to the NMS or NMSs specified. You specify the value as a specific IP address for one NMS or as an IP address filter for multiple IP addresses. For example: <ul style="list-style-type: none">• 159.215.12.1 allows only the NMS with the specific IP address of 159.215.12.1 to have access.• 159.215.12.255 allows access for any NMS on the 159.215.12 segment.• 159.215.255.255 allows access for any NMS on the 159.215 segment.• 159.255.255.255 allows access for any NMS on the 159 segment.• 0.0.0.0 or 255.255.255.255 allows access for any NMS.
Access Type	Defines whether an NMS (identified by the NMS IP option) has Write access (can GETs and SETs), has Read access (can only GETs), or is Disabled (cannot use GETs or SETs).

Continued on next page

Menu Items

Network *continued*

SNMP: Trap Receiver

Item	Definition
Community Name	The password the unit uses when it sends traps to the NMS identified by the Receiver NMS IP option (15 character maximum).
Receiver NMS IP	The IP address of the NMS that will receive traps sent by the unit. Note: To send no traps to any NMS, set the Trap Receiver IP to 0.0.0.0.
Trap Generation	Enables or disables the ability of the unit to send traps to the NMS identified by the Receiver NMS IP option.
Authentication Traps	Enables or disables the ability of the unit to send authentication traps to the NMS identified by the Receiver NMS IP.

Menu Items

System

User Manager

The properties of the Administrator and Device Manager are configured under the User Manager section. The Administrator has unrestricted access, but the Device Manager can configure only the MasterSwitch VM unit; the Device Manager cannot configure Network and System items.

Item	Definition
Auto Logout	How long a user can be inactive before being logged off automatically. Default: 3 minutes.
Authentication	A setting of Basic causes the Web Interface to use standard HTTP 1.1 login (base64 encoded passwords); MD5 causes the Web Interface to use an MD5-based authentication login. In order for MD5 to function properly, you must enable cookies in your browser. Default: Basic
Administrator	
User Name	User name (10 characters maximum). Default: apc
Password	Password for HTTP 1.1 authentication only (10 characters maximum). Default: apc
Authentication Phrase	Authentication phrase (for MD5 only). The phrase must be 15 to 32 characters. Default: admin user phrase
Device Manager User	
User Name	User name (10 characters maximum). Default: device
Password	Password only for HTTP 1.1 authentication (10 characters maximum). Default: apc
Authentication Phrase	Authentication phrase for MD5 only. The phrase must be 15 to 32 characters. Default: device user phrase

Continued on next page

Menu Items

System continued

Outlet User Manager

You can create up to 16 independent Outlet User accounts for the MasterSwitch VM unit. Each Outlet User is assigned a unique user name, password, description, and an outlet access list, as described below.

Current Outlet User List. The list shows the existing outlet user accounts and the outlets to which they have access. To edit an existing account, click on the underlined user name. To add a user, select **Add New User**.

Configure the Outlet User Account Settings. Once you have selected an Outlet User Account, you can configure or delete an account. The following table lists and defines the configurable settings for Outlet User Manager.

Item	Definition
User Name	Outlet user name for both HTTP 1.1 and MD5 authentication (10 characters maximum). Note: A User Name in orange indicates the user account has been disabled.
Password	Outlet user password for HTTP 1.1 authentication (10 characters maximum).
Authentication Phrase	Outlet user authentication phrase for MD5 authentication. The phrase must be 15–32 characters.
User Description	Identification/description of the outlet user (30 characters maximum).
Account Status	Enables, disables, or deletes an outlet's account. Note: A disabled account prevents the Outlet User of the account from logging on. The User Name appears in orange if the account has been disabled.
MasterSwitch VM Outlet Access	Selects the outlets to which users have access.
Delete User	Deletes an outlet's account.

Continued on next page

Menu Items

System continued

Identification

Item	Definition
Name	The system name used to identify the device. This name will be used for the sysName OID in the SNMP agent.
Contact	The contact or owner of the device. This will be used for the sysContact OID in the SNMP agent.
Location	The physical location of the device. This will be used for the sysLocation OID in the SNMP agent.

Date/Time

Item	Definition
Date	The date for the system in the form of: MM/DD/YY.
Time	The time for the system in the form of: HH:MM:SS (24 hour time).

File Transfer

Item	Description
Describe the Current Transfer Settings	
Remote TFTP Server IP	The IP address of the remote TFTP server defined in the Network menu's TFTP/FTP settings. TFTP: Remote Server IP
Remote FTP Server IP	The IP address of the remote FTP server defined in the Network menu's TFTP/FTP settings. FTP: Remote Server IP
Remote FTP Server User Name	The user name of the FTP server defined in the Network menu's TFTP/FTP settings. FTP Client: User Name
Remote FTP Server Password	The password of the FTP server defined in the Network menu's TFTP/FTP settings. FTP Client: Password
Configure the Name of the File to Download	
Filename	The name of the file to be downloaded
Initiate the File Transfer	
Result of Last File Transfer	Displays the result of the last file transfer.
Initiate File Transfer Via	Allows you to choose whether the file will be transferred using TFTP or FTP

Menu Items

System continued

Tools

Item	Definition
No Action	Causes no action
Reboot Card	Restarts the management card operation, but does not affect MasterSwitch VM outlet states.
Reset Card to Defaults	Restores all configuration settings, including user accounts, to their default. Warning: This will reset the TCP/IP settings and enable BOOTP!
Reset Card to Defaults Except TCP/IP	Restores all configuration settings (except TCP/IP) to their defaults.

Links

Item	Definition
Configure each User Link (up to 3)	
Name	The link name that will appear on the menu bar.
URL	The HTTP link in URL form: <i>http://mysite.com/mypage.com</i> .
Configure the APC Links	
Name	View the name of an APC link.
URL	Define the URL of each APC link.

Note: The hyperlinks are defined and used only in the MasterSwitch VM Web interface.

Menu Items

Help

Overview

MasterSwitch provides help menus on each interface. On the Web interface, the help menu is located on the lower, left side of the screen or as a button (?) on the black title bars. In the Control Console, type ? to access the Help menu.

Contents

The Contents screen provides an overview of many parameters reported and configured through the Web and Control Console interfaces. To access the internal help pages, select Help in the navigation frame in the Web interface, or click the ? at the end of the black title bars in the Control Console.

About Card

About Card provides the following information about the MasterSwitch VM unit: the serial number, the hardware revision, and the date and time that the version of APC OS was loaded.

Security

Security Features

Planning and implementing security features

As a network device that passes information across the network, the MasterSwitch unit is subject to the same exposure as other devices on the network.

Use the information in this section to plan and implement the security features appropriate for your environment.

Port assignments

If a Telnet, FTP, or Web server uses a non-standard port, a user must specify the port when using the client interface, such as a Web browser. The non-standard port address becomes an extra “password,” hiding the server to provide an additional level of security. The TCP ports for which the Telnet, FTP, and Web servers listen are initially set at the standard “well known ports” for the protocols. To hide the interfaces, use any port numbers from 5000 to 65535.

User names, passwords, community names

All user names, passwords, and community names for SNMP are transferred over the network as plain text. A user who is capable of monitoring the network traffic can determine the user names and passwords required to log in to the Administrator, Device Manager, and Outlet User accounts of a MasterSwitch unit’s Control Console or Web interface. This security limitation of the protocols affects any device using Telnet, a Web server, or an SNMP version 1 agent.

Security

Authentication

Authentication versus encryption

The MasterSwitch unit controls access by providing basic authentication through user names, passwords, and IP addresses, but provides no type of encryption. These basic security features are sufficient for most environments, in which sensitive data is not being transferred. To ensure that data and communication between the MasterSwitch unit and the client interfaces, such as Telnet and the Web browser, cannot be captured, you can provide a greater level of security by enabling MD5 authentication (described below) for the Web interface.

MD5 authentication (Web interface)

The Web interface option for MD5 authentication enables a higher level of access security than the basic HTTP authentication scheme. The MD5 scheme is similar to CHAP and PAP remote access protocols. Enabling MD5 implements the following security features:

- The Web server requests a user name and a password phrase (distinct from the password). The user name and password phrase are not transmitted over the network, as they are in basic authentication. Instead, a Java login applet combines the user name, password phrase, and a unique session challenge number to calculate an MD5 hash number. Only the hash number is returned to the server to verify that the user has the correct login information; MD5 authentication does not reveal the login information.
- In addition to the login authentication, each form post for configuration or control operations is authenticated with a unique challenge and hash response.
- After the authentication login, subsequent page access is restricted by IP addresses and a hidden session cookie. (You must have cookies enabled in your browser.) Pages are transmitted in their plain-text form, with no encryption.

If you use MD5 authentication, which is available only for the Web interface, disable the less secure interfaces, including Telnet, FTP, and SNMP. For SNMP, you can disable write-only access so that read access and trap facilities are still available.

Although MD5 authentication provides a much higher level of security than the plain-text access methods, complete protection from security breaches is almost impossible to achieve. Well-configured firewalls are an essential element in an overall security scheme. For additional information on MD5 authentication, see RFC document #1321 at the Web site of the Internet Engineering Task Force. For CHAP, see RFC document #1994.

Continued on next page

Security

Authentication *continued*

Summary of access methods

The following table describes each interface and its access methods.

Interface	Security Access	Notes
Serial Control Console	Access is by user name and password.	Always enabled.
Telnet Control Console	These methods are available: <ul style="list-style-type: none">• User name and password• Selectable server port• Server Enable/Disable	The user name and password are transmitted as plain text.
SNMP	These methods are available: <ul style="list-style-type: none">• Community Name• NMS IP filters• Agent Enable/Disable• Four access communities with read/write/disable capability	NMS IP filters allow access from either one IP address or from multiple IP addresses. You specify multiple NMSs not by their literal IP addresses but in the format of an NMS IP filter. See SNMP: Access Control on page 21 for more information.
FTP Server	These methods are available: <ul style="list-style-type: none">• User name and password• Selectable server port• Server Enable/Disable	Only the Administrator account has access.
Web Server	These methods are available: <ul style="list-style-type: none">• User name and password• Selectable server port• Server Enable/Disable• MD5 Authentication option	In basic HTTP authentication mode, the user name and password are transmitted base-64 encoded (with no encryption). MD5 authentication mode uses a user name and password phrase.

Product Information

Warranty Information

Limited warranty

American Power Conversion (APC) warrants MasterSwitch VM to be free from defects in materials and workmanship for a period of two years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. This warranty does not apply to equipment which has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser.

Obtaining service

To obtain service under warranty you must obtain a returned material authorization (RMA) number from APC or a designated APC service center. Products must be returned to APC or an APC service center with transportation charges prepaid and must be accompanied by a brief description of the problem encountered and proof of date and place of purchase. See **If problems persist on page 32** for more information, including packaging, shipping, and labeling requirements for returned products.

Warranty limitations

Except as provided herein, American Power Conversion makes no warranties, express or implied, including warranties of merchantability and fitness for a particular purpose. Some jurisdictions do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

Except as provided above, in no event will APC be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of this product, even if advised of the possibility of such damage.

Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Product Information

Troubleshooting

If problems persist

For problems not covered in this manual, or if your problem persists, follow this procedure:

1. Note the serial number and date of purchase of the MasterSwitch VM unit. Contact Customer Support at a phone number or address on the back cover of this user guide (see **APC Worldwide Customer Support on page 38**).
2. Be prepared to provide a description of the problem. A technician will help solve the problem over the phone, if possible, or will give you a Return Material Authorization (RMA) number.
3. If the MasterSwitch VM unit is under warranty, repairs or replacement is free of charge. If the warranty has expired, there will be a charge for repair or replacement.
4. Pack the MasterSwitch VM unit carefully to avoid damage in transit. Damage sustained in transit is not covered under the warranty. Enclose a letter in the package with your name, address, RMA number, a copy of the sales receipt, daytime phone number, and check (if applicable).
5. Mark the RMA number clearly on the outside of the shipping carton. The factory will not accept any materials without this marking.
6. Return the MasterSwitch VM unit by insured, prepaid carrier to the address provided by the Customer Support technician.

Product Information

Life-Support Policy

General policy

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

Examples of life-support devices

The term *life-support device* includes but is not limited to neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), autotransfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators (for adults or infants), anesthesia ventilators, infusion pumps, and any other devices designated as “critical” by the U.S. FDA.

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

Product Information

Specifications

Product specifications (AP9222)

The following table shows the product specifications for the MasterSwitch VM power distribution unit (AP9222).

Item	Specification
Electrical	
Input: Nominal input voltage Acceptable input voltage Nominal input frequency Input connector	100–230 VAC 90–250 VAC 50/60 Hz IEC 60320-C20 appliance inlet
Output: Output connectors	8 IEC 60320-C13 individually managed
Maximum total current draw:	Without loads: 0.2 Amps
Physical	
Size (H x W x D)	47.0 x 1.75 x 1.75 in. (119.38 x 4.45 x 4.45 cm)
Weight:	6.0 lb (2.3 kg)
Shipping weight:	8.0 lb (3.6 kg)
Environmental	
Elevation (above MSL): Operating Storage	0 to 10,000 ft (0 to 3000 m) 0 to 50,000 ft (0 to 15 000 m)
Temperature: Operating Storage	32 to 104° F (0 to 40° C) 32 to 113° F (0 to 45° C)
Operating Humidity:	0 to 95%, non-condensing
Approvals	
EMC verification:	FCC Class A, VCCI, CISPR 22 Class A, C-Tick
Safety Agency:	UL, CSA, VDE

Continued on next page

Product Information

Specifications *continued*

Product specifications (AP9221NX166)

The following table shows the product specifications for the MasterSwitch VM Controller (AP9221NX166).

Item	Specification
Electrical	
Input: Nominal input voltage	24 VDC
Maximum total current draw:	0.1 amp @ 24 VDC
Physical	
Size (H x W x D)	1.73 x 5.53 x 6.75 in (4.39 x 14.0 x 17.3 cm)
Weight:	1.69 lb (.766 kg)
Shipping weight:	4.53 lb (2.05 kg)
Environmental	
Elevation (above MSL): Operating Storage	0 to 10,000 ft (0 to 3000 m) 0 to 50,000 ft (0 to 15 000 m)
Temperature: Operating Storage	32 to 104° F (0 to 40° C) 32 to 113° F (0 to 45° C)
Operating Humidity:	0 to 95%, non-condensing
Approvals	
EMC verification:	FCC Class A, VCCI, CISPR 22 Class A, C-Tick
Safety Agency:	UL, CSA, VDE

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APC Worldwide Customer Support

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to find answers to frequently asked questions (FAQs), to access documents in the APC Knowledge Base, and to submit customer support requests.
 - <http://www.apcc.com> (Corporate Headquarters)
Connect by links to APC Web pages for specific countries and regions, each of which provides customer support information.
 - <http://www.apcc.com/support/>
Submit customer support requests.
- Contact an APC Customer Support Center by telephone or e-mail.
 - Regional centers:

APC Headquarters (U.S. and Canada)	(1) (800) 800-4272 (toll free)
Latin America	(1) (401) 789-5735 (United States) apctchla@apcc.com
Europe, Middle East, Africa	(353) (91) 702020 (Ireland) apceurtech@apcc.com
Japan	(03) 5434-2021 jsupport@apcc.com

- Local, country-specific centers: go to <http://www.apcc.com/support/contact> for contact information.
- Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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